

30p

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

VOL. XXXII

JANUARY, 1975

NUMBER 11



**WORLD WIDE COMMUNICATION**

# STOP mistreating your rig

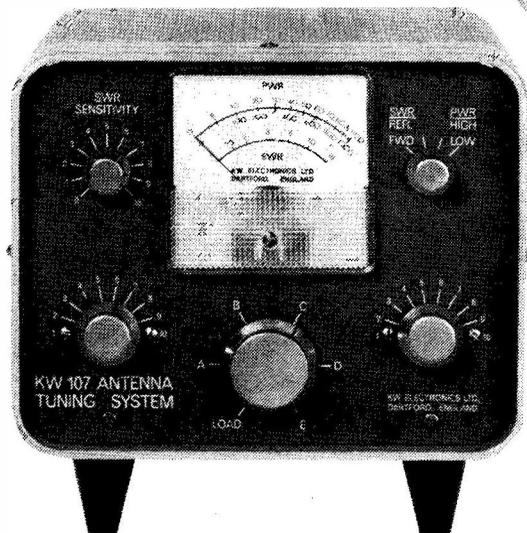
Match your antenna system to the PA stage with a KW 107—observe your TX "Waveform" with a KW 108.

## KW 108 Monitorscope

- Monitor your transmitted "Waveform" 10-160 metres.
- Can be left permanently in antenna feed.
- Two-tone generator incorporated to ensure optimum linearity for SSB.
- Displays SSB, AM and CW "Waveform."
- A further safeguard for your PA tubes.



**KW 108  
Monitorscope**



**KW 107  
Antenna Tuning System**

## KW 107 ANTENNA TUNING SYSTEM

The KW range of aerial matching units will ensure optimum power transfer from the PA stage to the antenna system.

- Longer life for your PA tubes.
- KW 107, suitable for most transceivers and transmitters (250 watt rating).
- The KW 109 is for use with linear amplifiers.
- Antenna selection.
- RF power and SWR measurement.
- Dummy load incorporated.
- Observation of SWR with and without antenna tuner.
- Attractive "G" line case.

The antenna tuner in the above unit can be purchased separately if you already have the KW 101/103, dummy load and antenna switch. This unit is known as the KW E-Z match.

Write or 'phone for catalogue to:



## Communications

(Decca Communications Limited)  
1 Heath Street, Dartford, Kent  
Tel: Dartford 25574/21919

Easy terms on Equipment available over 12, 18 or 24 months.

**Other KW Favourites:** KW 2000E Transceiver 10-160 ; KW 204 Transmitter ; KW 1000 Linear Amplifier ; KW 202 Receiver ; KW 160 ATU ; KW 103 SWR/RF Power meter ; KW Dummy Load ; KW Traps (the original and best) ; KW Trap Dipoles ; KW Low Pass Filter ; KW Balun ; KW Antenna Switch.

Stockists for Hy-Gain beams and verticals, CDR rotators, Shure microphones, etc.

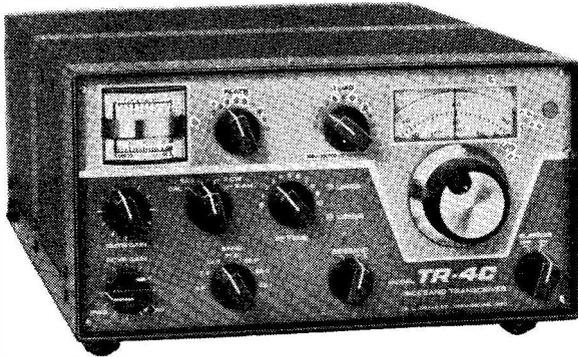
**KW spares are normally carried for a minimum of five years after date of manufacture of equipment.**

# Radio Shack Ltd ★

# London's Amateur Radio Stockists

*Just around the corner from West Hampstead Underground Station*

## BEST VALUE! The DRAKE TR-4C Transceiver



£349·92p

Inc. VAT, Power Supply and  
Speaker

The Drake TR-4C is a product of years of transceiver experience and design improvements. The resulting performance makes it one of the finest transceivers available. Its operating handiness is not only evident in circuit design, but also in packaging. Compact and lightweight, it is ideal for mobile use, portable excursions, and vacations. USB, LSB, CW or AM operation is at your finger tips with 300 watts P.E.P. of communications power.

### INCLUDED FEATURES :

- 300 Watts PEP input on SSB, 260 watts input on CW.
- Complete Amateur Band Coverage; 80 through 15 metre bands complete and 28·5-29·1 MHz of 10 metres. Rest of 10 metre band obtained with accessory crystals.
- Separate Sideband Filters; separate USB and LSB filters eliminate oscillator shifting and insure long term carrier vs filter alignment.
- Nominal 1·7 ; 1 Filter Shape Factor ; These filters stand among the industry's finest with 6 dB bandwidth of 2·1 kHz (chosen to slice thru QRM), 60 dB bandwidth of only 3·6 kHz and 100 dB ultimate rejection.
- Provision For Highly Effective Accessory Noise Blanking.
- Heavy Irridited Cadmium Plated Chassis.
- CW Side Tone Oscillator for monitoring your CW transmission.
- Finish ; scratch resistant epoxy paint.
- Crystal Calibrator built-in.
- VFO Indicator Light eliminates confusion of which main tuning knob controls the frequency when using an RV-4C remote VFO.
- Automatic CW Transmit Receive Switching sometimes called "semi" break-in.
- Full AGC with Drake dual time constant system confines a 60 dB signal change to a 3 dB audio change.
- Effective Transmitting AGC insures clean SSB output.
- Solid State Permeability Tuned VFO for low drift and accurate 1 kHz divisions on all bands. New easy to read dual concentric dials.
- VOX or PTT for use on AM or SSB.
- Receiver S-Meter automatically switches to indicate transmitting AGC on transit.
- Transmitter Plate Ammeter indicates Relative RF Output by depressing load control shaft.
- Adjustable Pi-Network output circuit.

DRAKE — SALES — SERVICE

SECURICOR ★ ACCESS ★ BARCLAYCARD

## RADIO SHACK LTD.

OPEN 5 DAYS 9—5 p.m.  
HALF DAY SATURDAY

CLOSED 1—2 p.m.

188 BROADHURST CARDENS  
LONDON, NW6 3AY

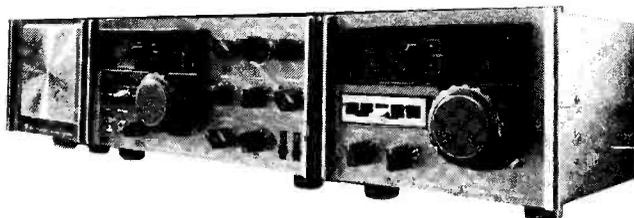
*Just around the corner from West Hampstead Underground Station*

Telephone : 01-624 7174 Cables : Radio Shack, London, N.W.6.  
Giro Account No. : 588 7151

# LOWE ELECTRONICS



## TRIO FOR HF



### TS900

Top of the line. 300W p.e.p. 0.1  $\mu$ V sensitivity. All modes including RTTY. Vox, max, PTT. The rig with **everything**.

£480 (VAT exc.)

Optional remote VFO 900 available.

### TS520

The go-anywhere rig. AC mains or 12v. operation built-in. Speech compression built-in. Marker built-in. Vox built-in. Superb RX performance and unbeatable transmit voice quality.

£290 (VAT exc.)

Optional remote VFO 520 and speaker SP 520 available.

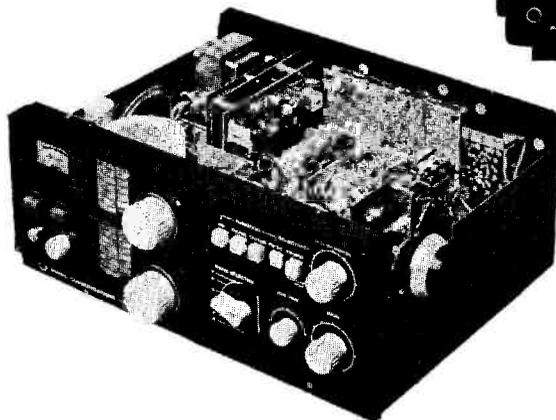


### QR666

New general coverage receiver. 3 way power supply. AC mains, 12v. external supply or built-in batteries. 170 kHz-30 MHz coverage. Product detector. 2 position selectivity.

£130 (VAT exc.)

Optional broadcast FM unit and marker unit available.



## GENERAL CHAT

Well, which way will amateur radio go in 1975. There seems to be no shortage of new licences so we could have even more crowded band conditions than ever. This means that each amateur must "keep his house in order" with respect to his signal, since it is just bad manners to splatter your signal across the next door QSO. Inevitably more attention will be paid to producing lower and lower intermodulation products in the transmitter and a closer watch must be kept on signal width. The use of better filters (i.e. 8 pole rather than the common 6 pole) in the transmitter will almost become a necessity and overdriven TV line output PA tubes will have to be under run before they become acceptable.

Our servicing load is as heavy as ever and previous customers will be aware of course that our connections with Yaesu as regards service are as strong as ever; it was we, after all, who established the Yaesu servicing reputation in this country and we shall always continue to maintain any equipment sold by us.

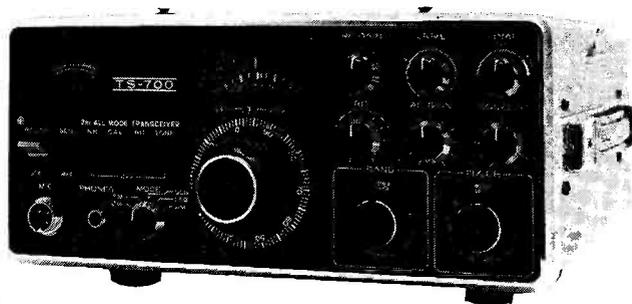
# LOWE ELECTRONICS



## TRIO FOR VHF

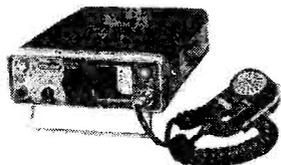
### TS700 Specification

FREQUENCY RANGE	144-146 MHz
MODES	usb, lsb, cw, am, fm
VFO COVERAGE	144-145 and 145-146 MHz
CRYSTAL OUTPUT	22 Channel capability
POWER OUTPUT	10W minimum
ANTENNA IMPEDANCE	50 ohms
CARRIER SUPPRESSION	50dB
SIDEBAND SUPPRESSION	Greater than 40dB
SPURIOUS RADIATION	Better than -60dB down in all modes
DEVIATION	± 10 kHz or ± 3 kHz
REPEATER TONE	1750-Hz Tuning Fork Oscillator
IF	10.7 MHz for ssb, am, cw, single Conversion 10.7 MHz and 455 kHz for fm, double Conversion
SENSITIVITY	0.5V for 10dB S + N/N
IMAGE REJECTION	Greater than 60dB
IF REJECTION	Greater than 60dB
AF SHAPE FACTOR	Better than 2:1 all modes
AF OUTPUT	Greater than 2W into 8 ohms
STABILITY	Better than 200Hz in any 30 min. period after warm-up
REPEATER SHIFT	Standard 600 kHz transmit downshift provided
CALIBRATOR	Built-in 1 MHz Calibration points
DIAL READOUT	To better than 1 kHz all modes
R.I.T.	4 kHz shift of receiver with respect to transmit frequency
NOISE BLANKER	Advanced circuitry noise blanker for noise free mobile or fixed operation
ALC INPUT	Socket provided for ALC input from linear
AUX RELAY	Socket provided for switching external linear



POWER REQUIREMENTS	120/240v. 50/60Hz AC ; 12-16v. DC negative earth
CONSUMPTION	Receive 45 watts AC ; 800 ma DC Transmit 95 watts AC ; 4A DC
DIMENSIONS (mm)	278 wide x 124 high x 320 deep
WEIGHT	11kg 24.2 lb

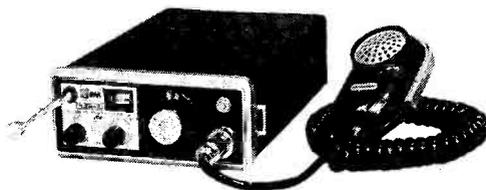
Price £300 (VAT exc.)



### TR7200G 2m Mobile Transceiver

22 Switch selected transmitting and receiving frequencies in the 2m. FM band between 144MHz and 146 MHz, five of which are factory-equipped with TX and RX crystals. Illuminated channel indication.

Channels Fitted 145-50 Simplex 145-15/75 Duplex  
145-525 Simplex 145-175/775 Duplex  
145-55 Simplex Price £125 (VAT exc.)



### TR2200G

The world's most popular 2 metre handy transceiver now comes complete with tuning fork controlled repeater access tone and facilities for 12 channels. With the advent of repeater operation in this country, it is now possible to work long distances with low power equipment and the sudden popularity of portable 2 metre equipment testifies to this fact. The TRIO TR2200G is a high performance transceiver with features not found in other rigs. Supplied with 3 channels fitted:

145-50 Simplex 145-55 Simplex 145-175/775 Duplex  
Most other I.A.R.U. channels available.

Price £80 (VAT exc.)

REMEMBER **IC210** STILL AVAILABLE AT £200 (VAT EXC.)

2 METRE FULLY TUNABLE

PHASE LOCK VFO

AC/12v. OPERATION

HEAD OFFICE 119 Cavendish Road, Matlock, Derbyshire. Tel. 2817 or 2430. Telex 377482

BRANCH OFFICES Goring Road, Steyning, Sussex. Tel. Steyning 814466  
Soho House, 362-4 Soho Road, Handsworth, Birmingham. Tel. 021-554 0708

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

MANY MORE EXCITING TRIO MODELS AVAILABLE. JUST ASK US!

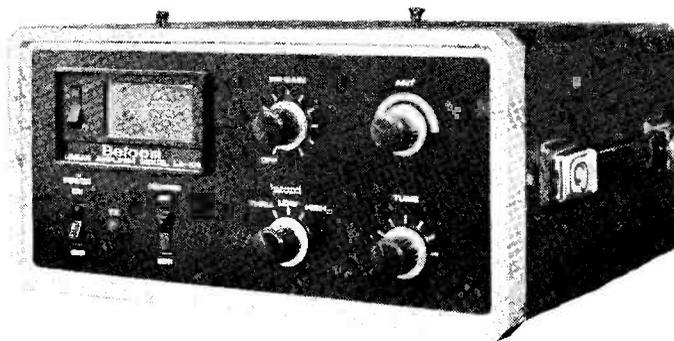
73 from BILL G3UBO/VE8DP, ALAN G3MME, JOHN G3PCY/5N2AAC, IAN G3ZYC

# LOWE ELECTRONICS

## BELCOM LA106 2m Linear Amplifier

MADE SPECIALLY BY NIHON DENGYO  
FOR THEIR LINER 2

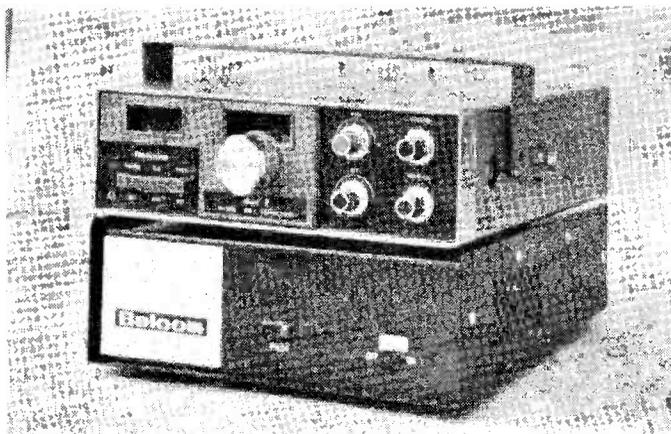
A reasonably priced, compact, high performance linear for 2m. SSB/FMCW operation. 10W of drive for more than 200W input gives your signal the extra kick to get it out of the noise. Built-in receive preamplifier with adjustable rf gain and using helical filters for extra selectivity and reduced intermod. from out of band signals. Built-in regulated 13v. 2.5A power supply for Liner 2 or any similar drive unit.



Frequency range : 144-146 MHz  
Modes : SSB, FM, CW  
Input power : 200W p.e.p.  
Drive power : 10W  
Receiver preamplifier adjustable gain up to 10 dB  
Accessory supply : 13v 2.5 regulated  
Power supply : 240v 50 Hz  
Dimensions (mms) 315 x 148 x 280  
Weight : 12 kgs  
Price : £165 plus v.a.t.

## SSB 144MHz MOBILE TRANSCIVER

### *Liner 2*



The brilliantly conceived and designed Liner 2 has revolutionised 2m. sideband and is responsible for the enormous increase in activity. It combines the advantages of switched channels with direct frequency readout (e.g. Channel 20 is 145.20 MHz) with the ability to tune between channels with the VXO. In addition the provision of R.I.T. which enables the Rx to be tuned to a kHz or two either side of the Tx frequency is a useful feature. The VXO gives, as one would expect, crystal stability which, coupled with an extremely effective noise blanker makes mobile operation a delight without detracting from its use (with an AC p.s.u.) as a base station.

Most important is the surprisingly low level of spurious emissions which sets a new standard. This low level is achieved by very careful design and alignment and owners are most strongly urged not to attempt alignment without a laboratory spectrum analyser.

For the first time, here is a completely solid state, fully tunable 2m. SSB rig which an electronically protected PA at a reasonable price which truly performs with the utmost reliability.

Price : Including microphone and bracket, spare DC power lead, mobile amount, spare dial lamp and fuse, £145 plus VAT.

# LOWE ELECTRONICS

## Venus Scientific Inc.

The company that put high voltage on the moon,  
now brings you expanding radio technology

# 2<sup>nd</sup> generation slo-scan

Venus Scientific brings ten years of space-age technology development to the production of the latest breakthrough in HAM Equipment . . . the SS2 Slo-Scan Monitor. The following unique features of the SS2 have been designed to offer the HAM operator the maximum functional performance in SSTV.

These advances include : **ACCU SYNC**, a diagnostic and tuning aid which converts the SS2 Monitor to an oscilloscope by the flip of a switch that monitors incoming and outgoing video ; **LED SWEEP INDICATORS**, go-no-go lights for ease of servicing ; **CAMERA ADAPTER** provision to accept **Polaroid Color Pack Camera or Polaroid Square Shooter**, which enables you to take pictures right off the air ; **SIMPLIFIED INDEPENDENT CONTROLS**.

**NOTHING COMPLICATED—CONNECTS DIRECTLY TO YOUR LOUDSPEAKER TERMINALS.**

**PRICE ; £249** including V.A.T.

For the full story on how VENUS' SS2 monitor has become the 2nd Generation of Slow-Scan and a list of accessories, write or call today.

NOW THE VENUS MONITOR AVAILABLE IN KIT FORM AT **£168** (V.A.T. exc.)

The following equipment, outside our new product line, is to be cleared at unrepeatable prices.

### LIMITED STOCKS ONLY

FTdx401 (latest model with AM)	... ..	£260.00
FT501 with P.S.U. (latest model)	... ..	£380.00
FV401	... ..	£35.00
SP401	... ..	£10.00
FV200	... ..	£30.00
DC200	... ..	£30.00
FV50B	... ..	£20.00
Sigmasizer	... ..	£130.00
FT-2 Auto	... ..	£120.00
FT220	... ..	£220.00

Multi-2000	... ..	£230.00
Inoue IC210	... ..	£216.00

### ANTENNAS

Asahi AS21 15m. 3 element small beam	... ..	£20.00
AS23 15 and 10m. 3 element small beam	... ..	£25.00
AS153W full size 3 element 15m. beam	... ..	£20.00
AS154W full size 4 element 15m. beam	... ..	£30.00
AS203W full size 3 element 20m. beam	... ..	£40.00
AS104W full-size 4 element 10m. beam	... ..	£20.00
Diamond DP-KB103 80 and 40m. verticals	... ..	£20.00

CASH AND CARRY OR £2.20 EXTRA SECURICOR

TRADE-INS WELCOME

EASY TERMS

PRICES INCLUDE VAT



# Western

## NEW! TOP VALUE AND PERFORMANCE YAESU—YOUR ASSURANCE OF QUALITY—introduce THE FT-201 10-80m. AC/DC TRANSCEIVER



£290 + VAT (Ex-stock)

### FEATURES :

- ★ Built-in ac/dc psu
- ★ 260W p.e.p.
- ★ 1 kHz readout
- ★ Effective noise blanker
- ★ Break-in cw keying with sidetone
- ★ ±5 kHz receiver clarifier
- ★ Built-in wvw reception
- ★ All mode operation for am, cw and ssb
- ★ Fast/slow/AGC
- ★ Built-in cooling fan
- ★ Complete line of compatible accessories

YAESU now brings you the newest addition to its growing family of solid state transceivers the FT201. Performance and portability are among the key features of this economical transceiver along with YAESU innovated modules to simplify servicing. The FT201 has features which you would expect to find only in units costing much more.

Full details in our "Communications Equipment" Catalogue, 20p.

## The superbly engineered FR-101 RECEIVER



- ★ 23 BANDS
- ★ 160m—2m
- ★ Plus general coverage
- ★ SSB/FM/AM/CW
- ★ Digital readout option available later
- ★ Transceives with FL-101 Transmitter for 160-10m. (available shortly)
- ★ Operates with FT-101B Transceiver

'D' De-luxe model is complete  
'S' Standard model is less certain bands and filters

FT-101S ... £245 + VAT  
FR-101D ... £330 + VAT

Full details of both the above models in our "Communications Equipment" Catalogue, 20p.

## SPECIAL OFFERS!

(CARR. AND VAT PAID)

FT-401 500 W Transceiver **£268.92**  
YC-355 35MHz Frequency counter ... **£86.40**  
FR400DX 10-160m. receiver **£159.84**  
FR400SDX 2-160m. receiver **£203.04**

# Electronics (UK) Ltd

## TWO 2-METRE WINNERS . . .

### THE STANDARD C146A

- . . . it's twice the power !
- . . . it's half the weight !
- . . . and about one third the size (of its competitors)



#### STANDARD

The Standard C146A is a 5 Channel 2 watt unit fitted with adjustable tone-burst for 1700 and 1750 Hz repeaters. The CSA Base Charger unit enables the C146A to be used as a main station and re-charges Ni-Cad batteries (set of 10 required).

#### 432 MHz

The C432 is a UHF 2W 5 Channel Hand transceiver with a full range of accessories as the C146A. The C430 is a 10W 12 Channel highly compact and efficient unit of the same size as the C140. This is the first professional 70 cm. transceiver available and will enable you to get going on 70 cm. with the advantage of smaller antennas and greater band space.

#### Prices (Carriage paid, exc. VAT)

CV100. VFO for C826MB	... £27-00
CV110. VFO for C140	... £37-00
C140. 2m. Transceiver	... £98-00
C146A. 2m. Hand Transceiver, 5 channel	... £74-00
C826MB 2m. Transceiver	... £110-00
SY-200 Synthesizer	... £79-00
C430. UHF Transceiver	... £129-00
C432 UHF Hand Transceiver, 5 channel	... £93-00

#### ACCESSORIES

C-12/230-5AE AC PSU for all models	£62-00
C-12/230-6E AC CHARGER for C146A and C432	£3-00
Ni-cad Batteries, set of 10	£10-00
2-205K remote speaker for all models	£8-00
CAD external antenna coupler	£1-95
CSA Base charger unit for C146	£14-00
CAT08E. Rubber flexible antenna	£2-75
CMP08 External microphone for C146A and C432	£8-00
CPM02 Telephone handset for all models	£23-00
C-12/230-2 AC Charger/Speaker	£66-00

THE



G6-144A

6 dB GAIN COLINEAR

. . . the real performer

6 dB gain compared to 1/2 wave dipole

**MASTER GAINER**

**HUSTLER for REPEATER or ANY FIXED STATION OPERATION**

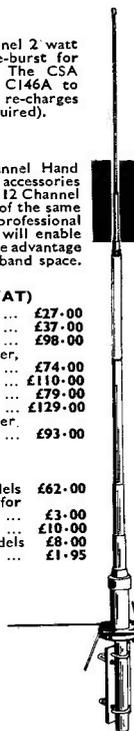
The Hustler Master Gainer is specially designed for rugged mechanical performance and optimum gain achieved through two 5/8 wavelength radiators correctly phased in colinear configuration. Stated gain figure is conservative and maximum radiation is at the horizon !

#### ELECTRICAL

6 dB gain over 1/2 wave dipole. Omni-directional radiation pattern. Maximum radiation—at horizon. 50 ohm feed impedance. Field adjustable—140-150 MHz. SWR at resonance—1.2 : 1 measured at antenna. Bandwidth—5 MHz for 2 : 1 or better SWR. Power—one kilowatt. FM. Feed—Shunt with D.C. grounding. Radiator—5/8 wave lower section, 1/4 wave phasing, 5/8 wave lower section, 1/4 wave phasing, 5/8 wave upper section.

#### MECHANICAL

Vertical element—17" long, 1-1/4" telescopic to 3/4" OD high strength aluminium. Radials—four, 2 1/2" x 3/8" OD aluminium rod. Connector—SO-239. Wind load—26 pounds at 100 mph. Wind survival—100 mph. Completely self-supporting. Mounting—fits vertical pipe up to 1-3/4" OD. Shipping Wt.: 6.8 lbs. Price : 52-95



#### PRICES (exc. VAT)

G6-144A	... £35-09
GGT-144	... £25-00
CGT-144 is the mobile version with 5.2 dB gain for boot mounting.	

### BANTEX FIBREGLASS MOBILE ANTENNAS (Carr. 75p) (Ex-Stock) + VAT

70/1/2. 70 MHz, 1/2 wave	... £3-00	BGA, 144 MHz, 1/2 wave	... £6-60	Magnetic mount	... £7-80
144/1/2. 144 MHz, 1/2 wave	... £2-85	BS, 144 MHz, 3/8 wave	... £5-20	All aerials complete with base.	

**CCE ROTORS (Carr. pd.) from us for fast delivery + VAT** AR30 £25 AR40 £30 New CD-44 £60 New Ham-2 £90

**CATALOGUE.** We will be pleased to send you a copy of our COMMUNICATIONS EQUIPMENT catalogue (20p) or TOWERS, ANTENNAS and ROTORS catalogue (20p). No SAE required.

## Western Electronics (UK) Ltd

Agent: G3PRR Chesham (02405) 4143

Hours of business: 9.15 - 5.15, 9 - 12.30 (Saturdays)

1-3 WEST PARK ROAD, SOUTHAMPTON

TELEPHONE: SOUTHAMPTON 27464

CABLES: WESTRONICS, SOUTHAMPTON

TELEX: 47388 WESTRONICS



# STEPHENS-JAMES

## LTD.

### 70 PRIORY ROAD, LIVERPOOL, L4 2RZ

Telephone: 051-263 7829

# G3LRB - G3MCN

THE NORTH WEST'S  
LEADING STOCKISTS OF AMATEUR  
RADIO EQUIPMENT

## ARAC MOSFET RECEIVER

28 - 30 MHz  
144 - 146 MHz  
AM FM SSB

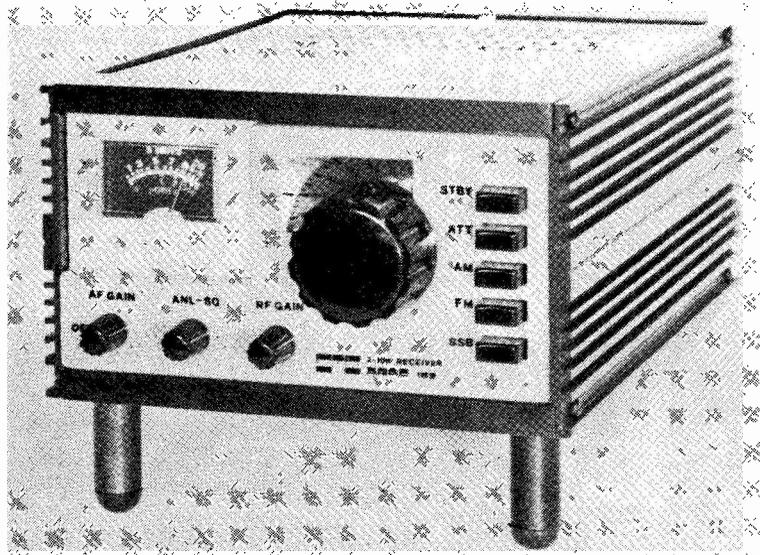
12v. DC operation. Built in  
speaker. 1uV for 10 dB S/N.  
Output 1.5 watt 8 ohm

PRICE £87-30

## ATAL 228

Solid State 8 watt AM/FM  
Transmitter

PRICE £123



<b>YAESU MUSEN</b>	
FT101B Transceiver ... ..	£356-40
FT201 Transceiver ... ..	£313-20
FTDX401 Transceiver ... ..	£334-08
FR101D Receiver ... ..	£356-40
FT200 Transceiver ... ..	£232-20
FL2100 Linear ... ..	£205-20
YC355 Frequency Counter ... ..	£137-00
<b>BELCOM</b>	
Liner 2 Transceiver ... ..	£156-00
100 Watt 2m. Linear ... ..	£172-00
<b>CODAR</b>	
PR40 Preselectors ... (Post 25p)	£11-00

<b>MICROPHONES (post free)</b>	
Yaesu 844 Desk Microphones ... ..	£16-12
Yaesu 846 Hand Microphone ... ..	£6-30
Shure 201 Hand Microphone ... ..	£6-00
Shure 444 Desk Microphone ... ..	£16-90
Shure 444T Desk Microphone ... ..	£16-50
Electro Voice 729SR Desk Microphone	£13-50
<b>JAYBEAM</b>	
Send large SAE for latest catalogue and price list of beams, clamps, masts, etc. 2 metres. 4 metres. 70 Cms.	

<b>KW ELECTRONICS</b>	
WK 2000E Transceiver ... ..	£369-00
KW202 Receiver ... ..	£210-60
KW204 Transmitter ... ..	£270-00
KW Linear Amplifier ... ..	£194-40
KW 107 Matching Unit ... ..	£73-40
KW109 Matching Unit ... ..	£85-80
KW 108 Monitorscope ... ..	£91-80
KW 160m. Antenna Match ... ..	£19-44
KW E-Z Match 80-10 metres ... ..	£23-76
KW103 SWR/Power Meter ... ..	£17-28
KW Balun ... ..	£3-24
KW Antenna Switch ... ..	£6-48

Instant HP and Credit facilities available. Full after sales service. All our prices include VAT. We urgently need good second-hand equipment. Spot cash paid. Send details and price required. Collections and deliveries can be made in some areas. Postage extra. Delivery cost by arrangement on larger items. All items in stock despatched same day as order received.

<b>ANTENNA ROTATORS</b>	
AR22R ... .. (Post 65p)	£29-70
AR30 ... .. (Post 65p)	£27-00
AR40 ... .. (Post 65p)	£32-40
CD44 ... .. (Post 75p)	£64-80
Ham H ... .. (Post £1)	£97-20
Stolle Automatic 2010 ... ..	£33-48
Stolle Multitonic ... ..	£37-80
<b>BARLOW WADLEY</b>	
XCR-30MK2 Solid state Receiver ... ..	£125-00
TR801 GM Tuner ... ..	£17-15
<b>SPACEMARK</b>	
S.S.T.V. Monitor ... ..	£140-40

<b>SWAN</b>	
700CX Transceiver ... ..	£426-00
300B Transceiver ... ..	£307-00
1200 Linear Amplifier ... ..	£189-00
M880A Transceiver ... ..	£194-40
SS-200A Transceiver ... ..	£538-00
TB-4HA 4 Element Beam ... ..	£135-00
<b>SOLID STATE MODULES</b>	
PA3 Dual Mosfet Pre-amp ... ..	£5-94
Europa SSB Transvertors complete with valves £88-00 without valves	£74-00

<b>ACCESSORIES</b>	
Twin Meter SWR Bridge ... (20p)	£11-20
Single Meter SWR Bridge ... (20p)	£6-60
Single meter SWR Bridge ... (20p)	£6-00
Egg Insulators ... ..	8p
3in. Ceramic Insulators ... ..	28p
Ceramic Dipole 1/4" Pieces ... ..	28p
PL259 Plugs 40p SO259 Sockets ... ..	40p
Cable Reducers ... ..	14p
300 ohm and 75 ohm twin feeder yd. UR43 16p UR67 40p HR233 16p	£14-85
Omega Noise Bridge TE701 ... ..	£21-45
Omega Noise Bridge TE702 ... ..	£22-00
MF100 Audio Generator ... ..	£22-00
Morse Practice Oscillators ... ..	£2-75
QSL Card Holders. Holds 120 cards ... ..	42p

Members of the Amateur Radio Retailers Association.

Shop Hours : 9.30 a.m. till 1 p.m.  
2.15 p.m. till 6 p.m.  
Half day Wednesday

<b>HY-GAIN ANTENNA RANGE</b>	
12AVQ 10-15-20m Vertical ... ..	£21-60
14AVT/WB 10 to 40m. Vertical ... ..	£31-91
18AVT/WB 10 to 80m. Vertical ... ..	£45-86
BN86 Balun ... ..	£10-26
TH3MK/3 Tribander Beam ... ..	£97-74
<b>MICROWAVE MODULES (post free)</b>	
2 and 4m. Converters (state I.F.) ... ..	£16-42
MMC144/20 LO Converter ... ..	£17-60
432 MHz Converter ... ..	£19-55
432 Varactor Tripler ... ..	£18-90
144 MHz Dual output Pre-Amp ... ..	£9-72

<b>ATLAS</b>	
180 watt PEP Solid State Broad Band Transceiver. 20-40-80-160M. 12v. DC operation ... ..	£280-00

**G-WHIP**  
Full range of the popular range of mobile antennas for 10m through to 10m. SAE for list and catalogue.

<b>COPAL</b>	
Model 601 24 hour Calendar Clock ... ..	£12-50

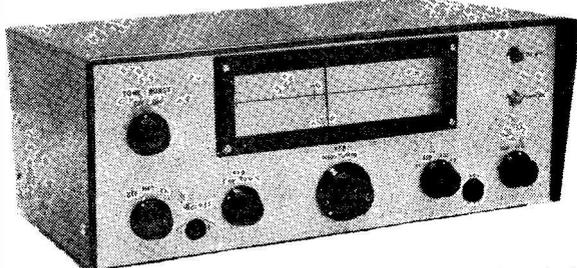
<b>SECOND-HAND EQUIPMENT</b>	
Eddystone 770R Receiver ... ..	£95-00
Eddystone 830/7 Receiver ... ..	£350-00
Yaesu FR50B Receiver ... ..	£65-00
KW160 am/cw Transmitter ... ..	£18-00
Yaesu FR400 Receiver ... ..	£108-00
Sommerkamp FR100B Receiver ... ..	£85-00
Liner 2 Transceiver ... ..	£120-00
Heathkit OS2 Oscilloscope ... ..	£30-00
Heathkit SB200 Linear Amplifier ... ..	£125-00
Heathkit SB300 Transmitter ... ..	£95-00
AR88D (Buyer collects) ... ..	£50-00
Magnum Speech Compressor for Drake TR or R4X ... ..	£55-00

<b>SOLID STATE MODULES</b>	
PA3 Dual Mosfet Pre-amp ... ..	£5-94
2m. FET Pre-amp ... ..	£7-31
Europa SSB Transvertor ... ..	£88-00

# TELFORD COMMUNICATIONS

78B HIGH STREET, BRIDGNORTH, WV16 4DS, SALOP. Telephone 074-62 4082 9 a.m. - 5.30 p.m.

"EAST or west — British is BEST"



other manufacturers offer 12 months. Well, after 15 years experience in the design of solid state RF circuitry, we know that if a unit or device is going to fail it will do so in the first few hours, if not the first few microseconds, of its life, certainly not in the first few months. We know therefore that a guarantee period of 6 months is more than adequate to safeguard your interests. We manufacture not only all our own metal-work, but also that for many of the other advertisers of gear for the amateur market, and we do all our own assembly. Our business is run by two highly experienced development engineers, with over 45 years design experience of both commercial and military equipment behind them. Yes, we do all the work ourselves, only that way can we ensure that our high standard of workmanship can be attained and maintained. This partly explains our relatively long delivery times on some lines. In fact we sold out of a lot of our units at Leicester last year, and we are now busy rebuilding our stocks. Those of you who took the opportunity of inspecting our workmanship on our stand at Leicester all commented very favourably on same. We have built up a reputation for good customer relations that must be second to none in our particular field. Please note that contrary to popular belief, our business is not connected in any way with J. R. Hartley. (GBAEV), only the mailing address is common. Our list of the full range of equipment with VAT inclusive prices, and current delivery times is set out below:

TC10 10 Watt All mode Transmitter	£140.40	6-8 weeks
TC9 10 Watt AM/FM Transmitter	£91.80	Ex-stock
TC7 Mk. 2 Tunable I.F.	£48.60	6-8 weeks
TC6 48 MHz. Mixer VFO	£32.40	2-3 weeks
TC5 2 Watt 5 Channel Tx AM (FM with TC6 drive)	£37.80	2-3 weeks
"GBAEV" Mk. 2 2 Metre Converter	£14.04	5-6 weeks
2 Metre Bandpass Aerial Filter	£5.89	Ex-stock
TC7 "Bandsearcher" Module	£4.71	2-3 weeks
Solid state aerial change over relay	£4.50	Ex-stock
Solid state aerial change over device only	£2.75	Ex-stock

Securicor delivery of TC10/TC9/TC7. Add £4.32 VAT incl.

73 and good DX John G8ARS

## NEW! UNIVERSAL R.F. SPEECH CLIPPER

INCREASES 'TALK POWER' — ELIMINATES 'FLAT TOPPING'

Easy to install — long battery life

- ★ Simply connect in series with your microphone lead. Needs no internal connection to your transmitter. Push-to-talk facilities are retained.
- ★ Can give increased "punch" or "talk power" comparable to a times-ten power increase, plus improved speech characteristics
- ★ Ideal for SSB, AM, or FM.
- ★ Advanced circuit uses optimised combination of digital and analogue techniques for long-term reliability and stability.
- ★ Seven integrated circuits, one transistor, three diodes.

**DESCRIPTION:** The Datong R.F. Clipper brings the unique benefits of rf clipping to any conventional transmitter. It should not be confused with agc-type speech compressors or af clippers. The Datong R.F. Clipper is a complete closed-circuit ssb transmitter and receiver. Amplitude clipping of the internally generated ssb signal (at 60 kHz) greatly increases the average-to-peak amplitude ratio of the speech input signal. This is achieved without harmonic distortion.

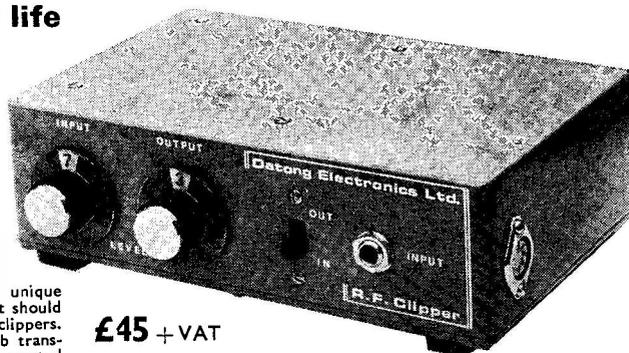
Price, including delivery by parcel post, only £45 plus VAT. Add 43p for delivery by registered first class mail.

Write or phone for full information, including a copy of the installation and operating instructions.

### DATONG ELECTRONICS LTD.

11 MOOR PARK AVENUE ● LEEDS LS6 4BT

Telephone: 0532-755579



£45 + VAT

See August Rad. Comm. for a review of this equipment

#### LOW-IMPEDANCE MICROPHONE INPUTS

To remove any mis-understandings we wish to point out that the Datong r.f. Clipper matches perfectly well into transmitters such as the LINER 2, TRIO TS700, PYE CAMBRIDGE, which have low impedance microphones and low impedance inputs. In fact it matches any commercial microphone/transmitter combination which we know of.

The "minimum external load" of 4K referred to in our data sheet applies only where a transmitter requires the full 400mV pk-to-pk output from the clipper. This is likely to arise only with home-built equipment.

# AMATEUR ELECTRONICS UK

OFFICIALLY  
APPOINTED  
DISTRIBUTOR

for



**COMPREHENSIVE STOCKS OF  
EQUIPMENT NOW AVAILABLE  
ACCESSORIES AND A RANGE**

**The Incomparable Deluxe  
FT-101B**



**STAR  
FEATURES**

- \* QUALITY
- \* PERFORMANCE
- \* RELIABILITY
- \* INNOVATION
- \* APPEARANCE
- \* VALUE
- \* STATUS

● **Solid State 160 thru 10 Meter Transceiver**

This deluxe rig is the descendant of the world famous FT-101 transceiver. Except for the driver and final amplifier stages, the FT-101B features all solid state circuitry, built on reliable "computer type," plug-in models. The FT-101B is contained in a compact, thirty pound (15 Kg.) package designed to go anywhere.

All that is needed for instant "on the air" operation from 160 thru 10M is either 12v. DC or 100-234v. AC and an antenna. The FT-101B is truly quality radio from the world's leader in amateur radio communications.

## **YAESU MUSEN - TRIED, TESTED**

PART EXCHANGES WELCOMED

EXCELLENT CREDIT TERMS

ON-THE-SPOT TRANSACTIONS

- ALSO AVAILABLE  
FROM OUR  
ACCREDITED  
STOCKISTS

**RADIO SHACK LTD.**  
188 Broadhurst Gardens  
LONDON, NW6 3AY  
01-624 7174

**STEPHENS - JAMES LTD.**  
70 Priory Road  
Anfield  
LIVERPOOL, L4 2RZ  
051-263 7829

**508-514 ALUM ROCK ROAD  
BIRMINGHAM 8**

**021-327 1497  
6313**



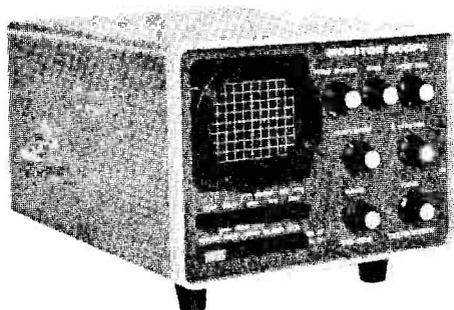
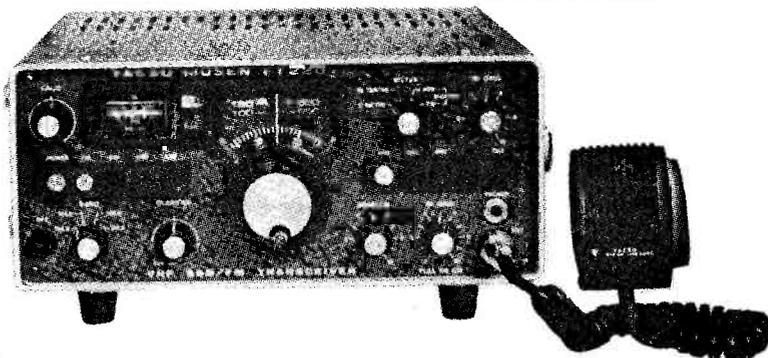
**GENUINE YAESU MUSEN BRANDED  
TOGETHER WITH ANCILLARY UNITS,  
OF ESSENTIAL SPARES**

**FULL YAESU  
WARRANTY  
SERVICE**

**FT-220**

**2m Transceiver**

This is the best value-for-money 2m. Transceiver on the market today—Full VFO coverage of 144–146 MHz plus 4 crystal channels. A truly all mode rig with FM, CW, USB and LSB. Mains or DC operation.



**YO-100 Monitor Scope**

Now, you, too, can maintain the cleanest sounding signal on the band with the YO-100 Monitor Scope. Compatible with virtually all transmitters and transceivers, the YO-100 features wide range inputs for all mode monitoring—even RTTY. A built-in 1500/1900 Hz tone generator adds to the versatility of this station accessory. A full compliment of front panel controls allows operator control of all key adjustments. Complete your station with the versatile YO-100 monitor scope.

