

# The SHORT WAVE Magazine

VOL. XXXV

MARCH, 1977

NUMBER 1

## TRIO R-599D



### FOR THE MAN WHO DEMANDS THE BEST

For this man, the choice in amateur band receivers must be the TRIO R599D. This is the receiver packed with features and facilities which make it the most sought after equipment in the amateur market. All band coverage from 160 to 10 metres also includes the 27 MHz CB section and WWV for accurate frequency checks. Provision is made for fitting optional VHF or UHF converters to extend your listening activities and all the converter switching is built in to the receiver so there are no connectors to fiddle around with.

Local stations—loud and clear with the unique TRIO feature of being able to use any filter on any mode. Weak DX; simply switch to AUTO selectivity and the R599D will match the bandwidth to the mode in use. Noise; just switch in the noise blanker to take out impulse interference. Want to read out the frequency? Just use the 25 kHz calibrator to check the dial and read off the frequency in use to better than 1 kHz. The velvet smooth dual reduction dial drive is a joy to handle.

Extensive use of the latest dual gate FET devices endow the R599D with all the sensitivity and freedom from cross modulation that you could wish for. All mode operation is standard, giving AM, USB, LSB, CW and FM with separate detectors for each mode at optimum performance. The AGC time constant can be switched for fast or slow characteristics and can also be turned off for the CW operator. An effective squelch system is fitted for suppressing inter station noise and works on any mode.

The R599D can be used from ac mains supplies or from a 12 volt dc external source using the power cord supplied. Used in conjunction with the matching T599S, you can assemble a station which is second to none.

Contact us soon for full details of the R599D and the other exciting TRIO products. 30p will bring you the full catalogue.

Sole Importers: LOWE ELECTRONICS  
Cavendish Road, Matlock, Derbyshire  
Tel.: Matlock 2817 or 2430

## 5 Band SSB/CW Transceiver TS520

### The Transceiver with everything



#### The TS520 System

TRIO have now completed the first stage of the total system concept for amateur radio equipment. With the TS520 and its associated accessories, the amateur radio operator can assemble a station to suit any or all requirements for his hobby enjoyment. All modes and all bands, fixed and mobile/portable are provided by the TS520 system.

#### SSB/CW Transceiver TS-520

A real "compact"; powerful, rugged and reliable. It has everything which otherwise is available only as an accessory at extra cost; built-in power supply for fixed-station use, transistorized DC/AC power converter for mobile operation, loudspeaker, fixed-channel provisions, VOX control, etc. All these are the TS-520's special features in short format:

**Versatile Transmit- and Receive Operations**—USB, LSB and CW on all radio amateur bands from 80m. to 10m., and—with the aid of the 2m.-Transverter TV-502—also on the VHF-band from 144 to 146 MHz, as well as fixed frequency operation on four channels. The TS-520 also allows reception of WWV stations on 10 MHz for dial calibration. By adding the External VFO-520 (optional) the TS-520 demonstrates utmost versatility: independent RX- and TX operation with different frequencies transceive operation with slightly variable RX frequency by means of the built-in RT circuit (Receiver Incremental Tuning) plus fixed channel operation totaling nine different combinations.

**Advanced Circuitry**—With the exception of the transmitter driver and final stage which are equipped with blower-cooled vacuum valves of type 12BY7A and 2 x 52001 the TS-520 is fully transistorized. The semiconductor complement consists of 44 transistors, 18 FETs, 1 IC and 84 diodes. The reliability and stability of this circuit has been substantiated by numerous contests and during rugged mobile operation.

**Outstanding Receive and Transmit Performance**—The transmitter section of the TS-520 features separate driver, plate and final tuning, a 2-stage ALC circuit for local and DX operation, thus assuring undistorted clearly legible TX signals even after hours of continuous operation. Provisions for linear amplifiers, such as ALC input, antenna relay switching output, etc., are available and ready for use. Dual-gate MOSFETs are employed in all critical receiver circuits to improve the input sensitivity, cross-modulation response and spurious rejection. An 8-pole SSB crystal filter in the IF amplifier provides exceptional selectivity and stability. An optional 500Hz CW filter is available as an accessory and can be installed at any time. The switch-selectable time constant of the AGC assures perfect reception of SSB and CW signals.

**Precision-type VFO**—a feature of all TRIO receivers, transmitters and receivers also contributes to the supreme performance of the TS-520. The VFO is fully encapsulated and is controlled by a meshgear dial drive (reduction ratio 4 : 1). Dial accuracy is better than  $\pm 1$  kHz, frequency drift will not exceed  $\pm 100$ Hz per hour. Dial calibration is accomplished by means of a built-in 25 kHz crystal marker oscillator.

**Built-in Power Supplies**—for fixed station use with 120/240v. AC 50-60Hz line voltage or for mobile operation with 12-13.8v. DC by means of the built-in DC/AC converter.

**Loaded with Extra Features:** threshold-type RF gain control; break-in CW keying with sidetone; VOX/PTT/MOX-control; RIT; TUNE switch; LED function indicators for RIT, VFO and FIX channel operation; WWV receive pushbutton; 4-position fixed channel selector switch; built-in 25kHz crystal marker oscillator; two-stage AGC; multi-function meter; terminals for optional accessories such as: 2m.-Transverter TV-502, External VFO-520, External Speaker SP-520, linear amplifier, headphone, microphone and key.

#### Sole Importers

**LOWE ELECTRONICS**

119 Cavendish Road

Matlock, Derbyshire

Tel.: Matlock 2817/2430

**TS520 £432 inc. VAT**

 **TRIO**

## THE 2 METRE SIDEBAND PACKAGE

# TR7010



If your station is equipped for FM only, and you wonder where other 2 metre operators have gone when conditions are good—just borrow a receiver and listen to the SSB around 144.3. Direct DX contacts with continental stations are commonplace because of the sheer distance covering ability of SSB. With the freedom from channel restrictions and the ability to have multi-station QSO's with ease, SSB capability can add a new dimension to your amateur radio 2 metre operations.

**SSB and CW operation.** Following the well deserved success of the TS700, Trio used its basic design and put together the ideal mobile/fixed station SSB/CW package—the TR7010.

Combining high receiver sensitivity and clean transmitted signal, the TR7010 gives continuous frequency coverage from 144.1—144.335 MHz to cater for CW, SSB, and beacon activity. 48 synthesised 5 kHz channels with VXO and RIT ensure crystal controlled stability with the freedom to move around the band.

**Design expertise.** Both transmitter and receiver in the TR7010 are of the single conversion type using an IF of 10.7 MHz. This gives a clean transmitter signal and a receiver that is free from unwanted image problems. Double balanced mixing is used throughout the transmitter and the carefully tailored audio system in conjunction with a first class crystal filter produces that good signal quality for which TRIO equipment is renowned. The PA stage uses a 30 Watt device which is run at only 20 Watts input to give optimum linearity and protection against misuse.

The construction of the TR7010 follows the rugged reliable package style of the TR7200G—and fits the same mobile mount so that one can fit either rig in the same mounting slide.

Fixed (using the matching PS5 supply), or mobile, the TR7010 is the DX SSB/CW rig for everyone.

### SPECIAL OFFER

Trio have agreed to maintain a special low price for the TR7010. Stocks are limited. Contact us for the current price on this model.

Sole Importers  
**LOWE ELECTRONICS**  
 Cavendish Road  
 Matlock Derbyshire  
 Tel: Matlock 2817/2430



# 70cm by **LOWE** ELECTRONICS

**KF 430**

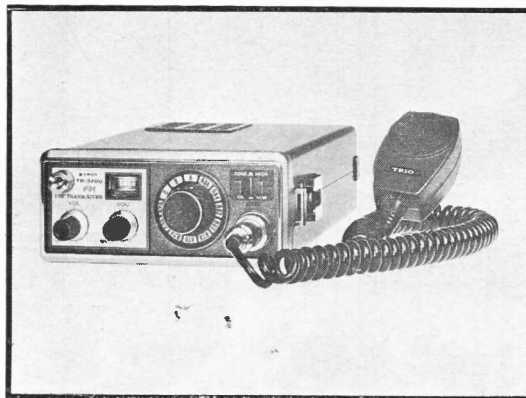
With the advent of many more repeaters on 70 cm. in April as phase 2 of the band plan gets under way, you don't want to be left in the cold by not having a rig ready.

The KF 430 is the ideal mobile rig for 70 cm. operation for many, many reasons. There is the size—only 240 x 85 x 60mm. (or  $9\frac{1}{2}$  x  $3\frac{1}{4}$  x  $2\frac{1}{4}$ " if you still think like me) which will fit into the smallest car. The performance packed into this tiny package is tremendous. Power output is 10 watts with switched reduction to 3 watts if required and the transmitter speech quality is excellent.

The receiver section is very sensitive at 0.4 microvolts for 20 dB quieting and the IF limiting characteristics are first class. The entire receiver front end is enclosed in its own fully screened enclosure, as is the transmitter output section. Multiple tuned circuits ensure a clean output signal at all power levels. All crystals are fitted with individual trimmers for spot on accuracy. The receiver selectivity is to current UK and European standards and the filter response is level.

The KF 430 comes complete with 9 channels factory fitted, automatic tone burst, matching microphone and mobile mount. NOW compare the price with other 70 cm. mobile equipment. Only £202 including VAT. Absolutely unbeatable at any price, the KF 430 is incredible at this level. See it soon.  
\*Small size  $9\frac{1}{2}$  x  $3\frac{1}{4}$  x  $2\frac{1}{4}$ ". \*Light weight only 1.2 Kg. \*Frequency range 433-436 MHz. \*Power output 10W or 3W switched. \*Receive sens. 0.4 microvolts for 20dB quieting. Fitted nine channels and auto tone burst.

£202 including VAT

**TR 3200**

TRIO have always set the pace in the handy portable field starting with the TR 2200 2 metre powerhouse. Following the success on 2 metres, the TRIO TR3200 gives the radio amateur the lead on 70 cm. as well, with all the quality engineering for which TRIO are famous.

The transmitter section of the TR 3200 features the latest semiconductor devices to give a high power output in excess of 2 watts, with switched reduction to 400 mW for local contacts. The audio section has a tailored speech response and an integrated circuit limiting amplifier which, together with a new style miniature microphone, gives that first class speech quality you like.

The sensitive (less than 1 microvolt for 20 dB quieting) double conversion receiver provides an output of more than 0.7 watts into either the built-in speaker or an external speaker or earphone. Multiple filtering at 10.7 MHz and 455 kHz, together with no less than five 455 kHz limiters, guarantees top performance, noise free reception.

A noise detection squelch system allows optimum sensitivity so that you do not miss those weak signals.

Multi function metering provides S meter, RF output meter and battery check facilities at any time.

The TR 3200 has space for 12 channels and is fitted at the factory with crystals for SU8, SU18 and SU20. Most repeater channels are available ex stock. The TR 3200 is fitted with the TRIO exclusive tuning fork controlled tone generator which ensures access first time every time.

The TR3200 comes complete with microphone, carrying case and shoulder strap, removable high gain 5/8 wave antenna, battery charger for the optional Nicad pack and three factory fitted channels. Contact us now for further details of the best portable rig around.

**It was with deepest sorrow that we learned of the death of Austin Forsyth, G6FO. Amateur radio has lost a friend, champion and a man of principle. We should all mourn his passing.**

*Prices are subject to alteration without notice.*

**HEAD OFFICE** 119 Cavendish Road, Matlock, Derbyshire. Tel. 2817 or 2430 9 a.m. to 9 p.m.  
**BRANCH OFFICES** Communications House, Wallington Square, Wallington, Surrey. Tel. 01-669 6700  
 Soho House, 362-4 Soho Road, Handsworth, Birmingham. Tel. 021-554 0708  
 27 Cookridge Street, Leeds. Tel. 0532 452657

**AGENTS** Alan GW3YSA, 35 Pen-Y-Waun, Efail-Isaf, Nr. Pontypridd. Tel. Newton Llantwit 3809  
 John G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex. Tel. Ringmer 812071  
 Sim GM3SAN, 19 Ellismuir Road, Baillieston, Nr. Glasgow. Tel. 041-771 0364

**OPENING HOURS: 9-5.30 TUESDAY TO SATURDAY INCLUSIVE**

**SEND 30p IN STAMPS FOR FULL CATALOGUE OR 50p TO INCLUDE OUR ANTENNA BOOKLET**

# THE TOP TRANSVERTER RANGE

The MMT144/28 pictured below is representative of our current range of professional quality all mode solid state linear Transverters which now comprises ;

- MMT144/28** — 28 MHz to 144 MHz all mode solid state linear Transverter  
**RX** — Gain : 30 dB, Noise Figure : 2.5dB  
**TX** — Required input :  $\frac{1}{2}$  watt. Power output : 10 watts continuous  
**PRICE** — £88.88 inc. VAT
- MMT432/28** — 28 MHz to 432 MHz all mode solid state linear Transverter  
**RX** — Gain : 30dB, Noise Figure : 3.0dB  
**TX** — Required input :  $\frac{1}{2}$  watt. Power output : 10 watts continuous  
**PRICE** — £109.13 inc. VAT
- MMT432/144** — 144 MHz to 432 MHz all mode DOUBLE CONVERSION solid state linear Transverter  
**RX** — Gain : 10dB, Noise Figure : 3.0dB  
 — Separate receive converter output gives independent second receiver facility  
**TX** — Required input : 10 watts (Suitable 10 watt termination network supplied)  
 — Automatic RF VOX minimises interconnection to the transceiver  
 — Power output : 10 watts continuous  
**PRICE** — £149.63 inc. VAT

All three models are designed around latest state of the art devices, and high stability construction techniques are the main theme throughout.

A spurious rejection of better than -65dB is achieved on all models by high-Q circuitry, and the incorporation of ultra-linear amplifier stages ensures the best possible "ON THE AIR" sound.

## FEATURES

- ★ Highly stable zener-controlled oscillator stages
- ★ Latest state of the art front end RF amplifier transistors ensure consistently low noise figures
- ★ PIN diode aerial changeover relay has a through loss of less than 0.2dB
- ★ High quality double sided glass-fibre printed circuit board is incorporated for RF stability
- ★ Separate internal PA compartment ensures excellent electrical and thermal stability
- ★ Low distortion balanced transmit mixers achieve a high degree of linearity and spurious rejection
- ★ By virtue of their linear mode of operation our transverters will accept SSB, FM, AM or CW modes



*For further data on these and our converters, frequency counters etc., please do not hesitate to contact our sales department at your earliest convenience. If you need any technical advice just a phone call will put you in touch with our technical staff.*

**GUARANTEE?** All of our products are fully guaranteed for 12 months

**MICROWAVE MODULES LIMITED**  
**BROOKFIELD DRIVE, AINTREE, LIVERPOOL**  
**L9 7AN**      **TELEPHONE: 051 523 4011**  
**TELEX: 628608 MICRO G**





# South Midlands

TOTTON (H.O.), LEEDS, CHESTERFIELD, LINCS,

**EXTENSION OF SERVICE:** — we take pleasure in announcing that from 1st March, 1977, the old established firm of J. & A. Tweedy Ltd. will combine with South Midlands Communications Ltd.

Any items from the S.M.C. catalogue may now be ordered from Chesterfield, Derbyshire or Woodhall Spa, Lincolnshire.



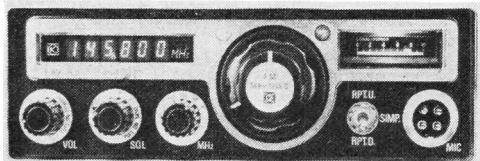
## DIGITAL II from KYOKUTO

SCANNER AND CRYSTAL T.B. OPTIONS

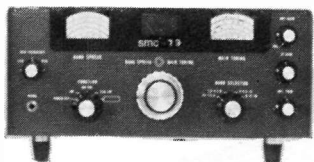
The Digital II offers complete 5 kHz step coverage across 2 metres and now with the Scanner 33, 25 kHz channels from 145 MHz upwards covered in around 10 seconds. It offers full lock and lockout on all channels. The scanner stops on a required channel for 10 seconds, then unless locked moves on. The bright digital readout comes from 6 seven segment 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 6 1/2" x 2" x 7 1/4". Easily undershad mounted with the supplied mounting bracket, or slipped in place of the broadcast wireless.

For strong handling, and low noise the R.F. mixer, first IF (16.9 MHz) second mixer (and LO) are all FET's. The front end is tuned by varicaps by the DC output of the P.L.L. with superb selectivity provided by a 15 pole (±8 kHz at -6dB ±15 kHz at -70dB) Ceramic filter. LED lamps indicate if the P.L.L. is unlocked or the squelch open. The V.C.O. is directly modulated (for exceedingly linear deviation). Unitary 6 circuit board construction (for serviceability and screening). Selective calling socket.



**DIGITAL II £235; CRYSTAL T.B. £10-00; SCANNER £49-50**  
All prices exclude VAT at 12 1/2%



**SMC 73 Ex-Stock £114.50 (+ VAT)**

## The SMC73 General Coverage Receiver

The SMC73 is an all Solid State, mains and 12v., communications receiver covering 550 kHz to 30 MHz in four overlapping ranges. Frequency readout is by two illuminated dials tuned by coaxial spun aluminium knobs, the larger for general coverage, the inner for amateur band (10-80m.) band spread (set by use of internal 3.5 MHz crystal calibrator).

FET's are employed in the R.F. Amplifier, mixer, VFO and BFO (these latter two stages being fed from independent stabilised supplies) ensuring good sensitivity, stability (electrical and mechanical), dynamic range (helped by adjustable RF attenuator), and marked freedom from "pulling" of both the local and beat frequency oscillators. An internal loudspeaker (but with jacks for 'phones and external speaker), illuminated signal meter, SO239 (UHF) coax socket and binding posts for antenna, switchable envelope (AM) and product detectors (SSB/CW) provision on switch for possible fitting of FM demodulator, are all features of this exciting new low price receiver.

## KP202 6 channel 144MHz handheld fully crystallized up

The handheld KP202 with its 2W of RF and 1/2W of audio immunity to image and IF break-through, offers performance to rival all walkie-talkies and many mobile 10W sets. The KP202 is supplied with telescopic whip, leather handle/whip case and F type plug. Accessories include automatic (R channels only) crystal tone burst (£10-00), flexi stubby antenna (£5-75), leather case (£4-75), base charger KCP2a (£11-25), set of 10 ni-cads (£8-50), F to UHF adaptors (£1-45), F plugs, spare whips, spare hods, etc.

SIX CHANNELS fitted S20 and S22 and any 4 of S0, S21, S23, S24, R3, R4, R5, R6, R7 ONLY £104.75 (+ VAT).

## KLM Solid State Mobile Linears



2 metre, SSB/CW/FM, RF sensing with manual override, "Microstripline" 12v. D.C. 10W drive. 2" x 6.5" x 10" (11") (Over 15 different models—S.A.E. details) (VAT 12 1/2%).

PA144/160/BL 145MHz 160W. output £155

## Microwave Modules Transverters



From Ten, Six or Two Metres (a '101 etc., a '620B or a '221R). 10W output, balanced T.X. mixers, low spurious content, high sensitivity with dynamic range (VAT + 12 1/2%) (full converter range stocked S.A.E. details).

MMT 144/28 or 50 2 metres £79-00  
MMT432/28 or 50 70 centimetres £97-00  
MMT432/144 Double conversion £133-00

## Yaesu Clock



Analog clock with automatically advancing 24 hour time zone hour disc giving, at a glance, time in principal cities or time zone. Battery powered, self starting, shock resistant.

QTR24 only £13-00 (VAT + 8%)



**RF SPEECH PROCESSOR KPI2**  
Audio to audio, via 10.7 MHz, mains powered, illuminated meter, FT-101, FT2 plugs suitable all phone models superb on FM.  
£53-50 + 8% VAT  
p. & p. 40p

## CRYSTAL FILTERS AND CRYSTALS P & P 20p. VAT EXTRA @ 12.5%

### YAESU FM CRYSTALS (£3-75 pair)

FT2F, FT2FB, FT2Auto, FT224  
SIMPLEX S (0, 12, 16, 19, 20-24)  
DUPLEX R (0-9) and IR (0-9) (T & R)  
YF30F50 350 Hz F\*101 CW £18  
YF30F600 600 Hz F\*101 CW £18  
YF30F12 12 kHz F\*101 FM £18

### TRIO & STANDARD FM CRYSTALS (£3-75 pair)

TR2200(G), C146A, C826MB  
SIMPLEX S (0, 20-24)  
DUPLEX R (3-7) and IR (3-7) R  
YF90H600 600 kHz 9 MHz CW £16  
YF90H2.4 2.4 kHz 9 MHz SSB £16  
YF90F12 12 kHz 9 MHz FM £18

### YAESU AND OTHER CRYSTALS (£2-20 each)

FT75(B), 38-666, 42, 50.5 MHz  
FT221(R), FT200(B), FT301(S), FT101(EX)  
SSB carrier crystals (HC18/U) 9 & 10.7 MHz  
YF107M600 600 Hz 10.7 MHz CW £16  
YF107M2.4 2.4 kHz 10.7 MHz SSB £16  
YF107M12 12 kHz 10.7 MHz FM £16

SEND A LARGE (10 x 12) SAE OR 15p STAMPS FOR YOUR FREE



## SOUTH MIDLANDS COMMUNICATIONS LTD.

OSBORNE ROAD, TOTTON  
SOUTHAMPTON SO4 4DN  
Hours of business : 9-5.30 ; 9-12.30 Saturday

Head Office, Showrooms  
Cables : Aerial Southampton  
Telex : 477351 SMCOMM G  
Tel: Totton (04216) 2785/3608/4930

### S.M.C. (NORTHERN BRANCH)

"THE CHAMBERS"  
No. 3 THE PARADE,  
NORTH LANE, HEADINGLEY  
LEEDS (0532) 782326

Open : 9-5 Tuesday-Saturday, 9-8 Thursday

# Communications Ltd

AGENTS : ENGLAND, N. IRELAND, SCOTLAND, WALES



## YAESU MUSEN 2 YEAR GUARANTEE '24 HOUR' SECURICOR SERVICES



**FT221R WE THINK IT THE BEST NOW IT COSTS LESS £339 (+VAT 12½%)**

Thanks to our bulk buying policy, we have beaten inflation and the falling pound saving you £22.50 on last year's price! As an added bonus all new SMC FT221Rs cover 4 MHz and are equipped with 600 kHz and 1.6 MHz shifts.

YAESU's state of the art, fully modular, plug in board, automatic mode, 2m. transceiver renders over the board "rats nest" wiring obsolete. A 134 MHz VCO, automatic varicap tuning of transmitter and receiver, gives you an exceedingly clean signal, sensitive receiver combined with good strong signal handling.

### FRI01S — FRI01D — FRI01SD — FRI01DD Ex Stock

The FRI01D (de luxe) wide coverage (23 (from 1.5 MHz) 500 kHz bands + 4 and 2 metres) receiver. Analysis of the signal path shows : 0-20dB switchable attenuator, two section permeability tuned input filter, Mosfet R.F. stage and mixer (crystal controlled), 3 section top coupled bandpass filter, no gain at first, I.F., IC balanced mixer, 20 kHz wide crystal filter, shunt diode noise blanker, single FET buffer stage, AM, CW or SSB (RTTY) filter, appropriate detector and audio stage. Add to this, two excellent VHF converters, squelch, FM detector, 1 kHz readout, excellent stability, Tx monitor control, crystal control facility, switchable AGC, transceive capability (FT or FL, 101) and that digital readout options are available of this (de luxe), or the standard (less the plug in optionals), converters, broadcast band crystals, filters, etc.) version truly an "apparatus communication sine fills" extraordinary.

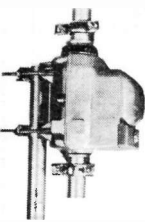


FRI01DD



### THE FT223 NEW LOW COST HIGH QUALITY 2m TRANSCIEVER

23 channels, 12v, DC, 1 or 10W output. Automatic tone burst, supplied complete with hand microphone, and mounting bracket, etc. Provision for sub audible tone squelch. **Ex Stock.**

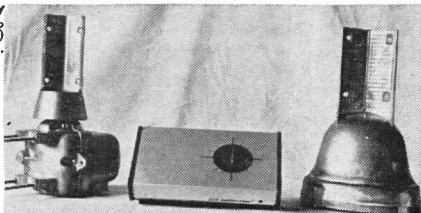


### ROTATORS Ex-Stock in Totton for fast delivery

VAT-Rotators 12½%. Cable and delv. 8% Carriage (BR5 or post) FREE. Securicor delivery £1 extra (mainland) All rotators supplied complete with appropriate control box and instrs.



- AR30 (illus. right near and centre) ... £39.50
- AR40 (illus. right centre and far) ... £46.00
- AR33 (De-luxe control AR40) ... £57.50
- Big Torque sim CD44 Head ... £79.50
- CD44 (C.B. illus. left) med. duty ... £95.00
- Ham II (C.B. illus. left) hy.duty ... £129.00
- 2010/220 Stolle through Rotator ... £41.25
- 2030/220 Stolle de-luxe type ... £45.50
- 5 core—AR30/40/44 2030 per yd. 20p
- 8 core—CD44, Ham II per yd. 32p
- AK121 ... £3.60



- ### CUSHCRAFT VHF OMNI (Carriage 95p) VAT 12½%
- ARX2 Ringo Ranger 145 MHz ... £21.50
  - ARX450 Ringo Ranger 432 MHz ... £21.50
  - AR2 3 dB Ringo Vert. ... £12.75
  - ABW144 2m. Big Wheel ... £14.50
  - AR25 QRC AR2 ... £15.00
  - ABW125 ABW harness ... £7.30
  - CX100029 MHz Ringo ... £25.75
  - ASQ1 2m. Squalo ... £11.75

- ### SMC TRAPPED DIPOLES (Post 45p) VAT 12½%
- S 500V P.I.P. 14 SWG ... £19.60
  - P500W. P.I.P. Cu/Terylene ... £21.75
  - HP IK P.I.P. 14 SWG ... £21.75
  - braid c/w 75' feeder, etc. £21.75

- ### MOSLEY TRI-BAND BEAMS (Carriage £2.50) VAT 12½%
- TA33 3 ele. 200W R.M.S. ... £64.00
  - TA32 2 ele. 300W A.M. ... £44.00
  - MUSTANG 3 ele. ... £82.50
  - MUSTANG 2 ele. I.K.W.A.M. ... £66.00

- ### GEM QUAD FIBREGLASS (Carriage £2.0) VAT 12½%
- GQ3E 2 element ... £119.00
  - GQ4E 4 element ... £238.00
  - GQ3E 3 element ... £178.00
  - CKIQ 1 ele. Conv. kit ... £60.00

- ### G WHIP HF MOBILE (Carriage 90p) VAT 12½%
- Tribander 10-20m. (+LF) £16.10
  - LF 40, 80 or 160 ... £4.87
  - Multimobile 10/20 + MM £19.00
  - MM40, 80 or 160 ... £4.87
  - Flexiwhip 10m. (+ FF) ... £13.35
  - FF15, 20, 40, 80 or 160 ... £5.04
  - Basement ¼" hole mount £2.20
  - Telescopic whip for coils £1.85

- ### AERIAL WIRE (Carriage extra) VAT 8%
- 14 SWG hard drawn Cu. yd. 10p
  - 7/036 cad cu standard ... yd. 13p
  - Cu terylene braid ... yd. 13p
  - 7/044 cad cu standard ... yd. 17p

- ### CABLES RF FEEDERS (Carriage extra) VAT 8%
- RG8/U50 ohm heavy ... yd. 35p
  - 75 ohm flat twin ... yd. 8p
  - UR43 50 ohm solid cent. yd. 15p
  - 300 ohm ribbon ... yd. 9p

- ### ROPES (Carriage extra) VAT 8 %
- 3mm. HT steel ... yd. 13p
  - X150 Rustproof 150m. ... £10.85
  - 3mm. HT steel ... yd. 20p
  - 7 x 18g. Galvanised 100' ... £2.20

YAESU MUSEN CATALOGUE, 22 PAGE STOCK/PRICE, S/H LISTS, ETC.

S.M.C. J. & A. TWEEDY  
79 CHATSWORTH ROAD,  
CHESTERFIELD, DERBY  
Tel.: (0246) 34982  
Open : Tuesday-Saturday 9-5

ELECTRONIC SUPPLIES LTD.  
"HAIN SHACK"  
ROUGHTON LANE,  
WOODHALL SPA, Lincs.  
Tel.: (0526) 52793  
Open :

EVENINGS — AGENTS — ALL QTHR  
G3ZUL Stourbridge (03843) 4510 Brian Kennedy  
G3RTU Darton (022678) 2517 Peter Avill  
GM8DOX B. of Allan (078683) 3223 Ian McKechnie  
GW3TMP Pontybodkin (035287) 846 Howarth Jones  
G13WVY Tandraee (0763) 840656 Mervyn Anderson





# J & A TWEEDY

ELECTRONIC  
SUPPLIES  
LIMITED

## DERBYSHIRE AND LINCOLNSHIRE

We take pleasure in announcing that from the 1st March, 1977 our company will combine with South Midlands Communications Ltd. and it is proposed that the name be changed to S.M.C. (Tweedy) Ltd. Our usual personal service will continue but reinforced with an increased range and larger stocks. Thank you for your patronage in the past, and assuring you of our best attentions in the future.

Signed: J. R. TWEEDY, R. BAINES, B. A. TWEEDY.

### ROGER BAINES, G3YBO

79 CHATSWORTH ROAD,  
CHESTERFIELD, DERBY.

Tel.: (0246) 34982

Open: Tuesday-Saturday 9-5.

PRICES EXCLUDE VAT, 8 or 12½%  
ACCESS - BARCLAYCARD - MAIL ORDER - HP  
Items on this, or other SMC advertisements are available from  
SMC, SMC Leeds, Tweedy and Agents

### JACK TWEEDY, G3ZY

"HAM SHACK"  
ROUGHTON LANE,  
WOODHALL SPA, LINGS.

Tel.: (0526) 52793

Open:

## THE FRG7 GENERAL COVERAGE RECEIVER Ex-Stock UNSURPASSED IN ITS CLASS! NOW DOWN TO £145+VAT!!

The FRG7 is a general coverage solid state receiver with specifications unparalleled in its price range. It uses a Barlow Wadley Triple-mix, drill cancelling loop for continuous, spin-tuned inclusive coverage of 5 to 30 MHz with calibration accuracy better than 5 kHz. Frequency selection is accomplished by setting the RF (pre-selector and range switch), dialling up the required number of megahertz, then tuning the VFO knob as normal.

The receiver is sensitive (0.5µV for 10dB, S + N/N (SSB)) and stable (within 500Hz for any 30 minutes after warm up) with A.M., 5SB and CW modes catered for. A 3 position audio filter, RF attenuator, dial lamp conservation switch, recorder and phone sockets are fitted. It is mains powered, but should the supply fail, or portable operation be required, 8 dry cells are automatically switched in.



## THE FT301 RANGE EX-STOCK—NEW LOW PRICES

The New FT-301 transceiver range (with options installed) offers —Full solid state, 12v. DC working external matching mains power supplies with speaker, and an external VFO are available. Plug in board construction, 160-10m. operation in 500 kHz segments, MSF and CB receive, RF speech processor, noise blanker, front panel controlled VOX (with M.O.X.) and P.P.T., semi break-in keying with side tone, clarifier with separate ON/OFF switch, 11" x 5" x 13½", 25 kHz crystal calibrator, internal VFO or 11 crystal per band (or external VFO with same facility) 3W. audio to internal or external speaker.

## YAESU MUSEN PRICES WITH TWO YEAR GUARANTEE '24 HOUR' SECURICOR DELIVERY

FT301 T/Rx 1-8-30, 100W 12v. ....	£485.00
FT301D Digital Readout '301' ....	£585.00
FT301S 10W PEP '301' ....	£300.40
FV301 External VFO ....	£62.00
FP301 PSU/Speaker ....	£79.00
FP301D FP301 + Clock, Ident ....	£125.00
FT75B T/Rx 3-5-30 VXO ....	£175.00
FP75B AC PSU/Speaker ....	£43.50
DC75B DC PSU/Speaker ....	£43.50
VC75 VOX and Compressor ....	£18.75
FT200B T/Rx 3-5-30 ....	£249.00
FP200B AC PSU/Speaker ....	£54.00
FRG7 Rx -5-30 Cont. AC/DC ....	£145.00

FT221R T/Rx 2m. "All Mod" ....	£339.00
FT223 T/Rx 2m. FM 23 chnl. 12v. ....	£139.50
FT224 T/Rx 2m. FM 23 channel, 12v. ....	£148.00
FT2Auto T/Rx 2m. FM Auto Scan ....	£215.00
Sig 80R T/Rx 2m. FM 80 x 25 kHz 12v. ....	£220.00
FTV250 Transverter 2m. 12/230v. ....	£139.00
FTV650 Transverter 4m. 12/230v. ....	£80.00
FTV650B Transverter 4m. ....	£120.00
FTC212 T/Rx 4m. FM 12 channel 12v. ....	£205.00
FT620B T/Rx 6m. "All Mod." 12/230v. ....	£280.00
FT501 T/Rx 3-5-30-500W Digital ....	£440.00
FP501 External PSU/Speaker ....	£60.00
YDB44 Desk microphone	£18.00

YV500E 500 MHz 0-02 P.P.M. ....	£285.00
YC500S 500 MHz counter I, P.P.M. ....	£225.00
YC500J 500 MHz counter 10 PPM/1 ....	£155.00
YV355D 220 MHz counter AC/DC ....	£139.00
YC355 35 MHz counter AC/DC ....	£105.00
YC601 Dig. Display 101 and 401 ....	£110.00
YC301 Monitor scope ....	£123.50
YO100 Monitor 2 tone osc. ....	£118.00
YPI50 Dummy load/wattmeter ....	£44.00
FF50DX Low pass filter	£15.25
Fan as for FT101 ....	£12.00
QTR24 World time clock	£13.00
YDB46 Hand mic. ....	£7.50

FR101S Rx 1-8-30, 12/240v. ....	£299.00
FR101D De luxe "S" BC, FM ....	£390.00
FR101SD Digital readout "S" ....	£387.00
FR101DD Digital readout "D" ....	£480.00
SP101B External speaker FL101 Tx 1-8-30 MHz 230v. ....	£15.50
FL2100B Linear 1-2 KW PIP ....	£325.00
FT101EE T/Rx 1-8-30 AC/DC ....	£248.00
FT101E "EE" with RF Cliper ....	£408.00
FT101EX "EE" with RF PSU etc. ....	£429.00
FT101B External VFO ....	£62.75
FT401B T/Rx 3-5-30 560W ....	£365.00
SP401 External speaker	£15.50

## A LARGE SELECTION OF PART EXCHANGE EQUIPMENT IS AVAILABLE AT ANY SMC BRANCH

### BANTEX

VHF WHIPS (Carriage 90p) VAT 12½%	
704, ½ 70 MHz fibreglass	£4.00
144½, ½ 145 MHz FG or SS	£3.50
85.5/8 145 MHz ....	£6.35
BGA FG ½ 2m. fibreglass	£8.75
BGA 5S ½ 2m. stainless steel ....	£8.50
B5U 10m. element	£4.50
203BA 20m. 4 element	£103.40
402BA 40m. 2 element	£146.00
18V 10-80 Load Vert.	£24.50
12AVQ 10-20m. Trap Vert.	£33.50
14AVQ 10-40m. Trap Vert.	£47.50
18AVT/WB 10-80m. Vert.	£64.50

### HY GAIN HF RANGE (Carr. £1-£2.50) VAT 12½%

BN86 1:1 ferrite Balun	£12.00
103BA 10m. 3 element	£43.50
153BA 15m. 3 element	£46.50
203BA 20m. 4 element	£103.40
402BA 40m. 2 element	£146.00
18V 10-80 Load Vert.	£24.50
12AVQ 10-20m. Trap Vert.	£33.50
14AVQ 10-40m. Trap Vert.	£47.50
18AVT/WB 10-80m. Vert.	£64.50
TH2MK111 10-20m. 2 ele.	£94.00
TH31NR 10-20m. 3 ele.	£96.00
TH3MK111 10-20m. 3 ele.	£137.00
TH6DXX 10-20m. 6 ele.	£164.50
HY QUAD 10-20m. 2 ele.	£151.80
DB1015A 10-15m. 3 ele.	£99.00
LA1 Lightning arrestor gas	£20.30
LA2 Lightning arrestor	£3.30
HY TOWER Vert	£162.80

### AERIAL INSULATORS (Post Extra) VAT 12½%

2½ Polyprop ribbed	14p
NTI 4½ polyprop ribbed	45p
SMCPIB carbon polyprop	85p
3" porcelain ribbed	33p

### COAX PLUGS

PL259 Standard UHF plug	48p
UHF fixed reducer	51p
"Soldierless" UHF RG8U	56p
"Soldierless" UHF UR43	51p
UG** Reducers star	14p
UR43 or 70 ....	14p
258 Back to back (female)	80p
"T" adaptor (2F + 1F)	£1.20
Right angle (1M + 1F)	90p
Phono/car to SO239 ....	55p
SO239 2-hole socket ....	37p

### JAYBEAM 70 (4m), 144 (2m), 432 (70) (Carr. £1) VAT 12½%

D5/2m 5 over 5 slot feed	£11.00
D8/2m 8 over 8 slot feed	£14.75
5XV/2m 5 ele. crossed	£12.90
8XV/2m 8 ele. crossed	£16.10
10XV/2m 10 ele. cross	£21.30
5Y/2m 5 element yagi	£6.20
8Y/2m 8 ele. yagi	£8.10
10Y/2m 10 ele. long yagi	£17.20
14Y/2m 14 ele. quad	£22.00
Q4/2m 4 ele. quad	£17.60
Q6/2m 6 ele. quad	£17.60
PBM10/2m_10 ele. Para	£20.50
PBM14/2m 14 ele. Para	£25.20
D8/70 8 over 8 slot feed	£12.50
PBM18/70 18 ele. Para	£15.00
MBM148/70 48 ele. Multi	£17.50
MBM88/70 88 ele. Multi	£23.40
12XY/70 12 ele. crossed	£24.00
4Y/4m ele. yagi	£10.20
2 way harness	£4.75
PMH2/4m 2 way harness	£7.60
PMH2/C Circ. phasing	£4.10
2 way harness	£5.50
JBL 15/59 2" joint sleeve	£3.37





# YAESU MUSEN

## FRG7 Synthesised General Coverage Communications Receiver.



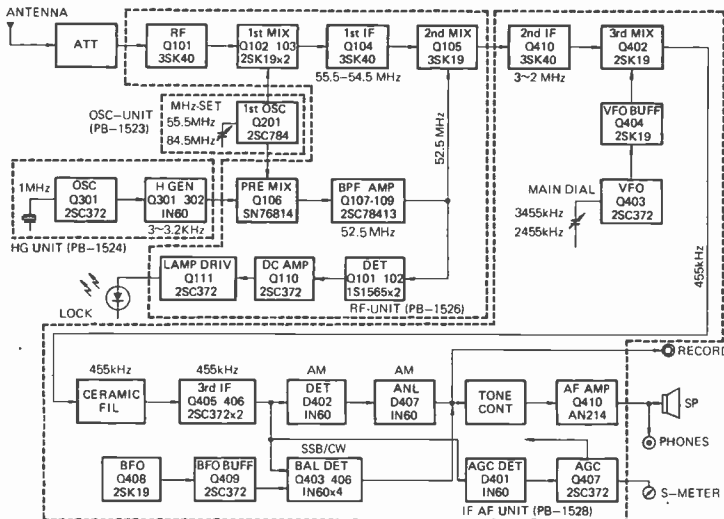
The FRG7 is a solid state mains and 12v. receiver offering continuous coverage 0.5-30 MHz with specifications unparalled in its price range.

Its advanced circuitry provides superb performance either as a standby receiver or for SWL's (BC and Amateur Bands alike)

The use of a Wadley loop (using the same VHF oscillator to mix up, then after pre-mixing with a stable crystal source down again (this cancelling all drift from the variable oscillator)) it provides equivalent performance to 30 crystal controlled converters feeding a low IF, but without the image problems of such an arrangement.

The signal path starts with the choice of 3 antenna connectors : for 1.6-30 MHz, a 50/75 ohm feed (to a SO239 (UHF) coax socket and a binding post) and for 0.5-1.6 MHz (medium wave) a separate high impedance binding post. A 3 position 0-40dB switchable attenuator aids reception of very strong signals and reduces adjacent channel interference. The low noise MOSFET RF amplifier provides a SSB sensitivity of 0.25µV (for 10dB N+ S/N at 10.5 MHz) and is sharply tuned by a well calibrated "pre-selector" capacitor with 4 band switched coils. Its output is low pass filtered (fc = 35 MHz) removing VHF image problems from the following mixer. This comprises a pair of JFETs, driven by the "MHz set" 55.5-84.5 MHz, oscillator, which upconverts the signal to the band pass first IF to 55 MHz ± 500 kHz where it is MOSFET amplified. The second IF of 2-3 MHz is produced by a FET mixer by heterodyning with the synthesiser derived 52.5 MHz signal. A 1 MHz crystal oscillator and diode harmonic generator produces a 3-32 MHz comb spectrum. This, with the first heterodyne oscillator (MHz set) is fed to a dual balanced i.c. pre-mixer. The output is expurgated by a multiple stage selective amplifier producing the 52.5 MHz second oscillator. A small fraction of this is rectified, DC amplified and lights the "lock" LED (saving power) when the MHz oscillator is malset. The 2-3 MHz signal is MOSFET amplified and fed to the third mixer (a JFET whose input and output are tuned by capacitors ganged to the main tuning control) where it is heterodyned to the fined IF by the main VFO which covers a 1 MHz range (2.455-3.455), is clearly calibrated, to 5 kHz (or better), well buffered, and highly stable. The third (455 kHz) IF starts with the ceramic selectivity element and is followed by two stages of bipolar (the first in the

signal path) amplification before the choice of detectors, twin diodes for AM, or a 4 diode product detector, with well buffered switched frequency (for selectable sidebands) B.F.O. A diode rectifies, a fraction of the output from the final IFT, this is boosted to drive the illuminated "S" meter and automatically gain control the MOSFET amplifier in the RF, second and third IF stages, reducing fading and distortion. Immediately following the demodulator is an automatic noise limiter, highly effective in suppressing pulse type interference on AM signals, and a three position "tone" switch (a high, low or band pass) audio filter, reducing the bandwidth to that required. A transformerless AF amplifier ; delivers a generous 2W to the internal 5" x 3", or external speaker, drives a phone jack, and a "volume" independent output for tape recorder. The receiver is, mains (234VAC), external (12v. DC) or internal dry cell powered, the most economic source being automatically chosen. This is reduced to a stable regulated 10v. (or 9v. for oscillator and the harmonic generator). A dial lamp switch is provided to conserve power when battery operation is employed.



### OUR AGENTS

Amateur Electronics,  
508-514 Alum Rock Road  
Alum Rock,  
Birmingham B8 3HX

South Midlands Communications Ltd.  
S.M. House, Osborne Road,  
Totton,  
Southampton, Hampshire SO4 4DN

Western Electronics (UK) Ltd.  
Fairfield Estate,  
Louth,  
Lincolnshire LN11 0JH



# WATERS &

Telephone : HOCKLEY (03704) 6835 2 lines



## MULTI-2700 SUPERB ALL-MODE 2 METRE TRANSCEIVER

USB/LSB/FMn/FMw/CW/AM PLUS 10M DOWNLINK OSCAR RECEIVER

Normal/Reverse

10W/1W Output

Repeat

12v/230v Supply

VOX/IRT/Calibrator

Dual VFO Control

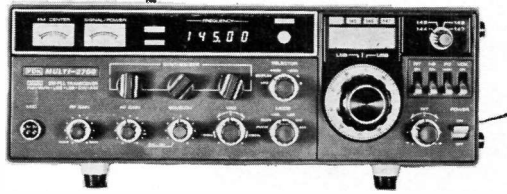
DX Speech Clipper

Digital or Analogue

High/Low Power

PLL for Stability

Noise Blanker



IN STOCK NOW STILL AT £449 inc. VAT

Don't consider any other model until you have sent for the 4-page booklet on this superb transceiver. The 200, crystal controlled channel synthesizer (at £2.50 per crystal) is worth £500 alone. Send today for full details.

