

The SHORT WAVE

Magazine

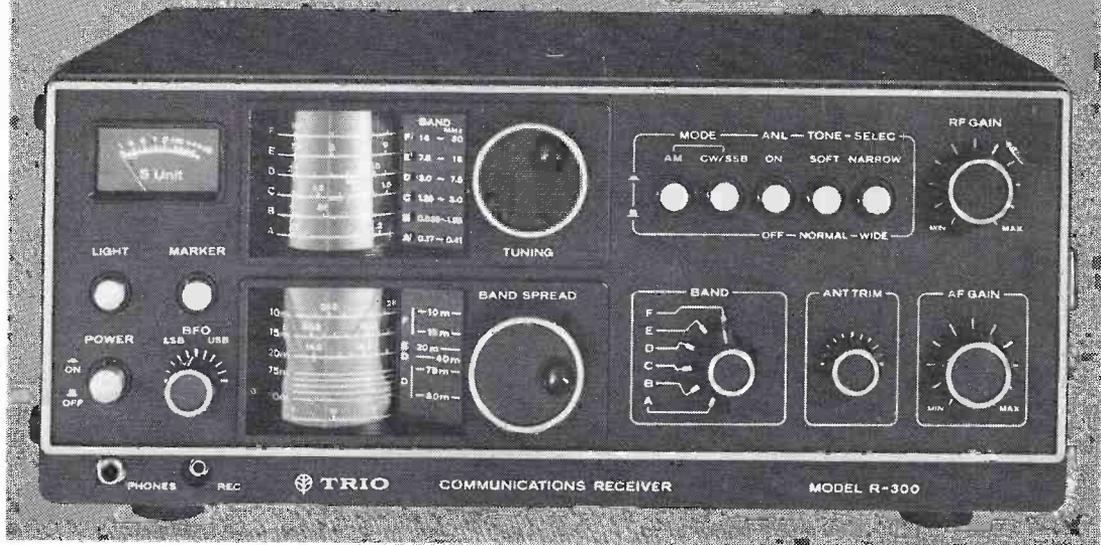
VOL. XXXIV

SEPTEMBER, 1976

NUMBER 7

TRIO R-300

Eavesdrop on the world



LISTEN TO THE WORLD

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

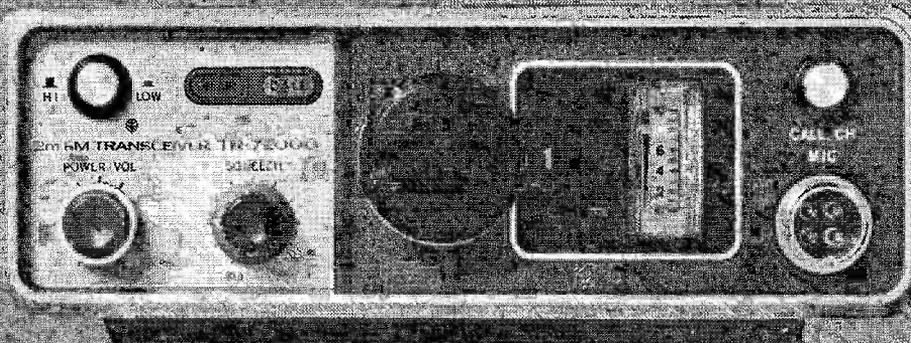
Six Wavebands—LW (170-410 kHz), BC (525-1250 kHz), 4 x SW (160-10m). The four shortwave bands continuously cover the frequency range from 1.25—30 MHz with separate calibration for the commercial (75—11m.) and radio amateur bands (80—10m.) of the large drum-type main tuning and bandspread dials.

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

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

WHEN ONLY THE BEST WILL SUFFICE

TR7200G



2 Metre FM mobile transceiver TR7200G

The TR7200G is now the best selling two metre FM mobile transceiver in Europe. It has always been a favourite all over the world among radio amateurs who demand the very best in performance and construction. Now with a complete range of accessories, the TR7200G offers the ultimate in fixed station and mobile FM operation.

Performance plus

High receiver sensitivity (typical measured performance 0.3 μ V for 15dB quieting) gives you a solid readable signal from long distance stations. Also it helps to combat flutter on the received signal when you are mobile in a town since the limiting threshold is superbly low. Minimum transmitter output of 10 watts (typically 14-15 when on the move) together with carefully tailored audio response and a new integrated circuit limiting amplifier gives your signal that outstanding quality that makes people listen. The matching Trio dynamic microphone supplied with the rig further adds to the signal quality and readability.

Repeater access tone

Generated by the Trio exclusive tuning fork controlled 1750 Hz oscillator. This is the tone generator that does not drift even when the interior of the transceiver is being cooked through sitting in a hot car on a summer's day. Stabilised amplitude output for constant deviation under all conditions. Access first time, every time.

Superb squelch performance

Utilising the very latest in noise signal detection techniques for a squelch sensitivity of better than 0.5 μ V. This simply means that you can be sure that the weakest usable signals will open the squelch when with other rigs, you always wonder if you are missing something with the squelch in operation.

Switched TX output power

1 watt or 10 watts by the touch of a button. Dial illumination colour change to indicate power level in use. Fully variable PA protection which gradually reduces power input to PA with increasing SWR. This allows you to continue operating when your mobile antenna gets wet (and rain really does change the SWR on most antennas).

Features, features

The 22 channel dial is engraved with all R and S channel numbers so you don't have to wonder "did I put R6 in chan 11 or 12?". It also, incidentally, has channels designated A, B, C, etc. for your Raynet or local frequencies. The LED under the channel number is RF powered and only lights on the channels fitted with a receiver crystal. The "on air" lamp is also RF powered but from the transmit crystals so you know precisely what crystals you have in the rig. Best engineered mobile mount on the market gives instant slide in/slide out installation with no nasty little screws to fiddle with. Just in case someone else wants to slide out your rig, there is provision for a padlock through the mounting slide to prevent it (of course he could remove the entire dashboard complete with rig). The TR7200G case is dust tight and waterproof and reflects the Trio no compromise design approach. Public address facility. Switchable receiver sensitivity. Helical front end filter, etc., etc. It's the best mobile FM transceiver on the market.

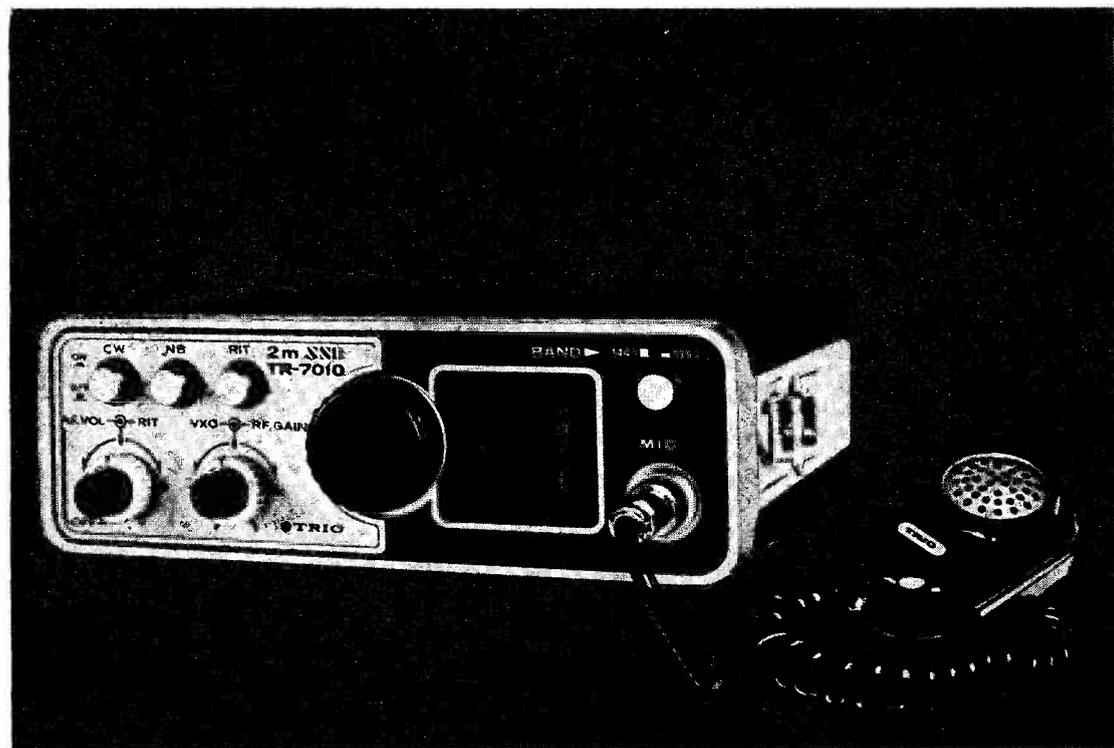
New Price Structure

The basic price fitted 5 channels is £162 including VAT. If ordered at the same time as purchase of the rig, we will fit 3 more channels for £10 or 6 for £20 inc. VAT. This means that you can have the finest 2 metre mobile rig fitted 11 channels for £182 incl. VAT.