**AND PROVEN - AROUND THE GLOBE!**

**FULL DEMONSTRATION FACILITIES**

A COUPLE OF STAMPS (WE'LL PROVIDE THE ENVELOPE) WILL BRING YOU DETAILS OF ANY ITEM—PLEASE STATE SPECIFIC EQUIPMENT IN WHICH YOU ARE INTERESTED

**J. & A. TWEEDY LTD.**  
79 Chatsworth Road  
Chesterfield  
DERBYSHIRE  
0246 863755

**TAURUS ELECTRICAL  
SERVICES**  
26-28 Nottingham Road  
LOUGHBOROUGH  
05093 5131

**THE AMATEUR  
RADIO SHOP, G4MH**  
13 Chapel Hill  
HUDDERSFIELD  
0484 20774

# WATERS & STANTON ELECTRONICS

## 1975 and we've done it again!

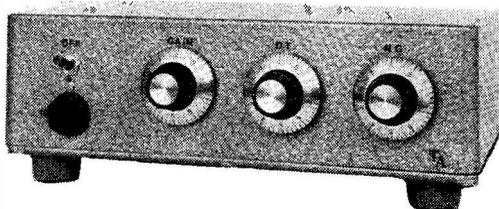
### A TRIPLE FIRST!

- 1972 we introduced the smallest hf beam in the World from Mini-Products
- 1973 we introduced rf clipping to the amateur—the Magnum Six
- 1974 we introduced MFJ's high performance audio filters for cw work
- and in 1975 we introduce **TECHNICAL ASSOCIATES AUDIO COMPRESSOR**

We are proud to introduce to you the Technical Associates advanced audio compressor. This is no ordinary compressor; it makes all others obsolete. In fact we confidently predict that by the end of 1975 this unit will be the standard item in most amateur stations. A bold statement? Just read the following features: —

- ★ High talk power without high cost of clipping or distortion-making of clipping
- ★ 14 transistors
- ★ up to 26 dB compression
- ★ less than 1% distortion at any setting
- ★ fast attack time — less than 1 millisecond
- ★ decay time from 200 milliseconds to 2 seconds — variable from front panel
- ★ Fast decay for dx working
- ★ slow decay for rag-chewing
- ★ variable noise gate — adjustable from front panel — to overcome annoying room noise produced by other models
- ★ noise gate prevents ambient noise level from tripping vox or being transmitted during pauses in speech
- ★ simply insert between mic. and tx.
- ★ front panel compression control
- ★ battery powered from PP6
- ★ approx. 3 m/a consumption
- ★ solid di-cast case.

The designers aim was to produce an audio unit that would increase talk power without introducing distortion. Audio clipping introduces severe distortion and filtering the audio produces a very thin sounding signal. You've probably heard some of these devices on the air! Well, Technical Associates set about overcoming these problems by designing an advanced speech compressor that neither sacrifices bandwidth nor produces distortion. Despite the fact that the circuit contains no less than 14 transistors it costs far less than any other processor available.



These units have been tested alongside commercial rf clippers and there was no difference in the received signal. The only comment was that the Technical Associates Compressor had far superior speech quality. Why pay more?

And if the above should still not convince you, then just listen to them as they appear on the air—but remember the name, **Technical Associates.**

**ONLY £22.68 (inc. VAT)**

or £34.50 with Shure 444 mic.!

BARCLAYCARD ACCESS

TRIO — YAESU — SWAN — MINI-PRODUCTS — JAYBEAM — MFJ — SHURE

### FAST MAIL ORDER SERVICE FROM OUR NEW PREMISES

SIMPLY PICK UP THE TELEPHONE AND QUOTE YOUR BARCLAYCARD OR ACCESS No.—DESPATCH SAME DAY!

#### MFJ PRODUCTS (USA)

- CWF-2BX cw audio filter ... £13.95
- SBF-2BX new ssb audio filter ... £14.58
- CMOS electronic keyer ... £21.06
- QRP Tx-40m. £12.42 matching vfo

#### MINI-PRODUCTS "Mini-Beams"

- (1.5kW)
- HQ-1 hybrid quad 10-15-20 ... £54.00
- B24 2 element yagi ... £42.12
- C4 10-15-20 vertical ... £24.30

#### MICROWAVE MODULES

- New 1 70 cm. transverter ... £67.00
- 2m. converters 2-4/4-6/28-30 ... £16.42
- 70cm. converters 28-30 ... £19.55
- 2m. pre amp ... £9.72
- 1296 converter 28-30 ... £25.92

#### SOLID STATE MODULES

- 4m. or 2m. Europa transverter ... £88.00
- Less valves ... £74.00
- 2m. converters 2-4/4-6/28-30 ... £16.20
- 70 cm. converter 144 IF ... £16.20
- 2m. pre amp £9.72 PA3 ... £5.94

#### SHURE MICS (note our low prices!)

- 201 ... £6.00
- 444 ... £13.95

#### SPEECH PROCESSORS

- New Technical Associates model ... £22.68
- DX engineering for TR3/TR4 ... £45.00
- Magnum Six (the Rolls Royce) ... P.O.A.

#### JAYBEAMS VHF ANTENNAS

- 4 Metres
- 4 element yagi ... £7.34
- 2 Metres (50 or 75 ohm)
- 5Y/2M yagi £4.64
- 10Y/2M yagi £11.88
- 8XY/2M crossed £11.03
- D5/2M slot £8.56
- UGP/2M G. plane £4.48
- HO/2M halo £2.00

#### 70 Cms.

- D8/70 cm. slot £9.72
- MBM46/70cm. £13.07
- 12XY/70cm. £18.04
- 8Y/2M yagi ... £6.05
- 5XY/2M crossed ... £8.86
- 10XY/2M crossed ... £15.23
- D8/2M slot ... £11.24
- XD/2M X dipole ... £6.21
- HM/2M halo £2.38

#### ROTATORS

- AR30 £27.00; AR40 £32.40; CD44 £64.80;
- Stolle 2010 £33.48 Stolle 2030 £37.80
- 5 core cable 18p per yard.

#### MOBILE ANTENNAS

- G-Whips tribander 10-15-20 ... £13.28
- Multimobile 10-15-20 ... £15.44
- Flexiwhip basic 10m. ... £10.26
- Basemount £2.00
- Extra coils £4.43
- Antenna Specialists vhf antennas —
- 4m. 1/2 wave £3.94
- 2m. 1/2 wave £2.59
- 2m. 5/8 wave £8.65
- Deluxe 2M 5/8 wave £17.28

#### YAESU

- FT101, FT201, 224, etc.

#### TRIO

- QR666 receiver 160 to 10 metres plus general coverage. 230v. AC or 12v. DC ... £140.00

#### SWAN (ex. VAT)

- 700 cw transceiver plus psu ... £395.00
- 700cx/ss16 transceiver plus psu ... £435.00
- Remote vfo ... £99.00
- Vox unit ... £25.00

#### 2m. SSB

- Liner 2 transceiver ... £156.00

#### STATION ACCESSORIES

- Headphones 8 ohm ... £2.95
- SWR meters 160 to 2m. ... £6.20
- SWR meter/power meter, dual meters 160 to 2m. ... £11.50
- 50 ohm coax 17p yd.; 75 ohm UHF 14p yd.; 300 ohm feeder 8p yd.; insulators 12p;
- High power Wightraps £4.60 pair; PL259 plugs 42p; Belling Lee 12p.
- HP3A TV interference filter ... £2.16
- 1 1/2 inch ferrite rings ... 23p each

#### SECOND HAND

- Yaesu Sig 200 ... £150
- Yaesu FT501 ... £359

#### NI-CAD BATTERIES

- HP2 £3.20; HP11 £2.20; HP7 £1.30

S.A.E. WITH ALL ENQUIRIES PLEASE

BARCLAYCARD

ACCESS

HIRE PURCHASE

TRADE-INS

**HOCKLEY AUDIO**

**SPA ROAD**

**HOCKLEY**

**ESSEX**

PRICES INCLUDE VAT

Early closing WEDNESDAY

Tel.: 03-704 6835



# MASTS & ANTENNAS

THE LARGEST RANGE & STOCKS IN THE UK. AMATEUR & COMMERCIAL



MODEL P.60

### VERSATOWERS

Illustrated left. Tiltover Telescopic post mounted ex-stock. The tilting action allows ease of maintenance and changes of antennas. The relatively low weight allows ease of installation. From : £172.25

### TELOMASTS

Galvanised steel Telescopic 10ft. section. 30ft. — £15.00 40ft. — £20.00 50ft. — £25.00  
 With rigging kits : 30ft. — £29.00 40ft. — £39.00 50ft. — £49.00

### HAMTOWERS

Galvanised lattice 10ft. sections 30ft. height with climbing steps on one face. From : £90.50

### ALIMASTS

A/Alloy Telescopic 1.5, 2, 3 metre sections. 6-21 metres from £11.60 ; 6m. to £38.00, 21m.

### HIGH GAIN ANTENNAS (Carriage paid)

#### HY-GAIN ANTENNAS (carriage paid but prices excluding VAT)

HY-Gain 18AVT/WB the great wide-band self supporting vertical (for 10-80 metres). Take the wide band, omni-directional performance of the famous 14AVQ, increase the bandwidth, add 80 mtrs. use extra heavy duty construction and you have the 18AVT/WB. True  $\frac{1}{2}$  wave resonance on all bands, 52 ohm feed, BAND EDGE SWR of 2 : 1 or less, handles 1kW (AM), ultra low angle radiation and may be roof or ground mounted.

Hy Tower, 10-80m., Self supporting tower	£132.00	TH3 MK3 10-20m. 3 element beam	£90.50	203BA 20m. 3 element beam	£87.00
18V, 10-80m. Vertical self supporting	£15.50	TH2 Mk. 3 10-20m. 3 element 40m.	£62.00	153BA 15m. 3 element beam	£44.00
12AVQ, 10-20m. Vertical self supporting	£20.00	Hy Quad 10-20m. 2 element 40m.	£90.00	103BA 10m. 3 element beam	£35.00
14AVQ, 10-40m. Vertical self supporting	£29.50	DB10-15A 10 and 15m. 3 element beam	£69.00	LA 1 Lighting arrester	£17.50
LC80Q Loading coil for AVQ, 80m.	£9.30	DB24B, 3 element 20m. 2 element 40m.	£129.00	LA 2 Lightning arrester	£3.00
18AVT/WB 10-80m. Vertical	£42.50	402BA, 40m. 2 element	£110.00	12RMQ Roof mounting kit	£11.00
TH6DXX 10-20m. 6 element beam	£177.00	204BA 20m. 4 element beam	£96.00	14RMQ, Roof mounting kit	£139.00
				400 Rotor	£9.50
				BN36 Balun	£9.50
				TH3 Jnr. 10-20m. 3 element 600W	£62.00

### JAYBEAM — THE COMPLETE RANGE (AND MORE) (Carriage extra)

NEW 2 METRES. Ready for January Lifts ? The 14Y/2M, 14 element Skybeam. Long Yagi with 14.5dB gain from only a 17' 5" boom stacks at 132". Available only from S.M.C. £14.00

#### OMNI-DIRECTIONAL

HO/2M Halo head only	-3dB	60 ohm	£1.85
HM/2M Halo with mast	-3dB	60 ohm	£2.20
UGP/2M Ground plane	0dB	60 ohm	£4.15
XD/2M Crossed dipoles	-3dB	60 ohm	£5.15

#### CIRCULAR

XD/2M Crossed dipoles	0dB	60 ohm	£5.75
5XY/2M 5 element crossed	7.8dB	60 ohm	£8.20
8XY/2M 8 element crossed	10dB	60 ohm	£10.20
10XY/2M 10 element crossed	13dB	60 ohm	£14.10

#### 4 METRES

4Y/4M 4 element	7dB	60 ohm	£6.80
-----------------	-----	--------	-------

#### BEARING

RZ100 Alignment bearing. All phasing and matching harnesses available.

#### G-WHIP The British mobile HF ANTENNA (carriage 75p)

TRI BANDER 10-20m.	£12.30	Base	£1.85
Resonators LF 40-160 at Whip for LF coil			£4.10
MULTIMOBILE 71 10-20m.	£14.30	Base	£1.81
Resonators MM 40-160 at Whip for MM coil			£4.10

#### FLEXIWHIP

10m. £9.50 (Base fitted) Resonators FF 15-60

#### RANGER

160m. £7.50

#### S.M.C. TRAPPED DIPOLES (carriage paid)

Standard 10-80m, 14 SWG hard drawn £16.00. High power as standard but 1kW p.e.p. £18.50. Portable copper/terylene braid with coax £17.25.

#### WIGHTRAPS (carriage 25p)

Standard, white, 10-80m., £2.85. High power, blue, 10-80m. £4.10

NEW 70 cms. Set for Oscar 7 ? The 12XY/70, 12 element crossed Yagi, complete with phasing harness for circular polarised fade free space communications. Now in stock. £17.60

#### YAGI'S

5Y/2M 5 element Yagi	7.8dB	60 ohm	£4.03
8Y/2M 8 element Yagi	10dB	60 ohms	£5.60
10Y/2M 10 element long Yagi	13dB	50 or 75 ohm	£11.00
14Y/2M 14 element long Yagi	14.5dB	50 or 75 ohm	£14.00

#### SLOT-FEED

D5/2M 5 over 5	10.3dB	50 or 75 ohm	£7.92
D8/2M 8 over 8	12.6dB	50 or 75 ohm	£10.50

#### PARABEAM

PBM14/2M 14 element parabeam 15.2dB 50 or 75 ohm £16.90

#### 70 CENTIMETRES

D8/70 8 over 8	12.6dB	50 ohm	£9.00
PBM18/70 18 ele parabeam	16.5dB	50 ohm	£10.90
NBM46/70 46 ele multibeam	17.3dB	60 ohm	£12.10

#### MOSLEY TRI BAND (10-15-20m.) BEAMS (carriage £1.75)

TA33 Jnr. E 3 ele., 200V RMS, £45 ; TA32 Jnr. E 2 ele., 300V AM, £32 ; Mustang 3 ele. 2kW PIP, £60 ; Mustang 2 ele., 1kW AM, £48.

#### BANTEX FIBREGLASS VHF MOBILE ANTENNAS

85  $\frac{1}{2}$  144 MHz, £5.00 ; BGA + 144 MHz, £6.60 ; BSU + 432 MHz, £5.00 ; 70/147 MHz, £3.00 ; Magnetic Base Mount, £7.50 ; Trunk Lip Mount, £5.10. Note deduct 50p from price if standard base is not required.

#### R.F. CABLES (P & P up to 20m 40p, over 50p lighter cables less)

50 ohm RG8U/UR67	33p/m	75 ohm UR39	25p/m
75 ohm UR57	33p/m	75 ohm Economy	10p/m
75 ohm BICC 2378	22p/m	75 ohm Flat twin	6p/m
50 ohm UR43/UR76	15p/m	300 ohm Ribbon	6p/m

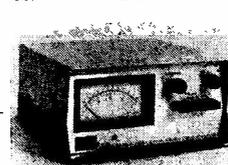
#### COAX PLUGS (p and p extra)

PL259, 42p ; UHF Chassis socket, 33p ; N plugs PL259A, 54p ; Reducers, 12p ; UHF Angle, 90p ; BNC plugs VHF back to back, 66p.

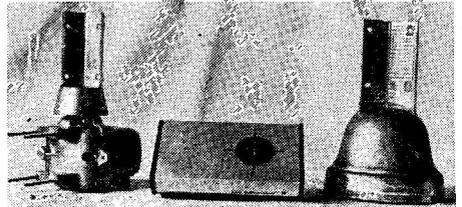
VAT NOT INCLUDED (8%)

## ROTATORS: EX-STOCK

### FAST DELIVERY



THE NEW CONTROL UNIT FOR THE CD44 (£60 + VAT) AND HAM 2 (£90 + VAT) Illustrated left. Carriage (BRS) Free. Securitor delivery 50p extra  
 AR30 for Stereo FM, T.V., and small VHF beams £25.00  
 AR40 for Medium VHF arrays, Small HF beams £30.00  
 CD44 Arrays up to 2  $\frac{1}{2}$  sq. ft. of wind area £60.00  
 Ham II Arrays up to 7  $\frac{1}{2}$  sq. ft. of wind area £90.00



AR30 £25 + VAT AR40 £30 + VAT

24 hour Securitor delivery on equipment. ACCESS. BARCLAY CARD. H.P. Phone in and we will despatch ex stock items same day.

# SOUTH MIDLANDS COMMUNICATIONS LTD.

Formerly trading as South Midlands Construction Ltd. and Western Electronics (U.K.) Ltd.

OSBORNEROAD, TOTTON, SOUTHAMPTON SO44DN.

Tel.: TOTTON (04216) 4930 or 2785

A MEMBER OF THE ARRA

Agent: Brian G3ZUL

Droitwich (09057 4510)

Hours of business: 9.5.30.9-12.30 Sat.

CABLES: "AERIAL SOUTHAMPTON"



# SOUTH MIDLANDS

## Why buy **YAESU**? Why from **S.M.C.**?

**WHY YAESU? SIMPLE:— IT'S THE BEST at a given price.**

Amateur radio equipment, of which they make more than anyone else, is their only business, and with over 130 licensed amateurs on the staff you can rest assured that the advanced design concepts are critically tested and assessed for today's practical needs.

**WHY S.M.C.? SERVICE, EXPERIENCE AND SPARES**

We have been importing Yaesu for over 3 years and have the experienced staff in Totton who really know the equipment and can advise you, and provide the continuity of service required.

In addition to Yaesu, we can supply all your needs.

ANTENNAS : TOWERS : MASTS : ROTATORS : COAX : PLUGS etc.

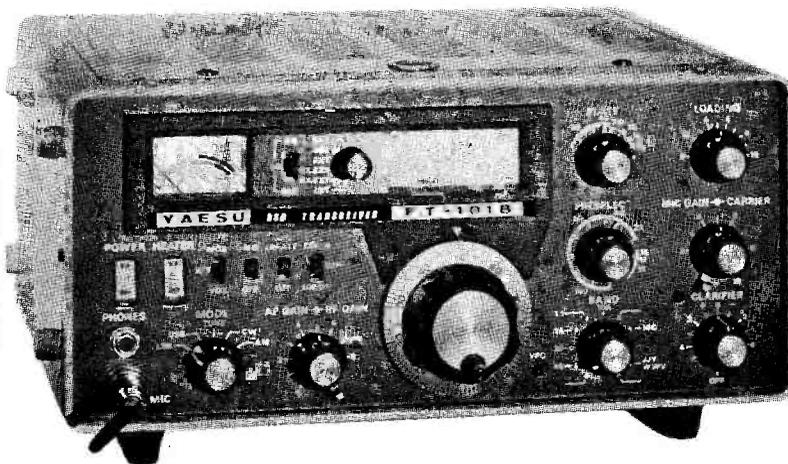
**S.M.C. YOUR ONE STOP SOURCE**

## DE LUXE MOBILE/BASE STATION FT101B EX STOCK

### Solid State 160 thru 10 Meter Transceiver

This deluxe rig is the descendant of the world famous FT-101 transceiver. Except for the driver and final amplifier stages, the FT-101B features all solid state circuitry, built on reliable "computer type," plug in modules. The FT-101B is contained in a compact, thirty pound (15 Kg.) package designed to go anywhere. All that is needed for instant "on the air" operation from 160 thru 10M is either 12v. DC or 100-234v. AC and an antenna.

Low level output socket.  
+5 kHz receiver clarifier.  
Built-in, fully adjustable VOX.  
Built in WWV reception (10 MHz).  
Heater switch conserves batteries.  
Built-in speaker and muffin type fan.  
Built-in mains and 12v. power supplies.  
High-Q, permeability tuned, RF stages.  
Noise Blanker with adjustable threshold.  
Complete line of compatible accessories.  
Selectable 25 kHz and 100 kHz calibrator.  
ALC control line, power available at rear.  
Includes dynamic, hand-held type microphone.  
Provision for crystal control or external VFO.  
Automatic break-in CW operation with sidetone.  
Solid state VFO for stability and 1 kHz readout.  
260 watts PEP SSB, 180 watts CW and 80 watts AM.  
Eight pole SSB filter for unparalleled selectivity.  
Adjustable carrier level for tune-up and AM operation.  
L.E.D. Lamps for internal VFO and clarifier operation



#### FREE SECURICOR DELIVERY ON YAESU

Warranty work — give us a call we will send you our Securicor contract letter to collect free of charge. (Other service work carriage £1.30).

#### PART EXCHANGE — A PLEASURE

Phone write or call for competitive quotation.

#### GOT A RADIO PROBLEM

Give us a call and we will try to help.

Second Hand List Phone 04216 4930 For Latest

PLEASE NOTE — THESE PRICES DO NOT INCLUDE VAT (8%)

ACCESS  
BARCLAY

Terms : c.w.o. or just phone with credit card number for same day despatch of ex stock items.  
Our H.P. facilities now include instant clearance for holders of a current (U.K.) callsign.

TRICITY  
FINANCE

# COMMUNICATIONS LTD.



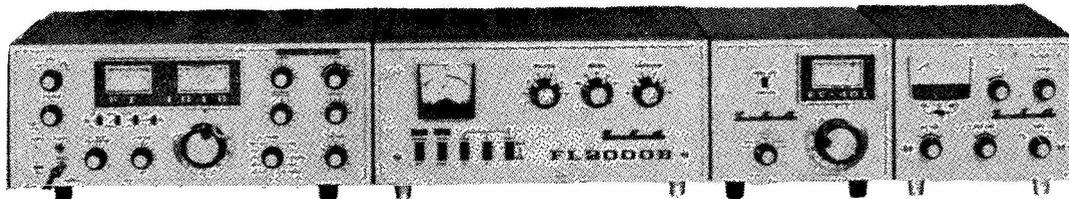
**YAESU MUSEN U.K. MAIN DISTRIBUTOR**

FT401 B

FL2000 B

FV401

FTV650



The FT401B (A FT401 with AM, but without the CW filter) and its accessories are shown above, and provide an uncompromising approach to the home station. The FT401B itself runs 560 watts P.I.P. but when throttled back to drive the FL2000B and coupled with the FV401 external V.F.O. provides the base station with ultimate DX appeal.

The unit nestling on the end is the FTV650, a 6m. transvertor which we can provide electrically modified for 70 MHz, 100w. P.I.P., 50W CW, 40W FM/AM, £80.00.

## NEW from S.M.C. — The FT620



(The V.H.F. man's perfect exciter!)

A compact unit featuring full 1 kHz resolution VFO coverage across 50-54 MHz in 8 ranges, SSB (selectable) AM or CW (build your own FM modulator) 4 crystal controlled channels in each band segment, receiver offset clarifier, noise blanker, built in AC and 12v. DC power supplies, mic supplied, optional AM filter and crystal calibrator, £175.00.

The exceedingly low level of spurious emissions and the 50 MHz<sup>2</sup> output makes this unit highly suitable for use as a drive source transverting to 4, 2 or 70 cms. and/or parametrically up converting to 70 or 23.

For use on 70 cms. we are pleased to announce the Microwave Modules transvertor is now available for use with a 50 MHz IF, £62.00.

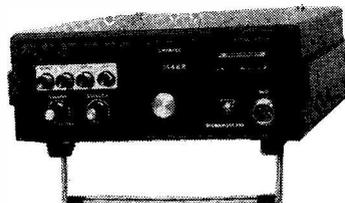
**ALL EX STOCK  
IN TOTTON**



**FT2F AUTO**

A unique concept in 2 metres FM transceivers. The "Auto Scan" circuit monitors every 1/2 second each of the 8 channels and automatically locks upon receipt of a signal. Individual lockout buttons enable you to eliminate any undesired or occupied channels. A priority circuit may be activated to check your local net or RAEN frequency every two seconds.

To transmit on a channel being received a momentary pressing of the P.T.T. locks the transmitter to the receiver. Manual operation is available, duplex operation with or without tone burst, built in mains and 12v. power supplies and microphone.



**SIGMASIZER 200 R**

200 channel synthesized FM transceiver offering complete simplex and duplex coverage of two metres in 10 kHz increments. A 600 kHz transmitter offset oscillator gives complete flexibility when coupled with the built-in tone burst. A priority channel may be preset for instant selection of net or RAEN channels. Automatic final protection, 10W of R.F. and a generous 2 watt of audio for mobile use with a battery drain of only 2.2A on transmit. The unit may be run as a base station with the FP2AC regulated power supply and battery charger.

**SEE OVERLEAF FOR A SELECTION OF MASTS/ANTENNAS**

## SOUTH MIDLANDS COMMUNICATIONS LTD.

Formerly trading as South Midlands Construction Ltd. and Western Electronics (U.K.) Ltd.

OSBORNE ROAD, TOTTON, SOUTHAMPTON SO4 4DN. Tel.: TOTTON (04216) 4930 or 2785

A MEMBER OF THE ARRA

Agent: Brian G3ZUL,  
Droitwich (09057 4510)

Hours of business: 9-5.30 9-12.30 Sat.

CABLE:

"AERIAL SOUTHAMPTON"

# STOP!

**Are you interested in buying top performance VHF or UHF equipment? Then look no further! . . .**

Our equipment and customer service are second-to-none. We note that we are still the only British amateur radio manufacturer with sufficient confidence in the robustness and reliability of our equipment to offer an **UNCONDITIONAL ONE YEAR GUARANTEE** inclusive of **FREE SERVICE** and **REPAIRS**. All equipment is despatched post-free by return.

## DUAL GATE MOSFET CONVERTERS FOR 2 METRES

Our 144 MHz Converter features many unique design points, and we feel it is time that we made some comments on design principles. We use gate-protected mosfets in the RF and mixer stages of our converter. To obtain the excellent noise figure and signal-handling capability which we alone achieve in our converter, we have found that it is essential to define the drain current of the RF stage mosfet within close limits. This is achieved in our design by a unique gate bias network giving DC feedback stabilisation of the drain current, thereby ensuring optimum performance over a wide range of operating conditions. Many other mosfet and jufet converter designs suffer wide variation in performance due to lack of attention in the above area. Our circuit design, together with careful selection of the RF stage mosfet, guarantees our noise figure specification of better than 2.8 dB. This figure is in line with the mosfet manufacturers' own specifications, and we would advise you to be very wary of other converter manufacturers who quote greatly improved noise figures, yet use similar technology to ourselves.

Noise figure is not the only important consideration in converter design. Signal-handling capability and freedom from spurious responses are of at least equal importance, and we have paid great attention in our design to offer the best overall performance within the limits of present-day technology. The image rejection of our 28-30 MHz I.F. converter is better than 65 dB, and is indicative of the high standards attainable with careful design techniques.

All our converters operate from a 9-15 volt supply.

### SPECIFICATION

Noise figure : 2.8dB max. Gain : 27dB typ.  
Image rejection : 65dB typ.  
Crystal oscillator : 116 MHz (zenered)  
Frequency error at 144 MHz : 3 kHz max.  
Power supply : 35mA at 12 volts.

We have extended our popular range of single conversion converters to include the following I.F.s :  
9-11, 12-14, 14-16, 18-20, 24-26, 28-30 MHz. Price £16.42 inc. VAT

**144 MHz DOUBLE CONVERSION MOSFET CONVERTER**  
I.F.s available ex-stock : 2-4, 4-6 MHz. Price inc. VAT £16.42  
This unit was developed to meet the heavy demand for a converter suitable for use with receivers having better performance at lower frequencies. It uses two dual-gate mosfet mixers, both fed from the output of a 70 or 71 MHz crystal oscillator. Selectivity is obtained at the first IF in the 74 MHz range, thereby overcoming the usual problems associated with low-I.F. single conversion converters.

**144 MHz CONVERTER FOR SSB—MMC144/28 LO**  
This latest version of our standard 28 MHz I.F. 2 metre Converter, with an additional coax socket giving local oscillator output at 116 MHz, can be used as the heart of a high performance 2m. SSB transverter. The excellent sensitivity of this converter is defined by the low noise dual gate RF stage. For SSB use this is particularly important if the DX-potential of the mode is to be realised.

### Technical Specification

Noise figure : 2.8 dB max.  
Gain : 27 dB typ.  
Image rejection : 65 dB typ.  
116 MHz output power : 5mW min.  
Crystal oscillator : 116 MHz (zenered)  
Frequency error at 144 MHz : 3 kHz max.  
Power supply : 35mA at 12 volts typ.  
Available ex-stock. Price inc. VAT £17.60

**70 MHz CONVERTER FOR SSB—MMC70/28 LO**  
SSB is now widely used on the 70 MHz band, and we are now manufacturing our 70 MHz converter with the local oscillator output facility provided at 42 MHz. Specification and price are as above for the 144 MHz version.

### 432 MHz MOSFET CONVERTER

I.F.s available ex-stock : 14-16, 18-20, 24-26, 28-30, 144-146 MHz.  
Price inc. VAT £19.55

This unit uses a dual-gate mosfet mixer for excellent strong-signal performance preceded by two BFY90 transistor RF stages for high sensitivity. All UHF tuned circuits are printed using Microstrip technology, and a crystal in the 100 MHz region is used in the oscillator chain to overcome unwanted beats in the tuning range.

### 432 MHz VARACTOR TRIPLER

Maximum input power at 144 MHz : 20 watts. Typical output power (at maximum input) : 14 watts. Price inc. VAT £18.90

### 1296 MHz VARACTOR TRIPLER

Maximum input power at 432 MHz : 24 watts. Typical output power (at maximum input) : 14 watts. Price inc. VAT £27.00

### 136 MHz SATELLITE BAND CONVERTER

I.F.s available : 28-30 MHz and others. Price inc. VAT £16.42

# MICROWAVE MODULES LIMITED

11 CRANMORE AVENUE, CROSBY, LIVERPOOL L23 0QD Tel: 051-928 1610

ADVERTISERS' INDEX

	Page
Amateur Electronics (G3FIK) ...	586, 587, 619
The Amateur Radio Shop, G4MH (Huddersfield) ...	629
Antenna and Electronic Consultancy Co. ...	631
Ashley Dukes (Honda) ...	631
Baginton Electronics ...	627
B. Bamber Electronics	
<i>back cover,</i>	<i>633</i>
J. Birkett ...	623
British National Radio School	625
C. & C. Electronics ...	631
Datong Electronics Ltd. ...	585
Eley Electronics ...	630
G3HSC (Rhythm Morse Courses) ...	633
G3LLL Holdings ...	633
G.W.M. Radio ...	635
Hamgear Electronics ...	630
Heath (Gloucester) Ltd. ...	594
D. P. Hobbs Ltd. ...	632
Home Radio Ltd. ...	629
K.W. Communications Ltd.	
<i>inside front cover</i>	
Lowe Electronics	578, 579, 580, 581
Marketing Services International	621
S. May (Leicester) Ltd. ...	632
Microwave Modules Ltd. ...	592
Mosley Electronics ...	621
Partridge Electronics Ltd. ...	625
P.M. Electronic Services ...	630
Radio Shack Ltd. ...	577
R.T. & I. Electronics Ltd. ...	622
Small Advertisements ...	631-636
Solid State Modules ...	620
Southern Surplus Merchants	632
South Midland Communications Ltd. ...	589, 590, 591
Spacemark Ltd. ...	626
S.S.B Products ...	632
Stephens-James Ltd. ...	584
S.W.M. Publications	
<i>inside back cover,</i>	<i>630, 632, 634, 636</i>
Thanet Electronics ...	628
Telecommunications International Agency Ltd. ...	624
Telford Communications... ..	585
T.M.P. Electronic Supplies	631
J. & A. Tweedy Ltd. ...	626
Waters & Stanton Electronics	588
Reg Ward & Co. Ltd. ...	635
Western Electronics Ltd. ...	582, 583
W. H. Westlake ...	633
Chas. H. Young, Ltd. ...	622

# SHORT WAVE MAGAZINE

(GB3SWM)

Vol. XXXII

JANUARY, 1975

No. 375

## CONTENTS

	Page
<b>Editorial</b> ... ..	595
<b>Communication and DX News</b> , by E. P. Essery, G3KFE ... ..	596
<b>Feeding a Dipole for Twenty</b> , by F. G. Rayer, G3OGR ... ..	601
<b>Pre-Amplifier for The Liner-2</b> , by C. J. Gill, G8EEM ... ..	603
<b>Mixer-VFO for VHF</b> , by P. J. Patrick, G3TWG ... ..	605
<b>"SWL"—Listener Feature</b> ... ..	609
<b>VHF Bands</b> , by A. H. Dormer, G3DAH ... ..	613
<b>The Month with The Clubs—From Reports</b> ... ..	616

**Managing Editor:** AUSTIN FORSYTH, O.B.E. (G6FO/G3SWM)

*Advertising:* Charles Forsyth

*Published at 55 Victoria Street, London, SW1H-0HF, on the last Friday of the month, dated the month following. Telephone: 01-222 5341 & 5342*

**Annual Subscription:** Home: £3.75, 12 issues, post paid  
Overseas: £3.75 (\$10.00 U.S.), post free surface mail

**Editorial Address:** Short Wave Magazine, BUCKINGHAM, MK18 1RQ, England

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

### AUTHORS' MSS

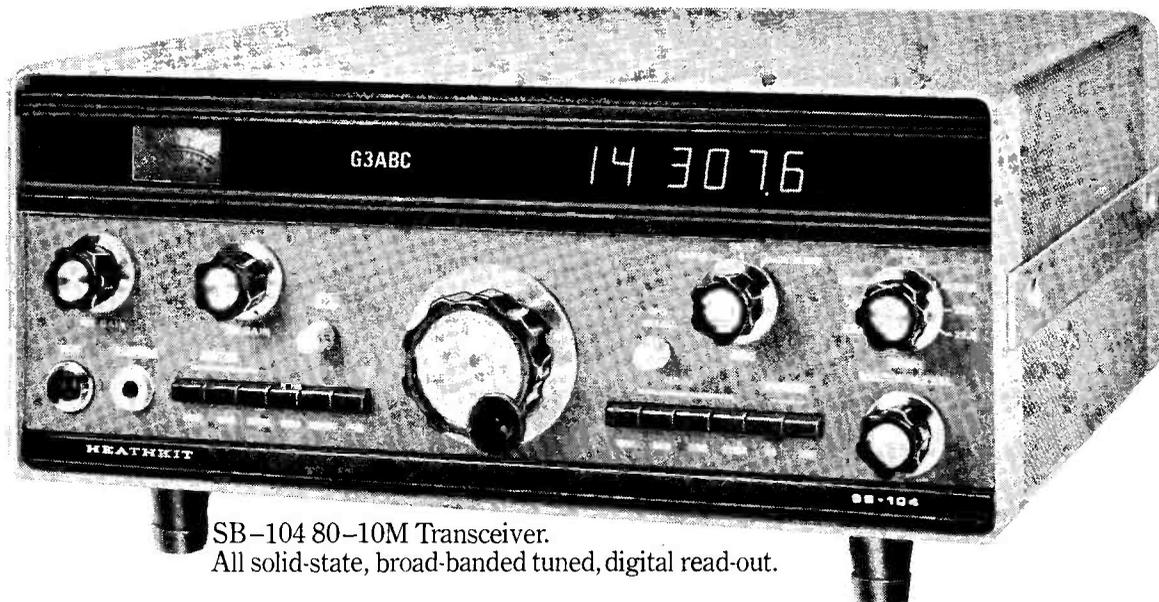
*Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets. Photographs should be lightly identified in pencil on the back with details on a separate sheet. All drawings and diagrams should also be shown separately, and 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.

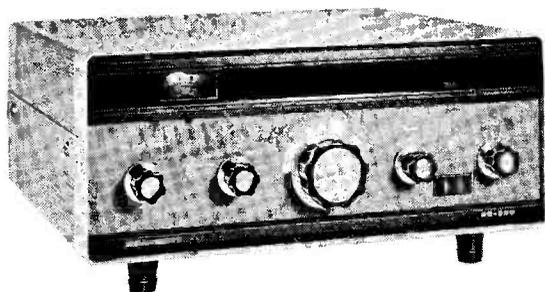
E. & O. E. VAT Reg. No. 239 4864 25

593

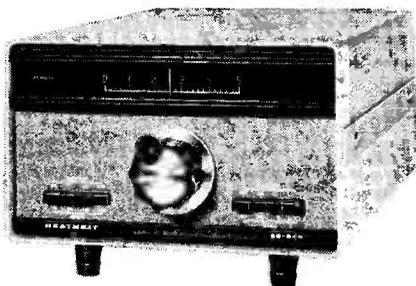
# Introducing the new Heathkit amateur range. The most advanced approach yet.



SB-104 80-10M Transceiver.  
All solid-state, broad-banded tuned, digital read-out.



SB-230 Conduction Cooled Triode 1kW Linear.



SB-644 Remote VFO.

The new Heathkit amateur range is the culmination of more than three years' development and research.

To give you the most advanced approach yet to amateur radio.

Featuring all solid-state design, digital read-out, very high standard of performance and real operating convenience.

The new Heathkit range is also totally broad-banded. So you can say goodbye to time consuming preselector, load and tune controls.

Post the coupon now for a free leaflet and technical specifications.

Heath (Gloucester) Limited, Bristol Road, Gloucester GL2 6EE. Tel: (0452) 29451.

To: Heath (Gloucester) Limited, Dept. SW15,  
Gloucester, GL2 6EE.

Please send me details of the new amateur range.

Name \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_

Remember easy terms are available  
with the Heathkit Monthly Budget Plan.

HEATH  
Schlumberger

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

E D I T O R I A L

***Prospect***

It is again the season for Sound Advice and Good Resolutions—and it hardly needs saying here that in our world of Amateur Radio much useful advice could be given and a long list of excellent resolutions could be catalogued.

It is widely held that nowadays radio amateurs use more commercial equipment than gear they design and build themselves. Certainly, whereas 30 years ago it was essential to home-construct much of one's apparatus, today there is no need to build anything at all—it can all be bought off the shelf, ready to go on the air. There is nothing wrong with this; indeed in many ways it is a very good thing that such an approach to Amateur Radio is possible.

But as always, amateurs will remain individualists who pursue a great hobby as the spirit moves them—they are not really much concerned about what others may be doing, thinking or building.

So instead of offering advice for the New Year to those who may glance over this page, we would simply say that we wish all our readers, all over the world, the best of luck, happiness and good fortune for the coming year, and success in whatever direction their amateur activities may lead them.

*And to all our readers and trade friends  
— at home and across the seas —  
Every Good Wish for the New Year*

*Austin Forsyth  
G6FO*

# COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

DECEMBER 9, we said would be the deadline for this piece; but various factors have conspired to require that copy had to be in before much of the correspondence could possibly be included—so it's somewhat a case of "bricks without straw" this time.

But maybe this is no bad thing once in a way, if it leaves space for reflection, and for the contemplation of the overall picture.

Equipment seems to keep much as it has been for some years, barring a trend for the amateur fraternity to look with a little less suspicion on solid-state and hybrid apparatus including integrated circuits. The popularity of the high-power American rigs of about 300 watts output is a bit hard to understand unless one is going to dispense with a linear, as the power gain to be obtained with the linear is so small—agreed one can reduce the drive in the transmitter but while this brings you down to the legal input, it also is a way of getting rid of some carrier and Sideband suppression—which is *not* so good.

The widespread use of the transceiver as the station rig, and its lack of facilities for adequate CW reception, have made the advent of clip-on accessories for better CW reception—the MFJ active audio filter, for example—into a Godsend for the operator who wants to go on taking CW but is not one of the lucky few who possess "crystal-filter ears." On the SSB side, there have been many who have realised the advantage of some speech processing, both in the business of getting increased "talk-power" and in the (probably even more important) matter of keeping the outgoing signal down to a pretty civilised bandwidth. One cannot but *hope* that no-one will be so misguided as to use any clipping on a SSB rig other than by RF means—apart from generating enough crud to make his own signal less readable, he is almost certain to be adding some splatter on adjacent channels.

Aerials: Every DX chaser realises how important it is to do one's best in this respect but it still does not appear to have been thought particularly important when looked at from the point of view of the planning-permission business. Surely it is about time for this problem to be at least rationalised. The planning authority attitude seems nowadays to be roughly this: "In general, to throw out any planning applications on Amateur Radio aerials; and where one cannot scratch up enough of a case for refusing permission, then ensure that the restrictions on the structure are such as to make it useless for its intended purpose. Meantime, let us turn a blind eye to all those telly aerials that are put up without permission, lest we planners have to apply for our own illegal telly-aerials to be permitted—after all, telly is *fashionable*, unlike that *dreadful* Amateur Radio which causes people to *think* sometimes." Rather, the attitude of planning officials at national and local level ought to be to grant permission for radio amateur masts, towers, and aerials *automatically* (subject only to very special cases, where the onus shall be to show a good cause for refusal, rather than requiring the applicant to show reasons for wanting such an aerial), up to a height of, say, fifty feet.

What we also need is to have the sunspot cycle advanced a couple of years! And on that note let us take our monthly look around the bands and the people who use them.

G4DMN (Shrewsbury School) is a refugee from Justin Cooper and his piece; another way of saying that he is a chap who has spent his apprenticeship with the receiver before getting his call, so he knows the way of things. Richard has a KW-2000B at Shrewsbury, used mainly to work Eighty and to keep his sked with father, G4DHC. However, to date the DX has refused to come back to any significant degree from the JA location at Shrewsbury although some success has been had from Parkgate, Wirral, using the G4DHC equipment. It sounds like a sad story of aerials that won't play—but before G4DMN can apply himself to the problem in great detail, there is a small matter of some examinations to be passed . . .

Those lucky(?) souls among you who had the good fortune to work "JA2GX" should note that he has been operating from France and not Monaco. He was closed down at 1800 on October 26 by the French authorities, who confiscated the logs; ITU have, we are told, passed the news of this little escapade to ARRL. Doubtless many a score will take a step downwards by one.

You may recall the Nauru DX-pedition earlier in the year, by JA1OCA operating as G21DX; his QSL card turns out to be rather nice with pictures of the island, the expedition and a map, some notes on what it was all about, and the QSL data itself, all so arranged that the card would go into a normal envelope and so would not be damaged in transit.

Did anyone work LAISH/BY?? There seems to be a lot of circumstantial evidence being quoted on this one, but as of this moment nothing solid enough to make this old scribe feel sure of his status—which may yet turn out to be good.

ZL2AFZ is a fairly well-known call on the bands, and at one time used to be on Chatham Is.; we now hear he had a motor-car argument with a power-line pole which modified both pole and car somewhat and needed the fire brigade to extricate ZL2AFZ. Luckily, his XYL who was with him was not so badly knocked up. Good wishes for his health and recovery could well be routed to his home QTH, all-same *Call Book*.

If you worked ON4AXA/MM you hooked up with a group on a raft drifting from Morocco across the Atlantic toward Trinidad in the equatorial current—they should, if all goes well, have reached the end of their journey round about the time this piece makes the bookstalls.

Reverting to pirates, did you hear about the "SV1ZZ" type just recently—seems he changed to VP2JR when the going got a bit rough—and all the beam headings seem to indicate this "Fred Phoney" lived in the Caribbean.

No wonder the band conditions are getting pretty abysmal; Zurich gave the following sunspot data: January 1975 looks like being 22.

Round about when this piece comes to be read, is about the time, we hear, that V55MC will be opening up from Spratly Is., it having been agreed that any of the nearby reefs will be good enough to count for this one; so keep your ears peeled.