### MICROWAVE MODULES

MMC 2m. conv. IF 2-4, 4-6, 28-30...	£20.25	(36p)
MMC 70 MHz con. 28-30	£22.50	(36p)
MMMC 70 MHz conv. 28-30 + local osc.	£22.50	(36p)
MMC 2m. conv. 28-30 + local osc.	£22.50	(36p)
MMC 70cm. conv. 28-30 or 144-146	£22.50	(36p)
MMC 1296/144 or 28-30	£28.12	(36p)
MMD 50 50MHz counter	£46.95	(36p)
MMD 500P 500MHz pre-scaler	£27.00	(36p)
MMT 432/28 70cm. transverter	£94.50	(36p)
MMT 432/144 2m. transverter	£149.62	(36p)
MMT 144/28 2m. transverter...	£88.87	(36p)

### NIHON DENGYO

Liner-2 Mk. II 2m. ssb tcvr. 12v. DC	£184.50	(£2.50)
Liner-430 70cm. ssb tcvr. 12v. DC	£296.25	(£2.50)
R115E reg. p.s.u. for liner-2 and 430	£31.50	(£2.50)

### SOLID STATE MODULES

2m. or 4m. Europa transverter 200W pip	£109.15	(n.c.)
2 or 4m. converters IF 2-4/4-6/28-30	£18.00	(n.c.)
70cm. converter IF 144-146	£18.00	(n.c.)
2m. boxed pre-amp	£8.72	(n.c.)
PA3 2m. miniature pre-amp board	£6.27	(n.c.)

### WATERS

Stable tone-burst modules 1750Hz	£3.93	(25p)
----------------------------------	-------	-------

### POLAR ELECTRONIC DEVELOPMENTS

Magnum 2m. transverter	£112.50	(£1.50)
Wavemeter 65-230 MHz	£16.00	(50p)
432 MHz linear	£50.50	(£1.00)
Magnum 2m. linear 230v. AC	£12.50	(£1.50)

### QM70 PRODUCTS

2 & 4m. converters 28-30	£18.00	(36p)
70cm. converters 28-30 IF	£19.50	(36p)
1296 MHz converters	£14.00	(36p)
Cobra 70cm. transverter	£86.00	(75p)
Solid state amplifier	£49.50	(50p)



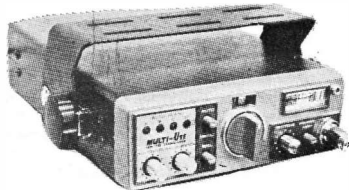
## FAST MAIL ORDER SERVICE

BY PHONE  
BY POST  
CALLERS

Simply telephone your Barclaycard or Access No. for immediate despatch. State clearly your requirements enclosing cheque or postal order. You are always welcome to come and inspect the equipment at our showrooms.



## FOR 70cms FM MULTI-UII



IN STOCK NOW £249 inc. VAT

Price includes : 9 Channels fitted  
Automatic Tone-Burst  
New FDM-10 Microphone  
24-hour Delivery.

This transceiver has to be the ultimate in 70 cms. fm. Like all FDK models it combines performance with those little extras that others leave out. The December RSGB review confirms its extremely sensitive front-end (4uv for 20 dB) and generous power capability (13 watts output). Add facility for safer driving and R.I.T. control, and you have to admit there is no other choice!

### VHF ANTENNAS BY JAYBEAM

4Y/4M 4 element yagi	£11.45	(£1.75)
5Y/2M 5 element yagi	£6.96	(£1.00)
8Y/2M 8 element yagi	£9.10	(£1.00)
10Y/2M 10 element yagi	£19.35	(£1.50)
PBM10/2M 10 ele. parabeam	£23.00	(£1.50)
PBM14/2M 14 ele. parabeam	£28.35	(£1.75)
5XY/2M 5 ele. crossed yagi	£14.50	(£1.25)
8XY/2M 8 ele. crossed yagi	£18.10	(£1.50)
10XY/2M 10 ele. crossed yagi	£23.95	(£1.75)
Q4/2M 4 ele. quad	£14.85	(£1.50)
Q6/2M 6 ele. quad	£19.80	(£1.75)
D5/2M 5 ele. slot fed	£12.35	(£1.25)
D8/2M 8 ele. slot fed	£16.55	(£1.50)
XD/2M crossed dipoles	£6.40	(£1.00)
UGP/2M ground plane vertical	£6.95	(£1.00)
HO/2M Mobile halo head only	£3.55	(50p)
HM/2M Mobile halo with mast	£3.09	(£2.75)
PMH1/2C 2 way phasing harness for circular polarisation	£4.60	(75p)
PMH2/2M 2 way phasing harness for 2 of 2 metre antennas	£6.15	(75p)
PMH4/2M 4 way phasing harness	£14.85	(£1.00)
SVNH/2M mounting kit for vertical pot. for 2 slot feds	£3.45	(75p)
5 dB co-linear		

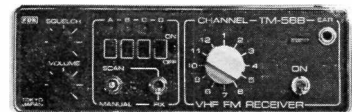
### UHF ANTENNAS BY JAYBEAM

D8/70cm. 8 ele. slot fed	£14.05	(£1.25)
PBM18/70cm. 18 ele. parabeam	£16.95	(£1.50)
MBM48/70cm. 48 ele. multi-beam	£19.65	(£1.50)
MBM88/70cm. 88 ele. multi-beam	£26.30	(£1.75)
12XY/70cm. 12 ele. crossed yagi	£27.00	(£1.50)
PMH2/70cm. 2 way phasing harness	£5.30	(75p)
PMH4/70cm. 4 way phasing harness	£11.10	(£1.00)

## NEW MODEL !



TM56-B VHF MONITOR RECEIVER  
IN STOCK END OF MARCH



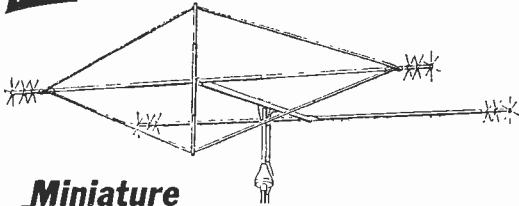
Introductory Price £69.50 inc. VAT

Features : 12 Manual Channels  
4 Scan Channels  
12v. DC/230v. AC  
Built-in Speaker  
5 Channels Fitted

This sensational monitor receiver has exactly the same configuration as the Multi-II famous for its sensitivity. Its 1.5 watts audio output makes it ideal for mobile use whilst the 230 volt p.s.u. enables it to be used as a base station. This is yet another winner from FDK and at £69.50 you had better get your order in quickly.

# STANTON ELECTRONICS

Telex : 897406

**NEW****Hi-pot Multiple Hat Loaded!**

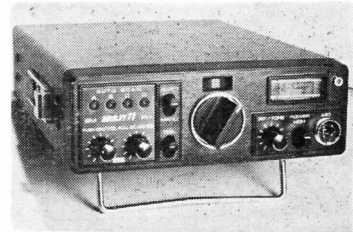
## Miniature Band HYBRID QUAD Antenna

HQ-1 A further stock of the fast selling HQ-1 aerials from USA has arrived. This amazingly compact beam covers 10-15-20 metres and has a turning radius of 6ft. 2in. It will take the full UK legal limit and is the ideal way of putting out a big signal from a small garden.

Price : £84.37 (£2.00)

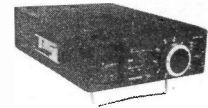
**NEW MODEL**

The FDk PS-110 power supply is the ideal unit for powering 12 volt mobile transceivers. Its generous ratings provides up to 4 amp. capacity and the front selector switch permits selection of 9v., 10.5v., 12v. 13.5v. and 15v. outputs. An over current indicator is incorporated and 3 sets of output terminals are provided (2 at the rear and one at the front) to add to its versatility as a general bench supply. A matching DC power cord for FDk transceivers is also supplied. Price (inc. VAT) £63.50

**FDK****FOR 2M FM  
THE SUPERB MULTI-11**

Fitted 7 Channels + Autoscans + Toneburst £199.68 inc. VAT  
Special Offer : 521, 22 and 23 £10 inc. VAT if ordered at the same time as Multi-11

**MULTI-11** This transceiver is now undoubtedly the best on the market. No other model has greater receiver sensitivity or cleaner transmitter output. And there's plenty of power output too; whilst other models struggle to give 10 watts out the Multi-11 loafs along at 13-13 watts output, effortlessly. But FDk doesn't stop here, they have gone on to add those extras which makes owning an FDk mobile a pleasure. Things like auto-scan, IRT control, tx monitor switch and of course that superb audio quality that brings you excellent reports. Send for full details today and see why others have changed to FDk.

**NEW MODELS**

Matches Multi-11 transceiver. 144-146 Rx/Tx. Plus 600 kHz repeater shift. Price (inc. VAT) £89.0

**FDK****FREE CREDIT**

For a limited period you may purchase an FDk transceiver and spread your payments over 6 months without paying a penny extra. This offer applies only to UK licensed amateurs. Example : Multi-11 deposit £49.68 and 6 payments Multi-11 deposit £62.50 and 6 payments. Phone or write for full details and best inflation. For longer periods up to 30 months we can offer very competitive rates!

**YAESU MUSEN EQUIPMENT**

FT101E transceiver, 160-10m. 230/12v. ....	£482.62 (n.c.)
SPI01B matching speaker console ....	£17.43 (£1.25)
FV101B matching remote vfo	£16.31 (£1.25)
FT200B transceiver 80-10m. 260w. ....	£264.37 (n.c.)
FP200B matching AC p.s.u. ....	£60.75 (n.c.)
FL101 transmitter 260w. 160-10m. ....	£365.62 (n.c.)
FR101S receiver standard 160-10m. ....	£336.37 (n.c.)
FR101D receiver de-luxe 160-2m. plus short wave broadcast ....	£438.75 (n.c.)
FR101DD as above with digital counter ....	£540.00 (n.c.)
FL2100B linear 1200w. input ....	£279.00 (n.c.)
YP150 dummy load/wattmeter	£47.52 (£1.00)
Yo100 monitor scope ....	£127.44 (£1.50)
FT221 2m. ssb/cw/fm/am transceiver ....	£403.87 (n.c.)
YD844 table microphone ....	£20.25 (75p)
YD846 hand microphone ....	£8.43 (75p)
FRG7. General coverage receivers ....	£167.00 (£2.00)
<b>TRIO</b>	
HC2 ham clock ....	£13.50 (48p)
New R.300 General coverage receiver in stock ....	£184.50 (£2.50)

**STATION ACCESSORIES**

MfJ audio filter boards 80/110/180 Hz ....	£14.62 (50p)
Shure 444 table microphone ....	£21.95 (£1.00)
Shure 201 hand microphone ....	£9.95 (50p)
Drake low-pass 1kW filter 80dB ....	£14.75 (75p)
SWR single meter ....	£9.85 (50p)
SWR dual meter ....	£12.65 (50p)
Telegraph key ....	£9.75 (50p)
Drake low pass filter ....	£14.65 (75p)
Ferrite rings 1 1/2" for a.f.i. ....	30p (8p)
HP3A high pass tv filters ....	£2.53 (15p)
Set of 10 HP7 ni-cads ....	£9.72 (75p)
Set of 9 HP11 ni-cads ....	£16.20 (£1.00)
Balun insulator 50 ohm (beams or dipole) ....	£8.43 (50p)

**TESTED TRADE INS**

Liner 430 as new ....	£247.00
Icom IC30A 70 cms. FM ....	£150.00
Trio QR666 ....	£129.00
Codax PR30 Preselector ....	£15.00
Codax Q-10 Q-multiplier ....	£15.00
Lafayette HA63 Rx 5-30 MHz	£20.00
Trio 520 Transceiver ....	£350.00

**2M FM HANDHELD TRANSCEIVERS**

KP202 fitted 6 channels plus t/b	£129.00
KCP2 charger ....	£12.65
Flexible antenna ....	£6.45
10 Ni-cads ....	£9.00
Leatherette case ....	£5.34

**ROTATORS**

AR30 antenna rotator ....	£42.18 (£1.50)
AR40 antenna rotator ....	£48.93 (£1.50)
CD44 antenna rotator ....	£100.00 (£1.75)
Ham 11 antenna rotator ....	£133.00 (£2.00)
CD bearing ....	£4.21 (50p)
Stolle 2010 antenna rotator	£46.50 (£1.50)
Stolle 2030 antenna rotator	£51.50 (£1.50)
Stolle alignment bearing ....	£11.25 (50p)

**HY-GAIN ANTENNAS**

12AVQ 10-20m. vertical 2kW	£36.62 (£1.50)
10AVQ 10-40m. vertical 2kW	£51.97 (£1.50)
18AVT/WB 10-80m. vertical 2kW ....	£72.45 (£2.00)
TH3 JNR 10-20 yagi 600W	£108.00 (£2.00)
TH3 MK3 10-20m. yagi 2kW	£154.12 (£2.50)
BN86 balun 2kW ....	£13.50 (50p)

**MAIL ORDER & HEAD OFFICE : Hockley Audio, 31 Spa Road, Hockley, Essex. Tel.: 03-704 6835 (2 lines)**

ALL PRICES INCLUDE VAT

CARRIAGE AT COST

AGENTS : G3XTX J.R. Electronics, 198 Collier Row Lane, Romford, Essex.

Tel.: Romford (0708) 68956

G3OQT Bredhurst Electronics, Willowbrook, School Lane, Bunbury.

Cheshire. Tel.: (Bunbury) 0829 260708

GM3GRX Eric Simpson, 6 Drossie Road, Falkirk, Stirlingshire. Tel.: 0324 24428

Monday to Saturday 9 a.m.-5.30 p.m

Early closing Wednesday





# Western

**Western** the **First Name** for



SEE REVIEW IN "RADCOM" THIS MONTH

offers the  
latest model  
**FRG-7 RECEIVER**

- ★ Sensitive
- ★ Stable
- ★ Versatile
- ★ Value for money

**WESTERN — NUMER ONE for YAESU**

**£144 + VAT**

★ **STAR OFFER — FT221R**

**£299 + VAT**

Yes—owing to a significant reduction in manufacturer's prices—**YOU ARE THE WINNERS!**  
Brand-new, full-spec., guaranteed FT221R—the leading 2m. all-mode transceiver—brought to you at this **NEW LOW PRICE** by—

**WESTERN the FIRST NAME for YAESU ★**

OTHER  
YAESU  
PRICES—

FT101E      £440.00  
FR101 D.    £355.00  
FR101 D. Dig. £455.50

FL101      £350.00  
FT200      £252.00  
FP200      £58.00

FT301 D. Dig.    £580.00  
FP301            £85.00  
FTV250          £150.00

ALL  
+  
VAT

# Electronics (UK) Ltd

## FDK VHF/UHF EQUIPMENT from WESTERN

★ SPECIAL OFFER of MULTI-2000 for ONLY £299 + VAT

Also ex-stock now, the new—

MULTI-2700—All mode 2m./Oscar transceiver

—£399 + VAT

MULTI-U11—70 cm. FM scanning transceiver

—£219 + VAT

ALL CARRIAGE FREE

## — MARCH MADNESS ON ROTORS/ANTENNAS —

AR30 ROTORS for £24 + VAT . . .

LOOK !

These are slight seconds in maker's sealed boxes—fantastic value—and carriage free too !

LOOK AGAIN !! HY-GAIN ANTENNAS . . .

TH6DXX Tribander beam—

£129 + VAT (£160 or more elsewhere)

18AVT/WB Trap vertical (10-80m.)—

£59 + VAT (list £73)

All the usual WESTERN lines as previously advertised still available

### Western Electronics (UK) Ltd

HEAD OFFICE (All Mail/Enquiries)

FAIRFIELD ESTATE

LOUTH, LINCS, LN11 0JH

(Tel. Louth (0507) 4955/6)

Agents : LES LYSKE, G13CDF, NEWTOWNARDS (0247) 812449  
ALAN CAMERON, GM3OGJ  
DAVID SMITH, G4DAX, WATFORD 42619

SHOWROOMS at —

LOUTH : Open 9-12, 1.0-5 p.m. MON.-FRI. Sat. by appointment.

SOUTHAMPTON : 1 WEST PARK ROAD, Tel. 0703 27464. Open

TUES.-FRI, 9-1, 2-5.30. SAT. 9-4 p.m.

LEICESTER : MAY'S HI-FI, CHURCHGATE, Tel 58662. Open

MON. SAT. 9-6 p.m., CLOSED THURS





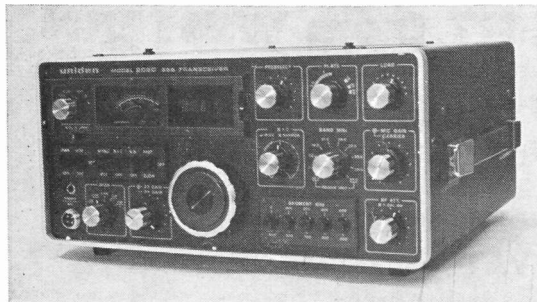


# STEPHENS-JAMES LTD.

## 47 WARRINGTON ROAD, LEIGH, LANCS. WN7 3EA

Please note new telephone number  
**TEL. 0942 - 676790**

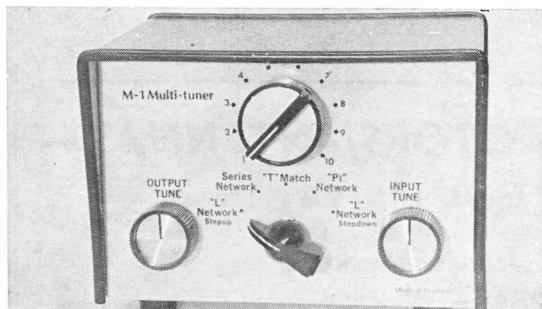
The North West's leading supplier for all your requirements. EASY ACCESS FROM THE M61-62.63—we're 5m. from M6, turn at the Greyhound Motel on the A580 (East Lancs. Road). OPEN 9.30 to 5.30, MONDAY TO SATURDAY.



**UNIDEN 2020.** AC/DC power supplies. CW filter. Noise blanker. Blower. Digital and analogue display give direct readout. 2-6146B in PA 80-10 metres. Receiver is pre-mixed single conversion using phase lock loop oscillator circuit. Separate filters for USB/LSB. Price £495.00



**UNIDEN 2030.** 144-146 MHz FM Transceiver. 12 channels. 12v. DC operation. 10 watt or 1 watt output. Antenna impedance 50 ohm. Complete with microphone and mounting bracket. Price £178.74



**Mk. 1 MULTI TUNER.** Designed and manufactured by us. 50 tunable switched positions for antenna lengths over 5 metres in the 2-30 MHz range. Five different circuits to give an excellent match between your receiver and antenna. Now in use in over 35 countries. Price £17.00. MK2 Multi-Tuner covering 550 KHz to 30 MHz. £23.00

### YAESU

FT101E Transceiver	...	...	...	...	£482.50
FT200 Transceiver	...	...	...	...	£326.00
FT401 Transceiver	...	...	...	...	£412.00
FR101S Receiver	...	...	...	...	£336.37
FR101D Receiver	...	...	...	...	£438.75
FR101D Digital Receiver	...	...	...	...	£540.00
FRG7 Receiver	...	...	...	...	£167.00
FT221R VHF Transceiver	...	...	...	...	£403.50

### ATLAS

210X Transceiver	...	...	...	...	£482.50
215X Transceiver	...	...	...	...	£482.50

### CALLETTI

Introducing a new range of VHF mobile and static antennas. All these were exhibited at the Leicestershire Exhibition.

5/8" Gutter mounted whip	...	...	...	...	£12.00
1/2 wave standard mount	...	...	...	...	£11.50
5/8" Standard mobile base mount	...	...	...	...	£12.00
Base station ground pane 4 radials	...	...	...	...	£13.59

Professional antennas at an Amateur Price

### BARLOW WADLEY

WE ARE PLEASED TO ANNOUNCE WE HAVE BEEN APPOINTED SOLE DISTRIBUTORS FOR THE BARLOW WADLEY RECEIVERS FOR THE MIDLANDS AND NORTH WEST. BADLOW WADLEY XCR-30 EX-STOCK AT £145 INC. VAT.

Complete with FM range ... £170.00

#### Accessories

Morse Keys	...	...	£7.85
Auto-Cq-Sender	...	(post free)	£41.11
Eddystone 898 Dial Assembly	...		
Drake Low Pass Filter	...	(post 75p)	£15.00
Omega TE-701 Antenna Noise Bridge	...	(post 50p)	£18.00
Omega TE-702 Antenna Noise Bridge	...	(post 25p)	£21.00
Whip antenna gutter bracket	...	(post 25p)	£24.00
Whip antenna gutter bracket	...	(post 25p)	£2.81
UR43 Co-ax 18p metre ; UR76 45p metre, post 2p metre ; 75 and 300 ohm twin feeder 10p metre, post 1p metre ; Heavy duty 75 ohm twin feeder 20p metre. PL269 46p SO239 46p, Cable reducers 15p.	...		

We carry a substantial stock of equipment and probably a larger variety of models than most dealers. Having established ourselves as the North Wests leading supplier of Amateur Radio equipment for over 11 years. We are a totally independent company and have no retail outlets through any agents or any other establishment in the North West. We can supply and mostly from stock, equipment from the worlds leading manufacturers. We import some items direct, and we export and manufacture equipment of our own design.

DRAKE-YAESU-UNIDEN-S.T.E.-CALLETTI-JAYBEAM - MICROWAVE - MODULES - G-WHIPS - TECHNICAL ASSOCIATES - SWAN - ATLAS - BARLOW WADLEY - C.D.E. - BELCOM.

Send us a large S.A.E. or 20p in stamps and we will forward you all the latest details and prices. All our prices include VAT at the current rate at the time of going to press.

S.A.E. with all general enquiries please. H.P. and Credit facilities. Barclaycard and Access facilities. Trade-ins always welcome. We would be pleased to sell your unwanted equipment on a commission basis.

We can supply most items from stock. All equipment is sold from the above premises. We do not supply any agents or agents of agents who work from home in their spare time. All equipment is air tested and carries normal guarantee

### Secondhand Equipment

(available at the time of going to press)

Yaesu FL101 Transmitter	...	...	£300.00
Yaesu FT101B Transceiver	...	...	£350.00
Yaesu FR101D Receiver	...	...	£335.00
Yaesu FT400 VFO	...	...	£60.00
Yaesu FT401B Transceiver	...	...	£375.00
Trio TX599 Transmitter	...	...	£195.00
Trio QR666 Receiver	...	...	£90.00
Eddystone 830/7 Receiver	...	...	£395.00
Eddystone 730/4 Receiver	...	...	£125.00
Eddystone 840C Receiver	...	...	£60.00
Swan 1200X Linear Amplifier	...	...	£200.00
Magnum 2 Transverter	...	...	£80.00
KV202 Receiver	...	...	£185.00
ARAC102 Receiver	...	...	£80.00
Halicrafters SX122 Receiver	...	...	£125.00
MFJ Frequency Standard	...	...	£12.00
Sentinel HF Preamp	...	...	£9.00
Eddystone EC10 Mk1 Modified	...	...	£50.00
Trio JR310 Receiver	...	...	£85.00
Drake SP4R Receiver	...	...	£325.00
Model CR70A Receiver	...	...	£30.00
Eddystone 750 Receiver	...	...	£65.00

As you can see we have a substantial turn over in secondhand equipment. If you require a specific model let us know and we will inform you when we have it available.

# S.T.E. MILAN VHF EQUIPMENT

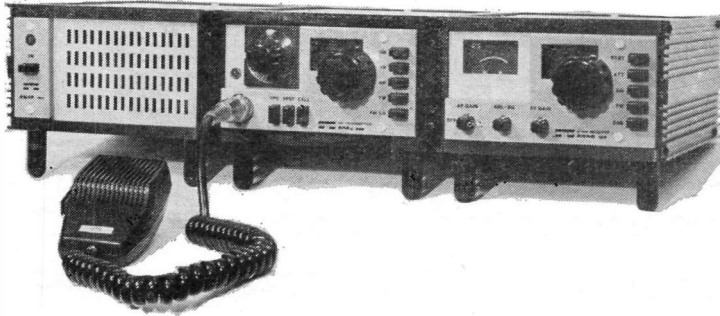
We enter our third year as sole distributors for the S.T.E. range in the U.K. The popularity of this equipment is growing all the time. With the kind help of the Directors of S.T.E. we have managed to keep the prices stable for the past three years. This equipment sell for about 20% in some of the ECC countries and to keep cost to

the customer down we have not sold to the trade and therefore you get the benefit of lower prices. The quality of these P.C.B's are the finest we have ever seen. Following on from the ARAC 102 receiver for 28-30 MHz and 144-146 MHz fully tunable we now have the ARAC 107 28-30 and 430-440 MHz with AM FM and SSB Facilities. The base station AK20 transceiver will be soon supplied with mobile mount and also available in kit form. We also look forward to many new models from S.T.E. in the next year.

ASP 154

ATAL 228

ARAC 102



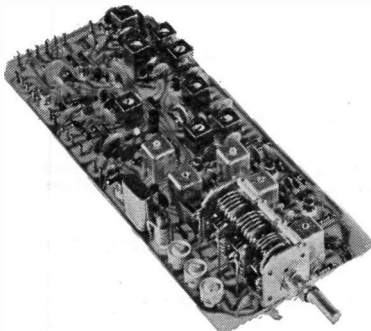
SPEAKER  
AC POWER SUPPLY UNIT

144 - 146 MHz  
AM FM TRANSMITTER  
with Microphone

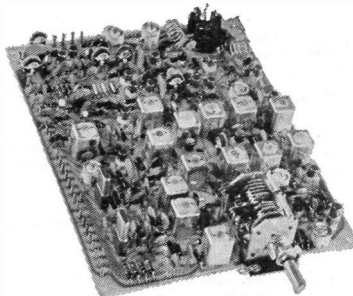
28-30 MHz 144-146 MHz  
AM-FM-SSB RECEIVER

**Price List (including postage)**

ARAC 107 Receiver	...	£127.50
ARAC 102 Receiver	...	£100.00
Atal 228 Transmitter	...	£126.00
ASAP 154 AC PSU with speaker	...	£35.00
AR10 Receiver Module	...	£37.50
AA1 Audio Amplifier	...	£4.10
AD4 FM Discriminator	...	£5.00
AL8 Linear Amplifier	...	£27.00
AT22 Transmitter	...	£50.00
AR20 C.C. Receiver	...	£50.00
AT23 C.C. Transmitter	...	£36.00
AS 15 Stabilised psu D.C.	...	£10.00
AG 10 Tone Generator	...	£4.50
AC2A Converter 28-30 MHz	...	£20.00
AK20 Transceiver Kit	...	£120.00



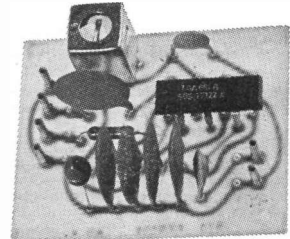
AR10 Mosfet receiver. 28-30 MHz Double conversion superhet. RF and amplifiers stages are gate protected mosfets for good sensitivity and low intermodulation. Noise limiter and squelch circuit. AM, SSB and CW reception. 12v. DC.



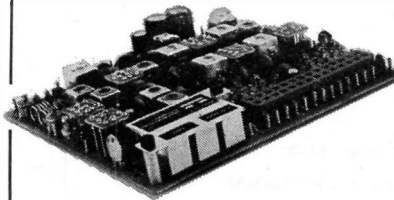
AT 222. A complete transmitter exciter unit for 144-146 MHz on AM or FM. VFO controlled or fixed channel operation. Complete with microphone pre-amp., speech processor including active audio filter. 1 watt output. FM. .25 watt AM. Output impedance 50-75 ohm adjustable. Frequency deviation 3-10 kHz adjustable.



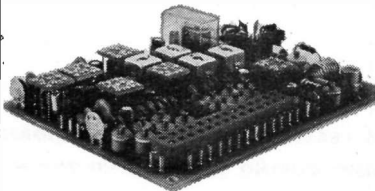
AK20, STE. Latest model from the famous STE Milan range of equipment. 12 channel operation in the 144-146 MHz range. 11-15v. DC operation. 8 watt output. Sensitivity 0.2 uv R.I.T. tone burst. Complete with microphone, and mobile bracket. Price £174.00



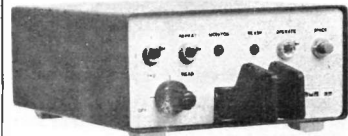
455 kHz FM Discriminator Amplifier. Limiting threshold 100uV. Amplitude modulation rejection 40dB. Audio output voltage at 1 kHz 200-300mV frequency deviation + or - 3 kHz.



AR20. 12 channel FM receiver 144-146 MHz. Input impedance 50-75 ohm. AM-FM modes. Sensitivity 0.2uV AF output 3 watts. 12v. DC operation.



AT23. 12 Channel FM Transmitter; 3 watts. 144-146 MHz. Frequency deviation 3-10 kHz adjustable. 12v. DC operated AF input sensitivity 2mV adjustable to 50 mV.



**ELECTRONIC KEYERS**

Jambic operation—Weighed transmission—Three memory lengths up to 1024 bits. Internal monitor. Transmitter keyed through internal relay. Silver plated contacts. 220v. AC operation. Price £106.00

## STEPHENS-JAMES LTD.

47 WARRINGTON ROAD, LEIGH, LANCs. WN7 3EA

Please note new telephone number 0942 - 676790

**PAUL  
G3VJF**



## THE ICOM RANGE FOR 1977

- IC-240** The revolution in 2 metre transceivers. This rig uses a synthesiser in place of a bank of crystals. It has 22 channel capability, and you can programme for any of the 80 channels at 25 kHz spacing between 144 and 146 MHz. A scanning facility and external VFO will be available as optional extras in due course. We supply the set ready programmed for 5 repeater and 10 simplex channels and a facility to listen on repeater input channels is built in. If you think of the cost of crystals you can see why the IC-240 is the best value for money at £198 inc. VAT and delivery.
- IC-215** The new 15 channel 3 watt portable from ICOM. This is a sturdy little set ideal for use with repeaters—see last month's RADCOM for further details. This set is becoming very popular. Fitted with 12 channels for £162 inc. VAT and delivery.
- IC-202** The popular SSB 3 watt portable which is sweeping the market. The VXO gives continuous coverage over the ranges 144.0 to 144.2 and 144.2 to 144.4 MHz. The coverage can be extended with extra crystals. See the August 76 copy of Radcom for a review. £172 inc. VAT and delivery.
- IC-211E** The most attractive multimode 2 metre rig on the market for use on SSB, CW or FM. There are two fully synthesised VFOs which are tuned with a single knob—a feature of the patent ICOM "LSI" synthesiser. Features include repeater, reverse repeater, VOX, automatic RIT, digital frequency display to the nearest 100Hz, two rate and electrically lockable tuning and mains or battery operation. Send for more details on this aristocratic 2m. rig. £529 inc. VAT.
- IC-245E** A digital pll controlled FM/CW/SSB rig for mobile or fixed station use—again with the single knob tuning covering 5 kHz steps on FM and 100Hz steps on CW and SSB. Another new concept in amateur radio £396 incl VAT.
- IC-30A** The ICOM 70cm. mobile transceiver that sets the pace in sensitivity and quality—not the cheapest on the market but well worth considering. 22 channel capability. Comes fitted with SUB for £225 inc. VAT.
- IC-225 SPECIAL OFFER.** For a limited period we can offer this 80 channel rig at £198 inc. VAT and delivery. See previous adverts or send for details.
- IC-3PA** The companion mains power supply for the IC-22A, IC-240, IC-225 or IC-30A. This supply has built in electronic protection which is far faster than any fuse and incorporates an extra forward facing speaker. There is a bracket supplied to hold ICOM transceivers. £58 inc. VAT.
- IC-3PS** The companion power supply to the IC-202 and IC-215 which is designed to incorporate the IC-20L linear and supply power for it. £70.29.
- IC-20L** A linear amplifier for the IC-215 or IC-202 to increase the output power to a full 10 watts. A neat compact module with PA protection and automatic change over powered from the rig. £74.
- IC-SM2** An attractive swan neck condenser microphone with a built in pre-amplifier in the base for use with the 202 or 215 which supply power for the amplifier via the mic cable. £26.
- RECHARGEABLE BATTERY PACK AND CHARGER BC-20** An ingenious ICOM product of a set of 10 ni-Cads which fit into two of the battery channels of the IC-215 or 202 giving a full supply voltage, and a charger which fits into the third channel which operates from 12 volts—ie you can charge it from your car or bench power supply while using the rig. The charger incorporates an inverter and current regulator to ensure correct charging conditions. £42.
- C TYPE Ni-Cads.** A set of nine "C" type (U11) rechargeable cells £22.00 (+75p p. & p.).  
External charger for use with above £12.00 (+75p p. & p.).  
Flexible antenna for IC-215 £4.75.

**FOR DETAILS LEAVE YOUR NAME AND ADDRESS ON OUR  
ANSAFONE (02273 63850) DURING THE EVENING WHEN CALLS ARE CHEAP**

Why not see and buy the excellent ICOM range at your nearest Thanet agent—phone for an evening or weekend demonstration.

**LONDON**—Terry G8BAM (01-556 9366)  
**SCOTLAND**—Ian GM8DOX (078683 3223)  
**DEVON**—Bob G3PQH qthr

**WALES**—Tony GW3FKO (0222 702982)  
**MIDLANDS**—Tony G8AVH (021-329 2305)  
**NORTH WEST**—Gordon G3LEQ  
(Knutsford (0565) 4040)

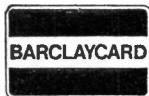
**NORTH**—Peter G3TPX (022678 2517) .  
Peter has outlets in  
**HULL**—Tony (0482 886392) and the  
**NORTH EAST**

HP TERMS AVAILABLE

YOUR SOLE AUTHORISED UK IMPORTER FOR ICOM

**THANET ELECTRONICS**

143 RECVLER ROAD, BELTINGE, HERNE BAY, KENT (02273 63859)



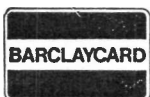


DAVE  
G4ELP

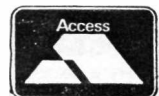
**JUST A FEW OF THE EXCITING RANGE  
OF ICOM 2 METRE AND 70 cm EQUIPMENT**



**ICOM – FOR QUALITY IN 1977  
I LIKE ICOM – DON'T YOU?**



**THANET ELECTRONICS**  
HERNE BAY KENT



**DRAKE**

®

**Radio Shack Ltd****Models W-4  
and WV4****Directional  
RF Wattmeters**

2-30 MHz

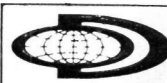


20-200 MHz

The new Drake directional, through line, wattmeters represent a significant advance in wattmeter design. The use of printed circuits, toroids, and state of the art techniques permits versatile performance and higher accuracy than units selling for more than twice the price.

In contrast to VSWR measuring devices employed in the past (VSWR bridges, ratiometers, and mismatch), the new wattmeters are frequency insensitive throughout their specified range, requiring no adjustments for power or VSWR measurements.

The wattmeters negligible insertion loss allows continuous monitoring of either forward or reflected power for fast accurate tune up, as well as continuous checking of transmitter-antenna performance.

**DRAKE****SSR-1****COMMUNICATIONS  
RECEIVER**

- Synthesized    ● General Coverage    ● Low Cost
- All Solid State    ● Built-in AC Power Supply
- Selectable Sidebands    Excellent Performance

TRIED AND TESTED WITH MANY THOUSANDS ALREADY  
IN USE. (SAE FOR DETAILS). £184.50 inc. SECURICOR DELIVERY

SECURICOR ★ DRAKE ★ SALES ★ SERVICE  
★ B.R.S. ★ ACCESS ★ BARCLAYCARD ★ HP

**RADIO SHACK LTD.**

188 BROADHURST GARDENS  
LONDON, NW6 3AY

OPEN 5 DAYS 9-5, CLOSED 1-2 p.m.  
SATURDAY 9-12.30 p.m.  
Giro Account No.: 588 7151

Just around the corner from West Hampstead Underground Station  
Telephone: 01-624 7174 Cables: Radio Shack, London, N.W.6  
Telex: 23718



ADVERTISERS' INDEX

	Page
Aero & General Supplies ...	63
Amateur Electronic (G3FIK) ...	18
Amateur Radio Exchange ...	48
Ashley Dukes ...	63
Baginton Electronics ...	63
B. Bamber Electronics <i>back cover</i>	
Bearman ...	60
J. Birkett ...	51
Bredhurst Electronics ...	62
British National Radio and Electronics School ...	54
C. & C. Electronics ...	61
Cambridge Kits ...	63
Catronics Ltd. ...	53
C.B. Electronics ...	48
CEC ...	47
Colomor Electronics Ltd. ...	63
Crayford Electronics ...	55
Datong Electronics Ltd. ...	49
G3HSC (Rhythm Morse Courses) ...	60
G2DYM Aerials ...	63
G.W.M. Radio Ltd. ...	58
Hamgear Electronics ...	60
D. P. Hobbs Ltd. ...	59
J. Yu ...	50
K.W. Communications Ltd. ...	52
Lee Electronics Ltd. ...	49
Lowe Electronics <i>Front cover, inside front cover, 1, 2</i>	
S. May Ltd. ...	63
M.H. Electronics ...	62
Microwave Modules Ltd. ...	3
W. Mills ...	59
Mosley Electronics Ltd. ...	61
Partridge Electronics Ltd. ...	53
P.M. Electronic Services ...	55
Radio Shack Ltd. ...	16
R.T. & I. Electronics Ltd. ...	50
Small Advertisements ...	57-62
Solid State Modules ...	52
Southern Valve Co. ...	62
South Midland Communications Ltd. ...	4, 5, 6
Spacemark Ltd. ...	54
S.S.B. Products ...	63
Stephens-James ...	12, 13
S.W.M. Publications <i>Inside back cover, 56, 58, 60, 64</i>	
Technical Associates ...	57
Thanet Electronics ...	14, 15
Reg Ward & Co. Ltd. ...	54
Waters & Stanton Electronics ...	8, 9
Geoff Watts ...	55
Western Electronics (UK) Ltd. ...	10, 11
W. H. Westlake ...	63
Yeasu-Musen Co. Ltd. ...	7

# SHORT WAVE MAGAZINE

(GB3SWM)

ISSN: 0037-4261

Vol. XXXV

MARCH 1977

No. 1

## CONTENTS

	Page
Austin Forsyth O.B.E., G6FO— <i>Obituary</i> ...	20
Communication and DX News, by E. P. Essery, G3KFE ...	22
Design for a Telescopic Tilt-Over Mast, by L. Metcalfe, G3TPA ...	26
Notes on Power Supply Design Using Three Terminal Regulators, by P. Burnett, G4BLL ...	29
Beginner's Guide to Oscar, by N. A. S. Fitch, G3FPK ...	31
"SWL"— <i>Listener Feature</i> ...	35
VHF Bands, by N. A. S. Fitch, G3FPK ...	39
The Month with The Clubs— <i>From Reports</i> ...	43

*Advertising:* Charles Forsyth

*Published at 34 High Street, Welwyn, Herts., AL6 9EQ, on the last Friday of the month, dated the month following. Telephone: 04-3871 5206 & 5207*

**Annual Subscription:** *Home: £4.80, 12 issues, post paid  
Overseas: £4.80 (\$10.00 U.S.), post free surface mail*

**Editorial Address:** Short Wave Magazine, 34 High Street, Welwyn Herts. AL6 9EQ, England.

*Prices shown in advertising in this issue do not necessarily constitute a contract and may be subject to change.*

### AUTHORS' MSS

*Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets. Photographs should be lightly identified in pencil on the back with details on a separate sheet. All drawings and diagrams should also be shown separately, and tables of values prepared in accordance with our normal setting convention—see any issue. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd.. on publication.*

© Short Wave Magazine Ltd.

# AMATEUR ELECTRONICS UK

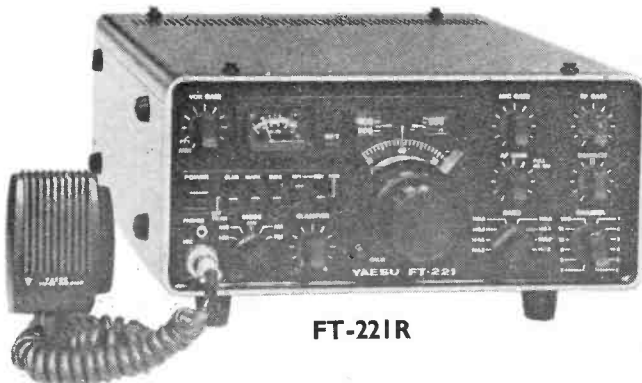
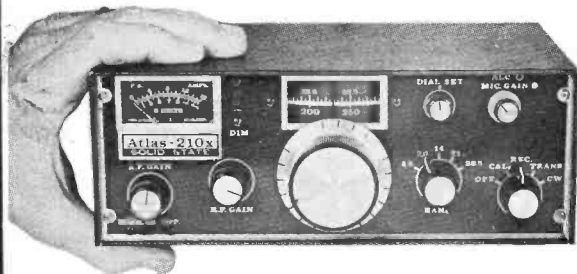
## YOUR FIRST CHOICE FOR YAESU MUSEN



**As direct  
importers  
we offer  
you —**

- ★ Largest selection
- ★ Large stock of spares
- ★ Full warranty service
- ★ Free Securicor delivery on major items

**Sensational ATLAS-210/215X▼**



FT-221R



FT-101E

**MAIN AGENT**  **ATLAS RADIO INC. SOLE UK AGENT FOR**  **SWAN ELECTRONICS**

A COUPLE OF STAMPS (NO ENVELOPE) BRINGS THE FT-221R, SWAN OR ATLAS LEAFLET. A POSTAL ORDER OR STAMPS FOR 25 PENCE BRINGS THE LATEST YAESU MUSEN MAIN CATALOGUE TOGETHER WITH OUR CREDIT VOUCHER VALUE £1 FOR USE AGAINST YOUR FUTURE YAESU PURCHASE.

USED EQUIPMENT — An S.A.E. please for our latest list.

ATTENTION GM's—NEW SCOTTISH BRANCH !

WE ARE PLEASED TO ANNOUNCE THAT OUR FULL-TIME BRANCH — AMATEUR ELECTRONICS UK—SCOTLAND—IS NOW OPEN AT 287 MAIN STREET, WISHAW, LANARKSHIRE. GORDON McCALLUM, GM3UCI, WILL BE AT YOUR SERVICE DURING NORMAL BUSINESS HOURS AND WILL BE VERY PLEASED TO SHOW YOU THE LATEST PRODUCTS. Tel.: WISHAW 71382.

BRANCH : AMATEUR ELECTRONICS UK—COASTAL, CLIFTONVILLE, KENT.  
KEN McINNES, G3FTE, THANET (0843) 291297

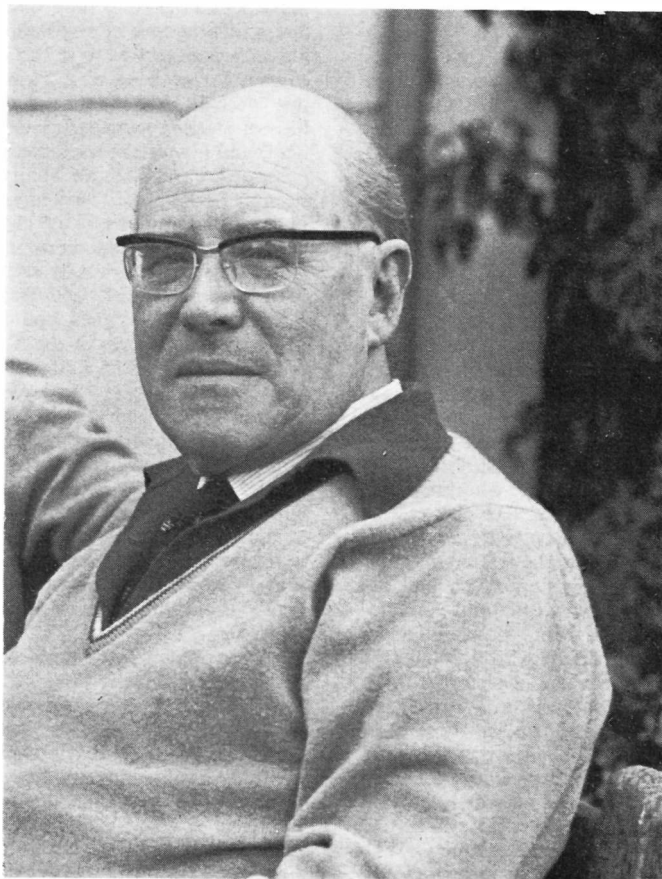
AGENT : WALES & WEST—ROSS CLARE, GW3NWS, CAERLEON 422232

**508-514 ALUM ROCK ROAD** **021-327 1497**  
**BIRMINGHAM 8** **Telex 337045 6313**



FOR THE RADIO AMATEUR AND AMATEUR RADIO

*The*  
**SHORT WAVE**  
*Magazine*



The late Austin Forsyth, O.B.E., G6FO.