Sole Importers

LOWE ELECTRONICS
Cavendish Road
Matlock Derbyshire
Tel: Matlock 2817/2430





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

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

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

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

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

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

SPECIAL OFFER

Until the end of the Leicester exhibition on 30th October, the TR7010 complete with optional crystals fitted (144.1—144.335 MHz) will be sold at the exhibition offer price of **£160** (including VAT). On the 1st November, the price will revert to normal.

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



LOWE ELECTRONICS



NR-56 FM RECEIVER

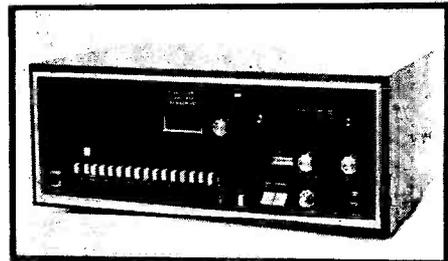
This remarkable little receiver gives the 2m FM listener everything he wants at a very reasonable price. Excellent sensitivity, stability and selectivity coupled with a built-in VFO and very effective squelch make it the ideal receiver for both beginner and keen listener. Although the built-in VFO more than covers the entire 2m. band, crystal control of FM channels offers many advantages (particularly in mobile operation), so crystals, which are ex-stock, may be fitted for the popular channels and repeaters. It requires 12v. DC for operation and is thus an excellent mobile receiver for mounting in the car, boat or caravan as well as for home use.

- ★ Double filters at 10.7 MHz and 455 kHz.
- ★ Dual conversion 10.7 MHz/455 kHz.
- ★ Narrow filter fitted for European Market.
- ★ FET RF stage for high sensitivity.
- ★ 12v. operation.
- ★ Build-in loudspeaker.
- ★ Small size 6½" x 6½" x 2"
- ★ Mobile mount and personal ear-piece supplied.
- ★ Full coverage VFO built in.
- ★ 11 crystal positions (optional crystals ex-stock).
- ★ 22 transistors, 1 integrated circuit, 16 diodes./
- ★ NR-56 £54.00 incl. VAT. Postage 48p. Crystals £2.40 incl. VAT.

FS1007P

The home station FM transceiver with everything. ★ Mains or 12v. operation ★ 16 channel scanning ★ channel skipping facility ★ priority channel with front panel crystal sockets ★ manual or auto scan ★ switched high/low power ★ switched wide/narrow deviation ★ 5 meter ★ RF output meter ★ centre zero tuning meter ★ RX fine tuning control ★ built-in SVR bridge ★ built-in digital clock with alarm and auto switch on ★ built-in loudspeaker ★ 10W TX ★ 0.3µV sensitivity ★ superb styling and finish.

Special Leicester Exhibition offer on this superb transceiver.
Up to £50 saving on normal list price.
Contact us NOW for details.



SHINWA FILTERS

Lowe Electronics present a range of HF and VHF filters suitable (indeed most desirable) for the discerning radio amateur. From the very wide range of filters manufactured by SHINWA, we have selected those which we feel are the most useful in this country.

All the filters are exceptionally well made in high quality housings 30 x 50 x 180mm (1110G is 160 x 310 x 55m.) and are terminated in SO239 sockets. They are suitable for a wide range of applications, the 1140 28-30 MHz BPF being particularly attractive to transverter users.

The 1110G is the big daddy filter having adjustable bandwidth up to 2 MHz wide at any frequency in the range 135-165 MHz.

All filters are supplied with an individual calibration curve so that you can see exactly what you are getting, and prices are most reasonable as you can see.

Model	Frequency	Insertion loss	Max. att.	Max. power	Price inc. VAT
1110	144-146 MHz band pass	1dB	>50dB	20W RMS	£13.72
1110G	135-165MHz/2MHz band pass tunable	1dB	>70dB	100W RMS	£47.25
1140	28-30 MHz band pass	1dB	>60dB	100W P.E.P.	£13.72
1006	146 MHz cut off low pass	1dB	>50dB	50W RMS	£11.48
1005	30 MHz cut off low pass	0.7dB	>50dB	300W P.e.P.	£10.80

RAK ANTENNAS

The range of RAK antennas (yes, I know it should be "antennae" represents the finest value available to-day. From the comprehensive range, we offer a selection for the amateur and SWL. All traps are fully encapsulated and splashproof. All hardware is in stainless steel and corrosion proofed alloy. Elements are made from hardened alloy wire (not Listener I) for strength with light weight. For the amateur radio operator who needs the ideal set-up, we would recommend (and we use) the AL48DXN which gives super performance on 80 and 40. "Use it" in conjunction with either a vertical or beam for 20, 15 and 10. You will get 80 metre performance approaching that of a full size dipole but in an overall length of 28 metres instead of 40!

Model	Coverage	Power Rating	Length	Traps	Price inc. VAT and Postage
Midy V N	80-10m.	1kW P.E.P.	23 metres	6	£41.37
AL48DXN	80-40m.	2kW P.E.P.	28 metres	2	£26.18
ABXL	80m.	4kW P.E.P.	40 metres	0	£12.77
Listener III	3-30 MHz	Receive only	24 metres	0	£26.05
Listener I	3-30 MHz	Receive only	5 metres	1	£10.02

HEAD OFFICE 119 Cavendish Road, Matlock, Derbyshire. Tel. 2817 or 2430 9 a.m. to 9 p.m.

BRANCH OFFICES Communications House, Wallington Square, Wallington, Surrey. Tel. 01-669 6700
Soho House, 362-4 Soho Road, Handsworth, Birmingham. Tel. 021-554 0708
27 Cookridge Street, Leeds. Tel. 0532 452657