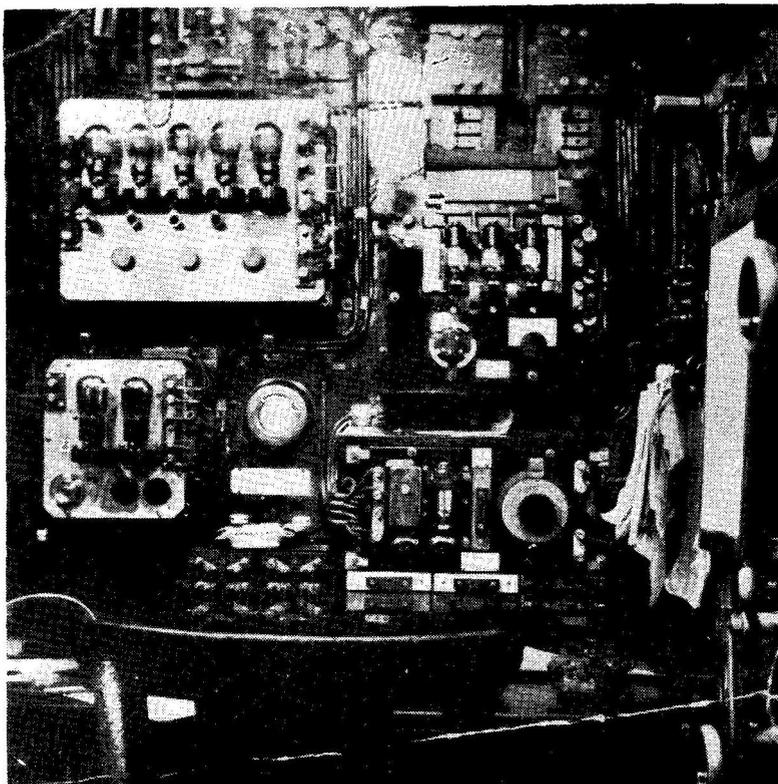
If you lack a contact with Volta, drop a line, with an s.a.e. to WIAM; his son is XT2AA but hates pile-ups. WIAM will tee things up for a sked with XT2AA, and also handle the QSL chore.

Quite a few people have expressed some doubt about the 9H1 calls heard on Top Band. It is now understood that the 9H1 lads are once again licensed for Top Band, as and from the end of September 1974. However, the fact that this re-opening of 160 metres to the



Brian Rix, G2DQU/M, was at Leicester on the Doram stand for the recent ARRA exhibition. In the car, he runs a Yaesu FT-42 covering the 10-80m. bands, operating mainly mobile on his way to and from the theatre.

And what, you may ask, does this somewhat prehistoric - looking picture represent? Actually, it is of considerable interest, being the radio room ("wireless office", as it would then have been termed) of H.M. Submarine "Perseus", in service on the China Station round about 1932. The point is that out there the ship could receive, while submerged to 30 feet, good signals from Rugby Radio transmitting on the 16 kHz frequency, 18750 metres, the GBR Tx putting about 700 amps RF into the aerial system, still to be seen today on its 800ft. masts. The picture was sent in by SWL A. E. Glass, 152 Churchway, Plymouth, wireless operator of "Perseus" at the time.



9HI's was not publicised seems to have resulted in them calling for hours and getting no reply. However, let us hope business picks up for them—old 'KFE could do with a 9HI QSO on Top Band.

#### Correspondence

GD4BEG (Sulby) has a long letter with much interest. Mike has just done a complete rebuild and is now operational with a home brew CW/SSB/AM/FM rig for Top Band; his aerial is an interesting arrangement and seems very effective. Basically things start from a third-floor window, rise to chimney-pot level vertically and reach about 55 feet, and then run 100 feet out to an opportune tree. From there it falls vertically to the fifteen-foot level from fifty-five feet, and returns at fifteen feet above ground to be bent upwards and back to the shack window. Normally, since there is no earth worth calling one available, the upper leg is connected through a parallel-fed ATU, putting the high-current section into the vertical at the end of the garden. This seems to get out well to DX. However, when high-angle radiation around U.K. is required, the thing can be energised as a loop, fed through a toroidal transformer as a matching device. As far as DX QSO's go, we notice such as VK6HD worked, lots of North Americans, 9HI, ODSIQ (who broke in to a contact with PAQHIP), DJ2VK at 1448(D), 4X4NJ around tea-time and ST2AY, who was finally raised after calling for two hours. On a different tack, Mike says he doesn't think European or inter-U.K. contacts could be counted as DX in any way! Of course, this all comes back to the question of what one's personal definition of DX is. Clearly, for GD4BEG on Top Band, the world is his oyster. But for many chaps who for good enough reasons cannot radiate a beefy signal, a 160m. QSO with GM is DX in the highest sense of the word. Anyway, the definition of DX attraction in terms of sheer distance probably was dead as early as 1930 as by then there had been the first all-continents net QSO. DX is what you personally make of it, and our ladder is aimed entirely at enabling the "tiddlers" to enjoy themselves competitively with the Big Ones.

As far as G3KFE is concerned, one of the most interesting exercises to do with Top Band has involved the attempt to alter an old TW "Communicator" from positive-earth operation to work on a car with negative earth. Switching round the two polarities proved to be pretty simple, and the transmitter side goes as well as ever, but

the receiver AF module seems determined to motor-boat just as soon as its input lead from the volume control is given a DC path back to earth—and no amount of decoupling, bad language, or even gentle rebukes, will persuade it to play fair!

G2BJY (Walsall) and your scribe have for long been correspondents, and occasionally we think of matters radio. For one thing, the interesting quirks thrown up by the revised counties, as for example G8IB is now in Oxford, not Berkshire. Geoff's score in the Top Band ladder is a demonstration of what someone with a small, hemmed-in QTH and no ways of stretching an aerial beyond can achieve, given some application of thought to the problem. However, he would still like to know how the big ones brew up their signals; perhaps the GD4BEG letter just quoted will inspire others to explain just how they do it, "it" being different in almost every case, due to the length of wire involved in creating a dipole for the band. On an entirely different subject, we have been debating the relationship between the old 10-watt AM signal and the maximum power allowed to an SSB station. G2BJY argues, and rightly, that an AM transmitter couldn't be linear up to 100% modulation, so the power comparison in the rules is to that extent fallacious, favouring the SSB chap even more than the theory would predict. However, this argument sent G3KFE back to his books, and he finds that 100% linear modulation in the AM mode can be obtained, to better than 1% accuracy. The magic circuit that did the trick is the so-called "triple-triode modulator" originally devised by Murray Crosby to go with his first product detector which made such an impact on the amateur scene. He claimed that a distortion, in AM, of less than 1% over the system transmitter to receiver, was attainable; and your scribe tried it, wound it up to 100 per cent and looked at the output on a spectrum analyser as a double check. But the old plate-and-screen modulator of our amateur rigs of yore would rarely better 70% modulation without beginning to go non-linear and spreading. An odd point is that the triple-triode device can be used as a transformerless balanced modulator too, suitably adjusted!

G3LIQ (Hull) reckons November to have been the best month for Top Band for a very long time. For him, November 9 was the start, when G3LIQ worked 4S7GV, who said he had also heard EI8H but the latter had failed to respond to his calls. If you want to try for a 4S7 contact, Glen is on during 2330-0030z daily. Going on a bit,

November 13 was *the* day, when the band opened at 2307z, and nine W's, VEIMX, VEICD and VP8NP were worked. On the Sunday mornings of November 17 and 24, many stations were heard, but the skip appeared to be one-way, favouring the W's; however, looking eastwards one could find and work ST2AY, 4X4NJ, OD5IQ and ZB2E.

The QRP signal from G4AYS (Moir), all 600 milliwatts of it, has now managed to penetrate as far as GM, GW and GI, not to mention a call from OK1MMW who gave him a 449 report. All credit to the OK station, who was doing what good operators do, in *listening* for the weak ones and working them; but to say that in no wise detracts from the fact that G4AYS with his tiny power and rockbound on 1844-79 kHz can get all round Europe with no real effort.

G5BIU (St. Mary's, Scillies) makes a start by pointing out that his last mention turned him into G5IU; it seems to have occurred somewhere along the line and not been spotted—but, luckily, a look in the 1975 U.K. *Call Book* says there isn't a G5IU in use now. David is at 35 countries worked on Twenty with the little two-watt—nearly up to DXCC, as G5BIU optimistically puts it. Another activity there has been Top Band, with a few QSO's recorded, so at last the island is represented again on the band. On the darker side, David's FT-101 hasn't arrived yet, and so he is on the lookout for an FT-75 or similar; any offers can be passed to the writer who will forward them immediately, if G5BIU also sends in a quick card with his Scillies address, so we know where to send 'em! (A wonderful thing the G3KFE shack filing system; it quite happily keeps receipts and tax demands and suchlike junk for years, but give it an important QTH and an address-book to record it in—and it promptly loses it!).

Still with G5BIU, it seems he, G3UUZ ("Andy the Light") and G3RPC are planning to put on a special station to commemorate the

100th anniversary of the sinking of the steamship *Schiller* near Bishop Rock—there will be one station on Bishop Rock, and another in St. Mary's.

G3NOF (Yeovil) writes to say that he has been off the air since the back-end of October due to illness, which accounts for his absence from this column. Your scribe must say that Don's regular and analytical reports on the bands each month have been a mainstay ever since he took on this piece in July 1966—so it is now over 100 times that G3KFE has been stirring up the DX mud!

Having got his 18AVT down to his /A QTH at Bristol, G4CXM/A found it didn't seem to do at all well there, so it had to come down again. The very low dipole, the alternative to the vertical, seems to be a bit like the curate's egg in its performance, with its good days and its "off" ones. Although most of the contacts were on CW on 14 MHz, the only one of interest was with W4VNE, who was, surprisingly enough for a W, using the good old long wire for an aerial. SSB was rather more fruitful, and produced reports from ZS6APO, ZELCQ, VK3UB, DJ6QT/CT3, H18XKP, UW6FZ, IA5TEZ, EA6BG, 9H4H, VE7JK, 9J2BO, ZD3G, ZL1AMO and VP2VBK. This brings the countries total up to 130, albeit the first 100 were knocked off in four months from starting to compile the scores.

A new correspondent is G4BOH (Bury) who puts in a Table entry showing all modes AM/CW/SSB. Chris started with a KW Vanguard, but after reading our test report on the HX-50 back in October 1964 he decided to "take the plunge" and, like the rest of us, went through the period of surprise at the remarkable difference in one's "service area" on Phone, particularly after dark. On the receiving side there is the old CR-100—the Mighty Marconi, not the Junky Japanese—which has been somewhat operated-on, plus a 140-foot wire at 30 feet. Like the majority of those who have commented, G4BOH reckons the Top Band table to be a good thing to increase the activity on the band. The Top Band Table will reappear next month.

G2NJ (Peterborough) often finds little snippets of interest, and this time his labour-of-love in connection with the Antique Wireless Preservation Society turned up some interesting facts. Back in 1930, G5UM reported the results of some tests between him and G2ZN, the latter maintaining the QSO with an input as low as *five milliwatts*, the distance being from Walthamstow (G2ZN) to Muswell Hill (G5UM). Of course, both these operators are still very much with us today, G5UM being well-known for his VHF activity of recent years, and G2ZN that was is now G2HR, Eric Johnson, very well known in the Club world, particularly with Silverthorn. G5UM, when Nick wrote to him about this, also mentioned the early Transatlantic Tests (which of course still run today, and still with WIBB spark-plugging things on the other side), adding that it was all done with far simpler gear than is used today; first across on 1.7 MHz was G6FO, then at Newport, in 1931, followed by G5WU of Penarth, and later G6GM from North Devon who, with wet batteries and a wind-charger, used to get over every winter. G3KFE recalls that well after the War, G6GM was still running with his batteries-and-charger set-up from Holsworthy, miles away from any power lines, using an old HRO modified to work off fifty volts DC, with which set-up he was certainly the first G, and possibly the first ever, to make all continents on Top Band. This first WAC would have been somewhere around the early fifties, if memory serves. And, to cap it all in the cause of a bit of nostalgia, it was a G5UM Top-Band transmitter/modulator which was the first box-of-tricks G3KFE tried to build; a thing called the "No-Cost Five" of September 1947's issue of *SHORT WAVE MAGAZINE*.

Our last letter in the clip comes from G3ZYY, aboard H.M.S. *Argonaut*, writing to say he is still in existence though temporarily inactive. Recently they have been up the north coast of Norway, and some listening was done on Top Band. Innumerable stations were heard whilst around the Shetland area, the strengths falling away as they got further North. A listening watch from 0030-0130z on November 10, the location being about 72°N. 25°E., some 1300 miles from London. Hi-Fix on 1.9 MHz was S5, DHJ 579. The amateurs heard were GM30LK, 589; G3YUV, 589; GM4ACG, 579; G3RXH, OK1KPU, OK3YDO, PA0HIP, all 569; G3LIQ, G3UBR, GM3YOR, OK1ATP, OK1MCW and OK2PAW, all 559; G6BQ, G3YRZ and G4CXP, all 449; and G3BFP, 339. It is of interest that about half-way through the period a quick check on Eighty produced no signals whatever. Also heard down the bottom end of Top Band on Sunday evenings at 1045z, was VS6DO, looking for European QSO's. Equipment, the ship's B.40 into an untuned 30ft. whip aerial. Trev reckons to be back at home for the latter-end of December and the January DX season, and then goes back to sea again.

Here and There

Once again, old Samuel's Morse code has been found useful in



Picture of the Bishop's Rock Light, about 27 miles south-west of Land's End, at low tide—of particular interest in our context because it is now the QTH of G3UUZ, "Andy the Light", a principal keeper in the Trinity House service. Duty is one month "on" the Light then one month "off" at St. Mary's, Scillies. His Ae. is a 60ft. vertical wire, down the side of the Lighthouse, with the lower lightning conductor as the earth.

Group seen in the "Granby Arms", the bar at the Leicester ARRA Exhibition—left to right: G3XKB, G3XDU, G8IWV, G8CDV, G3YQT, G3FWA and G4BYX. This picture was taken on the Friday of the Show, November 1st.



the modern age. Using the ATS-3 geostationary satellite, and an aerial comprising a two-turn helical mounted on a golfer's broly, an American GE engineer with a five-watt transceiver showed how he could communicate, by sending his message in Morse, *via* the satellite, to the GE Radio-Optical Observatory near Schenectady. Having received the message, the observatory went over to voice to reply, also over the satellite. *Just* like Oscar! However, in this case there was an interest in demonstrating that the satellite could be used, with QRP gear to make a practical search-and-rescue system, where the downed aircraft or whatever would receive a reply by voice, telling them the signal was received and also giving rescuers information on where to look. It seems the basic idea could be implemented on a world-wide basis—saving the polar regions—by six geostationary satellites mainly occupied in handling other traffic. It would give the rescuers a very accurate fix on the location of the casualty. It is interesting to note that the demonstration was done at a time when a very strong signal was known to be going through the satellite, and no mutual interference resulted.

A rather more sombre note is presented for consideration when we read that *RCA* are pulling out of microwave transistors and *Motorola* are laying off people all over the world as markets slump in the elec-

tronics field. This process, if it continues, could well see us back into the era of "home-brew or no rig at all" as far as Amateur Radio goes. Most companies in the market are running at very low profit margins or even at a loss, carrying the Amateur Radio side on the back of the more profitable commercial business. and already we have seen how many of the "traditional" American suppliers to our market have given up in face of Japanese competition. If the Japs are likewise forced into giving up, then we will be in for a thin time, and in any case it seems inevitable that prices for our sort of tackle will rise rapidly in the next few years. Who knows, we may yet see AM operation return in force to our bands—and much more home-construction of the simpler CW transmitters.

#### Finale

That's it for another month anything that came in too late to be included will be picked up next month, along with its own offerings, the deadline for which will be January 14, 1975, addressed "CDXN," *SHORT WAVE MAGAZINE, BUCKINGHAM, M18 1RQ*. Meanwhile, your scribe would like to thank those who have supported this piece through the year, and those who have read it—also those who sent their personal greetings either by letter or card for which, many thanks. 73, and *CU* next month. *HNY!*

### SOME CLUB HISTORY

Looking over early records, we find that in 1928 the Clubs then listed with their own call signs were as follows:

- G2CP: Wolverhampton & District Radio Transmitters' Society (no *QTH* given).
- G2OT/G2OU: Ilford & District Radio Society c/o H. O. Crisp, 2 Ramsey Road, London, E.7.
- G2MV: Malvern College Radio Society, Malvern, Worcs.
- G2IY: Hampstead & St. Pancras Radio Society (no *QTH* given).
- G2TU: Radio Transmitter's Union of Northern Ireland (no *QTH* given).
- G2FZ: Radio Experimental Society of Manchester (no *QTH* given).
- G2SN: Sunderland & District Wireless & Scientific Association (no *QTH* given).
- G5FT: Felstead School Wireless Society, Felstead, Essex.
- G5DP: Whitgift School Scientific Society, North End, Croydon, Surrey.
- G5FZ: Lincoln Wireless Society, Technical School, Monk's Road, Lincoln.
- G5LL: Manchester Radio Society, 155 Oxford Road, Manchester—also G6MX at 66 Oxford Road, M'cr.

- G5TK: Torbay & District Wireless Society (no *QTH* given).
- G5TT: Tottenham Wireless Society, 42 Drayton Road, Tottenham, London.
- G5UN: Birmingham University.
- G6AJ: Barnsley & District Wireless Association (no *QTH* given).
- G6JB: Wimbledon Radio Society, 11 Montana Road, Wimbledon, London, S.W.19.
- G6NC: Stoke-on-Trent Wireless & Experimental Society, 19 Jervis Street, Heron Cross, S-o-T.
- G6UM: Leeds Radio Society, Woodhouse Lane, Leeds.
- G6YA: Bradford-on-Avon District Radio Society (no *QTH* given).
- G6YM: Belfast YMCA Radio Club, Wellington Place, Belfast, Northern Ireland.

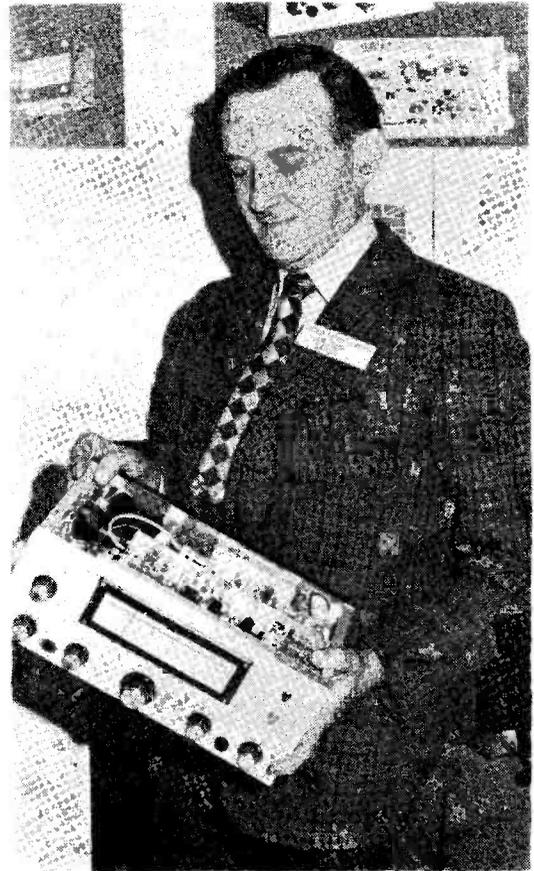
The foregoing information, such as it is, has been extracted from our (vintage) copy of the *Radio Amateur Call Book* for 1928—which in those days was priced at 85 cents, about four shillings. The paucity of fact underlines the importance of today's Radio Clubs and Societies organising themselves to keep accurate records and minutes, handed on from secretary to secretary. We would hazard a guess that only about three of the afore-mentioned Clubs still existing in the areas they cover are today aware that they had "a previous existence" nearly 50 years ago. A source of information could be file copies of the local newspapers of the time, or the records of the public library.



The Telford Communications stand at the ARRA exhibition at Leicester. The principal of the firm is J. C. Oliver, G8ARS, and much of the equipment they offer is to his design.



One of the smaller but most successful stands at the ARRA Exhibition was that of Datong Electronics, showing what is becoming their well-known RF speech clipper. On left, G8ENO, with G8ENN, principal of the firm. The performance of the Clipper was convincingly demonstrated on the oscilloscope.



Above: G8ARS of Telford Communications, Bridgforth, was at the ARRA show at Leicester with his new Model TC-10 solid-state multi-mode transmitter, as advertised in the "Magazine". At left: One of the interesting small stands at the Exhibition, Tilcock of Caterham, Surrey, specialising in a wide range of small tools. "Dan the Tools" is also G8DWM on the air.



## FEEDING A DIPOLE FOR TWENTY

POSSIBLE CONFIGURATIONS,  
AND THE SWR FACTOR

F. G. RAYER, T.Eng. (CEI)  
A.I.E.R.E. (G3OGR)

**T**HOUGH the points considered here relate particularly to aerials for the 14 MHz band, they do of course likewise apply to the other amateur frequencies. Some of them also bear on the use of such aerials for reception, as well as transmission.

A correctly arranged dipole of this type can always be expected to give a good account of itself. It is in fact a popular aerial for use with a transmitter or transceiver, and is worth having on the grounds that it is sure to prove to be convenient and successful.

### The Dipole

The original type in view is shown in Fig. 1, though this can be subject to some variations. The top, or radiating section, is a half-wave long at the operating frequency. As a result, the distribution of voltage and current gives a centre impedance of around 75 ohms, so the aerial can be cut here and a 75-ohm coax feeder can be attached.

The top length is that from one loop to the other, as shown. This length is important and will need to be accurately measured. For best results, it is placed high and clear of obstructions.

The feeder length itself is not important, and need not be known. This length usually depends on the location of aerial with respect to the equipment. The feeder may run along the house wall, or be situated as convenient. To avoid unnecessary parallel feeder currents, it is best that the feeder run away from the aerial at right angles for some distance. Parallel feeder currents are not very likely to cause trouble unless the feeder is inductively coupled at the transmitter end and the feeder length plus one-half the top corresponds to a half-wave or multiple of half-waves at the working frequency. Thus suitable feeder lengths in these circumstances lie from about 22ft to 42ft., or 54ft. to 77ft.

The co-axial feeder can be plugged directly into the transmitter (or receiver), or into a 75-ohm low-pass filter, or into some form of SWR indicator, in turn connected to the transmitter by any convenient length of similar feeder.

### Materials

A dipole centre-piece or "T" (as obtainable from aerial equipment suppliers) is preferable for the middle. Two ribbed or egg insulators are also necessary, and stout polythene line is ideal for supporting purposes.

Hard drawn 14g. enamelled single strand wire is probably best for the top, 16g. also being suitable. Stranded and covered wires such as 7/26 can be used but appear to deteriorate. Low loss normal or heavy-duty co-axial cable can be used, the latter only being justified when the power makes it necessary. Lightweight feeders are suitable for receivers or low power.

### Making Up

An open space which will allow the top to be stretched out for measuring is helpful. At the centre, scrape about 2in. clear of insulation, thread the wire through the centre-piece arms, and twist the ends. Remove the outer insulation from about 3in. of the feeder cable, unpick the outer brading, and cut the inner insulation off for about 1in. Twist the braid wires into a pigtail, and solder to one section of the aerial, similarly soldering the inner conductor to the other section. Solder also the twisted ends of the wires. A reasonably large iron is most suitable. Clamp or bind the cable to the centre piece, according to the means provided, to take strain off the connections. Alternatively, use screwed cable connector sleeves, liberally coated with *Bostik*, to make the outside connections.

The co-axial cable must be sealed so that moisture cannot enter. This can be done with "Sealastik" (*Expandite*) or similar compounds, with a wrapping of vinyl tape over the whole, cracks again being filled with compound.

The aerial can then be strained between two pegs or other fastenings, and the measurements checked. The length of each top section should be identical, and the overall top length correct. Allow a little extra (say 2 to 3in.) each end, to pass through the insulator and twist. All twists or joins should be soldered.

### Top Length

This is calculated from 468/MHz. So 33ft. will have a "centre resonance frequency" of about 14.18 MHz.

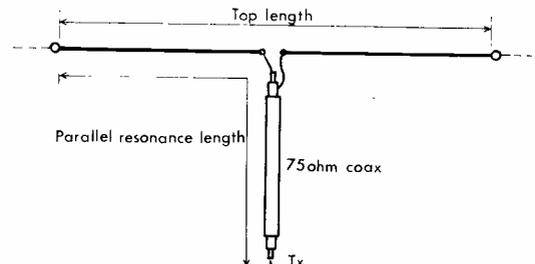


Fig.1 Dimension of coax fed dipole

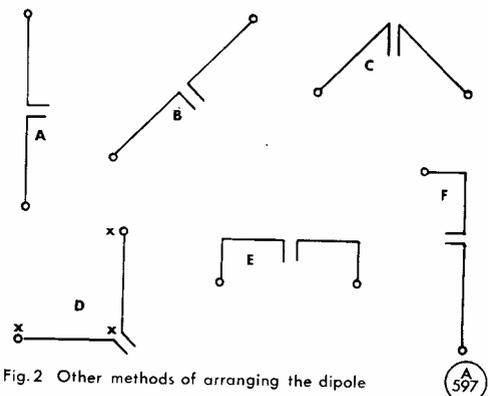


Fig.2 Other methods of arranging the dipole

*Dipole configurations as discussed in the text*

Should we need to modify this, the change in length will be about 3in. (1½in. each end) per 100 kHz. Thus about 33ft. 4½in. brings the frequency down to the CW end of the band.

However, local effects such as the height above ground and other factors slightly modify the resonance frequency, so initially a little adjustment by trial and error may be necessary.

Assuming the SWR can be checked, ideally this will be 1 : 1 at the design frequency, rising a little LF and HF of this. Tests can be made at 14, 14.1, 14.2 and 14.3 MHz. Should the lowest SWR be at 14 MHz, it is evident that the aerial is a little too long, and this can be corrected by pruning equal pieces off each end. On the other hand, if the SWR is lowest at the HF end of the band, the aerial is a little short.

As the aim is normally to operate the aerial directly from the transmitter (*via* the SWR indicator and filter if present) the SWR needs to be low—preferably under 1.5 : 1 throughout the range of frequencies to be used. Once this has been arranged, it is merely a matter of adjusting the PA tuning and loading controls for the usual input.

If no SWR indicator is available, then the need to prune the aerial may be shown by the transmitter loading normally at the LF end of the band, but not towards the HF end. If the reverse is the case, the aerial is too short. It may be necessary to exercise some care, as with some equipment components in the PA stage may be damaged if the SWR is too high.

#### Other Positions

The aerial in Fig. 1 requires two supports, such as two poles, or house and pole. Basically, the same type of aerial can be put up in other positions, some of which are shown in Fig. 2. For the aerial to be vertical at these frequencies, or nearly so, as at "A," a rather high support is required, or a cord between chimney and a support, to bring the aerial away from the house. "B" is much easier, requiring one moderately high support. "C" can be used with a single pole which supports the apex, the wires descending equally to low anchor points. "D" is horizontal, having three supports X at equal heights. "E" is similar to Fig. 1, but requires a smaller span, equal amounts each end dropping down. "F" resembles "A," but part of the top is turned horizontal to require less height.

With some of these systems the feed impedance is lowered, and a 1 : 1 SWR will not be achieved at any point on the band. Despite this they can give good results. Yet another arrangement is one having one quarter-wave section vertical, and the other horizontal and near the ground, resembling a quarter-wave vertical with one similar "radial."

#### Aerial SWR and Length Checking

With the aerial in use for transmission, this is probably the first aspect to be investigated. Bearing in mind that it is easier to cut pieces off than lengthen the aerial, a 33ft. 6in. dipole was put up at about 25ft. and the SWR checked. It was 1.1 : 1 at 14 MHz, varying to 1.5 : 1 at 14.3 MHz.

It is evident that the best SWR was probably LF

of 14 MHz, and as a shift to about 14.2 MHz would be satisfactory, 3in. were cut from each end, to move resonance about 200 kHz HF. After this, the SWR was checked again, and was found to be under 1.2 : 1 through the band.

With this length positioned at 45° ("B" Fig. 2) and the bottom end 5ft. above ground level, the SWR was slightly worse, with its highest at 1.3 : 1 at the HF end of the band. With this length operated at "C," using a single 30ft. high pole, the SWR was under 1.6 : 1 through the band. An SWR around 1.5 : 1 is quite acceptable.

#### Dipole Results

It is difficult to be too definite about results, as naturally one day may be good as regards conditions and the next not. Using a dipole as at "B," and 300 watts p.e.p., *best* reports have been 5/3 from ZL1 and 5/7 from VK3, reception of these being about 5/5. Aerial "C" proved to be similar, with *best* results 4/5 from VS9 and 5/8 from WA8, and 5/8 for reception. These seem fairly typical of a dipole in the clear. Using reception equipment such as an Eddystone 730/4 or K.W. Atlanta, the dipole seldom moves the meter beyond S4 or S5 for the most distant stations, though when in the clear signals can be copied down to levels barely moving the S-meter. When conditions are good the stronger signals coming through give S7 to S9 readings at a maximum of about 6-8,000 miles. Europeans are often S9+.

In general, it is apparent that it is quite possible to work DX with a dipole, but naturally it cannot compete with a beam or other more elaborate aerial giving higher gain.

#### Directivity Factor

This is not sharp, but is minimum in line with the wire, and at a maximum at right angles to the wire. A vertical aerial as at "A" is thus assumed to give good low-angle radiation (rather like a ground-plane). With aerial "B" it is in theory possible to angle the aerial to give maximum radiation in a wanted direction. In the present case it cannot be said, from personal experience, that this effect has been to any significant degree.

#### Reception Side

A dipole is a good general aerial for the intended band (and for *odd* harmonics, where this applies). If the feeder is not too long, reasonable reception is possible over a wide range of frequencies, but on lower frequency bands will become several S-points down on an aerial intended for these bands. So the dipole is really intended for one amateur band, though doing as a substitute with falling efficiency on other bands.

The dipole will be found to give much less trouble from some forms of interference than does an end-connected wire. This can be very noticeable if a change-over switch is available and when signal strength is adequate it is quite practicable to use a 20m. dipole for reception on 80m., or even Top Band, to take advantage of this.

# PRE-AMPLIFIER FOR THE LINER-2

TO IMPROVE RECEIVER SENSITIVITY, WITH INPUT GAIN CONTROL

C. J. GILL (G8EEM)

HAVING used the Liner-2 for some time it was decided to fit a pre-amplifier to improve the sensitivity on the "receive" side. Talking to other users of the Liner-2, it was the general opinion that although the sensitivity was improved problems with cross-modulation were introduced. It was therefore decided to construct a pre-amplifier with some form of gain control. This would enable the gain to be reduced when strong signals were causing cross-modulation. If the circuit was such that the gain could be reduced to less than unity the resulting attenuation would be of great value when receiving very local strong signals.

Two further conditions had to be met: These were (1) the circuit had to be simple and (2) the minimum of alteration carried out on the Liner-2. With these conditions in mind the circuit shown in Fig. 1 was constructed and the results obtained are shown in the Table.

TABLE

S-Meter	Without Pre-amp.	With Pre-amp.	
		(high gain)	(low gain)
S2	3.8 $\mu$ V	5.8 $\mu$ V	1.3 $\mu$ V
S5	7.5 $\mu$ V	11.0 $\mu$ V	2.8 $\mu$ V
S7	25.0 $\mu$ V	37.0 $\mu$ V	8.2 $\mu$ V
S9	120.0 $\mu$ V	200.0 $\mu$ V	44.0 $\mu$ V

These readings resulted by setting the S-meter to a given

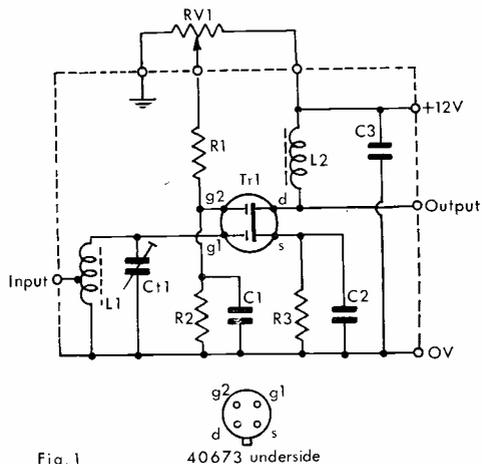


Fig. 1

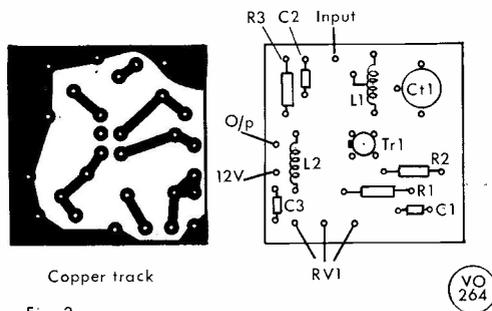


Fig. 2

Fig. 1, Fig. 2. Circuit and construction of the Liner-2 Preamp. Values can be: C1, C2, C3, .001  $\mu$ F; C1, 6-25  $\mu$ F; R1, R2, 180K; R3, 330 ohms; RV1, gain control, 10K; Tr1, 40673/3N140; L1, 8 turns 30g. on 270K 1/4th-watt resistor body, tapped at 4th turn; L2, 50 turns on 100K resistor body; P.C.B., 30 x 30 mm. fibre-glass.

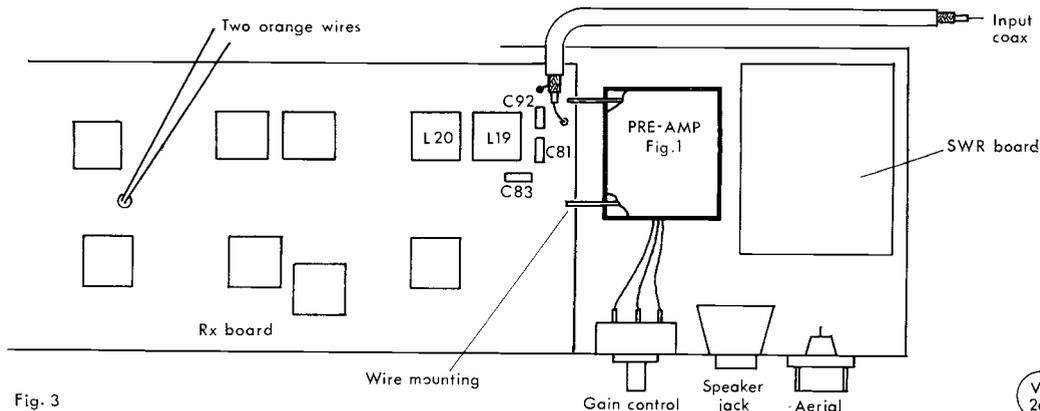


Fig. 3

Fig. 3. The Pre-amplifier incorporated into the Liner-2. For some further details see text. The gain control enables input level to be reduced in the presence of strong signals.

value and taking the input from an accurately calibrated RF generator.

### Construction

The pre-amplifier was constructed on a small single-sided printed circuit board and the layout is given in Fig. 2. The PCB was mounted by soldering two pieces of 14g. wire along each side of the board and then to the earth plane on the Liner-2 printed circuit board. The gain control was mounted next to the external speaker jack socket. This hole was the only physical alteration to the Liner-2. The placing of the gain control is dependent on the size of component to be used. The positioning of the pre-amplifier board and the gain control are shown in Fig. 3. The input pin on the "receive" board is fed with coax, which is removed and reconnected to the input pin on the pre-amplifier board.

### SOME HISTORICAL CORRECTIONS

According to R. N. Vyvyan's book *Marconi and Wireless*, recently republished, the first radiophone contact with Australasia was made by Marconi himself on May 30, 1924, on 92 metres, from the Company's Poldhu station, running 17 kW, reception being "of good strength" in Sydney, Australia. This, of course, pre-dates the 2SZ-4AA amateur CW contact between London and Otago, New Zealand (for which the power was a matter of watts only), the wavelength being about the same.

The point is that Marconi, whose experimental work was of necessity conducted in strict secrecy, was himself becoming aware of the practical possibility of long-distance communication using short waves—and it was on results such as this, and with Canada and the U.S.A., that the U.K. beam system was developed for inter-Continental working by radio. And by October 1924 Marconi was finding that good and reliable contact was possible on wavelengths as low as 32 metres using much less power than Poldhu's original 17 kW, with distant places such as Montreal, New York, Rio de Janeiro, Buenos Aires and Sydney.

While the 2SZ-4AA amateur result in October 1924 is no way diminished by these facts (it was, in any case, a "first" with New Zealand) it shows how cautious one must be about some of the early-day claims that have been made.

Incidentally, Cecil Goyder's personal callsign was 2HM or, as it would have been written in those days, EG2HM, that of Mill Hill School Radio Society being EG2SZ. That callsign configuration was adopted before the international prefix system was established, and for amateur operation letters to indicate continent-and-country of origin were used—such as "EG" for Europe, Great Britain; "OA" for Oceania, Australia; "SA" for South America, Argentine; "NC" for North America, Canada, and so on.

Sources: *Marconi and Wireless*, R. N. Vyvyan<sup>1</sup> (1933), re-issue by E. P. Publishing, Ltd., Wakefield, Yorkshire. *Radio Amateur Call Books*, 1927-'28.

The output from the preamplifier is taken to the input pin on the "receive" board. The positive pin on the pre-amplifier is fed from the pin which has two orange wires on it at the far end of the "receive" board—thus the pre-amplifier is switched off on receive.

The only adjustment to be made is to the input tuned circuit. This is best done with the aid of a signal generator, although the prototype was set up without one. With the gain set at maximum and a strong signal being received adjustment was made. Final trimming was carried out by setting the receiver on the beacon frequency GB3VHF.

The transceiver has been used on a variety of antennae ranging from a helical whip to a 13-element Yagi and the results have been good, no problems being encountered. There is no reason why this preamplifier should not be used with any receiver requiring extra gain.

On another historical note, it is widely believed that Britain held the lead in radar development and went into Hitler's War with the only operational system—which is true so far as the Western Allies were concerned. However, a book published in 1972 on Stalinist Russia asserts that by as early as 1935 Russia had developed a radar system of her own—but in the great "purges" instituted by Stalin (to the detriment of his country so far as war preparedness was concerned) the two individuals responsible for the direction of Russian radar development, P. K. Oschepkov and N. Smirnov of the Anti-Aircraft Defence Agency with many of their assistants, were "liquidated." Thus, Russia entered the War without her own radar and in 1941 had to buy her first equipments from Britain and the U.S.A.

(Source: *Let History Judge*, R. Medvedev, Macmillan & Co., Ltd.)

### OBITUARY—C. M. Benham, CBE (G4TZ)

We much regret to have to record that Cedric Benham, G4TZ (*ex*-2ZT, 1927), of Greens Norton, Towcester, Northants., died on December 2, in his 72nd year. He was with the International Marine Radio Co. prior to joining Painton & Co., Ltd., of which he eventually became the principal. Under Cedric Benham's management, the firm developed into one of the best-known manufacturers in the business of quality radio components for the trade, mainly resistors, knobs, dials, switches and connectors of every type, with a modern factory in Northampton. Painton's became a public company and was later taken over by Plessey, which severed the Benham connection. G4TZ himself, having served at sea when with the I.M.R.C., was a keen CW operator with a special interest in RTTY, and was active until recently, with the most modern equipment. He was a member of the Royal Thames Yacht Club and had his own boat *Dolphin II*, out in the Med., with a house in Majorca. His station was at Towcester, where he had only just installed a new aerial system, with a tilt-over tower.

# MIXER-VFO FOR VHF

## CONSIDERATIONS AFFECTING CHOICE OF FREQUENCY

P. J. PATRICK (G3TWG)

NOWADAYS more and more two and four metre stations are VFO-controlled in one form or another, and this includes not only SSB stations but users of practically every mode. There are several ways of effecting VFO control, all with their advantages and disadvantages in terms of ease of construction and alignment, performance and price.

A straight VFO using FET's followed by multiplier stages can be made to work satisfactorily on VHF, but problems are likely to be met in obtaining a stable drift-free T9 note. It will probably be necessary to run the oscillator continuously even when on "receive" and the VFO must be strongly constructed using only the best components, and there must be adequate buffer stages following the oscillator, otherwise random jumps or fluctuations in frequency can occur. Temperature compensation will probably be needed, and the power supply must be well stabilised and absolutely pure DC without any trace of ripple, or your note will not be T9. Although the circuit is simple, good performance is not easily obtained.

A VXO is simple, stable and effective where full band coverage is not essential. The main disadvantage is the number of crystals that may be needed for full band coverage.

A mixer-VFO will give a stable T9 note and full band coverage without difficulty. It is more complex than a straight VFO, and is therefore a project best undertaken by a constructor with some experience of VHF. The main problem that arises is that of spurious

### Table of Values

Fig. 1. Circuit of the VFO

C1, C2 = 22 $\mu$ F, s/m	R4, R11 = 150,000 ohms
C3 = .05 $\mu$ F	R5, R6 = 27,000 ohms
C4, C8, C11, C14, C16 = 15 $\mu$ F, s/m	R7, R9 = 100 ohms
C5 = 68 $\mu$ F, s/m	R8 = 330 ohms
C6, C22, C24 = .01 $\mu$ F	R10 = 120,000 ohms
C7, C23 = .001 $\mu$ F	R12 = 82 ohms
C10, C15 = 2.2 $\mu$ F	R13 = 4,700 ohms, 1w.
C9, C12, C13 = .0022 $\mu$ F	R14 = 150 ohms
C17 = 0.1 $\mu$ F	R15 = 5,600 ohms
C18 = 390 $\mu$ F, s/m	R16 = 12,000 ohms
C19 = 56 $\mu$ F, s/m	R17 = 820 ohms
C20 = 68 $\mu$ F, s/m	R18 = 47,000 ohms
C21 = .0022 $\mu$ F, s/m	R19 = 270 ohms
VC1 = 75 $\mu$ F (for four metres) or 110 $\mu$ F for two metres	RFC1, RFC2 = 2.5 mH, min.
R1 = 100,000 ohms	Tr1, Tr2, Tr3 = 3N140 (see text)
R2 = 220 ohms	Tr4, Tr5, Tr6 = 2N918
R3 = 2,200 ohms	D1 = OAZ 203, or similar

Notes: Crystal can be HC-18U type, 19.75 MHz for Two Metres, 19.20 MHz for Four Metres. Coils L1, L2, L3, L4 all close wound with 34g. enam. on 0.2in. formers in  $\frac{3}{16}$ in. cans (see text); L1, L3, 17 turns tapped at 4 turns from HT end; L2, 15 turns; and L4 tapped at four turns. L5, 23 turns 28g. close-wound on 0.2in. slugged former. Capacitors marked "s/m" should be silver-mica type. All resistors rated  $\frac{1}{2}$ w. unless otherwise stated. S1 to be spare pole on transmitter T/R switch.

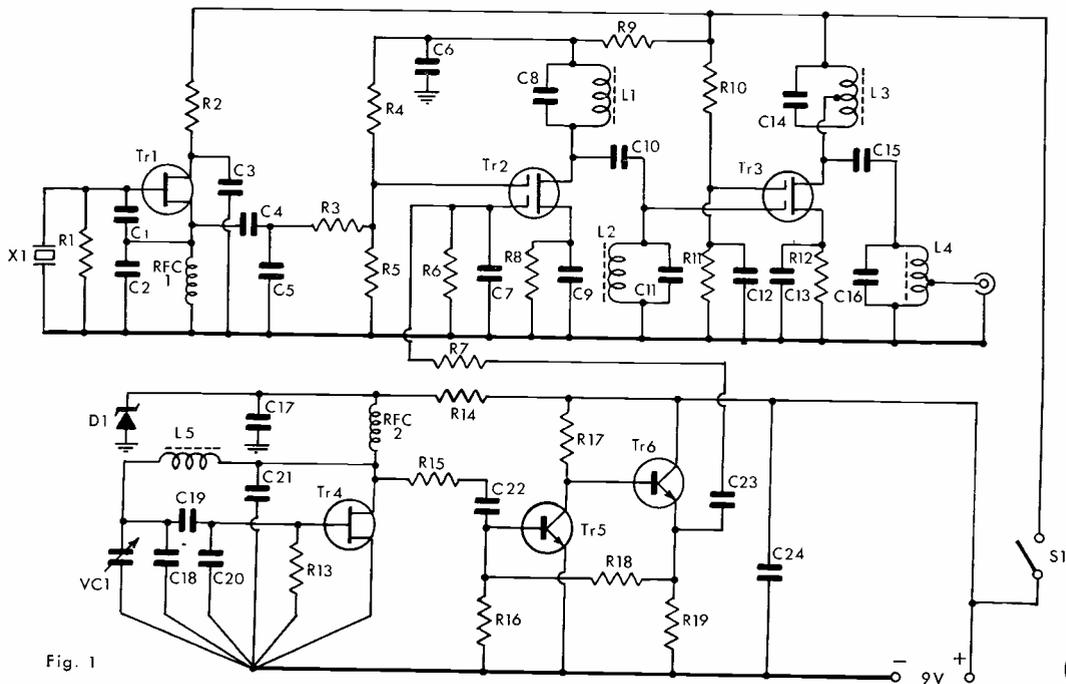


Fig. 1

Fig. 1. Circuit of the VFO



emissions, but this can be overcome by care in design and construction.