**WORLD-WIDE COMMUNICATION**

## AUSTIN FORSYTH O.B.E., G6FO — Obituary

**AUSTIN ("ANGUS") JAMES ESSLEMONT FORSYTH**, who died on January 15, 1977, was born in London on May 11, 1907. At the age of three he moved with his parents to a tea plantation in India where his father was the local doctor; in 1914 he started as a pupil at St. Paul's, Darjeeling, where he stayed for seven years until the family returned to England in 1921. He completed his education at Victoria College, Jersey, and it was whilst there that Austin really became interested in radio communications—constructing, experimenting and making it his business to find out all there was to know about this new and fascinating subject. There were few high-spots and beacons in the country which he hadn't climbed with his gear to see who and what he could hear.

It is also a matter of interest, perhaps, that at this time he was a very fine all-round athlete and was a member of the reserve swimming team for the 1926 Olympic Games. He was first licensed in 1928, and in that same year he started his working life underground as a mining engineer in the pits of South Wales (he always had a very great regard for Wales and the Welsh in spite of entirely Irish/Scottish origins).

In 1930, G6FO and Jack Hum, G5UM, got to know one another as a result of a mutual interest in developing the then-neglected 160 metre band. They both became members of Group 10A of the Research and Experimental Section of the RSGB and gathered about them a number of like-minded transmitting amateurs whose interest was to see more activity on a band which had become virtually deserted during the great rush to the DX bands of forth and twenty metres. Their objective was to prove that 160 metres had DX possibilities that might not be altogether apparent to those who preferred the easier pickings of 7 and 14 MHz. To this end a series of trans-Atlantic tests were set up to be conducted just before dawn every day during the winter of 1931 and 1932, a long and painstaking slog which had its reward when G6FO was "first across the Pond" on 1.75 MHz from his site in Newport, Mon. (transmitter: a P650 valve in a self-excited oscillator with a 200v. DC mains supply; receiver: a one-valve detector with a one-valve audio amplifier; aerial was a  $\frac{1}{4}$ -wave long wire). Never will those who participated in those tests forget the bell-like note of W1DBM pinging weakly into their receivers morning after morning, followed sometime later by Signals from W1BB and ultimately others! It is well worth recording that those who got across first G6FO, and soon afterwards his neighbour G5WU at Penarth) did it with a meticulously measured 9.7 watts DC input; this was not just because they feared losing their licenses by exceeding the regulation 10 watts: it was a point of honour that if it couldn't be done on the licensed power it was not worth doing at all.

G6FO was also one of the pioneers of the 56 MHz band during the 1934-35 period; with one of the first (if not the first) crystal controlled transmitters and an O-V-1 receiver he maintained regular contacts from Newport with G5JU in Bristol and G5BY in Croydon.

To his great disappointment Austin was forced to

give up his mining career in 1936 owing to a lung condition (G6FO had for the last 30 years a superb cough which he always said was because his lungs were half-full of South Wales coal dust!). He moved to Appledore, North Devon, and became South Western area representative for National Benzole.

From here in North Devon the superiority of West County over-the-sea sites for trans-Atlantic working again became evident, demonstrated both by G6FO and by G6GM, the late Harold Merriman, not far away in Holsworthy, with a high-up site looking straight out over the Atlantic. Any spare moments not connected with amateur radio were occupied in his capacity as the Secretary of the Appledore Lifeboat Association (Austin had a lifelong love of ships and the sea and for him the idea of a holiday was to sail to France and back over the course of a weekend on a friend's yacht). It was during this period 1937-38 that Austin first conceived the idea of starting a magazine to cater specifically for the needs and interests of the radio amateur; he found that he possessed a considerable ability for writing and in fact several articles he had written had already been published in electronic journals of the day. Now a certain "Short Wave Magazine" had been started in 1937 by others with the same aims, but by early 1938 the Magazine was in a distinctly weak and fragile condition; the first Editor, G5GQ, resigned and Austin who felt sure he could make a success of the Magazine, took the plunge and produced his first Editorial in the March 1938 issue. That he did make a success of it is now a matter of amateur-radio history.

Another important pioneering activity for which G6FO was responsible was, in 1938, to write a series of articles for the RSGB called "The Helping Hand"; this later came out in leaflet form and did an immense amount of good in influencing people favourably towards amateur radio, not only in the technical aspect but also by encouraging common-sense in operating. Also in 1938 he assisted Scott-Farnie in the formation of the Civilian Wireless Reserve.

However, his first period as Editor of "Short Wave Magazine" was short lived for in 1939 came the Second World War. Austin (who had already been granted a Commission as a Pilot Officer in the Royal Air Force Volunteer Reserve in March 1939) felt that he could contribute something to the war effort on the signals side, put the Magazine in "mothballs" and joined-up full time in the Administration and General Duties Branch in September 1939 with immediate promotion to Flying Officer. In April 1940 he transferred to the Technical Branch (Signals) and with his move began his highly significant and effective war-time career, his knowledge and abilities being stretched to the full. His chief concerns were radio- and radar-countermeasures and he made numerous operational sorties as the "boffin with his head in the office" checking and calibrating the various devices (in several cases his own ideas) designed to try and keep one jump ahead of the enemy in this intensely competitive field. But perhaps his major contribution was as one of the team working on the

design, development and deployment of "window"—strips of aluminium foil which were dropped literally by the million to jam the enemy's radar. G6FO, who had reached the rank of Wing Commander by April 1943, served at Hq. Bomber Command from October 1941 to January 1946 and was twice Mentioned in Despatches. (As a contribution to his own effort he had married one Elizabeth Coates, a WAAF Code & Cypher Officer, in 1940).

At the end of the war, in spite of having been offered the security of a Permanent Commission, he opted to return to Civilian life and take up the reins of "Short Wave Magazine" once again. For his services during the war he was awarded the O.B.E.

From that time until the moment of his death he worked continuously and tirelessly for the furtherance of amateur radio in all its forms and for the success of the Magazine, always maintaining a firm and independent view. He gradually replaced his home-built gear with Commercial equipment—always British! Eddystone, K.W. and Raymart (although it must be admitted that he did have a Heathkit oscilloscope and a standby Hammarlund transmitter!) A particularly interesting Magazine landmark came in 1957 when, in association with J. M. Osborne, G3HMO, he produced a solar powered transistor transmitter and an actual contact was witnessed by a member of the National Physical Laboratory and the *Daily Telegraph*.

On the other side, perhaps his biggest personal loss during this long post-war period came a few years later with the very sudden death of his great friend and Magazine colleague Howard ("Tommy") Thomas, G6QB.

Austin was always most helpful to aspiring amateurs and was even willing to lend his own equipment in order to get them started. A man of strong-minded and determined character, G6FO was never afraid at any time or place to make his views on amateur radio matters perfectly clear, and vigorously promoted and defended the pursuit against all-comers. As a first-class operator himself, the maintenance of good operating standards was something on which G6FO was very sensitive; in fact he was one of those telegraphists who enjoyed the gift of talking through the finger-tips, something that comes more easily perhaps to those who are naturally articulate—as G6FO certainly was—and his writings demonstrate.

He was also a man of astonishing physical as well as mental fortitude; it is not generally known that ten years ago he suffered a severe lung haemorrhage and was given only a faint chance of surviving. Austin, however, had other ideas: deadlines for the next issue were approaching and so he called for the essential paper-work and typewriter to be brought from his office to the hospital side-ward—the issue appeared right on schedule and Austin made a full recovery.

This, then, is something of the man behind "Short Wave Magazine" for so many years—a truly dedicated man. Undoubtedly, within the amateur radio context, G6FO was one of the very few "right men at the right time" and as an epitaph there can be only one—*For The Radio Amateur and Amateur Radio*.

Austin Forsyth leaves his wife, son and daughter.

---

*We are grateful to G2JL, G2CAV, G3HMO, G3IYX, G3VA, G5BG and G5UM for providing details of G6FO's life.*

---

#### G6FO — Tributes

So world-wide has been the response to the announcement of G6FO's death—from Readers, the Trade, old friends and colleagues—that it would be absolutely impossible to reply to every letter individually as each one of them deserves. May we take this opportunity, then, to thank in print all these kind people who have written so appreciatively of his efforts for Amateur Radio over so many years, and to tell them that his family have derived enormous comfort from their words; further, as for SHORT WAVE MAGAZINE itself, if any encouragement were necessary to carry on then it has been received in full measure.

As '6FO always did himself, we must now of course turn our attention to the future (this issue marks the start of Volume 35), but there will be many issues of SHORT WAVE MAGAZINE before the influence of Austin Forsyth G6FO is finally lost.



# COMMUNICATION and DX NEWS

*E. P. Essery, G3KFE*

## Top Band

This is one area where things have shown up, various countries not normally to be heard appearing: YU, I, F, and a Russian. However the Russian is disowned by the UA's, although UF6CX did tell G2HKU that the Russian amateurs are pressing their authorities for Top Band privileges; and although several G's have worked I stations, and received their QSL's, other reports have it that none of the Italians have Top Band privileges.

G2HKU (Sheppey) opens the batting, with his normal SSB chats to PAØPN, plus CW contacts with DJ5PN, EI9J, F3AT, GD4AM, GM3CFS, HB9AJU, OL2AUT, OK5TLG / P, OK2BGW / P, OK3KFF, OK3CEG, YUIPCF and YU3EY, Gotaways including ISØLYN, ZC4ID, and 9H1CD.

A first-time report—at least as far as your scribe's weed-encrusted memory goes—is in from G3PKS (Wells), who has about 3 watts of RF out, and a simple homodyne (direct-conversion) receiver. On the morning of January 30 a listen at 0730 showed EL and W's, with of course G's chasing them; firing-up the transmitter waited until noon, at which time GM3IGW/A, GI6YM and F3AT were all taken; a fair old daylight hop from Wells, though of course the contest stations brew up some hefty signals, and the G3PKS aerial gives one the impression that it's no slouch either. And it was nice to hear that G3IGW was out on the rampage again—we haven't heard of him contesting seriously for a long time.

WIBB (Winthrop, Mass.) may not write so many Bulletins on Top Band doings as he used to, or even work so many Europeans as he used to—but the bulletins are just as packed with information as ever, and his own scoring year by year continues to rise; Stew is now at 137 countries all-time, and his first DXCC on the band has since been joined with KV4FZ at 118C, W1HGT, W8LRL 111, W4BRB 102, K1PBW, with others rumoured to be either on the mark or just held for a few laggardly QSL's.

For the Spring Equinox W/VK-ZL Tests, both sides will be on the 1800-1808 kHz; W's first 2½ minutes of the five-minute period for calling, VK/ZL's the last 2½ minutes for calling, except when in QSO—this one should be of interest to we Europeans if only as listeners! On a different tack, as some sort of indicator of possibilities on this band, W1BB and others near the top of the tables seem to average about sixty countries each season. Lots more of interest in Stew's bulletin will have to wait until next time—we already, at this early stage in putting the material together, have perhaps the biggest bundle of mail since first we began this task a decade ago!

A new reporter on Top Band is G3JFF (Clanfield) who has made a considerable improvement radio-wise by moving from Horndean; he tangled with 9H1CG, EA8CR, OH2KA, OH2BFJ, F3AT, F8EX, F8DB, DL's, OK/OL's, YU3EY, GU4EON, OE5KE, EI9J, EI4BK, and all the U.K. call areas—the Gotaway list is quite impressive too, with 9D5A, VE1CD, and K1PBW.

G2NJ (Peterborough) was one of many who commented sadly on the passing of G6FO. Nick worked F3AT, who is located at Auxerre, and of course had lots chasing him; G2NJ reckoned this was the first F station to be on Top Band since pre-War. An interesting QRP signal was the one from G3URU, about 1.3 watts *input* to an invisible aerial made of 30 gauge enamelled wire, at a height of around twenty feet and with a couple of bends to obtain the desired half wave.

A new reporter on Top Band—or anywhere else for that matter—is G4EOK, the call of the club station of RNARS aboard HMS Belfast in the Pool of London, where the rig is the Bridge Wireless Office, where they have a FT-101, plus a KW Viceroy/Racal RA17 combination to play with, the aerials being a trap dipole, and 215 feet of ended aerial strung between the masts. The main operator has been G3HZL, but G3KP, G3LIK, G3LRE,

G3PED, G3PZP, G3ZQS, G4BZW, G4CJY, G4CPY, G6BJ have also had a significant hand in the game. Since November the score has been: ZC4IO, IK4AMO, ELON/MM off Miami, KV4FZ, YUIPCF, YUIBCD, YU1NPZ, YV1OB, YU3EY, YU3TFB, F3AT, F8DB, F8EX, 4X4NJ, 9D5A, 9H1CG, all W call areas with the exception of the Elusive Sevens, VE1-3, VE7, VO1, with Gotaways in the form of ST2AY, VS6DO, PJ2VD, and VP9. This mark you, on *Top Band!*

Nice to hear from G2BY (Wroxall, I.O.W.) again, Bert having given all the bands a bit of a tweak. By and large, the bands were pretty indifferent at Wroxall, with the Top Band activity being the odd contact with mainland G's, and one turn-out at 0300 which yielded—nothing!

Back to G2NJ for a later letter in which Nick pokes gentle fun at the characters calling 4U1TU on the evening of February 4, by, apparently, sending 4U1IX! That's one advantage of an iambic-mode keyer, it either sends perfect characters or complete gibberish, while the old pump-handle can send everything from Morse as Morse meant it, right through mildly individual and slightly wacky through to the pure-bred Martian Morse; and yet we are still optimistically trying to copy it, while the guy on the receiving end of the el-bug knows *instantly* when Master loses the initiative to the machine!

## Interjection

Which is to say how nice it is to see another copy of Geoff Watts' DX News Sheet. Geoff is going to stick to his intention to only handle copies for the G's; but if any of his fans from overseas—and there were so many of these before that they well out numbered the G's—can come to an arrangement whereby a G station receives an extra copy and forwards one on to the DX station, (which in effect removes from Geoff the hours of toil which caused his breakdown in health), then Geoff will be only too pleased. And, of

course, there is the Prefix List which he does for 35p to the U.K. of five IRC's for overseas airmail; this latter is *very* useful indeed. Nice to have you back aboard, Geoff.

### Eighty

This old greyboard must admit that although he has SSB on the band, it is somewhat of a penance if anything in the DX line is to be sought. Like the Irishman's name for King Kong—Begorrah. On the other hand the CW portion is often quite pleasant, the more so during the daylight hours, and when working the QRP lads who have, of necessity to be better operators than average. Let us look, for instance, at F9UO, who is in a high-rise block some 20 KM south of Paris, and never ceases to amaze everyone with his QRP and Joystick. Rene has a rather neat idea with his log-keeping; he uses a black pen for Eighty, blue one for Forty, and a red one, for Twenty, of which more anon. Looking at the story on Eighty, we see F9UO not only working the usual ones, but also getting over to VE3ATF, and hooking GJ2LU; but it must be said that quite clearly the F9UO heart is on 14 MHz.

This seems as good a time to mention the White Rose Award as any; stations in Europe need fifty points, DX thirty points, obtained by way of ten points for the club calls G3XEP and G8LVQ (either/or), five points for working any member of the White Rose Radio Society, or three points for working a station in Yorkshire. It is understood that in order to cope with the expected trade, the members will be on about 3710 kHz depending on the QRM, from 1700z for around 2½ hours; later they hope to set up shop on Twenty in a similar fashion. The Award Manager is Diana Hughes, G4EZI—QTHR.

Returning to our main theme, we have another letter from Leeds, this one from G3DNF. Gordon had a very good run in the Winter DL/AGCW contest, but says he understands that G4BUE at least was ahead of him, despite the G3DNF effort being the best ever. That's life, but frustrating!

Next comes G3RJV (Calverton), who remarks that he worked ZL4HX

with QRP at both ends, with the ZL reporting 59 on SSB; of course, there has to have been a snag, and it was that ZL4HX was on leave from his religious activities and at the time of the QSO was in the very next village, of Woodborough! It seems that ZL4HX is a keen QRP buff with a hand-held rig at one watt of SSB, and the Plessey SL-series of IC's, used to a throw-out dipole about twelve feet high which netted good SSB reports all over England and to GD.

Our next reporter is himself rare DX. A4XGZ (Salalah) has WB4NND as his QSL Manager, who is OK in the current call book. Tony will be at his present spot for the next two years, and will give all bands from Eighty right through to Ten a whirl as the conditions prompt. His speciality, at the moment at least, is to be on from 2200z right through to 0400z on Eighty, Thursday and Friday evenings. Looking at the logs, Tony seems to have given all the European countries a fair crack at the whip, albeit one does notice the odd diversion, such as the snapping-up of AP2KS, W's on occasion, EA8CR, and such-like, when they appear on the scene. It seems from Tony's latest letter that the next step in the game is to acquire a Linear—which should help to persuade Tony's own DX to bend an ear in his direction as well as making life a bit simpler for we Europeans trying to work him.

G2BY worked a few G's, and also got up and tried in the wee sma' hours, but to no avail—on the night he turned out, even 20 dB of attenuation in the front end could only yield a nice loud sharsh!

G4EDG (Newton Abbot) is nothing if not an optimist; on the other hand, Steve mentioned the pessimist Stateside who claims he has a "diode antenna"—signals can get in to the receiver, but no RF will go out to the desired spots! G4EDG comments on how much better the receiver is when an attenuator is used up front instead of just turning down the RF gain—between the receiver feed he has 470 ohms in series with the inner of the coaxial feeder into the receiver and 56 ohms right across the coaxial pins of the receiver as his simplest-possible attenuator. CW gave him C31FR, HC2SL, JA6LZG, KV4CI,

N6DX (California), N8AA (Ohio), VE7AON, VK3MR, W6PVB, W6PM, and SSB countered with PY3APH, VP2DAD, and XE1KB.

Eighty aboard H.M.S. Belfast has been a matter of sixty-one countries hooked since November 1, among them ZC4IO, W, VE, UA9, UL4, KP4, HK, 9Y4, OX, UF6, YV, 7X4AM, VK3MR and VK3XB.

### Forty

G3PKS (Wells) notes that plenty of DX has been heard around the "peak" times of sunset and sunrise, while W1ZW added a boost to morale at about 2000z one evening. The Aerial, G3PKS explains, is a Peculiar Pyramid—it comprises an Eighty-metre Windom and a Forty-metre Windom, back-to-back in the shape of a pyramid, the centre pole being at 33 feet, and right beside the shack which was deliberately located at the best place with reference to the available *air-space*. The single wire feeders of each Windom are led down together in the form of a three-inch spaced open-wire line to the shack where a Z-match tunes 3.5 to 28 MHz very nicely, the feeders being strapped for Top Band operation.

G5FF is at the moment using the call FØAYC, with QRP to an HW7 unmodified; aeriels include, for 7 MHz an ungrounded quarter-wave fifteen feed in the air; he is right under Mt. Agel, atop which hill are the aeriels of Radio Monte Carlo—this can by the sound of things be a bit of a nuisance. However, Arthur is of the opinion that the band is just as good as ever it was, saving for the QRO and QRM. If you would like a contact, FOAYC is to be found from 0900 to 1000z on either 7020 or 14070, looking for the QRP chaps.

Forty for G3DNF seems to have been very largely a matter of Europeans, mainly worked over the contest weekend January 15/16. The log shows Gordon making QSO's from 160 through to 15 metres for a claimed score of 3758.

F9UO largely treated Forty as a place for local working; one must admit to a feeling that Forty is not really a good place for QRP working, if only because of the QRO BC stations—all around the band who mean the high noise level has to be combated by the use of attenuation

of sufficient degree to wipe out all but the "big" signals; which means that the time to work DX on Forty with QRP is the peak time, at sunset or sunrise—and this is easier said than done!

Forty is the usual stamping-ground of G2BY but he found it a bit of a task to get out early enough for the good stuff; 0830z was managed, and this was good enough to make the grade to ZL, HI, W and JA on CW.

G4EDG's CW activities on Forty seem to have been lucrative in DX terms, with EA8LK, HI8MOG, JA's, KV4CI, PJ8KG, PT7AC, UI8ADB, UM8MBQ, UJ8JCL, UA0BBN, VK3MR, VP1KS, VP5CI, VU2GW, 3V8BF, and 6W8EX.

G4EOK, at H.M.S. Belfast didn't seem enormously keen on 7 MHz; they only note ZC4IO and a CX as being worthy of note since November 1 last year.

G3JFF (Clanfield, Hants.) is now setting up shop at the new place which is about five miles away from his earlier home at Horndean. Forty metres was rather bedevilled by the Pestilence thing from Russia (of which more anon), not to mention the broadcasters in "exclusive amateur" territory—are they, we wonder, *amateur* broadcasters? We wonder, because their efforts are often so amateurish! Nevertheless Mike stuck in his guns, and patience was rewarded PY0ZAE on Trindade Is. for a new country, PY0FOC, PY0RO both on Fernando de Noronha, 7X4AN, YV4BBT, LU6ABX, PJ2VD, HI8MOG, PY7PO, for as nice a collection as could be desired.

### Now Twenty

Where all the action tends to be, regrettably when one thinks of the number of kHz not being used below 30 MHz although allocated to us. Still, at least we haven't any repeaters on the band! And, it is interesting to notice, more 14 MHz reporters than for a long time.

G3RCA (Wigan) has noted the "close for a bit then re-open" effect on Twenty, pretty obviously, as his QSO's are nearly all in the daytime—morning, lunchtime, teatime—save for the odd late one. Looking at the early-morning ones, we see SSB with 5T5KJ, OE8PRK/YK, EP2NC,

FK0TX, AP5HQ, 7X5AS, YJ8RD, KX6BS, JY6ZZ, KG6RI, HL9TS, 9K2EH, TU2FL/M, 7X0BI, KG6JIA, KG6JIG, and CX2DH. Lunch-hour activity knocked off A9XBE, while the afternoon came up with FR7BE, FR7AI/E, 3B8CN, FO8DO, TR8BA, 7X2ARA, FO8EI, FR7BL, FR7AW, 5T5JD, TR8MM, S79DF, ZS3KC, A2CBN, FR7AD, FR7ZW, FR0CYZ, HR3JJR, YB0ACB, VU7ANI, OX3KS, VP2DQ, VP2DAC, XE1SAN, VP5DLH, HK0LE, ZS3LK, VU2UK, OX3GW, FM0COO, 3B8CS; and the evening times did the trick to HI8XPDOZ3DK/5T5, leaving the rest to be filled up by VK6, VK7, JA's, UAO, FL, and the regular sked with 5N2ESH.

Our next reporter is G14DAV (Carrickfergus), who has a W3DZZ aerial at twenty-five feet, fed with 180 watts; David assures us that the absence of reports from GI for a long time does not mean there is no activity; in his own case, Twenty was the one that came across with CW contacts to WB4MQO, G3TZL/MM in the Med., W7ULC (Oregon), 3Y3CC, WB5DQJ, KP4DQP, W1, W2, W3 and WBOMLU (N. Dakota)—this last at 2030z!

Next G2HKU; Ted had his usual sked with ZL1VN, ZL3SE, ZL1AAE, ZL1BQJ, and UF6CX, all SSB, plus CW contacts with PY7CPB, and PY7PO.

G5ACW (Hillindon) found precisely the opposite of the usual "dead band if you have a visitor" situation; he and his twin junior ops are all licensed, and while son Roland was telling the YL reporter from the local paper what it was all about, Jim was idly tuning round for something interesting and tripped over VK0TB just signing with an F6. A quick call, and back the VK came. The YL reporter was quite shaken, and certainly the result was a very good write-up in the local paper, complete with a picture covering most of the top of a page, from which we gather that the rig is a mix of commercial, modified stuff, and home-brew. Seems VK0TB runs full power to a two-element beam, and as a result of this interesting contact—rare DX in any man's language—a regular sked is being run—14250 or 14320 kHz around

1600z on Saturdays and Sundays, until the ship comes to pick up the whole expedition from Casey Base around March 7. Incidentally, VK0TB has VK3ADD as QSL Manager, David Brain, 40 Ann Street, Dandenong, Victoria, Australia.

A4XGZ next. Tony's first log, covering the early part of January, did not copy all that well, but looking through it we glean that on Twenty as on Eighty, G's were snapped up whenever they were to be had on SSB, perhaps the prize catch being S8AAA—although there are rumbblings that this one was possibly a Phoney. Tony will no doubt be pleased to receive a QSL for that one, or to work the S8AA which is understood to be coming on the band ere long. From a place like that, given time and inclination to operate, it would probably be difficult not to work DX—but the pile-ups must pall after a while.

G3PKS was a little taken back when he worked PY1RO/O, who then proceeded on his merry way without announcing his whereabouts—Rolf was in Fernando de Noronha at the crucial time, and for the record, while PY1RO has been out of his usual Top Band environment of late, he still tries the band when he can, producing a trickle of Top Band ones on Fernando de Noronha, and, of course a very flood of contacts on higher bands.

We have already mentioned that F9UO and his Joystick plus QRP managed to get over the Pond on Eighty; thus it will come as no surprise to see the very first contact on the very first page is a W on Twenty! There are several pages of log copies, and we see that F9UO made WAC—indeed it would have been umpteen WAC's but for a slight dearth of African contacts, although the ones in the log showed good signal reports in both directions.

Like the curate's egg, Twenty has been good—in parts. This is the considered opinion of G2BY, who found the mornings good to JA and ZL and the late afternoons good to W6, W7 and ZS in the late afternoons plus VR3AH (Christmas Is.), W7NW, XE10E, VE7DDH, FM0COO, HL9VA, FY7YE, VP9HT, CO2BB, and the usual East Coast W's and JA's.

The G4EOK gang at H.M.S.

Belfast note they have worked 9Y4, KP4, PY, 4X4, UL7, VK, PY1RO/O, ZS, 9LICD, and ZD8RR during their evening sessions in the Bridge Wireless Office.

This is the band for DX avers G3JFF, provided you have a knife to carve your way through the European QRM; Mike did so quite successfully to EP2VW, PY1RO/Ø, YBØACT, W6, W7, UAØ, FY7YE, ZS6OS, D2AAI, KL7MF, 5Z4IN and VK, ZL, JA.

#### Fifteen

Served it's notice that it wanted a mention on your scribe by leading his old eye from one band-report to the next in G3JFF's 14 MHz line! However, it is very much of a daytime band, and of late it has been up and down like the proverbial yo-yo. G4EAN (Nottingham) mentions a couple of W's and a couple of UA's, adding somewhat wistfully "I usually leave my operating to the weekend, and then something *always* crops up!"

G14DAV keyed on this band to find ZS50V, WB4QJZ, WA4SCL, 4Z4NUT, WA4VSB, 9LICD, SM6DJI/MM, in the Red Sea, the aerial at G14DAV on this band being a 5/8 wave vertical at ground-level.

A4XGZ's logs make this old scribe go green with envy, he of course attracting DX to himself by virtue of the DX'y call he himself sports; so we look, not so much for the exotic, which is there in plenty, as the, to us, run-of-the-mill prefixes which say he is getting into our neck of the woods—and of that there is no doubt whatever, a single call producing a string of QSO's until Tony has to get out from under on that frequency and start again.

G3CED shows just three Russians on the band, the farthest one being a UK6—but work just keeps on interfering!

At G2BY, the band was definitely a bit empty—but Bert does not give up easily and completed QSO's on CW with ZS11WA, W5FGO/MM, JA8UI / MM, JA4VLU / MM, PYØZAE, JX3P, W6, W7, and a few JA's; some of these were caught during openings which were hardly long enough for the proverbial rubber-stamp contact!

On the other hand G3JFF says it often *sounded* dead but would suddenly come to a spurt of activity;

Mike worked LU5EIO, PJ8KG, 9J2BO, ZS6OS, ZS6BNH, EP2GJ, and 6W8EX, *plus* the local club net on Sunday evenings.

#### Ten?

Not really very popular generally, most people tending to write it off completely—even a fruitless CQ or two would serve to give an impression of activity to those who would swipe it from us! On the other hand, there have been odd moments when, for a few moments the band has opened to DX, and people have been there to take advantage of them. G2BY for example, notes a five-minute hearing of 3B8MS on the morning of January 22 at 1015z.

G2ADZ (Chessington) comes up with an all-ten metre report; he recalls being jimmy-in-the-middle when G6FO and G5BY were doing their five-metre thing, receiving on both five metres and later two metres with a straight receiver. Now he looks at Ten more than most, and his account of the period from November-end to date shows lots of openings to Europe, plus FG7XA, PYØZAE, 9G1JN, 4X4FU, SV11W, ZC4IO, 4Z4LM all worked, plus hearings of EA7TL, EA8FF, 9H1CH, 4X4WB; and of course quite a lot of openings to Europe by VHF-type propagational modes.

G3PKS had a couple of ten-minute CQ calls on the band brought forth a UA4AE from Volgograd at 579 but before the QSO was ended the Russian signal had sunk without trace.

G3JFF found a few local G stations, and also the local club net trying out Ten in case their 21 MHz spot is swamped by DX in the summer!

#### Comments

CR6IK, as he used to be, is now in Portugal again, and is a subscriber; he lost all his gear, left in Angola when the troubles were on, and is now studying-up on RTTY. Let's hope Wil has better luck this time, and enjoys reading his Short Wave Magazine.

Somehow, the letter from GM3RFR (Baltasound) managed to get itself under a paper-clip when it should have been being reported; so Sam gets a bit of room all to himself! GM3RFR is still pursuing his lonely road of DX-ing with five watts p.e.p. input, the score at the time of his letter being 58 countries worked.

For the period in question Sam found DL, SM, PAØ, OH and LA on 7 MHz, DL, I, UB5, UA2, ON, OH, 4J3, YU, VO, FP8, EA8, LA, GM and OE all on 14 MHz; and YU, I, LZ, F, G, 4Z4, and 7X2 on 21 MHz.

G3PKS is very much of a homebrew merchant; and he has a recommendation that a couple of nail-files make a great improvement on the traditional bits of hacksaw-blade for a keyer paddle; which sounds to this writer to be a very definite bright idea, to be adopted on his own keyer in the near future.

G2BJY mentions working G6ZY/CN/M a couple of times; G6ZY must be all but part of the furniture there now in CN-land with his /M gear working the DX—which prompts your scribe to think it is about time he moved all his gear into the car for a quick look at the bands on the way to and from the salt-mine.

Back to the W1BB Bulletin, and Stew says this will be remembered on Top Band as the "Year of the Super-Stations." K1PBW and K6SE lead the way, each with phased verticals for the transmitter, and Beverages for the receiver; KV4FZ is almost in the middle of the sea, and has a 350-foot tower at command, plus many kinds of receiving aerials, *including underwater ones*, not to mention the quiet location which is the greatest boon a Top Band operator can hope for.

Let's now turn to the West Coast DX Bulletin, that regular indicator of what's afoot in the world of the Californian Kilowatts. The question of the status of Southern Sudan is still taxing the minds of those who rule on what is and what is not suitable for DXCC country status; they still have not ruled on this one since Bill Rindone was there back in the summer of 1976. And when this is perhaps the hottest news around at the moment, you realise how many people are holding fire on their DX-pedition thoughts until the sunspot cycle lifts band conditions at least a little.

#### Finale

That's it for this time. Deadline for next time is March 8. That is, to arrive, first post, at SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts., AL6 9EQ (and of course be marked CDXN).

# DESIGN FOR A TELESCOPIC TILT-OVER MAST

L. METCALFE, G3TPA

**A**FTER operating on two metres exclusively for some time, an SSB rig for the HF bands was obtained, and not unnaturally my thoughts turned to the need for a suitable antenna for Twenty and Fifteen metres, plus a suitable mast or tower for support. A glance through the advertising pages of *SHORT WAVE MAGAZINE* soon made me realise that a commercial tower was too costly an item, and since the light alloy mast which had supported my 4-4 Two-metre beam was too flimsy for an HF band antenna, I decided to try the DIY approach.

The requirements were:—

- (a) A height of 35-40 feet.
- (b) Strong enough to support the antenna.
- (c) Able to telescope and tilt over, in order to facilitate maintenance, but particularly to get it down quickly because of the not infrequent gales which are a feature of the Pennine area.
- (d) Not needing more than two persons to erect or lower.

Having used a wooden tripod for my cameras for some years, I decided to base the design of the mast on the extending leg action of the tripod.

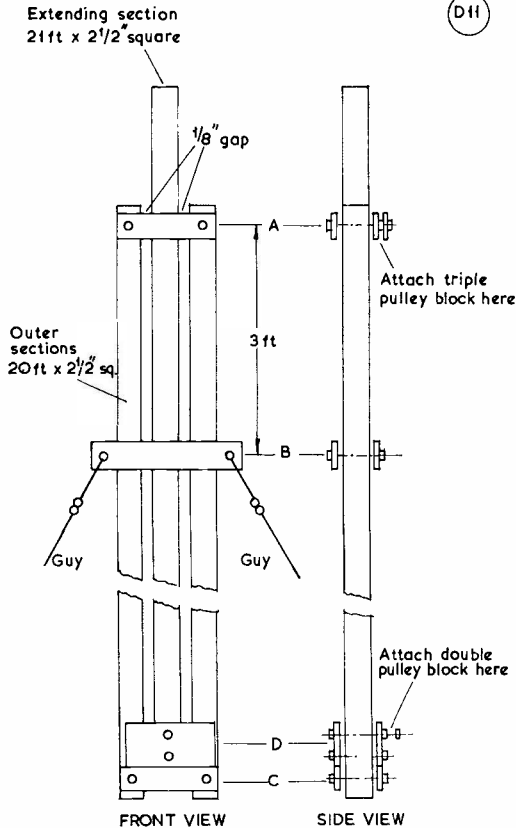


Fig. 1

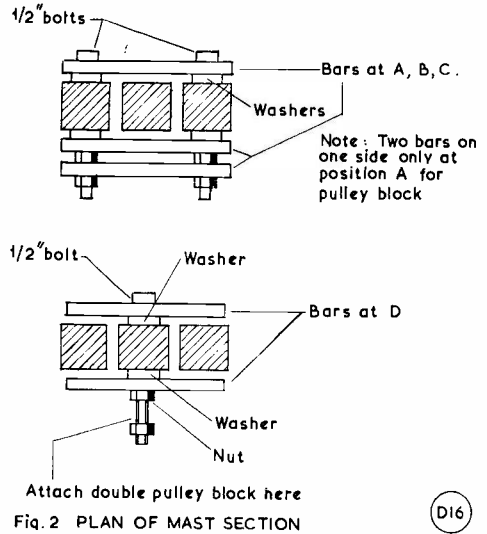


Fig. 2 PLAN OF MAST SECTION

Three sections of 2½ in. square timber were bought from the local timber yard, two of 20 feet length and one of 21 feet long. The two shorter ones form the lower half of the mast, and are fixed, while the longer section slides between them, and is raised and lowered U-boat periscope fashion, by a winch, to the required height. The outer sections are spaced by 2-inch strips of metal ½ in. thick, drilled with ½ in. holes at each end and spaced to allow ¼ in. or ⅜ in. space between the centre section and the outer ones to allow free movement. (See Figs. 1 and 2).

Pully blocks are attached at the top of the fixed section and bottom of the extending section, and used in conjunction with a winch and the use of poly-propylene rope, the whole is used to raise and lower the extension. The brackets for this winch are bolted to the outer sides of the fixed section and also incorporate the pivot point to enable the whole mast to be tilted over to the horizontal position. (See Figs. 3 and 4.)

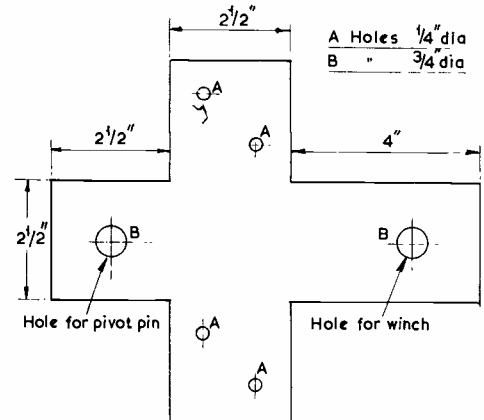


Fig. 3 PIVOT BRACKET - 2 off - 1/4" thick



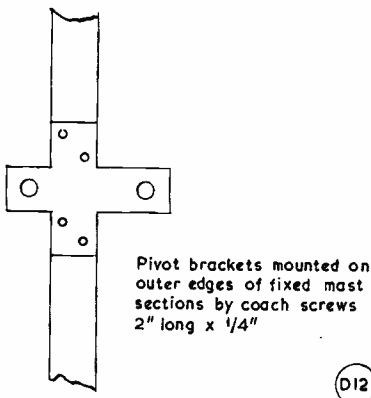


Fig. 4

A Tabernacle of 6in. x 3in. timber of suitable length, and spaced by more strips of 2in. x 1/4in. metal is sunk into the ground and firmly fixed into a bed of cement or concrete. The whole mast is mounted in the tabernacle at the pivot point, and a second winch on the tabernacle is used to raise and lower the mast between the horizontal and vertical positions. A suitable stop pin 3/4in. dia. prevents the mast going beyond the vertical position, and a hinged bar drops into position behind the mast to prevent it falling when the tension on the winch is released. (See Fig. 6.)

Guy-wires may be used if required, either at position "B" in Fig. 1, which would probably be best if a quad antenna was used, whereas position "A" would be all right for a Yagi.

During construction care should be taken to ensure holes drilled in the wood are accurate and run at right angles through the work. The timber should be "TANALIZED," a process of wood preserving, which will be carried out by the timber merchant if required at slight extra cost, before delivery.

You should also ensure that the mast sections are

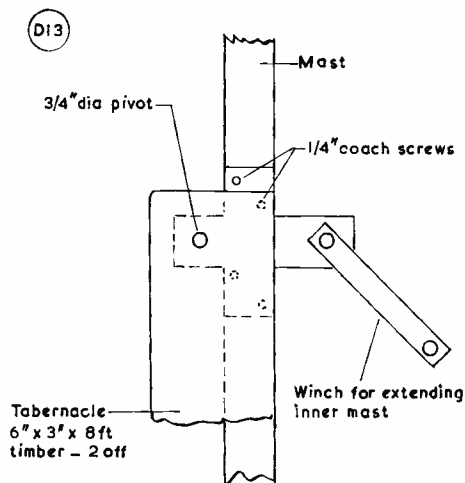


Fig. 5 TOP SECTION OF TABERNACLE & METHOD OF PIVOTING MAST.

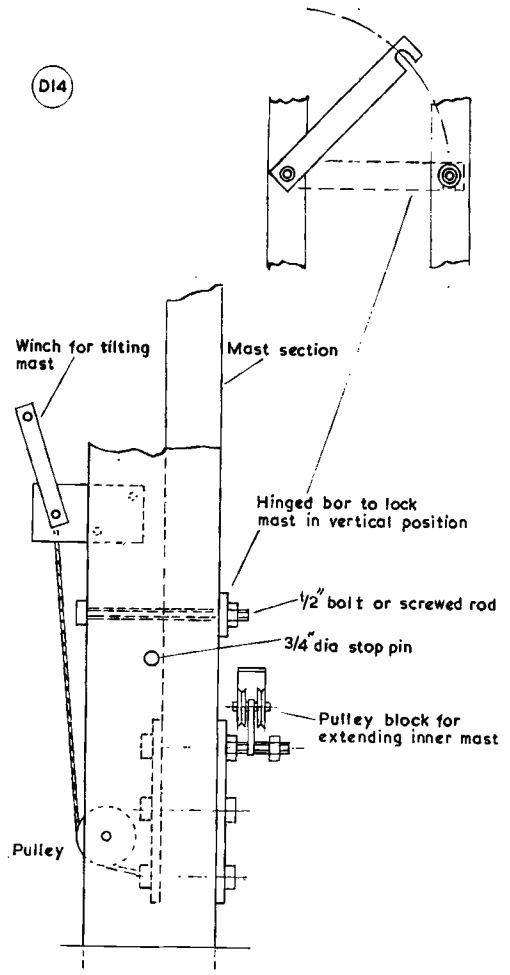


Fig. 6 END VIEW OF LOWER HALF OF TABERNACLE

as straight as possible, selecting them yourself if the merchant will allow.

All metal work should be painted with a good outdoor paint and varnished, and should be examined periodically for rust or corrosion.

The dimensions in this design may be modified to one's own requirements, as may the design itself. I submit it only as a practical design which I have found suitable to my requirements in particular, and which other readers may find of interest. One item which I did not mention is a method of locking the centre mast section in position when it is raised. Perhaps some reader might incorporate it in his own version of this mast.

I usually wind the mast up to operate on the air, and wind it down again when the station is closed down. This ensures the mast is not exposed to the winds longer than necessary, and does not become something of a "permanent landmark," which could with the passing of time, be viewed with a jaundiced eye by officialdom and unsympathetic neighbours.

## RADIO AMATEUR LICENCES

From January 1, 1977, the Home Office will be issuing four new types of radio amateur licence which will replace all existing amateur licences when they become due for renewal.

The new Amateur Licence A (full facilities) and B (having certain limitations) will include all those facilities available to holders of the existing Amateur (Sound) Licences A or B, and will also include operation from a vehicle, or vessel other than at sea, or as a pedestrian; facsimile, amateur television, slow scan television, data on amateur bands 144-146 MHz and above, as well as double sideband suppressed carrier operation will also be included; and Emergency County Planning Officers will be added to the categories able to call upon Raynet (emergency communications).

The purposes of the new-style licences are:

- (1) to give more flexibility to British radio amateurs, so that they may pursue their hobby without having to make special application for several of the above facilities at present needing separate licences or authorities;
- (2) to enable the Home Office to deal with the increase in applications for amateur licences and regulatory work over the next few years with the minimum of delay.

Existing facilities authorised by a total of 20 licences and special authorities will thus be contained (with a few exceptions) in the new Amateur Licence A or B; and for Aliens combined fixed and mobile facilities in the Amateur Licence C or D. The new fee for all UK amateur licences will be £5.50.

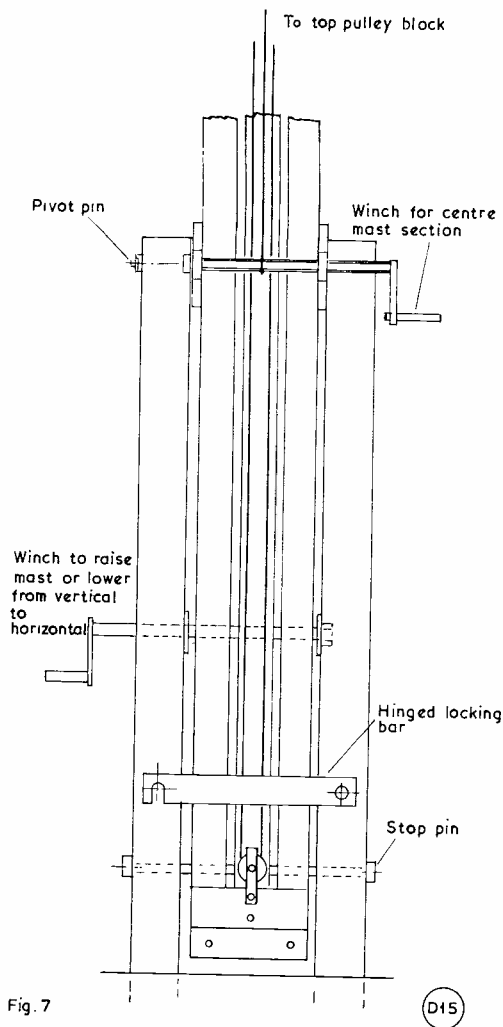


Fig. 7

There it is then. If you can afford a Strumech 60-footer and super-beam—O.K. If you can't, but want a mast for under £30, you might give this effort of mine a try.

### Stolen

David Andrews G4CWB, reports to us the theft from his car in Reading of a Trio TR-2200G (s/n 230247) and a VB-2200 (s/n 060961); would anyone coming across this equipment please contact their local Police.

## MOBILE RALLY SEASON—1977

The following lists details of events received so far. **April 3**, White Rose Rally, Lawnswood School, Leeds, junction A660/A6110, opening noon, with talk-ins on two-metres FM by G8LVQ on S22, and on eighty-metres SSB by G3XEP on 3.7 MHz, free parking, Trade stands etc. **April 17**, North Midlands Mobile Radio Rally, Drayton Manor Park, nr. Tamworth, Staffs., talk-ins on two-metres, seventy-centimetres and 160-metres, all usual events. **May 1**, Spalding Tulip-Time Rally, Glead Boys School, Halmer Gardens, Spalding. **May 22**, Barry College of Further Education Radio Society, Barry Rugby Football Ground, Merthyr Dyfan Road, Barry, talk-in on two-metres by GW3VKL on S20 and via GB3BC on R6, Trade stands, bar, etc. **July 10**, Upton Radio Rally, Hill High School, Upton-on-Severn. **July 24**, Anglian Mobile Rally, Stanway School, Colchester.