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

OPENING HOURS: 9-5.30 TUESDAY TO SATURDAY INCLUSIVE

SEND 30p IN STAMPS FOR FULL CATALOGUE AND PRICE LISTS

THE UNIQUE **STRUMECH** VERSATOWER **SYSTEM.**

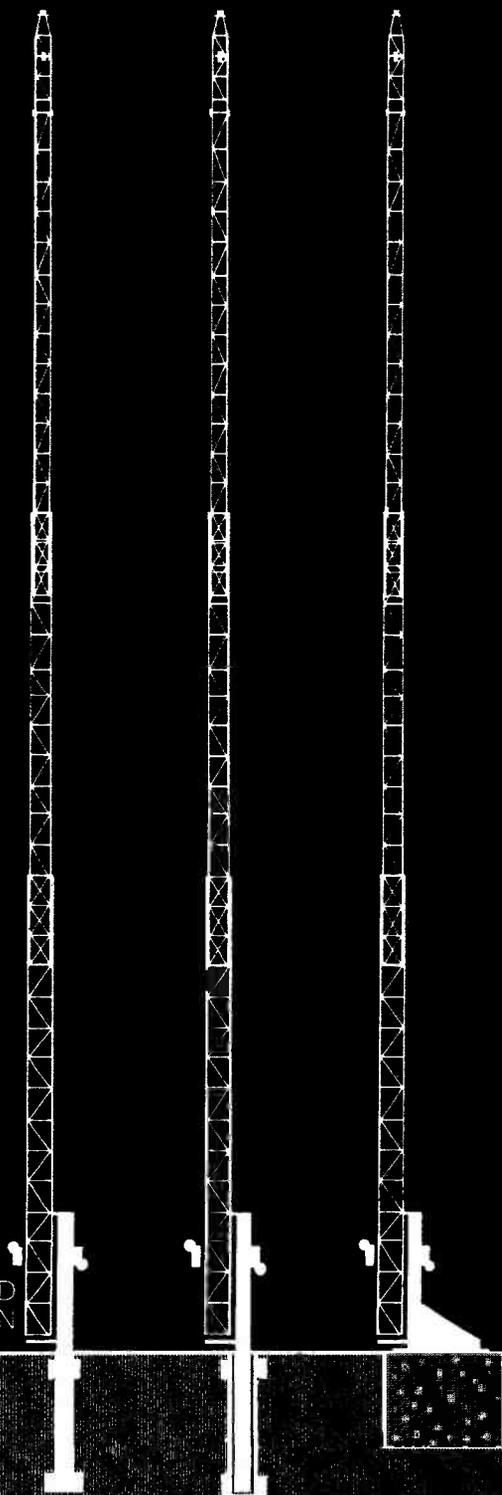
**Designed and
manufactured
by PROFESSIONALS
for PROFESSIONALS.**



Fully complying with the latest
BS Code of practice CP3, chapter 5,
part 2.

All Strumech Versatowers are
designed to withstand wind speeds
of up to 117 mph, depending upon
area of array.

ENQUIRIES TO:
SOUTH MIDLANDS COMMUNICATIONS LTD
OSBORNE ROAD, TOTTEN, SOUTHAMPTON





Western

IT'S "WESTERN" FOR YAESU
"WESTERN" FOR STANDARD
AND "WESTERN" FOR VALUE



THE LATEST LITTLE GEM FROM YAESU — THE FRQ-7

This general coverage solid state receiver is STABLE! The Wadley loop system and triple conversion makes this receiver a must for general coverage 0-50 MHz to 29.9 MHz. Operates on AC, DC or internal batteries giving a wide variety of operating conditions. **ONLY £162 inc. VAT and Carriage.**

STOP PRESS!

ANNOUNCING A NEW YAESU PRODUCT!!

The FT-301D!!

Solid state digital transceiver
160m. to 10m. coverage. 200W pep
All modes — SSB/CW/AM/FSK
6 digit readout TX/RX clarifier

Send S.A.E. for details/prices (likely to be available Nov./Dec.)

BRITAIN'S BEST BUY!
for the serious FM Repeater
operator—the **STANDARD C828!**
There's no other choice!

BASE STATION—MOBILE—PORTABLE

We're so fascinated by this little beauty that we think it makes everything else "obsolete" (or expensive). The Price **£151.88 inc. VAT.**

- * 10 watts (Hi), 1w. (Lo) output.
- * 12 channels SIMPLEX or REPEATER. 10 Ch. fitted.
- * Single crystal control means you only have to buy 1 CRYSTAL PER CHANNEL.
- * Fitted SO, S20, 21, 22, and 23. R3, 4, 5, 6, and 7.
- * LED (BUSY) indicates whether you have accessed the repeater or not.
- * LED's to indicate EXTERNAL VFO, TRANSMITTER ON REPEATER OPERATION.
- * SPEAKER/MIC gives PRIVATE LISTENING and has switch to override the channel selector enabling a changeover to be made to an external VFO (Type CV110).
- * TONEBURST is built in (Automatic on "Repeater")
- * NEW LEATHER CARRYING CASE/ANTENNA TYPE FCB-O11 (available later) makes the C828 into a 12 Ch. 1/10w. portable unit.

STANDARD PRICES (Carriage paid inc. VAT)

CV110N for C828	...	...	£50.63
C146A 2m. 5 channel hand-held transceiver	...	...	£101.25
SY200 synthesiser	...	...	£101.25
C430 UHF transceiver 10W 10 ch.	...	...	£180.00
C432 UHF hand transceiver 5 ch.	...	...	£129.38

ACCESSORIES

C12/230 AC PSU for all models	...	...	£84.38
C12/230-6E charger for C146A and C432	...	...	£3.38
Ni-cad batteries, set of 10	...	...	£9.00
CZ05K remote speaker for all models	...	...	£10.13
CAD external antenna coupler	...	...	£2.25
CSA base charger unit for C146A	...	...	£16.89
CAT-08 rubber flexible antenna	...	...	£3.38
CMP-08 external microphone for C146A and C432	...	...	£10.69
CMP-31 Microphone/speaker	...	...	£10.69
CRC-01 remote control unit	...	...	£9.00
FCB-01 carrying case with CAT-17 antenna	...	...	£18.00

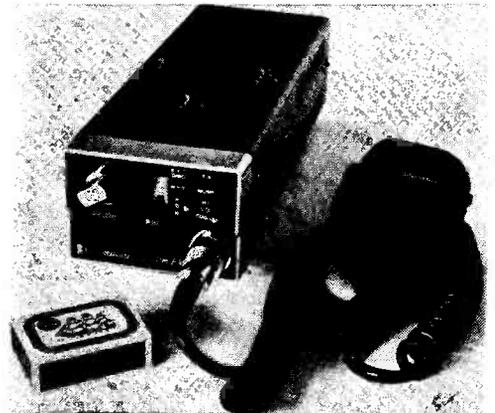
THE OSKER SWR-200 POWER METER

Features:

- Switchable for 52 or 75 ohm systems.
- Each instrument is individually calibrated.
- Four ranges: 0-2, 0-20, 0-200, 0-2kV and 3-200 MHz.
- Excellent styling.

Price: **£29.16 (inc. VAT and carriage).**

BACK IN STOCK AGAIN



Electronics (UK) Ltd

Announce . . .

The WESTOWER TELESCOPIC STEEL TOWERS a "WESTERN" brand quality product

STANDARD TOWERS (HEAVY DUTY ALSO AVAILABLE)

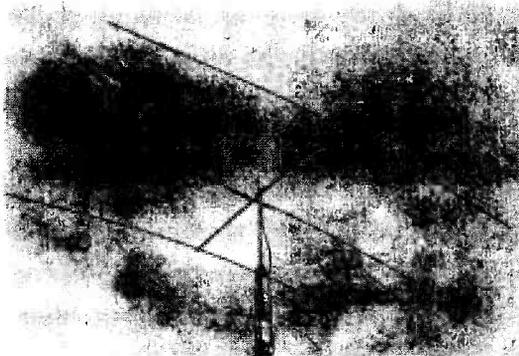
Height	Framed Post		Post Mounting		Framed Base Plate		Trailer Mounted		Wall Mounted		Socket Post	
	MODEL	PRICE	MODEL	PRICE	MODEL	PRICE	MODEL	PRICE	MODEL	PRICE	MODEL	PRICE
25'	1S/FP	£ 145	1S/P	£ 155	1S/FBP	£ 170		£	1S/W	£ 115	1S/SP	£ 180
42'	2S/FP	189	2S/P	199	2S/FBP	215	2S/TM	660	2S/W	160	2S/SP	224
58'	3S/FP	230	3S/P	240	3S/FBP	255	3S/TM	699	3S/W	199	3S/SP	264
75'	4S/FP	345	4S/P	355	4S/FBP	370	4S/TM	815	4S/W	315	4S/SP	279

PRICES INCLUDE CARRIAGE BUT EXCLUDE VAT

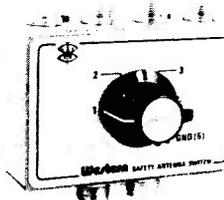
AND THIS MONTH TWO OTHER NEW "WESTERN" QUALITY PRODUCTS

WE PROUDLY ANNOUNCE TWO OTHER BRAND NEW "WESTERN" PRODUCTS

PENETRATE TO THE FOUR CORNERS OF THE EARTH WITH OUR NEW EXCITING DX 33 "PENETRATOR,"
3-Element Beam for 10-15-20 metres up to 2kW P.E.P. gain up to 8dB. Front/back ratio up to 20dB. PRICE £73.12 (inc. VAT and carr.)