Finally, there are circuits using a phase-locked loop to tie a high frequency oscillator to one on a lower frequency. These give a stable output without spurious emissions, but are more complex to build and set up.

There are two main varieties of circuit to be found in a mixer-VFO for VHF. The first is similar to a transverter. For two metres a crystal frequency is multiplied up to around 116 or 130 MHz and then mixed with output of a tunable oscillator on 28 or 14 MHz. Such a scheme has the advantage that a later date it can easily be adapted as a transverter for use with an HF SSB rig. The other way is to use a crystal and tunable oscillator the frequencies of which add or subtract to give an output on 24 or 48 MHz. The VFO can thus easily be fed into the first stage of an existing transmitter, in which the necessary multiplication to the output frequency will be carried out. Modifications to your existing rig will be minimal, and it was for this reason that this arrangement was chosen, with an output on 24 MHz for two metres or 23.4 MHz for four metres.

### A Clean Output

Both the main varieties of mixer-VFO described in the foregoing are capable of giving a clean output provided that care is taken in their design, construction and alignment—but either type can produce a lot of spurious outputs if proper care is not exercised. There are four main ways in which spurious mixing products can be reduced. First, the crystal and tunable oscillator frequencies should be chosen so that harmonics of the tunable oscillator fall outside the passband of the selective amplifier stages following the mixer. Tunable oscillator harmonics can cause strong in-band spurious signals if this rule is not followed. Careful choice of frequency can also ensure that no low-order unwanted mixing products are radiated, and ratios between VFO and crystal frequencies of 2 to 9 (adding) or 2 to 11 (subtracting) are recommended, amongst others. If the transverter principle is used, additional care will be needed if the crystal frequency is multiplied before the mixer, since spurious products can be generated by unwanted harmonics of the crystal beating with the tunable oscillator. In all cases a crystal frequency which is close to, or an exact multiple of, the VFO frequency should be avoided.

The output of the mixer should be fed into an amplifier using several tuned circuits at the mixer output frequency, well screened from the oscillators. This will kill out-of-band spurious signals before they can do any harm. In this VFO there are four tuned circuits at 24 MHz assisted by one in the first stage of the transmitter. All are high-Q.

The level of the input signals to the mixer should be adjusted so that there is no more input than is needed to drive the following stage in Class-A, with particular attention being paid to keeping the input from the tunable oscillator low. Further increase in the inputs to the mixer will increase the output on spurious frequencies but give little or no increase in output on the desired frequency.

A balanced mixer is needed in most mixer VFO's. Although double balanced mixers are now available in

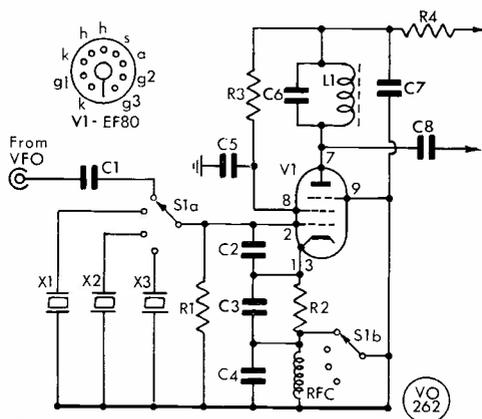


Fig. 2

Fig. 2. Transmitter CO modified for VFO input

### Table of Values

Fig. 2. Modified Crystal Oscillator	
C1 = 30 $\mu\mu\text{F}$	RFC1 = 2.5 mH
C2 = 20 $\mu\mu\text{F}$	V1 = EF80, or EF184
C3, C5 = -0.1 $\mu\text{F}$	L1 = 15 turns 24g.
C4 = 100 $\mu\mu\text{F}$	c/wound on
C6 = 10 $\mu\mu\text{F}$	0.2in. former,
C8 = 47 $\mu\mu\text{F}$	tuned to 24 MHz
R1 = 100,000 ohms	S1 = Two-pole multi-
R2 = 470 ohms	way to suit xtal
R3 = 22,000 ohms	switching
R4 = 4,700 ohms	X1, X2,
	X3 = Existing xtals

IC's like the SL640, the majority of such mixers are balanced with respect to one input only. A typical push-pull balanced mixer will attenuate that input and its harmonics by 20 to 25 dB, while letting through the other input, its harmonics and all the sum and difference frequencies. A balanced mixer is essential where harmonics of the tunable oscillator can fall within the passband of the amplifier stages following the mixer, or, as with transverters, where a harmonic of the prime mover output frequency falls in or close to the two or four metre band. Where the input frequencies to the mixer are carefully chosen and the selective amplifier has a nice tight passband, the use of a balanced mixer is less essential, although some reduction in spurious outputs may still accrue.

### Circuitry

This design relies on the first three of these measures to ensure that the output is clean, and has performed satisfactorily now for three years, first on four metres and at present on two. However, it is very important that no variation is made from the designed crystal and tunable oscillator frequencies without very careful calculation. The design uses a 19.75 MHz crystal and a tunable oscillator covering 4.25 to 4.583 MHz for two metres or a crystal for 19.2 MHz and a tunable oscillator covering 4.14 to 4.366 MHz for four metres. Use of a "compromise" crystal frequency of 19.52 MHz will

lead to a harmonic of the tunable oscillator range falling within the desired output frequency range for both bands. If it were attempted to use the VFO for two metres with a 19.2 MHz crystal a similar result would follow, while four-metre operation with a 19.75 MHz crystal would give a spurious harmonic just outside the band. There is one exception to this general rule. It is permissible to retain the same frequency range for the tunable oscillator but have crystal frequencies higher than the VFO output frequency, *i.e.* to use an overtone crystal of 28.58 MHz for two metres, or a crystal for 27.61 MHz for four metres. But do not be tempted to use lower frequency crystals and multiply up, as this is a certain way to breed spurious outputs.

A little arithmetic will show that an attempt to make the tunable oscillator very low in frequency, with the object of further improving the stability of the VFO will invariably lead to harmonics of the tunable oscillator falling in the passband of the selective amplifier, or very close to it, so that a balanced mixer becomes essential. The value of  $5\frac{1}{2}$  to 1 used in this circuit as the ratio between the tunable oscillator frequency and the VFO output frequency is a good compromise between the conflicting requirements of stability and a clean output.

So far we have only considered the question of oscillator harmonics. However, it can be shown that where a limited frequency range is covered and the tunable oscillator frequency is chosen so that the output frequency divided by the centre frequency of the tunable oscillator range comes out to an odd half (*i.e.* approximately  $5\frac{1}{2}$  for this VFO, as noted) then not only will the tunable oscillator harmonics fall outside the passband of the selective amplifier but also the products resulting from mixing twice the crystal frequency with harmonics of the tunable oscillator. Where higher harmonics of the crystal frequency are involved in the mixing process they will need to mix with the eighth or higher harmonics of the tunable oscillator to give outputs within the bandwidth of the selective amplifier. Provided the oscillators give a reasonably pure waveform and the inputs to the mixer are kept low, these high-order mixing products should not cause problems.

### Other Circuit Considerations

The tunable oscillator uses the FET Vackar circuit which is stable and gives a good output waveform. The crystal oscillator is an FET Colpitts circuit. A bipolar transistor could be used here but FET's are now nearly as cheap. For best results the tunable oscillator should run continuously on both "transmit" and "receive," as shown in the circuit diagram, but stability is still very satisfactory even if this is not so arranged. The networks C4, C5, R3 and C23, R7, C7 are used to adjust the inputs from the oscillators to the correct level for the dual gate Mosfet mixer Tr2. R3 and R7 were mounted as part of the leads between printed circuit boards to facilitate easy substitution when adjusting the inputs to the mixer. The mixer uses a conventional dual-gate Mosfet circuit which has a good reputation for efficient, clean mixing. 3N140's were used in the mixer and selective amplifier but there is no reason why gate-protected Mosfet's should not be used. The selective amplifier has four tuned circuits at 24 MHz. These are enclosed in individual  $\frac{3}{4}$ in. square cans with the

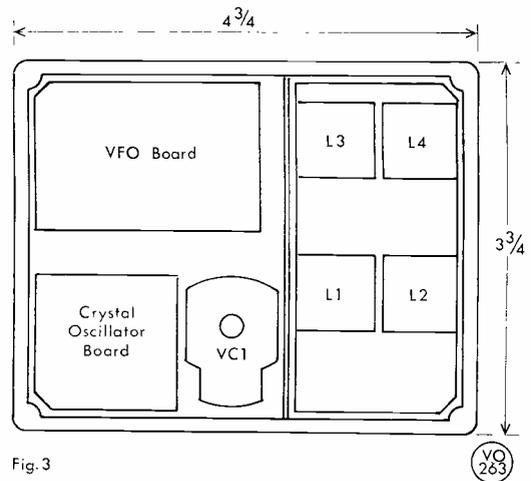


Fig. 3

Fig. 3. Layout of the prototype Mixer-VFO

tuning and coupling capacitors mounted inside the cans. Using this type of can with printed circuit board, arrangements must be made to earth the can to the board. The writer arranged this by using a solder tag on top of the board wired through. Other constructors might consider using double sided printed circuit board for the mixer amplifier board the smaller  $\frac{1}{2}$ in. square Neosid A6 cans with their 5 mm. formers. (These latter are designed for fitting on printed circuit board, and if used the coils should be wound with 22 turns tapped at 5 turns instead of as shown with the circuit diagram). The amplifier stage must be screened from the mixer and the oscillators to avoid oscillator harmonics by-passing the tuned circuits. The use of two  $\frac{3}{4}$ in. square cans side by side will provide screening between the mixer and amplifier stages but a screen will be needed between the oscillators and the amplifier.

It will be necessary to modify the oscillator circuit of the transmitter with which the VFO is to work so that it acts as an amplifier when switched to the VFO input. The circuit in Fig. 2 shows a simple and effective way of doing this. When switched to a crystal position, V1 acts as an 8 MHz oscillator tripling in its anode to 24 MHz, while when switched to VFO the feed-back to the cathode is short-circuited by S1B and the valve functions as a straight-through amplifier at 24 MHz.

In the prototype, the unit provided the right amount of drive for the transmitter, largely by chance! A greater voltage output could be obtained into a high impedance by tapping the output higher up L4, while a lower voltage output could best be obtained by increasing R7 and possibly R3.

### Construction

The three main sections of the VFO were built on separate printed circuit boards, sized  $1\frac{1}{8} \times 3\frac{1}{2}$ in. for the mixer board,  $1\frac{1}{2} \times 2\frac{3}{8}$ in. for the tunable oscillator, and  $1\frac{1}{2}$ in. square for the CO board. This was to allow for changes if found necessary without the need to start completely afresh. The prototype was built in a diecast

box  $4\frac{1}{2} \times 3\frac{1}{2} \times 2$  inches and it is undoubtedly a tight squeeze even with the *Jackson Bros.* C804 capacitor. It would be better, if space permits to build the VFO into a rather larger box and use a double bearing capacitor. This would allow L5 to be positioned further from the sides of the box, which is desirable where components are mounted on the lid, as in the prototype. Alternatively L5 could be placed in a screening can.

For four metres VC1 needs to be  $75 \mu\text{F}$  but for two metres a capacitor of approximately  $110 \mu\text{F}$  is needed. This value can be obtained by removing five fixed and five moving vanes from a  $150 \mu\text{F}$  Jackson C804 capacitor. Alternatively some scaling up or down of coil and capacitor values (up to plus or minus 30%) could be tolerated so as to use an existing capacitor, taking care to increase or reduce all of the fixed capacitors in the same proportion.

### Alignment and Adjustment

Alignment should not be difficult assuming that the circuit values given are followed. Check that both oscillators are functioning and set the core of L5 to give the correct frequency range on the tunable oscillator. The feedback into the VFO is sufficient to maintain oscillation but not much more, and it is just possible that an increase in the value of C19 might be needed if a below-average transistor and a low-Q core for the coil were used simultaneously. Having set the core, check that oscillation occurs throughout the tuning range. Next, the selective amplifier can be aligned by feeding its output into a meter, or into the transmitter with which it is to work and measuring the grid current at the first test point with the transmitter switched to "Net" or the PA valve removed. When output is obtained a check should be made with a receiver or absorption wavemeter to ensure that the tuned circuits are aligned to the correct frequency and not to an oscillator harmonic. Slight stagger-tuning is desirable, and the writer aligned L1 and L2 for output on 24.08 MHz and L3 and L4 for output on 24.25 MHz.

If you should use different coil formers with the selective amplifier it is advisable to check the coils with a GDO both before mounting and after they have been mounted and coupled together on the chassis.

If the inputs to the mixer are already at about the right levels you will find that all the coils in the selective amplifier appear to tune fairly sharply and the output is sufficient to drive the transmitter with some falling off near the band edges. With too much input to the mixer, it and the following amplifier stage may be overloaded and the tuning of L1 and L2 in particular may seem broad. R7 should then be increased to reduce the input from the tunable oscillator to the mixer until tuning becomes sharper, and it may also be possible when an optimum value has been found for R7 to increase R3 as well. If insufficient output is obtained from the unit it may be possible to increase it by decreasing R3 or R7 (in that order) but care should be exercised if this is done since it could produce a disproportionately large increase in spurious outputs. No attempt should be made to decrease R3 or R7 beyond the point where any apparent broadening of the response of the selective amplifier is noticed. Further additional output can then only be obtained by altering the tapping point on L4,

if feeding into a high impedance, or by providing additional amplification. However, with most transmitters output from the VFO should be fully adequate.

### Conclusion

This VFO has now been in use on 4 or 2 metres for some three years. Stability is good and no comments of any spurious outputs have been received. It is a fairly difficult project, and a newcomer to VHF would be best advised to get going with crystal control and then build the VFO rather than try and build the whole lot as one.

Numerous contacts have been made with SSB stations using this VFO and no adverse comment has been received on stability. One station remarked after about 5 minutes that "You have an appreciable amount of carrier" having previously thought that he was talking to an SSB station.

If intended for use on FM channels it would be desirable to fit a dial with good resetting accuracy and possibly to restrict the coverage of the VFO as well so as to ensure that the VFO can be accurately re-set to the required channel.

### VINTAGE WIRELESS MUSEUM—Change of QTH

Douglas Byrne, G3KPO, writes to say that he has moved his Vintage Wireless Museum—founded by him and of which he is the curator—to Alverstone Manor Hotel, Shanklin (2586), Isle of Wight. Anyone wishing to visit during the Summer is invited to get in touch with him there.

### ABOUT RSGB FINANCES

We were glad to see, from their recent accounts, that the Radio Society of Great Britain has been able to show a working profit for their year to June 1974 of £3,700. Though this is not much on a gross "take" for the year of nearly £88,000 (a reasonable commercial figure would be £10,000) it does at least go towards diminishing the losses of previous years, and still leaves the Society with substantial assets.

It is also interesting to know that—as first put forward in our *Magazine* Editorial for February, 1972—the RSGB is now considering the possibility of getting the Hq. out of London altogether. All who are in any way interested in the Society and have that Editorial available should re-read it in the light of the current situation, forecast more than two years before the action is beginning to be taken. In this same context, the Editorial in the August 1970 issue of *SHORT WAVE MAGAZINE* might be worth re-reading in view of present circumstances.

## SHORT WAVE LISTENER FEATURE

By *Justin Cooper*

### MAINTENANCE AND FAULT FINDING — MODIFICATION PROCEDURES — OTHER TECHNICAL POINTS — ABOUT BC BREAKTHROUGH — READER NOTES AND COMMENTS — THE LADDERS TO DATE

QUITE often a letter comes in, which implies that the writer thereof, though a keen SWL, is very doubtful indeed about tackling any constructional work or even maintenance of his own equipment—so perhaps it would be worthwhile to indicate J.C.'s own approach to the problem.

Take maintenance first: One must have preferably, the full handbook, and if not, at least a circuit diagram. The handbook will include a "table of voltages" which should immediately be marked-up with the actual figures obtained with the station testmeter; if there is only a circuit diagram, this can be marked with the voltages at each valve-pin or transistor electrode, the "conditions of test"—the position of all receiver controls—being noted on the back. This is filed away with all the other station data in a large envelope which lives in the shack with the licence, the *Call Book*, the log and other such documents pertaining to the station.

Now, if you have a fault, you can safely assume that nothing has happened to the tuning so you can now proceed to business, with a *scratch-pad and pencil at hand*. First, note the signs: Does the Rx light up when you switch on; if it doesn't, have a care to check the fuses, both in the set and in the power-plug, before you go further. If you see smoke, it is not a disaster, because that will enable you to identify the culprit optically (by looking at it!) to tell the area where the fault lies. If none of these is the answer, slip the thing out of its case, clip the meter negative to the chassis, and proceed to go round all valve pins in turn, checking the figures so obtained against the figures you had first, marked up on the circuit, and note any deviations of more than, say, five per cent, against the relevant valve and pin number, or transistor and electrode. This will pin-point you down to a section of the circuit—let us say the grid of the output stage is positive instead of negative, and the anode of the first AF stage is lower than usual. Clearly the circuit fault lies between these two points, which are joined by a coupling capacitor in the circuit. Reach for the iron, unsolder one end of the capacitor, and recheck the pin voltages, which have now probably returned to nearer the normal; if so, replace the capacitor, toss the old one out—this is important for the future—and all's well. If the voltages are still a bit awry, check all the resistors in the first AF stage and the output stage, as one or more of them may have changed value as a result of the initial fault.

Simple, isn't it? However, the main thing is to keep it logical, and clearly to note down exactly what you do at each test, what range the meter was on, and so on, so that you can be certain that you can repeat any of your tests, and so that you can avoid having to go over the same ground time and time again if you do get a baffling fault. By looking back at the notes you made, and *thinking*, you should be able to see where you made the false step. Without these notes you can go round and round in circles, and convince yourself you can't fault-find! Reason—you will have forgotten the exact sequence of tests and measurements, so you won't be able to spot the false step.

Now, another question of a similar sort is the modification of an existing bit of gear. First of all, *make sure it works in its original state*. This means that if it doesn't work after modification, the fault must lie in the modification work, which simplifies things enormously. Secondly, write down each step as you do it, so you can reverse steps if need be and return to the original unmodified-and-working condition, should things go wrong. Thirdly, before you reach for the tools, sit down with the pad and pencil, and write down all the steps which need to be taken. For example, J.C. has an old TW Communicator Top Band transceiver, from the days when nearly all cars had positive-earth electrics. The car now in use has negative-earth, so the Communicator must be made to suit the new conditions. How do we go about it?

First, list the ways in which it *might* be achieved, and consider these, in case a new line of attack might be opened out therefrom. Scrub out each of these lines as you decide they are "not on" until you find the best way. Now, sit down again with a fresh sheet, and detail what has to be done; in this case, isolate the IF and AF modules

so that they can be run on negative-earth supplies without a short, reverse the zener diode, isolate the inverter chassis from the main chassis, and replace the *p.n.p.* transistors at RF, mixer/oscillator and BFO stages by silicon *n.p.n.* types. Then trace the existing wiring of the twelve-volt line, sketching it out until you are sure you have it all accounted-for. Now, consider how each step can be achieved with the material you have at hand, and write it down in detail. When you come to the wiring of the twelve-volt line, turn back to your first sketch and see what can be done with the existing wiring, marking in the new wiring in a different colour of pencil on a new sketch, to compare with the original one you did. Check it all through.

You have now probably done a complete evening's work on your project without touching anything in anger. The following evening, recheck to make sure you still understand what you are doing, and set out to achieve each objective individually, marking them off as you do so. When all is done, and point-to-point checks show everything is as you meant it to be, you can be fairly confident that switching-on will see the rig basically running OK, and only a bit of tidying-up will remain to be done—like a minor adjustment of resistor values in the revamped RF, mixer and BFO stages for optimum working, and maybe a little tweaking up of the front-end alignment.

You notice how much of the work is done beforehand, on paper. All the records are filed away in a "Lab Book" which is kept up-to-date, with the dates of its opening and completion marked on the spine.

#### New Entries

Our first in this category is from *R. Elliott (Brentwood)* who makes an initial entry contrived with a 9R59DS receiver, Joystick and Joymatch ATU. Ray mentions the problem of images encountered with this set-up, and is now debating on the alternatives of a pre-selector on the one hand or a different receiver altogether. The answer to this one is that one should avoid a preselector, but if used, then it must be run at the lowest convenient gain level in the presence of high-level signals nearby—and it may well be found that the preselector needs to be used in conjunction with an aerial attenuator to get the best results. On a different tack, Ray has already passed the R.A.E. and is now busy on the Morse so as to be able to go straight to a G4 call.

*J. Dougherty (Ryhope, Sunderland)* has been in and out of SWL since back in 1950, when an R.1155 was purchased and used right through till 1970. Some of the intervening years were spent as a wireless operator in the Army in Malaya, which kept the interest going. Recently, a Trio QR-666 receiver was purchased—to the horror of the XYL—(we know the problem!) John holds his dipoles up by means of bamboo poles obtained from the local carpet-shop, who are pleased to get rid of them.

*L. Gibson (Barrow-in-Furness)* has a Trio JR-310, a dipole for Twenty, and an end-fed wire for general use, coupled through an ATU, plus, on the earthing side, a ten-foot spike in the ground and 70ft. of old coax cable in the ground as a sort of "earthed counterpoise." Les is a member of the Furness Club, and reckons the help and advice he gets there to be invaluable.

#### Technical

The first question comes from *W. J. Reid (Hallsham)* who starts by wondering about ATU's versus preselectors—in his case not so much from the point of view of cutting the images but rather that of simply getting the best from a Lafayette HA-800. Unhesitatingly, we would plump for an ATU, the more so in this case as it would be tacked to a long-wire arrangement, which is wide open to pick-up of unwanted signals on the one hand and liable to reflect odd values of reactance into the receiver on the other. Use of an ATU with 100 feet of wire would almost certainly bring up signals on all the main bands of interest by a couple of S-points or so. *Six metres* is an American band which is interesting insofar as there are known cases of signals on it covering inter-continental distances at the top of the sunspot cycle. The last question is the matter of getting hold of a 100 kHz crystal to plug into the calibrator in the HA-800—the only thing to do here is to trace the circuit out, measure the dimension of the

crystal holder (or specify the valve-base it is meant to be plugged into) and to give these dimensions to one of the crystal merchants who advertise in the *Magazine*. Alternatively, it may be possible to get one cheaply at the local Club junk-sale, and modify the calibrator to provide whatever base the crystal wants to sit in: the older "rocks" will sometimes be found to be the right size to use two pins of an octal valve base, which might be a help in basing such a crystal.

An interesting question is posed by *R. Holland (Malvern)* who finds his aerial-wire is starting to stretch and fray—what is the best wire for a 7 MHz dipole, then? A Good Question indeed! Personally, J.C. has ever been one to prop up the centre of his dipoles with a pole, and let the ends be held up by much lighter and usually impromptu sky-hooks. The whole point here is that if you consider the weight of the aerial wire and its insulators plus the heavy coaxial feeder involved in a forty-metre dipole, you realise that the dead-weight acting downwards is translated into considerable strain on the ends—thus the heavy wire and strong halyards called for in most of the books. Now, if you prop up the middle on a pole, all this strain is removed and transferred to a pole which is simply in compression. Hence, the wire and the ends can be much lighter all round—and if the ends are allowed to droop down a bit into the inverted-Vee configuration you find you have more pickup off the ends of the wire—that is, a more all-round polar pattern of response. J.C. has his "pole" lashed to the side of the house, and his aerials hanging from this have included a very successful inverted-Vee for 7 MHz made from fine copper wire and using some of the plastic curtain-ring insulators so long advocated by G3KFE. As to stranded or single-conductor wire, J.C. has a personal preference for the single conductor and no soldered connections, but others have had much joy out of stranded stuff; the vital thing in either case is to do preventive maintenance at regular intervals, to catch any problems before they become serious.

*R. Andrews (Barry)* listens a lot to the GB3BC repeater, through a solid-state converter into a 9R-59D, and thinks this is a good thing for VHF communications—probably rather more so in the Welsh hilly districts than, say, in the East Anglia where the terrain is flat enough to give a mobile a reasonable range without repeaters.

The problems of BC stations appearing in the 14 MHz band, observed on a FR-50B receiver, was raised last time by P. Rooney, and is commented upon by *G. F. Gullis (Ogbourne St. George)*. He and his brother Sandy have only ever heard one in their FR-50B which has been in use for a year now pretty intensively. This backs up J.C.'s feeling that most likely the signals referred to have little to do with the receiver itself; they may be due to the use of an untuned long-wire displaying a resonance at an unwanted frequency and so collecting excessive RF from a strong BC station on, say, the image—or a soldered joint in the aerial wire (or even a dirty and unsoldered joint for that matter) could be acting as a rectifier and so causing harmonics of the BC station to be strong locally. One could, indeed, even find the effect as being due to such a "rectifier" joint in the house wiring, a wire fence, or a rusty guttering—this last often a source of TVI for the transmitting chaps. The only way to find these little horrors is to have a portable radio tuned to the signal, a loop on the end of a piece of co-axial cable plugged into its aerial socket, and to use this as a "sniffer" to try and detect the points where the unwanted signal is strongest. And, please, blame Murphy, not J.C. if the offender turns out to be buried in the plaster!

*R. Carter (Blackburn)* finally gave up chasing the elusive fault in his receiver, and sent it off to Bill Lowe at Matlock, whence it came back in a week, in nice time for the contest. On a technical point, Ben postulates a receiver covering, say, 28-30 MHz for AM, CW, SSB and FM modes, and wonders whether the addition of a converter to cover Two Metres would still enable all these modes to be heard—they are all popular on Two. Yes, by all means—the only possible snag would be that you might have a sideband reversal, depending on your local oscillator frequency, which would mean using the "wrong sideband" position of the switch for this mode—no snag there. Possibly one might have difficulty with FM but no more than would have been noticed if FM was listened to on Ten. A "proper" FM detector is needed in the main receiver, as with slope detection it is often necessary to adjust the IF selectivity to suit the FM signal on tune. They can all be running different amounts of deviation. Your old scribe uses an *Eddystone* 888 receiver and 28-30 MHz output converter on Two and has found no need for modifications to the 888 for any mode.

Last time around we noticed here the absence of the familiar scraw from *K. Kyezor (Perivale)*, explained now by the problems associated with getting fixed up to move to Wellingborough (still not completely resolved) where, he says wistfully, there will be room to put up a *real* aerial. Something to look forward to, and an incentive to keep the negotiations going; meantime, the old JR-310 soldiers merrily on at Perivale. Certainly, says J.C., it should be allowed to

continue doing so until it can be evaluated on that good new aerial before any decision is made to replace it by something better.

*R. MacKean (Liverpool)* has an HE-40 and is annoyed by the S9+ locals on SSB who are only resolvable for about three sentences per QSO. Overload is the problem here; the incoming signal is so large by the time it gets to the detector that the BFO voltage is quite inadequate to enable it to be resolved. The answer is to reduce the signal, either by fitting an IF gain control, or by the use of an attenuator in the aerial lead, and also, if it can be done without impairing BFO stability, raise the level of BFO injection by increase of the coupling capacitor.

*J. Trevett (Broadstone, Dorset)* asks how to make a start with RTTY? First, one needs a receiver capable of holding a good SSB signal well—in other words, a stable Rx. Secondly, one needs to build or buy a "terminal unit" the function of which is to turn the "received noises" into signals that can drive the teleprinter, this last being the third basic item. For this old scribe's money, the first real step would be to join up with BARTG because they seem to be able to advertise all the things an RTTY op. could want, often at well below the open-market prices, and because their *Newsletter* contains a wealth of useful information on the subject. And, of course there are books on RTTY.

### Funny Prefixes

As always, there is a nice balance between the funny-curious and the funny-ha-ha varieties. Starting with the latter, *R. C. Woolley (Ashbourne)* came across 5HMOG/AM in an East African Airways VC10 over the Channel. These are too common to be funny, really; one suspects that they are genuine enough, but with such odd calls, one could hardly classify a VC10 airplane as a *pukka* amateur shack!

The alternate use of I9 and IT9 from Sicily is queried by *M. Quintin (Wotton-under-Edge)*, he having heard the same station giving same name and QTH and using both these prefixes at different time. Frankly, J.C. doesn't know, but since the Italian licensing is based upon postal regions it may well be acceptable. We have a near-parallel in the U.K., where an amateur in Monmouth has to make his own decision to be G or GW—but once made, it sticks.

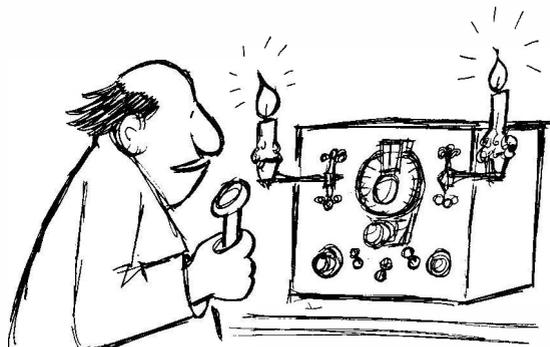
Strange prefixes seem to be very much associated with the CQ WW Contest says *A. Roberts (Loughborough)*. Andrew turned up the 9J0BO, HG5, CV4, 4M6 and the CT7 chaps during the contest, and, rightly, counted them all in to help his total along. His list of 120 new prefixes, incidentally, were all booked in with the aid of 54 inches of vertical wire, no aerial tuner, a Trio 9R-59DS, and a good location. Not mentioned is the need for a pair of "good" ears.

Now to *S. Foster (Lincoln)*, who adds 34 new ones to his total. Among various prefix points from earlier rounds, Stew can vouch for the IF0XRR/5, primarily operating for propagation research, and using low power.

Several JG calls puzzled *M. Smith (Matamata, New Zealand)* as also did FT9KL heard working a VK. The JG calls are variants on the JA theme, but as for the FT9—in the absence of any mention by anyone else, or any "gen" here, for the moment we must, regretfully enough, denounce him as a probable phoney.

### General Chat

The pages are slipping inexorably through the typewriter, but still many letters remain to be mentioned, so we must be brief.



G3COI  
 "... have got over the Rx dial light problem here ....."

Interesting group of overseas visitors at the Leicester ARRA Exhibition on Friday, November 1st—left to right, E12VFP, EI4AN, EI6S, EI2CR and EI0CF; all of whom made the journey specially for the Show.



*D. Sharred (Birmingham)* has added six more countries to his previous 21 on Top Band, bringing him up to 27. Apart from 4X4UR, 4U1TU and 9H1BX on SSB, CW was the mode with which to log ST2AY, HB0LL, and, on November 15, VK6HD brightened David's listening. What it boils down to, though David doesn't say so directly, is that he has heard all continents on Top Band, which is no mean achievement.

*P. Barker (Sunderland)* seems to have spent quite a bit of time on the receiver, but, as he says, there has not been a lot of DX about—perhaps the best of the crop was to copy K0YKJ from Boulder, Colorado on SS/TV, and to hear XU1DX in Phnom Penh.

*H. M. Graham (Harefield)* usually has the odd word of wisdom embedded in his letter. Noting our comments last time out on changing listening-times and the effects on the score of so doing, Maurice (who is normally a mid-evening and weekend afternoon listener) decided to have a basinful of 0630-0730 and see just what profit he could gain from the single hour. On Twenty there were A9XT, SM6DBB, SQ8GVM and 9H4K, while a quick check on Eighty turned up one DL, a brace of G's and WA9TZD. Not much in the way of S-meter movement on either A9XT or WA9TZD but both perfectly readable. The proof of the pudding is, after all, in the eating. On another tack, Maurice listens on Ten when he can, and this is the interesting bit, he found pay-dirt on each session, but, of course, mainly in a North-South direction. Again, proof that, around the period 1100 to maybe 1600ish, the band is well worth checking for DX signals.

*K. Salter (Newton Abbot)* seems to have hooked nearly all the genuine oddball callsigns that have been about, with nary a phoney in the lot; and his normal listening times on Twenty have been productive of a fair share of DX.

*J. Cowan (Rochford)* is back ashore again and, at the time of his letter waiting to go to another ship, this time as the only operator aboard, which should make sure the Captain keeps an eye on him! Incidentally, the leave ration for "sparkers" these days is one day off for every two spent at work; and if you find that too much you can always convert a month of your leave into seetime and be paid for doing so!

There is, he observes, a subtle change in his thinking of late—thus *N. N. Graham (Newcastle-on-Tyne)*, who is beginning to feel some slight urge to communicate with fellow radio amateurs. It looks as though the ranks of the transmitting types will increase by at least one sometime in 1975, XYL QRM permitting.

Now *S. Lawrence (Market Harborough)* who, it may be recalled, we conjectured to be the author of the unsigned letter last time; Stephen is a bit "umpty" because we did not credit him with the score claimed in the unsigned letter—but how could we, till we were sure who wrote it? In fact, J.C. sat on it and now the mystery is resolved, it will go in the Ladder. On a different tack, Stephen mentions a "941GN," which, in his handwriting could well be 9G1GN; he also wants to know about the YU suffix /X, which we understand to be rather on the lines of our own /A or /P system. Finally, he has a call for help—his school radio society has a CR-66 receiver, and they want some gen on it, data sheet or whatever, to copy and return within

the week. If you can lay hands on such, send it to: S. Lawrence, 7 Ashfield Road, Market Harborough, Leics.

*R. C. Bradley (Wrexham)* finds the 80m. band, in the morning, full of jungle-bells and high-power CW signals; much of this, it must be said, is probably the legitimate output of the commercials with whom we share the band, plus of course, amateur CW signals and RTTY from legitimate amateur stations. This, to J.C., is a mere nothing since after all these commercial signals have prior right; what is so horried on Eighty is the amount of sheer drivel talked by phone stations other than DX operators—a marked contrast to the chat, say, on Two or Top Band. Frankly, this old scribe ventures on to 80m. unless he has his trusty audio filter and Q-Multiplier wound up to the limit so he can read the DX CW right through the sidebands and splatter of the Phone merchants nattering in the CW end of the band.

*Bert Glass (Plymouth)* further raises his CW score, and has also been listening profitably on Ten during the middle of the day, only Oceania being unrepresented in his list.

A first and last letter comes in from *D. M. Macleod (Loanhead, Midlothian)* as he is now GM4DGS. However, he is at the moment stuck as the gear suffered in the journey back from his old station at VQ9DM in the Seychelles.

The *Binghams (Carrickfergus)* will soon, hopefully, have a fully-licensed amateur in the family, as Billy is attending Morse and R.A.E. at Jordanstown Polytechnic; this probably is the reason for only seven new prefixes hooked this time.

We did begin to think that *N. Henbrey (Northiam)* had sunk

## ANNUAL HPX LADDER

(Starting date January 1, 1974)

SWL	PREFIXES	SWL	PREFIXES
R. C. Woolley (Ashbourne)	499	M. L. Peters (Newbury)	369
J. Dougherty (Sunderland)	457	S. McHugh (Pontefract)	345
K. Salter (Newton Abbot)	457	D. J. Porter (Doncaster)	336
N. N. Graham		C. Davis (Norwich)	311
(Newcastle-on-Tyne)	444	W. McFaul (Londonderry)	289
A. C. Roberts (Shephed)	427	S. H. Bundy (Luton)	288
S. Lawrence		G. George (Woodmancote)	270
Market Harborough)	423	B. Russell (Runcorn)	264
S. Sharred (Birmingham)	413	R. J. Rennard (Redditch)	254
J. D. Porter (Baslow)	406	L. Gibson	
J. Hesman (Birmingham)	390	(Barrow-in-Furness)	226
A. J. Gullis		R. Elliott (Brentwood)	212
(Ogbourne St. George)	385	J. Aspinall (Leeds)	202

Starting score 200, in accordance with HPX Rules. All Prefixes in this list to have been heard in 1974. When a score of 500 is reached, transfer to the All-Time Table will follow. Final listings of the 1974 Table will appear in March "SWL." New Table starts from January 1, 1975.

**HPX LADDER**  
(All-Time Post War)

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
W. Bingham	(Carrickfergus) 1560	C. K. Verstage (Old Basing)	759
R. Shilvock (Lye)	1456	P. Barker (Sunderland)	739
S. Foster (Lincoln)	1411	S. Eldridge (Crawley)	731
T. Rootsey (Ilford)	1405	B. Cushing (Hove)	681
K. Kyezor (Perivale)	1329	L. Craven (Alvechurch)	679
J. Fitzgerald	(Gt. Missenden) 1222	A. Buchman (New York)	678
R. Carter (Blackburn)	1181	D. Sharred (Birmingham)	661
A. W. Nielson (Glasgow)	1142	C. L. Lee (Ilford)	657
M. J. Quintin	(Wotton-u-Edge) 1104	G. F. Gullis	(Ogbourne St. George) 643
L. A. S. Poole	(London, N.21) 1090	M. Pein (Liverpool)	627
H. Alford	(Burnham-on-Sea) 1049	M. F. Parry (Shrewsbury)	612
P. C. Jane (East Loce)	1048	G. Lucas (Kennoway, Fife)	609
B. Hughes (Worcester)	1041	M. Rodgers (Harwood)	600
J. H. Sparkes (Trowbridge)	992	J. R. Cowan (Rochford)	592
G. W. Raven	(London, S.E.11) 975	M. Eccles (Lancaster)	572
A. West (Herne Hill)	961	B. J. McCartney	(Workingham) 559
R. H. McVey	(Weston-super-Mare) 922	M. Smith	(Matamata, New Zealand) 554
M. Cuckoo (Herne Bay)	918	M. Kitchener (Hitchin)	549
N. Hembrey (Northiam)	901	R. Swan (London S.E.19)	547
K. A. Whiteley (Castleford)	884	W. H. Smyth (Hartlepool)	531
A. R. Holland (Malvern)	857	P. Rooney (Liverpool)	526
N. Askew (Coventry)	855	J. Bell (Hampstead)	521
H. M. Graham (Harefield)	829	CW ONLY	
Mrs. J. Jane (East Loce)	826	A. Glass (Plymouth)	1064
H. A. Londesborough	(Swanland) 824	T. Rootsey (Ilford)	723
E. W. Robinson	(Bury St. Edmunds) 817	W. B. Taunton (Meopham)	675
B. Thomas (Pontefract)	787	H. A. Londesborough	662
J. Gravell (Burry Port)	775	G. Richards (Swanland)	410
E. Parker (Hove)	771	A. F. Roberts	(Kidderminster) 362
		S. Sharred (Birmingham)	341
		A. W. McNeill (Newbury)	319
		W. Hutchinson	(Hornchurch) 282

Starting score 500 for Phone, 200 for CW. Listings include only recent claims.

please get in touch?

P. K. Freeman (Poole) seems to have become a bit entangled with his aerial tuners, for VHF and HF. A good rule of thumb is to tune the capacitor to 1½ pF per metre of the wavelength you are after, and then to adjust the coil to suit. Another thing is that the pi-network won't necessarily cope with anything—there can be certain reactive combinations which baffle it. However, all is not lost—the quickest way out of the problem is to “birds-nest” the components together with croc-clips and wire into various configurations until you get something that *does* do the trick; and, when you've got a circuit that works, draw it on paper, strip the lashup down and build it properly. This will be found far quicker than trying to design things up, mainly because you are for all practical purposes unable to estimate the value or sign of the reactance, let alone the resistance, for every band of interest.

R. H. McVey (Weston-super-Mare) reckons conditions have been better than would have been expected of late; he was a little surprised to find VU7GV and doubts the authenticity of the call—we wouldn't think so, as it was probably VU2GV operating, as he said, from Andaman Is.

J. Bell (Hampstead) finds he gets a headache after about an hour at the receiver chasing prefixes—this may be nothing more than headphones fitting badly, or the lack of ventilation in the shack.

The loss, and subsequent remarking, of a Prefix entry list is be-moaned by B. F. Hughes (Worcester) as he is pretty sure some 30 or 40 have been allowed to slip through the net—never mind, you'll soon pick them up again! On another tack, B.F.H. wonders if photostat copies of some of his rare QSL's would be worth sending in for possible reproduction. It's worth a try, although one would think the contrast would be too low to reproduce well from a photostat.

C. Verstage (Old Basing) has quite a stable of receivers, including a Drake R4C, Racal RA17, Yaesu FR-400, and now has added a Yaesu FR-101 which he finds better. It is interesting to note that one of the recent QSL cards to arrive was from 9Q5CO which seems to imply a resumption of activity in that country. Another rare QSL to come in was from XV5AC.

And that, good people, is the end of it for this time. We have several other pieces of paper, all of which come from those who send in a score without a letter, said scores having been taken in. See you all next time out.

**Finale**

Having mentioned “next time” we must define it. First post arrival, January 24, 1975, addressed to “SWL,” *SHORT WAVE MAGAZINE, BUCKINGHAM, MK18-1RQ*. And, for the Coming Year, may all your signals be good ones.

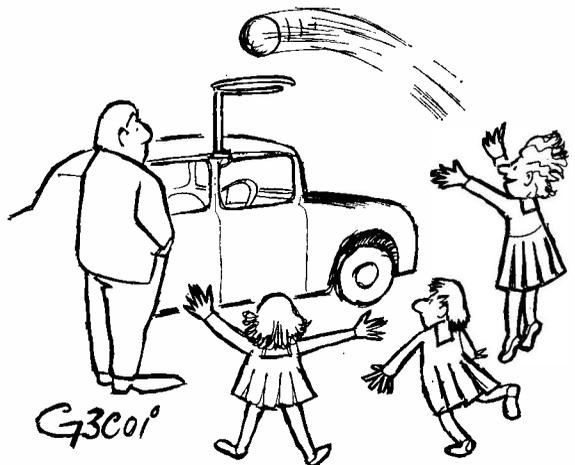
without trace in the autumnal monsoon weather; but no, he is still with us and active enough to rewrite a list containing 901 prefixes, from scratch.

Oddly enough the next letter in the clip comes from another OT in the HPX game, namely J. Fitzgerald (Gt. Missenden), who, we thought, had also sunk. In fact, the ailment was nothing so serious—just a fit of absent-mindedness which caused him to miss a couple of deadlines!

A. Buchman (New York) was also unfortunate enough to miss a deadline, but again, no matter, the prefixes still roll in; and now at last Alvin has his Joystick to help things along a little.

It's an ill wind that blows no good at all, must be the conclusion M. Pein (Liverpool) arrived at—he lost a large chunk of his Prefix sheet and so had the task of writing them all out again by dredging through the logs; the good was that this revealed seven prefixes which had not been claimed before!

How to pass the R.A.E. when one works a shift system which makes one lose one lecture in three is the problem for J. W. Sanderson (Ferryhill, Co. Durham); and it is compounded by the fact of not knowing any other amateur. One of the ways to deal with the first problem, provided one has an understanding R.A.E. lecturer, is to leave a recorder running during the lecture, and to play back the tape—a cheap Jap cassette job is quite adequate for this sort of thing. As for the problem of no contact with the locals, SWL Sanderson's phone number is Ferryhill 51938—will any local amateur or SWL



“Short Wave Magazine” covers the whole field of Amateur Radio  
and **is obtainable to order through any newsagent.**

## Oscar VII

AS briefly reported last month, *Oscar VII* was successfully launched on November 15 at 1711z and by the second orbit all planned systems were "Go" and signals and telemetry were being copied. As must be expected, it takes a bit of time to establish precise orbital parameters, but the latest observations indicate an orbital period of 114-944 minutes, a Westerly increment of 28-735° and an inclination of 101-7336°—a retrograde orbit therefore, as was the case with *Oscar VI*. It should be noted that the figures following the point are *decimals* and not seconds of time or arc. What this means then is that successive orbits will be spaced by about 1 hr. 55 mins. in time and by about 28-74° West at the equator crossing points. For example, during Orbit No. 300, *Oscar VII* crosses the equator at 1503-8z and at 275-9°W and during Orbit No. 301 the crossing time is 1658-8z at 304-635°W.