We would be glad to have reports and pictures covering these events—address to Editor, "Mobile Scene" Short Wave Magazine, 34 High Street, Welwyn, Herts. AL6 9EQ—also details of other Rally events.

## NOTES ON POWER SUPPLY DESIGN USING THREE TERMINAL REGULATORS

P. BURNETT (G4BLL)

**M**OST readers will, by now, have noticed the Three Terminal Integrated Circuit Voltage Regulators making their appearance in low voltage (0-24v. positive and negative) power supplies. They simplify considerably the task of obtaining a well regulated output voltage (or current) and replace the many discrete components which would otherwise be required.

The range of regulators to be discussed will give maximum output currents ( $I_o$ ) of 100mA. to 3 amps at the specified output voltage ( $V_o$ ) and are available in a variety of packages from small signal transistor TO39 or TO92, 14-pin DIP, TO220 (flat plastic), to the familiar TO3 power transistor package.

The future trend in voltage regulation is towards the use of several of these low current fixed voltage devices placed strategically throughout the circuit eg. one device per card (p.c. board). This method exhibits the following advantages:

- (1) Smaller packages possible.
- (2) Little or no heat sinking required.
- (3) Elimination of bulky high power regulators or the equivalent circuit using discrete components.
- (4) Elimination of common impedance paths and associated by passing or decoupling capacitors.
- (5) Elimination of voltage drops due to connectors and long interconnecting leads.

The basic three terminal regulator circuit is shown in fig. 1, the stabilising capacitor C2 is only required if the regulator is located more than two inches from the filter capacitor C1. C2 may be a 0.22  $\mu$ F disc ceramic (not easy to obtain) or 2.2  $\mu$ F (or larger) solid tantalum or 22  $\mu$ F (or larger) aluminium electrolytic. The difference in values necessary is due to the higher effective series resistance exhibited by each type of capacitor. C3 is added to give improved transient response and ripple rejection but is mandatory in certain cases to ensure stable operation.

The design of a supply giving the following outputs will be discussed:

$\pm$  12 volts at 600mA. (Up to a max. 1 amp.)

$\pm$  5 volts at 2½ amps. (Up to a max. 3 amps.)

as these are the voltages commonly required for analogue and digital IC devices, but the same design criteria can be adapted for any other voltage required; eg. the writer also required an output of -8 volts at 500mA to feed the input line buffers (AM2521) of a slow to fast scan converter.

The initial step is to determine the type of regulator and package to use. In the case of the  $\pm$  5volt supply the choice was simple as there is (at the time of writing) only one range generally available which will give these voltages at the required current and they are the LM323 3 amp 5 volt positive and LM345 3 amp 5 volt negative regulators in the TO3 package. For the sake of uniformity

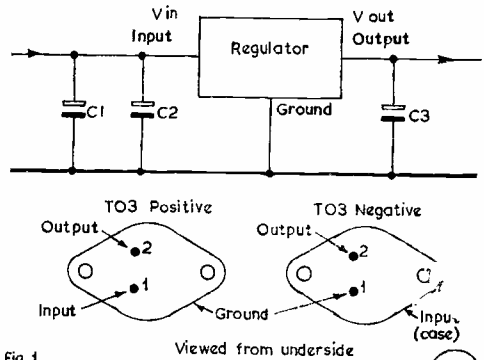


Fig.1

External circuit with TO3 base connections for regulator.

the TO3 package was also chosen for the  $\pm$  12 volt supplies (LM340K 1 amp 12 volt positive and LM320K 1 amp 12 volt negative) and the -8 volt supply (LM320-8 1 amp 8 volt negative) although the TO220 flat plastic package also giving one amp output could have been used. The TO3 positive regulators may be bolted direct to the heat sink as the case is grounded. The negative regulators require to be insulated as the case now forms the input terminal. To ensure maximum heat dissipation use silicon grease between the making surfaces of the regulator, mica washer and heat sink. It was also found that the negative regulators required a 4.7  $\mu$ F solid tantalum capacitor across the output to ensure stable operation.

The next step is to determine the type and size of heat sink to employ to maintain the junction temperature ( $T_j$ ) of the device below the specified maximum. Under short circuit conditions the internal thermal protection circuits will limit the junction temperature but extended operation under these conditions could adversely affect the reliability of operation. In general, use a heat sink with a thermal resistance of at least 4.7°C/watt unless the regulator is being run well within its capabilities when a large heat sink will not be required.

We can now determine the input voltage ( $V_{in}$ ) requirements and whether half wave, full wave or bridge rectification is to be employed. Normally the nominal input voltage to the regulator is between two to fifteen volts higher than  $V_o$ . However, these devices should not be operated close to the "dropout voltage" (the difference between the input and output voltages at which regulation will not be maintained for any further reduction in input voltage) as the ripple on the filter output may cause the regulator input voltage to drop below the threshold value. Neither should an input voltage close to maximum be used as the maximum available output current will not be realised. As a practical guide Table I gives the "preferred" transformer output voltages. They are readily available from standard transformers.

It is not proposed to consider the use of half wave rectification as this gives poor transformer utilisation,

high ripple and a high value filter capacitor requirement (approximately four times higher than the value required for full wave circuits). Also integrally packaged bridge rectifiers are available in a wide range of voltages (piv) and currents and at quite modest prices.

Neither is it necessary to use a choke input filter circuit as the family of regulators under discussion will

### Table of Values

Fig. 2. Circuit of Power Supply

#### Capacitors

C1, C2 = 0.01 $\mu$ F 1000v. DC wkg.	C7 = 0.01 $\mu$ F disc ceramic
C3, C4 = 15000 $\mu$ F 16v. DC wkg. (High Ripple Rating)	C8 = 4.7 $\mu$ F 40v. DC wkg. (Solid Tant.)
C5, C6 = 2.2 $\mu$ F 40v. DC wkg. (Solid Tant.)	

#### Regulators

Reg. 1 = LM323K (+5v. 3 amp)	Reg. 2 = LM345K (-5v. 3 amp)
---------------------------------	---------------------------------

#### Miscellaneous

Rect. 1 = 100 p.i.v. 10 amp	T1 = 9v-0.9v 50VA per section
	S1 = D.P.S.T. 250v.

### Table 1

$V_o$	Transformer Vsec.
12v.	15v. or 17v.
8v.	12v.
5v.	9v.

cope adequately with the ripple output from a capacitor filter circuit. To keep ripple to an absolute minimum use a high value electrolytic 5000  $\mu$ F to 15,000  $\mu$ F allowing for a commercial tolerance of -50%. Also note that the case may not be isolated from the negative terminal and in negative supplies the capacitor will need to be insulated from the chassis mounting. The final circuit is shown in Fig. 2.)

It is sincerely hoped that readers will have found this short discussion of interest, the use of formula has been "deliberately avoided" but those who wish to probe deeper into the subject and to prove the values given or determine the parameters for themselves are referred to a booklet entitled "Voltage Regulator Handbook" published by National Semiconductors.

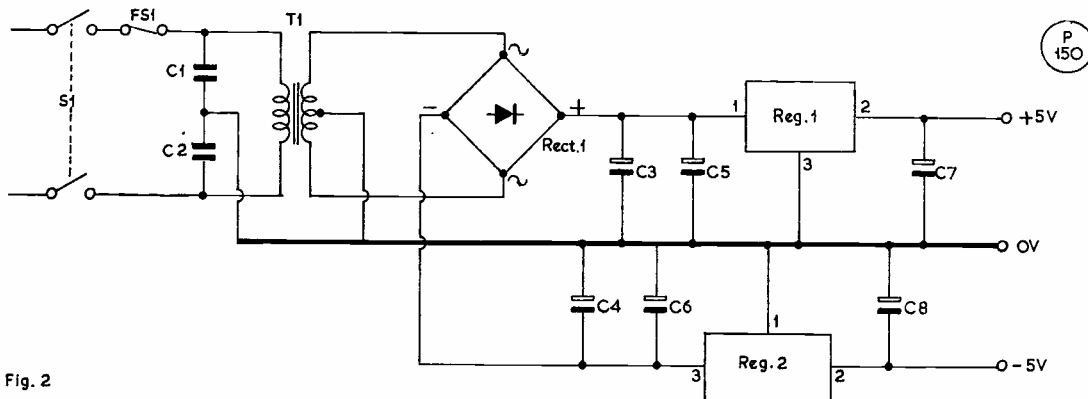


Fig. 2

Circuit for the 5-volt supplies; the same is equally applicable to the 12v. and 8v. supplies, utilizing the appropriate transformer, bridge rectifier and regulators.

## PHOTOGRAPHS ALWAYS WANTED

Readers are reminded that we are always glad to have good photographs of Amateur Radio interest for general illustration in SHORT WAVE MAGAZINE. Though colour prints can sometimes be satisfactorily reproduced black-and-white, we much prefer the latter in the original. Except that we cannot conveniently make use of photographs that are either very small or very large, size is not of great importance as this is in any case determined to our requirements in the block-making process. What is

important is that the picture should be clear and sharp with fully descriptive notes—and this description should *not* be written on the back of the print itself, but on a separate piece of paper lightly attached to the photograph. Payment is made for all pictures used, immediately on publication.

Send to: Editorial Dept., SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ

## BEGINNER'S GUIDE TO OSCAR

N. A. S. FITCH (G3FPK)

**A**TTITUDES to the amateur satellite programme vary from those of the devotees, who seldom use any other mode, to those of the fraternity who declare that *any* artificial aid to communication is cheating and is to be deplored. In between there are those, like the author, who enjoy the challenge of communicating through orbiting transponders from time to time, especially when UHF/VHF conditions are flat, and those who are keen to "have a go" but who do not know how to get started. This article is intended for this last group. Brief History.

*Oscar 1*, the first Orbiting Satellite Carrying Amateur Radio, was launched on December 12, 1961 and lasted 20 days. Its 1000 milliwatt transmitter on 144.98 MHz ground out "HI" in morse. *Oscar 2* lasted 18 days after its launch on June 2, 1962 and consisted of another "Hi" beacon on 144.99 MHz. The first amateur communication satellite was *Oscar 3* which was launched on March 9, 1965. It lasted 15 days, receiving signals on 144.1 MHz, relaying them on 145.9 MHz but was only partially successful. *Oscar 4* was put into orbit on December 21, 1965 and lasted three months. It received signals on 144.1 MHz, relaying them on 431.938 MHz but was not very successful, either. The *Australis Oscar 5* was launched on January 23, 1970 and was the first amateur satellite to be ground controlled. It lasted two months but only carried beacons on 144.05 and 29.45 MHz.

### What is an Oscar?

*Oscar 6* and *Oscar 7* are the two active amateur satellites currently operational and they orbit the Earth near enough every 115 minutes at a height of approximately 1470 kms. They consist of small packages containing solar panels, batteries, receivers and transmitters with appropriate aeriels. The batteries are charged via the solar cells each time the satellites come into sunlight. They receive signals in part of one amateur band and re-transmit them in part of another. Unlike single frequency, terrestrial repeaters, they will transpose linearly any type of narrow band signal, such as CW, SSB, TRRY, SS/TV, NBFM and AM, although the first four are recommended. *Oscar 6* and *7* can be fully commanded from several ground stations.

### Where to Listen

Both satellites can be heard in the 10 metre band, *Oscar 6* between 29.45 and 29.55 MHz, *Oscar 7* from 29.40 to 29.50 MHz. *Oscar 7* can also be received in the 2 metre band between 145.925 and 145.975 MHz. The majority of signals heard will be CW and SSB but there is a little RTTY and SS/TV activity. Both satellites continuously transmit telemetry in the form of code groups on CW plus RTTY on *Oscar 7*. More of this later.

### Orbit Information

The simplest way to understand *Oscar* orbits is to imagine you are out in space observing the Earth, rotating on its axis from west to east, with the north

pole at the top as in Figure 1. If you could detect an object as small as a satellite, you would see it coming from behind the Earth, over the Antarctic region proceeding northwards, passing the equator then disappearing over the north polar region. This part of the orbit is known as the *ascending node*. The remaining half of the orbit, when the satellite travels from north to south, is called the *descending node*.

You would have noticed that the orbit is tilted anticlockwise or is *retrograde* in space parlance. The satellites never go right over the poles and the most northerly or southerly latitude *Oscar 6* would reach is 78°-24'. For *Oscar 7* it is 78°-18'. In round figures, an orbit of either satellite takes 115 minutes during which time the Earth will have rotated eastwards by 28½ degrees. (The Earth rotates one quarter of a degree per minute.)

An orbit commences when a satellite crosses the equator travelling north and all orbit predictions relate to this time in Universal Clock Time (UCT) and the degrees west of the Greenwich meridian where it occurs. This method of stating longitude often confuses the uninitiated more used to degrees east and west of Greenwich, but it is really quite simple. Up to 180°W there is no problem. After that, 230°W is equivalent to 130°E; 305°W to 55°E and so on.

### Where to get Orbit Details

The orbits of *Oscar 6* and *7* are highly stable so it is possible to issue accurate predictions of the times of equatorial crossings and corresponding longitudes of every orbit for a year ahead. Probably the best known of these predictions is the W6PAJ Clendar which is available through AMSAT-UK. (Ref. 1). Alternatively, predictions for the week ahead can be obtained from the Sunday news bulletins over GB2RS, from the 80 metre AMSAT net at 1015 local time on 3780 kHz or from the London area VHF net on 144.28 MHz at 1930 local time, both on Sundays.

The first orbit of the day is called the *reference orbit* and will obviously occur in the first 115 minutes of the day. These are always out of range of the U.K. The data given in Table 1 will enable future orbits to be calculated with great accuracy, given any reference orbit information. For daily use, it is quite accurate enough to add multiples of 115 minutes and 28½° to the reference orbit to derive data for each orbit subsequently within range.

### How to Use the Predictions

Having looked up or calculated the basic data for an orbit, they have to be turned into beam headings, acquisition of signal (AOS) and loss of signal (LOS) times for your particular location. Numerous ingenious ways of deriving such information have been published. (Refs. 2 & 3).

### The Receiving System

The reception of the 10 metre signals relayed by *Oscar 6* and *7* differs from normal reception from distant ground stations in that it is basically line of sight. Furthermore, it is likely that only a few milliwatts is being radiated by the satellite per station. The performance of many amateur band LF/HF receivers and transceivers falls off in the 10 metre band, particularly at the high end. Consequently, a simple preamplifier to provide 10-20

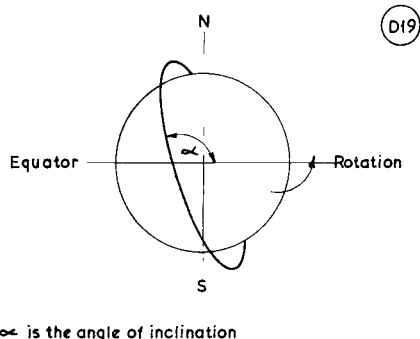


Fig.1 OSCAR ORBIT VIEWED FROM SPACE

dB gain will bring about a dramatic improvement in reception. A circuit successfully used by the author is shown in Figure 2. The components are mounted along a short strip of five tracks of *Veroboard* with the toroidal coils mounted at either end at right angles to each other. As most dual gate MOSFET devices tend to oscillate at UHF, the ferrite bead over Gate 2 lead should not be omitted.

A simple dipole or ground plane aerial will enable good signals to be heard from the nearer passes but for serious "DX" work at horizon distances, a low angle beam of some kind should be considered, mounted in the clear above the local noise blanket. Simple and compact beams with good gain for their size are the *HB9CV* and *ZL-Special* designs. A compressed version of the latter was described in Reference 4; it measured only 3.58 x 1.07 metres overall. To cope with the nearly overhead passes, a fixed dipole running east-west is sufficient since the satellites will be travelling north-south south-or north on such orbits.

Most VHF operators will have some kind of beam for the 2 metre band, consequently, reception of the downlink signals from *Oscar 7* on mode "B" should be quite good provided the beam is correctly aimed. Again, for high passes, a dipole or crossed dipoles mounted above a ground plane give good results.

### The Transmitting System

Dealing first with *Oscar 6* and *Oscar 7*, mode "A" the *maximum* e.r.p.'s at 3200 kms. slant range are 80 and 100 watts respectively. This means that a 150 DC input CW transmitter or an SSB TX using a QQV06-40A PA stage at 200 watts p.e.p. input should be quite sufficient just feeding crossed dipoles. However, it has

TABLE 1  
SATELLITE PARAMETERS

Satellite	Oscar 6	Oscar 7
Period (mins.)	114-99441	114-94513
Longitude progression per orbit	28-75015°W	28-73707°W
Retrograde inclination	101-6015°	101-7010°

been frequently proved quite possible to "get in" with less than one watt to a dipole, *provided* everyone keeps to QRP. The author has found that, when beaming west and northwest towards the U.S.A. at weekends, when usage is highest, 20-25 watts into a 10 element Yagi is more than adequate at extreme range in normal conditions.

To eliminate the need for tracking, it is better to run high power to dipoles than lower power to a beam. In any case, for optimum results, a beam should be capable of being elevated but this is often not practical due to the extra expense and mechanical limitations. However, generating high power costs more money and the gear take up more space so one must decide which route to take.

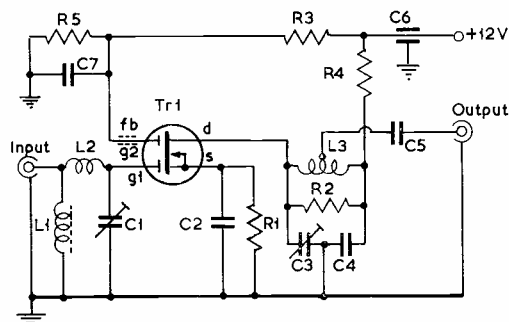


Fig.2 29 MHz PREAMPLIFIER

### Table of Values

C1, C3 = 20μF trimmer	R2 = 2,200 ohms
C2, C4 = .01 μF disc	R3 = 100,000 ohms
C5, C7 = .001 μF feed through	R4 = 120 ohms
R1 = 150 ohms	R5 = 47,000 ohms
	Tr1 = 40673
	FB = Ferrite bead

### TABLE OF COIL DATA

L1 = 22μH RF Choke.
L2 = 22 turns 24g. enamelled on iron powder toroid T50-6.
L3 = 19 turns 24g. enam on T50-6 core tapped 6 turns from "cold" end.

Secondly, dealing with *Oscar 7*, mode "B," a 70 cm. TX is required and the recommended *maximum* e.r.p. at 3200 kms. slant range is 100 watts. Here again though, experience has shown that the spacecraft's receiver is sensitive enough to pick up and retransmit very low power signals, *provided* the QRO merchants keep off. Most amateurs who use mode "B" will have gear for 2 metres and 70 cms. already, including rotatable beams for both bands on one mast. Such a set up is ideal for satellite communication over the longer distances when the elevation is low, especially if crossed Yagis are used enabling different polarisations to be selected for best results. For reliable communication *via* the overhead passes, dipoles for transmission and reception are convenient.

## Polarisation

The aerial polarisations for *Oscar 7* are given in Table 2. Satisfactory results will be obtained with linear polarisation but fading will be more trouble-some at times.

TABLE 2  
AERIAL POLARISATIONS — OSCAR 7

System	Polarisation
2/10m. repeater uplink	Left hand circular
2/10m. repeater downlink	Linear
70cm./2m. repeater uplink	Right hand circular
70cm./2m. repeater downlink	Right hand circular
435.1 MHz beacon	Left hand circular
2304.1 MHz beacon	Right hand circular

N.B. These polarisations are for the northern hemisphere only.

## Band Plans

As with other amateur allocations, there are band plans for the orderly use of the space sections of the 2 and 10 metre down link bands and these are shown in Table 3.

TABLE 3  
SATELLITE BAND PLANS

Satellite	Band (MHz)	Modes
<b>Oscar 6</b>	29.450 — 29.510	SSB
	29.490 — 29.550	CW
<b>Oscar 7</b> Mode "A"	29.400 — 29.445	SSB, RTTY, SS/TV
	29.445 — 29.455	All modes
	29.455 — 29.495*	CW only
<b>Oscar 7</b> Mode "B"	145.925 — 145.950	SSB
	145.945 — 145.955	All modes
	145.955 — 145.975	CW

\* The top 5 kHz should not be used but kept as a guard band for the beacon on 29.502 MHz.

## Range of Communication

For a station at sea level in the British Isles, the horizon distance to the satellites is about 4550 kms. equivalent to a ground distance of 3950 kms. It follows that the maximum ground range is twice the latter, or 7900 kms. However, this range can be exceeded considerably when there is anomalous propagation on the 2 metre, 70 cm. and/or 10 metre bands. For example, a tropospheric duct will enable a VHF or UHF signal to be received by the satellites when they are below your horizon. For instance, G3IOR has worked W6CG over a ground distance of 9570 kms. The normal 7900 kms. distance brings within range of London such places as Salt Lake City and Seattle in the U.S.A. Lusaka in Africa, St. Helena in the South Atlantic and Goa and Lhasa in Asia.

## Telemetry and Codestore

It is hoped that the foregoing will have enabled a newcomer to amateur satellite communication to understand the subject sufficiently to at least calculate when and where to listen for *Oscar 6* and *7*. Short wave listeners will be able to hear many countries via satellite and it is interesting to copy down the telemetry or TLM sent down continuously on the beacon frequencies.

The CW TLM consists of 24 three-figure groups which, when decoded (Ref. 5) give details of such parameters as battery voltage, current and temperature, the power output of the transponders, etc. The TLM is an essential feature of the satellites as it enables the ground control stations to take appropriate action if excessive battery current is being drawn or the PA stage of the TX is getting overheated, for example.

On *Oscar 6*, the TLM is on 29.45 MHz the CW only code groups being transmitted at either 10 or 20 w.p.m. On *Oscar 7* mode "A" the beacon is on 29.502 MHz and on mode "B," 145.972 MHz and it is sometimes transmitted on RTTY on which it transmits 60 channels of information. On certain occasions the TLM is not transmitted but instead, messages are loaded into the beacon TX from ground command stations and radiated from the satellites. Such "Codestore" messages have included Christmas, New Year and Birthday greetings and urgent instructions to other ground command stations and users.

Special report forms for TLM reception are available from AMSAT-USA (Ref. 6) and records of the TLM are of great use to the organisation as they give valuable clues to any odd behaviour, such as erratic mode switching on *Oscar 7*.

## Practical Communication

Undoubtedly the most common misuse of the satellites is the use of far too much power. Particularly on the 2/10 metre modes, this seems to be due to rather inferior receiving systems employed by some operators. This causes these stations to run a lot of power before they can find their own signal. The downlink sensitivity required is 0.1 microvolt for 5 dB over the noise and this will enable weak signals to be heard.

There are few amateurs fortunate enough not to be troubled with RF interference from switched mode power supplies and line timebase oscillators in TV sets, faulty domestic thermostats and sundry industrial and other "funny noises." Much of this interference can be dealt with by a good noise *blanker* as opposed to a noise limiter. Circuits worthy of consideration are noted in References 7 and 8 if your receiver is deficient in this respect.

To illustrate how to communicate through an amateur satellite, let us take a step-by-step example for *Oscar 7* in mode "A."

- (1) From the W6PAJ calendar or other publication of broadcast data, check when a convenient orbit will occur.
- (2) Tune up your 2 metre TX in the 145.85-146.95 MHz segment before the calculated AOS time.
- (3) If your transmit and/or receive aerials are rotatable point them in the direction from whence the satellite will come over the horizon.



- (4) Set up your receiver to cover the 29.4-29.5 MHz part of the 10 metre band and make sure the RX is *not* muted when the TX is on.
- (5) Next, listen for the TLM which is nominally on 29.502 MHz. However, remember that the satellite is travelling towards you at an orbital velocity of about  $4\frac{1}{2}$  miles per *second*, causing a Doppler shift upwards in frequency of up to 700 Hz.
- (6) Having established that the satellite is within range and functioning, you should hear a number of mainly SSB and CW signals as you tune across the band 29.4-29.5 MHz so the next goal is to find out if your signal is being received by the satellite. What you must *not* do is to transmit a powerful carrier, swishing your VFO across 2 metres trying to hear yourself. This is very anti-social and unfortunately all too prevalent.

You can quickly calculate where your signal ought to be within a few kilohertz on 10 metres. For example, if you transmit on 145.900 MHz, right in the middle of the uplink band, your 10 metre signal would be near the middle of the downlink band, i.e. 29.450 MHz. Similarly, a signal on 145.925 MHz would be found near 29.475 MHz. Figure 3(a) should make this relationship clear. Again, due to the Doppler effect, you should tune up to 4 to 5 kHz higher, if the satellite is approaching, or lower if it is receding from you.

- (7) If you put out a "CQ" call, monitoring your own signal on 10 metres, be prepared for someone breaking in; that's the beauty of satellite working, it is the ultimate in break-in operation. Some CW stations are crystal controlled so you should tune around in case anyone is answering elsewhere in the band. Once contact is established, a QSO would proceed in the usual way.
- (8) If you generate the required e.r.p. by a low power TX feeding a gainy beam, do not forget in your initial enthusiasm to turn the aerial from time to time. A convenient approach is to turn the array in increments equal to the half power beamwidth, say  $45^\circ$  for an 8 element Yagi. At extreme range, accurate aiming is important.

### Oscar 7 Mode "B"

So much for a mode "A." For mode "B" you must be able to transmit between 432.125 and 432.175 MHz, reception being nominally 145.975—145.925 MHz. To minimise the Doppler shift, which gets more pronounced as the frequencies increase, the spacecraft's downlink band is *inverted*. This means that if you *increase* your 70 cm. transmit frequency by 10 kHz, your received frequency on 2 metres will *decrease* by the same amount. Figure 3(b) should make this clearer. Furthermore, this inversion means that an upper sideband signal on 70 cm. will become a lower sideband signal on 2 metres. Apart from these points, the procedure for mode "B" operation is very similar to that for mode "A" except that Doppler shifts will be much more pronounced.

### Funding the Satellite Programme

As with terrestrial repeaters, the orbiting repeaters have to be designed, built, tested, launched and sub-

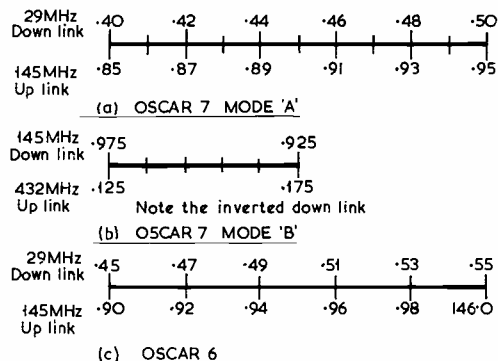


Fig.3. Relationship between Up link and Down link Bands for OSCAR 6 and OSCAR 7. See text concerning effects of Doppler shift

(D21)

sequently controlled from ground command stations. All this takes a great deal of time and money. It is only right that those who regularly use amateur satellites should contribute something towards the programme. Membership of AMSAT-UK is open to anyone. There is a minimum subscription of £3.00 for the 1977 year but extra donations are always welcomed. "Oscar News" is the publication which keeps members in touch concerning past achievements, present activities and future plans. The secretary's particulars are given in reference 9.

### Conclusions

It is hoped that this article will have persuaded those who have been thinking about satellite operation for some time to take the plunge. It really isn't all that mysterious or complicated. As to the future, *Oscar 8* is due for launch later this year and will carry another 145/29 MHz transponder—like *Oscar 6*—and a 145/435 MHz one for the first time. In late 1979, it is planned to launch the most ambitious amateur satellite yet into a highly elliptical orbit enabling far greater ranges to be achieved. Progress on these projects will be covered in our "VHF Bands" feature.

### References

- "1977 Orbital Predictions for Amsat-Oscar 6 and Amsat-Oscar 7" by W6PAJ. Available from AMSAT-UK price £1.50 to members, £3.00 to non-members of AMSAT from Pat Gowen, 17 Heath Crescent, Hellesdon, Norwich, NR6 6XD. Send large s.a.e. with 11p stamp.
- "Keeping Track of Oscar, Part 4" by Browning. Radio Communication, April, 1972, pp. 212-215.
- "Oscar, Where Art Thou?" by Fitch. Short Wave Magazine, May, 1976, pp. 160-161.
- "ZL-Special Compressed for 10m." Short Wave Magazine September, 1972, pp. 412-413.
- Telemetry decoding formulae are given in the W6PAJ calendar.
- AMSAT-USA, P.O. Box 27, Washington, DC, 20044, U.S.A.
- "Valve type Noise Blanker for use at 29 MHz." ARRL, "Radio Amateur's VHF Manual," 3rd edition, pp. 63-64.
- "Solid State Noise Blanker" by K4DHC. Ham Radio" February, 1973, pp. 38-41.
- Current Operating Schedules: 0-6—Mondays, Thursdays and Saturdays, *ascending* orbits and Sunday morning *descending* orbits; 0-7—Mode "A" on *odd* days of the Julian calendar, Mode "B" on *even* days. Wednesdays reserved for special experiments sanctioned by AMSAT-USA.

# • • • SWL • • •

## SHORT WAVE LISTENER FEATURE

By Justin Cooper

THIS time round your conductor has a heavy heart indeed, as have all of us who have a direct working connection with the Magazine. Quite apart from the void in terms of the Amateur Radio scene, we are all finding out as we continue our various tasks just how fine an organiser G6FO was—G3KFE and the writer had, over the years, got to the state where a phone call every three months was about all the contact needed, the rest being catered for in the course of writing a covering letter and posting the copy; G6FO was a real *professional* in every sense of the word. Perhaps the only thing that could upset him was to see anything disorganised, whether a group or an individual.

However, the show must go on, and we now turn to the letters; and here of course we are somewhat light on mail, possibly due to late arrival of some January copies which seem to have dropped into a void for several days in a manner as yet unexplained. All we *can* say is that they were due to be out on January 7, and in fact we at this end were a week late on that, which was a reflection of the sudden action-stations call once we realised we had a problem; so that hang-up between printer delivering and newsagents receiving was a double disaster. However, with fingers duly crossed, your scribe can say that as he writes this, a copy of the February issue is at his side just as though everything were normal, it being due to arrive in this morning's post, and the intention is most definitely that this is the way we are going to continue.

Last couple of times, we have muttered on about the receiver, and detailed some at least of the important points; and on re-reading these, we begin to imagine that we could well be putting lots of potential SWL's right off at the thought of the price they would have to pay for a receiver. But, it's not quite like that, really. The most important component is the bit between the headphones, and the little grey computer inside, which marshals all our resources into the exercise of turning the electrical signals on the aerial into letters written in the log or on the scratch-pad which have meaning. Many moons ago, we were thinking, the Editor and your J.C., that some sort of series could be worked up, based on an imaginary new chum and his adventures between the start and the time of his first QSO as a licensed amateur. One of the results of this exercise was the purchase of a CR70, which when all is said and done is a pretty basic sort of receiver—and it is quite amazing how many prefixes have been picked out on this little box, which we switch on every so often, just to remind ourselves how lucky we are to be able to use first class gear all the times we want to. And, we contend, it's the finest way to start—struggle with a simple, basic, home-brew receiver using transistors or valves until you can firstly get the best performance out of it, and secondly use its performance in the manner calculated to get the best results. And, we would add a rider to the effect that if you have the wish to keep your skills at an absolute

peak, never fail to keep a simple receiver in the shack and at regular intervals use it; also, *whether you like the mode or not*, listen to the CW ends of the bands. The object of this last is not to try and make you like CW if you don't, but to sharpen up your realisation of the mental processes involved in copying a signal through heavy QRM. Watch a skilled CW operator adjust his beat note within the narrow pass band, such that, for example, in QRM, he will often so adjust the BFO that the beat note is very low in frequency; he may not realise this but what he thus does is to increase the percentage difference between the wanted and unwanted signal; consider two beat notes, one at 850 Hz unwanted, t'other at 800 Hz and rare DX you've been waiting for for years. None too easy with the simple receiver, or the expensive one for that matter, to copy the wanted one and neglect the unwanted. However, take the beat note down as low as the speaker or phones will stand; at 50 Hz beat note for the wanted one, the QRM signal has become 100 Hz, and instead of a few per cent difference in the beat notes there is now a 2:1 difference, which makes the copy as easy as pie. The same *sort* of tricks are as applicable to SSB as CW operators and SWL's, though of course the precise how and why is not quite so obvious; for example one recalls years ago logging for an old fellow in one of the contests; there was a terrible heterodyne whistle on one signal, which made it all but uncopyable to J.C., while the old chap not only worked him but then took on a string of others, while on the same frequency and with the same QRM—and it was a long time before we realised that the only difference between our reception was simply *age*—the whistle annoying the writer was quite inaudible to the Old-Timer, because his ears just did not respond that high in frequency!

### New Chums

S. Hammond (Solihull) has managed to become one of the gang who mistake *prefixes* for *callsigns*, so we are sure he won't mind if we take this opportunity to explain the make-up of an amateur radio callsign. Consider the G stations; say, G3SWM. In this case the callsign and the prefix are a little mixed, insofar as the prefix is G3, and the callsign 3SWM; but that's the way it is wherever you have more than one possible number in the middle of a complete callsign, such as G3AAA and G4AAA. The number may also be an indication of location, as for example in Russia and America; W1AAA will be up in the Maine/Connecticut neck of the woods, but W6AAA would be in California. What it boils down to is that you must collect one G3, one G4, one GM3, one GM4, and so on, until you have a total of 200, or 500, depending on which Table you are entering. And if you think it's hard, let us just say that a good week-end at the receiver will net the required 200 and probably show representatives of all six continents!

Another one with doubts was J. Grice (Castleford)

who took the trouble to write in and offer a proposed log layout for comment; and about all we can say is that if *everyone* submitted logs as neatly as readers Hammond and Grice, old J.C. would be in Paradise!

A. Dimmick (Glasgow) is a lucky chap with a father taking the R.A.E. after a career as a ships Radio Officer; which explains why at 15 years old, Alan can copy CW with the best, although he has concentrated on listening to SSB with the shack KW2000B.

Now to Banbury, where S. W. Allsopp resides; the interest first started back in 1962, when Stuart was about ten years old. By twelve, he had his own receiver, a Murphy "all-band" BC set with which he discovered 7 and 14 MHz, and later, with accumulating technical know-how tweaked the medium wave down to Top Band. When this box gave out, there was a gap for a couple of years before an AR88D became the shack pride-and-joy, which added Eighty, Fifteen and Ten to the scene. However, that had in its turn to go, after which there was a hiatus of umpteen years, marriage, house-buying (and doubtless the paint-pots which always seem to accompany houses!), in which the interest was sustained by seeing the odd copy of the Magazine; last November there was an 888A going in the Small-Ads, in Banbury, and in need of a good new master—enough said! So far, it has produced lots of interesting signals from around the world, and the next step is to replace the present bit of wire by a properly organised dipole.

## HPX LADDER (All-Time Post War)

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
K. Kyezor (Irechester)	1687	G. F. Gullis	
W. Bingham		(Ogbourne St. George)	847
(Carrickfergus)	1621	W. H. Symth (Hartlepool)	840
S. Foster (Lincoln)	1596	B. T. Mackness (Dagenham)	816
R. Shilvoek (Kingswinford)	1552	C. K. Verstage (Old Basing)	800
R. Carter (Blackburn)	1431	L. Gibson	
J. Fitzgerald		(Barrow-in-Furness)	741
(Gt. Missenden)	1412	P. Rooney (Liverpool)	725
B. Hughes (Worcester)	1382	D. Taylor (Harborne)	714
M. J. Quinton		S. Budd (Worthing)	714
(Wotton-under-Edge)	1314	J. Aspinall (Leeds)	661
P. C. Jane (East Loos)	1313	M. Gibson	
K. A. Whiteley (Castleford)	1297	(Barrow-in-Furness)	631
A. W. Nielson (Glasgow)	1217	M. Law (Chesterfield)	605
M. Cuckoo (Herne Bay)	1214	S. T. Bowen (Kippax)	545
H. A. Londesborough			
(Swanland)	1177		
J. H. Sparkes (Trowbridge)	1073		
E. W. Robinson			
(Bury St. Edmunds)	1052		
Mrs. J. B. Jane (East Loos)	1028	A. Glass (Plymouth)	1240
M. C. P. Bennett (Dartchet)	1024	N. A. Phelps (Devizes)	1258
H. M. Graham (Harefield)	937	H. A. Londesborough	
P. Barker (Sunderland)	917	(Swanland)	969
M. Rodgers (Harwood)	847	A. F. Roberts	
		(Kidderminster)	465
		T. Grimbleby (Hull)	400

Minimum starting entry 500 for Phone. 200 for CW. Listings in accordance with HPX Rules and only include recent claims.

P. Ramsay (Stevenston, Ayrshire) is another one in a bit of a twist over the HPX rules, he having sent in a starter with but 73 prefixes on it, heard on 3.5 and 7 MHz phone. That leaves quite a way to go for the magic 200 which gets you into the listings, but it will no doubt come given time; meanwhile Peter is hunting

round for all the American States; the aerial is a helical vertical, all-same G3KHC's article in the January issue.

R. Montgomery (Lisburn, Co. Antrim) reports on an opening he noticed on Ten from 1300 to 1435z on December 19 1976. The "starting-gun" was to hear GW4BLE breaking in on the Seventycems converter, after which gentle hint the Elan beam was turned South, the 28 MHz band properly tuned, and all Europe and down into North Africa heard; it is interesting to note that the beam heading for *all* the stuff heard was South, even though, for example, UA6 was among the loggings.

### Help!

W. Morrison (South Belmont, Ayr) has an R1392 plus the N234 PSU, plus the Handbook for the rather similar P. 104. However, they lack the vital cable between the receiver and the PSU, and details of the crystals needed. J.C. has written to reply, recommending joining the local club; but if anyone has the know-how to help reader Morrison get on the air, it would be much appreciated—contact them direct at 35 Burnbank, South Belmont, Ayr.

### Other Reports

As we have already commented, thin on the ground through so many probably not "getting their reminder" for this piece due to the problems already discussed. A. Gascoigne (Hitchin) had a few queries on the HPX List, which we have resolved; his station comprises SMC-73, Veritone CR-150, and a Pye T190, with a couple of end-fed wires to pick up the signals.

J. Aspinall (Leeds) didn't get any takers to the request for "gen" on his SX-17, so he has lashed out on a Trio R-300; no doubt when he has had it a little longer, Joe will indicate how the two receivers seem to compare.

Another taciturn type is D. Taylor (Harborne) who confines himself to a very neatly-written list, which is largely bumped up by the current crop of assorted IK prefixes.

One of the both-modes merchants is H. A. Londesborough (Swanland) who is over the "ton" on Phone and all but at the same level on CW.

And, talking of CW, N. A. Phelps (Devizes) who has knocked one off his claimed score—presumably a logging mishap. However, OM Phelps has J.C. with all his sails flat aback over "GJ3DVC." It *must* be a typing error for certain, but, of course, Murphy's Law says that the 1977 Call Book doesn't have any answers to the puzzle, while the earlier edition had already been consigned to the WPB. So—until next time, J.C. will have to exercise his soul in patience!

M. Gibson (Barrow-in-Furness) is one of the taciturn types—just a list of new prefixes heard—and, like so many others, quite a proportion of his new crop were IK's, Italian stations celebrating fifty years life of their nations Society, ARI.

Taciturnity is also a characteristic of R. Shilvoek (Kingswinford); his list, though is of interest in that when first your J.C. took over this piece, it was the custom to "retire" at 1000 prefixes. Now of course, there are several stations over the 1500 mark on SSB, and several over the thousand mark on CW. Additionally it is interesting to note that ten years ago the total of "possibles" was around the 1400 prefixes mark, but now the number is far higher, probably nearer two

## ANNUAL HPX LADDER

(Starting date January 1, 1976)

SWL	PREFIXES	SWL	PREFIXES
G. Ridgeway (Ardleigh)	499	R. R. Williams	
D. W. Waddell (Herne Bay)	443	(Borehamwood)	350
L. West (Langley)	414	R. Ramsey (Stevenston)	312
P. Wells (Colne)	403	P. Polanyk (Coventry)	300
		A. Dimmick (Glasgow)	220

Starting score 200, in accordance with HPX Rules. Table closed December 31, 1976, new Table starts January 1, 1977. Both 1976 and 1977 lists will be shown in May "SWL."

thousand. Times change!

M. Rodgers (*Harwood*) has been a bit out of it by way of his University studies during term-time but when Christmas came, the break was used to give the receiver a run and so keep himself in the Ladder.

Not only has he moved his address, but P. Barker (*Sunderland*) seems also to have changed his handwriting! Anyway, as usual there were some interesting snippets in his letter; he notes that QST carries a comment that the WT call your scribe gave the thumbs-down to not long ago was in fact genuine while FCC searched for some lost examination papers. One thought we British had a near monopoly of bumbledon, but if this is true, the FCC staff ought to be hung drawn and quartered—where is the right in giving a licence until the licensee has been shown to have the technical knowledge? It would be interesting now to speculate what FCC will do if the exam paper is found and the chap in question is marked as a failure—do they take his ticket back, or let him go on? If the latter, then we are talking of licensed piracy! On a different tack, the old home-brew slow-scan TV monitor has been replaced by a Robot 70c, with which Paul is delighted; and his slow-scan score is now 123 prefixes seen and 47 countries. Not a bad score, at that!

Next on the list we come to K. Kyezor (*Irchester*) who remarks that in the week prior to his letter, he had on several occasions noted the "echo" effect on W station, but on looking at the band (14 MHz) a couple of hours later found it dead to all but the Europeans. The echo effect, of course, is just that; the signal is first heard, and then again 1/7 second later, by which time the wave has done a complete circle of the globe, implying that, in the case of W's, the echo has been 1½ times round the world!

B. F. Hughes (*Worcester*) found himself with a same-day deadline when he got his copy, and so his threatened complete recheck of the list has had to be postponed—but with a current claim of 1382, a complete recheck would be quite a mammoth task! On a different tack, Bernard is quite chuffed with his FRG-7, which he has been using to a large extent on Eighty.

Sometimes your conductor's old brain becomes a mite fuddled; and it did so this time over the question of the GU and GJ prefixes, mentioned earlier; of course he should have recalled that these are now used for Jersey and Guernsey, in place of the old GC, as a study of the "small print" in the 1977 G Call Book makes quite clear. However, it took the station receiver to jolt the little grey cells into operation!

Next on the list we have M. Cuckoo (*Herne Bay*) who of late years seems to have joined the ranks of the

quiet ones—again this time he has just his Table entry to take in.

B. T. Mackness (*Dagenham*) was feeling pretty despondent about the bands last time, but even though he didn't find much in the way of new stuff, he has noticed how the proportion of spots in Cycle 21 and Cycle 20 is changing month by month, giving a pretty fair indication that by the end of 1977 things will be on the upturn. The really good openings are associated on the one hand with plenty of sunspots, and on the other with the quiet geo-magnetic field conditions; the difference between "Normal" and "High Normal" conditions being often the difference between a given solar flux in conjunction with a quietening in the geo-magnetic field as indicated by the A number pushed out by the observatories.

K. Whiteley (*Castleford*) found himself a bit pushed for time this month, but his list contains two GU's—odd that so far no-one has included GU and GJ in a list.

L. Gibson (*Barrow-in-Furness*) notes that over the past couple of years his QSL return has gone up—doubtless as a result of studying the requirements of the recipient—and in this context, Les reckons that Forty is good hunting territory; among the murk and QRM one can find stations who probably have no idea they are being received at DX. For example, your scribe recalls two lads in Coventry nattering on Forty between their two shacks—a matter of a hundred yards apart. Imagine their surprise to receive reports from a VK SWL who listened to them night after night!

P. Rooney writes from *Worcester College Oxford* to let us know he is still alive and kicking; but although there has been no lack of the desired success in exams, there also has been no lack of the hard work, which will of course get harder as the time for Finals looms up. Even then, there will be no let-up, as a six-month course in Chester is required for professional examinations; it all means mid 1978 before the Rooney spare time is available for the receiver, to any degree.

G. Ridgeway (*Ardleigh*) closes his 1976 list, and makes a first claim for 1977's Table, at 347 prefixes, accumulated over fifteen days of spare time; and since he ended 1976 at 499 prefixes, Graham says 1977 has to be the year when he gets onto the All-Time Ladder! In fact, your J.C. is prepared to take a small bet that Graham could in fact by studying his log, make an all-time entry right now, if he could but spare the paper and the time.