BE SAFE with our new
"WESTERN" Safety Antenna
Switch—5 Position Outlets
(U.H.F. Sockets). All unused
Antennas can be earthed to
ensure maximum radiation
efficiency.
Price £8.85 (Inc. VAT & carr.)



SEND S.A.E. FOR PRICE/LIST LEAFLETS OF NEW
"WESTERN" PRODUCTS AND GET DETAILS
OF OUR BARGAIN PRICE "W.E." CO-AX PLUGS/
SOCKETS, etc.

YOUR ONE-STOP SHOP FOR ALL AMATEUR
RADIO REQUIREMENTS — "WESTERN"

Western Electronics (UK) Ltd

HEAD OFFICE (All Mail/Enquiries)

FAIRFIELD ESTATE
LOUTH, LINC'S, LN11 0JH

(Tel. Louth (0507) 4955/6)

SUMMER HOLIDAYS: LOUTH/SOUTHAMPTON

CLOSED—August 21st—September 5th inclusive

Agents:

LES LYSKE, G13CDF, NEWTOWNARDS (0247) 812449
ALAN CAMERON, GM30GJ, ALLOA (02592) 4653
DON KITSON, G3TRK, COLNE, LANCS. (0282) 44187

SHOWROOMS AT:

LOUTH. Open Mon.-Fri.: 9-1 p.m., 2-5. Sat. by appointment

1 WEST PARK ROAD, SOUTHAMPTON (0703) 27464

Open Tues.-Fri.: 9-1, 2-5.30. Sat. 9-4.

27 CHURCHGATE, LEICESTER. Tel. 58652

Open Mon.-Sat. 9-6. Closed Thur.



STEPHENS-JAMES LTD.

47 WARRINGTON ROAD, LEIGH, LANCS. WN7 3EA

TEL. 052-35 76790

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

YAESU-MUSEN

We stock the full range of Yaesu-Musen equipment at the current prices. Receivers, Transmitters, Transceivers, etc. Full information sent on receipt of large S.A.E.

DRAKE

We normally have the full range of this equipment available. Check with us for prices and details. **UNIDEN**
The new Uniden 2020 Transceiver proving to be very popular indeed, this proved to be a real good seller and now we have the 2030 FM Transceiver.

We can also supply equipment by Bantex, Decca Communications, Belcom, Swan and the new Atlas range. Along with accessories, antenna's by Hy-Gain, G-Whip, Jaybeam, Microwave Modules, Barlow Wadley, CDR Tech, Space-mark, Technical Associates, etc. Send large S.A.E. and we will send any information you require.

Please note all equipment is air tested before sale. We do not employ any part time employees for sale of equipment all sales made from the above premises and we do not supply to any individual for re-sale from private accommodation.

ACCESSORIES

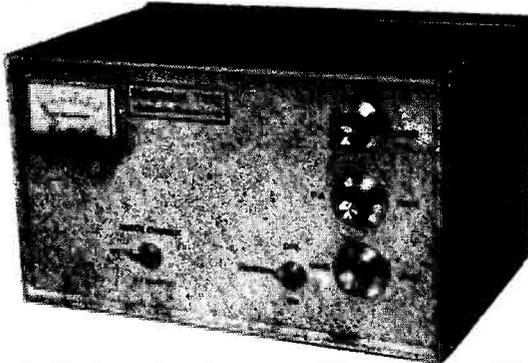
Katsumi Electronic Keyer	(post 50p)	£40-00
Samson ETM 3C Keyer ...	(post 75p)	£54-00
Baeur Keying Paddle ...	(post 25p)	£8-95
Single Meter SWR Bridges	(post 45p)	£8-50
Twin Meter SWR Bridges	(post 45p)	£12-20
Osker 200 SWR Power Motor	(post 75p)	£25-92
Osker 2000B Power Motor	(post 75p)	£29-00
Auto-CQ-Sender ...	(post free)	£41-11
Plastic Insulators, Black ...	(post 5p)	-12
UR43 18p m., UR67 45p m.	(post 2p m.)	
75 and 300 ohm Ribbon Feeder	10p metre	
PL259 Plugs 46p, SO239 Sockets 45p		
Cable Reducers 15p, Linne Connectors 75p		
Eddystone 898 Dial Assembly	post 75p)	£15-00
Junkers Heavy Duty Morse Keys	(post 75p)	£25-00

For the caller we have a range of over 100 cabinets from 4" x 2" x 2" to 12" x 12" x 12". Chassis, masts, Clamps, Aluminium Tubing. Plastic Boxes. Valves, Plugs, etc.

SECONDHAND EQUIPMENT

(in stock at time of going to press)

Eddystone 770R Receiver	... ..	£130-00
FR101D Receiver	... ..	£375-00
FT10E Transceiver	... ..	£400-00
Drake SPR4 with all Crystals and Noise Blanker	... ..	£375-00
Panda PR20V Tx (buyer collects)	... ..	£20-00
Panda Cub Tx ( " " )	... ..	£20-00
AR88D Receiver ( " " )	... ..	£35-00
Lafayette HA500 Receiver	... ..	£50-00
Lafayette HE80 Receiver	... ..	£50-00
Heathkit HR10B Receiver	... ..	£45-00
KW202 Receiver	... ..	£225-00
Eddystone 730/4 Receiver	... ..	£150-00
Eddystone EC10 Mk. 2 Receiver	... ..	£125-00
Eddystone AC PSU	... ..	£15-00
KW2000A Transceiver, PSU	... ..	£200-00
Swan 700CX Transceiver	... ..	£385-00
Swan 1200X Linear Amplifier	... ..	£200-00
Trio T5510 Transceiver	... ..	£195-00
Liner 2 Transceiver	... ..	£120-00
IC21XT FM Transceiver	... ..	£120-00



MAGNUM 2 and 4 Metre Transverters. 28 MHz low drive input, CW, SSB, AM and FM. Inclusive of relays and power lead, size 10" x 6" x 7". £112-50

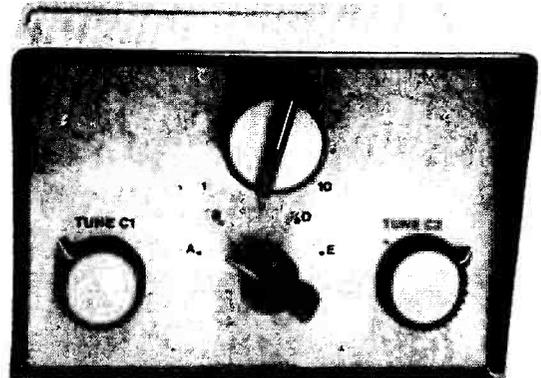
70 CMS LINEAR AMPLIFIER 2C3G triode valve drive power 5 watts output 50 watts AM-FM, SSB-CV. £50-40



VHF Absorption Wavemeter. 65-230 MHz. Post free. £16-00
Our overseas agents will be pleased to supply any of the Magnum products. Overseas Private and Trade enquiries welcome.