Each 25 orbits the time and bearing of the crossing at the equator may be found by deducting 6-6 minutes and 1-6°W from the starting datum, which facilitates longer term forecasting. Using Orbit No. 300 as above, Orbit No. 325 will cross at 1457-2 on a bearing of 274-3°W. Given a starting point, therefore, and using some simple arithmetic, predictions can be made for some time ahead.

To start the ball rolling, Orbit No. 660 on January 9, 1975 will cross the equator at 0842-0z on a heading of 180-5°W and you can take it on from there. There may be small changes measured as more precise data become available and we will keep you up-to-date with these throughout the three years predicted life of the satellite. They will in any case be very small and only if the figures given here are used for forecasting months ahead without amendment will they become significant.

It is emphasised that these data refer to *equatorial* crossings and that where the pass is from North to South the AOS (acquisition of signal) will be some 25-30 minutes later and about 10-15 minutes later when the pass is from South to North. LOS (loss of signal) will occur some 25 minutes after AOS for an overhead pass and at proportionately shorter intervals for more distant orbits.

## Operation

Details of the various operating modes and procedures were given in the February, 1974 issue of *SHORT WAVE MAGAZINE* and it should suffice here to give a condensed version of them and note any changes.

**Mode "A":** 2m/10m repeater operating. Input between 145-85-145-95 MHz with output over 29-40-29-50 MHz and beacons operating on 29-50 MHz and 435-1 MHz transmitting telemetry data. At the present time it is difficult to access the repeater due to the unwanted presence of a 14 dB pad at the Rx input, and it looks as if the 80-100 watts e.r.p. quoted as adequate for access is a bit on the low side. The beacon frequency has been measured as 29-502 MHz at zero Doppler shift and the two watts of output gives a good signal (around S5) most of the time. There is a pronounced Doppler shift, some 5 kHz, on this beacon. This mode is in use on all *odd* numbered dates of the year and *not* on all *odd* numbered dates of the month as has been announced.

**Mode "B":** 70 cm/2m repeater operating. Input between 432-125-432-175 MHz and output over 145-975-145-925 MHz, when 435-1 MHz beacon is off. Note that the downlink passband is inverted. Transmission should be on USB and this implies correct

# VHF BANDS

A. H. DORMER—G3DAH

reception on LSB; the transmit frequency must be lowered to raise the receive frequency when netting. Beacon frequency is measured as 145-971 MHz and the 200 mW output is providing good telemetry signals. This mode is in use on all *even* numbered dates of the year and not of the month. Note also that the original operating schedule for *Oscar VII* showed Wednesdays as off days. This has been modified as above. As with *Oscar VI*, certain stations are using excessive power to access the repeater resulting in shut down or distorted signals. About 300-400 watts e.r.p. is all that is required—say a QV06-40A and a 14-ele. beam.

**Mode "C":** Operation on reduced power on Mode "B" with the 2m. beacon only operational.

**Mode "D":** Both repeaters off and telemetry via the 70 cm. beacon on ground command.

## General Comments

It is early days yet to report individual results with *Oscar VII*, but here are just a couple which have come in: G8AWS has already worked 13 countries on Mode "B." including a couple of very nice contacts with W6 and K6. He runs 30 watts to a crossed 12-element beam on 70 cm. and a crossed 10-element array on two metres, both of which are fully steerable in azimuth and elevation. Sounds the ideal set-up and he is certainly a fine signal here in Herne Bay. G8EOP has worked five countries with 100 watts e.r.p. to a 46-element beam. G3DAH has worked 14 countries (best DX W0) with 30 watts to a 14-element beam on 70 cm. and a 10-element beam for 2m. reception.

For philatelists, AMSAT *Oscar VII* first-day covers postmarked at the launch site in California on November 15 are available from AMSAT against six IRC's and a large, self-addressed envelope. The address to write to is: AMSAT, P.O. Box 27, Washington D.C., 20044.

There are many ways of recording the telemetry data. An original one was devised by George Sassoon, G3JZK, who takes the RTTY from the Rx on an electro-cardiograph and deciphers it at leisure!

Attention is again drawn to the excellent *Oscar Newsletter* produced by G3WPO and G3IOR. This contains really up-to-the-minute news about both satellites, together with technical data on reception, orbit predictions, telemetry decode and suitable apparatus for use with the repeaters. Some s.a.e.'s get you in on the act if you send them, with £1, to Tony Bailey, G3WPO, *QTHR*, who will advise you about annual subs., etc.

Have fun with *Oscar VII*—and let us know your results, in detail.

## Contests

**Results:** The results of the VHF/NFD event could hardly have been much closer with

the March and District A.R.S. leading by a mere 4% over the Southampton Group. Band winners were: G3FDW on 4m., GW3OXD on 2m., GW3SLJ on 70 cm. and G4BEL on 23 cm.

The Summer 70 cm. Cumulatives brought victory to G3KMS (Bolton, Lancs.) with G3JVL of Hayling Island as runner-up. In spite of generally poor conditions for most of the sessions, several contacts over 300 km. were completed.

The 6th BARTG VHF RTTY contest resulted in a win for DJJQT/P with more than twice the score of the runner-up, DJ8EA—and small wonder really, since he was operating from a lighthouse with an antenna feeder run of 90 metres! The leading British station was G3OUF, who took fourth place. The BARTG will be reviewing the question of differing operating speeds, which caused no small amount of confusion, when they come to formulate the rules for next year's event.

**Reports:** Conditions continued to be no more than average for the 4m. Cumulatives of November 10 and 17, were poor for that on November 24, but perked up a bit for the December 1 session.

Conditions were variable for the 144 MHz Fixed Station event on December 8, being much better in the late afternoon than at the start. Pressure was up to 1022 mb during the day (for a change!) and some good DX was available, including a small amount of Continental activity. Scores over the 100 mark were fairly common, but the best heard was that of G3VLG in Leicester who had over 200 contacts.

By and large, one is left with the impression that propagation on all the VHF/UHF bands, certainly during most contests, has been much poorer this year than last. There have been no stable periods of high pressure of any significant length, and the dreary succession of "Lows" from the Atlantic, are undoubtedly the cause. The poor level of activity, local and DX, indicates the reluctance of many operators to call CQ into what may appear to be an "empty band," instead of treating poor conditions as a challenge. One has only to listen to some of the regular skeds to hear what can be done when the bands appear to be flat.

## Linear Amplifiers

Attention was drawn recently in this Column to the misuse of linear amplifiers, particularly on two metres, and some suggestions were made for improving the situation. The notes attracted the attention of Robin Harvey, G4BBR, who runs full legal power on both 2m. and 70 cm. using a

## TWENTY-THREE CENTIMETRES

Station	ALL-TIME TABLE		Total
	Countries	Countries	
G4BEL	24	7	31
G3JVL	20	4	24
G3DAH	20	3	23
G8ARM	20	2	22
G4BYV	15	5	20
G3COJ	15	3	18
G3JXN	17	1	18
G4ALN	15	3	18
G3EHM	14	2	16
G8AOD	11	2	13
G5DF	11	1	12
G8FMK	10	1	11
G3NHE	8	1	9
G8FJG	7	1	8
G8EOP	1	1	2

We should very much like to see more entries for this Table, not only from the competitive point of view but also to give an indication of where activity on this band lies. So how about it?

## THREE BAND ANNUAL VHF TABLE

January to December 1974

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G3NHE	56	6	74	18	56	11	221
G3DAH	51	8	63	18	35	9	184
GD2HDZ	41	6	80	13	36	7	183
G5DF	44	7	65	16	37	6	175
G4AGE	29	4	67	11	42	8	161
G3XDY	28	4	72	12	20	8	144
G8EOP	—	—	71	13	42	10	136
G3OHH	46	7	56	11	12	2	134
G3FIJ	30	4	44	13	15	4	110
GM3ZBE	28	4	48	13	4	6	102
G3BW	—	—	65	10	22	4	101
G4CZP	—	—	79	14	—	—	93
GW8FOL	—	—	75	16	—	—	91
G4AEZ	15	2	46	11	13	3	90
GW8FKB	—	—	77	10	1	1	89
G4BMM	8	2	45	11	19	4	89
G8GHZ	—	—	67	10	9	1	87
G8HBQ	—	—	61	9	12	3	85
G3SHY	15	3	27	6	23	5	79
GM4CXP	—	—	67	12	—	—	79
GW3KGD	—	—	64	15	—	—	79
G8GNE	—	—	40	10	23	3	76
G2AXI	21	3	32	8	9	1	74
G3AHB	—	—	55	10	7	1	73
G8ECO	—	—	49	9	12	2	72
G8DGR	—	—	52	11	4	1	68
GW8BXQ	—	—	52	12	1	1	66
G8FMK	—	—	27	2	34	3	66
G4DHF	—	—	56	9	—	—	65
G18EWM	—	—	52	9	1	1	63
G8FWB	—	—	51	10	—	—	61
G8HHI	—	—	51	10	—	—	61
G8GGP	—	—	50	9	—	—	59
GW8HVP	—	—	48	8	—	—	56
G3EKP	21	7	15	4	2	2	51
G8FUI	—	—	35	8	5	2	50
G8CBU	—	—	42	5	—	—	47
GW4BXE	12	2	20	11	—	—	45
G8HQA	—	—	37	7	—	—	44
G4DNJ	—	—	32	5	5	1	43
G8GLS	—	—	36	6	—	—	42
G8BBP	—	—	37	5	—	—	42
G8GXE	—	—	29	5	1	1	36
GW3XJQ	—	—	27	9	—	—	36
G3FKP	—	—	29	2	—	—	31
G8HYH	—	—	27	4	—	—	31
G8BPJ	—	—	23	2	1	2	28
G3SXX	—	—	21	6	—	—	27

## Notes:

- (1) Claims should be on the basis of the *OLD* county boundaries until December 31, 1974.
- (2) The Tables show claims to date from January 1, 1974 and closed on December 31, 1974.
- (3) From January 1, 1975, the new county organisation for England and Wales will be used in the compilation of this Table. Throughout 1975 Scottish counties will remain unchanged for the purposes of this Table.
- (4) Claims should be sent to "VHF Bands," *SHORT WAVE MAGAZINE*, BUCKINGHAM, MK18 1RQ.
- (5) Please start sending in your claims as soon as possible after the start of the New Year.

pair of 4CX250B's, and he has sent in some useful supplementary hints on setting up a linear, an abridged version of which is reproduced here with due acknowledgment to him.

- (1) Ensure that the tetrode amplifier is neutralised and free from parasitics,
- (2) With appropriate heater, anode and screen volts applied, adjust the DC bias for the recommended zero signal value of anode current,
- (3) Connect a suitable dummy load and set the loading control for rather heavy loading,
- (4) With a single-tone source, increase the signal drive until a small change in screen current is noted,
- (5) Resonate anode circuit for a positive peak in screen current,
- (6) Resonate the grid circuit for a peak in anode current,
- (7) Increase drive until either the desired value of single-tone screen or anode current is reached, whichever comes first,
- (8) Without drawing grid current, adjust loading, anode tuning and drive level to duplicate as nearly as possible the data sheet conditions. Anode current will increase with drive and screen current will peak at resonance but decrease with increased loading,
- (9) Connect an aerial and repeat step (8) by adjustment of anode tuning and loading with the same drive level as before,
- (10) Apply SSB input and adjust audio gain for highest output on voice peaks without drawing grid current or flat-topping.

Now this is all good stuff and little need be added to it except, perhaps, to say that screen current in a tetrode linear is a most sensitive indicator of correct operating conditions, and that when setting-up, and preferably permanently, a screen current meter is a great help in assuring a clean signal. A dummy load is pretty easy to construct, and if you don't want to make your own, there are commercial models available—but using one does make things easier and will eliminate all the huffing-and-puffing and whistling which pollutes the air all too often. It may be noted here that neither the QOV06-40A nor the QOV03-20A has a manufacturer's rating for VHF SSB service!

## Beacons and Repeaters

GB3PI and GB3BC are now well established and are licensed for one year. GB3MH (Malvern Hills) should be ready to go by the end of the year. They have been having a spot of receiver trouble. The London repeater, GB3LO, has been heard testing from Crystal Palace, the tests at Epsom having been satisfactory, although marred, by deliberate jamming! (We have some "nice" people in our midst, even on VHF). It is reported that the aerial feeder problem has been sorted out and that operation should commence before the end of the year.

The same date is applicable to the Hampshire repeater, GB3SN, located at Four Marks, near Alton, which has been heard radiating a call sign and long dash, so is presumably undergoing air test. Other repeaters are being planned or are awaiting the grant of the licence by the Home Office, and details will be given here in due course.

Just a reminder about frequencies: GB3PI and GB3BC input channels are on R6, 145.15 MHz; GB3LO and GB3MH on R7, 145.175 MHz; and GB3SN on R5, 145.125 MHz—where the "R" nomenclature is that specified in the IARU Region I Band Plan. The output frequencies are, in

every case, 600 kHz higher.

There is strong Continental pressure for beacons on Two to be allocated frequencies around 145.0 MHz as well as at the bottom end of the band, where they could well interfere with DX CW operation. *Everyone* seems to be in favour of having beacons as "guides to propagation conditions"—but nobody wants them on their own doorstep!

Plans are in hand for the establishment of 70 cm. beacons at Chelmsford, Luton, Liverpool, Cambridge and Crowborough, but reality is far away as yet.

A new departure for beaconry is likely to reach fruition by the end of the year in the operation of a 10.1 GHz installation on the Isle of Wight under the care of G3KSU. Initially, the output will be of the order of 80 milliwatts but it is planned to increase this to 2.5 watts later. The antenna is to give 11 dB gain from a slotted waveguide and will radiate a 1 kHz tone with a frequency deviation of  $\pm 500$  kHz. Beam heading will probably be along the South Coast eastwards.

#### VHFCC Awards

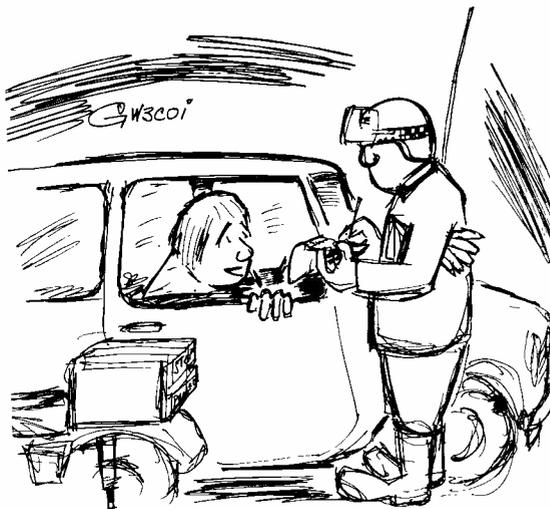
We are pleased to welcome G18HX to the Club and to award him Certificate No. 228 for two metres from Co. Down. Norman Henderson has been licensed since August, 1973 and runs a Pye AM10D for local contacts on AM and a Linc-2 for DX working. The QTH is approximately 400ft. a.s.l. with a fairly good take-off in all directions for the 8/8 slot-fed Yagi. The QSL return rate has been very poor at around 40%.

A no less cordial welcome to Maurice Wickham, GW8FQF (Pensard, near Abergele) who gets Certificate No. 229, again for 2m. operations. He was first licensed in February, 1972 and did quite a bit of /M and /P work for the first year using Pye equipment on both 2m. and 70 cm. At home, he also runs Pye gear with a BRT-400, modified for FM/AM with a Telford converter. The 8-cle. Yagi for 2m. is at 32 ft. and the 46-cle. for 70 cm. at 36ft. The QTH is at zero feet a.s.l., just south of the beach, with 800 ft. hills from East to West through South. He says that it is quite a feat to work even the GM's when the tide is high! In January, 1973 he got himself a Linc-2 and found DX much easier with best DX to date as HG5 during the sporadic-E openings recently. The 70 cm. gear runs about 5 watts output from a QV03-20A and best DX is with Kincardineshire. He hopes to have 70 cm. SSB going shortly and will follow that with 23 cm.

Finally, greetings to G4APL of Caterham, Surrey, who gains award No. 230 for 2m. work. Paul was first licensed in September, 1970 as G8DYZ after spending some years as an SWL on the HF bands, becoming G4APL two years later. An HW-17A, modified for AM/FM transmit and receive, is doing good service and is supplemented by a Linc-2 for SSB and CW. The Rx set-up consists of a Mosfet converter and an HRO-500, the 14-cle. Parabeam being on a Versatower at up to 50ft.

#### View from GM

Considerable thought is being given in Scotland to the selection of simplex calling and working channels for fixed-frequency FM working. The IARU Band Plan, accepted by all countries in Region I, allots four channels at 25 kHz spacing (designated S20-S23 in ascending order of frequency)



*" . . . could help you with your enquiries if you stood on the near-side—you are detuning my whip . . . "*

between 145.50 and 145.575 MHz. Channel S24 on 145.60 MHz, shown in the Plan as a simplex channel, is also annotated R0, the lowest of the repeater output frequencies, although this implies that the repeater *input* frequency would then be on 145.00 MHz, and by local agreement, this channel will be avoided in view of its country-wide use as a mobile calling frequency.

The Central Scotland Group recommends S20 (145.5 MHz) as the calling channel with S23 and S24 as the working frequencies. This is at variance with the practice in the South where 145.0 MHz remains a popular calling channel, very much abused by many fixed and mobile operators who treat it as both a calling and working channel. S20 (145.5 MHz) is the allotted calling channel with S21 (145.525 MHz) and S22 (145.575 MHz) as working channels. Some use is made of S24 (145.6 MHz) in Scotland and the North of England. The situation is further complicated by the practice in the South of allotting frequencies to Zones on a fairly arbitrary basis.

Your scribe does not wish to enter the arena and do battle with opposing factions as to which channel should be used for what purpose and where, but it does appear that the well-equipped mobileer must now be prepared to fit channels S20-S24, also 145.0 MHz and one or more repeater channels if he travels frequently over any great distance. A very expensive process, and one which, in any case, cannot be applied to all FM equipments in current use. It looks as if some centralised coordination is required here.

GM3GEC is pressing on with his 10 GHz transceiver and he and GM3OXX are busy selecting sites for the 1975 expeditions. GM8BJF has nearly completed his 2m. solid-state transceiver built around the Plessy IC's. It incorporates a phase-locked oscillator and a digital frequency synthesiser switched at 10 kHz. GM8HUM is now GM4DQK but will not be deserting VHF. The recent 90 m.p.h. gales in Scotland

brought down the antennas at GM3BQA from 80ft. to ground level.

#### General News

G8FMK puts forward the idea of an AM calling channel for 2m. and 70 cm., pointing out that there are already calling channels for SSB, CR and FM, and suggests 144.3 MHz and 432.3 MHz as possible frequencies. If such an idea were adopted, use of these channels might be extended to create an "All Phone Modes" channel which would stimulate cross-mode contacts, particularly for users of apparatus with restricted coverage, such as the Linc-2.

G3LQI puts in a plea for more CW on the VHF bands—a point we have been trying to get across for years—and goes along with the idea of a CW calling channel. A frequency of 144.12 MHz has been suggested, and it seems worthwhile giving this a trial. It is to be hoped that, if this finds general favour, it will be borne in mind that it is a *calling* and not a working channel, and that once contact has been established a quick QSY is called for!

Apologies go to GD2HDZ for reporting last month that he had a sked on 23 cm. with PA0SSB—it is G3JVL who has it. Arthur still has some way to go before he is fully equipped for the 23-centimetre band.

#### Deadline

Christmas and the New Year intervening, we shall have to tighten up the deadlines for the next two issues. You should get this copy by Friday, January 3, 1975 and readers deadline for the February issue will be January 10, 1975.

Please remember to send in your scores for the last of the 1974 Three-Band VHF Tables as soon as possible after December 31, 1974. Address as usual is: "VHF Bands," *SHORT WAVE MAGAZINE*, BUCKINGHAM, MK18 1RQ.

All the best for the New Year and bags of good DX. *Vy 73 de G3DAH.*

# THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for February issue: January 9)

FREQUENTLY one reads a comment, either in a letter to this piece, or in a newsletter, that the writer can't understand why more of the locals aren't in the group? "We put on a good programme, we have a good club room, a good station available, etc., etc.," so what's wrong?

Basically, *nothing!* The chap who makes the comment is just forgetting about human nature; some of us are "clubbable." Others, more introvert, feel unhappy in a large gathering like a party or Club meeting; yet others like being members but the thought of being "on the committee" and so in some way responsible if the Club folds worries them. Yet others would serve on the committee quite happily but balk at being asked to act as secretary, treasurer or chairman simply because it involves a basic form of public speaking which is a bit frightening in cold blood—or even because they are afraid they would stumble over reading the minutes of the last meeting. These are real fears, not to be dismissed lightly, and they are part of that rich variety in people which accounts for some of us being DX'-hounds, some craftsmen constructors of the highest order, some rag-chewers on the local-natter bands, some rabid contest operators and so on.

One would think that if a Club were to look at its "catchment area" with *Call Book* in hand, and count up the potential licensed membership in the area, compare it with the total number of licensed members actually in the Club and fairly regular attenders, then a ratio of better than half of the locals actually in the Club is pretty fair going—and the proportion of SWL's likely will be about the same unless there is some special attraction, such as a Club-run R.A.E. or Morse class.

What then accounts for some "country" clubs being so strong— one thinks of Spalding, for instance, or Shefford—despite their apparent lack of potential members? Usually they have a large number of associates who do not live locally but pay membership dues because they want to read the newsletter or because the junk sales are well worth a visit, when there is often test-gear from some local firm being disposed of, or some other such special reason; but we will take a bet that normal attendances are not a great deal above the norm we have postulated.

However, we must come down to the matter in hand, namely, what's going on in January 1975.

## Midlands

January 21 is the date for Solihull, at the Manor House, High Street, Solihull; the speaker will be G8DNF, giving his well-known talk on the DX-pedition to Andorra. We notice the start time is given as 7.30—no doubt this is to get the business out of the way prior to the talk, so it would be a good thing as well as a courteous, since the speaker is coming from far afield, to be there on time. Visitors are specially welcome to this one.

It should be an interesting evening on January 17 at Melton Mowbray, where G3FXP will be talking about the History of Telegraphy—after all, even the phone-only merchants must realise that telegraphy was that which laid the ground-work of technology, enabling telephony to become practical. The venue is not stated, but we seem to recall it as being the St. John Ambulance building in Melton Mowbray—doubtless G3NVK will be only too pleased to tell you if you get in touch with him, as Panel.

Annual general meetings are in the air at this time of year, and Spalding run true to form in this, with theirs on January 10, at the "Ship Albion," 7.30 p.m. With a membership of 160, no less, they hope for a good turn-out.

One way of getting to know the latest about the Derby doings is to listen to Radio Derby on Wednesday mornings (VHF or medium-wave channels). This is the way to rake 'em in, by preaching not only to the converted (*you, dear readers!*) but also to the Great British Public. Let's see what goes on in January at 119 Green Lane: on the 1st there is a Surplus Sale, followed on the 8th by a retrospective view of the year; this one is also a Ladies' Night. January 15 is down for a Film Show, and on the 22nd Mark Edworthy will be talking about Integrated Circuits. The last meeting of the month—January 29—is, as usual, a Junior Night.

Another Year-in-Retrospect session occurs on January 3 at Derby Nunsfield House, who have their Hq. at Nunsfield House, Boulton Lane, Alvaston, Derby, and it is followed by a Junk Sale (this must be a pre-organised plot to keep the stuff circulating round Derby and district!) on January 10. A Night on the Air is down for January 17, and a display of homebrew, kit-built, and commercial gear occupies January 24. That leaves January 31, for a Technical Film Show.

"Amateur Applications of Integrated Circuits" is a fine title for a lecture; and who better to give it than G4CLF of Plessey Components, Ltd., who make those useful linear and communications IC's. As for who he gives it to, this is the Sheffield Amateur Radio Clubs amalgam, on January 6 in Room 3106 of Sheffield Polytechnic. This "super-group" is made up from the *Sheffield Club* itself, the *Polytechnic* group and the *Sheffield University Society*—one notes they have "individual" members from Worksop and Rotherham and a couple of otherwise non-affiliated members. Seems a good idea for a group of Clubs to get together in this sort of way once in a while, to attract lectures of a very high standard.

At Nottingham, they have five meetings for January—on the 2nd, 9th, 16th, 23rd and 30th—all at their regular gathering ground, Woodthorpe House, Mansfield Road. With 60 or so fully paid-up members, secretary G3AFJ feels that they are now out of the doldrums of some years ago. The Morse class attracts 15 members. They would like their existence made known to the many licensed amateurs in the Newark-Mansfield-Worksop area who have not yet joined.

Bromsgrove gather at the Avoncroft Art Centre on Jan. 10, Feb. 14 and March 14 and this Club made an entry in the November MCC.

Bedford now have a regular room at the United Services Club and soon will be able to instal HF/VHF gear for G3WTP, their own station. There are five regular meetings scheduled for January, on the 2nd, 9th, 16th, 23rd and 30th, all of which involve lectures or discussions on subjects of prime interest to the radio amateur—we note "Insurance for the Amateur" (Jan. 2) and "RF Radiation and its Effects" (Jan. 23). The February meetings are weekly on Thursday evenings.

Wolverhampton, one of the strongest Clubs in the Midlands, with quite a solid membership and a good *Newsletter* get together at Nechells Cottage, Stockwell Road, and for January have no less than nine meetings scheduled, one of which to catch our eye being "Looking at Magazines, Books and Advertisements," on Jan. 16. (We would be interested to hear what G8GCV says on the subject!). The Club Project involves the construction of a simple HF beam array. The current *Newsletter* carries a well-observed report on the Leicester ARRA Exhibition, with some shrewd comments (with which we are in agreement!).

## Up North

Although the Bury and Rossendale meeting is on the second Tuesday in each month at the Mosses Community Centre, Cecil Street, Bury, on every *other* Tuesday there is an informal get-together, with class tuition in Morse and R.A.E.

Bolton use the Clarence Hotel, Bradshawgate, and have the AGM there in January. However, no date is given, and also there is a hint of a change of Hq.—so if you intend to go, perhaps it would be best to contact the secretary first.

It is some Hq. they have at White Rose; Shack, Workshop, Library, Lounge, and Canteen, all at 83 Town Street, Armley, Leeds. Here they can be found on any Wednesday, but we notice in particular a lecture on Coil-Making by G3WFS on January 8, and the AGM on January 29. For this last, nominations must be in writing and handed to G3VTY a week before.

Over the Border now, to Mid-Lanark, at Wrangholm Hall Community Centre, Jerviston Street, New Stevenson, Motherwell. They seem to aim to make it a formal activity of some sort on alternate Fridays, with a natter session on the "blank weeks"; they say this is to make up for not giving the chance to natter at lectures! At all events, we see January 10 is down for "The Joys of Home Brewing"—not the alcoholic stuff but the electronic brews, GM8CF1-made. January 24 should bring some sparks—"The Black Box Debate." Looking ahead a little, we see GM3KJP will be demonstrating aerial and feeder measurements, using both home-constructed and professional test-gear—this should be an interesting and very instructive evening. The February 7 date covers this last, leaving the 21st for the Annual General Meeting.

All members and potential visitors to Wirral are asked to note that the January dates are put back one week; so the meetings will be on January 8 and 22. The exact details are not firm, but will be including a talk by G3VEB, a film show, and another Surplus Sale before the end of February, if all goes well. The Hq. is at the Sports Centre, Grange Road West, Birkenhead.

The usual heavy list of activities appears in the report from South

Spalding & District Radio Society put on an impressive stand for an exhibition at the opening of their local civic centre. Numerous items of home-built amateur band gear were displayed along the bench and included, at the far end, a CC/TV system. Among the Club operators were G3PVR, G3XBS and G400, with much SWL assistance. Spalding is one of the most active Clubs on our list.

Picture courtesy "Lincolnshire Free Post"



Manchester. Monday evenings are at the club shack, "Greeba," Shady Lane, Manchester 23, for the VHF lads to forego; in addition the full strength of the group is deployed every Friday at the Sale Moor Community Centre, Norris Road. In more detail, we see on January 3, G8MDJ talking about the GM3UCB DX-pedition. On January 10 they have a tape talk by G3IOR entitled "Some Further thoughts on Propagation—was Marconi right?" After that thought-provoking event, on January 17 they have a look at the progress of the Club project. January 24 sees them talking about Frequency Measurement and Frequency Standard transmissions, G3HZM handing out the "gen." To round it all off, there is a Night on the Air on January 31.

The Harrogate group have a new Hq., Christ Church Further Education Centre, Church Square, where they meet every Monday evening, 7.30 p.m.—they can operate all bands Top-to-Ten using a KW-2000A.

We must now head way up into GM for Glenrothes where the Club have a place at Douglas Road, Leslie, Fife, to get together every Wednesday evening. For January 5 we notice they have a Film Show, the title of the film being *The Moving Spirit*.

#### Westward Ho!

No, we don't mean that a group has surfaced in that golfer's and boating paradise—the nearby one is at Barnstaple, North Devon for which one should contact G4CG address as Panel. Rather are we referring to the geographical grouping involving Wales and the West Country.

For instance, there is Cornish, which is about as far West as one can go. They have an intriguing title for January 2, namely, G3XTF's "Chemistry in Radio." If you want to look them up on this occasion, head for the SWEB Clubroom, Pool, Camborne, Cornwall.

Yeovil never give much indication of their activities; they just remind us that on any Thursday evening you can find them at the Youth Centre, 31 The Park. However, they must have made a new-year resolution this time, as we see for January 9 a Junk Sale, and again on January 30, a tape lecture.

Back towards the Midlands, we come to Hereford but their December *Newsletter* gives us no clue as to meetings in January—however, the secretary of this active group is G4CNY, who will be able to give you all the details. We gather from said *Newsletter* that they are going well, with interesting talks and visits. A social evening is in prospect, for which suggestions are requested from members. The Club runs a monthly Heard/Worked column covering the HF/VHF bands, some 14 members participating.

#### Southrons

January in West Kent means the 10th and 24th at the Adult Education Centre, Monson Road, Tunbridge Wells; the first date sees G3VEH of the Pye Telecomms repeater group talking about GB3PI, and on the later one G3JIX is to discuss radio methods used in Astronomy. In between these formal sessions, on the following Tuesdays there are meetings held at the Drill Hall, Victoria Road, Tunbridge Wells.

Acton, Brentford & Chiswick must be noted next—one of our most consistent reporters to this piece. January 21 is the important date, being the Annual General Meeting. Venue, as ever, is the Chiswick Trades and Social Club, 66 High Road, Chiswick, London, W.4, starting at 7.30.

Although their Hq. is at the Loyal Hall, Silver Street, Newport Pagnell, the group we are now mentioning call themselves Milton Keynes, acknowledging the existence of the new town. It will be interesting on January 6, as the local GPO representative is coming out to talk about tracing interference.

An illustrated talk on Ascension Island is set for January 2 at Maidenhead, the speaker being from the BBC. Then there is January 21, when the Club's new receiver will be demonstrated and explained to the membership by G3VCT. Maidenhead group get together at the British Red Cross Hall, The Crescent—and refreshments are provided.

Activity, we hear, is on the increase at North Kent with attendances steadily climbing; they foregather at the United Reformed Church Hall, Bexleyheath Clocktower, the entrance being in Chapel Road, on the second and fourth Thursdays each month. January 9 is mentioned in the *Newsletter* as being the date on which the firm of Homer & Whitbread (G8IWX and G8AYN) will be there to demonstrate their range.

Not so far away is Cray Valley; they have booked their room for January 2, for a talk and demo. by Walters & Stanton of the Swan line, aerials and the audio gear they handle. On January 16 there is a natter evening. Hq. is at Eltham United Reformed Church Hall, 1 Court Road, London, S.E.9.

It looks like the second Thursday at Southgate if they stick to the routine indicated for previous months; they will foregather at the Scout Hut, off Wilson Street, Winchmore Hill Green, N.12. As the December session is the AGM, we can hardly expect to know just yet what is planned for that January date.

"Multipliers and Amplifiers" come to Crystal Palace on January 18, the proceedings being in the able hands of G3OOU and G8HAX. Start at 8.0 p.m., Emmanuel Church Hall, Barry Road, London, S.E.22.

The third Tuesday seems to be the evening for Surrey to gather at the Ship Inn, High Street, Croydon—if the last few months are anything to go by they certainly have a fine selection of speakers lined up.

A warning note sounds in the Sutton & Cheam *Newsletter* to hand. It seems that the husband-and-wife team, G4DDY and G4CCY, had their Storno two-metre gear swiped from the car, though it was very clearly marked (by modifications) as being amateur equipment. The fact that the station log and *nothing else* was taken at the same time suggests that the specialist in stolen Amateur Radio gear is getting going in this country, something previously unknown. To revert to the group, they have their Hq. at the Library, Cheam, where on January 21 G3CDK will talk about his experiences with "Repeaters—and Other Things!"

Farnborough work well ahead of time, which enables us to look at the front page of their *Newsletter* and see that on January 8, G3TMQ will be giving a talk on Frequency Synthesis. Look for them in the 8th Farnborough Air Scouts Hut, Rectory Road, on the second and fourth Wednesdays in each month.

Not very often we hear from Oxford (University Radio Society) who hold their sessions at the Mansfield Road Club, on the second and fourth Wednesdays of each month. They who would like to see visitors or intending members there.

As it is the AGM in December, no doubt the committee at Verulam will be rapidly picking up their new jobs and fixing up something for the January meeting. This, if current form is anything to go by, will be at the Market Hall, St. Albans on January 15.

The Maidstone group, with their own well-known callsigns G3TRF/G3YSC have four meetings—on January 3, 10, 17 and 24—during the coming month, all at the Sportscentre, Melrose Close, help for Beginners being featured on the 3rd and 17th.

According to G3KDL, their secretary, the Radio Society of Harrow has meetings at the Sea Cadets Hq., Woodlands Road,

on January 3, 10, 17, 24 and 31—another Club with regular weekly meetings, with much going on of interest to members. Their president is the well-known old timer, Bill Corsham, G2UV, who is credited with the invention of the QSL card—over the years since, it has often been suggested that this is an innovation which, in the Amateur Radio context, might better never have been conceived!

Echelford run nets on Top Band, Eighty and Two Metres and produce a comprehensive *Newsletter* covering members' activities. They are having trouble with "a couple of jokers" (sic) who are creating QRM for them on Top Band—however, there are now D/F receivers going to locate the source of the bother.

#### Special Interests

This heading is to cover those groups who cater for special categories of amateur. First on the list is A.R.M.S., for the mobile operator, in any part of the country or indeed the world where /M type working is permissible. For details, contact G3FPK, as Panel.

WAMRAC is for those amateurs and SWL's who are Methodists, basically, albeit they will accept members from any Christian denomination. There seems to be quite a lot of Wamrac activity on the air, by way of nets and skeds, mainly on Eighty as far as U.K. goes, but some on Twenty and VHF.

#### Finale

This is the lot for this month. We have done our best to take in all possible material that came in to time, despite an unexpectedly fierce printing schedule—but a packet of eight reports was caught in the post and delayed past the last moment for inclusion. These will be included next time round.

Please, then, your news for February—dates, Hq. addresses and such details, to arrive first post on January 9, addressed to "Club Secretary," *SHORT WAVE MAGAZINE*, BUCKINGHAM, MK-181RQ. And a Happy New Year to all who follow this piece.

#### Names and addresses of Club Secretaries reporting in this issue :

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, London, W3-8LB.  
 A.R.M.S.: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey, CR2-1EZ.  
 BEDFORD: S. Felts, G8FMG, 6 Whitelodge Close, Kempston, Bedford (852414), Beds.  
 BOLTON: F. R. Hamilton, 329 North Road, Atherton, Manchester, M29-0RF.  
 BROMSGROVE: J. Duffrane, 44 Hazelton Road, Marlbrook, Bromsgrove, Worcs.  
 CORNISH: H. Webster, G3XTF, Crandale, Gillyfields, Redruth (6905), Cornwall.  
 CRAY VALLEY: P. F. Vella, G3WVP, 78 Hurst Road, Sidcup, Kent.  
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London, SE23-3BN (01-699 6940).  
 DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby (21931), DE3-7GE.  
 DERBY (Nunsfield House): J. Cage, G8GBV, 25 Petersham Drive, Alvaston, Derby, DE2-0JU.  
 ECHELDFORD: A. J. M. Wenham, G3ZXA, 28 Pine Wood, Sunbury-on-Thames (86440), Surrey.  
 FARNBOROUGH: R. C. Bagwell, G8ECO, 33 Frimley Green Road, Frimley, Camberley, Surrey.  
 GLENROTHES: A. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fify, KY1-2LH.  
 HARROGATE: D. Boniface, G8IBB, 11 Holmfied Road, Ripon, North Yorkshire.  
 HARROW: L. D. E. Light, G3KDL (address wanted).  
 HEREFORD: S. H. Jesson, G4CNY, 181 Kings Acre Road, Hereford.  
 MAIDENHEAD: E. C. Palmer, G3FVC, 37 Headington Road, Maidenhead (20107), Berks., SL6-5LA.  
 MAIDSTONE: G. Taylor, G4BNI, 26 Valley Drive, Loose, Maidstone (43976), Kent.  
 MELTON MOWBRAY: R. Winters, G3NVK, 32 Redwood Avenue, Melton Mowbray (3369), Leics., LE13-1TZ.  
 MID-LANARK: D. H. Plumridge, GM3KMG, 7 Waterside Gardens, Hamilton (28759), Lanarks, ML3-7PY.  
 MILTON KEYNES: T. M. Rabbits, G8HUH, 39 Vandyke Close, Woburn Sands (583706), Milton Keynes, Bucks., MK17-8UU.

NORTH DEVON: H. G. Hughes, G4CG, Grinnis, High Wall, Sticklepath, Barnstaple, Devon.  
 NORTH KENT: R. Wells, G4ARQ, 12 Bulbank Road, Belvedere, Kent.  
 NOTTINGHAM: G. Dover, G4AFJ, 21 Greenwood Avenue, Nottingham, NG3 7FX.  
 OXFORD: C. R. Mitchell, G8IUU, 85 Howard Street, Oxford (44064).  
 SHEFFIELD (Amateur Radio Clubs Association): P. Day, G3PHO, 39 St. Albans Road, Sheffield (306956) 10, South Yorkshire.  
 SOLIHULL: L. G. Boswell, G4AEJ, 170 Kestrel Avenue, Yardley, Birmingham, B25-8QX.  
 SOUTHGATE: B. Oughton, G4AEZ, 48 Morley Hill, Enfield, Greater London.  
 SOUTH MANCHESTER: D. Holland, G3WFT, 7 Alcester Road, Sale, Cheshire, M33-3GW.  
 SPALDING: R. Harrison, G3VPR, 38 Park Avenue, Spalding, Lincs.  
 SURREY: S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon, CR2-8PB (01-457 3258).  
 SUTTON & CHEAM: A. Keech, G4BOX, 26 St. Albans Road, Cheam, Sutton, Surrey.  
 VERULAM: H. Young, G3YHY, 93 Leaford Crescent, Watford (25633), Herts., WD2-5JQ.  
 WAMRAC: L. Colley, G3AGX, Micasa, 13 Ferry Road, Wawne, Hull, Humberside, HU7-5XU.  
 WEST KENT: M. Stanton, G4CCQ, Sweetbourne Cottage, Hastings Road, Lamberhurst (393), Kent, TN3-8JG.  
 WHITE ROSE: K. R. Robson, G3VTY, Flat 7, 34 Saint James Drive, Horsforth, Leeds.  
 BURY & ROSSENDALE: C. Kirby, G8HQW, 2 St. Peters Place, Haslingden, Rossendale (4915), Lancs.  
 WIRRAL: H. Crofts, G3DLF, 3 Barmouth Road, Wallasey (051-638 2515).  
 WOLVERHAMPTON: J. P. H. Burden, G3UBX, 28 Coalway Road, Wolverhampton, West Midlands, WV3 7LX.  
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset.

**508-514 ALUM ROCK ROAD  
BIRMINGHAM 8**

**021-327 1497  
6313**



**FOR THE WIDEST SELECTION  
IN NEW AND USED GEAR —**

**SWAN**  
ELECTRONICS



SS200A

America's ultimate in Ham equipment. Fully Solid State yet 300 watts of power with infinite VSWR protection. Broadband circuits eliminates Tx tuning!

- **YAESU MUSEN** (SEE SEPARATE ADVERTISEMENT)
- **KW COMMUNICATIONS** FULL RANGE EX-STOCK
- **ATLAS 180** NOW EX-STOCK FOLLOWING MAIN AGENCY APPOINTMENT

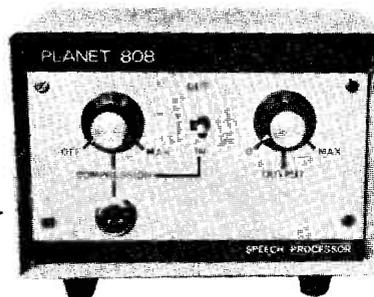


**THE FANTASTIC 700CX  
TRANSCIVER**

**700 WATTS OF PUNCH—  
BEAUTIFUL TO BEHOLD AND A  
DELIGHT TO HANDLE**

**PLANET'S**

**SUPERB  
NEW AF  
SPEECH  
PROCESSOR!**



**USED EQUIPMENT — MANY CHOICE ITEMS**

**COLLINS — DRAKE — RACAL, Etc.**

PLUS SPECIAL OFFERS ON DISCONTINUED SOMMERKAMP AND TRIO MODELS

**AERIALS — ROTATORS — ANCILLARY EQUIPMENT, Etc. —  
SEE LAST MONTH'S ISSUE**

A COUPLE OF STAMPS (WE'LL PROVIDE THE ENVELOPE) WILL BRING YOU OUR LATEST USED EQUIPMENT LIST OR INDIVIDUAL INFORMATION ON SPECIFIC ITEMS—18 PENCE BRINGS THE LATEST GLOSSY SWAN OR YAESU CATALOGUE (FULLY REFUNDABLE AGAINST EVENTUAL PURCHASE).

**Northern Agent—JOHN ROWLEY, G3KAE, Scarborough. Tel: West Ayton 3039**  
**Scottish Agent—RON TURNER, GM8HXQ, Wishaw. Tel: Wishaw 72172**

**AMATEUR ELECTRONICS UK**

# SOLID STATE MODULES

63 WOODHEAD ROAD, SOLID, LOCKWOOD  
HUDDERSFIELD, HD4 6ER

Telephone: 0484-23991

Manufacturers and Suppliers of Communications Equipment

MEMBER OF THE A.R.R.A.

## NEW FOR '75

New products available from last year's development programme.

### NEW No. 1. EUROPA 70 CM. 28-30 MHz Receive Converter—Ex Stock

This completely new receive converter is called a Europa converter because it will plug into our Europa 70 cm. transmit converter which will be available in a month or so.

The oscillator chain in the converter will drive the Europa transmit converter.

- ★ The two FET R.F. stages are based on our already successful SM71 70 CM. pre-amplifier.
- ★ The mixer also uses an FET.
- ★ The oscillator chain starts with a 101 MHz crystal.
- ★ Noise figure 3.5 dB. Gain 30 dB.
- ★ Size: 2½" x 4" x 1½".
- ★ Price of this extremely high performance unit, £20-52.

### NEW No. 2 EUROPA 70 CM. Transmit Converter

Now in our production department for an early delivery. Full data will be published next month, but it is high power and the price, just to whet your appetite, is £43-00.

### NEW No. 3 SM71 70 CM. PRE-AMPLIFIER. Ex stock. A selected 2 stage FET amplifier.

- ★ Noise figure 3.5 dB, gain 18 dB.
- ★ Size: 2½" x 4" x 1½". Price: £9-72.