That blasted woodpecker-noise is still around says R. Carter, although at the time of his letter it seemed to have dropped as low as 7 MHz and to be being heard only on alternate days. Anyway, in *Blackburn* they are made of tough stuff; Ben reckons that if you close your ears to it you can still wrinkle the odd signal out from under. On the line of doubtful starters, a station was noted twice on Eighty signing ML8DU, both times around the 2330z mark—does anyone else have any information on this one, or on the UZ6CL often to be heard on Forty in the afternoons? Personally, J.C. would hazard a guess that the first one is a phoney, and the second very likely OK.

R. G. Williams (*Borehamwood*) has Trio 9R59 and HA230 receivers, with a Heath SW-717 as the back-up; the aerial is an indoor dipole, feeding through an FET pre-amp and an ATU, with which has scratched up a

1976 final score of 350 prefixes.

T. Scrimshaw (*Birmingham*) is still scratching along at getting the TCS receiver on the go—one would have thought by now someone would have come up with the needed information to help Tim—his address is 69 Pamela Road, Northfield, Birmingham 31. On a different tack, Tim is scratching up the components for the active filter mentioned in the June 1976 issue of this Magazine, and apropos this wants to know how op-amps work. A Good Question! Well now, the name is really Operational Amplifier, and it can best be summed up as a block of gain; this block has an output which, in the absence of input signal, tends to “sit” midway between the positive and negative supply rails, which in their turn have their common terminal grounded. Round at the input end, there are *two* input terminals, one of which is “inverting,” and one “non-inverting” the phrase here referring to the phase relationship of the terminal to the signal at the output. There are usually facilities for ensuring that with zero input the output can be trimmed exactly to where it belongs while in addition there are usually some frequency-compensation facilities which have to be added externally. Having the two possible inputs, which by their very nature are in anti-phase with each other and phase-related with the output, all sorts of interesting things can be done with them. A useful little book on the subject is “Elements of Linear Micro-circuits,” by T. D. Towers, which looks at the theory and practice of the little beasties.

In conclusion we have a couple of letters to deal with which, to put it mildly, should have seen the light of day earlier! The culprit, need you ask, is the joke of a filing system your old J.C. has used for years, and which, to be fair to it, has never let him down before.

A. C. Geer (*Odstock*) says he is “only an SWL” but having been playing with wireless since before 1920, and building all the “trick circuits” of the day, Armstrong, Flewelling, Scott-Taggart, Cossor, Austin is now going to get stuck in to the R.A.E. stuff and get his licence—and as we have said before in this piece, it is a great pleasure to hear of an Old-Timer actually sitting down and having a go rather than letting the brain run to seed. As Tony Buzon points out, the actual loss of brain power through life is probably less than ten per cent, and even that could be largely attributed to rustiness in the techniques rather than in the loss of power pure and simple. Again, one hears of people who “cannot remember” things as they get older—any actor learning his lines can disprove this boary old myth. Again, take a look at the sort of conventional notes taken by the average student—around ninety per cent of what he writes is redundant material, just used to connect and inter-relate the *key* words; the key words therefore are the only ones which need to be down, provided they are correlated with the other key words. Buzon has it all in a book, by BBC Publications, at £1.20 paperback; and any OT with R.A.E. ideas in his head would do well to buy a copy, and adopt the methods used, both to speed up the learning, and most of all, to *improve the retention* of what has been learned.

J. White (*London E.1*) raised in his letter, pretty well all the novice-listener's early questions in one go! However, to answer his thirst for the real “gen” needs a certain basic hint of “propagation” which we haven't

mentioned in this piece since long-ago time. Now, in essence, the long-range signals heard between ten metres and the medium wave band are heard by the “sky wave”; this means the signal leaves the aerial and goes up into the blue sky, through various ionised layers of atmosphere, until it gets to the “F layer” which is about the highest and thinnest atmosphere to be ionised. There it is refracted, just like the rays of light when a pencil is placed in a bowl of water make the pencil appear to bend at the interface between air and water; light waves and radio waves being but the same sort of animals of different wavelengths. Now, our radio wave is hitting the layer at a very glancing angle which means the refraction turns the wave gently down at a similarly glancing angle and sends it back down to earth again. OK so far; but, as we have indicated, there are several layers of ionised air below the F region, notably D and E layers, which are *absorbers of RF*, and these latter *attenuate* signals passing through them, the effect being greatest at low frequencies and least at higher frequencies. Still with us? Right, now for the punch-line, which is to comment that all the ionised layers are thus because of the action of the sun's rays, which in turn are affected in some mysterious way with the presence of sunspots. Thus, in the daytime each layer is at its strongest; at night the lower ones just disappear for all practical purposes, and the F layer also weakens, and recombines if it has split into two during the day. So—what it all adds up to, essentially is that the higher frequencies will tend to be daylight only efforts, while the low ones are night-time only. Forty and Twenty tend more toward daylight-only at the trough of the sunspot cycle, and night-time bands at the peak of the cycle—which can be summarised as saying that 7 and 14 MHz are well worth a look-see at any time when they are showing signs of life.

The cycle described above is of course over-simplified, and in addition it is overlaid by smaller cycles; we have already talked about a daily and an eleven-year effect, and to that we can add a monthly effort, and a seasonal one, these last being effects of the posture of Sun and Earth to each other rather than fundamental effects.

What it boils down to is that even if your receiver has some stations marked on the dial, you may not be able to pick them up just by turning the set on; but *if* they are operating at the right time, and *if* you listen at the right time, there is a sporting chance you may pick the station up. But, of course, just as we amateurs have a series of bands, so has a BC station a set of frequencies, and to maintain his services he will have to change from one to another round the clock; and like the broadcaster, so it is with the amateur, picking the band to suit his needs and for which he may have gear in the station, or even in the amateur case for pure preference.

### Finale

So there it is for another month. Because of the hiccup we have had in distribution, it has been decided that in next “SWL” we will run the final 1976 and the first 1977 entries side by side, to give everyone a chance to put in their finals for 1976; and of course the All-Time Post War table will also appear. So, for the next piece, your deadline is March 24, addressed to “SWL,” SHORT WAVE MAGAZINE, 34 HIGH STREET, WELWYN, HERTS., AL6 9EQ.

# VHF BANDS

NORMAN FITCH, G3FPK

## Television

IT is not often that there is any A/TV news to report in this column since the practitioners of the art rarely correspond. So it makes a change to be able to review *Amateur Television*, a booklet published in October last year by the British Amateur Television Club.

*Amateur Television* is edited by Mr. A. Hughes from contributions by several authors and comprises ten chapters. The first one, "Background," is a brief history of the club founded in 1949, compiled by Don Reid and is followed by a short piece on aerials and reception by Cyril Chivers. Chapter 3, "Transmitting," by J. J. Rose, discusses the special requirements for a TV TX's PA stage and presents circuits for screen grid and control grid modulation. For those possessing a 2m. TX, the circuit and layout of a two-stage tripler is included. Ideas on operating techniques are briefly dealt with in the next chapter by J. Wood. The section on licences has become a little out of date as there is now no need for a separate TV licence. However, the requirements for frequency measurement, monitoring, etc., are still necessary.

The sixth chapter, "Picture Sources" by J. Lawrence, is very well written and copiously illustrated with circuit diagrams, layout drawings and waveform pictures and is the real meat of this booklet. It is followed by "Monitors" by B. Summers which covers the modification of the domestic TV set for use as a monitor. J. J. Rose is the author of the 8th chapter on recording and deals with the subject narratively and with block diagrams. No manual on A/TV would be complete without reference to SS/TV and C. Grant Dixon is the author of this chapter of 15 pages and it is

very well written and illustrated with numerous circuit diagrams. The final chapter by Nigel Walker deals with colour TV by the NTSC and PAL systems.

*Amateur Television* is professionally printed in A5 format on 90 g.s.m. bond containing 112 pages. Being offset litho produced by photographic reduction of normal typewriter script, the text is very small and rather "thin." Whilst there is no list of contents, nor an index, the chapter headings are bold. The diagrams vary from excellent to decidedly amateurish and some that run up and down the page have to be viewed from the left, others from the right. As one would expect, much of the booklet comprises previously published material from the club's journal, "CQ-TV" which probably accounts for the non-uniformity of component identification; e.g., 2·2K and 2K2. But these are rather carping criticisms of a very useful publication which any A/TV enthusiast is bound to want. It is available from BATC at "White Orchard," 65 Showell Lane, Penn, Wolverhampton, W. Midlands at £1·75. The editor and contributors are to be congratulated for a very fine effort.

## North Atlantic Project

In the column last November, mention was made of the *North Atlantic Project*. Serge Canivenc, F8SH, who is IARU Region 1, VHF *Sporadic-E* co-ordinator, has just sent along the very latest information on *Project VESNA* (VHF E's over North Atlantic). Permission has been obtained from C.N.E.T. to use the laboratory at the top of the water tower in the Long Lines Department area in the Lannion industrial estate. Permission is now being sought to use part of the upper platform for installation of the aerials for 50 MHz and for 28, 144, 435 MHz and maybe 10 GHz later on. The crystal for the 50 MHz Tx has been received.

Serge reports excellent transatlantic cooperation in *Project VESNA* with Ray Clark, K5ZMS, Secretary of the Six-Metre International Radio Klub, SMIRK! Transmission of reports will be made on a weekly basis. F8SH is preparing a report for publication in *Radio REF* this April and promises to keep your scribe informed on the progress of

test transmissions on 50 MHz from Lannion. These are planned to start on April 15 in time for the beginning of the *E's* season a month later. It is hoped that many readers will participate in *Project VESNA*. Anyone with 6m. receiving capability should contact F8SH whose address is:—6 Rue do Pont-Hél , F-22700 Perros-Guirec, France.

## Beacons

Dealing firstly with overseas beacons, F8SH writes that a 6m. beacon is operational continuously from Costa Rica on 50·080 MHz signing TI2NA but he did not mention any further details. This could be a useful one during the *E's* season. G3POI mentioned two "private" Dutch beacons. PA0JTA on 144·135 MHz, running 50 watts, mainly evenings and weekends when the licensee is home, and on 70 cms., PA0CBR on 432·075 MHz. In a 40m. QSO on January 14 with G3COJ, CT2BS said that his 2m. beacon is now back at his house being modified from one watt to 15 watts. During last summer's *E's* season, it was operating from a TV station but will resume from his house this year on a QRG to be advised, hopefully in the beacon band. Despite reports of a CT2BB beacon, CT2BS says there is no such thing. David Jarrell is very enthusiastic about achieving a 2m. contact with the British Isles. (He has heard BBC Radio 2 on VHF FM). Your scribe would not be at all surprised if this does come about in 1977 as the distance is similar to those over which many worked *via E's* last summer.

On the home front, GB3NEE, the Durham beacon, is operating again on 144·127 MHz with 3 watts *e.r.p.* to a pair of 5-ele. Yagis beaming simultaneously 135° and 315° at 360m. a.s.l. This to be increased by 10 dB soon. On 23 cms., the Dunstable Downs beacon, GB3DD, has had slight aerial changes made. Currently on 1296·05 MHz, the new QRG will be 1296·89 MHz. The Emley Moor beacon is now licensed, callsign GB3MLE, for 1296·93 MHz and should soon be on with 100 watts *e.r.p.* the Yagi beaming 120°. Our thanks to G3COJ for this information.

## VHFCC Award

The only VHFCC Certificate

awarded this month goes to John White, GW8IQC, from Newport in Gwent. His no. 275 was for 2m. operation. John was licensed in February, 1974, after several years' "apprenticeship" as an *s.w.l.* The first station consisted of a *Standard* C826B and a pair of crossed dipoles. About 20 months ago, he graduated to a *Trio* TS-700 and 5-ele. Yagi at 18ft., the QTH being 75ft. a.s.l. with a good take-off east and south, poor to the west and non-existent to the north.

### Contests

The 144 MHz Fixed contest last December 5 was won by GW8JHL/A with a total of 1625 points from 246 QSO's. Runner up was G8HCL with 1146 points from 230 contacts. There were 72 entries compared with 110 the previous year when the contest was a two-fold affair with a section for non-SSB participants. (Acknowledgments to RSGB News Bulletin Service, GB2RS).

By the time this issue appears, the 144 MHz Open contest will be upon us the weekend of March 5/6 from 1600 to 1600 GMT. The published rules include 4b, which is all entries lumped together; *e.g.*, fixed, portable, -/A and mobile. G3SEK, to whom entries should be sent, confirms this should be 4a. *i.e.* separate Fixed and Portable sections. The 432 MHz Open contest is scheduled for March 20, followed by the 70 MHz Open event on April 2/3.

### The Tables

This month sees the start of the 1977, Three Band Annual VHF Table. Since it covers a period of only four weeks of rather flat conditions, there are not many entries. For the benefit of new readers, just send in your accumulated totals of counties and countries worked on 4m., 2m. and 70 cms. when you write to "VHF Bands." It seems that some are still using the older counties such as Middlesex, Huntingdon, etc., but it is the present day English, Northern Irish and Welsh counties and the Scottish regions which are the basis of this table, *plus* all the Irish Republic counties. One of the best maps to buy is the "British Isles County Map" from *Geographia Ltd.* which shows the newest counties superimposed on the old ones. Incidentally, this map is ideal for

drawing the 50 kms. radial rings around your QTH for contest scoring covering all the British Isles.

The 23 cms. All Time Table has not been published for some time due to lack of space so it is being included this time based upon your latest claims. The QTH squares Table had to be omitted last month too, but there has not been much movement in it due to the lack of any real auroral and tropospheric openings. Please note that all these tables are based upon what you have worked, whether confirmed or not, and that no QSL cards should be sent.

### Scottish News

Jack Wilson, GM6XI (Edinburgh) has sent one of his periodic, concise reports covering activity North of the Border. The main news is that, at a meeting in Motherwell on January 14, a properly constituted Central Scotland FM Group was formed with GM3KMG as Chairman and a "top line" committee behind him. The new group wasted no time as GB3CS came on the air on January 30 with one watt *e.r.p.*, proof of the competence of the new management. Except for parts of Edinburgh, coverage is excellent. Jack reports that so far, behaviour is excellent and that no doubt, coverage will improve when a higher powered TX and new aerial are installed. GM6XI is off the 70 cms. band at the moment due to aerial failure so that *Oscar 7* has one less client.

### Meteor Scatter and E-M-E

Doug Parker, G4DZU (Leeds) has launched four 14-ele. *Parabeams* for 2m. and not unnaturally, is quite loud wherever he is beaming. He had arranged an E-M-E sked with Reinhard Koch, DK1KO, in FN12g for 0600 on Feb. 6 preceded by a possible *tropo.* contact. Unfortunately, neither came off but Doug did hear an SM calling "CQ M/B" on *tropo.*

Dennis Boniface, G4DSC (Ripon, N. Yorks.) now has a 4CX250B amplifier going at full legal input on CW with digital keyers on the way. His results so far are 8 complete QSO's out of 33 attempts, a not insignificant performance considering the limitations of the QTH in a valley, 100ft. a.s.l. As to results, Dennis summarises the *Geminids* as a "washout" with EA, YU and I skeds no good at all and that with UC2AAB hopeless with nothing heard at all in two tests. The successes claimed are SM2CKR (KX12g) and SM0FFS (JT51f). The *Quadrantids* were better but tests with SM3FGL and 14PWL on Jan. 2 failed to come off, although OE5JFL (GI48h) was worked next day. The sked with YU2RQG was marred by QRM from the OE5JFL/EI9V test. Tests on the 4th with SM3BIU and DJ5MS failed although Dennis received 44 pings and 17 short bursts from the German between 0600 and 0800. However, DJ5MS was successfully contacted

THREE BAND ANNUAL VHF TABLE  
January to December 1977

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G3FPK	—	—	53	8	—	—	61
G8HQJ	—	—	31	6	15	2	54
G4FOR	—	—	43	10	—	—	53
G8GML	—	—	38	2	11	1	52
G3FIJ	19	1	19	6	5	1	51
GM4CXP	5	2	30	6	1	1	45
G4FCD	—	—	35	5	—	—	40
G4DEZ	—	—	31	4	—	—	35
G8ITS	—	—	23	3	—	—	26
G4ERX	—	—	18	5	—	—	23
G8JHX	—	—	17	2	—	—	19
GD2HDZ	1	1	4	2	6	2	16



in GI15e by random MS on Jan. 9 between 0600 and 0825 in just two bursts at 0759 and 0818GMT. G4DSC monitors *Radio Gdansk* on 70.31 MHz and, on the morning of Jan. 3, he was not getting pings so much as one long burst, giving almost continuous reception.

#### Four Metres

Graham Badger, G3OHC (Sutton Coldfield), took part in the 4m. CW contest on Jan. 23 and bemoans the very poor conditions. The highest serial number he heard was 14! He concludes that many participants gave up early. From the Borders Region, Derrick Dance, GM4CXP, reckons that the contest was "a real challenge as it coincided with 'super punk' conditions!" He only had five contacts despite trying hard, viz: GM4DIJ (Edinburgh), G3JYP (Appleby), GM3ZXE/P (Tayside), G4AEQ (Mchstr.) and G8KB near Sheffield. *Gotaways* were G3OHH, G3WRA, G3XWZ and GM4BVD. To exemplify the sub-standard conditions, Derrick normally hears the GB3SU beacon RST 319/429 but for most of the contest, it was inaudible.

#### Two Metres

"Aurora—fact not fiction!" is how GM4CXP's letter starts referring to the first genuine such event heard in these latitudes this winter. The happening lasted from about 2030 to 0053 GMT on the night of Jan. 30 for the GM operators. Derrick was first alerted to it at 2050 when GM8FFX was heard calling, "CQ Aurora." The latter had been hearing GM4CXP aurorally when Derrick was working G3BOC/M and beaming SSW. The *aurora* was coming and going quite a bit and the best signals occurred between 2125 and 0053 GMT. The following stations were worked *via* the QTF or beam headings indicated:—

2130	GM3JFG	XR40c	045°
2259	LA2PT	FT13b	045°
2320	GM3DZB	YR44j	045°
2327	GM4BVD	YQ43e	045°
2334	SM3FGL	IV53g	022°
2341	SMØFUO	IT69j	040°
2348	LA2PT		045°
0002	SM4FXH	GU70j	000°

each station

The best DX heard was SM3COL (IW06f) at RST 58A at 0030. Apart from the *aurora*, stations have been

#### TWENTY-THREE CENTIMETRE ALL-TIME TABLE

Station	Counties	Countries	Total
G4BEL	38	10	48
G3DAH	28	8	36
G3JXN	28	5	33
G4BYV	20	9	29
G3NHE	24	5	29
G3COJ	19	8	27
G4ALN	20	5	25
G3JVL	21	4	25
G6NB	19	4	23
G3OBD	20	3	23
G8ARM	20	2	22
G8EOP	11	5	16
GD2HDZ	9	5	14
G5DF	13	1	14
G8AOD	11	2	13
G8FMK	12	1	13
G8AII	7	2	9
G8ABH	7	1	8
G8FJG	7	1	8
G8GNZ	4	2	6
G4DKX	5	1	6
G2AXI	4	1	5
G8GML	4	1	5
G8IFT	3	1	4

worked in the south of England under weak signal conditions.

Clive Penna, G3POI (Kent), only heard one station in this *aurora*, LA3UU in FT11d at 2312. This was followed by a partial contact 7 mins. later and a proper one at 2341. Clive found the QTF very sharp at 010°. He reports that SM2CKR (KX12g) found it necessary to beam quite far east for this event. Although advised by GM8FFX earlier in the evening of a very bright, visual *aurora* in Aberdeen, careful monitoring from G3FPK at intervals during the evening failed to reveal any auroral signals so it seems that London and the south of England was on the fringe of this one.

It is always a pleasure to welcome new correspondents to this feature. R. A. Elliott, G4ERX, from Hutton in Essex, in his first letter, mentions using a borrowed *Trio* TX599/JR599 combination with a *Europa-B* transverter since Christmas using his

own 10-ele. crossed Yagi. As a "new boy" to 2m. SSB, he asks, "Would stations please QSY off the calling frequency after establishing contact, and would stations please listen on their own frequency after completing a QSO and before turning their aerials round?" Could not agree more, OM. G4ERX's own equipment comprises an *FT-101E* transceiver with a 2m. transverter on the stocks, plus a variety of gear for both 2m. and 70 cms., AM and FM.

John Nelson (Hammersmith), whose fine quality SSB signal was mentioned last month, has revoked the old G8HAL call for G4FRX. He took the morse test at Cullercoats Radio and says that the staff could not have been more helpful. The officer in charge sends the best CW from a straight key that John has ever heard. The "A" licence was taken out primarily so that the decided advantages of CW can be realised on 2m. G4FRX runs 150 watts of CW and is always listening for stations to the north and north-west.

SWL Glen Sweeney reports that there were periods when the band seemed open but nobody around to take advantage of it. He wonders if they are all on FM? Glen would like to hear more *non-channelised* FM, more multi-mode contacts and more AM and CW activity. From his Nottingham QTH, two countries and nine counties have been heard this year but the Annual 3-Band Table is only for transmitting amateurs, Glen.

Arthur Breese, GD2HDZ (Laxey), reckons conditions can't get much worse. The date of his letter is that of the *aurora* so perhaps he "scored" in that? He mentions that U.K. stamps are *not* valid in the Isle of Man so those about to send stamped envelopes should, instead, send *loose* stamps—or IRC's if they are that rich! If anyone was to ask your scribe what he thought of conditions so far this year, he would be tempted to reply, "Rubbish!" However, the only English county *not* so far worked—apart from the Scillies—is Northumberland. Upon reflection, although all distant signals have been down, much of the time it has been possible to work quite long distances *if* one is prepared to

dig for the DX and struggle a bit. It seems that far too many folk give up all too easily unless there is a "lift" on. Surely we should seize upon rotten conditions to see what *can* be achieved rather than throw in the towel without even trying?

Incidentally it is when conditions appear flat that the calling frequency should be kept well clear. All too often lately, a local QSO has been in progress either on it or very near it, just because the participants couldn't hear any distant stations, thus denying those who could the chance of establishing a contact.

Before concluding this section, and there are no 70 cms. reports to follow, did any reader hear any auroral signals from 1600-1900 GMT on Jan. 9? The GB2RS news bulletin the following Sunday reported that south coast stations had worked a number of SM's but so far no confirmation of this has been forthcoming. Furthermore, G3USF reported normal, low *gamma* readings for this period.

### Satellite News

For the past three months *Oscar 6* has been exposed to maximum sunlight so battery temperatures of 58°C. have been recorded, far too high for *NiCads*. The Surrey 0-6 commanding is now very reliable and is keeping a very close eye on the telemetry. Although the battery temperature has fallen rapidly, there is very little charge going in so 0-6 might be taken out of regular service any time and only switched on for special purposes, such as inter-satellite tests due on Feb. 9-11.

The second of the 0-6 QRP days on Jan. 19 was quite successful. Your scribe, using an old *Pye* "Ranger" running about five watts output to an indoor 3-ele. Yagi got RST559 from W2GFF on orbit no. 19494. Unfortunately, some strong QRP? stations had very deaf receivers! They did not hear genuine QRP stations replying to their "CQ" calls. During the third QRP day on Feb. 2, G3IOR got his signals back from overhead when only running 100 milliwatts and worked a couple of keen-eared types.

*Oscar 7* was due to be in Mode "B" at least until Feb. 15 after which it was hoped to resume normal, alternate "A" / "B" operation. G3IOR reports 0-7 being in Mode

"C" quite a bit, recently, that is, in the quarter power mode 70 cms./2m., presumably due to low battery voltage. Persistent use of high power on the 70 cms. uplink will result in more Mode "C" days: the remedy should be obvious. Sad to report, it is not only certain continental stations who use far too much *e.r.p.* One G8\*\*\* was heard with a signal so loud that it was calculated he must have been radiating several *kilowatts* at 0-7. Selfish behaviour of this sort will merely result in the premature demise of the transponder for everyone.

Anyone fancy an expenses paid trip to the U.S.A.? AMSAT-USE urgently seeks a volunteer to assist with the *mechanical* construction of *Oscar 8* and the Phase 3 programme. The sting is that it is travel expenses paid, not salary, apparently. Anybody interested should contact Perry Klein, W3PK, at AMSAT, P.O. Box 27, Washington, D.C., 20044, U.S.A.

### QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G8FUF	1	79	172	252
G3POI	—	—	169	169
G4BWG	—	23	110	133
G3JXN	16	50	66	132
G3CHN	—	—	130	130
GM4CXP	—	21	107	128
G3COJ	15	49	63	127
G3FPK	—	—	124	124
G4BAH	—	32	92	124
G3OHC	—	26	91	117
9H1CD	—	2	110	112
G4CDF	—	—	109	109
G8GML	1	34	74	109
G8HVY	—	10	92	102
G3XCS	—	14	82	96
G2AXI	1	34	59	94
G4DKX	2	23	66	91
G81WA	—	17	74	91
G8BKR	1	6	79	86
G6UW	—	—	85	85
G8EOP	8	36	38	82
G3FIJ	—	25	54	79
G8HHI	—	7	71	78
GD2HDZ	8	24	45	77
G8GII	—	11	62	73

G3BW	—	21	47	68
GJ8AAZ	—	11	54	65
G8KLN	—	1	62	63
G8JJR	—	—	63	63
G4CIK	—	—	62	62
G8HAF	—	—	61	61
G3KPU	—	—	60	60
G8KSP	—	—	60	60
G4AEZ	—	15	44	59
G8KKX	—	—	59	59
G8IFT	5	16	35	56
OZ9IY	—	—	53	53
GD3YEO	—	—	52	52
G8LHT	—	—	48	48
GW8HVP	—	—	48	48
G8ITS	—	1	43	44
G8JEF	—	—	44	44
G4EYL	—	—	41	41
G8JAH	—	1	35	36
G8LLG	—	1	24	25
G4CIK/A	—	1	23	24
G8JAJ	—	—	24	24
G8JKA	—	—	21	21

Starting Date January 1, 1975. No satellite or repeater QSO's. Table in order of grand totals this month.

### DX Notes

From G3POI comes news that DB5NA is planning a trip to the Aland Islands, OH0, dates to be announced. This would take in JU and/or KU squares. For the peak of the *E*'s season, LZ1AB plans to operate portable from NC59d at the end of June and beginning of July. Both SM7CRO and SM7EWG are in IR14f and are QRV on 2m. SM0BYC plans to operate from MZ square as SM2BYC in the summer. There is just a tiny bit of Sweden in that square around Haparanda only 80 kms from the Arctic Circle.

### Deadlines

If your contributions to this issue have been missed out, it is likely copy was not re-mailed from Buckingham in time. Readers will appreciate the sad reason for this. Please send all your future contributions to: "VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. Deadline for April is March 4 and for May, April 6. 73 de G3FPK.

## THE MONTH WITH THE CLUBS

By "*Club Secretary*"

(Deadline for April issue: March 4)

ONE feels rather diffident at commenting on the death of G6FO in this piece; however the readership of SHORT WAVE MAGAZINE may have seen him, we on the part-time staff saw a man who did his utmost to smooth our path to the meeting of deadlines, and did his utmost for our hobby in so many ways. There were those who feared him; but their fear was of their own divising, in that they instinctively knew that he had sized them up for what they were, or are—and that his assessment did not agree with their own.

However, "Clubs" must go on, and it is our first duty to mention the howler we perpetrated in setting the reader deadline last time round; just one complete week adrift in the wrong direction from your scribe's point of view, though doubtless in the right one for many Hon. Secs.! They'll all go in, though, somehow; and for the record, let us say that the "Clubs" reader deadline is to arrive twenty-one days before the issue date, which in its turn is always set for the last Friday of the month preceding—thus the March issue is due to appear on February 25, the April one on March 25, and so on; just work back three weeks from the date so found and that's your arrival deadline; the post time has then to be taken into account, to give your posting deadline. The only time this essential rule goes overboard is with the January issue, which has to be prepared in the light of the long Christmas break now favoured, the generally increasing delays in the mails as the festive post builds up; all these factors work in one direction, while the fact that for this one month it is now impossible to issue on our due date, so we have to go back to the first Friday in January for the issue. However, we'll sort out that when we get a bit nearer the date!

But, of course, in essence, the message is that you can go on sending your reports, knowing full well that they will go on appearing—and we would add that our policy on Clubs reports is that we accept them from any club or group; our only restriction is that we will not become involved in inter-club rivalry to the extent of taking sides—in such cases we confine ourselves to giving each group its mention.

### The Mail

Here we can commence with **Radio Fraternity Lodge No. 8040**, who write to advise that the new Master is G3BEZ, while the Secretary is G8TY; if you would know more, G8TY's address is in the Panel on p.00.

As you will have guessed from our opening paragraph we are taking them as they fall from the clip; and it is **Wirral** for our first visit. They have Hq. at the Sports Centre, Grange Road West, Birkenhead, and they can be found there on the first and third Wednesdays in each month; March 2 for Part four of the G8IVW Semiconductor Saga, in which the gang are to be introduced to the FET; and March 16, for which the activity has yet to be decided.

Down south now, to **Basingstoke** with lots of plans for the coming year being laid; but, most unusually for

him their Hon. Sec. forgot to mention dates or venue! Thus, if you want to look in on the lads, you will have to get in touch first with G3CBU, whose address appears in the appropriate line of the Panel.

**Farnborough** have their club contest for both the transmitters and the SWL's over the weekend March 5/6; then there follows the monthly meeting at the Railway Enthusiasts Club, for a lecture on Weather Rockets and Satellites. The venue mentioned is in Hawley Lane, Farnborough.

The **Big Day** for **Sutton & Cheam** this month is on Saturday, March 19, for the Annual Dinner and Dance; all the gen, and the tickets, from Bob Tillin, G3MES, who is doing the donkey-work on this special "do." Turning to the more humdrum matter of the normal routine, we see—that there just isn't much "normal" this month! From March 16-19 they will be manning a stand at the Wallington Hobbies Exhibition organised by the Rotary Club. Callsign not known yet, but there will be stations operational on HF and VHF, and, it is hoped, talk-in facilities. Before all this, there is the informal get-together at Rays Social Club, while the "formal" drops right in the middle of the busy period, on March 17, for G8AAI to talk about Amateur Television, at Sutton College of Liberal Arts, Cheam Road, Sutton.

Way down in the West Country now, to **Cornish**, who foregather at the SWEB Clubroom, Pool, Camborne each month. On March 3, the subject is Electrical Safety in the Home, the speaker being G3XFL.

The Scout Hut, Occupation Road, is the home of **Peterborough** Radio and Electronics Society; they have a Junk Sale on Friday, March 18, for which the start is set at 7.30.

There are two dates for **Cheltenham** (RSGB Group) in March—the normal effort on March 3, and another one on March 18 (a Friday) when they join with the GCHQ gang to listen to Dr. B. Marsh of Coventry talking about Aurora and Radio. Both these dates are reserved at the group Hq., the Old Bakery, Chester Walk, Cheltenham.

It is still a question of every Friday *except* the third one, for **York**—and, says the Hon. Sec., what a problem it is to recall which is the blank date each month! This month the address has changed, in that the club is now called the United Services Club, 61 Micklegate, York—it used to be known as the British Legion.

Now we have the Radio Amateur Invalid and Bedfast Club, better known to all and sundry as **RAIBC**. In the current issue of their "Radial," your scribe was highly amused at the "Christmas Dinner for a Harassed Ham," one course of which was Special Bamboo Power Pack Pie (in Black Box)! If you know of anyone eligible for full membership, you should put him in touch with the Hon. Sec.—see Panel—and if you can possible do so, join yourself as a supporter.

"CQ TV" is the title of the magazine put out by the **BATC** chaps, who are of course bound in the common interest of transmitting pictures, either in the normal way or by Slow-Scan. Details from the Hon. Sec.—see Panel.

**Southdown** will be at the Victoria Hotel, Latimer Road on March 7, to hear G8AAI giving his well-known talk on Amateur TV. Looking rather further into the

future, we must advise you all to contact the Hon. Sec. for the details of the venue for future dates—there is a change of Hq. in the offing we gather.

**Cray Valley** will be in session on March 3, at the United Reformed Church Hall, 1 Court Road, Eltham, on March 3 for another of their famed Junk Sales; and on 17th there will be the informal, at the same address.

Passing on to **Reigate** we see their Hq. address is the Constitutional Centre, Warwick Road, Redhill, and the booked date is March 15 at 2000 sharp; the speaker will be G3GVV and his theme the work of the IARU in the context of the World Administrative Radio Conference in 1979. March 1 is set down for their Natter Nite, at the Marquis of Granby, Hooley Lane, Redhill.

Our next is a group who are part of the **Royal Navy** club; they are based on HMS *Belfast*, and as most people will know, the *Belfast* is moored as a floating museum in the Pool of London, almost opposite the Tower. They have their normal club activities, but in addition they will be operational from the ship between April 8-17—the Easter period. For more details on the group, contact the Hon. Sec.—see Panel.

At **Verulam** they have a regular place at the Market Hall, St. Albans on the fourth Thursday in each month; March 24 for a Film Show. The informals take place at the R.A.F.A. Hq., Victoria Street, St. Albans, on the second Thursday in each month.

The Brains Trust is revived—shades of Prof. Joad! This version is all to do with Amateur Radio, and was the programmed item for the **Surrey** group, on February 2. It is a scheme for self-entertainment that could well be used by any club with a hole in their programme. Looking on to March at T.S. Terra Nova, 34 The Waldrons, Croydon, where they will foregather on March 2—the programme being as yet not announced; there is another meeting in their programme each month, but as there appears to be a misprint in the Newsletter now to hand, we feel it best for you to refer to the Hon. Sec. at the address in the Panel.

The **Association of Sheffield** clubs produce a common newsletter and hold joint meetings on occasion; from the latest copy of the Newsletter we hear that the *University* club has revived, holding lunchtime meetings at the Red Deer off Mappin street at lunchtime on Wednesdays; while the **Polytechnic** lads have Thursday evenings in their shack on the third floor of the Phoenix in Charles Street. The **Sheffield** club are based on the Sheaf House Hotel, Bramall Lane—details from the Hon. Sec.—while the **Workshop** group are in session every Thursday evening at the Anchor Inn.

At **Melton Mowbray** things have been overshadowed by the recent death of their member G3FDF—a founder and at one time Hon. Sec. of the club there. The suggestion has been made that a trophy be purchased and named in his memory, and at the time of writing thoughts were being turned to the precise way in which the honour of holding the Trophy could be decided each year. Turning to the group meeting, the next one will be on March 18, by a member of the Wireless World staff, telling them about production of a magazine. The venue, as usual will be the St. John Ambulance Hall, Asfordby Hill, Melton Mowbray.

It seems quite a while since we last heard from

**Shefford**, who were at one time as regular as clockwork with their reports; however, they assure us, they are still very much alive and kicking, still in the Church Hall, Amphil, Shefford (this must be one of the easiest club addresses in the country to find), and still on a weekly basis. March 3 is set aside for a planning session for Field Day, and a spot of inventory checking for good measure, and on 10th they have their favourite “mini-lectures” programme. March 17 is down for a Quiz by G3EUS, and on 24th there will be a Junk Sale; rounding off the month on March 31, there will be an exhibition/demonstration/discussion on members equipment. A final comment by the Hon. Sec. indicates that they are open to have their arms twisted by hopefuls wishing to give them a talk; and he also adds that if there is anyone who would like to attend but cannot for want of transport, will they please get in touch with him and he will see if anything can be done. The address for this generous offer is to be found in the Panel.

Our next stop is up at **Chester** where the group are based on the Chester YMCA, where they get together on the 2nd, 3rd and 4th Tuesdays in each month. Since they have just gone through an AGM, the new committee is at the time of writing still fixing up the programme of events, for the latest on which we have to refer you to the Hon. Sec. in the address shown in the Panel.

Last month saw **Wakefield** indulging in a spot of self-criticism through answers to a questionnaire; this month they have March 1 for a Ragchew session, and 15th given over to a talk by G3TDZ; all of course at Ings Road School, Wakefield.

Over now to **Bishops Stortford**, where the problem of an Hon. Sec. was solved at the AGM by electing two of them! It might have resolved their problem but it added one for us, so your scribe tossed a penny for which one to include on his card-index. As to the club, they continue to foregather at the British Legion in Windhill; 7.30 in the bar for a nominal start, up in the Committee Room at 8. Adequate parking exists on the left as you go up the hill, and as for finding the gang—straight through the outside door, through the double doors into the bar and listen for radio talk! And, if you are too late to find them in the bar, then straight up the stairs and turn right at the top into the Committee Room.

More than once your scribe has commented on the way clubs with YL members always manage to lumber the ladies with a task; this fate has befallen **White Rose's** G4EZI, who is custodian for the White Rose Award. As for the Club, they have their own place at 83 Town Street, Armley, Leeds 12, where they are “at home” every week on Wednesday evening.

Still in that general area, we come to **Northern Heights**, at the Peat Pitts Inn, Ogdon, Halifax, on alternate Wednesdays; but the Newsletter omits details of the goings-on (or should it be “goings-off” up there?) at each meeting. This being so we must pass you on to the Hon. Sec.—see Panel.

The **Wessex (Bournemouth/Poole)** group have now moved to their new venue at the Dolphin Hotel in Holdenhurst Road, where they will be in session on March 4 and 18; on the first date G5HD will be talking about VHF contest planning while on the later date the theme will be the SWL's, with some attention also being paid to those who are interested in CW operation.

Our next stop is with **East Lancs.** from whom we have not heard for years—but the handwriting on the report is much more familiar having been last heard of from 5N2-land. Eric is now G4DGR, and his QTH is shown in the Panel, under East Lancs. He tells us that the venue is the YMCA in Blackburn, on the first Thursday in each month; the March date shows a Junk Sale, with April for a Quiz evening—East Lancs. v. Preston with Bury setting the questions.

**Stourbridge** are to lose their Newsletter Editor this month—after a slightly shaky start a year ago he was beginning to really swing; and he can be proud of his record of coming out on time. What a pity he has had to give up; but studies and career must always come before one's hobbies, and we hope there is someone to carry on. The informal is on March 1 at the "Shrubbery Cottage," Health Lane, Kingswinford (what a delightful name for a pub—wonder what his history of it is?—Ed.) while the formal session is March 21 for the Annual General Meeting.

**Acton, Brentford & Chiswick** have their place at the Chiswick Trades and Social Club, 66 High Road, Chiswick, London E.4. The booking is once monthly, and for this time we see they have G3CCD talking about his new TH3 Mk. 3 beam and the results he is getting from it.

While any Thursday evening will find radio amateurs and SWL's heading for the Spencer Dallington Community Centre, Tintern Avenue, off Gladstone Road, **Northampton**, March 3 sees them entertaining G3ZVI of Garex, while both 10th and 17th are devoted to RTTY talks in which time it is hoped to cover the whole business; and on March 31 there will be a Test Equipment Evening, with some rather advanced stuff available—but bring your own, as it might help someone else!

Moving along a bit we next come to **Wolverhampton**, who notify that as of last October, the Hon. Sec. has changed to G8EDG—see Panel. However, although he does not mention any of the club activities we have the Hq. address, sensibly part of the letterheading: Neachells Cottage, Stockwell End, Tettenhall, Wolverhampton WV6 9PH, where we know they have a regular session each week—but for the rest we have to refer you to the new Hon. Sec. at the address in the Panel.

At **Swindon**, the Hq. is at the Coldharbour public house, Blunsdon, and on March 2 and 16th they will be rolling up in force, says the Hon. Sec., although at the time of writing he could not give firm indications as to what was going to happen on those dates, he being still, doubtless, in negotiation.

**Crystal Palace** have the third Saturday, which means 19th, at Emmanuel Church Hall, Barry Road, Peckham, and will this time be having a talk on RTTY by G3YKB.

**Silverthorn's** G2HR is not too well at the moment, and under observation in Chingford Hospital at the time of their letter—we hope Eric is soon back in action, as he has been a mainstay for the group for as long as your scribe can recall, either as Editor, as Hon. Sec., as R.A.E. lecturer, or whatever. Looking at the group, they are based on Friday Hill House, Simmons Lane, Chingford, where they will be found every Friday evening in one of the best set-ups for miles round, with shack, lecture room, snack-bar down below and all the mod. cons.

On to **Harrow** where big things seem to be happening; the AGM has thrown up a new Hon. Sec., and in addition they have moved Hq. to the Roxeth Community Centre, Scott Crescent, West Harrow, Middx.

Down West again, to **Yeovil**, where they have every Thursday; details from the Hon. Sec. as to the venue, but we can say that G8AVR has the first, third and last dates in March for talks respectively titled "Speak to me only with your PIs—How to bring your computer to life" on to "Big fleas and little fleas—the progress of miniaturisation," and finally "The computer under the stars, 1984": on March 10 G3MYM talks about QSL Card design, and on March 24 there is a trip out to the Control Tower at R.A.E. Yeovilton.

Having had a fine Wine and Cheese Party last month, the **Bangor** lads are back at the Redcliff Hotel on Friday, March 4, for a talk on the development of the Electricity Supply Industry in Northern Ireland.

Microwaves will be the topic for **Milton Keynes** on March 14, with G3WKL doing the honours on this interesting subject; the spot to aim for is the Loyal Hall, Silver Street, Newport Pagnell. Looking onwards a little their *April* date falls at a time when the Lovat Hall is closed for the Easter Monday; so there will instead be a Social Evening in the Rose and Crown, which is also in Silver Street.

**A.R.M.S.** are of course the group for the Mobile types, whether licensed or SWL; their M.C.A. is the /M equivalent of DXCC, and it is interesting to notice that the leader has 262 countries confirmed—which isn't a bad score from a home station chasing countries, at that! The name and address of the Hon. Sec. appear in the Panel.

Then there is the **G-QRP Club**—which we now believe could well shed its "G" as it has become so international in its membership, with over 250 on the books now, a very fine newsletter with lots of interest for the technical types, as well as the operating-only gang. Well worth the cost of a subscription.

**Worthing** lads have a base at the Adult Education Centre, Union Place, Worthing, every Tuesday evening, the kick-off being set for 8 p.m. On March 8 there is a Construction Contest, and on 15th a Ragchew evening; March 22 is down for a talk on Construction Techniques. Any further details may be obtained by dropping a line to the Hon. Sec. at the address in the Panel.

Up at **Nottingham**, things are also on a weekly basis. March 3 is down for a Forum—a popular item with the group but one that has never been described to us. On 10th, there is to be a talk on RTTY by A. Pollock, with an Activity Night on 17th. "The one that got away" comes in for consideration on March 24, referring in this context to the home-brew gear that *didn't* work (!); and on 31st there is a Junk Sale. Whilst that is it for March, perhaps we should mention that April 7 is the date set for the AGM.

### New Clubs

Our first stop in this group is the **Kent Coast** set-up, based on the Grosvenor Court Hotel, First Avenue, Eastern Esplanade, Cliftonville, Margate. It is here you go on March 10, when G8DHJ will be talking about the transmission and reception of Colour TV.

Our second stop is in **Ormskirk**; here the position

at the moment is that the group get together in each other's homes, taking it in turn to be host, to a full assortment of A and B licensees and SWL's—and they say they could do with a few more members! This sounds good, but of course it means that it is only courteous to get in touch with the Hon. Sec.—see Panel—before planning a visit.

Old friends are back again at **Hull** in more ways than one; the group itself used to be regular reporters to this piece, and the new Hon. Sec.—see Panel—used to write to CDXN regularly before he went on an extended trip to ZS-land, from which he has evidently returned for a while.

No messing about with the **Derby** scribe; if you took just one word out of his offering, you would lose some useful information! For March he sees things as: March 2 for a Surplus Sale, and a Night on the Air on 9th; then the all-important AGM comes up on March 16. On March 23, instead of the normal meeting, everybody goes off to a lecture by Dr. Saxton, given at St. Helens House. Finally there is March 30, for a "Technical Topics" evening.

Now we have **Aberdeen**, who have recently been modulating Radio Aberdeen, and getting mentions in various publications, certainly seem to be livening things up in their part of the woods. March 4 is a Junk Sale, while on 11th, GM3ZBE will be giving a simple explanation of SSB, AM, and FM. March 18 sees Bill Williams talking about recent building projects, and on 25th, J. Gall is to talk over the problems he ran into and overcame in building a counter. All these are in the hall at the rear of 91 Crown Street, Aberdeen; if you are going down Crown Street, take the second on the left; the entrance to the hall is at a blue door in the lane on the right-hand side. On an entirely different tack, the club included with the newsletter, minutes of a meeting of the Central Scotland FM group held at Wrangholm Hall in Motherwell, called by the Mid-Lanark group. If these minutes are to be taken as a correct record of what transpired, then there is a moral to be drawn. It seems the repeater license had been held since May 1976, and the existing committee could not promise the repeater would be operational within even two years—a new committee was then elected and the machine was testing on the air within six days and fully operational within fourteen days from the date the new committee was elected to office. The moral to be drawn from this is clear to all clubs sitting at their AGM's and voting people into office for the next year, and it is very simply this. There is no good whatever in electing someone just because he is too soft-hearted to refuse to take on a task that is beyond him, and if you do, the club, just like a company, will die of inanition. If this happens, *don't* blame the chap you shotgunned into office because you have asked of him more than he can give. A democratic organisation, like any other, requires someone to *lead*; and leading people often means you have to be dictatorial if the enterprise is to be a success; if the dictator is benevolent, you have a happy group of people, if he is motivated by selfishness you have the "dictatorship" against which the Second World War was fought. That was won, in the event, because this country at that time had a man who was a tougher dictator than the one in Germany, and at the same time was motivated by the

best interests of the world at large rather than pure selfishness taken to the point of Hitler's mania.