MAGNUM 2 metre LINEAR AMPLIFIER. MICROWAVE MODULES, Rx Pre-amp, RF switched. Self-contained power supply. Full input and output relay switching. Up to 100 watts SSB output. £112-50



SWL Tuning Unit Mk. 1. 50 switchable tunable positions. Two inputs single feed or co-ax. Suitable for any antenna over 15ft. long on 2-30 MHz. Produced in demand to many requests, post free. Now in use in over 25 Countries in 5 Continents. £17-00

Instant HP and Credit Facilities available. Barclaycard and Access facilities. After sales service on all equipment. Part exchanges welcome, items sold on commission basis. Saves you advertising costs and assures you of good price. Spot cash paid for clean equipment. SAE with all enquiries please. Postage extra. Minimum postal charge 20p on small items. Carriage by arrangement. Free in some areas. Easy access to M6, M61, M62, M63.
All our prices include VAT at the

Current rates
No Parking Problems

SHOP HOURS 9.30 TO 5.30 MONDAY TO SATURDAY

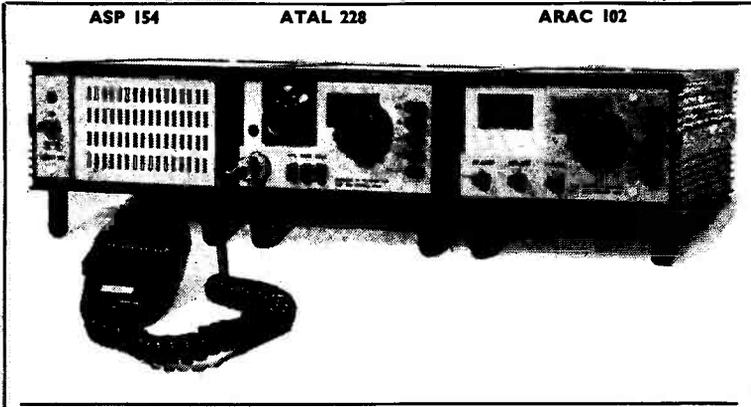
A.R.R.A. EXHIBITION
LEICESTER—OCT. 28, 29, 30

S.T.E. MILAN VHF EQUIPMENT

During the last two years the popularity of the range of equipment by S.T.E. has been growing. The ARAC 102 receiver has been a "Best Seller" (have you seen any second-hand?). Later in the year the Atal Transmitter came into stock and all reports have been good. Now we are offering the complete range of modules for the D.I.Y. enthusiasts. Transmitters, receivers, etc. The construction of these modules are first class — the P.C.B's are the finest we have ever seen.

Price List (includes postage)

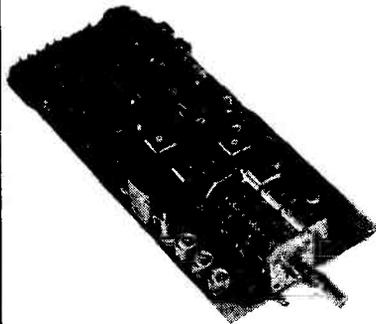
- ARAC 102 Receiver ... £100.00
- Atal 228 Transmitter ... £126.00
- ASAP 154 AC PSU with speaker £35.50
- AR10 Receiver Module ... £37.50
- AA1 Audio Amplifier ... £4.10
- AD4 FM Discriminator ... £5.00
- AL8 Linear Amplifier ... £27.00
- AT22 Transmitter ... £50.00
- AR20 C.C. Receiver ... £50.00
- AT23 C.C. Transmitter ... £36.00
- AS 15 Stabilised psu D.C. ... £10.00
- AG 10 Tone Generator ... £4.50
- AC2A Converter 28-30 MHz £20.00



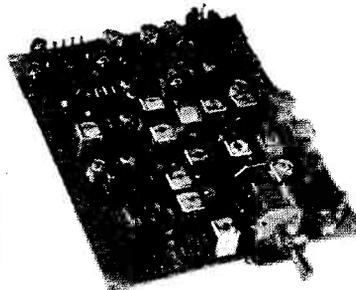
SPEAKER
AC POWER SUPPLY UNIT

144 - 146 MHz
AM FM TRANSMITTER
with Microphone

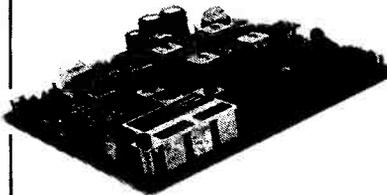
28-30 MHz 144-146 MHz
AM-FM-SSB RECEIVER



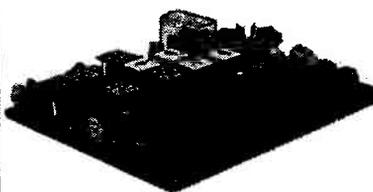
AR10 Mosfet receiver. 28-30 MHz Double conversion superhet. RF and amplifiers stages are gate protected mosfets for good sensitivity and low intermodulation. Noise limiter and squelch circuit. AM, SSB and CW reception. 12v. DC.



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



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

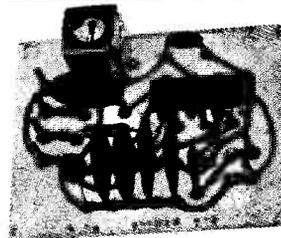


AT23. 12 Channel FM Transmitter. 3 watts. 144-146 MHz. Frequency deviation 3-10 kHz adjustable. 12v. DC operated AF input sensitivity 2mV adjustable to 50 mV.

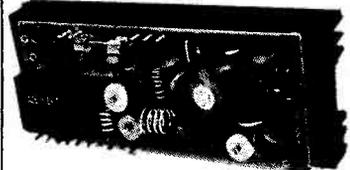
TWO NEW MODELS FROM S.T.E.

ARAC 170 Receiver. Two bands 28-30 MHz — 430-440 MHz AM-FM-SSB/CW. Tuning 10MHz from 430-440MHz in 5 bands. SSB-0.2mv (10db S.N.) FM 0.3mv (20db S.N.) 12v DC OP. £127.50

AK20 FM Transceiver. 12 channel FM operation. Tone burst. 4 watts output. Sensitivity 0.2mv (10db Quieting) 0.35mv (20db quieting) Complete with microphone. **From £123**



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



Linear Amplifier. Frequency 144-146 MHz output 10 watts FM, 8 watt PEP SSB, 8 watt AM. Input power 1 watt FM, 25 watt AM-SSB. Input impedance 50 ohm output impedance 50-75 ohm. 12v. DC.

SEE THE ENTIRE S.T.E. RANGE AT LEICESTER EXHIBITION.

STEPHENS-JAMES LTD.

47 WARRINGTON ROAD, LEIGH, LANCs. WN7 3EA

052 - 35 76790



South Midlands

ESTABLISHED 1958 — OVER 18

FOR FURTHER INFORMATION AND DEMONSTRATION CALL IN TOTTEN OR LEEDS OR SEND A LARGE (10" x 12") S.A.E. (or 15p stamps) FOR YOUR FREE YAESU CATALOGUE, 22-PAGE STOCK/PRICE LIST, SECONDHAND LIST ETC. ETC. DEMONSTRATION FDK MULTI 2700 NOW AVAILABLE

NEW FROM SMC AMPERE SOLID STATE LINEARS VHF & UHF

For 144 and 432 MHz, RF sensing, excellent bias arrangements, 12V (13.8VDC), 10W drive, 13 x 5.8 x 20 cms.

APB82A	145 MHz,	80W output,	10A	£88.89 (+ VAT)	AVAILABLE
APB57A	432 MHz,	45W output,	6A	£88.89 (+ VAT)	EARLY OCTOBER



THE DIGITAL II (FM 144-105XR11)



The de luxe 2 metre F.M. transceiver with a 5 kHz stepped synthesiser and bright digital readout, from 6 seven segment LED's. Selectable 10 or 1 Watt output, for simplex or duplex (up and down shifts), across 144-146 (rx to 149 MHz) from a tiny 6 1/2" x 2" x 7 1/4" Easily underdash mounted with the supplied mounting bracket, or slipped in place of the broadcast wireless.

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

INTRODUCTORY PRICE ONLY £225 + VAT

THE MULTI UII A NEW DIMENSION IN SEVENTY CMS.

A unique combination of frequency control by either external VFO, 23 switchable or 4 instantly selectable auto scanning channels.