### NEW No. 4 SM23 1296 MHz CONVERTER

- ★ Fully BALANCED hot carrier diode Hybrid ring mixer.
- ★ Tuned Hybrid two pole oscillator chain filter.
- ★ BNC input socket, Belling Lee output socket as standard.
- ★ Noise figure 7 dB, gain 27 dB, IF 28-30 MHz.
- Price of this high performance converter is only £21-60.

### NEW No. 5. THE EUROPA "B" An updated version of the extremely successful Europa, some of the changes are:—

- ★ New front panel design.
  - ★ ROUND knobs "at last."
  - ★ Internal aerial change over relay.
  - ★ SO 259 aerial socket, so you can fit thick co-ax.
  - ★ 10 times more accurate frequency and more stable oscillator crystal.
  - ★ No increase in price!
- The Europa makes sense! For the cost of the Europa and a 28-30 MHz transceiver or transmitter-receiver combination, you get:—
- ★ Coverage of the H.F. bands with your H.F. gear.
  - ★ Highest 2 metre transmit power available. Up to 200W INPUT.
  - ★ Highest receive sensitivity available, 2 dB noise figure.
  - ★ Extremely high stability and clean output spectrum.
  - ★ Very well constructed and attractive appearance.
  - ★ Well established and highly reliable basic design.
  - ★ 2 metre or 4 metre version—off the shelf.
  - ★ Low price: £88-00 complete, £74-00 less valves—valves required are 2 off QV03/10, 1 off QV06/40A. Additional 12.6v. transformer for use with 6.3v. AC heater Yaesu equipment (FT401, etc.), £3-24, or in a case to match the Europa, £6-37.

### 2 METRE OR 4 METRE DUAL GATE MOSFET CONVERTERS—Ex Stock

### THE SENTINEL 2 OR 4 METRE CONVERTERS—ALL IFs FROM STOCK

Just as popular as ever:

- ★ Noise figure—2 dB. Gain—30 dB.
- ★ IFs 2-4 MHz and 4-6 MHz double conversion for general coverage receivers.

- ★ IF 28-30 MHz for amateur band receivers.
- ★ 4 metre IF, 28-28.7 MHz.
- ★ Price only £16-20.

### SENTINEL X DUAL GATE MOSFET 2 METRE CONVERTER Ex Stock

A de luxe version of the above converter, containing a mains power supply or external battery operation. It has front panel RF gain control. Technical data is the same as the Sentinel. Stock IFs: 2-4 MHz, 4-6 MHz and 28-30 MHz. Price: £21-06.

### THE SENTINEL 2 METRE CONVERTER KIT, 28-30 MHz. Ex Stock

The use of 116 MHz oscillators in our 28-30 MHz converters has made the alignment so much easier that we are now producing it as a kit. Specification and appearance is the same as our Sentinel converter. It is supplied with a printed circuit board drilled with all necessary coils mounted to make assembly simple. The price is only £11-60. If it won't work send it back with £2-00 and we'll make it work for you, so you can't go wrong.

### THE SENTINEL MF DUAL GATE MOSFET 2 METRE TO MEDIUM WAVE CONVERTER, Ex Stock

Receives 2 metres on a conventional MW B.C. receiver, very good used with a car radio. I.F. output of 0.5 MHz for 144-5 and 145-6 MHz in two switched bands. Size: 5" x 1½" front panel, 4" deep. Price: £20-25.

### SM 70 70 CM. CONVERTER, Ex Stock

- ★ IF output 144-146 MHz. Noise figure 3.5 dB. Gain 30 dB.
- ★ By using an IF of 2 metres we can produce this high performance unit for only £16-20.

### SENTINEL LOW NOISE FET PRE-AMPLIFIER, Ex Stock

- If you want the ultimate in 2 metres sensitivity:
- ★ Built in a box which matches our converters.
- ★ Isolated supply lines make it compatible with any existing supply polarity.
- ★ Low noise figure—1 dB. Gain—18 dB.
- ★ High selectivity tuned circuits. Price: £7-36.

### THE PA3 DUAL GATE MOSFET PRE-AMPLIFIER, Ex Stock

- ★ Small (about one cubic inch) printed circuit board pre-amplifier developed to fit inside transceivers where it can be wired into the receiver aerial lead after the c/o relay.
- ★ Low noise figure—2 dB. Gain—18 dB. Price: £5-94.

### SM 81 70 CM. PRE-AMPLIFIER—see above

Other items (please note prices include VAT)

Swan—700 NEW, £426. Atlas 180 NEW, £270. FT101 MK II with 160 metres, £270. FT101 MK III with new N.B. etc., £290. Heath HW30, £25.

Crystals: 15.5 MHz, HC6U, £2. 39.1 MHz, £2. 38-666 MHz, £2. All the prices include VAT (8%) and British Isles delivery. We export goods daily so this is no problem. We can give same day C.O.D. service (£50 limit).

All our products carry a 12 months guarantee. If you have any doubts, ring or write for assistance.

We carry many popular converters and pre-amps for Satellite bands etc., in stock, other frequencies are on short delivery. Finally, I should like to thank all customers for giving us a successful 1974.

We ALL here wish all of you a happy and prosperous 1975.

# MSI MARKETING SERVICES INTERNATIONAL

(A COOKE INTERNATIONAL ELECTRONICS COMPANY)

## MOBILE RADIOS

For the 144 enthusiasts, STORNO CQM13C, FM High Band, a bit soiled outside, but clean inside. Single channel, but very easily converted to six. Complete, less control box £8.00, carriage UK £2.00. Photocopy of the circuit details and diagram £1.00 extra if purchased with set. One only BASE STATION, GEC RC700, H/B. FM. Desk top set with GPO type telephone handset. Nearly new 12½ kcs bandwidth, £90.00. Can be installed and crystallised up to channel by our engineers.

## CRYSTALS

Limited offer—48-0125 MHz in style K = HC-25/U, made to a very high spec, £1.25, inc. p & p. Note 1 Third overtone resonates at 144-0375 MHz. Frequency Standards : HC-6/U holder 50 ppm, 1 MHz £2.20, inc. p & p. Ditto 100 Kcs £2.50, inc. p & p. All other frequencies to order. SAE with your enquiry please. Xtal Filters, 10.7 MHz IF 25 Kcs bandwidth, ex-equipment, £1.25, inc. Other filters available to order. Crystals made to order in 4 weeks.

One only, Cossor Marine VHF Radio type No. 124-ME 28. Complete with manual. Second-hand, but good condition. 240v. AC mains. 28 channel. Out of MPT spec! 50 kcs. wide. Parts alone must be worth £25.00. This equipment is heavy. Buyer collects.

## CONSTRUCTORS' CORNER

The following are new components in bags, suitable for most popular transistor radio projects :

Fixed capacitors, various, useful selection	55p per bag, inc. p & p	Tag strips, assorted.	15p per bag, inc. p & p
Tuning capacitors, miniature, 4 in bag	55p " " "	Packets of solder, multicore	5p " " "
Knobs, black, small, silver insert, 6 in bag	50p " " "	Portable tape motors, 12 volt, 2 in bag	55p " " "
Ditto medium, and pointer, 6 in bag	55p " " "	Newmarket transistors, set of 7 for a seven-	
Audio output transistors, 10 in a bag, various	55p " " "	transistor radio, 2 packets, 14 transistors	25p " " "
Ferrite rods and slabs, assorted, some long	50p " " "		

## WIRE

Self-fluxing enamelled copper wire by BICC, ENFIELD & CONOLLY. Gauges from 26 to 44. List on request. SAE please. Miniature mains cable, grey, PVC covered 3-core 15p metre. Hook up wire 7-0076 PVC covered 10p metre. Single strand 5p.

## ODDS

Ex-computer panels containing Transistors, Diodes R's and C's and some having IC's and trim pots as well, 5 boards £1.50, inc. p & p. 45 ohm 5in. loudspeakers, new in makers' boxes, 45p, inc. Large quantity of Plessey 1 µF capacitors 1000v DC/300v AC wkg., also 12 and 15 Pf. 2Kv wkg. Enquiries welcome.

**We also have a large stock of television EHT leads with CRT connectors attached. Again enquiries welcome.**

New motors 1/20th HP continuously rated as follows, 110v DC £1.50, carriage UK £1.00, 115v AC ditto. 220v DC £2.00 plus carriage, 240v AC £3.00 plus carriage. Fully shrouded four-hole flange fixing. Capacitor start. PLASTIC TOOL RACKS with felt insert to prevent rusting, complete with fixing screws for wall or bench. New in boxes, 25p, inc. p. & p.

OUR TERMS ARE C.W.O. Accounts with Colleges etc. by arrangement. Carriage on orders under £1.00—20p unless otherwise stated. DON'T FORGET THE VAT 8 per cent please. Please note, we are SHUT MONDAYS.

### ALL CORRESPONDENCE TO

RAMALLA HOUSE, ANCTON LANE, MIDDLETON-ON-SEA, BOGNOR REGIS, SUSSEX, PO22 6NJ  
TELEPHONE 024-369 2849

Wind, frost or rain—  
**MOSLEY is the name**  
**WE ARE THE ANTENNA**  
**PEOPLE**

### SOME ANTENNAS

#### MONO-BANDERS

A-310	3 Elements, 10 metres ...	£30.00
A-315	3 Elements, 15 metres ...	£34.00
Classic-203-C	3 Elements, 20 metres ...	£85.00
A-92-S	3 Elements, 2 metres ...	£14.00
DI-10	Ground Plane, 10 metres ...	£24.00
DI-2	Ground Plane, 2 metres ...	£9.00
MCQ-20	20 metre Quad ...	£55.00

#### DUAL-BANDERS

Elan	3 Elements, 10 and 15 metres ...	£38.00
Elan	2 Elements, 10 and 15 metres ...	£28.00
TD-2	Trap Dipole, 40 and 80 metres ...	£18.00
TCD-2	... ..	£18.50

Send for HANDBOOK containing full details of Antennas and other technical information. 33 pages 25p. Refundable upon purchase of Antenna.

# mosley makes impact

TOWERS  
ROTATORS  
COAX  
ROPES &  
LINES

BASIC  
PRICES.  
ADD VAT

#### TRI-BANDERS

Mustang Mk 2	3 Elements, 10, 15 and 20 metres ...	£60.00
Mustang Mk 2	2 Elements, 10, 15 and 20 metres ...	£48.00
TA-33 Jr.	High Power Model incl. Balun	
TA-33 Jr.	3 Elements, 10, 15 and 20 metres ...	£52.00
TA-32 Jr.	3 Elements, 10, 15 and 20 metres ...	£45.00
TA-31 Jr.	2 Elements, 10, 15 and 20 metres ...	£32.00
Classic-36	Rotary dipole, 10, 15 and 20 metres ...	£20.00
V-3 Jr.	6 elements, 10, 15 and 20 metres ...	£115.00
MCQ-3B	Trap Vertical, 10, 15 and 20 metres ...	£15.00
EI-Toro	Cubical Quad, 10, 15 and 20 metres ...	£90.00
QUAD-BANDERS	Vertical, 20, 40 and 80 metres ...	£14.00

#### QUAD-BANDERS

Atlas	Trap Vertical, 10, 15, 20 and 40 metres ...	£26.00
SWL Antennas		
SWL-7	Dipole, 11, 13, 16, 19, 25, 31 and 49 metres ...	£14.00
RD-5	Dipole, 10, 15, 20, 40 and 80 metres ...	£14.00

All antennas available ex works carriage and insurance extra

Administrative Address only

**40 Valley Road, New Costessey, Norwich, Norfolk**  
**NR5 0BD, England**

# MOSLEY

Electronics Ltd

# AMATEUR RADIO CHAS. H. YOUNG LTD. G3V FV

170-172 · CORPORATION STREET · BIRMINGHAM B4 6UD

021-236 1635

## MICROWAVE MODULES

70 MHz Converters 28-287 MHz IF	£16-42
144 MHz " 28-30 MHz IF	£16-42
144 MHz " 4-6 MHz IF	£16-42
144 MHz " 2-4 MHz IF	£16-42
144 MHz " 28-30 MHz IF (with 166 MHz output)	£17-60
432 MHz Converters 28-30 MHz IF	£19-55
432 MHz " 144-146 MHz IF	£19-55
1296 MHz " 28-30 MHz IF	£25-92
1296 MHz " 144-146 MHz IF	£25-92
144 MHz Pre-Amp (2 outputs)	£9-72
432 MHz Varactor Triplers	£18-90
1296 MHz Varactor Triplers	£27-00
136 MHz Converter (Satellite Band)	£16-42

Other IF's to order  
All above post free

## SOLID STATE MODULES

144 MHz Converters 4-6 MHz IF (30p)	£16-20
144 MHz Converters 28-30 MHz IF (30p)	£16-20
432 MHz Converters 144-146 MHz IF (30p)	£16-20
144 MHz Pre-amp (30p)	£7-36
144 MHz Pre-Amp PA3 for equip. (10p)	£5-94
Europa Transverter 10-2M with valves (£1)	£88-00

## MICROPHONES

Shure 201	(30p)	£6-60
Shure 444	(30p)	£16-50

● **Midland Agents**  
for EDDYSTONE, JAY BEAM,  
JOSTY KITS, AMTRON KITS

WE SPECIALISE IN THE SERVICE OF EDDYSTONE RECEIVERS AND CAN ACCEPT MOST MAKES OF COMMERCIALIY MADE COMMUNICATION EQUIPMENT.

WE ARE ALSO INTERESTED IN PURCHASING GOOD QUALITY UNMODIFIED SECOND-HAND EQUIPMENT.

## RECEIVERS

Yaesu FR50B with cal.	(£1-50)	£75-06
Yaesu FR101S	(£2-00)	£264-60
Eddystone EC10A21 Marine	300	
500 kHz 1-5 MHz-30 MHz	(£1-50)	£230-00

## ATU SWR

KW EZ Match ATU	(50p)	£21-60
KW103 SWR/Power 52 OHM	(35p)	£15-12
KW103 SWR/Power 75 OHM	(35p)	£15-12
KW107 ATU/SWR 52 OHM	(50p)	£64-80
ME11N SWR/Power 52/75 OHM	(50p)	£15-88
Hansen SWR3 SWR 52 OHM	(30p)	£6-90
Hansen SWR4 SWR 52 OHM	(30p)	£7-99
FSI Field Strength Meter	(25p)	£3-68

Multi-storey Car Park at rear of shop.

NO C.O.D. PLEASE PRINT YOUR NAME AND ADDRESS. YOU MAY ORDER GOODS BY PHONE AND PAY BY ACCESS OR BARCLAY. Enquiries S.A.E. please. Prices include VAT and are subject to change without notice.

## AERIALS and AERIAL EQUIPMENT

Eddystone LP1506 Active Aerial	(50p)	£26-40
10 kHz-30 MHz	(20p)	£3-08
Bantex i wave 2M Glass Fibre	(20p)	£3-08
Jay Beam		
2M Halo (head only)	(25p)	£2-00
2M Halo (with mast)	(25p)	£2-38
5 ele. 2m. beam	(50p)	£4-64
8 ele. 2m. beam	(50p)	£6-05
10 ele. 2m. beam	(50p)	£11-88
14 ele. 2m. beam	(50p)	£18-25
5 ele. crossed 2m. beam	(50p)	£8-86
8 ele. crossed 2m. beam	(50p)	£11-02
5 over 5 2m. beam	(50p)	£8-55
8 over 8 2m. beam	(50p)	£11-34
4 ele. 4m. beam	(50p)	£7-34
18 ele. 70 cm. beam	(50p)	£11-77
46 ele. 70 cm. beam	(50)	£13-07
KW Traps with AT	(50p)	£6-60
KW L.P.F. Filter 52 OHM	(25p)	£10-26
KW L.P.F. Filter 75 OHM	(25p)	£10-26
Low Loss Coax 50 OHM	(35p)	yd. 46p
Low Loss Coax 75 OHM	(35p)	yd. 20p
3" Ribbed Insulators	(10p)	20p
AT. Insulators (centre T)	(10p)	19p
ML1 100 lb. line approx 300 yds.	(30p)	£1-63
140ft. HJD 14 S.W.G. Bare Copper Wire	(35p)	£3-30
KW Ant. Switch IP 3W	(20p)	£5-40
KW Balun 1:1	(15p)	£2-70
Twin Feeder 30 OHM	(25p)	yd. 4p
Twin Feeder 30 OHM 110 yd. drum	(50p)	£3-80



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

where equipment is fully overhauled

HEATHKIT GR64 Receiver	£25-00 (£2-00)
HEATHKIT SB300 Receiver	£95-00 (£3-00)
HEATHKIT DX100 Transmitter	£50-00 (£5-00)
HAMMARLUND SP-600-JX Receiver	£160-00 (£3-50)
HAMMARLUND HQ-170 Receiver	£120-00 (£3-50)
KW-201 Receiver	£100-00 (£5-50)
KW-2000A with A.C. P.S.U.	£180-00 (£4-00)
KW-204 Transmitter	£180-00 (£4-00)
KW VESPA Mk. II, with A.C. P.S.U.	£105-00 (£4-00)
EDDYSTONE EA12 Receiver	£160-00 (£3-50)
STAR SR-350 Receiver	£50-00 (£2-00)
EDDYSTONE 730 Receiver	£95-00 (£3-00)
HEATHKIT SW-717 Receiver	£30-00 (£2-00)
R.216 Receiver, V.H.F. Receiver	£105-00 (£3-50)

WE CAN ALSO SUPPLY ANY MAKE OF NEW EQUIPMENT—and have pleasure in giving a few examples which are normally in stock:—

**AVOMETERS.** Model 7, Mk. 2, £48-82; Model 8, Mk. 5, £52-24; Model 40, Mk. 2, £48-82; Model 72, £20-06; Multimeter Mk. 4, £17-35; Standard Leather Carrying Case (Models 7, 8, 40), £9-80; Ever Ready ditto, £11-35; Multimeter Leather Case, £5-05; 10KV D.C. Multiplier for model 8 or 9, £9-00; 30KV D.C. ditto, £13-06; Pair of Long Reach Safety Slips, £14-93; Model EA113 Electronic Avo, £96-60; Model 272 Electronic Avo, £34-30; Model TT169 Transistor Testor, £20-06. All above post free in U.K. Trade and Educational enquiries invited. All other AVO and TAYLOR products available, ask for quote.

**S. G. BROWN'S HEADPHONES.** Type "F" 120 ohm, 2000 ohm, 4000 ohm, £10-80 (50p); Rubber Earpads for same, 70p per pr. (10p); Standard Jack plugs, 24p (4p).

**EDDYSTONE EQUIPMENT.** Please enquire.

**CODAR EQUIPMENT, PR40, £11-00 (60p).** Leaflets on request.

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

**NOTE:** 8% VAT must be added to all prices, new and secondhand, 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.

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 enquiries for specific items which although not advertised, may very well be in stock.

FREE SHURE MIC. WITH EVERY KW TRANSMITTER or TRANSCEIVER purchased

**PARTRIDGE "JOYSTICKS."** "New Lightweight VFA" £12-10 (60p); "JOYMATCH" III, Aerial Unit, £12-10 (60p), LO-Z500, £17-60 (60p); ATU kit, £5-00 (50p); ATU assembled, £6-05 (50p); Artificial earth, £6-00 (50p); Aerial Bandswitch, £6-00 (50p). Literature on request.

**TRIO EQUIPMENT.** Please enquire.

**SHURE MICROPHONES,** 44AT, £15-00 (40p); 44A, £13-00 (40p); 401A, £6-50 (30p); 201, £5-40 (30p); 202, £6-00 (30p). 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.

**TMK METERS:** TM500, £13-75 (50p), TW20CB, £17-50 (50p), TP55N, £9-75 (50p), Model 700, £30-00, also cases for same.

**PHILIPS PM2403 ELECTRONIC MULTIMETERS, £53-00 (60p),** 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. 1). KW2000E & P.S.U., £342-00 (£3-50); KW202, £195-00 (£2-50); KW204, £250-00 (£3-00); KW1000 Linear, £180-00 (£4-00); KW107, £68-00 (£1-50); KW EZ MATCH, £22-00 (60p); KW160, £18-00 (80p); KW109, £78-00 (£1-50); REMOTE VFO for Atlanta, £38-00 (70p); KW103 Monitor Scope, £85-00 (£3-00); Speaker for KW202, £13-00 (50p); KW103, £16-00 (50p); KW Low Pass Filter, £10-50 (30p); 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)

# J. BIRKETT *Radio Component Suppliers*

25 THE STRAIT . LINCOLN . LN2 1JF

Telephone: 20767

## U.H.F. COMPONENTS

**X BAND PIN DIODES** Coaxial mounting. 6 for 50p.  
**X BAND CRYSTAL HOLDERS** at £1.08.  
**X BAND DETECTORS** Similar to SIM 2 at 15p.  
**X BAND DIODES** Similar to IN 23 at 25p.  
**X BAND GUNN DIODES** at £1.65.  
**X BAND HIGH & GALLIUM ARSENIDE TUNING VARACTOR DIODES** (Schottky Barrier Diodes). For use with Gunn Diodes. Two types available: Type 1, 1pf to 2pf; Type 2, 3-3pf to 4-7pf. Both with data at £1.65 each.  
**2 GHz STRIPLINE NPN TRANSISTOR** Like BFR 90 at £3 each.  
**DUAL 2 GHz NPN TRANSISTORS** untested with data at 3 Pair for 55p.

**AF 279 PNP STRIPLINE TRANSISTORS** at 44p each.  
**BF 271 1 GHz RF AMP NPN TRANSISTOR** at 15p each.  
**RF AMPLIFIER TRANSISTORS** BF 198 400 MHz, BF 199 550 MHz, BF 240 400 MHz, BF 241 400 MHz. Any 6 for 50p.  
 BF 180 or BF 181. 5 for £1.  
**1000pf 500v.w. TUBULAR CERAMICS**, 15p doz.  
**SPECIAL OFFER** of IN 4007 DIODES 1000 PIV 1 amp., 16 for £1.08.

**ZN 414 RADIO I.C.** With data at £1.20.  
**TANTALUM BEAD CONDENSERS** .22uf 35v.w., 1uf 35v.w., 2uf 25v.w., 2.2uf 35v.w., 4.7uf 35v.w., 5uf 25v.w., 6.8uf 25v.w., 6.8uf 35v.w., 10uf 16v.w., 15uf 10v.w., 20uf 6v.w. All at 8p each.

**5 ASSORTED UNMARKED GOOD TRIACS** for 80p.  
**200 ASSORTED DISC CERAMICS** for 50p.  
**TEXAS HIGH SPEED DIODES** Type IN 3881R. 200 PIV 6 amp at 20p each.

**100 ASSORTED I.C.'s** Marked, Unmarked. Consisting of Op-Amps, 74 Series, Audio Amps., etc. 100 for 75p, 200 for £1.25.

**PLASTIC BC 107 type TRANSISTORS** Unmarked, 40p doz.  
**LIGHT SENSITIVE TRANSISTORS** Unmarked OCP 71 at 25p.

Branded OCP at 40p, OCP 71 at 50p, Silicon Photo Transistor NPN at 45p.

**MULLARD OP-AMP** Type TAA 243 at 30p.  
**50 ASSORTED MULLARD POLYESTERS** C280 Series Consisting of 10 x .01uf, 1 x .015uf, 2 x .022uf, 2 x .033, 2 x .047uf, 10 x .1uf, 1 x 1uf, 10 x .22uf, 2 x .33uf, 8 x .47uf, 2 x .68uf. The 50 for 80p.

**I.C. SOCKETS** 8 Pin, 14 Pin, 16 Pin. All at 15p each.  
**WASHER KIT FOR SEMICONDUCTORS** TO 3, BD 131, Bushes, etc. at 30p.

**DIVIDE BY 2 300 MHz COUNTERS** with data at 80p.  
**DIVIDE BY 4 180 MHz COUNTERS** with data at £1.10.  
**DIVIDE BY 10 300 MHz COUNTERS** Untested with data, 3 for £2.

**COLOUR TV CONVERGENCE POTS** 10 ohm, 50 ohm, 75 ohm. All at 10p each.

**COLOUR TV DELAY LINES** Mullard type at 40p each.  
**FM I.C.'s** Like TAA 570 Untested with data, 5 for 55p.

**MULLARD 10 WATT AUDIO MODULE** Type LF 1173 at £2.08.

**SANYO 15 WATT AUDIO MODULE** with data at £3.  
**PLASTIC HIGH GAIN TRANSISTORS** Like 2N 2926, 10 for 50p.

**GERMANIUM DIODES** IN 34A, OA 85, OA 91, OA 95. All at 8p each.

**JAPANESE TRANSISTOR KIT** 3 x 2SA49, 3 x 2SA52, 3 x 2SA53, 3 x 2SB56. The 12 for 42p.

**10 SILICON BRIDGES** 10 amp SUB-MINIATURE Untested, £1.25.

**AUDIO I.C.'s** SN 76013ND at £1, TBA 800 at £1.25, TAA 611B at 65p, 250mW Audio I.C. at 35p.

**STEREO DECODER I.C.** Type SN 76110 (MC 1307) at 85p.  
**PLASTIC VHF 200 MHz NPN TRANSISTORS**, 40p doz.

**BRANDED TRANSISTORS** BC 107, BC 308, BC 177, 2N 706, 2N 706A, BSY 95A, Lockfit types BC 147, BC 148, BC 149, BF 194, BF 195, BF 196, BF 197. All at 6 for 50p.

**TRANSISTOR ARRAY** Like CA3045/6 Tested with data at 35p.  
**20 ASSORTED 250mW BRANDED ZENERS** at 75p.

**THYRISTORS (S.C.R.'s)** 100 PIV 10 amp at 25p, 400 PIV 10 amp at 50p, 800 PIV 10 amp at 66p.

AC128, AC 176, 6 for 40p; AC 188, 5 for 50p.  
**CALIBRATED VERNIER DRIVES** 1" at 88p, 2" at 99p, 2½" at £1.30.

**DUAL GATE MOSFET's** 40601 at 55p, 40603 at 55p, 40673 at 55p, MEM 616 at 50p.

**P CHANNEL SINGLE GATE MOSFET** General Purpose, 6 for 50p.

**50 GENERAL PURPOSE NPN-PNP MIXED TRANSISTORS** 85%, Good, 50p.

**DUBILIER 250 Volt AC FILTERS** Type SBN2CF at 20p each.  
**DUAL CRYSTALS** in B7G GLASS ENVELOPES 28-0000-28-1556 MHz, 28-46667-28-64444 MHz, 28-21111-28-34441 MHz, 28-40000-28-56667 MHz, 28-01111-28-14444 MHz, **SINGLE CRYSTALS** 28-3333 MHz, 21-750 MHz, 10-37037 MHz.

**DUAL 10 MHz types** 10-26296-10-30741 MHz, 10-39360-10-44074 MHz, 10-32693-10-37407 MHz, 10-39259-10-44815 MHz. All at 15p each.

**FT 243 types** 6200 kHz, 6317 kHz, 6400 kHz, 6525 kHz. All at 10p each.

Unmarked Gold Bonded Diodes, £3 for 1000.  
**DUBILIER TAG ENDED ELECTROLYTICS** 500uf 50v.w. size 2" x 1", 4 for 25p; 2000uf 50v.w. size 4½" x ¾" at 25p; 5000uf 25v.w. 4½" x 1½" at 25p; 10,000uf 12v.w. 4½" x 1½" at 20p; 10,000uf 25v.w. 4½" x 1½" at 40p.

**200 ASSORTED DISC CERAMICS** for 50p.  
**COMMUNICATION SERIES OF I.C.'s** Untested with data consisting of 1 x R.F., 3 x I.F., 2 x VOGAD, 2 x AGC, 1 x Mike Amp, 2 x Double Balanced Modulators, 1 x Mixer. The 12 I.C.'s for £3. Separate I.C.'s at 27p each.

**AF AMPLIFIER and VOGAD CIRCUIT** with Side Tone untested with data at 30p each.

**SSB DEMODULATOR, AM DETECTOR, AGC** Untested with data at 30p each.

**TRIPLE DEMODULATOR AM, SSB, FM, IC.** Untested with data, 3 for £1.

**150 MHz NPN TRANSISTORS ZT 89** at 40p doz.  
**BC 213L, BC 214L TRANSISTORS**, 6 for 55p.

**TV DIODES** AY 102 at 30, kA 148 at 10, BA 144 at 10p, BA 154 at 5p, BA 156 at 5p.

**DUBILIER MINIATURE CONDENSERS.** .01uf 400v.w. Metallised Paper at 15p doz.

**SPECIAL BRANDED SEMICONDUCTOR ASSORTMENT** Consisting of:—

5 Sprague Transistors  
 16 Japanese 2SB and 2SA Transistors  
 4 NKT Transistors  
 10 Assorted Transistors  
 15 Zener Diodes  
 45 Signal Diodes  
 6 IN 4004 1 amp 400 PIV Diodes  
 2 Op-Amps

Total 103 Pieces Price £1.08

**TUNING CONDENSERS WITH SLOW MOTION DRIVES** 250+250pf at 33p; 500+500+20+20pf at 33p; 300+300pf at 33p; 365+365+365pf at 66p; With Direct Drive. 6pf at 10p, 10pf at 30p, 25pf at 25p, 25+25pf at 45p, 180+250pf at 33p.

**6 PLASTIC POWER NPN TRANSISTORS** Untested for 50p.  
**SMALL PANEL WITH I.C.** TAA 350 Plus other Components at 40p.

**FET's** 2N 3819 at 25p, BF 244 at 25p, MPF 105 at 44p, 2N 5457 at 33p.

**1 lb. FERRIC CHLORIDE** with Marker Pen and Instructions at £1.10.

**CERAMIC TRIMMERS MICRO-MINIATURE** 3.5 to 8pf at 3 for 12p.

**CERAMIC TRIMMERS SUB-MINIATURE** 2.5 to 6pf, 3 for 12p.

**CERAMIC TRIMMERS SUB-MINIATURE** 4-7pf to 20pf, 3 for 10p.

**OXLEY MINIATURE AIR SPACED TRIMMERS** 30pf at 5p each.

**PHILLIPS SUB-MINIATURE 3pf TUBULAR TRIMMERS** at 5p each.

**DISC CERAMICS** .01uf 50v.w., .01uf 500v.w., .02uf 50v.w., .05uf 500v.w. All at 15p doz.  
**BY 103 1300 PIV 1 amp SILICON DIODES** at 15p each.

Member of the ARRA

Please add 10p post on orders under £1.

# TELECOMMUNICATIONS INTERNATIONAL AGENCY LTD.

BROCKENHURST STUDIOS, FIBBARDS ROAD, BROCKENHURST, HANTS.

Tel.: Brockenhurst 2219, 3430 or 3434

**COURIER TRADEMAN.** Portapack TX and RX aircraft band, 5 channel ... .. £75.00 inc. carriage

**NEW RADIO TELEPHONES.** FM or AM. High, low and Marine bands. Catalogue on request.

**LINER 2.** Add on amplifier module comprising of 40 watts PEP amplifier and preamp for the Rx. Extremely simple to use with any liner 2, but could be easily adapted for use with any TX RX requiring more power and better sensitivity.

With RX preamp ... .. £47.42, carriage £1.00  
Without RX preamp ... .. £40.10, carriage £1.00

## VALVES

QQVO3 10A ... .. £1.50	ECC 85 ... .. 40p
ECC 83 ... .. 30p	EL 85 ... .. 35p
KY 66 ... .. £2.00	EL 33 ... .. 95p
EAC 91 ... .. £1.50	EZ80 ... .. 25p
ECF 82 ... .. 38p	ECC 81 ... .. 22p
EF 91 ... .. 33p	KT 77 ... .. £1.50
EY 84 ... .. 50p	EL 84 ... .. 35p
E 80 CF ... .. 40p	

5 pin type B din plugs ... .. 14p  
Painton 6 way plugs ... .. 12p  
5 pin type B din sockets ... .. 8p

**LOUDSPEAKER.** Miniature 1½" 3 ohm. New £1.50, postage 8p

ELAC 5 x 3 at 8 ohm elliptical. New 75p, postage 8p

**HAND SETS.** New SG Brown handsets £4.94, carriage 65p

**HAND PORTABLES.** Cossor type CC2/8 Mk. 2. V.H.F. Walkie Talkies. High Band. FM ... .. £60.00 + carriage

## TRANSISTORS

PT 4176D 44w. ... .. £3.00	AF 239 ... .. 20p
PT 4176C 20w. ... .. £2.23	OC 60 ... .. 10p
PT 4176B 10w. .... .. 67p	OC 44 ... .. 10p
PT 4176A 3w. .... .. 45p	OC 75 ... .. 15p
2N 4427 5w. .... .. 67p	OC 35 ... .. 25p
2N 3866 ... .. 48p	OC 200 ... .. 10p
ME 1001 ... .. 18p	IN 91 ... .. 25p
2N 5180 ... .. 48p	V 100 ... .. 85p
2N 2369A ... .. 15p	ACY 22 ... .. 14p
BF 115 ... .. 15p	ACY 20 ... .. 10p
BSX 26 ... .. 10p	OA 200 ... .. 4p
BC 108 ... .. 10p	AC 128 ... .. 8p
OA 10 ... .. 15p	OA 47 ... .. 6p
ASZ 2L ... .. 25p	OAZ 200 ... .. 30p
OAZ 207 ... .. 30p	CA 3011 ... .. 92p
PT 8726 ... .. £14.80	PT 4544 ... .. £8.52

Carriage on transistors, 5p

25 Way Cable ... .. 15p per ft, carriage 5p per ft.

## NEW STUD UHF POWER DEVICES

TIA 6B 400 MHz 1 watt output ... .. 70p, carriage 5p  
TIA 7B 400 MHz 9 watt output ... .. £3.67, carriage 5p

## MC MURDO RED RANGE

24 way plugs ... .. 40p
32 way sockets ... .. 50p
32 way plugs ... .. 50p
F. & E. plugs ... .. 45p
12v. 2.2 lamps MCC 643 ... .. 10 for 10p
6.5v. .3 amps lamps MCC ... .. 10 for 10p

**ULTRA FM & AM BASE STATION.** 12½ kHz type approved in extremely good condition. In working order, complete with desk controller ... .. £66.00, carriage £1.00

**XTAL OVENS.** Cathodeon ... .. 48p, carriage 5p

**RELAYS.** Mains contact heavy duty 12v. coil 75p, carriage 10p

**DESK MICROPHONE** kits including 200 ohm insert £1.80, carriage 20p

**SGB CLASSIC** Ultra modern mobile microphone dynamic £7.00, carriage 20p  
Stand to convert to base unit ... .. £2.00

**NEW MURPHY PSU** stabilised 12.5v. DC at 10 amps £29.95, carriage 45p

**SG BROWN MICROPHONE.** Stowage units. New 45p, carriage 5p

**SG BROWN.** Fist microphone. Dynamic 300 ohms £4.50, carriage 10p

**SG BROWN DIPLOMAT** 300 ohm head set and 300 ohm microphone ... .. £7.50, carriage 20p

**SG BROWN DIPLOMAT** head set 22 ohms with 22 ohms microphone complete with din plug £5.50 each, carriage 20p

**VOLUME CONTROL BOX** with jack socket 150 ohm 50p

**PBX OPERATORS PACIFIC HEAD SETS.** 150 ohms, microphone 3 k ohms. Complete with earpiece assembly kit £7.50 each, carriage 20p

**STEREO HEADSET.** 8 ohms + 8 ohms ... £5.00, carriage 20p

**SCHOMANDL** frequency counter. Slight attention needed £75.00, carriage extra

24v.-12v. converters ... .. £14.95, carriage 50p

**SGB PACIFIC** 4c400/5 3 k ohms mic + 150 ohm RX £7.50, carriage 20p

**SGB DIPLOMAT HEADSET** 68 ohm mic + 50 k ohm RX £7.50, carriage 20p

**SGB HEADSET ONLY** 250 ohm + 250 ohm series 75p, carriage 20p

**SGB HEADSET ONLY** 22 ohm + 22 ohm 75p, carriage 20p

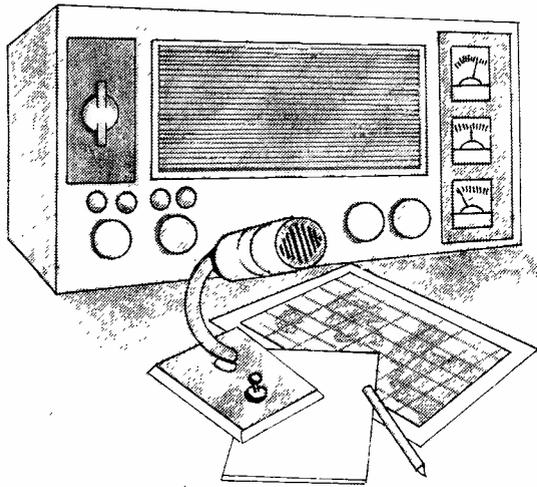
**SGB HEADSET ONLY** 50 k ohms ... 75p, carriage 20p

**SGB HEADSET B94** 600 ohms total ... 50p, carriage 20p

DUE TO REORGANISATION, WE HAVE A SELECTION OF VARIOUS COMPONENTS FOR SALE AT A VERY LOW PRICE SUITABLE FOR THE AMATEUR MARKET. CALLERS ONLY AT ADDRESS BELOW.

ALL PRICES EXCLUDE VAT  
SUBJECT TO EQUIPMENT BEING UNSOLD

Telecommunications International Agency Ltd.  
Brockenhurst Studios  
Fibbards Road  
Brockenhurst  
Hants.



# 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!**

Brochure, without obligation to:

**BRITISH NATIONAL RADIO & ELECTRONICS SCHOOL, Dept SWR 13/75**

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

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

(Block caps please)

"VFA 5ft. below ground, same as dipole, elevated 15ft., one "S" point UP on dipole"—W7OE, retd. U.S. Govt. Electronics Engr.

## ABOVE ALL

it's the antenna system that counts! However good your equipment, if a PARTRIDGE SYSTEM cannot improve your signals with the VFA at same height, return it (in re-saleable condition) for a cash refund.

PARTRIDGE have a complete VFA SYSTEM, correctly terminated for your equipment ranging from modern communications gear to a modest solid state radio. Don't be satisfied with anything less than the PARTRIDGE WORLD RECORD ANTENNA SYSTEM! Make your selection from the list below:—

(Each SYSTEM consists of the elegant gold stove enamelled 7' 6" VFA and a matching finish JOYMATCH A.T.U., despatched direct by parcel post—our risk)

(All prices delivered—our risk)

SYSTEM "A" for modern Communications Receivers	£29.58
SYSTEM "D" for other S.W. and M.W. receivers, all types	£20.84
SYSTEM "J" for TXs and TCVRs up to 500w. PEP 160 thru 10m. (pa input)	£33.59
JOYMATCH A.T.U. kit (1.6 continuous to 30 MHz)	£6.24
JOYMATCH A.T.U. kit (500 kHz continuous to 30 MHz)	£6.24
Either kit fully assembled	£7.55
JOYMATCH "Aerial Bandswitch" tuned aerial, MW and SW	£6.24
SUPER SENSITIVE general coverage DX-CRYSTAL SET that REALLY WORKS, not a toy, complete with Aerial and sensitive matching Earpiece	£3.92
COMMUNICATIONS HEADPHONES, 8 ohms, matches most modern Comm. Rxs.	£3.39
VFA Stock Lasting (Massive VFA support on chimney stack)	£2.51
VFA Heavy duty Wall Bracket (18" stand off)	£2.51
JOYMATCH Artificial Earth (ground) switch tuned	£6.24
A.G.T.U. Artificial Earth D.I.Y. add on unit for your A.T.U.	60p
Radials for the A.G.T.U. cut to required band, each	60p
"INVISIBLE AERIAL" wire, tough PVC covered tinned copper 22 swg, per 10m.	60p
A.G.T.U. supplied fitted to JOYMATCH A.T.U.s (less radials)	80p
Coax cable, RX type, 75 ohms, per 10 metres	88p
AERIAL WIRE, heavy duty 16 swg enamelled aluminium, per 10 metres	59p
VALVES. Complete set for 9R59DS and 9R59DE, including OA2 stabiliser	£4.75

Send 4½p stamp for details and expert advice.

BOX 4



Phone 0843 62535  
or 62839  
(after office hours)



G3CED

G3VFA

# J. & A. TWEEDY (ELECTRONIC SUPPLIES) LIMITED

SPECIALISING IN AMATEUR RADIO EQUIPMENT

## SWAN

700CX ... .. £426.00  
MB 80A ... .. £178.00

## YAESU

FT 101B ... .. £356.00  
FV 101B ... .. £51.84  
SP 101B ... .. £14.00  
FT 201 ... .. £313.00  
FR 101S ... .. £264.00  
FL 101 ... .. t.b.a.  
FL 2100 ... .. £210.00  
FT 200 ... .. £232.00  
FT 401 ... .. £267.00  
FL 50B ... .. £67.00  
FV 50B ... .. £25.00  
YO 100 ... .. £100.00

Jaybeam aerials—full range

## Hy-Gain Antennas

12AVQ ... .. £21.60  
14AVQ ... .. £31.90  
18AVT/WB ... .. £45.90  
TH3jr ... .. £67.00

## CDE Rotators

AR30 ... .. £27.00  
AR40 ... .. £32.40  
CD44 ... .. £64.80

## BELCOM

Liner 2 ... .. £156.00  
LA 106 ... .. £178.00

## Mini-Products

HQ 1 ... .. £54.00  
C4 ... .. £24.30

## Solid State Modules

Good selection in stock including EUROPA

## Microwave Modules

Good selection in stock for 2m. and 70 cm.

## ACCESSORIES

MFJ Filter ... .. £14.00  
HP3A TVI Filter ... .. £2.16  
Shure 444 ... .. £14.00  
SWR Twin Meter ... .. £11.50  
SWR single meter ... .. £6.40  
Wight Traps ... .. £3.00  
KW Trap Dipole ... .. £26.00  
KW Balun ... .. £2.85  
KW Antenna Switch ... .. £6.00

Prices include VAT but carriage is extra — HP — Trade-ins — ACCESS

G3YBO DERBYSHIRE

79 Chatsworth Road,  
Chesterfield  
Telephone : 34982 (6-8 p.m. 863755)

G3ZY

LINCOLNSHIRE

The Ham Shack  
Roughton Lane  
Woodhall Spa  
Telephone : 52793

## CW IS STILL VERY MUCH ALIVE!

### SAMSON ELECTRONIC KEYS

—the choice of Ships and Coast Stations the world over.

Two different models —

#### ETM-2b TRANSISTORISED KEYS

Developed from the well-established ETM-2. Printed circuit, 11 transistors, 6 diodes. Ratio Control. Single paddle. Speed control. 8-50 wpm. Sidetone oscillator. Almost-inaudible sealed reed relay. Grey case 4" x 2" x 6". Powered by four ZM9 mercury batteries available world-wide. (Price includes batteries.) Well-engineered keying lever, fully adjustable gaps and tensions.

ETM-2b — with make-break relay contacts. (Ratings: 1A, 400V, 30W max.) Complete with mercury batteries. £34.16 (or with penlite batteries, £32.73).

ETM-2bs — with spdt changeover relay contacts. (Ratings: 0.5A, 250V, 10W max.) Complete with mercury batteries. £38.72 (or with penlite batteries, £37.30).

#### ETM-3b INTEGRATED CIRCUIT SQUEEZE-KEYER

Printed circuit with 4 ICs and 13 semiconductors. Twin paddles. Constant 3:1 ratio. Speed control, 8-50 wpm. Operate/Tune button. AC mains power supply, 110/220-240v. Almost-inaudible sealed reed relay. Grey case 4" x 2" x 6". The renowned SAMSON keying lever movement with fully adjustable gaps and tensions. Can be used either as an iambic mode squeeze-keyer (characters made with fewer paddle movements—you can make a "C" with one squeeze!)—or as a normal electronic keyer.

ETM-3b — with make-break relay contacts. (Ratings: 1A, 400v., 30W max.). £37.85.