Scotland is well to the fore this month—our next letter is from the newly-formed **Edinburgh** and District gang, who are based on Hq. at the City Observatory, Catton Hill, where they foregather every Tuesday evening; it is requested that should you wish to look in on them you contact the Hon. Sec. at the address in the Panel.

At **Southgate** the Newsletter cover has received a face-lift; but it still doesn't tell us that they get together at the Scout Hut, Wilson Street, on the second Thursday in each month—lucky we happen to know that much, even if the crystal ball doesn't tell what will actually happen! But, never mind, the Hon. Sec. will be delighted to tell you—get in touch with him at the address in the Panel.

**Torbay** next, and the Annual Dinner and Dance on Saturday, March 12, at the Templestone Hotel, Torquay. As for the regular meeting, that is down for Saturday March 26, subject to be arranged, at Hq., Bath Lane, rear of 94 Belgrave Road, Torquay.

A new variation on Murphy's Law is expounded by the scribe at **Edgware**, who claims that all deadlines expire two days before you thought they did! However, be managed to get in (by the skin of his teeth!) with the information that March 10 and 24 are the dates, and the venue the usual one at the Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware.

Now a couple of Brummies come to the top, sent in by the same scribe—which leads us to hope the clubs split the savings in postage fifty-fifty! **South Birmingham** first; the shack is open every Friday evening for a Construction-and-Natter Night, and on Wednesday, March 2 there will be either a Film Show *or* a Test Equipment lecture by G4ELO. Hq. is at Hampstead House, Fairfax Road, West Heath, Birmingham B31.

The other group is **Midland** who have March 1 and 29 at Brasshouse Centre, off Broad Street, for Construction Nights; plus March 15 when G8AMD and G8FTU will be talking about 70 cm. Repeaters, at the University of Aston, Gosta Green.

#### Sign-Off

We have already discussed the routine for locating your deadline in the preamble to this piece, at March 4 arrival, latest, addressed to your Club Secretary, **SHORT WAVE MAGAZINE**, 34 High Street, **WELWYN**, Herts., AL6 9EQ.

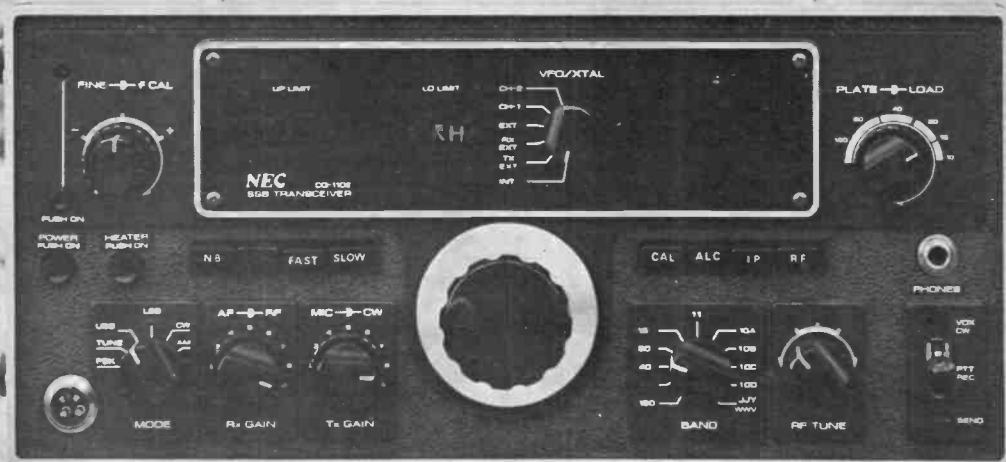
See you all next month!

#### Late Flash

Just as this piece was being finished, a telephone call reached your conductor from Welwyn, to let us know that last time round we "got it wrong" as to the **Surrey** club routine—giving only one of their two dates for the month and placing that on the wrong day. Since they took the trouble to ring us and point this out, we read between the lines that someone turned up on the wrong night and found no meeting; and that is a situation which is not very pleasant either for the club itself or the visitor or potential member who was unlucky. We can only hang our heads in shame, and say we try never to slip-up like this; and we hope the potential member will not blame the club officials who are among the most regular and reliable reporters to this feature. Sorry, chaps.

# CQ 110E

FURTHER IMPROVED IN MORE THAN 60 DETAILS



**CEC** SOLE DISTRIBUTOR FOR EUROPE OF **NEC** RADIO AMATEUR EQUIPMENT

CH 6830 Chiasso

Via Valdani, 1

Telefono (091) 442651

Telex 79959 CH



# C.B. ELECTRONICS

UNIT 3, 771 ORMSKIRK ROAD, PEMBERTON, WIGAN, WN58AT

Telephone : Wigan (0942) 216567

G3LRB (JACK) G3SMI (CLIFF) NORMAN

Not just another new firm, but people with a wealth of technical experience and know how, relating to amateur radio techniques, requirements and servicing—who will always be pleased to advise and assist in all respects, whether it be Sales, Service or Information.

To all our amateur friends who have dealt with us in the past we extend a welcome and invite you to call and see us at anytime. We are easy to find on the A577 Wigan/Ormskirk Road,  $\frac{1}{2}$  mile from M6 Motorway, Junction 26.

See us for your requirements of :—

YAESU :	HF and VHF Receivers, Transceivers, etc.
UNIDEN :	HF and VHF Transceivers.
ELECTRONIC DEVELOPMENTS:	VHF Transvertor Linears, Wavemeters, etc.
J BEAM LTD.:	VHF Antennas
HY GAIN :	HF Antennas
C.D.E.:	Rotators.
BELCOM :	VHF Transceivers.
S.S.M.:	VHF Converters, Transvertors, etc.
WESTERN ELECTRONICS :	Antennas, Multiband Traps, Antenna Switch, Towers, etc.

PART EXCHANGES WELCOME

S.A.E. ALL ENQUIRIES

H.P. AND CREDIT TERMS



## AMATEUR RADIO EXCHANGE

PROPRIETORS : BRENDA APTAKER, BERNARD GODFREY (G4AOG)

The Aladdin's Cave for the enthusiast, with a secondhand selection that is second to none. Converters. Transverters. Transceivers (HF/VHF/UHF). Receivers. Linear Amplifiers. Power Supplies. Rotators and much, much more. . . . Come and browse. . . . Come and buy. . . . Come and have a cup of Brenda's coffee either way !

JUST IN ★ TERMIPRINTER 5 plus VDU—as new

★ Good secondhand equipment always wanted ★  
plus

NEW EQUIPMENT: Yaesu, Icom, Standard, FDK, Swan, Microwave Modules, QM70, Antenna Specialists, Bantex, Jaybeam, KW, Hy-Gain, etc.

★ NOW IN STOCK ★ ICOM IC202, IC215, IC240  
★ YAESU FRG7 and FT101E  
★ MULTI II and UII  
★ TRIO R300

Phone for full details of current stocks and opening hours



by telephone  
Easy terms  
up to 3 years

Securicor  
delivery

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

# NEW PRODUCT UP-CONVERTER MODEL UC/1

SYNTHESISER CONTROLLED GENERAL COVERAGE RECEIVING ADAPTOR PLUS TWO-METRE CONVERTER FOR RECEIVERS COVERING 28-29 MHz AND/OR 144-145 MHz



Model UC/1 converts any existing amateur-bands-only receiver which has coverage of 28-29 MHz or 144-145 MHz (e.g. HF bands receivers or transceivers and 2-metre "all-mode" transceivers) into a general coverage receiver with equivalent high performance. Compared with the alternative of purchasing a separate receiver for general coverage, Model UC/1 avoids wasteful duplication and gives better performance for less outlay.

**FEATURES :**

- Gives complete no-gap coverage from 90 kHz to 30 MHz, in thirty switched 1 MHz bands.
- Also operates as a 2-metre converter with receivers covering 28-30 MHz.
- Two separate outputs are provided, one for 144-145 MHz and the other for 28-29 MHz receivers.
- No receiver modifications are required. Model UC1 simply connects in series with the aerial feeder.

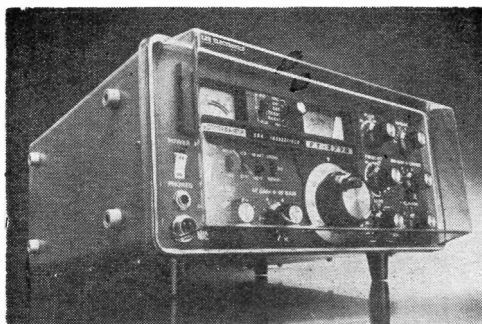
- Overall performance is limited primarily by that of the main receiver.
- Straightforward digital switch selection of the desired 1 MHz band segment eliminates critical adjustments such as "tuning for lock."
- Built-in aerial attenuator.
- Frequency synthesiser locked to 1 MHz crystal.

PRICE £97.50 plus 12½% VAT, Total £109.69 (including delivery in UK)

Data Sheet for UC/1 available free on request. Also available: Frequency-Agile Audio Filter Model FL1; Universal RF Speech Clipper, details on request, or refer to our advertisement in December's issue.

## DATONG ELECTRONICS LTD.

11 MOOR PARK AVENUE ● LEEDS LS6 4BT ● TELEPHONE : 0532-755579



## LEE ELECTRONICS LTD.

01-723 5521 CLOSED THURSDAYS G8JVL  
400 EDGWARE RD., PADDINGTON, W.2

LONDON'S LEADING STOCKISTS OF ● YAESU  
● ANTENNA SPECIALISTS ● STANDARD ● ICOM  
BANTEK ● JAYBEAM ● REVCO ● QM70 ● ETC.

**SPECIAL EXCLUSIVE OFFER**

Perspex Dust Covers designed and manufactured by us to keep your Yaesu equipment in mint condition. Suitable for Models FT101, 101B, FL101, FR101, FT201, FT101E, FL2100, FT277, FT288A, FRG7, etc. Price £4.00 each inc. VAT. Carriage 45p.  
FT301, FT221, FT220, FT620, £3.00 each inc. VAT. Carriage 45p.

YAESU FRG7. Communication Receiver, .5 to 30 M/Hz. ...	£148.50
YAESU FT.221R 2-Metre Transceiver (now fitted for correct Repeater Shift). Special Price NOW ...	£339.00
YAESU FT.101E Transceiver ...	£429.00
YAESU FT.101EE Transceiver ...	£400.00
YAESU FT.101EX Transceiver ...	£365.00
<b>STANDARD</b> 12-Channel 2-Metre Mobile Transceiver (fitted with SO plus 2 Private Channels). Special Introductory Price	£99.00
Set of 5 Additional Channels if required ...	£20.00
Crystal-Controlled Tone-Burst fitted if required ...	£10.00
<b>STANDARD C.828</b> Mobile Transceiver (10 Channels fitted) ...	£159.00
<b>STANDARD CS.830.</b> 1-watt Marine-Band Hand-Held Transceiver (fitted 6 channels) (6 and 16) ...	£139.00
ICOM IC240 2M Transceiver ...	£176.00
ICOM IC202 2M SSB Transceiver ...	£152.90
<b>MULTI UII</b> 70cm. 10-watt Mobile Transceiver (fitted 8 channels) ...	£215.00

2-Metre Helical Antennas fitted BNC Plug (+ P. & P. at 20p)	£3.85
2-Metre Helical Antennas fitted PL259 Plug (+P. & P. at 20p)	£3.85
JVL 2-metre 3db Base-Station Groundplane Antenna (+ Carr. £1)	£19.00
JVL 2-metre 6db Co-Linear Base-Station Antenna (+ Carr. £1.25)	£27.00

**MICROWAVE MODULES (ALL MODELS IN STOCK) :**

MMT.432/28 70cm. Transverter ... (+ P. & P. at 50p)	£97.00
MMT.144/28 2-metre Transverter ... (+ P. & P. at 50p)	£79.00
MMT.432/144 Transverter (70cm. to 2 metres) (+P. & P. 50p)	£133.00

**SPECIAL OFFER**

A.T.P. Electronics. Ex-Computer, fully stabilised, DC power supplies 6v. to 30v. DC at 5 amps ... (+8% VAT) £18.00  
Ideal for working your mobile rig at home. CARRIAGE £1.95

ALL PRICES + VAT

Will customers kindly note that we will be closed from 6th to 20th April inclusive for Easter holidays and Stocktaking.

Sé Habla Español

SEND 26p IN STAMPS FOR FULL YAESU CATALOGUE

## R. T. & I. ELECTRONICS LTD.

where equipment is fully overhauled

TRIO 9R-59DS. Receiver ... ..	£65.00 (£3.00)
TRIO JR500. Receiver ... ..	£75.00 (£3.00)
TRIO QR666. Receiver ... ..	£100.00 (£3.00)
EDDYSTONE 840C. Receiver ... ..	£80.00 (£3.50)
HAMMARLUND HQ170A. B.S. Receiver ... ..	£180.00 (£4.00)
R.C.A. AR8516L. Receiver ... ..	£240.00 (£4.50)
R.C.A. AR88D. Receiver ... ..	£90.00 (£4.50)
YAESU FRDX400. Receiver ... ..	£150.00 (£4.00)
KW.201. B.S. Receiver ... ..	£130.00 (£4.00)
Liner 2. Transceiver with mike ... ..	£120.00 (£1.50)

We are MAIN DISTRIBUTORS for AVO, MEGGER, TAYLOR and SULLINAN INSTRUMENTS

All types of AVOMETERS and MEGGERS, normally in stock also accessories and spares

We also repair all types of instruments  
Trade and Educational enquiries invited

S. G. BROWN'S HEADPHONES. Type "F" 120 ohm, 2000 ohm, 4000 ohm, £12.65 (60p); Rubber Earpads for same, 85p per pr. (20p); Standard Jack plugs, 24p (4p).

EDDYSTONE EQUIPMENT. Please enquire.

YAESU MUSEN FRG-7 Receiver in stock ... .. £148.50 (£3.00)

YAESU MUSEN FT-221-R Transceiver ... .. £359.00 (£4.00)

In present conditions we regret that all prices are subject to alteration without notice.

NOTE : 12½% VAT must be added to all prices, new and secondhand, except Test Equipment which is 8%, inc. carr. and packing.

Carriage for England, Scotland and Wales shown in brackets, Terms: C.W.O., Approved Monthly Accounts, Hire Purchase and Part Exchange. Special facilities for export.

FREE SHURE MIC. WITH EVERY KW TRANSMITTER or TRANSCEIVER purchased

At R.T. & I.

- ★ We have full H.P. facilities.
  - ★ Part exchanges are a pleasure.
  - ★ We purchase for cash.
  - ★ We offer a first-class overhaul service for your electronic equipment, whether you are an amateur or professional user.
  - ★ We have EASY Parking facilities.
  - ★ We welcome your enquiries for specific items which although not advertised, may very well be in stock.
- PARTRIDGE "JOYSTICK"** New improved VFA. £17.25. Joymatch IIIA £17.75. Joymatch IIIB, £15.76. LO-Z500X, £21.86. Joymatch A.T.U. Kit £7.17. A.T.U. Kit Assembled, £8.67. Artificial earth and bandswitch £7.17. Note—Partridge prices include postage, packing and VAT.

### TRIO EQUIPMENT.

New Trio R-300 Receiver, in stock £164.00 (3.00)  
All Bands with xtal calibrator.

**SHURE MICROPHONES**, 526T, £27.80 (£1.00); 444, £23.00 (£1.00); 401A, £12.10 (£1.00); 202, £10.00 (£1.00); 201, £10.30 (£1.00); 414A, £18.00 (£1.00); 414B, £18.00 (£1.00). Full details on request.

**KEYNECTORS**, piano key mains connector units, £4.25 (40p). Trade enquiries welcome.

**VALVES**. Please state your requirements.

**ADVANCE TEST EQUIPMENT**—we are agents—your enquiries please.  
**TNK METERS**: TM500, £19.75 (75p), TW20CB, £23.75 (50p), TP55N, £14.50 (60p), Model 700, £39.75 (75p), also cases for same.

**PHILIPS PM2403 ELECTRONIC MULTIMETERS**, £55.00 (£1.00), etc., etc. We also supply **PHILIPS & LABGEAR COLOUR TV TEST EQUIPMENT**, including Colour Bar Generators, Cross Hatch Generators, Degaussing Coils, Oscilloscopes, CRT Testers, Transistor Testers, etc., etc.

**KW EQUIPMENT**: (Don't forget your FREE mic. with every Tx. and Txcr.) KW2000E & P.S.U., £342.00 (£3.50); KW202, £210.00 (£2.50); KW204, £250.00 (£3.00); KW1000 Linear, £220.00 (£4.00); KW107, £68.00 (£1.50); KW E-Z MATCH, £25.00 (80p); KW109, £80.00 (£1.50); KW108 Monitor Scope, £85.00 (£3.00); Speaker for KW202, £18.00 (50p); KW103, £16.00 (50p); KW Antenna Switch, £6.00 (25p), etc.

## R. T. & I. ELECTRONICS LTD.

Ashville Old Hall, Ashville Road, London E11 4DX Tel. 01-539 4986  
NEAREST STATION: LEYTONSTONE (Central Line)

# antenna specialists

## THE ULTIMATE CHOICE

ANTENNAS FOR EVERY REQUIREMENT FROM 27 - 512 MHz

Listed below are examples from their wide range of products

ASP201	½W, 108-512 MHz mobile ant. (plus 75p P.P.)	£3.23	ASP655	130-174 MHz ½W 3dB Gain DC grounded base station ant. Power capability 100W. Termination SO-239. Complete with mounting brackets for masts up to 1½" O.D. Available Now (plus 75p carr)	£14.44
ASP629	½W, 130-174 MHz 3 dB gain, DC grounded mobile ant. (plus 75p P.P.)	£7.61	ASP659UK	425-440 MHz 5 dB gain base station collinear. Power capability 100W. Termination female "N" type connector. Complete with mounting brackets for masts up to 1½" O.D. Available now.	£15.49
ASP677	½W, 140-174 MHz 3 dB gain mobile ant. (plus 75p P.P.)	£13.51	ASPA680UK	144-148 MHz 6 dB gain base station collinear. DC grounded, power capability 350W. Length approx. 12". Weight approx. 4 lbs. Rated wind velocity 118 mph. Termination Male "N" type connector. Complete with mounting brackets for masts up to 1½" O.D. Available now.	£47.25
ASPE462	½W, 420-440 MHz 3dB gain mobile ant. (plus 75p P.P.)	£7.23	ASPN701UK	430-440 MHz 12 dB gain DC grounded base station collinear. Power capability 250W. Length approx. 18". Weight approx. 9.5 lbs. Rated wind velocity 128 mph. Termination male "N" type connector. Available now (plus £2.50 carr.)	£105.00
ASPE667	425 440 MHz 5 dB gain Collinear mobile ant. (plus 75p P.P.)	£16.91	NEW !!	Helical Ants. for the following portables:	
ASP749UK	½W, 144-174 MHz 3 dB gain, Disguise mobile ant. HI-Band Splitter	£28.30	Trio TR2200GX	... .. (plus 40p P.P.)	£3.85
ASP619	No hole mount mounts, suitable for ASP201, ASP677, ASP667, easily adaptable for use with other antennas. Complete with 10' RG-58U cable and PL-259 connector	£3.70	Trio TR3200	... .. (plus 40p P.P.)	£3.35
K-203	ASP667, easily adaptable for use with other antennas. Complete with 10' RG-58U cable and PL-259 connector	£8.09	icom IC215	... .. (plus 40p P.P.)	£3.85
ASP332	Gutter mount suitable for use with ASP629, ASP393, complete with 10' RG-58U cable and PL-259 connector	£8.09			
ASPR332	Gutter mount suitable for use with ASP677, ASP667, easily adaptable for use with other antennas. Complete with 10' RG-58U cable and PL-259 connector	£8.09			
New Magnetic Mount	Fits ASP629, ASP393, ASP677 and ASPE667. Complete with 10' RG-58U cable (plus 50p P.P.)	£9.19			

Please add 12.5% to above prices for VAT

AVAILABLE FROM —

**LONDON**  
LEE ELECTRONICS LTD. 01-723 5521  
AMATEUR RADIO EXCHANGE 01-579 5311  
TERRY BARNETT, G8BAM 01-556 9366

**KENT**  
THANET ELECTRONIC 02273 63859

**AVON**  
D. G. SMITH, G3UUR 0225 833433

**BEDFORDSHIRE**  
ALAN R. MORRIS, G4ENS 0582 414179

**CHESHIRE**  
BREDHURST ELECTRONICS 0829 260708

**YORKSHIRE**  
THE AMATEUR RADIO SHOP 0484 20774  
NICK SHEARD, G8KLY. 0274 51913

**SCOTLAND**  
IAN McKECHNIE, G8BDOX 078663 3223

**S. WALES**  
J. J. DOYLE, GW4FOI 0639 294

**N. WALES**  
BILL DAVIES, GW8AHI QTHR.

**N. IRELAND**  
G.I. AMATEUR SUPPLIES ENNISKILLEN 2955



J. YU

21, LANGLEY AVENUE, SURBITON, SURREY, KT6 6QN  
SOLE DISTRIBUTOR TO THE AMATEUR TRADE

# J. BIRKETT *Radio Component Suppliers*

25 THE STRAIT . LINCOLN . LN2 1JF

Telephone: 20767

6 TO 1 REDUCTION BALL DRIVES  $\frac{1}{4}$ " Spindle at 55p each  
3" Dia. CERAMIC ROTARY SWITCHES. 1 Pole 11 Way 2 Bank.  
£1.80 each

2 Amp R.F. CHOKES. Wire Ended at 6 for 50p  
TEXAS 800 VOLT 2 Amp NPN TRANSISTORS at 50p 3 or  
£1.10

10,000uf 16v.w. ELECTROLYTICS. Size  $3\frac{1}{2} \times 1\frac{1}{8}$ " at 15p, 4 for 50p  
6 ASSORTED 10X 80M CRYSTAL for £2.16

TEXAS R.F. PNP 2G 106 TRANSISTORS at 20 for 57p  
5 WATT TO39 NPN DARLINGTON TRANSISTORS at 20p each  
TBA 120S I.C. at 75p

BRANDED PLASTIC TRANSISTORS. BC 108, BC 212 Types at  
10 for 60p

IOXAJ CRYSTALS. 5040, 5155, 5175, 5180, 5230, 5675, 5695, 5730,  
5784-25, 5785, 5795, 5865, 5870, 5871-1, 5915, 5960, 5970, 5978-28,  
6021-71, 6026-67m 6060, 6065-65, 6066, 6123, 6132-22, 6126-27, 6129-44,  
6132-22, 6157, 6169, 6168-33 6170, 6171, 10172, 6173, 6201-66, 6204-44,  
6265-56, 6287-78, 6310, 6312-77, 6326-66 6332-22, 6335, 6335-5, 6337-78,  
6340, 6346-67, 6348-88, 6360, 6362-78, 6370, 63711-11, 6387-77, 6450,  
6460, 6465-66, 6466-6, 6480, 6521-11, 6526-66, 6560, 6566-67, 6568-89,  
6580-20, 6582, 6583-33, 6630, 6770, 6780, 6790, 6836-37, 6845, 6937-78,  
6938-89, 7035, 7080, 7130, 7150, 7210, 7325, 7350, 7351, 7365, 7390,  
7410, 7420, 7450, 7480, 7515-5, 7525, 7530, 7645, 7655, 7740, 7815,  
7860, 8116, 8118-15, 8118-46, 8120, 8137-5, 8140, 8143-125, 8146-15,  
8153, 8155, 8156, 8176, 8280, 8284, 8285, 8294-12, 8295, 8300, 8301,  
8319, 8320, 8323, 8325, 8330, 8428, 8434, 8449-1, 8450, 8478-46, 8480,  
8510, 8514, 8530, 8630, 8635, 8640 kHz. All at 20p each or 8 for £1.

CERAMIC PL504 VALVE BASES at 4 for 50p  
20 VARI-CAP DIODES. Untested for 15p

GENERAL PURPOSE UNIUNION TRANSISTORS at  
20p each

AUDIO I.C.'s SN 76001N at 50p, TAA 611B at 65p, TBA 641A at  
80p, SN 76013ND at £1, SN 76023ND at £1. TBA 800 at 80p, LM  
300 at 80p

SILICON PHOTO TRANSISTORS at 15p, PHOTO DAR-  
LINGTON at 22p

PLASTIC 30 WATT POWER TRANSISTORS. NPN at 22p, NPN  
at 25p, 35p pair

50 BC 107, 8, 9 TRANSISTORS. Untested for 57p  
MINIATURE 8uF 300v.w. ELECTROLYTICS. 10 for 57p  
COMPRESSION TRIMMERS. 10pf, 30pf, 50pf, 150pf, 750pf, 1000pf.  
All at 6p each

600 MHz TRANSISTORS TYPE BF 224 at 10 for 57p  
50 AC 128 TRANSISTORS. Branded but untested for 57p  
500 yd. Reel of PVC CABLE. 14 Strand -0048 for £3

MICRO ALLOY PNP 600 MHz MSD39 UNMARKED TRAN-  
SISTORS. 10 for 57p

SPECIAL JFD TUBULAR-TRIMMERS. 50pf at 15p each  
OXLEY MINIATURE 2 To 50pf AIRSPACED TRIMMERS at  
15p each

GLASS WIRE ENDED CRYSTALS. 28 kHz, 28.5 kHz at 50p each  
PLASTIC BOXES WITH LIDS.  $3\frac{1}{2} \times 2 \times 1$ " at 35p,  $3 \times 2\frac{1}{2} \times 1$ "  
at 45p,  $4 \times 3 \times 1\frac{1}{2}$ " at 50p,  $4\frac{1}{2} \times 3\frac{1}{2} \times 1\frac{1}{2}$ " at 75p,  $6 \times 3 \times 2$ " at 80p

DIVIDE BY 2 300 MHz COUNTERS with data for 80p  
DIVIDE BY 4 150 MHz COUNTERS with data for 80p

20 ASSORTED  $\frac{1}{2}$ ,  $\frac{1}{4}$  watt RESISTORS for 75p  
20 ASSORTED FT 241A CRYSTALS. 54th Harmonic 71 to 98 MHz  
for £1.10

1000uf 35v.w. WIRE ENDED ELECTROLYTICS at 4 for 50p  
BYX94 125V PIV 1 Amp SILICON DIODES at 12 for £1

10 GLASS SINGLE POLE MAKE REED SWITCHES for 50p

500pf TRANSMITTING  
VARIABLE CAPACITORS  
at £3.50 each

ELECTRET CAPACITOR  
MICROPHONE CAPSULE  
WITH TRANSISTOR  
PRE-AMP. All in sub-miniature  
package with data at £1.85

SPECIAL SUB-MINIATURE  
BUTTERFLY PRE-SET  
AIR SPACED TRIMMERS  
10pf x 10pf at 22p each

MULLARD VHF TUBULAR  
TRIMMER Nut Fixing  
18pf at 15p each

VHF TRANSISTORS  
Unmarked Good

2N 4040 at £1.80  
2N 4041 at £1.95  
2N 4429 at £1.95  
2N 4440 at £1.95  
BLW 13 at £1.95  
BLY 84 at £1.95

10 MULTITURN TRIMPOTS. Assorted for 60p  
RCA RF TRANSISTORS. 2N 4427 at 60p, 2N 3375 at £1

RADIO I.C. ZN 414 with data for £1

OFF CUTS OF -I VERO BOARD £1 per pack  
X BAND GUNN DIODES with data at £1.65

.0005uf 75 K.v.w. VISCONEL CAPACITORS at 50p  
2-5 GHz DUAL NPN TRANSISTORS. Untested with data at  
4 for 57p

MINIATURE SILICON DIODES. Assorted Voltages 100 for 57p  
SUB-MINIATURE TOGGLE SWITCHES. SPCO at 35p, DPDT  
at 45p

DUBILIER 50uf 450v.w. ELECTROLYTICS. Size  $3 \times 1$ " at 10p,  
7 for 57p

THYRISTORS. 10 Amp Type 100 PIV at 25p, 400 PIV at 50p, 800 PIV  
at 60p

VHF DUAL GATE MOS FET's like 40673 at 33p, 4 for £1.10  
CRYSTALS. IOXAJ 600 kHz at 50p, 7 MHz at 60p, 8 MHz at 60p

BF 177 100 Volt NPN TRANSISTORS. TOS Can at 10p, 6 for 50p  
100 ASSORTED MULLARD C280 CAPACITORS for 57p

SUB-MINIATURE 8 ohm LOUDSPEAKERS.  $\frac{1}{2}$ " Dia. at 75p  
FT 243 CRYSTALS. 8040, 8100 kHz at 75p each, 7620, 7720, 7966-7,  
8166-7, 8223-3, 8300, 8366-7, 8483-3, 8583-3, 8650, 8716-7 kHz. All  
at 40p each.

GENALEX FERRITE RINGS.  $\frac{1}{2}$ " Dia. Int. Dia.  $\frac{1}{4}$ " at 15p each  
MINIATURE TUNING CAPACITORS. 150 x 150pf Air Spaced  
at 50p

TANTALUM BEAD CAPACITORS. .1uf 35v.w., .15uf 35v.w.,  
.47uf 35v.w., .68uf 35v.w., 1uf 35v.w., 2.2uf 35v.w., 4.7uf 10v.w.,  
4.7uf 35v.w., 5uf 25v.w., 6.8uf 25v.w., 6.8uf 35v.w., 10uf 25v.w.,  
15uf 20v.w., 20uf 6v.w., 22uf 16v.w., 33uf 25v.w., 47uf 6v.w. All at  
9p each

2N 3553 UNMARKED GOOD VHF TRANSISTORS at 3 for  
£1.10

TUNING CAPACITORS WITH DIRECT DRIVE. 125 + 125pf  
at 45p, 150 + 150pf at 50p, WITH S.M. DRIVE. 500 + 500 + 17 +  
17pf at 38p, 500 + 500pf at 50p

EMI HUGHES or TRANSTRON GOLD BONDED DIODE.  
50 for 40p

200 + 200 + 100uf 300v.w. ELECTROLYTICS. Size  $2\frac{1}{2} \times 1\frac{1}{2}$ " at  
25p, 10 for £1.80

FET's like 2N 3819 at 6 for 75p  
30 AF 117-OC170 TRANSISTORS. Untested at 57p

ROCKER SWITCHES. 240 volt 5 amp On-Off at 15p, 4 for 50p.  
BRANDED 10 Watt ZENERS. 15, 18, 22, 33, 56, 100 volt. All at  
30p each

TBA 120S at 75p each

SOLDER-IN FEED THRO's. 300pf, 1000pf. Both 20p doz.

COMMUNICATION SERIES OF I.C.'s. Untested consisting of  
1 x R.F., 3 x I.F., 2 x VOGAD, 2 x AGC, 1 x Mike Amp, 2 x Double  
Balanced Modulator, 1 x Mixer. The 12 I.C.'s with data for £3

MULLARD MODULES LP 1173 10 WATT AUDIO at £2, LP  
1171 AM-FM IF MODULE at £3, LP 1179 AM-FM TUNER FRONT  
END at £3.50

BUTTERFLY PRE-SET MINIATURE VARIABLE CAPACITORS.  
25 x 25pf at 50p, 25 x 25pf wide spaced at 55p, 38 x 38pf at 60p, 38 x  
38pf wide spaced at 65p

455 kHz VERSION OF LP 1175 FILTER with circuit at 55p  
VHF TRANSISTORS. 2N 918 at 25p, BFY 90 at 50p

MATCHED PAIRS OF AD161-AD162 at 85p pair  
B7G CRYSTALS. 90, 99, 99-962, 146-5, 147-250 kHz. All at 40p each

Please add 20p for post and packing on U.K. orders under £2.  
Overseas orders at cost.

# Get the Optimum from your Rig

## -STOP MISTREATING IT!

Match your antenna system to the  
PA stage with a KW 107 - observe your  
TX 'Waveform' with a KW 108



### KW 107 ANTENNA TUNING SYSTEM

Incorporates E-Z match, SWR/RF Power meter dummy load. Antenna switch. High power version KW 109 is available.

### KW 202 RECEIVER

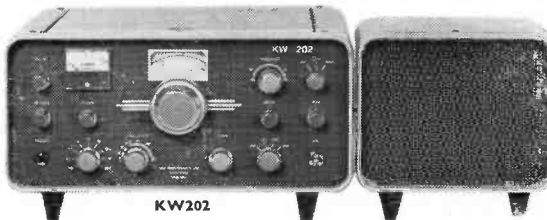
One of the finest Amateur Band Receivers on the market. SSB filter and "Q" multiplier. Excellent sensitivity and stability. Two speed tuning 10-160 metres.

Write or phone for catalogue.



**KW 108 MONITOR SCOPE**  
Monitor your transmissions 10-160m. Two-tone test generator incorporated to ensure optimum linearity for SSB.

## Optimum Performance Receiver



KW202

# KW

**Communications Products  
DECCA COMMUNICATIONS LTD**

Crampton Road, Otford, Sevenoaks Kent,  
TN14 5EA. Tel.: Sevenoaks (0732) 50911

\*Easy terms on  
equipment available  
over 12, 18  
or 24 months.

### OTHER KW FAVOURITES

KW E-Z match ATU ; KW  
103 SWR/RF Power Meter ;  
Traps (The original & KW  
Best) ; KW Trap Dipoles ;  
Balun Mk. I and Mk. II ;  
KW Antenna Switch ; KW  
Stockists for Hy-Gain  
beams and verticals ; CDR  
Rotators, Shure Micro-  
phones, etc. KW Spares  
are normally stocked for a  
minimum of five years  
after manufacture of equip-  
ment.

## S.S.M. SOLID STATE MODULES

63 Woodhead Road, Solid, Lockwood, Huddersfield, HD4 6ER

Telephone 0484-23991

Manufacturers and Suppliers of Communications Equipment

### TRANSVERTERS 2 Metre or 4 Metre Europa B

- \* 200W input 50% efficiency. 200mW drive.
- \* 2dB N.F. 30dB gain on receive.
- \* -80dB spurious responses.
- \* Price £97.78 + VAT = £110.00, complete to plug into Yaesu equipment. EX-STOCK.

### EUROPA COMPLETE POWER SUPPLY TYPE CPS10

Price: £40.00 + VAT = £45.00



### NEW SOLID STATE EUROPAS

- EUROPA 55 2 metre transverter Price £80.00 + VAT = £90.00 Ex-Stock
- EUROPA 70 70cm transverter Price £84.45 + VAT = £95.00 Ex-Stock
- \* Operates from 12v. AC or DC.
- \* 10W OUTPUT.
- \* 2dB N.F. for 2 metres, 3dB N.F. for 70 cms., gain 30dB, IF 28-30 MHz.

### CONVERTERS Sentinel Dual Gate MOSFET Converters

- 2 metres, 4 metres, Marine Band, Satellite Band, other frequencies to order. 2 metre IFs: 2-4 MHz, 4-6 MHz, 28-30 MHz, 4 metre IF: 28-28.7 MHz. Performance cannot be bettered. Price: £18.00 + VAT = £20.25. Ex-Stock.

SENTINEL 2 METRE CONVERTER KIT 28-30 MHz IF only. Price: £11.50 + VAT = £12.94. A well proven kit supplied with printed circuit board, drilled and with all coils mounted to make assembly easy. If it doesn't work, send it back with £2.25 and we will fix it.

### SENTINEL X 2 METRE CONVERTER

Contains a mains power supply and a front panel RF gain control. Stock 2 metre IFs: 2-4 MHz, 4-6 MHz, 28-30 MHz. Price: £22.00 + VAT = £24.75.

SENTINEL M.F. Another Dual Gate MOSFET 2 metre converter which converts to medium wave in two switched bands. Price: £18.00 + VAT = £20.25.

70cms. SM70 70 cm. to 2 metre FET converter. N.F. 3dB, gain 30dB. Price: £18.00 + VAT = £20.25. Ex-Stock.

SENTINEL 70 70cm. to 28-30 MHz converter. 3dB N.F. 30dB gain. Price: £20.00 + VAT = £22.50. Ex-Stock.

### PRE-AMPLIFIERS

2 METRES. The Sentinel Low Noise FET pre-amps. The "Ultimate" performance. N.F. 1dB Gain 18dB. Ex-Stock, 2 metres, 4 metres, Marine Band, Satellite Band. Other frequencies to order. Isolated supply rails, 12v. (9-15v.) at 5mA. Price: £7.75 + VAT = £8.72. Ex-Stock.

PA3. To fit inside your 2 metre transceiver, size 1 cubic inch, N.F. 2dB, gain 18dB, supply 12v. (9-15v.) at 5mA. Price: £5.57 + VAT = £6.27. Ex-Stock.

70cm. SM 71 FET pre-amplifier, gain 18dB. Price: £8.89 + VAT = £10.00. Ex-Stock.

### THE SENTINEL H.F. PRE-AMPLIFIER

A wideband pre-amplifier covering 1-40 MHz, gain 15dB, N.F. 1dB. Input and output Z 50 ohms, supply 12v. (9-15v.). The box size is 2½" x 3" x 1½" and an internal c/o relay allows the unit to be inserted in a transceiver aerial lead, and is also used to switch the pre-amp out of circuit. Price: £9.00 + VAT = £10.12. Ex-Stock.

THE PA10 printed circuit board version of the above—less c/o relay. Size only 1 cubic inch. Price: £5.00 + VAT = £5.62. Ex-Stock.

SSM Z MATCH. 80-10 metres matches 15-5000 ohms, 2kW at 50 ohms. Size: 8½" x 4" front panel, 7" deep. Price: £28.00 + VAT = £31.50.

### SSM IAMBIC MORSE KEYS

CMOS circuit for use with "Squeeze" or single paddle keys. Price: £30.00 + VAT = £33.75.

Twin paddle key to complement our keyer, £10.00 + VAT = £11.75.

ACCESS BARCLAYCARD H.P. or C.W.O.

We offer same day COD (£50 limit). Just phone your credit card number for same day service. 12 month guarantee on all units. If you require more detailed information or help, we are a telephone call or a letter away, so do not hesitate to ask. You can call in anytime to collect or inspect equipment. Paul G3MXG.

FROM **Catronics**

200 MHz D.F.M.



**VHF DIGITAL FREQUENCY METER — Model DFM 5**

The updated version of the Catronics Frequency Meter with extended frequency range to 200 MHz with a restyled cabinet and front panel. Size approx. 8½" x 7" x 3".

- ★ Full 7 digit 0.35" amber display.
- ★ I.C. memory giving a "non-blinking" display.
- ★ Automatic suppressed zeros on 3 leading digits to reduce power consumption.
- ★ TTL and ECL i.c.s used to give good reliability.
- ★ 10 MHz master oscillator for high accuracy.
- ★ 12v. (-ve earth) d.c. input and 210-260v. mains p.s.u. fitted.

Price only £135 incl. VAT. (Add £1.50 for insured post)

**AMATEUR RADIO BULK BUYING GROUP**

**JAYBEAM VHF AERIALS**

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

<b>FOR 12M. BAND :</b>	<b>FOR 70 cms. BAND :</b>
C5/2M: colinear ... £28-12	D8/70 : 8 over 8 slot ... £14-06
5Y/2 : 5 ele. Yagi ... £6-98	PBM18/70 : 18 ele. parabeam ... £16-88
8Y/2 : 8 ele. Yagi ... £9-12	M8M48 : 48 ele. multi. ... £19-68
10Y/2 : 10 ele. Yagi ... £19-35	MBM88 : 88 ele. multi. ... £26-32
PBM14/2 : 14 ele. parabeam ... £28-35	12XY/70 : 12 ele. cross Yagi ... £27-00
5XY/2 : 5 ele. cross Yagi ... £14-52	<b>PHASING HARNESS :</b>
8XY/2 : 8 ele. cross Yagi ... £18-12	PMH/2C : 2m. circular ... £4-62
10XY/2 : 10 ele. cross Yagi ... £23-96	PMH2/2 : 2m. stacking ... £6-18
Q4/2 : 4 ele. Quad ... £14-85	PMH2/70 : 70 cm. stacking ... £5-34
Q6/2 : 6 ele. Quad ... £19-80	MT75/50 : Transformer ... £2-48
D5/2 : 5 over 5 slot ... £12-38	<b>MASTS/ROTATORS etc.:</b>
D8/2 : 8 over 8 slot ... £16-60	SPM : 16ft. Portable mast ... £9-45
XD/2 : crossed dipoles ... £8-94	PME : 4ft. extension ... £1-58
UGP/2 : Unipole ... £6-42	SVMK : Vertical mount ... £3-48
HM/2 : Halo and Mast ... £3-54	AR40 Rotator ... £48-09
TAS : ¾ wave whip ... £11-82	5 way cable ... 22p/yard

Add CARRIAGE as follows: Harness, Halos and UGP 75p. Rotators and all other aerials: To: UK Mainland only, £1-50, Isle of Wight £2, N. Ireland, £2-50, elsewhere at cost. These prices include VAT.

**PLESSEY SL600 ics at LOW PRICES**

We carry the most comprehensive stocks of SL600 devices anywhere in the country—available for immediate delivery.

SL610C £1-90	SL611C £1-90	SL612C £1-90	SL613C £3-30
SL620C £2-90	SL621C £2-90	SL622C £7-10	SL623C £5-25
SL624C £2-80	SL630C £1-80	SL640C £3-20	SL64C £3-20

Full data sheets on all SL600 devices are included in our Data Catalogue—SEND 30p + LARGE 14p SAE.

Please note: ALL OUR PRICES INCLUDE VAT, but add 20p post and packing for components.

**COMMUNICATIONS HOUSE (Dept. 713)**  
 20 WALLINGTON SQUARE,  
 WALLINGTON, SURREY, SM6 8RG  
 Telephone : 01-669 6700

**Can YOUR Antenna do all this?**

You've read our ads with their recent testimonials and user histories—so this month we thought we'd remind readers of the selling points of the

**JOYSTICK VFA (World Patents)**

- ★ Only 7' 6" long, comes in 3 easily assembled sections.
- ★ Tunes -5-30 MHz., no gaps.
- ★ Matching Antenna Tuner.
- ★ No harmonic resonances—means that the highest efficiency transfer of power and waveform from TX to ether takes place. In turn this ensures that TVI and other spurious emissions are just not substantially present.
- ★ Low angle radiation as an effective ground plane—that husbanded power goes on to reach destination with the least number of loss-making skips.
- ★ Gives receiver additional front end selectivity and gain—reduces cross-mod and out of band blocking.
- ★ Your installation can be "tailored" to space available. Install VFA on mast or chimney or in roof space with a long or short feeder—or SIMPLY STAND IN THE SHACK. One delighted user proved his VFA by operating FROM A BASEMENT!

ALREADY IN USE BY AMATEUR TRANSMITTING AND SWL STATIONS WORLD-WIDE AND IN GOVERNMENT COMMUNICATION.

**SYSTEM 'A' £32.40**

250w.p.e.p. OR for the SWL

**SYSTEM 'J' £38.60**

500w. p.e.p. (improved 'Q' on receive)

**PARTRIDGE SUPER PACKAGES**

COMPLETE RADIO STATION FOR ANY LOCATION

All packages feature the World Record Joystick Aerial (System "A"), with 8ft. feeder, all necessary cables, matching communication headphones. Delivery Secured our risk. ASSEMBLED IN SECONDS! — BIG CASH SAVINGS!