Both the Tx deviation and the Rx bandwidth are switchable for 50 or 25 kHz spacing. The main dial is channel numbered (e.g. 16 = 433.4, 20 = 433.5 etc.) and is illuminated only when a channel is recalled up. Two R.F. stages in the receiver provide great sensitivity (0.5vV for 30dB NQ). The use of a band pass first IF (CF 45 MHz) gives high image immunity and low channel crystal drift. Further conversions to 10.7 and 455 prevent IF image whilst providing good pass and skirt selectivity. The transmitter of switchable 10/1W output draws only 2.5 or 1.3A (0.6 or 0.3A Rx) and has a netting of new crystal facility. Other features include, diode RF switching, R.I.T., "on the air" lamp, PO meter, S meter, AFP, reverse polarity protection etc.

With 8 Channels from— SU (0, 8, 12, 16, 18, 20) and RU (0, 2, 4, 6, 10, 14)

INTRODUCTORY PRICE ONLY £200 + VAT



KP202

The handheld KP202 with its 2W of RF and 1W of audio immunity to image and IF break-through, offers performance to rival all walkie-talkies and many mobile 10W sets. The KP202 is supplied with telescopic whip, leather handle/whip case and F type plug. Accessories include automatic (R channels only) crystal tone burst (£10.00), flexi stubby antenna (£5.25), leather case (£4.40), base charger KCP2 (£10.50), set of 10 ni cards (£8.50), F to UHF adaptors, F plugs, spare whips, spare hods etc.

SIX CHANNELS FITTED S20 and S22 and any 4 of: S0, S21, S23, R3, R5, R7 ONLY 99.50 (+ VAT)

ROTATORS Ex-Stock in Totton for fast delivery VAT-Rotators 12 1/2%. Cable and delv. 8% Carriage (BRS or post) FREE. Securicor delivery £1 extra (mainland) All rotators supplied complete with appropriate control box and instrs.

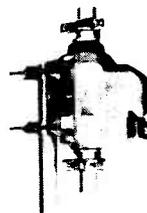
CDE ROTORS	
AR30	Light VHF/UHF £29.25
AR40	VHF and Light HF £38.50
AR33	De luxe control AR40 £44.75
CD44	Medium duty £75.85
Ham II	Heavy duty £115.00

STOLLE ROTORS	
2010/220	Automatic £40.00

BEARINGS	
CD562	CDE £4.25
RZ100	Stolle (ballrace) £10.00

MOUNTING KIT	
AK121	CDE to Versatower £3.60

CABLE	
5 core	AR30/40/33/2010 pr. yd. .20
8 core	CD44/Ham II pr. yd. .32



RZ100



2010/220 and Cont. Box



KP202
KCP12



AR30 AR30/40 AR40/33



PLEASE NOTE THESE PRICES DO NOT INCLUDE VAT (8% or 12 1/2%)
Terms—Cash with order or credit card holders just 'phone in for, if possible, same day despatch. Immediate H.P. available for card owners for amounts up to £225. Holders of current U.K. callsigns (where references have been provided) can be speedily cleared or normal H.P. at competitive rates is available.



Communications Ltd

YEARS OF PROFESSIONAL EXPERIENCE



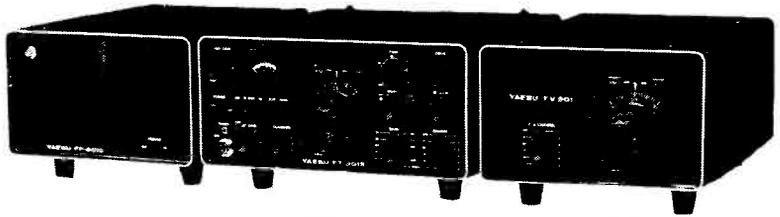
YAESU MUSEN 2-YEAR GUARANTEE 24-HOUR SECURICOR SERVICE

NEW FROM YAESU. The FT301D is an all solid state, 10-160 metre, precision built (plug-in boards), 12-volt, digital readout (to 100 Hz) transceiver, measuring only 11" x 5" x 13½", weighing 22 lb. and is equally at home in the car or with the matching external AC PSU/speaker (and V.F.O.) in the shack. Towards the end of the year, a new mains PSU with built-in 6-digit 12 or 24-hour electronic clock will be ready as will be the programmable automatic CW identifier. The sensitive FET-packed receiver has rejection tuning (IF pass band tuning), noise blanker, 3 position AGC, and provision for 600 Hz, 2-4 and 6 kHz crystal filters. The transmitter employs RF-derived ALC, and a wide band amplifier combined with a pre-set pass band system for 200W PIP of CW or RF-processed SSB or 50W of AM or FSK. The FT301D is now in concentrated production. The first units will, we hope, leave the factory end of September, thus allowing us a demonstration model for the Leicester Exhibition. Price around £550.

THE FT301S EX-STOCK

The FT301S is a new solid state 12v. transceiver of plug in construction, which with all options installed offers :-

Top band to 10 metres (inc. 5 MHz MSF) in 500 kHz segments, 10W output, built in RF speech processor, selectable 2-4 or 600 Hz crystal filters, front panel controlled VOX (with MOX) and PPT, semi break-in keying (with side tone), clarifier with a separate off switch, 25 kHz crystal calibrator, 1 kHz readout from the dual speed VFO (100 and 16 kHz per turn), single knob resonance, internal VFO or 11 crystal per segment (or external VFO with same crystal facility), 3W audio to the internal or external AC p.s.u.'s loudspeaker.



FP301(S)

FT301(S)

FV301

The transceiver employs a pre mix VFO and single conversion signal frequency IF (9 MHz) uses MOSFETS in the RF and mixer stages followed directly by a roofing filter for sensitivity coupled with dynamic range.



FT101E

The FT101E, complete HF station FT101E(EEX) EX-STOCK

The FT101E a complete mains or 12v. DC station contained in a compact 30lb. package. 260W P.I.P. of SSB (with in-built R.F. speech processor), 180W., CW and 80W. of AM, 10 to 160m. (inc. 10 MHz RX). The sensitive and selective (permeability tuned RF stages and 8 pole crystal filter) receiver offers: threshold adjustable noise blanker, switchable 25 and 100kHz calibrator, ±5kHz clarifier (with separate on/off switch), etc., etc. The VFO is stable and linear (readout to 1kHz), external VFO or crystal control can be selected, with LED indicators illuminated accordingly. Carrier level is adjustable for : tune up, AM, for CW operation, whose performance with the semi break in keying, with side tone, and the optional 600Hz filter installed is of a high order. Linear and transceiver provisions are made with sockets for : relay contacts, ALC output, all internal HT supplies, low level RF heater links and switches, etc., etc.

The FRG7 is a general coverage solid state receiver with specifications unparalleled in its price range. It uses a Barlow Wadley triple mix drift cancelling loop for continuous, spin tuned, inclusive coverage of 0.5 to 30 MHz with calibration accuracy better than 5 kHz. Frequency selection is accomplished by setting the RF (pre-selector and range switch), dialling up the required number of megahertz, then tuning the VFO knob as normal.

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



POWER METER/Dummy Load YP150

The YP150 is a fan cooled 50 ohm dummy load, using a large carbon resistor which maintains impedance (VSWR less than 1.2:1 at 145 MHz) by the use of a "Tapering Trough" and a power meter for use between 1-8 and 200 MHz calibrated 6, 30 and 150W FSD on a large 3½" x 2" meter with a maximum error of 10% (FSD) size 6 (7") x 4½" x 11 (12") weight 6 lb.

DIGITAL DISPLAY YC601

The YC601 digital display unit (for 101 and 401 series (3-18 MHz IF) indicates transmit and received frequencies to 100 Hz on six bright green, 9 segment gas discharge tubes. Built-in mains PSU (consumes only 10W), gate time of 100ms, size 3" x 8½" x 9" (10½") and weight 5½ lb. Supplied complete with connecting cables, etc.



YC601

SOUTH MIDLANDS COMMUNICATIONS LTD.

Head Office, Main Showrooms and all Mail Order enquiries
OSBORNE ROAD, TOTTEN, SOUTHAMPTON, SO4 4DN
Osborne Road is off Rumbidge Street
Hours of Business: 9-5.30. Saturday 9-12.30
Telex 477351 SMCMMG. Tel (04216) 4930 & 2785.