ETM-3bs — with spdt changeover relay contacts. (Ratings: 0.5A, 250v., 10W. max.). £42.36.

### — OR IF YOU LIKE IT STRAIGHT... —

#### JUNKER PRECISION HAND KEY

A superbly engineered straight hand key used for many years by professionals afloat and ashore. With this key you can't help but send good morse.

Free-standing—it does not have to be screwed to the operating desk. Good weight distribution and large rubber feet stop it sliding or rocking. Weight: 2½ lbs. Front and back contacts of precious metal, with fine adjustment of contact gaps by positive click-stop action. Lever-action spring tension adjustment. Spring pigtail at keying arm pivots ensures good contact. Insulated keying arm, moulded knob with rubber anti-slip insert. 3-way terminal block and cable clamp at rear. Key-click filter (L, C & R) built into base. Rear-hinged cover (with spring catch) and other metal parts finished in attractive hammertone grey. Base area: 3½"W. x 7½"D. Overall height: 2½", £16.29.

#### BAUER KEYING LEVER UNIT

We have imported this popular unit for many years for inclusion in home-built electronic keys. Adjustable contact gaps and spring tensions. Single paddle on moulded base 1½" x 2". Height: 1" (excluding paddle), so is compact enough to go inside most keys, £5.77.

#### BUILDING CW FILTERS ?

Don't let RTTY and SSTV hog the 88 mH TOROIDS, 41p each.

ALL PRICES INCLUDE VAT

All goods post-paid U.K. Send stamp for Catalogue SP5.

## SPACEMARK LTD.

THORNFIELD HOUSE, DELAMER ROAD,  
ALTRINCHAM, CHESHIRE.

(Tel. 061-928 8458)

**SPECIAL CONNECTORS BY**—Amphenol, Bendix, Cannon, Deutsch, McMurdo, Painton, Plessey, Pye, Thorn and others; Hellerman Sleeves, Amp Tags, Nynvin & Pren cables, Circuit Breakers by C. H. Kliron, Rotax, Wood. High wattage resistors, Knobs, Fuses, Potentiometers, Valves including US, British 4, 5, 7 and 9 pin, U.S. and Mazda Octals, 87G, 88A, 88B, 88G, 89A, 89G, large TX types and bases to suit.

**145 MHz TX PA AND DRIVE UNIT.** QQVO6-40A PA, 5763 doubler, 5763, 5686, 6AU6 valves, all stages gang tuned, size 11 x 4 x 5 ... £15

**COLLINS RECEIVERS SIX-1/A** 118-135.95 MHz (AIRCRAFT BAND) with control unit and photocopy from manual, 22 x 5 x 8 ... £150

**UHF RX** with 2 x 3 section trough lines 4 1/2" long, double superhet 54 and 6.9 MHz, 87G, 89A valves, size 8 x 17 ... £5

**70 MHz AUTO ALARM RECEIVERS,** flashing light and audio tone outputs, 3 tone filters in some for selective calling. Several types available from ... £3

**MARCONI TX UNIT 100** watt output, 2-24 MHz, 6AQ5 driver, 829B buffer, 2 x 829 BPA, tuning 23 turn 2inch dia. roller coil, 2 gang capacitor, coil and capacitor turret. Size 8 x 10 x 16". Weight 26lb. **WITH CIRCUIT** ... £8

**MARCONI MODULATORS.** 90 watt output, transformer to match 2,000 ohms and screen winding speech clipper audio AGC, switched metering for: PA grid, Buffer grid, PA anode, Mod anodes and screens, 500 and 1,000 volts HT valves 12AX7, 12AT7, 6AL5, 6AU6, 12AX7, push-pull pair 829B, 6AQ5, 6AU6, OA2 etc. HT required, 600 volts, 275 volts DC, 250 volts AC, room for PSU inside case. Size: 8 x 12 x 15". **WITH CIRCUIT.** Weight 32lbs. ... £10

**SRI4/15 STC PAIR OF RECEIVERS,** double superhets with control box and junction unit. Cover 75 MHz, 118-108 MHz, 329-335 MHz. 5 x 7 x 13" ... £10

**COLLINS 185-4C AM TX/RX** 2-18 MHz, 20 channel crystal controlled, 100 watts output, 28V power required, complete with ATU, control, mountings and Manual, 3 sets available ... £200

**MODULATORS, 4 5854M's in PUSH PULL PARALLEL** up to 240 watts AF out for 10mV input, speech clipping, VOGAD, 300-3000Hz. Power required, 400-750 volts HT, 300 volts MT, 28 volts heaters and bias. **With circuit.** Size 5 x 5 x 9" ... £11

**VHF TX/RX AND DIGITAL CRYSTAL UNIT, TYPE LRE35**

1. Can be used as an air band receiver with digital crystal controlled tuning.
2. Can be used at a digital selected transverter signal source with 123-124 MHz or 130-131 MHz outputs to mix with 21 or 14 MHz for 2m operation.

Power requirements: 265-300v HT, 19v LT,—500v Bias. Size: 13" x 8" x 8". Weight: 18 lb. **With circuits.**

Air Band RX 118-131.9 MHz, 140 100 kHz spaced channels ... £25

Air Band RX 118-131.95 MHz, 280 50 kHz spaced channels ... £75

Transverter source 123, 123.5, 124, 124.5 for 21 MHz mix ... £20

Transverter source 130, 130.5, 131, 131.5 for 14 MHz mix ... £20

Extra channels in 100 kHz steps ... £1

**VHF TX BY COLLINS TYPE 17L-4**  
Similar to previous unit but has QQVO6-40A PA and stages which could be modified to use as mixer. **With 4 channels** between 118 and 135.95 MHz ... £40

**COLLINS MODULATOR UNIT** up to 130 watts AF from push pull 6159's (sim. 6146) driven by 250mV into 5751 and 5814 amps and 5726 clipper 300-3000 2dB filter. Power required, 600-750 volts HT, 250 volts MT, 24 volts heaters—60 volts bias. **With circuit.** Size: 5 x 3 x 6 ... £12

**RX RF UNITS 2-24, MHz 4 BANDS.** 6AK5 RF 6BE6 MIX 6AU6 IF out also includes TX drive balanced modulator (2) 6AU6. 6AU6 and 6AQ5 drivers. All inductive tuning with 5 tuned circuits at signal frequency. **With circuit** ... £8

**RX IF UNITS 1-82 MHz input, 110 kHz 2nd. IF.** AF output with BFO. 6BA6 1-82 MHz amp, 6BE6 mix, 6AU6 1-93 MHz osc, 2 6BA6 IF 110 kHz, 6BA6 BFO, 6AL6 det. AGC, 12AT7 AF CV448 NL, OA2 Stabilizer ... £10

**STORNO QM39 4 METRE FM TX/RX OSCILLATOR**  
Ready converted and aligned with a pair of crystals from our advertised stock. 10 watt output, QQVO3-10 PA, transistor IF, AF and 12 volt + or — PSU. Deviation adjustable up to 5 kHz. Relay for second channel supplied, up to 8 may be fitted. **Circuit of tone unit.** Boot mount with mic, control, speaker and cables. Power, 1 amp RX, 6 amp TX. Size 4" x 10" x 13". Weight 15lb. ... £30

**CRYSTALS TYPE HG6U & 4039** £2 each. 25% discount 10 or more.

2179 2189 2222 2753 2760 2764 2802 2805 2840 2854 2868 2875 2889 2938 2948 2951 2952 2954 2957 2966 2985 3023 3232 3319 3333 3354 3375 3389  
3396 3403 3404 3410 3411 3417 3419 3431 3432 3438 3445 3473 3481 3488 3854 3868 3869 3876 3883 3889 3897 3904 3911 3918 3924 3925 3932 3938  
3939 3946 3966 3973 4002 4138 4320 4365 4432 4467 4481 4654 4668 4674 4688 4709 4730 4744 4751 4758 4765 4786 4800 4807 4814 4821 4828 4843  
4952 5000 5010 5025 5092 5119 5130 5140 5147 5154 5161 5224 5231 5238 5252 5259 5266 5273 5280 5287 5294 5301 5320 5324 5328 5332 5337 5341  
5345 5349 5354 5362 5366 537515379 5383 5388 5465 5506 5521 5524 5551 5589 5611 5619 5649 5668 5910 5920 5934 5952 5956 5964 5971 5984 5985  
5986 6084 6089 6091 6093 6106 6110 6110 6121 6125 6132 6136 6143 6145 6165 6171 6182 6187 6198 6210 6221 6332 6337 6376 6387 6410 6415 6432 6480  
6488 6495 6498 6502 6506 6509 6516 6521 6532 6532 6554 6559 6567 6589 6598 6604 6607 6611 6619 6627 6632 6649 6657 6662 6677 6686 6721 6732  
6743 6820 6937 6994 7129 7157 7167 7171 7177 7210 7270 7311 7319 7326 7341 7356 7364 7371 7379 7386 7394 7401 7409 7424 7431 7439 7446 7461  
7491 7500 7533 7542 7552 7557 7562 7566 7572 7577 7582 7583 7587 7600 7616 7633 7664 7683 7685 7700 7716 7733 7766 7856 7883 7950  
8116 8173 8183 8150 8166 8266 8333 8350 8349 8357 8360 8366 8387 8402 8409 8410 8417 8432 8447 8454 8484 8516 8845 8854 8862 8871 8930 8953  
9096 9285 9293 9302 9311 9319 9327 9336 9344 9353 9361 9370 9378 9395 9404 9412 9413 9421 9442 9461 9487 9519 9781 9815 9837 9845 9863 9868

10021 10037 10062 10087 10112 10137 10158 10162 10187 10212 10237 10262 10287 10437 10465 10486 10513 10549 10908 11250 11500 11550 11859  
12287 12312 12337 12362 12387 12412 12437 12462 12487 12512 12537 12562 12587 12612 12637 12667 12687 12712 12737 12750 12762 12787 12837 12900  
13062 13075 13087 13112 13137 13162 13187 13212 13232 13252 13272 13292 13312 13250 13262 13272 13275 13304 13312 13337 13350 13387 13412 13425  
13437 13462 13487 13500 13540 13590 13640 13690 13729 13739 13740 13747 13749 13750 13752 13779 13789 13790 13799 13800 13840 13890 13940  
13972 13990 14112 14250 14408 14416 14500 14750 14762 14787 14812 14848 14887 14898 14912 14937 14948 14962 14987 14998 15000 15012 15037  
15048 15062 15087 15098 15112 15137 15148 15162 15187 15198 15212 15237 15248 15262 15287 15294 15298 15311 15337 15344 15377 15511  
15512 15537 15544 15561 15562 15577 15587 15594 15611 15612 15637 15662 15686 15712 15725 15737 15762 15772 15837 15887 15912 15937 15962  
16837 18247 18250 18372 18431 18497 18662 18747 18872 18997 19122 19247 19372 19497 19622 19747 19872 23620 23720 23820 24620 24720 24820  
25020 28000 31200 31225 31250 31275 31300 31325 31350 31375 31400 31425 31450 31475 31495 31500 31525 31550 31575 31600 31625 31650 31675 kHz.

**HC6U X 24 FOR 144-146 MHz.** 6001 6021 6024 6031 6039 6046 6068 6069 6075 6076

**HC6U FOR HF BANDS.** 1820 1930 7032 7047 7054 7077 7092 7099 14112

**CRYSTALS TYPE BT7G** £2 each 25% discount 10 or more.

2854 2868 2889 2910 2938 2945 2987 3023 3404 3411 3432 3446 3467 3481 4220 4575 4654 4668 4703 5491 5499 5506 5551 5581 5584 5599 5604 5611  
5649 5654 5659 5671 5680 5691 5692 5695 5697 6510 6537 6540 6552 6557 6567 6590 6612 6627 6640 6642 6652 6657 6662 6664 6667 6677 6679 6672  
8841 8845 8845 8854 8862 8871 8879 8896 8930 8932 8916 8947 8967 8973 8983

**CRYSTALS TYPE 10XJ** £2 each. 25% discount 10 or more.

X 24 for 144-146 MHz. 6010 6021 6026 6032 6043 6051 6065 6076 6082 & 100's more every few kHz to 6998 kHz.

**HC6U 2028 2142 2144 2146 2148 2153 2155 2157 2159 2163 2165 2170 2172 2174 2176 2207 2209 2210 2212 2214 2216 2219 2223 2226 2442 2449 2454**  
**2552 2604 2626 2628 2625 2643 2647 2650 2656 2658 2662 2665 2677 2680 2684 2688 2695 2710 2718 2737 2757 2758 2762 2769 2783 2786 2985**  
**3139 3143 3254 3158 3161 3169 3181 3182 3192 3195 3196 3203 3207 3210 3217 3231 3253 3256 3258 3263 3266 3268 3271 3273 3276 3452 3459 3466**  
**3467 4695 4788 5536 5559 5943 5946 6523 6549 6569 6602 6605 7174 7547 7558 8465 8700**  
**10XJ 6000 6020 6030 6040 6050 6070 kHz.**

**CRYSTALS** as above, £2 each. New stock as follows:

3087 3092 3098 3103 3109 3114 3120 3125 3131 3137 3142 3148 3153 3159 3164 3170 3175 3181 3187 3192 5800 5933 8150 8200  
8250 8300 8350 8400 8450 8500 8550 8600 8650 8750 8800 8850 8950 9000 9050 9100 10024 10135 10246 10357 10468 10579 10690 10801  
10913 11024 11135 11246 11357 11468 11579 11690 11801 11913 14275 14575 146275 47275 48275 49275 50275 51275 52275 53275 54275 55275 56275 57275

kHz. Type HC6U.

Roiler coil 22 turns 2 1/2 in. dia.  
Cambridge boot and dash covers/pair.  
500 0 500 micro amp meter unit.  
500 micro amp 1/2 inch meter  
QQVO3-20A, 06-40A bases per two.  
Boot Ranger leads and plugs.  
Co Ax 75 ohm UR203/10m.  
All above £2 each including post U.K.  
Co Ax 75 ohm UR203/10m.

.9H 200mA potted choke.  
Vanguard covers /pair.  
45 MHz IF unit, 6 valves.  
30 amp hash filters.  
8mF 800v. capacitors.  
Boot Ranger con unit.  
Co Ax 75 ohm UR70/10m.

Cable 20 core /3m.  
Cable 12 core /4m.  
Cable 6 core /6m.  
Cable H.D. twin/10m.  
Mod. Trans. 20 watt.  
Mod. Trans. 100 watt.  
80, 40, 15, 20 TX tuner.

ALL PRICES INCLUDE CARRIAGE ENGLAND. SAE ALL ENQUIRIES

# BAGINTON ELECTRONICS

(G3TFC)

COVENTRY AIRPORT

Phone (0203) 302449

or 302668

# THANET ELECTRONICS

DAVE G8ELP

PAUL G3VJF



## REPEATERS

Repeaters are playing an increasingly major role in VHF mobile activity. Those who live within range of repeaters already operating will know that for successful contacts it is not only necessary to have the correct amount of deviation but also to have adequate clipping to secure maximum talk power without being cut off by the repeater for over-deviating. The audio frequency tailoring should be correct for maximum readability under noisy mobile conditions and there must be a switchable tone-burst generator which does not drift significantly when the rig gets hot.

The IC-22 fulfils all these requirements. If bought from us we fit a switchable tone-burst generator on the standard access frequency of 1750Hz, but this is adjustable (we will do it for you if you like) to 1700Hz, which is required by the pioneer GB3PI and possible future repeaters where co-channel operation is necessary. Alternatively for an extra £4 we will fit two generators and a switch giving you a choice of either frequency. A typical generator does not drift by more than 10Hz over the temperature range 0°C to 50°C thus making it quite un-

## INOUE IMPORTERS

necessary to use unadjustable tuning forks or to lock your generator to a hydrogen master! Crystals supplied are 145.00, 145.500 and 145.550. Extra channels cost £3.50 each and we have plenty of crystals for all 9 repeater channels on order from Japan. The receiver input sensitivity is high (0.4 uV for 20dB quieting) and cross-modulation and spurious emissions are extremely low. A squelch control renders the receiver silent when no signal is present and a "signal received" light comes on to let you know when you are missing a contact because you have turned the volume control down to keep the XYL happy. At the moment the stock situation is very good.

Of course you have all the advantages of the IC-22 plus the availability of 80 channels, without having to buy another crystal, if you get an IC-225—see our advert.

Please do not hesitate to write or phone us for further details—evening or daytime. We offer credit facilities, or if you have an Access card why not phone your order together with your Access number and your name and address as it appears on the card, before 3 PM and we will dispatch transceivers to you by Securicor the same day subject to stock conditions. We can now accept Barclaycards also.

## PRICE LIST — JANUARY 1975

### INOUE

IC-210 2m FM Transceiver—fully tunable 144-146 with built-in phase-locked VFO 240v. AV and 12v. DC	£200.00
IC-22 22 Channel mobile transceiver (3 channels supplied)	£109.26
Extra channels for above	£3.50
IC-225 80 channel mobile transceiver	£195.00
IC-3PA 13.5v. DC Stabilised Power Supply	£41.48

### MICROWAVE MODULE PRODUCTS

2m. Converters 1Fs 2-4, 4-6, 28-30	£15.20
2 Converter 28-30 IF with 116 MHz LO output for transverter use	£16.30
70 cm. Converters 1Fs 28-30, 144-146	£18.10
2m. Low noise preamp with 2 isolated outputs	£9.00
70 cm. Triplers 2m. in 70 cm. out. Max input = 20W giving 12W out.	£17.50

### SOLID STATE MODULES PRODUCTS

Converters 2m. 1Fs 2-4, 4-6, 28-30	£15.00
70 cm. IF 144-146	£15.00
Europa Transverter complete	£81.48
or less 2x QQVO3/10 and 1 x QQVO6/40A (2 and 4m. versions)	£68.52
PA3 miniature 2m. preamp for building into existing equipment	£5.50

### POWER AMPLIFIERS

40w. Linear Amplifier, Transistorised	£40.00
FM or SSB (suitable for Lincor 2, TS700, IC-210, IC-22, etc.)	£44.00
Above with built-in Rx. Pre-amp.	£44.00

PRICES ARE NETT—Please add 8% VAT to all orders.  
Delivery is FREE

24-HOUR  
ANSAPHONE  
SERVICE

TRADE ENQUIRES WELCOME

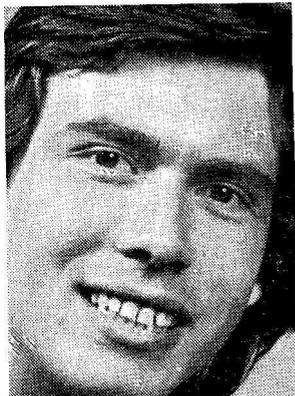
## THANET ELECTRONICS

3 SHEPPEY VIEW, WHITSTABLE, KENT, CT5 4PG. Tel.: (02272) 62555

Northern Agent; Mr. Peter Avill, G3TPX, 7 Moorland Crescent, Mapplewell, BARNESLEY.

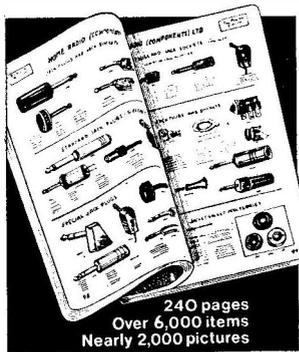
Tel.: Darton (022-678 2517) By appointment evenings and weekends.





# \*COME AND JOIN THE ELECTRONIC ENTHUSIASTS CLUB!

I've been dealing with Home Radio Components for a number of years and I've never felt I was a customer; rather that I'd joined a bunch of enthusiasts who were out to help me every way they could. This shows itself in many ways. Take their catalogue for instance. Several pages are taken up with information such as useful formulae, how to choose a microphone, the meaning of conventional signs, resistor and capacitor codes. Every page in that catalogue must cost them a great deal of money, and these things can't show them a direct return. On the other hand it does show that they care!! There is a whole page telling you the best way to order, plus carefully worked out order forms, and two pages showing how you can open a credit account. Then there is their philosophy with the catalogue. They are anxious that the good customer will get it for the minimum price, so they include 14 coupons each worth 5p if used as directed. Don't take my word for it, try it for yourself, join the merry band!



Membership is automatic, once you buy a catalogue. Send off for it today. It costs 65p plus 33p postage and packing, but with the coupons you can get back 70p—the whole cost of the catalogue plus 5p towards the postage. Complete the coupon below and send it to the address shown, with your cheque or p.o. for 98p.

**65p** plus 33p Post and Packing  
Send the coupon today

Please use block capitals

Name .....

Address .....

**HOME RADIO (Components) LTD.** 912965 London  
Dept. SW, 234-240 London Rd, Mitcham, CR43HD

## THE AMATEUR RADIO SHOP (G4MH)

13 CHAPEL HILL, HUDDERSFIELD

Telephone ; 0484 20774

(MEMBER OF AMATEUR RADIO RETAILERS ASSOCIATION)

AGENTS FOR : YAESU KW SWAN ATLAS J BEAM

HP A PLEASURE, ALSO BARCLAY AND ACCESS CARD

**NEW : The Atlas 180.** 180 watts p.e.p. 160-20 metres. In stock.

**NEW EQUIPMENT :**

Yaesu	FT101B	FT200 ± PSU
	FR101D	FR400SDX
	FT220	FT201
	YO100	YC355D etc. etc.

**NEW TRIO EQUIPMENT**—Up to Press still a few items left.

They are :  
**JR599** ... .. £172.00    **TL911** Linear ... £150.00  
**TX599** ... .. £172.00    **9R59DS** ... .. £52.50  
 Filters for JR310                      VFOs for TS515

**J BEAMS IN STOCK NOW :** Ground Plane. 10XY2M, 5 over 5, MBM46 70 Cm. Beam, etc. G Whips, 5/8 Antec Whips (2 mtr.), (Callers) ... £4.75

**OUR OWN 2 MTR. TX AND MODULATOR. THE 4MH.** TX 15 watts input QQVO 3/10 final, xtal supplied. Mod P.P EL84s. S.A.E. for details. Each unit ... inc. VAT (post 50p) £12.50

**SECOND-HAND :** Guaranteed. All inc. VAT. Carriage extra.

<b>TRANSCEIVERS</b>	Trio TS510 + p.s.u.	... .. £155.00
	Trio TS500, p.s.u., v.f.o.	... .. £130.00
	Heath HW 100 + p.s.u.	... .. £130.00
<b>TRANSMITTERS</b>	Sommerkamp FL200B	... .. £88.00
	KW Vespa	... .. £90.00
	KW Valliant	... .. £12.00
	General Electric 100V— Inc. Monitor Scope	... .. £120.00

<b>HAM BAND RECEIVERS :</b>	FRDX500 (2 metres)	... .. £140.00
	FR400SDX (2 metres). Mint	... .. £175.00
	Drake R4A	... .. £175.00
	Drake R4B	... .. £200.00

HQ170A	...	...	...	£85.00
Heath RA1	...	...	...	£25.00
Ten Tec RX10	...	...	...	£25.00
Trio JR 500	...	...	...	£48.00

General coverage RECEIVERSz:

The famous Racal RA117 from	... .. £375.00
Collins 51J2	... .. £175.00
RCA 8516L	... .. £175.00
GEC BRT 400E	... .. £65.00
R 216. 80-150 MHz	... .. £85.00
B40 (New condition)	... .. £40.00
Trio 9R59DS	... .. £42.00
RCA AR88D	... .. £45.00

**SECOND-HAND ACCESSORIES :** FB400S V.v.o., £20. Telford TC7 Mk. II IF, £25. Heath Scope OSI, £30. PR40, £8.

**NEW ACCESSORIES (inc. VAT)**

SWR Ind. 2 metre SWR and Power	... .. £11.00
SWR Ind. Single Meter	... .. £6.00
TE15 GDO	... .. £17.90    T.A. Speech Comp £21.50
Headphones, padded 8Ω or 4k Ω	... .. £6.50
Headphones, padded 8Ω Stereo/Mon.	... .. £3.25
Shure Mics. 444T £16.50, 444, £14.25, 201, £6.50	
Loudspeakers. Box size 8" x 5" with 4" L/S fitted. Ideal for receivers, dark wood finish	... .. £3.25
Rotators : AR30, £27. AR22, £29. AR40, £32. Valves : 6LQ6/6JE6. £2. QQVO 3/10, 60p.	
2 Mtr. 8 MHz 10XJ xtals inc. VAT and post, £1 each. 8001-43, 8002-5, 8006-67, 8008-0, 8013-53, 8020, 8021-42, 8037-25, 8044, 8046-67, 8050, 8058-75, 8060, 8064-28, 8071-43, 8078-57, 8090-77, 8092-5, 8106-66, state airt. HC18U, 24-060, £2.	

WE ALSO CARRY A WIDE SELECTION OF HI FI EQUIPMENT AND CAN PX HAM GEAR FOR HI FI ETC. OR V.V. POST AND CARRIAGE EXTRA ON ALL ITEMS UNLESS STATED. WE REQUIRE SECOND-HAND EQUIPMENT. HALF DAY WEDNESDAY, LATE NIGHT THURSDAY. 3 MILES FROM M62. 5 MILES FROM M1.

HAPPY NEW YEAR FROM JIM G4MH, CLIFF G3NEW

## CREATE YOUR OWN REFERENCE LIBRARY

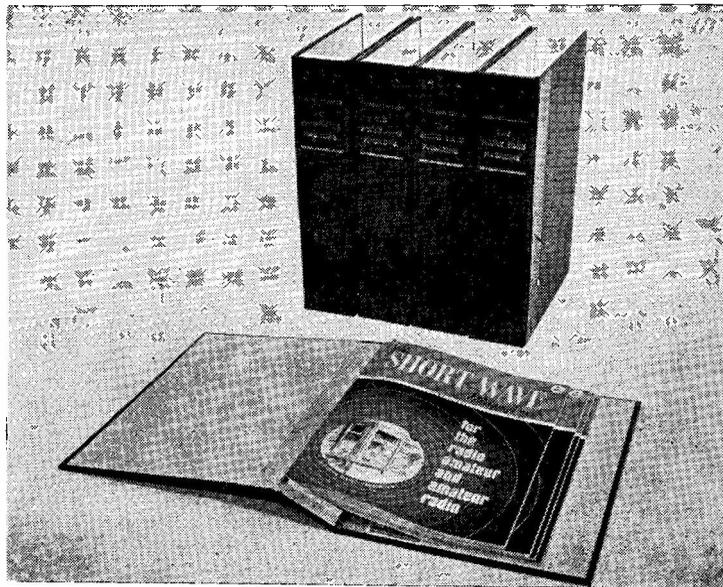
The "EASIBINDER" is designed to bind 12 copies of the Magazine as you receive them month by month, eventually providing a handsomely bound volume for the bookshelf.

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 Leathercloth and Milekin, the binders have only the title gold blocked on the spine.

Price £1.25 post free.

PUBLICATIONS DEPARTMENT  
SHORT WAVE MAGAZINE  
55 VICTORIA STREET  
LONDON, SW1H 0HF



*Subscription rate to Short Wave Magazine is £3.75 for a year of twelve issues, post free.*

## PRESELECTORS FROM HAMGEAR

We offer the following preselector/antenna tuners, some with the added attraction of a calibrator.

P.M.IID.	Battery preselector	...	...	£11.50
P.M.IIDX.	Mains preselector	...	...	£16.50
P.M.IIF.	Mains preselector/calibrator	...	...	£24.50
P.M.IIFM.	Mains preselector/calibrator	...	...	£28.50
P.M.IIFB.	Mains preselector/calibrator	...	...	£32.50
P.				£38.50
P.M.IXA	Separate calibrator	...	...	£25.50

Postage 30p

This is our eleventh year of building preselectors for the H.F. bands, so why not find out more about these. If they do not suit your particular receiver we always offer a complete refund.

A 3½p stamp will get all up-to-date information.

## HAMGEAR ELECTRONICS

2 CROMWELL ROAD, SPROWSTON  
NORWICH, NR7 8XH

## P.M. FOR CRYSTALS

We have added many new frequencies to our stock list including 4 and 8 MHz TX crystals for channels S21-145-525, S22-145-550, S23-145-575 and S24-145-600 together with 44 MHz RX crystals for the same frequencies. We now have in stock 10 MHz range of RX crystals for Storno equipment including all the above frequencies together with the following channels 145-0, 145-5, R2, R3, R4, R5, R6 and R7. (See last months S.W.M. for full stock list.)

Crystals to special manufacture and to Pye Specifications are available to special order. Please send S.A.E. for details or telephone between 5-7 p.m. and ask for Mr. Norcliffe.

TERMS: CASH WITH ORDER—S.A.E. WITH ALL ENQUIRIES  
MAIL ORDER ONLY

Prices include P & P and VAT except where stated

**P.M. ELECTRONIC** 7A ARROW PARK ROAD, UPTON,  
**P.M. SERVICES** WIRRAL, MERSEYSIDE, L49 0UB  
Telephone 051-677 8918 (until 7.30 p.m.)

## R.F. POWER TRANSISTORS

2N3375.	7.5 watts at 2 metres, 3 watts at 70 cms.	...	...	£1.25
	Individually tested before despatch	...	...	
VJE-77M	Power Varactor Diodes (few only). 37 watts at 70 cms. gives approx. 25 watts 23 cms.	...	...	£3.50
Professional Grade	14 din DIL sockets	...	...	12p
OCTAL BASE	Plug-in Silicon Rectifiers. 4 x 400 PIV 0.4 amp diodes	...	...	35p
BETA LIGHTS	3/8" Fluorescent Buttons	...	...	20p
	3/8" long Fluorescent Bar	...	...	27p
	3/4" diam. Fluorescent Splitring	...	...	33p

## ELEY ELECTRONICS

112 GROBY ROAD, GLENFIELD, LEICESTER

## SMALL ADVERTISEMENTS

("SITUATIONS" AND "TRADE")

6p per word, minimum charge £1.00. No series discount. All charges payable with order. Insertions of radio interest only accepted. Add 50% for Bold Face (Heavy Type). Box Numbers 15p extra. No responsibility accepted for transcription errors. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, SW1H 0HF.

## TRADE

**ANTENNAE:** G-Whip, J-Beam, 18-AVT, HQ-1. — Holdings, 39-41 Mincing Lane, Blackburn, Lancs. (Tel: 59595/6).

**QSL Cards:** And GPO-approved Log Books. Also headed notepaper. Send 5p s.a.e. for samples. — Atkinson Bros., Elm Tree Press, East Looe, Cornwall, PL-13 1JT.

**NEW FT-101 Modifications:** VOX problems? Cross Modulation? Lack of gain when static-mobile? Short of talk-power or Rx selectivity? Want alignment details? RF feed-back through headphones? To make old FT-101 better than competition, send large s.a.e. to: G3LLL. Holdings of Blackburn, Ltd., 39-41 Mincing Lane, Blackburn, Lancs., BB2 2AF. (Tel: 59595/6).

**W18,** eighteen-inch Wall Brackets. with U-bolts, price £3.30 carriage paid. — Ballards, 108 Camden Road, Tunbridge Wells, Kent, TN1 2QX. (Tel: 31803).

**QSL CARDS:** Full range, send s.a.e. for samples. — R. J. Craven, 6 Broadtree Close, Mellor, Nr Blackburn, Lancs.

**FEBRUARY Issue:** Due to appear January 31, 1975.

Single copies at 36p post free will be sent by first-class mail for orders received by January 29, subject to supplies being available. — Circulation Dept., Short Wave Magazine Ltd., 55 Victoria Street, London, SW1H-0HF.

## READERS ADVERTISEMENTS

3p per word, minimum charge 50p 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 15p extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street London, SW1H 0HF.

## READERS

**SALE:** Yaesu FR-DX400S amateur band receiver. coverage 160-2m., with matching speaker and in original carton, mint condition, £165 or near offer. — Verstage, 5 Milking Pen Lane, Old Basing, Basingstoke (65165), Hants.

**SELLING:** Teleprinters — Creed 7E, very clean condition, £20. Teletype Type 15, good working order, £15. — Jesson, G4CNY, 181 Kings Acre Road, Hereford. (Tel: 0432 3237, evenings).

**FOR SALE:** FT-101B, in mint condition, with CW filter, two months since new, reluctant sale of first-class equipment, £290. Latest CD.44 rotator, complete with 30 yards cable, as new, £35. Tubular tilt-over mast, 40-ft. guyed, heavy duty A-frame, offers over £30. Delivery at cost. — Ring Bonser, Mansfield (Notts.) 20324, after 7.0 p.m.

**MAGAZINES Wanted:** "RSGB Bulletin," Oct. 1964. "QST," Oct. '71. "73 Magazines" for Jan.-March '64, and March-May-June-August 1966. — Jesson, G4CNY, 181 Kings Acre Road, Hereford. (Tel: 0432 3237, evenings).

## T.M.P. (Electronic Supplies)

for  
SOMMERKAMP EQUIPMENT, SPARES AND ACCESSORIES  
FRITZEL VHF BEAMS, HF BEAMS, DIPOLES, ROTATORS  
W2AU BALUNS WITH BUILT IN LIGHTNING ARRESTER  
TOROIDAL BALUNS and RANGE OF TOROID CORES and KITS

## Used Equipment

FT200 and PSU/SPKR. used for demonstration only.  
Guaranteed ... .. £190  
FT250 & PSU/SPKR, little used and unmarked ... .. £155  
EA12 receiver, like new in looks and performance ... .. £145  
KW2000 & PSU G-line model, fair condition ... .. £100  
Carriage extra on all items, further details sent in your S.A.E. or you can telephone anytime. Callers appointment only.

**3 Bryn Clyd, Leeswood, Mold,  
Clwyd, CH7 4RU.**

Tel : Pontybodkin 846 STD 035 287

HONDA  
GENERATORS

AT COMPETITIVE PRICES

Models 300—4000 watts A.C. and 6, 12 and 24 volts D.C.

IMMEDIATE AVAILABILITY OF MOST MODELS.

For full details and **COMPETITIVE PRICES WHICH INCLUDE FREE DELIVERY IN THE UNITED KINGDOM,** Call, Write or Phone **GODALMING 23279.** (24 hr. Answering Service). Open Tues. - Sat. 10.30 - 12.30, 2.30 - 6.30.

**Ashley  
Dukes**

**FARNCOMBE STREET,  
FARNCOMBE,  
GODALMING,  
SURREY**



## Users of TRIO 2200—LOOK AT THIS!

Off the shelf HELICALS with BNC (FX/BNC/2200) (inc. VAT) £3.44  
Also HELICALS with PL259 plug (FX/UHF/2200) (inc. VAT) £3.55  
**STORNO 500 Users, too!**  
HELICALS with special Storno plug (FX/Storno/500) (inc. VAT) £3.48  
PLUS—HELICALS, cut to your requirements, with 2 or 4BA screw (male or female) ... .. (inc. VAT) £2.77  
Low Band (4 metre) units also available. SEND FOR PRICE LIST.  
Carriage on all helicals — 35p

## GLIDING ENTHUSIASTS

5/8 wavelength antennae for gliding frequencies now available.  
A5-6G (hinged rod) ... .. (inc. VAT + 60p carriage) £5.20  
A6-5G (screw-in rod) ... .. (inc. VAT + 60p carriage) £5.12

**ANTENNA & ELECTRONIC CONSULTANCY CO. LTD.**

74 Upper Sherborne Road, Basingstoke, Hampshire, England  
Tel.: Bas. 27527

## C. &amp; C. ELECTRONICS

(DEPT. F) 10 WEST PARK, LONDON, SE9 4RQ

## CRYSTALS

(Mail Order Only)

Fundamental crystals 50ppm (0-60 C) or 30ppm (ambient),  
4-21 MHz ... .. £2.93  
Overtone crystals 50ppm (0-60 C) or 30ppm (ambient),  
21-105 MHz ... .. £2.95

Normal delivery time 5 weeks

STOCK CRYSTALS AT £2 TILL 31st JANUARY

See last months issue for details

10% discount on orders of 5 or more crystals

Add 10p for post and packing on orders under £12

Crystals supplied to any specification for P.M.R., marine or military use, etc. State equipment/specification when enquiring.

Please send s.a.e. with all enquiries

Rapid delivery service is available, information supplied on request

**WALKIE-TALKIE** 14 valve 4 channel No. 88 ex-WD transmitter/receiver unit, £6.50, p/p 75p. No. 19 ex-WD used transmitter/receiver, £6.50, p/p £1.50. **SALVAGE TELEMETERS** multi-valve receiver, speaker, amplifier and tape unit, vast value, sealed cartons, new, £4.50, p/p 50p. **PADDED** moving coil ex-WD earphone, £1.25, p/p 25p. **STEEL BOXES**, hinged, clasped, ex-WD, 3 1/2" x 1 3/4" x 2 1/4" ideal security, £2, p/p 75p. A bargain. **A.C. 110v. SMALL** geared and un-gearred motors, £1.25 pair, p/p 25p. **HELMETS**, steel ex-WD unused, £1.25, p/p 37p. **MOBILE** 12 volt ex-WD transmitter/receiver type 88 AFV set, £13.00, carriage £1.40. **EYESHIELDS** anti gas goggles, 36 packet, £1.00, p/p 25p. **GRUNDIG** valved Stenorette units, £4.00, p/p £1.00. Office, tape, speech recorders. **REMINGTON** valved office speech recorders. Vast value, £4.00, p/p £1.00. **SPEAKERS**, 8" x 5", 3Ω, 2 for £2.50, p/p 50p. **CARSEAT** Britax 2 point safety belts, new, 2 for £5, p/p 50p. A bargain. 16 kV. New ex-WD meters 3 1/2", £4.50, p/p 25p. **CARBON** power microphone unit, 45p, p/p 15p. **AUTO TRANSFORMERS**, 110v. 75w, £1.00, p/p 25p. **COUNTERS** new ex-WD 4 figure 2300Ω, 2 for £1.00, p/p 25p. Ex-WD 4ft. tank aerial top sections, 3 for £1.00, p/p 50p. No. 19 Power Packs ex-WD, £4.50, p/p 50p. **PILOTS OXYGEN MASK** Tube Microphone, £4.25, p/p 24p. Vast stocks of ex-WD and factory surplus at

**SOUTHERN SURPLUS MERCHANTS LTD.**  
66/68 London Road, Kingston-upon-Thames, Surrey  
Callers welcome 9-6 Monday to Saturday

### G3ACQ offers:

FT 75 — FR400DX — QR666 — SW Bridges — Yaesu microphones. All of the **SOLID STATE MODULES RANGE**. Bantex whips — Rotors — Hygain aeriels. XTAL CALIBRATORS — SW Bridges — Absorption wavemeters — Scopes — Meters — Trio Walkie Talkies — G.D.O.'s — J Beam — L.P.F. — Clocks — AND 60,000 Crystals, 75p each. S.A.E. please.

### S. MAY (Leicester) LTD.

12/14 CHURCH GATE, CITY CENTRE,  
LEICESTER, LE1 4AJ  
Telephone : 58662

G3HEO

G8FAL

### D. P. HOBBS LTD.

"INOUE IC210. 2m. FM Transceiver fully tunable 144-146 with built-in phase locked VFO, 240 volt and 12 volt DC, £280-80. IC222 22 channel mobile transceiver (3 channels supplied) £118-00. Extra channels for above, £3-50.  
"Sommerkamp" TS.1608G 28 MHz 2 watts Hand Transceivers, £124-20 pair.  
FT.250. 80-10 metre Transceiver 240 watts pep, £189-00.  
FP 250. Power supply and speaker, £51-84.  
FT 277 B. 160-10 metre Transceiver 240 watts pep. Built-in AC/DC power supplies, £361-80.  
"Microwave Modules" Converters. "Jaybeam" Aerials. "Bantex" Whips. "Denco" Coils. Hosts of components, new and surplus—Always in stock.

11 KING STREET, LUTON, BEDS.  
Telephone 20907

### "DX ZONE MAP"

ANOTHER 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 new Prefix List revised to Sept. 1973

Price £1.20

including postage and special packing in postal tube to avoid damage in transit.

Publications Dept.

Short Wave Magazine Ltd., 55 Victoria Street,  
London, SW1H 0HF (01-222 5341/2.)

**FEBRUARY Issue:** To appear January 31, single copies at 36p post free will be despatched first-class mail on receipt from printers. Orders by January 29, with remittance to: Circulation Dept., Short Wave Magazine Ltd., 55 Victoria Street, London, SW1H-0HF.

**SALE:** HRO Senior, with nine GC coilpacks, two PSU's and manual, very good condition, £30. B.44 Mk. III (4m. transceiver), as new, £10. — Ring Adkins, 01-794 2294. (London N.W.3).

**FOR SALE:** Heathkit HW-7 Tx/Rx, CW, QRP, covering 40/20/15m. bands (has worked VK3 at 5/9) with key, bargain at £25; PSU available, extra. High-power 4CX-1500B valve, 1 1/2 kW, HF/VHF, ideal for linear amp., brand new but no base (cost £132), £35 or near offer. Digital panel meter, 0-0001 to 1-9999 volt, plasma display, very sensitive, £15 or near offer. VHF power transistors, 12/20/40/60/85 watts, suitable for two metres, write for details and prices, going cheap. — Hunter, 13 Vanburgh Hill, Blackheath, London S.E.3.

**WANTED:** Morse keys. Details and prices please. **SELLING:** Green 12.300v. converter, £3.—Lumb, G3IRM, 14 Linton Gardens, Bury St Edmunds, Suffolk.

**SALE:** Yaesu FR-DX400 receiver, used few hours only, with matching speaker, £150 or near offer. —Saxby, 5 Surfside, Sutton-on-Sea (572), Lincs.

**WANTED:** Nos. 62, 22, 18 and C.12 Sets. State condition and prices.—Manning, 556 Fishpond Road, Fishpond, Bristol.

**SELLING:** Four HC6/U Tx/Rx xtals, new unused, suit Ranger/Vanguard for 145-15-145-75 MHz and 145-5 MHz, £8. HE-40 Rx, working, £7. QOV07-50 valve with base and 144 MHz tank circuit, £2-50. 813 base, 50p. Huge Tx variable capacitor, about 500 pF, handles 2 kW, £5. Roller coaster coil, 48 turns on 2 1/2-in. ceramic former, beautiful job, £5. Codar Q-multiplier, £4.—Thomas, GW4BCD, 13 Northways, Porthcawl, Glam.

### G3EKX S.S.B. PRODUCTS G3EKX

#### ★ SPEEDY CRYSTALS ★

Large stock available by return post. Send a list of your needs and alternatives. We will reply by return if you enclose a S.A.E. All new metal types up to 111 MHz.

EDDYSTONE EC10 Mk. 2. Excellent ... ..	£80-00
EDDYSTONE 680X. Very clean. Plus Speaker ...	£78-00
HRO 5T. Octal version. Power unit plus Speaker ...	£45-00
HROM. Power Unit and Speaker ... ..	£30-00
BC221 plus Mains Unit Cal. Book ... ..	£24-00
CLASS "D" AC Power. Book ... ..	£11-00

**G2DAF.** TX and RX. Also **MOBILE 160M TX/RX** including loaded whip, press to talk mic., Transistor 12v. pack. Selection Test Gear. Send S.A.E. for List. **PART EXCHANGES.** All types of gear **WANTED.**

**PAIR MATCHED 6HF5, £6 ; 6146, £6-20 ; 616B, £7-20.**  
Add 40p P. & P.

1 FRANCES STREET, TRURO, CORNWALL  
Telephone : 0872-862575

**WANTED: DX-40 and VFO.** Details and price please.—Conelly, G3UXE, 19 Norfolk Road, Maidstone (50583), Kent.

**FOR SALE: EC-10 Mk. II,** very good condition, with Burns FM demodulator (needs fitting), £50. EMU 2m. converter, IF 28-30 MHz, £5. Hansen SWR-3, £4. Microwave Modules 70 cm. converter, IF 28-30 MHz, £12. **WANTED: Heath SB-102** and Shure 444 mic.—Day, G4DED G8FSK, QTHR. (Tel: 08675-2215).