**PACKAGE No. 1** As above with R.300 RX SAVE £13-87! **£210-55**

**PACKAGE No. 2** Is offered with the FRG7 RX. SAVE £13-87! **£193-11**

**PACKAGE No. 3** Budgets may come and do their worst—so here is a lower-price, high-quality package, featuring the all solid state SMC 73 Rx., with all the Partridge extras. SAVE £26-05 PLUS! **£154-86**

**RECEIVERS ONLY, inclusive delivery, etc.**  
 R.300 £184.50 FRG7 £167.06 SMC73 £128.81



Just telephone your card number

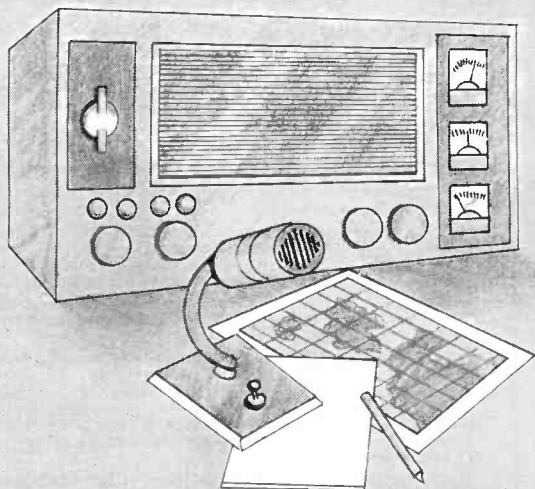


Phone 0843 62535 (or 62839 after office hours) or write for details—send 8½p stamp

NOTE: All prices are those current at time of closing for press, inclusive of then current VAT and carriage.

BOX 4, PARTRIDGE HOUSE, PROSPECT ROAD, BROADSTAIRS, CT10 1LD. (Callers by appointment).





# Become a radio amateur.

Learn how to become a radio-amateur in contact with the whole world. We give skilled preparation for the G.P.O. licence.

WAA

**Free!**

SWE-3/7

Brochure, without obligation to:

**BRITISH NATIONAL RADIO & ELECTRONICS SCHOOL,**

P.O.Box 156, Jersey, Channel Islands.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

(Block caps please)

## NEW SAMSON ETM-3C C-MOS KEYS

1  $\mu$ A battery drain—Why switch off?

- Self-completing dots/dashes/spaces. ● Can be used either as normal electronic keyer or as an iambic mode squeeze keyer.
- 8-50 wpm. ● Constant 3:1 dash-dot ratio. ● 6 C-MOS ICs and 4 transistors. ● Plug-in PCB. ● Long battery life—typically 1  $\mu$ A drain when idling—Built-in battery holder for 4 x 1.5v. batteries (but will work over 3-10v. range). ● PCB has both a reed relay (250v., 0.5 amp., 25w. max.) and a switching transistor (300v., 30 mA max.)—either keying method can be used. ● Has the well-known fully-adjustable Samson precision twin keying lever assembly. ● Operate/Tune button. ● Sidetone oscillator.
- Grey case 4" x 2" x 6". ETM-3C, £63.88.

**ETM-4C:** As ETM-3C but with 2 combinable memories.

BUILT FOR DEPENDABLE MARINE AND COMMERCIAL SERVICE

### JUNKER PRECISION HAND KEY

A superbly engineered straight key used for many years by professionals afloat and ashore. With this key you can't help but send good morse. Free-standing—no screwing down. Front and back contacts—fully-adjustable gaps/tension. Key-click filter. Hinged grey cover, £28.64.

### BAUER KEYING PADDLE

Single-paddle unit on 1½" x 2" base for home-built EI-bugs. Adjustable gaps/tensions, £9.97.

### 88 mH TORIODS

For CW, RTTY, SSTV and other filters, 90p each.

All prices post paid UK and include 12½% VAT.

Please send stamp with enquiries.

**SPACEMARK LTD.**  
THORNFIELD HOUSE, DELAMER ROAD  
ALTRINCHAM, CHESHIRE  
(Tel: 061-928 8458)

## REG. WARD & CO. LTD.

(G2BSW)  
(G8CA)

KW 103 VSWR Meter and Combined Power Meter ...	£16.00
KW 107 Combined E-Z Match, VSWR and RF Power Indicator, Dummy Load and Antenna Switch for 3 Outlets	£68.00
KW Trip Dipole Coaxial Feeder ...	£26.00
KW Trap Dipole with Balun ...	£29.00
KW 3-way Antenna Switches (for coax) ...	£6.00

### YAESU

Yaesu FT 301D All solid state TCVR ...	£599.00
Yaesu 101E ...	£429.00
FT200B Transceiver and FP200 A/C PSU ...	£289.00
Yaesu FR1015 RX ...	£299.00
Yaesu FR101D ...	£390.00
Yaesu 401B TCVR: ...	£365.00
Yaesu YO100 Mon. scope ...	£118.00
FT221-2M TCVR: CW/AM/FM ...	£359.00
Yaesu FRG7 New General Coverage Receiver, ...	£144.00
Yaesu 401B ...	£365.00

Sentinel 2m. Preamps and 2m. Converters/Europa Transverters.

### SHURE MICROPHONES

Model 444, £19.20 ; Model 201, £7.89

### USED EQUIPMENT:

Grundig Satellit 2000 with S.S.B. unit. ...	£115.00
FT 101 Excellent ...	£250.00

### TECHNICAL ASSOCIATES

Audio Compressor ...	£21.00
----------------------	--------

### USED

FT101 Excellent ...	£250.00
Satellit 2000 ...	£115.00
Heath SB610 Excellent ...	£60.00

### WANTED

Yaesu FR50B's in good condition.  
VALVES for YAESU, etc. GBMB, 6BZ6, 6UB, CEJ7, 6AV6, 6KD6, 12AX7A, 12BY7A, 12AU7, R.C.A. VALVES for KW and Heathkit equipment, 6146, 6146B, 6HF5, 6LQ6, 6GES, 6EA8, 6GWB, 6GK6, 6CM6, 6CL6, 6CB6, 6BN8, 6HS6, 6EW6, 12BA6, 12BE6, 12B26, 6J56C, etc., and many other types.  
J-Beams and Stolle Rotators: 140ft. 14g copper ant. wire ; Ribbed and T-Insulators ; 52 and 75Q-co-ax, and U.H.F. plugs and sockets. Mast Couplers for 2in. Masts. Wightraps. G-Whips mob antennae, 12AVQ and 18AVT, etc. SWR.10 (Twin Meters). SWR/PWR Meters.

### AMTRON KITS

TRADE INS WITH PLEASURE. OUR STOCK OF GOOD SECOND HAND EQUIPMENT CHANGES DAILY—LET US KNOW YOUR REQUIREMENTS.

Due to currency fluctuations prices of imported equipment are liable to alteration. Add 12½% VAT to all prices except used equipment.

HP TERMS AVAILABLE

CARRIAGE EXTRA ON ALL ITEMS

**AXMINSTER - DEVON**

Telephone : 33163



# P.M. ELECTRONIC SERVICES

**7A ARROWE PARK ROAD, UPTON, WIRRAL, MERSEYSIDE, L49 0UB**

Tel.: 051-677 8918, 4.30-7 p.m. Cables : CRYSTAL BIRKENHEAD

**VAT—PRICES EXCLUDE VAT WHICH SHOULD BE ADDED AT THE HIGHER RATE (12½%) FOR ITEMS MARKED (H) AND AT THE LOWER RATE (8%) FOR ITEMS MARKED (L)—OVERSEAS ORDERS (inc. Eire and Channel Isles) NO VAT CHARGEABLE**

## 2M TX & RX CRYSTAL AVAILABILITY & PRICE CHART

CRYSTAL FREQUENCY RANGE (Tx or Rx) and HOLDER	4 MHz-TX-HC6/U	6 MHz-TX-HC25/U	8 MHz-TX-HC6/U	10 MHz-RX-HC6/U	11 MHz-RX-HC6/U	12 MHz-TX-HC25/U	14 MHz-RX-HC25/U	18 MHz-TX-HC25/U	36 MHz-TX-HC6 & 25/U	44 MHz-RX-HC6/U	44 MHz-RX-HC25/U	48 MHz-TX-HC6 & 25/U	52 MHz-RX-HC25/U	72 MHz-TX-HC25/U
144-030 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
144-4433-2 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
144-480 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
144-600 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
144-700 ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-000/SO ...	a	b	b	b	b	b	b	b	b	b	b	b	b	b
145-050/R2T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-075/R3T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-100/R4T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-125/R5T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-150/R6T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-175/R7T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-200/R8T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-300/5/12 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-350/5/14 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-400/5/16 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-500/5/20 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-525/5/21 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-550/5/22 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-575/5/23 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-600/5/24 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
145-650/R2R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-675/R3R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-700/R4R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-725/R5R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-750/R6R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-775/R7R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-800/R8R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145-950/538 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a

PRICES : (a) £2-36 (b) and (c) £2-90 + VAT (H).

AVAILABILITY : (a) and (c) Stock items, normally available by return (we have over 4,000 items in stock). (b) Four weeks normally but it is quite possible we could be able to supply from stock.

N.B. Frequencies as listed above but in alternative holders and/or non stock loads are available as per code (b).

ORDERING. All we require to know is (1) Output frequency, (2) Crysta frequency range, (3) The Holder and, (4) Either the Load Capacitance (pfs) or equipment. It is not essential to give the exact frequency, though it would be of assistance to quote it if known.

### JAPANESE AND AMERICAN EQUIPMENTS

With the ever increasing popularity of Japanese equipments we have further expanded our range of stock crystals. We can now supply for YAESU (FT2F, FT2FT, FT2 Auto, FT224), most of the ICOM range and the TRIO-KENWOOD range.

We can also supply from stock crystals for the HEATHKIT HW202+HW17A YAESU FT221 CRYSTALS NOW IN STOCK, ALL AT £2-90 + VAT (H). All popular channels.—For repeater use advise xtal frequency required as earlier models have different shift xtals to later FT221R. We can also supply the crystal to give NORMAL "tune to RX" working (as FT221R) For 70 cm we can supply the 1.6 MHz shift xtal for direct use with a MICROWAVE MODULES MMT432/144 which can supply for £133-00 + VAT (H)

CRYSTALS FOR THE NEW BRITISH 70 cm. CHANNELS  
We are stocking the following channels: RB2 (434-65/433-05), RB) (434-70/433-10), RB6 (434-75/433-15), SU8 (433-20), RB10 (434-85/433-25), RB14 (434-95/433-35), 5U18 (433-45) and SU20 (433-50). TX & RX for use with: PYE UHF Westminster (WV15U), UHF Cambridge (U10B), Pocketfone (PF1) and STORNO CQ/CQM 662 all at £2-36 plus VAT (H). For the U450L Base Station we have the TX crystals for all the above channels plus the RX crystals for SU8 and RB14 also at £2-36 plus VAT (H). The RX crystals for RB2, RB4, RB6, RB10, 5U18 & SU20 for use in the U450L Base Station, together with the TX & RX crystals for the remaining 5U channels (5U12-433-30-RTTY and 5U16-433-40) for all the above equipments are available at £2-90 plus VAT (H) delivery as per class (b) 2m. items.

4m. CRYSTALS FOR 70-26 MHz — HC6/U  
TX 8-7825 MHz and RX 29-7800 MHz ... at £2-36 each + VAT (H)  
RX 6-7466 MHz ... at £2-90 each + VAT (H)

10-245 MHz "ALTERNATIVE" IF CRYSTALS £2-36 + VAT (H)  
For use in PYE and other equipments with 10.7 MHz and 455 kHz IFs to get rid of the "birdy" just above 145.0 MHz. In HC6/U, HC18/U and HC25/U.

CRYSTAL SOCKETS—HC6/U HC13/U and HC25/U (Low loss)  
16p. + VAT (H) plus 10p P. & P. per order (P. & P. free if ordered with crystals).

CONVERTER/TRANSVERTER CRYSTALS — HC18/U  
All at £3-00 + VAT (H). 38-6666 MHz (144/28), 42 MHz (70/28), 58 MHz (144/28), 70 MHz (144/4), 71 MHz (144/2), 95 MHz (432/52), 96 MHz (1296/432/144) 101 MHz (4432/28), 105-6666 MHz (1296/28) and 116 MHz (144/28).

### CRYSTALS SPECIALLY MANUFACTURED FOR AN AMATEUR USE TO CUSTOMERS REQUIREMENTS

Now supplied to our new improved amateur specification (temp tol ± 30ppm 0-60°C, adj. tol ± 30ppm) as follows : In HC6/U 1.5 to 2MHz, £3-95 + VAT (H) and HC6/U 2 to 105 MHz and HC18/U and HC25/U 4 to 105 MHz, £3-00 + VAT (H). Delivery usually 4-6 weeks. Please give circuit conditions (i.e. load in pf. etc.) when ordering. Fundamentals (1.5-21MHz) will be supplied to 30pf circuit conditions, and overtones (21-105 MHz) to series resonant conditions unless otherwise specified. For details of closer tolerance crystals please send S.A.E.

TEST EQUIPMENT FREQUENCY STANDARD CRYSTALS—  
100 kHz in HC13/U, £2-95 + VAT (L). 1 MHz and 5 MHz in HC6/U and 10 MHz and 10.7 MHz in HC6/U and HC25/U. £2-80 + VAT (L).

### BURNS ELECTRONICS

We are the Northern Appointed Agents for BURNS KITS, etc., and can supply most of their products from stock.

### MODULAR COMMUNICATIONS SYSTEMS

For the RTTY enthusiast we can recommend and supply the "MCS" Range of products. This includes Terminal Units, AFS Keyers, Magnet Drivers for TTL interface, Telegraph Distortion Measuring Adaptor, RTTY Audio processor, Power units, etc., etc.  
For the CW MAN we have the "MCS" CW Filter which gives three stages of active filtering. Please send S.A.E. for full details of the "MCS" range.

### ANZAC MD-108 DOUBLE BALANCED MIXER

5-500 MHz supplied with full details for only £5-95 plus VAT (L).

### CRYSTALS FOR PROFESSIONAL USE CRYSTALS TO COMMERCIAL SPECIFICATIONS

We can supply crystals to most commercial and MIL specifications, with an express service for that urgent order. Please send S.A.E. for details or telephone between 4.30-7 p.m and ask for Mr. Nordcliffe.

TERMS : CASH WITH ORDER—MAIL ORDER ONLY—S.A.E. WITH ALL ENQUIRIES—PRICES INCLUDE P. & P. (BRITISH ISLES) EXCEPT WHERE STATED—OVERSEAS CHARGED AT COST.

### RADIO AMATEUR PREFIX-COUNTRY-ZONE LIST

published by GEOFF WATTS

Editor of "DX News-Sheet" 1962-1976

The List you have always needed, the list that gives you everything, and all on one line! For each country :—

- its DXCC "status"
- the normal prefix
- the special prefixes
- the ITU callign block allocation
- the continent
- the "CQ" Zone No.
- the ITU Zone No.

Full information on Antarctic stations, USSR Klub-stations, obsolete prefixes used during the past 5 years, and much more, and the List can be kept always up-to-date because ample space has been provided for adding every new prefix, each new ITU allocation, etc. Everything arranged alphabetically and numerically in order of prefix. Ideal for Contest operators and SWL's.

Tell your Club-members about it. Order a gift copy for that overseas friend 15 pages. Price 35p (UK) or sent overseas (air-mail) for \$1 or 5 IRCs (55p)

GEOFF WATTS

62 BELMORE ROAD, NORWICH, NR7 0PU, ENGLAND

### CRAYFORD ELECTRONICS

#### CONNECTORS

This is only a small sample from our range—we keep most connectors for popular transceivers, please enquire.

3 pin plugs for ICOM microphone (sockets also) ...	60p
4-pin plugs for TRIO/YAESU/ICOM microphone ...	65p
DC power plugs for ICOM IC22, 225, etc. and IC202 ...	20p
Speaker plugs for ICOM, etc. (3.5mm.) ...	15p
Pye WESTMINSTER microphone plugs ...	65p
PL259 "UHF" plugs 45p (reducers 15p) SO239 sockets ...	45p
BNC 50 Ω plugs UR43 entry ...	70p
N 50 Ω plugs UR43 entry ...	£1-40

We also stock products by :—  
MICROWAVE MODULES — BURNS — JAYBEAM — CDE  
ROTATORS — AEC Meters — QM70 — ELECTRONIC DEVELOP-  
MENTS — RADIOSPARES — ANTEC.

ACCESS BARCLAYCARD GIRO

S.A.E. Enquiries and Lists.  
6 LOVELACE CLOSE, WEST KINGSDOWN, SEVENOAKS,  
KENT, TN15 6DJ  
24 Hr. Answer Service 047485 2577

## CREATE YOUR OWN REFERENCE LIBRARY

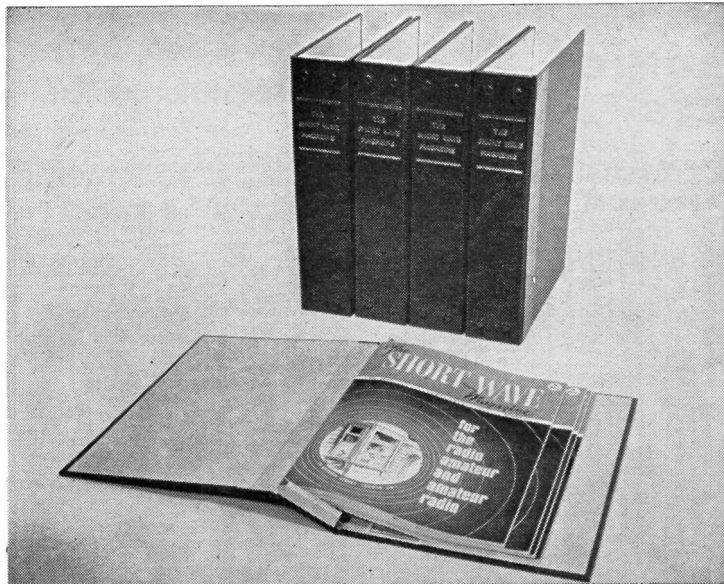
The "EASIBINDER" is designed to bind 12 copies of the Magazine as you receive them month by month, eventually providing a handsomely bound volume for the bookshelf.

No need to wait until twelve copies are assembled. As each copy is received, it is quickly and simply inserted into the binder. Whether partially or completely filled, the binder is equally effective, giving the appearance of a book, with each page opening flat.

Strongly made with stiff covers and attractively bound in maroon Rexalon and Milskin, the binders have only the title gold-blocked on the spine and the date frame.

Price £1.75 (incl. P & P)

PUBLICATIONS DEPARTMENT  
SHORT WAVE MAGAZINE  
34 HIGH STREET,  
WELWYN,  
HERTS. AL6 9EQ



*Subscription rate to Short Wave Magazine is £4.80 for a year of twelve issues, post free.*

## BETTER SHORT WAVE RECEPTION

by William I. Orr W6SAI and Stuart D. Cowan W2LX

New 4th Edition

In the latest edition of this excellent work for all those who own (or intend to own) a radio receiver, these two well-known and respected writers have produced chapters covering: the radio spectrum and what you can actually hear world-wide; the tuning of a shortwave receiver; the business of buying a receiver, both new and secondhand; a description of the SW Rx in non-technical terms, together with receiver adjustment and alignment; DX-ing above 30 MHz; a description of the VHF receiver; building and adjusting efficient aerials; reception techniques.

Thoroughly readable and "digestible," this book is without doubt a very valuable addition to the bookshelf of any SWL.

160 pages

£3.30 inc. post

Order from:

Publications Dept.,

**SHORT WAVE MAGAZINE LTD.,**  
34 High Street, Welwyn, Herts., AL6 9EQ

## HAM RADIO

A BEGINNER'S GUIDE

by R. H. Warring

Written by a well-known author, this book deals with transmitting and receiving equipment; its installation and maintenance; the operation of amateur stations; call signs; amateur transmitting licences; Morse Code transmission described in detail.

Excellent reading for those wishing to gain a sound knowledge of Amateur Radio without the need to become too technically expert.

152 pages

£2.50 inc. post

Publications Dept.

Short Wave Magazine Ltd., 34 High Street,  
Welwyn, Herts. AL6 9EQ. Tel: Welwyn (043871)5206/7

## BUTTERWORTH TITLES NOW IN STOCK . . .

**The Practical Aerial Handbook, 2nd Edition**

232 pages by Gordon J. King (Hard Cover) £6.10 inc. post

**Foundations of Wireless and Electronics, 9th Edition**

521 pages by M. G. Scroggie (Soft Cover) £4.40 inc. post

**Radio and Electronic Laboratory Handbook, 8th Edition**

614 pages by M. G. Scroggie (Hard Cover) £8.65 inc. post

Available from Publication Dept.

**Short Wave Magazine Ltd.**

34 High Street, Welwyn, Herts. AL6 9EQ

## SMALL ADVERTISEMENTS

("SITUATIONS" AND "TRADE")

9p per word, minimum charge £1.50. No series discount. All charges payable with order. Insertions of radio interest only accepted. Add 50% for Bold Face (Heavy Type). Box Numbers 25p extra. No responsibility accepted for transcription errors. Replies to Box Numbers should be addressed to The Short Wave Magazine, Ltd., 29 High Street, Welwyn, Herts., AL6 9EE.

## TRADE

**Japanese Equipment:** Ask us about all Japanese Equipment. Write: **Overseas Section, Yokohama Sogo Ham Centre, 5-42 Minami Yoshida Minami, Yokohama 233, Japan.**

**Quality QSL Cards:** Send s.a.e. for sample by return post. Quick delivery.—**Compalith Printing Services, 115 Promenade, Cheltenham, Glos., GL50 1NW.**

**Radio Amateurs Examination City & Guilds.** Pass this important Examination and obtain your G8 Licence with an RRC Home-Study Course. For details of this and other Courses (GCE, professional examinations etc.) write or phone: **The Rapid Results College, Dept. JV/1, Tuition House, London SW19 4DS.** Careers Advisory Service, 01-947 7272 or ring 01-946 1102 for prospectus only (24 hr. answering service).

**QSL cards:** s.a.e. for sample by return of post. Quick service. — Hogan, 14 Sunnymead Avenue, Mitcham, Surrey.

**QSL cards with your photograph** on them. Send s.a.e. for sample. — Leo, G4EQI, Haines Clark Printers, Gooch Street, Birmingham B5 7HE.

**April issue: Due to appear March 25th.** Single copies at 45p post free will be sent by first-class mail for orders received by Wednesday, March 23rd, as available. — Circulation Dept. Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts AL6 9EQ.

## READERS' ADVERTISEMENTS

5p per word, minimum charge 70p, payable with order. Add 25% for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 25p extra. Replies to Box Numbers should be addressed to the Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ.

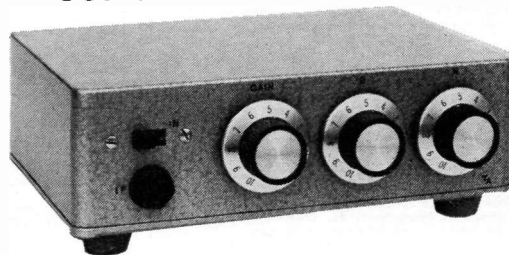
## READERS

**Sale:** R.390A/URR general coverage receiver, fitted mechanical filter etc., in very good condition, complete with three manuals and in cabinet, £325. — Kennedy, 224 Fraser Avenue, Reading, Berks. (Tel: 0734-85222 daytime).

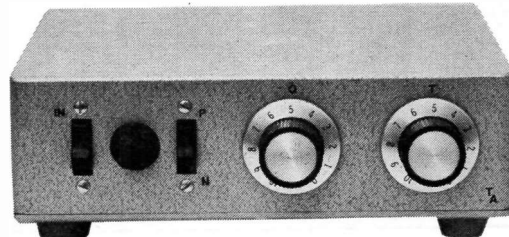
**For sale:** Hammarlund HQ-180 general-coverage amateur bandspread receiver, all modes, with notch filter, BFO, S-meter and clock, perfect condition, £120. Icom 202, 144-144.4 MHz, 6 months old, £130. Modular Electronics 15w.-output linear for Icom 202, £25. Codar AT-5 transmitter with PSU, £15. Three 'Vanguards' 25-AMB, only one with speaker and control box, £10 each. Carriage extra on all items. — Ferguson, GM3TRI, QTHR. (Tel: Perth 26941).

**Manuals:** A.510, CT-436, Mercury, CT-218, 770, R.1475, £2. B.40, CR-150/3, BC-348, £1.75. Many others. — Brooks, 5 Farrant House, Winstanley Road, London SW11 2EJ.

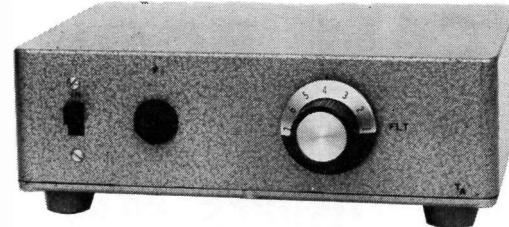
**Selling:** 'G3ZVC' SSB transceiver with preselector and IC's for PA, £45. AM-25T Vanguard with control cables, £20; AM-25B Vanguard with cables, £10; both working on two-metres. Channelmaster rotator, £20. — Taylor, 11 Minehead Street, Leicester. (Tel: Leicester 854241).

TECHNICAL ASSOCIATES  
COMMUNICATION AIDS

**AUDIO COMPRESSOR** ★ Suitable for SSB/AM/FM ★ pure compression, no clipping! ★ 24 to 26dBs of compression, with less than 1% distortion ★ variable decay time, on front panel ★ variable noise gate pauses in speech ★ all functions routed to output in "off" position ★ goes between mic and tx on mods involved ★ these compressors have been tested alongside commercial rf clippers, the only difference at the receiving end was superior audio quality, £22.50 + VAT (12½%) + 50p P. & P.  
**PRINTED CIRCUIT MODULE.** Supply your own case and knobs. Assembled and tested. Type A.C.I., £12.50 + 12½% VAT + 25p P. & P.

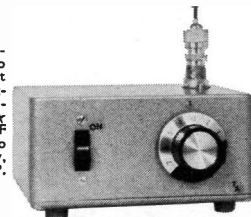


**RX PEAK AND NOTCH FILTER** ★ no gimmicks ★ all integrated circuits ★ will clear QRM in seconds ★ 1 watt o/p stage ★ headphone socket ★ goes between RX and loudspeaker ★ by-pass switch ★ notch-width control for optimum width of notch ★ tune control allows you to pu the notch or peak where you want it ★ runs from internal PP9 battery or any supply from 9v. to 15v. ★ will also peak up CW signals, £24.50 + VAT (12½%) + 50p P. & P.  
**PRINTED CIRCUIT MODULE.** Including all pots and switch. Assembled and tested, £13.50 + VAT (12½%) + 25p P. & P. (Type P.N.I.I.)



**RX BAND PASS FILTER** ★ 9 integrated circuits ★ 1 watt O/P stage ★ headphone socket ★ 8 switched positions of filter ★ high pass—2.5 kHz-2.00 kHz-1.5 kHz-200 Hz-110Hz-80Hz ★ Bandwidths selected for optimum readability on AM, SSB, FM, CW ★ giving the operator total control over bandwidth and QRM conditions ★ makes the poor RX superb and the superb RX better ★ runs from internal PP9 battery or any supply from 9v. to 15v., £24.50 + VAT (12½%) + 50p P. & P.  
**PRINTED CIRCUIT MODULE** including rotary switch, £13.50 + VAT (12½%) + 25p P. & P. (Type B.P.11).

**XTAL CALIBRATOR** ★ A deluxe unit with seven ranges down to 1 kHz ★ Switch selected from front panel ★ 1 MHz-500Hz-100 kHz-50kHz-10kHz-5kHz-1 kHz ★ Radiates from its own 8 inch ant. ★ Markers usable from 1 MHz to UHF ★ Complete with ant., ready to use, just connect a 9v. battery, £19.00 ★ VAT (8%) ★ 25p. P. & P.



64 CRIMPLE MEADOWS, PANNAL, HARROGATE,  
N. YORKS.

## G. W. M. RADIO LTD.

All prices include VAT and post/carriage. Discount for callers

A fresh delivery of BC221 **FREQUENCY METERS**. Complete with charts, less power supply. These are recently recalibrated, £20. Also a few VHF version, TS174M, £27.50.  
**RECEIVERS**, PCR, 200-550 and 900 to 2000 Metres, 6 to 22 Mc/s. Needs 250v, DC 100ma and 12v. LT, sockets for 2½ ohm speaker, clean and tested, £20.  
**AERIAL INSULATORS**. Egg type, white china, 1½", 6 for £1. Pyrex 2½", 75p each. Compact mains trans. 110/250 to 150-0-150v. 50ma and 6-4v. Ia. Suitable TTL/Nixie or BC221 PSU, good used condition, £1-75. Transmitting **CAPACITORS**, JB 100pf twin stator, £1-50. Reed relays for recent auto keyer designs 200 ohm coil, 15p each plus 10p post any number. **WATCHES** GS Smiths, sweep second hand, £9-50. Lemania stop 1/5th second, £16-75. Both screw back, fully overhauled and genuine ex-Military. Sent by Registered post. Quality jewelled action **ALARM CLOCKS**. **WEHRLE COMMANDER** Steady/Repeat alarm. Large, magnificent and brand new, £9-50. MOST items previously advertised still available.  
**BASES** large ceramic for 4-125 or 4-250, etc., £1-25. 829B valves with base, ex equipment, £2. **METERS** modern plastic type, 500v. DC or 1ma DC, £2-50 new and boxed.

### RADIO TELEPHONES

**POCKETPHONES PFI** for 430 Mc/s. Clean and complete, untested because crystals removed by supplier. Less batteries. With circuit and tuning instructions, £20 pair (one Rx one Tx).  
**WESTMINSTER W15AM "P"** band ruggedised ex-Police Motor Cycle. With accessories, £50. Unit only £30.  
**CAMBRIDGE AM10B**. Lo band with control box, no cable, £25.  
**ULTRA VALIANT MR4A6 AM**. 12½ kc/s Lo band. Solid state except driver and PA are quick heat valves, £25.  
**COSOR COMMAND CC 303**, similar specification to the above MR4A6, and both types complete with control gear, £25.  
**VANGUARD** units only single channel valve Lo band, no accessories, £11.  
**PFI** mains battery chargers for 12 Tx and 12 Rx batteries, £11.  
**I.T.T. STAR AM7** mid-band solid state. 12v. with dropper for 24v. 12½ kc/s. Unit weight 6½ lbs. (11½ lbs. with speaker dropper and mounting). Single channel, £32-50 or four channel, £37-50.  
**INTRUDER ALARMS**. Photo electric Tx/Rx and control unit, £10. Airlite model 62 headsets, with NATO plug and very clean, £5-50.  
A fresh delivery of **BC221 FREQUENCY METERS**. Complete with charts, less power supply. These are recently recalibrated, £20. Also a few VHF version TS174M, £27.50

All Receivers and Test Equipment are in working order at time of dispatch  
 Carriage charges included are for England and Wales only  
 Telephone 34897

*Terms: Cash with orders. Early closing Wednesday.*  
**40-42 PORTLAND ROAD, WORTHING, SUSSEX**

**Selling:** Trio R-300 with manual, Joystick VFA and ATU, five months old, **mint**, £100 cash. — Ring Shuttleworth, 061-643 3196.

**Wanted:** Heathkit Mohican Rx with handbook, and suitable mains PSU. Handbook or any information on ex-Army Rx Selective Carrier No.2 Mk.II, Cat. No. YB-05377. Any books on amateur radio astronomy. Details and price please. — Roberts, 9 High Street, Bala, Gwynedd LL23 7AG.

**For sale:** Henpecked amateur going QRT: IC-210, £170. EC-10 Mk.II, £100. Both mint condition. (London). — Box No. 5564, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts AL6 9EQ.

**Selling:** Drake R4-B with speaker, 15 crystals, spare set of new valves and manual, **mint**, £215; includes Beyer dynamic earphones, Joystick and Joymatch III tuner. Buyer collects. — Harman, 3 Moreton Court, 212 Dover Road, Walmer, Kent. (Tel: Deal 64398).

**Sale:** Radiospares mains isolating transformer 200/250v. at 200vA., £10. Large de-luxe roller coaster, all ceramic, silver-plated wire, £9. Both brand new, unused. Postage extra. **Wanted:** R.C.A. AR8516L, must be in first class condition. Details and price please. (Lancs.). — Box No. 5565, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts AL6 9EQ.

**For sale:** Liner-430, as new, few hours use only, £225. Sony Trinitron Secam TV, 819/625, VHF F2-F12, UHF 21-69, as new, £130. — Ring Lewis, Coventry 711199.

**Wanted:** Bradley CT-471C multimeter. Handbook for Manson HD-180A frequency standard. VHF receiver covering 30-180 MHz. Details and price please. — Passfield, 30 Greenleaf Close, Tulse Hill, London S.W.2. (Tel: 01-674 5825).

**Wanted:** Transceiver, preferably K.W. Must be in excellent condition, will collect within reasonable distance. Details and price please. — Harlow, G3SHL, QTHR. (Tel: Leicester 402013).

**For sale:** Liner-2 with PA-3 pre-amp. and QM70 70cm. transverter, £155. Must go together — bargain to get going on both bands. — Coomber, G8JXL, QTHR. (Tel: 01-886 6843 after 7 p.m.).

**Selling:** Drake SSR-1 general coverage receiver, as new, £160 cash. Buyer collects. — Ring Richards, Bodmin 3738 (Cornwall).

**Offering:** Codar AT-5 transmitter with Codar mains unit. Labgear LG-50 transmitter. Both in excellent condition. Offers? — Critchley, 9 Abbey Close, Penkridge, Stafford.

**Selling:** UHF radio/transmitter performance tester, £10. Type 51 wave form generator, £8. Mobile Pye Cambridge VHF Tx/Rx, working on 2m., with microphone, £35. BCC VHF base station transmitter, £6. AC-mains stabilised PSU, will drive many ex-govt. equipments, £1.50. Carriage extra, s.a.e. with enquiries. — Hayward, Sunnyfields, Lighthouse Road, St. Margarets Bay, Dover, Kent.

**For sale:** Drake R4-C, as new in carton, with manual, only bench tested, all 10 and 160m. xtals, extra 1-5 filter, £350. Hy-Gain Model 400 rotor and control box, unused, £80. **Wanted:** Collins 75S-3B and 32-S3 spare parts. — Box No. 5559, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

## NEW!

# CALL BOOK 1977

## DX LISTINGS £9.55

## U.S. (Only) ,, £10.20

*The above prices include postage and packing*

Publications Dept.

## SHORT WAVE MAGAZINE

34 High Street, Welwyn, Herts., AL6 9EQ

Tel.: Welwyn (043871) 5206/7

**Selling:** Heathkit GC-1U Mohican general coverage receiver, £26.50. Two-metre converter, IF 4 MHz, with pre-amp. and 3-element beam, £22.50. 70 cm. converter, IF 144 MHz, with pre-amp. and 4-over-4 beam, £22.50. Post paid. — Jenkins, 15 Tiltstone Avenue, Eton Wick, Berks.

**Wanted:** KW-500 or KW-600 linear amplifier. Details and price please. — Ring Acton, G3MBJ, Burton-on-Trent G3767.

**April issue:** Due to appear March 25th. Single copies at 45p post free will be sent by first-class mail for orders received by Wednesday, March 23rd, as available. — Circulation Dept. Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts AL6 9EQ.

**Wanted:** Copies of 'Ham Radio' Oct. 1971, Nov. 1972, July 1974, Feb., June, Sept., 1975. State price. — Barnett, Post Box 10, Evesham, Worcs.

**Selling:** Yaesu FRG-7 with Eddystone active-antenna, ideal for flat or where outdoor antenna impossible, accurate spot-on tuning, cost together £192, will sell separately. Joystick SWL antenna with tuner, £18. Hitachi stereo radio recorder Model No. TRK-5190K, 4-band, mono/stereo/auto/manual recording, mixing facilities, accurate radio section, ideal for recording enthusiast, cost £125. All gear new Nov./Dec. '76. Offers? Genuine sale, cash needed. (London). — Box No. 5560, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts AL6 9EQ.

**For sale:** Belcom FS-1007P, 16-channel, auto-scan, base transceiver, with five repeater and nine popular simplex, auto tone-burst and narrow filter fitted by importers, 3 months old, as new, £170. Panda ATU, 80-10m., £45. Heath HW-12A 80-metre SSB transceiver, with HP-13 DC power supply, £85. — de Bono, G3NJK, QTHR. (Tel: 0533-774477).

**Sale:** Lowe monitor Rx, five channels fitted, unused, £35 or near offer. — Ring Fulcher, Norwich 55236, evenings.

**Sale:** KW-204, used sparingly, but with minor fault in tone osc./mic. amp. section, and slightly marked case, hence only £140. Trio JR-310 with Top Band, narrow filter, calibrator and full 28-30 MHz, £70. IC-22A, fitted eleven channels, little used and in excellent condition, £120. — Elliott, G3ZOG. (Tel: Sunderland (0783) 280080).

**Wanted:** AR88LF receiver in first class condition, positively no modifications. Details and price please. — Ring Glover, Farnworth 75345 (Lancs.) after 6 p.m.

**Selling:** Trio TR-7200G, transmit unused, original packing, with mount, mic., manual, ¼-wave aerial and 16 crystals, £160 or near offer. — Ring Saxby, 0521-41572.

**Sale:** FT-DX500 transceiver, excellent condition, £220 or near offer. Liner-2 with pre-amp., also 'FB' rig, £120 or near offer. — Macleod, GM4DZX, QTHR. (Tel: 041-959 4455).

**For sale:** Yaesu FR-50B Rx, 80-10m., boxed with manual, little used, perfect, £75. — Ring Salt, G8LVE, 0279-20478 (Harlow), evenings.

**Selling:** Yaesu FRG-7, new condition, in makers' box, with handbook, used very little, £135. (London). — Box No. 5561, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts AL6 9EQ.

**For sale:** Drake SSR-1 Rx, boxed, in original condition, used approx. 10 hours, best offer over £170 secures. — Ferguson, 16 Erracht Road, Inverness IV2 4RE.

G4DSG

G3HEO

## D. P. HOBBS LTD.

### THE COMPONENT SPECIALISTS

Trio QR666 Communications Receivers ... ..	£145-00
Yaesu FT200 T/ciever ... ..	£235-00
Yaesu FT200 Power-unit ... ..	£54-00
Belcom Liner 2, MK11 ... ..	£164-00
QM70 New Cobra. 2m./70cm. FM T Transverter with mic. audio	£76-45
28M/70. 2m./70cm. FM Transverter ... ..	£46-40
28/144. Hi-power Transverter ... ..	£88-80
28/144. Solid State Transverter ... ..	£46-24
50 watt 2m. Linea amp. ... ..	£44-00
144/28 Converter ... ..	£16-00
432/28 Converter ... ..	£17-34
1295/28 Converter ... ..	£21-34
Microwave Modules 2 metre Converters. 2-4, 4-6, 14-16,	
28-30 MHz. I.F. ... ..	£16-12
144/28 Lo output ... ..	£17-60
4 metre Converter ... ..	£16-00
70 cm. Converter ... ..	£17-60
23 cm. Converter ... ..	£21-60
2 metre Preamp ... ..	£10-40
432/1296 Varactor Tripler ... ..	£24-00
70 cms. Transverter... ..	£84-00
Uniden 2030 12 channel 2 metre Transceiver, fitted five channels	£131-00
NR-56VF 2m. Monitor Receiver ... ..	£48-00
50K ohm Push-to-talk Mics. ... ..	£3-75
FDK Multi-U11, 23 chan. 70 cms. Transceiver ... ..	£221-33
FDK Multi-11, 23 chan. 2 metre Transceiver ... ..	£190-55

ALL ABOVE PLUS 12½% VAT

#### MICROWAVE MODULES COUNTERS :

50 MHz Counter ... ..	£61-11
500 MHz Pre-Scaler ... ..	£44-00
50 MHz Counter with built-in Prescaler (50 MHz)	£79-63
Microstat 80 Testmeters ... ..	£14-50
Supertester 680R Testmeter ... ..	£22-50

ABOVE PLUS 8% VAT

PART EXCHANGE WELCOME ACCESS OR BARCLAYCARD

11 KING STREET, LUTON, BEDS.

Telephone 20907

#### RECEIVERS :

Racal RA-17 50 kHz-30 MHz ... ..	£325-00
Eddystone EC10 Mk. II 550 kHz-30 MHz ... ..	£125-00
Eddystone 730/4 550 kHz-3; MHz ... ..	£95-00
SP-600 (U.S.A.) Receiver 500 kHz-3; MHz ... ..	£175-00

All in excellent secondhand condition

**TELEPRINTER TYPE 7B :** Pageprinter 24v. D.C. 50 bauds secondhand good condition, no parts broken (+ £3 carr.) £20-00  
Send S.A.E. for Teleprinter Equipment list.

**FREQUENCY METER TYPE BC-221 :** 125-20,000 kc/s. complete with original calibration charts. Checked out, working order ... .. (+ £2 carr.) £21-00

**ANTENNA MAST 36ft.:** Aluminium, base dia. 3" tapering to 2" at top. Complete with red hazard lights, stays, guys, etc. Approx. wt. 3 cwt. ... .. £95-00  
With Rotating Antenna suitable for 200-400 MHz (extra) £15-00

**CRYSTAL TEST SET TYPE 193 :** Freq. 3000-10,000 kHz. Mains 230v. 50Hz. Measures crystal current under oscillatory conditions and the equivalent resistance. Crystal freq. can be tested in conjunction with a Freq. Meter (£2 carr.) £25-00

**SOLARTRON OSCILLOSCOPE CT-316 (CD.518) :** 3" tube, D.C.—5 MHz calibration marker 1 MHz and 100 kHz. 230v. A.C. single beam. Excellent condition ... .. £32-50

**SOLARTRON OSCILLOSCOPE CT-386A (CD.5235) D.C. —10 MHz 4" tube. Double beam, 230v. ... .. £1-50**

**R.216 Receiver Manual (photostat copy) ... .. £1-50**

**PLESSEY PVR500 Telegraph/Teleprinter Receiving Terminal** consisting of PF130 Series Five Channel H.F. Preselector, PR53H Fixed Frequency Receiver, PV78B FSK Converter/Keyer £125-00

#### BARGAIN MAPS

Large stock of unused U.S.A.F. surplus maps, weather charts, ordnance survey maps, etc. including:—

ONC-EI United Kingdom in full and part N.W. Europe. Scale 1 : 1,000,000 58" x 42" Colour.

JNC-9N Europe. Scale 1 : 2,000,000 58" x 42" colour.

AND many others—please send S.A.E. for list.  
PRICE : 70p each (inc. p. and p.)

OR available in packs of 25 maps, price £10 + £1 p. and p. 10 assorted maps at 60p each

WE WISH TO BUY RACAL V.F.O. UNITS

Please add 8% VAT on the above items, except maps.

Add 12½% VAT to receivers, aerial.

W. MILLS

3 and 3a Baldock Street, WARE, Herts., SG12 9DT  
(situated on old A10 opposite Church), Tel.: Ware 66312 (STD 0920)

# HAMGEAR

When we first introduced our P.M.IID preselector/ATU some years ago we knew it was good and never thought it could be improved upon very much. It has been improved, we have introduced some very carefully controlled regeneration via a switch from the front panel. This regeneration gives an extra 6/8 db gain from 20 to 34 MHz, just where most receivers need a bit extra. Customer reports indicate that we are right to take our preselectors along this road and so far we have nothing but praise.

This regenerative unit is termed the P.M.IIDX 76 Super and is battery operated. Following customer requests we now include a 100 kHz crystal marker as an extra in this model.

For followers of Oscar we have updated our popular "Oscaramp" and given it just a hint of regeneration, the results are quite remarkable and we do not think there is anything quite like it currently available.

Prices of these units are:—P.M.IID, **£15.20**; P.M.IID 76 Super, **£20.50**; P.M.IIDX 76 Super with Calibrator, **£35.50** and Oscaramp Super 77, **£15.50**. Postage/Packing is 75p U.K. Why not send for our 5 large pages of information, plus antenna experiments using the units, please send three 8½p stamps.

## HAMGEAR

2 Cromwell Road, Sprowston, Norwich NR7 8XH

## "DX ZONE MAP"

### SEVENTH REPRINT!

In four colours, on durable paper for wall mounting, 35in. wide by 25in. deep. Giving essential DX information—bearing and distance of all parts of the world relative to the U.K., the 40 Zone areas into which the world is divided for Amateur Radio purposes, with major prefixes listed separately. Distance scale in miles and kilometres. Time scale in GMT. Marking of Lat./Long. close enough for accurate plotting. Hundreds of place names, mainly the unusual ones, and most of the rare islands.

With Prefix List revised to Sept. 1973

Price **£1.50**

including postage and special packing in postal tube to avoid damage in transit.

Publications Dept.

Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ. Tel: Welwyn (043871) 5206/7

## VALVES/TUBES/AERIALS

Huge range:— Callers welcome.

Ring : 01-449 1934/5 (stamp for lists)

BEARMAN (Wholesale/Retail)

6/8 Potters Road, New Barnet

## MORSE MADE BY THE RHYTHM METHOD!

**FACT NOT FICTION.** EASY If you start RIGHT you will be reading amateur and commercial Morse within a month. (Normal progress to be expected.)