Northern Branch:
THE CHAMBERS, No. 3 THE PARADE
NORTH LAKE, HEADINGLEY
Tel. (0532) 78 2326
Hours of Business: 9-5 Tuesdays-Saturdays
9-8 p.m. Thursdays.

Brian Kennedy, G3ZUL,
Droitwich (09057) 4510
A Ian McKechnie, G8BDOX,
G Bridge of Allan (078683) 3223
P Peter Avill, G3TPX,
N Darton (021 678) 2517
T Howarth Jones, GW3TMP
S Pontybodkin (035 287) 846
T Mervyn Anderson, G13WVY,
Tandragee 04666

A
L
L
Q
T
R



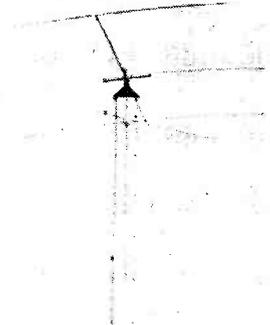
SOUTH MIDLANDS COMMUNICATIONS LTD

TELOMAST WITH TA33 TELESCOPIC GALVANISED



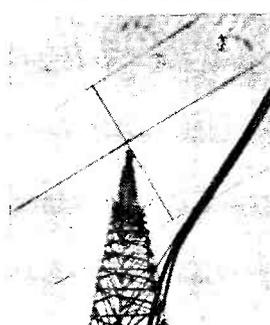
10' telescopic heavily galvanised steel mast supplied with guy rings etc. or c/w full rigging kit.
 Carriage £2.75, ex-stock VAT 8%
 30' £22.85 or £41.75 c/w rigging
 40' £29.75 or £53.75 c/w rigging
 50' £37.95 or £69.95 c/w rigging

HANTOWER with TH3 Jnr. SELF SUPPORTING



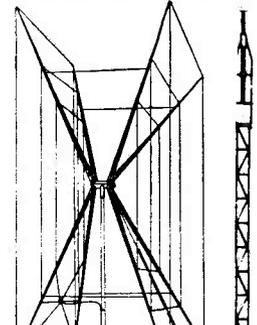
Galvanised lattice 10' sections. Free standing with climbing steps. Carriage £3.50 ex stock 8% VAT.
 30' c/w base grillage ... £135.00
 40' c/w base grillage ... P.O.A.

TELETOWER with TH3 Mk. III TELESCOPIC GALVANISED



Carriage and rigging (RX) extra
 42' ... £121.00 (RK £28)
 57' ... £174.00 (RK £28)
 75' ... £224.50 (RK £49)
 101' ... £303.50 (RK £76)

GEM QUAD 2 ELE. FIBREGLASS SPREADERS



10-20m., 2, 3, or 4 ele. F/B ratio 25dB low radiation angle. Tri-dectic fibre glass spreaders withstanding 100m.p.h. winds yet weighing only 21 lbs.

ALIMASTS

TELESCOPIC LIGHTWEIGHT

13 versions, 6 to 21m, from stock. Rigging extra. Carriage £1. VAT 8%
 4 x 1.5m. £13.60 3 x 3m. £17.20
 5 x 2m. £21.70 7 x 3m. £42.00

TELESCOPIC TILTING Buy Now!

Telescopic (20' sections) with full tilting facility allowing for easy antenna maintenance and alterations. The relatively low unit weights and superior design of ground post allows easy and cheap installation often without resorting to concrete. Whilst stocks last, we offer the old prices (POA).

VERSATOWERS

SEE FAR RIGHT Buy Now!

HY GAIN HF RANGE

(Carr. £1-£2.50) VAT 25%

- 18AVT/WB—10-80m—wide band, 50 ohm, 1kW. Self supporting, 25', trapped 1/4, roof or ground mounted, low radiation angle, vertical.
 BN86 1:1 ferrite Balun £12.00 TH2MKIII 10-20m 2 ele. £94.00
 103BA 10m 3 element ... £43.50 TH3NJR 10-20m 3 ele. £96.00
 153BA 15m 4 element ... £54.50 TH3MKIII 10-20m 3 ele. £137.00
 203BA 20m 4 element ... £103.40 TH6DXX 10-20m 6 ele. £164.50
 402BA 40m 2 element ... £146.00 HY QUAD 10-20m 2 ele. £164.50
 18V 10-80 Load Vert. ... £24.50 DB1015A 10-15m 3 ele. £99.00
 12AVQ 10-20m Trap Vert. £37.50 LA1 Lightning arrestor gas £20.30
 14AVQ 10-40m Trap Vert. £43.50 LA2 Lightning arrestor £3.30
 18AVT/WB 10-80m Vert. £64.50 HY TOWER 10-80m. Vert. £159.00

BANTEX VHF WHIPS

- (Carriage 75p) VAT 25%
 B5 1/4 145 MHz fibreglass £6.35 701 1/2 70 MHz FG or SS... £4.00
 BG f.g. 1/2m fibreglass £8.75 Trunk Lip Mount ... £5.25
 BGA s.s. 1/2m stainless... £8.50 Magnetic Base Mount ... £8.50
 B5U 1/2 430 MHz stainless £5.00 Standard Base unwanted £0.50

ROPES (Carriage Extra) VAT 8%

- 3 mm. H.T. steel yd. £0.13 | X150 rustproof 150m. ... £10.85
 1/2" circ. terylene yd. £0.08 | 7x18g. galvanised 100' ... £2.20

AERIAL INSULATORS (Post Extra) VAT 12 1/2%

- 2 1/2" polyprop ribbed ... 10p | SMC.1 8" porcelain polyprop 85p
 NTL 1 1/4" polyprop ribbed ... 45p | 3" porcelain ribbed 33p

AERIAL WIRE (Carriage Extra) VAT 8%

- 14SWG hard drawn cu. yd. 10p | 7/044cad Custandard yd. 17p
 7/036 cad Custandard yd. 13p | Cu terylene braid yd. 13p

COAX PLUGS (Post and Packing Extra) VAT 8%

- PL259 UHF Plug ... 48p | SO237 2 hole socket ... 37p
 PL258 Back to back ... 80p | T adaptor ... 1.20

CABLES RF FEEDERS (Carriage Extra) VAT 8%

- RGB/U 50 ohm Heavy yd. 35p | UR39 75 ohm Medium yd. 24p
 UR57 75 ohm Heavy yd. 36p | T327 75 ohm Dist. yd. 20p
 75 ohm Flat twin yd. 8p | UR43 50 ohm Solid Cent. yd. 15p
 300 ohm Ribbon yd. 9p | UR76 50 ohm Strand Cent. yd. 15p

CUSHCRAFT VHF OMNI (Carriage 80p) VAT 25%

RINGO RANGER-ARX2-6dB gain over 1/2 ground plans. Uses 3 x 1/4 in phase and 1/4 stub, ultra low angle radiation, approx. 10' high. (Illustrated). LOW PRICE. EX-STOCK.

- ARX2 6dB Ringo Ranger £20.50 ABW133 2m. Big Wheel £14.50
 AR2 3dB Ringo Vert. ... £12.75 ABW125 ABW harness £7.30
 AR25 ORO AR2 ... £15.00 ASQ1 2m. Squalo ... £11.75
 CX1000 29 MHz Ringo... £25.75 ASQ22 Stacked ASQ1 ... T.O.S.