**SELLING: K.W. Vespa Mk. II,** £75. KW-202, £85. KW-107 Supermatch. £45. Petrol generator, 2½ kW, 230v. AC. Mustang Tri-Band beam, £15. 80/40m. trap dipole, £6. Pye Reporter, four metres, £10. E.M.I. wavemeter, £6. S.640 Rx, non-working, £6. 4-ele 4m. J-Beam, £6. 14-ele 70cm. J-Beam, £5. 4-in. H/D aluminium masts. Scores of transformers, most in new condition; s.a.e. please. — Forbes, G3JKU, QTHR. (Tel: Burgh-Heath 51799).

**FOR SALE: Telford TC-7 Mk. II with "G8AEV" converter,** excellent condition, £35. — Walker, G4DIU, 4 Woodcraft Gardens, Lovedean, Hants. PO8 9PZ (Tel: Horndean 4401).

**WANTED: Outdoor VFO for KW-2000B.** State condition and price, please.—Cox, G3RYV, 20 Allenby Road, Maidenhead, Berks. (Tel: 0628-22551).

**SELLING: Trio 9R-59DS** complete with handbook, first class order, £39 or near offer.—Marriage, Wash Water House, Newbury (41613), Berks.

**SALE: KW-2000A** with spare case, AC/PSU and two unused 6146's, £150.—Dawson, G3ZVU, QTHR. (Tel: Oxted 4277 after 7.30 p.m.).

**FOR SALE: HRO** with PSU and coil packs for 160-10m., £20. HRO BS coilpacks for 80-10m., £3.50 each. Also one HRO being dismantled for spares.—Grainger, 50 John Street, Brierly Hill, Staffs.

**WANTED: HRO power unit,** handbook and 20m. bandspread coilpack. — Eden, Pond Cottages, Aytrey, Forres (2995), Morayshire, Scotland.

**FOR SALE: Heathkit DX-100U** transmitter, works perfectly, excellent appearance, ideal for CW, with solid-state power supply and manual, £40 or near offer.—Crowther, G3KLF. (Tel: Slepe 8439).

**WANTED: Hallicrafters SX-28** receiver or similar, working. Details and price please. — Lopsien, Glendon, Gilmerton, Crieff, PH7 3LZ.

**SALE: M.K. Products** solid-state SS TV monitor with separate PSU and spare 5FP7 tube, £70 or near offer.—Barker, 15 Buttermere Street, Grange-town, Sunderland.

**FOR SALE: Plug-in unit** for CR-1200 oscilloscope, £25. Rascal 100 MHz transistorised 8-digit counter/timer, £60. Solartron digital voltmeter, £18. **WANTED: Rascal RA-17** case. RA-37 LF adaptor for Rascal Rx. Rascal SSB adaptor. Any spares for Rascal RA-17. Also good quality oscilloscope, signal generator and valve voltmeter.—Ring Lord, G3PHN, 053-04 4626 (Ashby-de-la-Zouch).

**SELLING: Eddystone 830/7** receiver, mint condition, used almost exclusively to monitor morning broadcasts from Radio Australia (cost, plus accessories, £590 when bought from Imhofs, London, in April 1974), £440 or near offer. (N. Ireland).—Box No. 5378, Short Wave Magazine Ltd., 55 Victoria Street, London, SW1H-0HF.

## New lines for the New Year

**MAINS ISOLATION TRANSFORMERS.** 375 watt. 240 in/240 out, £2.95. Post 50p.

**STORNO LB VISCOUNTS** in excellent order, FM with selective tone panel, only £6 each for the unit, post £1.

**CONTROL BOXES,** cable and mic. for the above, £5, post 60p.

Some less mic. and may have slight cracks in case, etc., £3 each, post 50p.

**STORNO LB FM Mains BASE STATION 33C,** £7 each, good order, carr. £2. Control units for above Base Station, or HB of the above, with tone selective call, speaker and mic. built in, £7 each, post 60p. Nice order.

**HUDSON LB FM Base Stations,** nice condition . . . may have a minor part missing. 95% there, tx and controls, only £6 each, worth more for spares. Carr. Matching external transistor Rx., £4, post 45p.

OC35, New Mullard Transistors, 45p each, post 5.

OC36 New Mullard Transistors, 50p each, post 5p.

**CRYSTALS,** see last months advert or send for free lists of current stock or HCGUs all at only 75p each.

**CABLES,** loads of new top quality cables, mains/microphone/multi-core/scratched, etc., send for free lists. S.A.E. please. All well under wholesale prices.

**POWER SUPPLIES.** Many ex-equipment top grade Storno in stock. 12v. DC/130v. DC/300v. DC/6-3v. AC, etc., all on chassis with caps., chokes, solid state rectifiers, re-settable mains fuses, etc., all cheap. £2-£5 each. State wants.

Storno Ae C/o Relays with built-in SO259 socket, very nice, 50p, post 10p. Spares for most storno equipment.

**BARGAIN BOXES.** 14 lbs. of new and used components/Boards/Plugs/Panels, etc., normally worth £6 for £2, post 50p.

**CARRIERS** for Vanguards and Rangers, 50p each, post 25p any number.

**RTTY . . . CREED 85R,** Reperforators-printers, very rare, in A1 mint condition, many have been used for only 6-8 hrs., 100-260v. DC powered, only £10 each but collection must be arranged as these are fairly heavy and difficult to send. From time to time CREED 7Bs, A1 condition for only £12 collected. Ex-equipment small valves, 68H6/ECC88/EC91/6AK5, etc., 20 mixed for £1, post 25p. Brand new 815's, 50p each, post 10p any number.

A few QQVO6/40s, £2.40, post 20p. QVO3/12s, 45p, post 10p.

S.A.E. for up-to-date lists.

## W. H. WESTLAKE

West Park, Clawton, Holsworthy, Devon. Tel.: Holsworthy 253758

### FT.101 Mark I

Simple modification plus our Clipper vastly reduces cross modulation, drop in Rx gain on 12 volts, VOX difficulties and lack of selectivity, etc. Gives performance in most ways at least equal to and in some ways completely superior to standard FT.101B. Large s.a.e. for full details.

### BETTER THAN A LINEAR AND ½ OF THE PRICE

At last a distortion-free RF Clipper. Fits in minutes and really works. YAESU SSB Filter fitted. Only for FT.101. Giving up to 6 times or more effective talk power gain, plus extra RX selectivity and gain. Not to be confused with audio type distortion producing clippers, or compressors. £45.00 plus VAT with free 444 mic this month.

### FT.101 — RF Clipper still the best

**G3GXZ**—"Have done exhaustive tests with Nets where comparison with other mobile signals has been available. Members have commented on excellent communications ability of FT.101 plus G3LL's Clipper."

**GSRP**—"In terms of cost effectiveness, the best investment I have made for years."

**DA2YR**—"When I'm in M the clipper certainly helps the readability of my rather weak signal."

**W2AOQ**—"Unit works so well have given up plans to buy a Linear."

Full details from—

G3LLL, HOLDINGS LTD.,

39/41 MINCING LANE, BLACKBURN, BB2 2AF. Tel.: 59595/6

## MORSE MADE EASY !!!

**FACT NOT FICTION.** 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 £4.95 including P.P.I. etc. (overseas £1 extra.)

For further details of course Ring 01-660 2896 or send 4p stamp for explanatory booklet to—S. BENNETT, G3HSC,

(Box 14) 45 GREEN LANE, PURLEY, SURREY

## WANTED

### PYE RADIOTELEPHONE EQUIPMENT

Also Manuals and Instruction Books for Test Gear and Radiotelephone equipment.

Top Prices Paid

### B. BAMBER ELECTRONICS

20 Wellington Street, Littleport, Cambs.

Tel. ELY (0353) 860185

# CALL BOOK 1975

**NOW AVAILABLE  
FROM STOCK**

**DX LISTINGS £5.50**

**U.S. (Only) ,, £5.95**

*The above prices include postage and packing.*

(1974 Editions no longer available)

**Please order your copy early from:**

**Publications Dept.,**

**SHORT WAVE MAGAZINE**

55 Victoria Street, London, SW1H 0HF

01-222 5341

## WORLD RADIO/TV HANDBOOK 1974

The World's only complete reference guide to International Radio & Television Broadcasting Stations. It includes: Frequencies, time schedules, announcements, personnel, slogans, interval signals and much more besides of value to the listener.

Lists all International short-wave stations, including frequencies, for each country; foreign broadcasts, long and medium wave stations (AM broadcast Band), TV stations and domestic programmes. Long recognised as the established authority by broadcasters and listeners. It is the only publication that enables you to identify BC stations quickly and easily. Enables you to fill more pages in your log book on the SW BC bands and helps you add more BC-station QSL cards to your collection.

**£3.15**

(The above price includes postage and packing).

from:

**SHORT WAVE MAGAZINE**

55 Victoria Street, London, SW1H 0HF

**SALE:** Swan-500 Transceiver with 230XC power supply and plug-in VOX unit, good condition, £165 or near offer. Could deliver 50-mile radius of Bristol.—Ring Askew, Abson 2289.

**FOR SALE:** SB-101 transceiver with SB-600 AC/PSU, factory-built, incredibly stable and superb quality, with 160m. "G3SEL" translator ("Short Wave Magazine," March 1972) and microphone, the whole rig in really excellent condition, £175. G3SEL going QRT.—Ring Powell, G3SEL, West-Coker 2712 (Somerset).

**WANTED:** Ten-Tec Rx-10 receiver with high-impedance headset. Details and price please. (Isle of Wight).—Box No. 5379, Short Wave Magazine Ltd., 55 Victoria Street, London, SW1H-0HF.

**SELLING:** FT-2F, as new and little used, with all accessories, manual and six pairs xtals, £70 or near offer. **Pye FM Vanguard**, similar to Cambridge but high-power, working on 2m., with crystals fitted for 145 and 145.5 MHz, high/low power switch (10w. or 60w.), ideal base or mobile rig, with all accessories including manual, very good condition, £40. Two-metre 5/8 Bantex mobile aerial, £2.50. Pye Tulip mic., £3.—Power, G8GQW, QTHR. (Tel: 01-464 6747).

**SALE:** M.K. Products solid-state SS TV monitor with separate PSU and spare 5FP7 tube, £70 or near offer.—Ayton, 19 Percy Terrace, Hendon, Sunderland, Tyne and Wear. (Tel: Sunderland 56774, office hours).

**WANTED:** KW-110 Q-multiplier.—Thomas, Gordon House, Ham Common, Richmond, Surrey.

**SELLING:** Property of the late G6LK: FT-401/FV-401, £200. FTV-650, £35. KW-1000, £85. K.W. SWR meter, 52-ohm, £5. SB-220, £150. Swan-500C with PSU and TV-2B transverter, £200. Drake R-4 with SC-6 converter, £120. TR-44, £25. YD-844, £5. M.F.J. CW filter, £5. Shure 444, £5. Shure 444T, £6.—Surman, Dumbledore, The Drive, Ifold, Billingshurst, Sussex.

**WANTED URGENTLY:** Oscilloscope and multi-meter. Details and price please.—de la Bertache, G3RCO, Westleigh, Fore Street, Beer, Devon EX12 3EQ. (Tel: Seaton 21016).

**FOR SALE:** HRO, MX with four bandspread coils, PSU and speaker, £25. Minimitter Q5'er, £5. — Ring Battell, 01-272 1736 (London).

**FOR SALE:** KW-2000E with AC and DC PSU and Q-multiplier, only six months old, £325. Reason for sale, cash needed urgently for house.—Tidey, G4CXS, 33 Charnock, Swanley (68352), Kent.

**SALE:** Codar CR-70A receiver with PR-30/RF pre-selector, £23 or near offer. **WANTED:** Two-metre converter, any IF.—Ring Powrie, Romford 45733.

**FOR SALE:** Eddystone 730/4 receiver, as new condition and in maker's carton, with manual, £75 or near offer.—Ring Billington, 01-656 9882 after 7 p.m.

**SELLING:** New 12v. Nicad battery, 2 amp-hr., ideal for Liner-2 etc., £7. New xtals: 63.00 MHz (for "G3TEDZ" Rx), £1.50; Marconi 100 kHz, £1.50. 4CX250B with UHF base, £3.50; 4X150A, £1.60; 75 MHz xtal, 75p. S.a.e. for lists. **WANTED:** Osker power meter, M.M. pre-amp and DL70 valve. —Neville, G8ENI, QTHR. (Tel: Cheslyn Hay 415374).

**WANTED:** Pye Westminster or Cambridge, dash-mounted, in good condition. Details and price please.—Green, G3TRL, QTHR. (Tel: 051-355 2017).

**WANTED:** Eddystone or B.T.S. 4-pin plug-in coils with base, pre-war if possible. Also "Practical Wireless" 1936/1938. Your price paid. — Wood, 8 Rohais Court, St Clement, Jersey, C.I.

# G. W. M. RADIO LTD.

All prices include VAT and post/carriage

**RADIO TELEPHONES.** Storno Viscount CQM.39.25 L/B FM with cable, box and mike, £15. Storno 10 watt 230v, AC with desk controller and cable, L/B GM, £20. For callers only, Murphy base stations AM L/B, £10. All less channel crystals. BC221 complete charts, no psu, £18.

**RECEIVERS.** Marconi HR55N 70—100 Mc/s. AM, clean, complete but untested, £7. Matching transmitters HT 55N. QVQV6-40 PA 2 x 5B254M Mod., £10. Both are 19" rack chassis in good quality table top case. Built-in power units for 100-250v. AC. Carriage is costly—much cheaper for callers.

**OSCILLOSCOPES.** Solatron CD1014 (CT436). Double beam, DC to 6 Mc/s. 10 My per Cm. sensitivity, clean and good order, £55 by Securicor. Solatron CD1212 5" tube, TB 100 nanosecs. to 5 secs. input 200 mic/volts, to 100 volts. Clean and working, with 24 Mc/s. dual trace plug in unit, £80. Wide band 40 Mc/s. unit, £20 (only sold with 'scope). CT52 small mains scope simple, but very useful, £25.

**DIODE RECTIFIERS.** 41 HF40, 400v. at 40a, 60p or 4 for £2-10. BYZ13, 800v, 20a, 70p or 4 for £2-50.

**REED RELAYS.** 4-pole normally open, 5v. DC coil as used in recent Electronic Keyer design, 16p each (plus 10p post for any number). Also reed inserts 1-85" overall (body length 1-1"). Diameter 1/4". Max. ratings 250v. DC and 500 mA. Gold clad normally open contacts, 69p per dozen, £4-12 per 100, £30-25 per thousand.

**JB 4 gang 500 pf variable capacitor, ceramic insulated, 1/4" shaft, £1-27. 250v. AC INDUCTION MOTORS 48 watt with gear box, output 50 r.p.m., £1-55.**

**RELAYS.** 240v. AC SPCO contacts handle 25 maps, £1-25.

**RACAL.** Frequency standard and power unit for Channelizer MA150. Comprises mains power unit giving outputs of 6-5v. 11-5a, negative 78v. and 250v. stabilised (transformer rating is 450 ma). Also contains 12v. crystal oven for 100 kc/s. crystal. Clean, untested, £8. RACAL SSB adaptors RA218 for RA17 and RA117 Receivers, clean, untested, £30.

**AERIAL INSULATORS,** EGG type. White china 1 1/2", 6 for 55p. Pyrex 2 1/2", 55p each.

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 order. Early closing Wednesday.

**40-42 PEARL ROAD, WORTHING, SUSSEX**

# REG. WARD & CO. LTD. (G2BSW)

WE ARE OFFICIALLY APPOINTED K.W. AGENTS FOR THE SOUTH WEST (Somerset, Dorset, Devon, Cornwall)

KW 160 Top band A.T.U.	£16-00
KW 108 Mon. scope	£76-00
KW Atlanta with psu.	£210-00
KW 2000E TCVR. & A.C. p.s.u.	£275-00
KW 202 Receiver with matching speaker	£186-00
KW 204 Transmitter	£210-00
KW 101 VSWR Meter (52 or 75 ohm)	£8-25
KW 103 VSWR Meter and Combined Power Meter	£14-00
KW E-Z Mastix 10-80m. A.T.U.	£20-00
KW 107 Combined E-Z Mastix, VSWR and R.F. Power Indicator, Dummy Load and Antenna Switch for 4 Outlets	£60-00
KW Trap Dipole Coaxial Feeder	£22-00
KW Trap Dipole with Balun	£24-00
KW 3-way Antenna Switches (for coax)	£5-00
<b>YAESU</b>	
Yaesu FT101B Tcvr.	£330-00
Yaesu FR400DX	£155-00
FR50 — Cal. WWV	£67-00
FT200 Transceiver and FP200 A/C PSU	£215-00
FR400SDX Rx. (with 160 and 2m.)	£210-00
SP400 Speaker	£11-00
Sentinel 2m. Preamps and 2m. Converters	£11-00
<b>SHURE MICROPHONES</b>	
Model 444, £13-50 ; Model 201, £5-70.	
<b>USED EQUIPMENT :</b>	
Park Air 2m A.M. TX 4 XTAL channels. Comp. with H/book, spare valves and Shure desk mic.	£269-00
Yaesu FRDX400 RCVR, fitted with 2m. Converter	£135-00
VALVES for YAESU, etc. 6B8B, 6BZ6, GUB, CE17, 6AV6, 6KD6, 12AX7A, 12BY7A, 12AU7, A.R.C.A. VALVES for KW and Heathkit equipment, 6146, 6146B, 6HF5, 6LO6, 6GES, 6EA8, 6G6W, 6GK6, 6CM6, 6CL6, 6CB6, 6BN8, 6HS6, 6EW6, 12BA6, 12BE6, 12B26, 6JS6C, etc., and many other types.	
J Beams and Stolle Rotators ; 140ft. 14g. enam copper ant. wire ; Ribbed and T-Insulators ; 52 and 75 Ω co-ax, and U.H.F. plugs and sockets. Mast Couplers for 2in. Masts.	
<b>TRADE INS WITH PLEASURE. OUR STOCK OF GOOD SECOND HAND EQUIPMENT CHANGES DAILY — LET US KNOW YOUR REQUIREMENTS.</b>	

Due to currency fluctuations prices of imported equipment are liable to alteration. Add 8% VAT to all prices except used equipment.

HP TERMS AVAILABLE CARRIAGE EXTRA ON ALL ITEMS

**AXMINSTER - DEVON Telephone: 33163**

**FOR SALE:** Cambridge, Varicap tuning, £20. Tx base station, £10. Hi-band Vanguard with control box, £15. DST-100 Rx complete, £10. No. 19 Set. £2. 883A triode, new, £3.—Mason, G3IO, GTHR.

**SALE:** Liner-2 SSB transceiver, 6 weeks old and mint condition, complete with handbook, all fittings and original packing, £125. Two-metre 4 MHz AM Tx and modulator, 16w., with crystals 145-800, 145-440, 145-944 MHz, set of spare valves and mic., very good condition, £20 or near offer. Channel-Master aerial rotator with control unit, £10 or near offer. 6-ele 2m. beam, £2-50. — Currie, GMCAT, 71 Lamerton Road, Kildrum, Cumbernauld G67 2HT. (Tel: 041-776 5281, office hours Mon. to Sat.).

**SELLING:** Codar AT-5 Tx and AC/PSU, mint, £20. (Essex).—Box No. 5380, Short Wave Magazine Ltd., 55 Victoria Street, London, SW1H-0HF.

**WANTED:** QRP transceiver, or Tx for 80cm. CW (transistorised). Details and price please.—Elsworth, G4AYG, QTHR.

**FOR SALE:** Codar CR-70A general coverage receiver with separate speaker, PR-40 pre-selector, Hamgear PMIX calibrator with five outposts, and M.F.J. CW filter, all in mint condition, £45 the lot. Would separate, or W-H-Y.—Hanson, 6 Woodhall Place, Parkside Estate, Newcastle-under-Lyme, Staffs.

**COMPLETE STATION FOR SALE:** Heathkit HW-101 transceiver, SB-600, HP-23A speaker/power-pack, Shure 201 mic., and with all manuals, first class condition, £155. Or with excellent home-built speaker/power-pack, only £125. — Beekar, G3WY, QTHR. (Tel: Evesham 45497).

**SALE:** AR88D, in excellent condition throughout, with S-meter and manual, original finish and wiring, no mods., £60. BC-221 frequency meter, with PSU and original calibration charts, immaculate, £26 plus carriage. Cowl-Gill motor, as new, £10. Co-ax cable UR.67, soft, unused, £5. Both plus postage. **WANTED:** R.390/A/URR; Creed tape reader with terminal unit. Details, condition and price please. (Lancs.); — Box No. 5381, Short Wave Magazine Ltd., 55 Victoria Street, London, SW1H-0HF.

**SELLING:** FT-75 with 10 extra crystals, AC and DC PSU's, and VFO; G-Whip Multimobile with extra coils; the lot, £175. Yaesu FL-2000B linear, brand new, £165. AR-22 rotator, TA-33Jr., Hygain balun, £45.—Barry, G3UFU, 15 Fairlawn Court, London, W4 5EE. (Tel: 01-994 6931).

**MANUALS:** Creed Model 75 teleprinter equipment manual; T.1154/R.1155 manual; both mint condition. Offers?—Halligey, 62 Periwinkle Lane, Hitchin (53273), Herts.

**SALE:** C.45 Set FM Tx/Rx, 23-28 MHz, with 12v. PSU and details, £28. B.44 Tx/Rx, ideal for 4m., £9. Pye Vanguard, nearly on 145 MHz, £12. Command Rx, 190-550 kHz, £4-50. Pye Rx's, Hi and Lo, £3 each.—Ring McCarthy, Southend 711742.

**FOR SALE:** FR-400SDX, mint condition, £150.—Fielding, 455 Ripple Road, Barking, Essex. (Tel: 01-594 8992).

**WANTED:** Buy or borrow circuit service manual or any information on Radar Tx/Rx No. TR-3694 (ref. 10D/18625), believed to be of Ekco manufacture.—Eaton, 80 Mole Street, Sparkbrook, Birmingham 12. (Tel: 021-772 0248; or 021-744 6381 evenings).

**FOR SALE:** Telford Communications "G8AEV" Mk. II two-metre converter, IF 4-6 MHz, hardly used, £19 including postage.—Barnes, Butcombe, Morchard Bishop, Exeter.

## CALL BOOKS

### INTERNATIONAL :

<b>RADIO AMATEUR CALL BOOKS (1975)</b>	
"DX Listings" . . . . .	£5.50
"U.S. Listings" . . . . .	£5.95
"G's" only 1975 Edn. . . . .	£1.20

## MAPS

<b>DX ZONE MAP (GREAT CIRCLE)</b> In colour with Country/Prefix Supplement Revised to September 1973 . . . . .	£1.20
<b>AMATEUR RADIO MAP OF WORLD</b> Mercator Projection — Much DX Information — in colour. Second Edition . . . . .	66p
<b>RADIO AMATEUR MAP OF THE U.S.A. AND NORTH AMERICA</b> State boundaries and prefixes, size 24" by 30", paper . . . . .	62p
<b>RADIO AMATEUR'S WORLD ATLAS</b> In booklet form, Mercator projec- tion, for desk use. Gives Zones and Prefixes (New Edition) . . . . .	£1.11

## LOG BOOKS

Standard Log (New Glossy Cover) . . . . .	65p
Receiving Station Log . . . . .	49p
Minilog . . . . .	28p

(The above prices include postage and packing).

## MORSE COURSES

### G3HSC Rhythm Method of Morse Tuition

*Complete Course with three 3 speed L.P. records with books including U.K. P.P.I. etc. . . . .	£4.95
*Beginner's Course with two 3 speed L.P. records with books including U.K. P.P.I. etc. . . . .	£3.65
*Single 12" L.P. Beginner's with book . including U.K. P.P.I. etc. . . . .	£3.00
*Single 12" L.P. Advanced with book . including U.K. P.P.I. etc. . . . .	£3.02
Three speed simulated GPO test. 7" d.s. E.P. record. including U.K. P.P.I. etc. . . . .	£1.00

Prices include postage, packing and insurance  
in U.K. only \*Overseas orders + £1.00.

Available from

## SHORT WAVE MAGAZINE

Publications Dept., 55 Victoria Street,  
London, SW1H 0HF . . . . . 01-222 5341

(Counter Service, 9.30-5.15, Mon. to Fri.)  
(Nearest Station: St. James's Park)

(GIRO A/C No. 547 6151)

**FOR SALE:** Good FL-400 Tx, going QRT, hence  
£150 for quick sale. QTH East London. — Ring  
Stone, 01-357 2285 office hours.

**SALE:** Liner-2 SSB 2-metre transceiver, complete  
with mic. and built-in Mosfet pre-amp, recently  
checked and re-aligned, in perfect working order,  
£120 including carriage.—Thexton, G3URE, QTHR.  
(Tel: Wideopen 5311 daytime, or 3044 evenings).

**OFFERING:** AR88D with S-meter, two speakers,  
handbook and complete spare valves, PSU, 250v.  
250 watts. Twenty transmitting pentodes from 30 to  
250 watts. 28 meters including 16 RF, 12 milliamps,  
volts of various values. Seven 7 MHz band xtals.  
Vibroplex Lightning bug key; precision hand key;  
carbon hand and throat microphones. 220v. mag-  
netic relay switch for 600-ohm feeders. Some boxes  
of heavy duty resistors; fixed capacitors; multi-way  
switches, plugs and sockets. Box of stand-off feed-  
through and antenna insulators including seven 7-in.  
Pyrex ribbed. 2/300-ft. co-ax and flat twin. Ex-  
German multimeter test set. Several transmit vari-  
able capacitors. For sale as one lot. Best offer over  
£50. Buyer collects.—Cole, G2EC. (Tel: 01-730 3869,  
Chelsea).

**WANTED:** 62 Set in any condition. Cash waiting.—  
Silver, 4 Spencers Bellvue, Lansdown Road, Bath  
BA1 5ER.

**WANTED:** Buy or borrow circuit details for Trio,  
Jennen, 9R-4V SW receiver. — Brennan, Green  
Hill, Kinsale, Eire.

**SELLING:** Trio 9R-59DS receiver with matching  
speaker, only 6 months old and little used (cost  
£50), £25. (Property of late husband).—Ring Insley,  
Romford 20906 anytime.

**SALE:** Edometer Mark II complete, £12. Roller  
inductance coil, ex-W.D., £4.—Meiklejohn, Castle  
Steps, Bayards Cove, Dartmouth, South Devon, TQ6  
9AX.

## RADIO AMATEUR HANDBOOK (ARRL 1974)

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 edition contains 700 pages, including  
index, and nearly 100 new illustrations and  
drawings. The price remains at **£2.94**,  
also available in a hard-covered clothbound  
edition at **£3.74** (both post free).

Order from

Publications Dept.

**SHORT WAVE MAGAZINE LTD.**  
**55 VICTORIA STREET,**  
**LONDON, SW1H 0HF**

# Technical Books and Manuals

(ENGLISH AND AMERICAN)

## AERIAL INFORMATION

ABC of Antennas . . . . .	O/S
Aerial Handbook (Briggs) . . . . .	93p
Antenna Handbook, Volume 1 . . . . .	£1-84
Antenna Round-Up, Volume 1 . . . . .	£1-55
Antenna Round-Up, Volume 2 . . . . .	£1-85
Beam Antenna Handbook, 4th Edition . . . . .	£2-15
Quad Antennae, 2nd Edition . . . . .	£1-87
Simple Low Cost Wire Antennas . . . . .	£1-80
Vertical, Beam and Triangle Antennas (E. M. Noll, "73") . . . . .	O/S
Dipole and Long-Wire Antennas (E. M. Noll, "73") . . . . .	£2-38
Antenna Handbook (ARRL), 13th Edition . . . . .	£1-45

## BOOKS FOR THE BEGINNER

Amateur Radio (Rayer) . . . . .	£1-68
Beginners Guide to Radio (7th Edition) . . . . .	£1-20
Beginners Guide to Transistors . . . . .	£1-20
Beginners Guide to Colour TV . . . . .	£2-13
Beginners Guide to Electronics . . . . .	£2-08
Better Short Wave Reception, 3rd Edition . . . . .	£1-88
Course in Radio Fundamentals . . . . .	£1-21
Fascinating World of Radio Communications . . . . .	£1-83
Foundations of Wireless and Electronics . . . . .	O/S
Guide to Amateur Radio . . . . .	95p
Ham Radio (A Beginners Guide) by R. H. Waring . . . . .	£1-75
How to Become a Radio Amateur . . . . .	O/S
Learning the RT Code . . . . .	33p
Morse Code for the Radio Amateur . . . . .	27p
Radio, by D. Gibson . . . . .	92p
Radio Amateur Examination Manual . . . . .	95p
Simple Short Wave Receivers (Data) . . . . .	95p
Understanding Amateur Radio . . . . .	£1-47

## GENERAL

ABC of Electronics (by Farl J. Waters) . . . . .	£1-68
FM & Repeaters for the Radio Amateur . . . . .	£1-70
ABC of FET's . . . . .	£1-40
Easibinder (to hold 12 copies of "Short Wave Magazine" (together) . . . . .	£1-25
FET Principles, Experiments and Projects . . . . .	£2-25
Making Transistor Radios (R. H. Waring) . . . . .	O/S
Guide to Broadcasting Stations (7th Edition) . . . . .	88p
Ham (Radio) Notebook . . . . .	O/S
Having Fun with Transistors . . . . .	£1-67
110 Semi-Conductor Projects for the Home Constructor (Iliffe) . . . . .	£1-30
How to Listen to the World (8th Edition) . . . . .	£1-98
110 Integrated Circuit Projects for the Home Constructor (Hard Back) . . . . .	£1-98
Know Your Oscilloscope (by Paul C. Smith) . . . . .	O/S
Practical Transistor Theory . . . . .	£1-60
Practical Wireless Circuits . . . . .	£1-41
Prefix List of Countries . . . . .	25p
Radio Engineers Pocket Book (Newnes) (N.E.) . . . . .	£1-31
Shop and Shack Shortcuts . . . . .	O/S
The Fascinating World of Radio Communications . . . . .	£1-82
Test Equipment for the Radio Amateur . . . . .	£2-10
Telecommunications Pocket Book (T. L. Squires) . . . . .	£1-38
World Radio and TV Handbook, 1974 Edition . . . . .	£3-15
Dictionary of Telecommunications . . . . .	£2-45

## HANDBOOKS AND MANUALS

Amateur Radio DX Handbook . . . . .	£2-25
Electronic Circuit Handbook, Vol. 1 . . . . .	£1-50
Electronic Circuit Handbook, Vol. 2 . . . . .	£1-50
New RTTY Handbook . . . . .	£1-90
RTTY Handbook (Tab) . . . . .	£2-68
Radio Amateur Handbook 1974 (ARRL) . . . . .	O/P
Radio Amateur Handbook 1974 (ARRL) (Hard Cover) . . . . .	O/P
Radio Amateur Operators Handbook . . . . .	82p
Radio & Electronic Handbook . . . . .	£1-30
Radio Communication Handbook (RSGB) . . . . .	O/P
RTTY Handbook . . . . .	O/S
RTTY A-Z (CQ Tech. Series) . . . . .	£2-35
Surplus Conversion Handbook . . . . .	£1-45
Slow Scan Television Handbook . . . . .	O/S
Television Interference Manual (G3JGO) . . . . .	92p

## USEFUL REFERENCE BOOKS

Amateur Radio SSB Guide . . . . .	£1-65
Amateur Radio Techniques, 5th Edition . . . . .	£2-25
Care and Feeding of Power Grid Tubes (Elmas Division of Varian) . . . . .	£1-69
Engineers Pocket Book, 6th Edition . . . . .	£1-55
UK Call Book 1975, New Edition . . . . .	£1-20
Hams' Interpreter . . . . .	85p
Hints and Kinks, Vol. 8 (ARRL) . . . . .	70p
Radio Amateur Examination Manual (N.E.) . . . . .	95p
Radio Data Reference Book (3rd Edition) . . . . .	£1-10
Radio, Valve and Transistor Data (Iliffe) 9th Edition . . . . .	£1-00
Service Valve and Semiconductor Equivalents . . . . .	40p
Single Sideband for the Radio Amateur (ARRL) 5th Edition . . . . .	£1-75
Single Sideband Theory and Practice by H. D. Hooton . . . . .	O/S
Sun, Earth and Radio, by J. A. Ratcliffe . . . . .	98p
Transistor Pocket Book . . . . .	£1-64
NBFM Manual . . . . .	£1-05

## TRANSISTOR MANUALS

ABC of Transistors . . . . .	£1-40
Field Effect Transistors (Mullard) . . . . .	£2-05
Having Fun with Transistors . . . . .	£1-68
Handbook of Transistor Circuits . . . . .	£2-45
Transistor Audio & Radio Circuits (Mullard) . . . . .	£2-05
Transistor Fundamentals: Basic Semi-Conductor, Vol. III, and Circuit Principle, Vol. 1 . . . . .	each £2-02

## VHF PUBLICATIONS

VHF Handbook, Wm. I. Orr. . . . .	£2-65
VHF Manual (ARRL) . . . . .	£1-45
VHF/UHF Manual (RSGB) . . . . .	O/P

Amateur Radio Awards (RSGB) . . . . .	£1-45
Questions and Answers on Radio and TV . . . . .	90p
Integrated Circuit Pocket Book . . . . .	£2-72
International Transistor Data Manual (Semicon) . . . . .	£5-75
Teletprinter Handbook (RSGB) . . . . .	£5-40
Advanced Communication Systems . . . . .	£8-50

O/P (Out of print)

THE ABOVE PRICES INCLUDE POSTAGE AND PACKING

T. O/S (Temp. out of stock)

Many of these titles are American in origin.

Available from

SHORT WAVE MAGAZINE

Publication Dept., 55 Victoria St., London SW1H 0HF - 01-222 5341

(Counter Service, 9.30-5.15. Mon. to Fri.)

(Nearest Station: St. James's Park)

(GIRO A/C. No. 547 6151)

# B. BAMBER ELECTRONICS

20 WELLINGTON ST., LITTLEPORT, CAMBS.

Tel.: Ely (0353) 860185 (Tuesday - Saturday)

CALLERS WELCOME BY APPOINTMENT

## ELECTROLYTIC CAPACITATOR PACKS

4.7mfd at 6.3v., 5 for 25p; 22mfd at 6.3v., 5 for 30p; 100mfd at 6.3v., 5 for 35p; 220mfd at 6.3v., 5 for 40p; 330mfd at 6.3v., 5 for 40p; 470mfd at 6.3v., 5 for 45p; 3300mfd at 6.3v., 5 for 95p.  
1mfd at 10v., 10 for 25p; 33mfd at 10v., 5 for 30p; 100mfd at 10v., 5 for 40p; 220mfd at 10v., 5 for 40p; 330mfd at 10v., 5 for 45p; 470mfd at 10v., 5 for 60p; 3300mfd at 10v., 5 for 95p.  
33mfd at 16v., 5 for 35p; 330mfd at 16v., 5 for 60p; 1000mfd at 16v., 5 for 95p.  
33mfd at 25v., 5 for 40p; 47mfd at 25v., 5 for 40p; 100mfd at 25v., 5 for 45p; 220mfd at 25v., 5 for 50p; 330mfd at 25v., 5 for 75p; 470mfd at 25v., 5 for 95p; 1000mfd at 25v., 5 for 95p.  
3.3mfd at 35v., 6 for 30p; 10mfd at 35v., 5 for 40p; 33mfd at 35v., 5 for 40p; 47mfd at 35v., 5 for 45p; 100mfd at 35v., 5 for 60p; 220mfd at 35v., 5 for 75p; 330mfd at 35v., 5 for 95p.  
2.2mfd at 50v., 10 for 40p; 22mfd at 50v., 5 for 40p; 33mfd at 50v., 5 for 45p; 330mfd at 50v., 5 for 95p.  
64mfd at 64v., 5 for 65p; 1mfd at 100v., 10 for 25p; 0015mfd min disc ceramics, 20 for 20p; 390pf tantalum at 500v., 10 for 30p.

## HANDI-PACKS

TV PLUGS (metal type), 6 for 50p.  
TV SOCKETS (metal type), 5 for 50p.  
TV LINE CONNECTORS (back-to-back skt), 5 for 50p.  
TO3 TRANSISTOR INSULATOR SETS, 10 sets for 50p.  
MIXED ELECTROLYTICS, large bag, £1.00.  
PC BOARD WITHDRAWAL HANDLES, mixed cols., 8 for 50p.  
SOLDER, 20SWG, 60/40 alloy, approx., 9 yds, 25p.  
OA81 DIODES, 15 for 25p.  
OC200 TRANSISTORS, 6 for 50p.  
PERSPEX COIL FORMERS, 1½in. x ½in. dia., 5 for 25p.  
TURRET TAGS, ½in. dia., 25p pack.  
ROTARY SWITCHES, min. 4 pole 2 way, 2 for 50p.  
ANTI-PARASITIC BEADS, 15p pack.

**MAINS ISOLATING TRANSFORMER**, 375VA, tapped primary, 240v. output, new, £6.00.

**MAINS ISOLATING TRANSFORMER** (ex equip.), in metal cases, totally enclosed, tapped mains input, 110-240v. etc., output 240v. at 3A + 12v. at 0.5A, £11.00.

AS ABOVE, output 240v. at 12A + 12v. at 3A + 22v. at 2.5A, £27.50.

**RADIOSPARES 500-WATT AUTO TRANSFORMER**, 100/110/130/200/220/240/250v. tapped input and output, step up or step down facility, ex new equip., £6.00.

## MAINS TRANSFORMERS

All 240v. input, voltages quoted approx. RMS  
(Please quote Type No. only when ordering)

**TYPE F27BS** (ex Pye F27 base station TX) 500v. at 350mA, 6.3v. at 8A, £6.00.

**TYPE 40/2**. 40v. at 2A, £1.00 each.

**TYPE 18/8**. 18v. at 8A, £4.50 each.

**TYPE 16/6**. 16v. at 6A, 45v. at 100mA, £4.00.

**TYPE 28/4**. 28v. at 4A, 125v. at 500mA, £4.00.

**TYPE 63/1**. 6.3v. at 1A, 85p each, 2 for £1.50.

**TYPE 129**. 400v. at 20mA, 200v. at 10mA, 6.3v. at 500mA, £1.25.

**TYPE 72700**. 600v. at 20mA, 18v. at 1A twice, 50v. at 25mA, 6.3v. at 1.5A, £1.25.

**TYPE 72703**. 400v. at 10mA, 200v. at 5mA, 6.3v. at 400mA, £1.25.

**TYPE 70462**. 250-0-250v., 50-0-50v., 6.3v., £1.75.

TERMS OF BUSINESS : CASH WITH ORDER, MINIMUM ORDER OF £1.00. ALL PRICES NOW INCLUDE POST & PACKING (UK ONLY)

EXPORT ENQUIRIES WELCOME  
PLEASE ENCLOSE STAMPED ADDRESSED ENVELOPE WITH ALL ENQUIRIES

PLEASE ADD 8% VAT

## BARGAIN BOXES

**EDGEWISE METERS**, 50 microamp FSD, centre zero, but can be left hand zero'd, display area 1½in. x ½in., smart modern appearance, £1.50 each.

A new publication: "HOW TO MAKE 2M and 4M CONVERTERS FOR AMATEUR USE", describing all-trans. bipolar, fet and mosfet converters that are easy to construct, 65p (Zero-rated VAT).

**HIGH GRADE ELECTROLYTICS**, 6800 mfd at 25v., with screw terminals, complete with capacitor clip for vertical mounting, 50p each, discount on quantity.

**PL259 PLUGS** (PTFE). Brand new, 50p each, or 5 for £2.25.  
**SO239 SOCKETS** (PTFE). Brand new (4 hole fixing type), 50p each or 5 for £2.25.

**MODERN TELEPHONES**, with dial, standard type, fawn and grey, £2.75 each.

**INTEGRATED - CIRCUIT TEST CLIPS**, by AP Inc., gold plated clip on type, brand new, individually boxed, £1.50 each.

**PYE AC10 POWER SUPPLY**. 240v. input, 12v. (nominal) AT 10AMP output, stabilised, fully enclosed, fused, used but tested, £30.00.

TELEPHONE TYPE EARPIECE INSERT, 50p.  
REEDS (for reed relays). Single-pole make, 5 for 30p.

MULLARD TUBULAR CERAMIC TRIMMERS, 1-18pf, 6 for 50p.

ICs, some coded, 14DIL type mixed, untested, 20 for 25p.

IF CANS, ½in. square, suitable for rewind, 6 for 30p.

IF CANS, ½in. x ½in. x ½in., suitable for rewind, 10 for 30p.

SMALL NEONS, 6 for 25p.  
24v. MIN. REED RELAYS, encapsulated single-pole make, 2 for 50p.

24v. 2-8 LAMPS, MES type, 6 for 20p.  
CHASSIS TAGS, 25p pack.

CABLE CLIPS, for sailing cable, 15p pack.  
MINIATURE SLIDER SWITCHES, 2 pole, 2 way 5 for 50p.

C-MOUNT for TV camera lens, 30p.  
BSY95A TRANSISTORS, 6 for 50p.

6.3v. 0-3A CAPLESS LAMPS, 10 for 25p.  
PNP AUDIO TYPE TO5 TRANSISTORS, 12 for 25p.

BLACK PLASTIC KNOBS, ½in. dia., ½in. spindle, 4 for 50p.

RING MAGNETS, 7mm. outside dia., 20 for 50p.

25-WAY ISEP PLUGS and SOCKETS, 40p set (1 plug + 1 skt.). Plugs and sockets sold separately at 25p each.

CANNON right-angled plugs XLR LNR15, 75p DIN SKTS 5 pin, 270 deg., 4 for 50p.

DIN SPEAKER SKTS, 2-pin, 4 for 30p.  
STANDARD JACK PLUGS, ½in., 4 for 50p.

ANDREW 44AN FREE SKTS. (N-TYPE) for FH4/50B or FH14/50B cable, £1.00 each.

BULGIN ROUND FREE SKTS, 3-pin, for mains input on test equipment, etc., 25p each.

SO239 BACK TO BACK SOCKETS, £1.25 each.

BNC INSULATED SOCKETS (single hole type), 65p each.

**VALVES**

QQV03/20A (ex equipment), £2.10 each.  
QQV03/10 (ex equipment), 75p each.

2C39A (ex equipment), £1.00 each.  
QQV02/6 (ex equipment), £1.00 each.

4CX250B (ex equipment), £2.10 each.  
4X250B (ex equipment), £1.50 each.

DET-22 (ex equipment), 2 for £1.00.  
EF80 (new), £25p E281 (new), 25p.

ECC81 (new), 30p. ECC83 (new), 30p.

**PYE RADIO TELEPHONE EQUIPMENT**. Cambridge, Westminster, Motofone, Europa series. Send S.A.E. for full details, stating requirements, frequency, channel spacing, etc.

**HIGH QUALITY SPEAKERS**. 8½in. x 6in. elliptical, 2in. deep, 4 ohms, inverse magnet, rated up to 10 Watts, £1.50 each, or 2 for £2.75. (Quantity discount available.)

**MAGNETIC DEVICES PROGRAMMERS**, contain 9 micro-switches with 9 adjustable drums for period switching (needs slow motion motor to drive drum) many switching applications, £1.00 each.  
AS ABOVE, but 15 switch units, £1.50 each.

**DIECAST BOXES** (approx. sizes)

4½" x 2½" x 1½"	75p	4½" x 3½" x 2"	85p
4½" x 3½" x 3"	£1.15	6½" x 4½" x 2"	£1.35
8½" x 5½" x 2"	£1.85	8½" x 5½" x 4"	£2.25

**TWIN HEAVY DUTY CABLE**, PVC covered, 50/0.25mm., 15p per metre, or £10.20 per 100 metre reel.

**CURLY LEADS**, 4-core telephone-type, 18in. closed, approx. 5ft. extended, 2 for 20p.

**RACAL SSB MOBILE TRANSCEIVERS**, 2 to 9 MHz, 10-channel (can be VFO'd), 24v. input (will operate on 13.5v.) Approx. 6W PEP output, complete but untested, with one side band filter (10.7 MHz) fitted, with circuits, £50.00, one only.