Using scientifically prepared 3-speed records you automatically learn to recognise the code RHYTHM without translating. You can't help it. It's as easy as learning a tune. 18-W.P.M. in 4 weeks guaranteed. For Complete Course 3 Records & Books send **£5.00** including P.P.I. etc. (overseas surface mail £1 extra).

For further details of course Ring 01-660 2896 or send 7p stamp for explanatory booklet to: S. BENNETT, G3HSC. (Box 14) 45 GREEN LANE, PURLEY, SURREY

**Selling:** Heathkit Type GD-1U valve GDO, £7. Eagle TT-144 dynamic transistor tester, £3. Gramplan DP4/H 50K microphone, £7. Avo EM-272 electronic multirange meter, £20. All in 'as new' condition and post-paid. — Marshall, G4BJF, QTHR. (Tel: Loughborough 63324).

**Sale:** Ex-Admiralty Marconi CR-100/B.28 receiver, working, with manual, £40 or near offer. Buyer collects. — Ring Parker, Drayton 368 evenings (Abingdon).

**For sale:** Lafayette HA-350 amateur-bands Rx, coverage 10-80 metres, with calibrator, CW filter and manual, £55. Katsumi CW filter, £5. BC-221-0 frequency meter, 125 kHz to 20 MHz, with original charts and mains PSU, £22. TS-174/U frequency meter, 20-250 MHz, with original charts and mains PSU, £32. All in very good condition. Buyers collect. — Ring Saunders, Newbury 49395 evenings.

**For sale:** G-Whip Multimobile 71, basemount, 10-20 metres, mint condition, £15 inc. post/packing. — Smye, G4DMN, QTHR. (Tel: 051-336 2386).

**Selling:** Yaesu GRG-7 general coverage receiver, new, boxed, £140. Hamgear Preselector PM-IID, £11. Solid-state AC/DC radio phonograph, £15. Codar MB-6, with manual, mint condition, £15. Toshiba AC/DC cassette recorder, £16. Joystick aerial and tuner, £17. — Hosanee, 4 College House, Hydestile Hospital, Godalming, Surrey.

**Sale:** HW-100 with PSU, speaker, K.W. SWR unit and K.W. E-Zee Match, £130 cash. — Ring Ward, Stevenage 59362 after 6 p.m.

**Wanted:** Brokdown Collins 75-S1, 75-S3 and 32-S3 for spares, or 'S'-Line spares. Details and price please. — Box No. 5562, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts AL6 9EQ.

**Wanted:** FR-101DD or similar; also quality receiver and/or converters covering 100-200 MHz. Cash wanting. — Ring Stark, Accrington (0254) 32155/35947.

**Wanted:** For collection of German W.W.II military radio equipment: wireless sets, receivers, transmitters, accessories. Details and price please. (Belgium). — Box No. 5563, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts AL6 9EQ.

**Selling:** Icom IC-22A, 11-channel, tone-burst, £125. S.T.E. Arac 102 2-metre Rx, £50. Hustler mobile 2m. colinear, £15. 12v./5A. battery, £5. — Ring Knowles, 051-525 2574.

**Wanted:** Back-copies of I.E.R.E. Journal; also VHF receivers covering 50-250 MHz. — Hughes, 11 Henley Road, Ludlow, Salop.

**Sale:** KW-2000A, with mains PSU, mobile PSU, Shure mic., spare 6146's, leads and manual, £180 or near offer. — Buckley, G3VLX, QTHR. (Tel: Orpington 26584).

**Wanted:** BC-348 or similar wide-band coverage Rx, with amateur/rawler/MW. Reasonable price paid. — Roberts, 71 Gibbins Road, Selly Oak, Birmingham.

**Selling:** Heath IB-1100 frequency counter with IB-102 scaler to approx. 180 MHz, mint condition, with manuals, £85. — Ring Callaway, G4FIG (QTHR as G81KY), Lancing 62134, Sussex.

**Wanted:** Atlas transceiver; also good 2m. transceiver. — Hunter, G4EBJ, Holme Lea, Maryport Road, Maryport (2543), Cumbria CA15 7EE.

**For sale: VHF/UHF power transistors/valves:** 2N5707, £5; 2N5641, £5; BLY90, £14; QQVO3-10, £3; 4CX250B, £10. Send s.a.e. for other goodies. Or will **part-exchange** the above for general coverage Rx (e.g. AR88, Eddystone etc.). — Mourao, 31 Chaucer Way, Colchester, Essex. (Tel: Welwyn Garden City 23434 ext. 3403, working hours).

**For sale:** Extendable lattice aerial, 25-ft. approx. Buyer to dismantle. Offers? — Parker, 46 Abingdon Road, Drayton (368), Abingdon.

**Sale:** Telford TC-10 Mk.II all-mode Tx, £60. Or **exchange** for linear amp. suitable for Liner-2. — Tester, G8KPI, (Tel: Lewes 2254, daytime).

**Selling:** BC-221 frequency meter with original charts, £16 plus £2 carr. R.C.A. mains transformer, input 200/250v. 50Hz, output 2300-1750-0-1750-2300v. at 750mA., £16 plus £3 carr. Tetrode QY3/125 (4/125A), £4 plus £1 carr. — Bottomley, G6TZ, QTHR. (Tel: Coventry 468388).

**Sale:** Kokusai 455 kHz filter Type MF455-15K (one carrier crystal), £12; suitable for 'G2DAF', K.W. Tx's etc. Crystals 9 MHz and 12.5 MHz, £1.10 each. — Parsons, 46 Beaumont Rise, Fareham, Hants.

**Sale:** Tech 20D RF signal generator (120 kHz to 500 MHz) and Tech 65-VTVM, both brand new, with combined holding rack, cases and receipt (cost £68.50 last November), sell for £52. (Sussex). — Box No. 5555, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts AL6 9EQ.

**Offering:** AR88LF with product detector, new RF stage and other mods; 2m. converter, with case, S-meter and manual; also Pye Reporter radiotelephone, needs PSU. — Ault, 23 Newton Street, West Bromwich.

**For sale:** Eddystone 840C general coverage Rx, mint condition, with manual, £50 or near offer. — Ring Newlands, Tonbridge 359291 (Kent).

**Exchange:** GR-78 receiver, compact, one micro-volt sensitivity, 190 kHz to 30 MHz in six bands, 5 watt AF output, mains or 12v. external supply FOR AR88D. Please write or call. — Peters, 9 Hospital Road, Arlesey, Beds.

**Wanted:** R.1116, R.208, R.106, R.109 and National 1-10A; also wireless Sets No.22 xtal, No.9, No.11, No.52 complete or Tx only, No.58 or accessories, scrap No.22 with variometer, No.22 power unit, and aerial tuning unit for Tx No.12. Any other interesting ex-govt. equipment? — Morriss, Pippingford Park, Nutley, Sussex. (Tel: 082-571 2205).

**Wanted:** External microphone for Standard C146A. — Ilbury, G3MMW? QTHR. (Tel: 0252-512451).

**Selling:** 'Realistic' DX-160 general coverage receiver, one year old, £70. Buyer to collect. — Ring Wanklyn, 021-429 3918.

**QTH for sale:** 17 miles N. of London at Broxbourne, Herts.: 6 years old, centrally heated, 3-bed semi-detached with thro' lounge, kitchen, downstairs cloakroom, integral garage including shack; roof-mounted TA-33 with BN86 balun, mast, guys, rotator and feeder, £17,250.—Ring Ludwell, G3ZZQ, Hoddesdon 64896.

**For sale:** Heathkit HW-32A Tx/Rx with AC/PSU, GH-12A microphone, crystal calibrator and speaker, £60. Eddystone 840C receiver, £30. The above in excellent condition; prefer buyers inspect and collect, or carriage at cost. — Gordon, G4AQJ, 46 Waltham Crescent, Nuneaton, Warks. (Tel: 0682-68510).

# "Mosley" - the tested and proved Antennae

TOWERS  
ROTATORS  
COAX  
ROPES

Send for HANDBOOK containing full details of Antennas and other technical information. 33 pages 40p. Refundable upon purchase of Antennas.

## SOME ANTENNAS

Mustang	3 Elements, 10, 15 and 20 metres ... ..	£90.00
TA-33 Jr.	High Power Model incl. Balun 3 Elements, 10, 15 and 20 metres ... ..	£82.00
TA33 Jr.	3 Elements, 10, 15 and 20 metres ... ..	£70.00
TA32 Jr.	2 Elements, 10, 15 and 20 metres ... ..	£49.00
TA31 Jr.	Rotary dipole, 10, 15 and 20 metres ... ..	£30.00
ELAN	3 Elements, 10 and 15 metres ... ..	£58.00
TD-2	Trap Dipole 40 and 80 metres ... ..	£27.00
TC2-2	Trap Dipole 40 and 80 metres compressed	£33.00
V-3 Jr.	Trap Vertical 10, 15 and 20 metres ... ..	£22.00
Atlas	Trap Vertical 10, 15, 20 and 40 metres ... ..	£40.00
<b>SWL ANTENNAS</b>		
SWL-7	Dipole 11, 13, 16, 19, 25, 31 and 49 metres	£21.00
RD-5	Dipole 10, 15, 20, 40 and 80 metres ... ..	£21.00
Orbit	Vertical 11, 13, 16, 19, 25, 31 and 49 metres	£36.00

Prices correct at time of going to press

**MOSLEY ELECTRONICS LIMITED**  
196 Norwich Road,  
New Costessey,  
Norwich, NR5 0EX  
ENGLAND

Administrative Address only

(All antennas available ex works carriage and VAT extra)

# C&C electronics

10 WEST PARK, LONDON SE9 4RQ

Telephone : 01-852 9397 • CRYSTALS

THE MADE TO ORDER CRYSTAL SPECIALISTS  
I OFF CRYSTAL PRICES

Fundamentals:			Price	
Group 1.	0-30 to 0-009 MHz	100ppm	£14.25	
2.	0-100 to 0-369	100ppm	£9.75	
3.	0-370 to 0-730	100ppm	£10.00	
4.	0-731 to 1-499	100ppm	£9.75	
5.	1-500 to 1-999	30ppm	£3.45	
6.	2-000 to 3-999	30ppm	£3.00	
7.	4-000 to 20-999	30ppm	£2.85	
8.	21-000 to 24-000	30ppm	£3.25	
3rd Overtones				
9.	23-000 to 54-999	30ppm	£2.85	
5th Overtones				
10.	55-000 to 104-999	30ppm	£2.95	
11.	105-000 to 119-999	30ppm	£3.85	
12.	120-000 to 130-000	10ppm	£8.50	
5th, 7th and 9th Overtones				
13.	130-001 to 216-000	10ppm	£10.25	

Unless otherwise requested fundamentals will be supplied with 30pf load capacity and overtones for series resonance operation. HOLDERS 0-30 to 0-200 MHz HC13/U, 0-170 to 196-000 MHz HC6/U, 4-000 to 216-000 MHz HC18 or HC25/U. Prices on application for other holders. DELIVERY Groups 1 to 4, 12 & 13—6 to 8 weeks. Groups 5 to 11—4 to 8 weeks.

DISCOUNTS 5% mixed frequency discount for 5 or more crystals within any price group. For orders of same frequency and spec discounts start at 5 off in groups 1, 4, 12 and 13. In all other groups discounts start at 10 off. Special rates for bulk purchase schemes including free supply of crystals for UK repeaters.

CRYSTALS FOR POPULAR VHF TRANSCEIVERS. Crystals supplied in approx. 5 weeks to any stated frequency for the following VHF transceivers: Heathkit, Icom, Ken, Standard, Trio and Yaesu. Price £2.50 per crystal.

IF CRYSTALS 10-245 MHz, HC18/U, 20ppm -20 to +70°C Price, £2.20. LOW FREQUENCY STANDARDS (8% VAT) 100 kHz in HC13/U Price £2.95. 100kHz in HC6/U, Price £2.80. CRYSTAL SOCKETS HC6/U and HC25/U. Price 16p.

MINIMUM ORDER CHARGE £2.00 PRICES ARE EX VAT—PLEASE ADD 12.5% UNLESS OTHERWISE STATED

All prices include postage to UK and Irish addresses. Crystals supplied to any specification for industrial, mobile radio or marine use etc. State equipment/specification when enquiring. Please send s.a.e. with all enquiries.

## MORSE CODE RECEIVING AND SENDING

### Receiving :

**CASSETTE A** For Amateur Radio examination preparation. Speed slowing increasing from 1-12 w.p.m.

**CASSETTE B** For Professional examination preparation. Computer produced morse from 12-24 w.p.m. Including international procedure signs and symbols and their incorporation into messages.

### Sending :

Morse Key and Buzzer Unit for sending practice and own Tape preparation. Phone output. Headphones available.

Prices : each cassette, including booklets, £4  
Morse key and buzzer unit, £4. Headphones, £4.

Prices include VAT, postage, etc.

**M H ELECTRONICS**  
12 LONGSHORE WAY, MILTON,  
PORTSMOUTH, PO4 8LS

## FOR ALL VALVE REQUIREMENTS

(s.a.e. lists)

Contact:— (Specialists in radio and television types).

**Southern Valve Company**

P.O. Box 144, Barnet, Herts. Tel.: 01-440 8641

## BREDHURST ELECTRONICS

FOR VHF IN THE NORTH WEST

### FDK

MULTI II 2m. FM fitted 7 channels	...	...	...	£199.00
MULTI III 70 cm. FM fitted 9 channels	...	...	...	£249.00
MULTI 2700 2m. all mode	...	...	...	£449.00
VFO for MULTI II	...	...	...	£89.00
AC PSU for MULTI II	...	...	...	£63.50

### New from FDK

TM 56-B Scanning 2m. RX fitted 10 channels	...	...	...	£69.00
--	-----	-----	-----	--------

### TRIO

R300 General coverage RX	...	...	...	£184.50
--------------------------	-----	-----	-----	---------

### ANTENNA SPECIALISTS

ASP 677 2m. $\frac{3}{8}$ wave	...	...	...	£15.20
ASP 629 2m. $\frac{1}{2}$ wave	...	...	...	£8.57
ASPE 667 70 cm. 5dB collinear	...	...	...	£19.02
ASPE 462 70 cm. 3dB collinear	...	...	...	£8.14
All mounting options	...	...	...	POA

### SECONDHAND GEAR

KW2000	...	...	...	£130.00
TRIO JR5005 + spkr.	...	...	...	£85.00
NATIONAL NCX500 HF TX/RX	...	...	...	£180.00

SPOT CASH PAID FOR GOOD SECONDHAND EQUIPMENT

HP—PART EXCHANGE—ACCESS—BARCLAYCARD

Callers by Appointment

All Prices inc. VAT

**WILLOWBROOK, SCHOOL LANE, BUNBURY,  
TARPORLEY, CHESHIRE. Tel.: Bunbury (0829) 260708**  
Northern Distributor for Waters and Stanton **G3OQT**

**Sale:** FT-101B transceiver with CW filter, spare PA tubes, handbook and all accessories, £320. (London). — Box No. 5556, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts AL6 9EQ.

**Sale:** AR88D, one of the original models, immaculate condition, with S-meter, xtal calibrator, two speakers, and set of spare valves. Offers over £75. (Norfolk). — Box No. 5557, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts AL6 9EQ.

**Selling:** Liner-2 with pre-amp., stabilised power supply, mic., mobile whip, as new, £130. — Ring Berkeley, Weybridge 40842.

—**Sale:** Heathkit DX-100U transmitter and Heathkit RA-1 receiver, both in good order and with manuals, £25 each or £40 the pair. Buyer collects. — Foote, G4FOH, 20 The Furlongs, Needingworth, Huntingdon. (Tel: Slepe 8580).

**Active VHF amateur,** responsible professional person, seeks share in flat or single bedsitter within easy reach of London; must be good VHF location. — Nelson, G8HAL/G4FRX, QTHR. (Tel: 01-602 5855).

**Wanted:** Several NR-56 2m. Rx's, 2200G transceiver, Microwave Modules 432/28 MHz converter. Parcels to friends' address in Dover. — Vanden Busche, ON6WR, 8 Van Iseghemlaan, 8400 Ostend, Belgium.

**Selling:** Zenith 80 2 $\frac{1}{4}$ -sq. SLR camera, complete with two backs, filters, meter etc. (similar to Hasselblad). Yaesu-Musen YO-100 monitor 'scope, complete and boxed; Belcom autoscanner VHF/FM transceiver; Belcom AF/R/F signal generator; Electronic digital and Kenwood clocks; Redifon TT-10 transistor T.U.'s. All new and unused. s.a.e. essential for reply. (Northants.) — Box No. 5558, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts AL6 9EQ.

**For sale:** KW-2000 transceiver with AC/PSU, £95. — Wilson, G3PNH, QTHR. (Tel: Chippenham 3548).

**Wanted:** Communications receiver in good condition. Or would exchange perfect Philips stereo system; or three very old radios, complete but needing attention. Cash adjustment if necessary. — Ring Williams, Sunderland (0783) 42905, evenings.

**Sale:** Liner-2, mint, £130; 'Cambridge' AM-10D, AM/FM, fitted 145.00, 145.20, 145.50, 145.55 and R7, £45; EC-10, £30; Two-metre converter for Heathkit SB-300 receiver, £8; Transformer, 350-0-350v. at 150mA., 6.3v. at 4A., £3; Lear Jet radio and 8-track cartridge player, £20. — Croft, G8CJM, QTHR. (Tel: Medway 47280).

**For sale:** Belcom FS-1007P 16-channel auto-scan base transceiver, with six simplex channels and narrow filter, 4 months old, hardly used, £120 or near offer. — Ring Devine, 0924-825025.

**Wanted:** Three Electroniques wide-band couplers Type WBC for 1.8 MHz. Your price paid. — Mackintosh, GM31AA, QTHR.

**Sale:** Atlas 210X with portable PS-200 AC supply, mint, £440. Would consider exchange for VHF rig, FT-221R, TS-700G, FR-101D etc., in sound condition. Shure 444T, new, £15. — Kenneford, 2 Mill Lane, Shoreham, Sussex. (Tel: 01-632 5314, daytime).

**Sale:** Barlow-Wadley XCR-30 Mk.II, new 1.12.76, £100. — Cockerell, 3 Blakehall Street, Preston, Lancs. PR1 4XP.

**Selling:** K.W. Vespa Mk.II, 160/10m., SSB/AM/CW, 6LQ6 PA, PSU, excellent condition, £80. Cowl-Gill motor, 12/24v., ideal for beam rotation, virtually unused, £10. — Newton, G4AHI, QTHR. (Tel: Rayleigh 4195).



## HONDA GENERATORS AT KEENEST PRICES!



300-4000 Watts AC, 6-24 Volts DC. Other makes 1-3000 KVA, Incl. the new E3500-115/230V AC and 12V DC

## MICROWAVE COOKERY BOOK

£2.25 INC. POSTAGE

LEADING MAKES OF MICROWAVE OVENS SUPPLIED

KEENEST PRICES Include U.K. delivery. Open Tues-Sat 10.30-1.30, 2.30-6.30 (Ansafone out of hours)

**Ashley Dukes** Farncombe St, Farncombe,  
Godalming (Tel 23279) Surrey.

### G3ACQ Offers ;

all YAESU from our Western Electronics department  
surplus crystals—J Beams components—Solid State  
Modules gear, etc.

## S. MAY (Leicester) LTD.

12-14 and 27 CHURCHGATE, CITY CENTRE,  
LEICESTER

Telephone : Leicester 58662

### G2DYM AERIALS

ANTI-T.V.I. AERIALS INDIVIDUALLY DESIGNED BY Ex-B.B.C.  
TRANSMITTER AND AERIAL ENGINEER. CUSTOM BUILT FOR THE  
TRANSMITTER OR S.W.L.

Details S.A.E. and 3 6p stamps.

LAMBDA ANTENNA STUD FARM  
WHITEBALL, WELLINGTON, SOMERSET

### SNOOPING LOW ?

NOW you can uncover the EXCITING 100-600 kHz band—with YOUR  
receiver. CONVERTER has 20dB gain, antenna matching and 3.5-4 MHz  
output. EASY to make, all parts, coils, printed circuit, case etc., instruc-  
tions, money back assurance, send £8-80 NOW.

**CAMBRIDGE KITS** 45 (SQ) Old School Lane,  
Milton, Cambridge

- ★ **REVCO**  $\frac{1}{2}$  Wave Stainless Steel Aerials £3-90, post 50p, state frequency
- ★ **UR95 Coax.** 50 ohm miniature, nylon coated, 2.3mm, 4p per m. P.P.  $\frac{1}{2}$ p per m.
- ★ 1,000 Mixed Carbon Film Resistors. Not more than 7 of each £4-00 P.P. 55p
- ★ **COPPER PCB.** Mixed pack of various sized pieces, £1 post 50p
- ★ 20 mixed all different new HC25U and HC18U XTALS. Our choice £2 P.P. 15p
- ★ 8 core screened PVC cable, up to 20m. coils at 12p per m. P.P. 2 $\frac{1}{2}$ p per m.
- ★ **XTALS, HC6U** 8-077, 8-045, 10-000, 11-115, 10-245 MHz, £1-50 each
- ★ **XTALS HC25U** 8-070, 12-077, 10-701 £1-50 each
- ★ 100m. stranded equipment wire, 20 colours x 5m. £1 Post 20p
- ★ Miniature 1/20th watt Resistors, 150 Mixed pack 60p post 10p
- ★ **UR43.** 50 ohms Coax 10p per m. P.P. 2 $\frac{1}{2}$ p per m.
- ★ 20 core Screened Cable, up to 9m. coils at 18p per m. P.P. 4p per m.
- ★ Full Lists of Cables, Xtals, etc. Free of charge S.A.E. please.

W. H. WESTLAKE, CLAWTON, HOLSWORTHY, DEVON

## G3EKX S.S.B. PRODUCTS G3EKX

**TELETYPE 19.** Teleprinters. As NEW ... .. £65-00

**COMMAND RECEIVER.** 6 to 9-1, unmodified ... £15-00

**B.C.C. 4 METRE Mobile.** 12v. DC I/P (Type 69D—  
5 channel) ... .. £30-00

**A.V.O. SIGNAL GENERATOR.** CT378A. (New condi-  
tion) with leads. 0-250-500 MHz ... .. £60-00

**HALLICRAFTERS, HT11B.** Radio telephone 12v I/P ... £50

★ **PRICES INCLUSIVE.** Please ADD Carriage  
and safe packing ★

**NEW CRYSTALS.** 15,000 in Stock. 10-245, 24-225,  
48,025, £1-50 each + 15p P. & P.—108 kHz to 108 MHz.  
S.a.e. essential.

## TOWN QUAY . TRURO

CORNWALL

Telephone 0872-862575

### ROBOT SSTV

(Isn't it time you joined in the fun)

New and secondhand equipment always available  
Large S.A.E. for full details please.

### AERO & GENERAL SUPPLIES

Nanaimo House, 32 Rufford Avenue, Bramcote,  
Nottingham, NG9 3JH  
Tel.: 0602 397588

## ALL VALVES & TRANSISTORS

**COLOMOR ELECTRONICS LTD.** 170 GOLDHAWK ROAD  
LONDON W12

Call or phone our  
Mr. Stefan for a quotation  
**01-749 3934**

We are one of the largest stockists of  
valves etc. in the U.K.

## EX GOVERNMENT SURPLUS

2 Gang 7-70pf. RF26-27 type, unused, for G2DAF designs, etc., £3

Morse keys, Army No. 9 type, dirty, stored 30 years, £4

Headphones type DLR with jack plug, £5

Microphones, throat LL No. 2, used, £2; in original packing, £3

Oxygen mask type microphones No.48; in original packing, £3

Valves by the thousand, octals, UX, B4-5-7-9, B7g, B9A, B9G, etc., suitable for AR88, CR100, CR150, Command, E358, HRO, RA1B & J, R107, R1155, R1475, SP400, SP600, SX17, and many other receivers. Send list of valve requirements for quotation.

**CRYSTALS: Still 1000's in stock per previous adverts £2 each**  
**BAGINTON ELECTRONICS** COVENTRY AIRPORT  
Tel. (0203) 302449 S.A.E. ALL ENQUIRIES

# Have you got all these ARRL titles on your shelf? . . . .

ELECTRONICS DATA BOOK ( <i>new title</i> )	... ..	£3.20
ANTENNA BOOK, 13th Edition	... ..	£3.38
UNDERSTANDING AMATEUR RADIO	... ..	£3.23
LEARNING THE RT CODE	... ..	70p
A COURSE IN RADIO FUNDAMENTALS	... ..	£2.13
FM AND REPEATERS FOR THE RADIO AMATEUR	... ..	£3.00
RADIO AMATEUR HANDBOOK 1977 ( <i>soft-cover</i> )	... ..	£6.60
RADIO AMATEUR HANDBOOK 1977 ( <i>hard-cover</i> )	... ..	£9.85
SPECIALISED COMMUNICATIONS TECHNIQUES FOR THE RADIO AMATEUR	... ..	£2.55
HINTS AND KINKS	... ..	£1.83
SINGLE SIDEBAND FOR THE RADIO AMATEUR	... ..	£3.25
VHF MANUAL	... ..	£3.15

(all prices include post/packing)

Available from **SHORT WAVE MAGAZINE**

Publications Dept.,

34 HIGH STREET, WELWYN, HERTS., AL6 9EQ. Telephone: Welwyn 5206/7

## RADIO AMATEUR HANDBOOK (ARRL 1977)

54th Edition

This HANDBOOK, the most widely used manual of communications theory, design, and construction, contains descriptions of the latest solid-state devices and their application. The construction projects included cover the entire field of Amateur Radio interest. Written in a no-nonsense style, the HANDBOOK appeals to beginners and advanced amateurs alike. This new edition contains nearly 700 pages, including index. Priced at £6.60, also available in a hard-covered cloth bound edition at £9.85 (including postage).

Order from

Publications Dept.

**SHORT WAVE MAGAZINE LTD.**  
34 HIGH STREET, WELWYN  
HERTS., AL6 9EQ

SIMPLE, LOW-COST

## WIRE ANTENNAS

by William I. Orr, W6SAI

This excellent and thoroughly recommended handbook, is the publication on the practical approach to building aeriels. After starting with aerial fundamentals there are discussions and descriptions of ground-plane, end-fed, DX dipole, vertical and wire beam antennas, plus coverage on a universal HF antenna system and working DX with an "invisible aerial"; the SWR meter and coaxial cable also have chapters to themselves.

The whole book is presented in an authoritative immensely clear, readable and enjoyable manner with the emphasis on the practical throughout—to the extent that even the chap who can hardly strip a piece of co-ax need not feel at all left out! Just as practical for the SWL, too!

192 pages

**£3.30** inc. post

Order from:

Publications Dept.

**SHORT WAVE MAGAZINE LTD.**

34 High Street, Welwyn, Herts. AL6 9EQ.

# Technical Books and Manuals

(ENGLISH AND AMERICAN)

**Radio Communication Handbook, Vol. 1.**  
(NEW 5th Edition) RSGB . . . . . £8-31

## AERIAL INFORMATION

Practical Aerial Handbook, 2nd Edition (King) . . . £6-10  
Aerial Handbook (Briggs) . . . . . £1-05  
Beam Antenna Handbook . . . . . £3-20  
Cubical Quad Antennae, 2nd Edition . . . . . £3-05  
Simple Low Cost Wire Antennas, by Orr . . . £3-30  
73 Vertical Beam and Triangle Antennas  
(E. M. Noll) . . . . . £3-20  
73 Dipole and Long-Wire Antennas (E. M. Noll) . £3-35  
S.W.L. Antenna Construction Projects (E.M. Noll) O/S  
Antenna Handbook (ARRL) 13th Edition . . . £3-38

## BOOKS FOR THE BEGINNER

"Short Wave Magazine" R.A.E. Questions and  
Answers, 1971-1975 . . . . . £2-10  
Solid State Short Wave Receivers for Beginners  
(R. A. Penfold). . . . . £1-05  
Electronics Self-Taught . . . . . £2-15  
Beginners Guide to Radio . . . . . £2-60  
Beginners Guide to Electronics . . . . . £2-25  
Course in Radio Fundamentals, ARRL . . . £2-13  
Guide to Amateur Radio (16th Edition) (RSGB) . £1-15  
Ham Radio (A Beginners Guide) by R. H. Warring £2-50  
Learning the RT code (ARRL) . . . . . 70p  
Morse Code for the Radio Amateur (RSGB) . . 40p  
Radio Amateur Examination Manual (RSGB) . . £1-15  
Simple Short Wave Receivers (Data) . . . £1-00  
Understanding Amateur Radio (ARRL) . . . £3-23

## GENERAL

Better Short Wave Reception, New 4th Edition . £3-30  
FM & Repeaters for the Radio Amateur (ARRL) £3-00  
Easibinder (to hold 12 copies of "Short Wave  
Magazine" together) . . . . . £1-75  
Guide to Broadcasting Stations (17th Edition) . . 95p  
Practical Wireless Circuits . . . . . £2-45  
Prefix List of Countries . . . . . 28p  
Radio Engineers Pocket Book (Newnes) (N.E.) . £1-35  
Test Equipment for the Radio Amateur (RSGB) . £2-35  
World Radio & T.V. Handbook 1976 Edition . . O/P  
World's SW, MW, LW, FM and TV Broadcasting  
Stations Listing . . . . . 70p  
Walkie-Talkie Radio Operators Guide . . . £1-95

O/P (Out of print)

O/S (Out of stock)

THE ABOVE PRICES INCLUDE POSTAGE AND PACKING

Many of these titles are American in origin

(terms C.W.O.)

Available from

**SHORT WAVE MAGAZINE**

Publications Dept.

34 High Street, Welwyn, Herts. AL6 9EQ - Welwyn (043871) 5206/7

(Counter Service. 9.30-5.00. Mon. to Fri.)

(GIRO A/C. No. 547 6151)

## HANDBOOK AND MANUALS

Radio and Electronic Laboratory Handbook,  
8th Edition (Scroggie) . . . . . £8-65  
Amateur Radio DX Handbook . . . . . £3-30  
Electronic Circuit Handbook Vol. 1 . . . . . £1-73  
Electronic Circuit Handbook Vol. 2 . . . . . £1-73  
New RTTY Handbook . . . . . £2-75  
Radio Amateur Handbook 1977 (ARRL) . . . £6-60  
Radio Amateur Handbook 1977 (ARRL) Hard  
Cover . . . . . £9-85  
Radio Amateur Operators Handbook . . . . . 85p  
Slow Scan Television Handbook . . . . . £3-10  
Television Interference Manual (G3JGO) . . . £1-00  
Specialized Communications Techniques for the  
Amateur (ARRL) . . . . . £2-55  
Practical Wireless Service Manual . . . . . £2-45  
Advanced Communications Systems . . . . . £9-97  
Working with the Oscilloscope . . . . . £1-85  
Know your Oscilloscope . . . . . O/S  
Know your Signal Generators . . . . . £2-30

## USEFUL REFERENCE BOOKS

Foundations of Wireless and Electronics,  
9th Edition (Scroggie) . . . . . £4-40  
Amateur Radio Techniques, 5th Edition (RSGB) £2-90  
Engineers Pocket Book, 6th Edition . . . . . £1-98  
U.K. Call Book 1977 . . . . . £2-10  
Hints and Kinks (ARRL) . . . . . £1-83  
Radio Data Reference Book (3rd Edition) RSGB . £1-35  
Single Sideband for the Radio Amateur (ARRL) . £3-25  
Sun, Earth and Radio (Hard Cover) . . . . . £2-70  
NBFM Manual (RSGB) . . . . . £1-13  
Q and A on Short Wave Listening . . . . . O/P  
Electronics Data Book (ARRL) . . . . . £3-20

## VALVE AND TRANSISTOR MANUALS

Field-effect Transistors (Mullard) . . . . . £2-15  
MOS Integrated Circuits & their Applications  
(Mullard) . . . . . O/P  
Transistor Audio & Radio Circuits—2nd Ed.  
(Mullard) . . . . . £3-00  
Towers' International Transistor Selector . . . £3-45  
Principles of Transistor Circuits (5th Ed.) . . £3-43  
Service Valve and Semiconductor Equivalents . . 50p  
Radio Valve and Semiconductor Data (10th Ed.) . £2-35  
Transistor Pocket Book . . . . . £1-70  
Popular Valve/Transistor Substitution Guide . . £2-10

## VHF PUBLICATIONS

VHF Handbook, Wm. 1 Orr (New Ed.) . . . . . £3-90  
VHF Manual (ARRL) . . . . . £3-15  
VHF/UHF Manual (RSGB), New 3rd Ed. . . . . £6-60

Amateur Radio Awards (RSGB) . . . . . £1-75  
Teleprinter Handbook (RSGB) . . . . . £6-75

# B. BAMBER ELECTRONICS

DEPT S, 5 STATION ROAD, LITTLEPORT, CAMBS., CB6 1QE

Tel.: Ely (0353) 860185 (Tuesday - Saturday)

CALLERS WELCOME BY APPOINTMENT ONLY

## ALL BELOW — ADD 8% VAT

### SPECIAL OFFER...

**STARPHONE HIGH BAND RF BOARDS**, with conversion data for making into a GOOD 2M. CONVERTER. (All that is needed: 1 xtal, 7 caps., 2 resistors, and 9v. DC). PCB contains 2 dual gate Mos Fet RF stages (3N140). Diode ring mixer, 3 stage Osc./Multiplier. All on one PCB, approx. size 6" x 1 1/2", ext. connections, 9v. DC supply, AGC (can be left fixed bias, or RF gain control) Ant. input, IF output (works from a few MHz to over 30 MHz). All Brand New, £6-50 each, while stocks last.

**PYE SSB125T P.C. BOARDS** (All brand new with circuit diagrams), 12v. DC.

**SSB RF FRONT END PCB.** 4 channel, 3-15 MHz, RF and Mixer stages, ant in, 1-4 MHz out, £2-00.

**SSB CHANNEL OSCILLATOR PCB.** 4 channel, with trimmers, for 4 fundamental xtals (2 stage), £1-00.

**SSB IF AND PRODUCT DETECTOR PCB.** 1-4 MHz SSB in, AF demodulated out, £2-50.

**SSB AUDIO AMP PCB (3 stage), £1-50.**  
**SSB 1-4 MHz OSCILLATOR & AGC AMP PCB** (less xtal), £1-50.

LIMITED SUPPLY ONLY. ORDER NOW!

**PYE PFI UHF POCKETPHONES**, can be converted to 70 cms. Complete, but untested, with circuits, less batteries, £25-00 pair (ITX + 1RX).

**THIS MONTH'S SCOOP PURCHASE, PYE CAMBRIDGE AM one DIO PCB.** Brand new, 60p each, or 4 for £2-00.

**CHARGER PCBs for ITT Starphone batteries** (12v.), with battery compartment. Requires 28v. DC at 50mA. Contains transistorised circuit for constant current limiting, £2-75.

**TELEPHONE HANDSETS** with "PRESS-TO-TALK" buttons, on curly lead, brand new, £3-50 (few only).

**"PRESS-TO-TALK", SPEAKER/MIKES** (as used on ITT portables) approx. 2 1/2" square, with spring clip on back, on curly lead. Black grained plastic, smart modern appearance. Sorry, sold out.

**PLASTIC BOXES** 3 1/2" square, 1 1/2" deep (wall-mounting type) with 5-pin din plug on front panel, 50p each.

**AEI CS10B/R MICROWAVE MIXER DIODES**, up to X-Band, max. noise figure 8-5dB at 9-375 GHz, 80p each.

**14 DIL REED RELAYS**, 5 to 12v. DC, 450 ohm coil, designed to work directly from TTL logic, single pole change over. Contact ratings, 28v., 1A, 3W, £1-75 each.

**AND SPIRALUX.** Tools for the Electronics enthusiasts. S.A.E. for list.

**PYE CAMBRIDGE PC BOARDS** (Removed from high band AM10)  
RF and MIXER BOARD, £7.  
455 kHz IF BOARD, £2.  
AM AUDIO BOARD, £1-20.  
AM SQUELCH BOARD, 50p.

**CAMBRIDGE Mod Transformer, £1-00.**  
**Mod Driver Transformer, 75p.**  
**12/24v. Inverter Transformer, £1-25.**

## PLUGS & SOCKETS

**BNC PLUGS** (ex-equip.), 5 for £1-50.

**PL259 PLUGS** (PTFE). Brand new, Packed with reducers, 65p each or 5 for £3-00.

**SO239 SOCKETS** (PTFE). Brand new (4 hole fixing type), 50p each or 5 for £2-25.

**N-TYPE PLUGS**, 50 ohm, 60p each.

**GREENPAR (GE30015).** Chassis Lead Terminations. (These are the units which bolt on to the chassis, the lead is secured by screw cap, and the inner of the coax passes through the chassis), 30p each, 4 for £1-00.

## ALL BELOW — ADD 8% VAT

**WELLER TCP2 and PU2D PSU.** Temperature controlled soldering iron with matching Power Supply Unit, containing sponge and spring stand, £27-00.

**SPARE TIPS** (for TCP2) Three types available: TYPE CC7 (Standard), TYPE K7 (Long fine tip), TYPE P7 (Very fine tip) £1 each.

**WELLER W60D** mains operated temperature control soldering iron, £13-80.

**SPARE TIPS** (for W60D) Two types available, TYPE CC7 (W60D) Standard, TYPE AA7 (W60D) Finer tip, £1-15 each.

A Few Spares available now for Pye Westminster W15AM only. S.A.E. for list. 110v. NEONS, screw-in type 4 for 50p.

**SUPER SERVISOL (SWITCH CLEANER), 65p can.**

**SUPER FREEZIT (FREEZER), 65p can.**

**MULTICORE SOLDER.** Size 5 Savbit, 18 SWG in alloy dispenser, 32p; Size C15AV18 Savit, 18 SWG, 56p; Size 12 Savit 18 SWG on plastic reel, £1-80; 1/2 Kg. (1-1 lb.) 60/40, 20 SWG on plastic reel, £3-00.

**ALU-SOL ALUMINIUM SOLDER** (Made by Multicore) Solders Aluminium to itself or Copper, Brass, Steel, Nickel or Tinplate, 165WG with multicore flux with instructions, approx. 1 Metre coil 40p pack. Large Reel £2-75

**SOLDER SUCKERS** (Plunger type). Standard model, £4-50, Skirted model, £4-95. Spare nozzles, 60p each.

**4 MHz XTAL PACKS** (10 assorted xtals between 4 MHz and 5 MHz) our selection only, £1-00 pack.

**MAINS ISOLATION TRANSFORMERS.** Tapped mains input, 240v. at 3A + 12v. at 500mA output. New, boxed, made by Gardners, £12-00.

**PERSEXP TUNER PANELS** (for FM Band 2 tuners) marked 88-108 MHz and Channels 0-70, clear numbers, rest blacked out, smart modern appearance, size approx. 8 1/2" x 1 1/2", 2 for 35p.

**DIECAST BOXES.** We still stock these but, owing to frequent price rises from our suppliers, and costly postal charges, it has been found impossible to publish up to date prices on these items. Please ring, or write (with SAE), for latest mail-order prices.

**HEAVY DUTY RELAYS.** 24v. DC operated (will work on 18v.) 3 heavy duty make contacts (around 10A rating) + 4 change contacts + 1 break contact. New, complete with mounting bracket (ideal for switching HT on Linears). Many uses for this high quality unit, £1-50 each.

**CERAMIC TAG STRIPS** (4 on 1 mount), 10 mounts for 50p.

**PROGRAMMERS** (Magnetic Devices) Contain 9 microswitches (suitable for mains operations) with 9 rotating cams, all individually adjustable, ideal for switching disco lights, displays, etc., or industrial machine programming. (Need slow motion motor to drive cams, not supplied) 9 switch version, £1-50.

**SMALL MAINS SUPPRESSORS** (small chokes, ideal for radio, Hi-Fi inputs, etc.), approx. 1 1/2" x 1 1/2", 3 for 50p.

**TUNED COILS,** 2 section coils, around 1 MHz, with a black smart tuning knob, which moves an internal core to vary the inductance, many uses, easily rewound, 3 for 50p.

**2-6pf, 10mm. circular, ceramic trimmers** (for VHF/UHF work), 3 pin mounting, 5 for 50p.

**ON/OFF/RX STANDBY SWITCHES** for AM10B Cambridge and Vanguard control boxes, 40p each, 3 for £1.

**VARIABLE STABILISED POWER SUPPLY,** mains input, 0-24v. input, stabilised and current limiting at 500mA + 32v. at 50mA. Brand new by British manufacturer. Size approx. 7 1/2" x 2 1/2" x 4", complete with external 1.5kohm 3-watt pot for voltage control. Connection data supplied, £7-00.

**PC BOARD WITHDRAWAL HANDLE'S** mixed cols., 8 for 50p.

TERMS OF BUSINESS: CASH WITH ORDER. MINIMUM ORDER OF £100. ALL PRICES NOW INCLUDE POST & PACKING (UK ONLY)

EXPORT ENQUIRIES WELCOME

PLEASE ENCLOSE STAMPED ADDRESSED ENVELOPE WITH ALL ENQUIRIES.

## PLEASE ADD VAT AS SHOWN

## ALL BELOW — ADD 8% VAT

### TRANSISTORS

**TO3 TRANSISTOR INSULATOR SETS,** 10 sets for 50p.

**BSX20 transistors** (VHF OSC/MULT), 3 for 50p.

**BC108** (metal can), 4 for 50p.

**PBC108** (plastic BC108), 5 for 50p.

**PNP AUDIO TYPE TOS TRANSISTORS,** 12 for 25p.

**BFY51 TRANSISTORS,** 4 for 60p.

**BF152 UHF AMP/MIXER,** 3 for 50p.

**2N3819 Fet.** 3 for 60p.

**BC148 NPN SILICON,** 4 for 50p.

**BC158 PNP SILICON,** 4 for 50p.

**BAY31 Signal Diodes,** 10 for 35p.

**BYX 38/300 Stud Rectifiers,** 300v. at 2-5A, 4 for 60p.

**BA121 Varicap Diodes,** 4 for 50p.

**IN914 DIODES,** 10 for 25p.

**2N3055 type Transistors, OK,** but unmarked, 3 for £1.

### VALVES

**QQV03/20A** (ex equipment), £3-00.

**QQV03/10** (ex equipment), 75p or 2 for £1-20.

**2C29A** (ex equipment), £1-00 each.

**DET-32** (ex equipment), 2 for £1-00.

**6B86** (ex equipment), 2 for 50p.

**Small Chrome handles** 1/2" dia., 1 1/2" between holds, 1" clearance, tapped 4BA (with screws and washers), 2 pair for 40p.

## ALL BELOW — ADD 12 1/2% VAT

**BARGAIN PACK OF LOW VOLTAGE ELECTROLYTIC CAPACITORS.** Up to 50v. working. Seatronic manufacture. Approx. 100, £1-50 per pack.

**VARICAP TUNERS.** Mullard type ELC1043/05. Brand New, £4-40.

A large range of capacitors available at bargain prices, S.A.E. for list.

**TV PLUGS** (metal type), 5 for 50p.

**TV SOCKETS** (metal type), 4 for 50p.

**TV LINE CONNECTORS** (back-to-back skt.), 4 for 50p.

**DIN 3-pin LINE SOCKETS,** 15p each.

**3 PIN DIN PLUGS,** 15p each.

**DIN 6-pin RIGHT ANGLED PLUGS,** 20p each.

### ELECTROLYTICS

**ELECTROLYTICS,** 50µF, 450v., 2 for 50p.

**ELECTROLYTICS,** 100µF, 275v., 2 for 50p.

**ELECTROLYTICS,** 470µF 63v., 3 for 50p.

**ELECTROLYTICS,** 1,000µF 30v., 3 for 60p.

**ELECTROLYTICS,** 1,000µF 180v., 3 for £1.

**ELECTROLYTICS,** 5,000µF mfd., at 35v., 50p each.

**ELECTROLYTICS,** 5,000µF 50v., 60p each.

**ITT ELECTROLYTICS,** 6,800 mfd at 25v., high grade, screw terminals, with mounting clip, 50p each.

**ELECTROLYTICS,** 10,000 mfd. at 63v., 75p each.

**MINIATURE EARPHONES** with min. jack plug, 50p.

**1 Meg. Lin. POTS** 1/2" plastic spindle, 2 for 50p.

**50k ohm lin. POTS,** 1/2" plastic spindle, 40p each.

**TWIN IF CANS,** approx. 1" x 1 1/2" x 1" high around 3.5 to 5 MHz, 2 separate transformers in one can, internally screened, 5 for 50p.