JAYBEAM 70 (4m), 144 (2m), 432 (70) (Car. £1, VAT 12 1/2%)

- D5/2m 5 over 5 slot feed £9.90 PBM14/2m 14 ele. Para. £21.00
 D8/2m 8 over 8 slot feed £13.40 D8/70 8 over 8 slot feed £11.30
 5XY/2m 5 ele. crossed £10.30 PBM18/70 18 ele. Para. £13.75
 8XY/2m 8 ele. crossed £12.90 MBM48/70 46 ele. Multi £15.20
 10XY/2m 10 ele. crossed £17.75 MBM88/80 88 ele. Multi £20.35
 5Y/2m 5 element yagi ... £5.40 12XY/70 12 ele. crossed £20.90
 8Y/2m 8 element yagi ... £7.00 4Y/4m element yagi ... £8.50
 10Y/2m 10 ele. long yagi £13.80 PHM2/70 2 way harness £4.15
 14Y/2m 14 ele. long yagi £17.85 PHM2/4m 2 way harness £6.60
 Q4/2m 4 element yagi ... £10.50 PHM2/C Circ. phasing ... £3.50
 Q6/2m element quad ... £14.00 PHM2/2m 2 way harness £4.95
 PBM10/2m 10 ele. Para. £16.40 JBL15/59 2" Joint sleeve £3.37

SMC TRAPPED DIPOLES (Carriage Paid) VAT 25%

- S 500W P.I.P. 14SWG ... £19.60 | P 500W P.I.P. cut/terylene braid c/w 75' feeder etc. £21.75
 HP 1K P.I.P. 14SWG ... £21.75

MOSLEY TRI-BAND BEAMS (Carriage £2.50) VAT 25%

- TA33 3 ele. 200W R.M.S. £64.00 | TA32 2 ele. 300W A.M. £44.00
 MUSTANG 3 ele. ... £82.50 | MUSTANG 2 ele. ... £66.00

GEM QUAD FIBREGLASS QUAD (Carr. £2.00) VAT 25%

- GQ2E 2 element ... £95.00 | GQ4E 4 element ... £198.00
 GQ3E 3 element ... £147.00 | CK1Q 1 ele. Conv. kit £55.00

G WHIP HF MOBILE (Carriage 75p) VAT 25%

- Tribander 10-20m (+LF) £14.61 | LF40, 80 or 160 ... £4.37
 Multimobile10/20m+MM £18.60 | MM40, 80 or 160 ... £4.87
 Flexiwhip 10m (+FF) ... £12.42 | FF15, 20, 40, 80 or 160 ... £5.04
 Basement 1/2" hole mount £1.95 | Telescopic whip for coils £1.50

SOUTH MIDLANDS COMMUNICATIONS LTD.

Head Office, Main Showrooms and all Mail Order enquiries
OSBORNE ROAD, TOTTEN, SOUTHAMPTON, SO4 4DN
 Osborne Road is off Rumbidge Street
 Hours of Business: 9-5.30, Saturday 9-12.30
 Telex 477351 SMCMMG. Tel. (04216) 4930 & 2785

Northern Branch:
THE CHAMBERS, No. 3 THE PARADE NORTH LANE, HEADINGLEY
 Tel. (0532) 78 2326
 Hours of Business:
 9-5 Tuesdays-Saturdays
 9-3 p.m. Thursdays

Brian Kennedy, G3ZUL, Droitwich (09057) 4510
 Ian McKechie, G4BDX, Bridge of Allan (078483) 3223
 Peter Avill G3TPX, Darton (022 678) 2517
 Howard Jones G4WTF, Howarth, Leeds (053 274) 3444
 Poyntodkin (035 287) 846
 Mervyn Anderson G13WVY, Tandrage 840656

A L Q T H R

this antenna's no whip-off!

A 5/8 Wave 'Stainless Steel' Mobile Whip Antenna – precision manufactured to this standard of excellence for LESS THAN £10 is good value by any stretch of imagination. Look at these features and judge for yourself.

- * Non-corrosive waterproof fixing.
- * Detachable for car wash and against theft.
- * Nominal coverage 130–174 MHz VHF.
- * Strong (tensile strength 90–100 tons per sq. in.) shock spring mounting at base, heavily braided through shock spring to maintain electrical length.
- * Loading coil to match electrically at 50Ω and resonant at desired frequency.
- * Only 10mm hole required for fixing.
- * Supplied with blank cover, 2BA Allen Key and cutting chart (for desired frequency).

MECHANICAL SPECIFICATION

Base: Black moulded 'Talc-Filled polypropylene, a special chemical process during moulding ensures extra hardness.

Ferrule: Machined brass, heavy chrome plated.

Internal Contacts: Beryllium copper 'heat treated' and silver plated.

Antenna Rod: Stainless Steel 2.7mm at base and tapered.

Shock 'Barrel-Spring': 12 gauge spring steel.

Loading Coil: 18 gauge enamel coated copper wire.

ELECTRICAL SPECIFICATION

Gain: +3dB relative to ¼ wave.

Bandwidth: 5MHz

Power Rating: 100W

Frequency Range: 130–174MHz

V.S.W.R: Better than 1.5:1

Input Impedance: 50Ω nom.

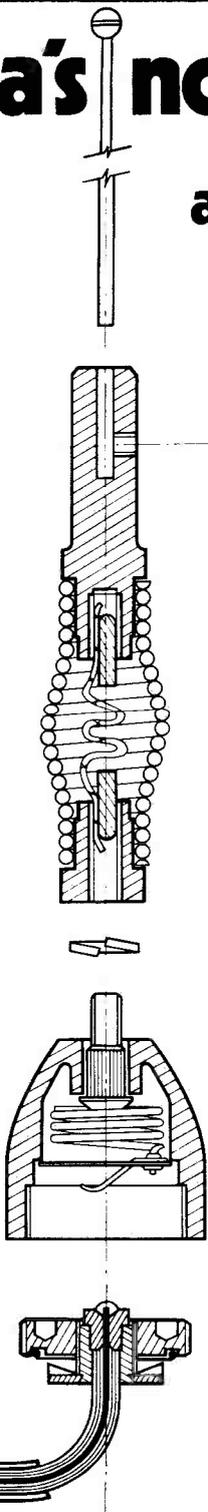
undeniable value

£8~10 +12½%VAT

and neither is this..,

also available is a 1/4 Wave Mobile Whip Antenna that offers the same nominal coverage and mechanical specification as the 5/8 wave model except the 1/4 wave is not equipped with a shock spring and loading coil.

We recommend that the 1/4 wave be roof mounted for optimum ground-plane effect.



£3~65
+12½%VAT
 Blank cover
 50p extra
 if required.

These antennae plus a multitude of other interesting equipment, components and construction kits may be found in Doram's new Edition 3 catalogue price 60p inc. p & p and Doram's construction kit brochure 25p inc. p & p or both together for special reduced price of 70p inc. p & p.

DORAM

Doram Electronics Limited
 P.O.Box TR8
 Leeds LS12 2UF

An Electrocomponents Group Company

S.S.M. SOLID STATE MODULES

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

Telephone 0484-23991

**Buy with confidence from U.K.'s longest established
VHF/UHF manufacturer. Our equipment is now
used in over 100 countries world wide.**

EUROPA B THE WORLD'S BEST SELLING 2M TRANSVERTER



Ideal for long distance V.H.F. use, either direct or via satellites. The Europa B plugs into Yaesu/Sommerkamp equipment for instant V.H.F. operation. For other H.F. equipment use our power supply type CPS 10.

THE EUROPA B gives you:

- ★ The confidence of our most efficient back up service in the 12 month warranty period and beyond.
- ★ Highest transmit power available 200W. Highest receive sensitivity available—2dB N.F.
- ★ Compact, attractive appearance will complement your station. Size: 9" x 4½" front panel 4½" deep.
- ★ Cleanest output spectrum available. All spurious outputs—80 dB.
- ★ Price: £109.15 complete to plug in and from stock.

EUROPA COMPLETE POWER SUPPLY TYPE CPS 10
Supplies all voltages to Europa and contains a dummy load attenuator to make the Europa compatible with any HF equipment. Price: £45.00—Ex-stock.

SSM Z MATCH 80-10 METRES

This unit has been produced to satisfy the constant demand for a compact matching unit to meet the critical load requirement of the modern P.A. Receivers are also becoming more sensitive to aerial matching and our Z match can of course be used to match the aerial to your receiver. The units have been tested at 2KW CW output power into a Bird Termaline Watmeter/Dummy load. The aerial connections can be used with balanced or unbalanced feeders and the connectors are screw terminals for wire aerials AND SO239s for co-ax fed aerials. Don't forget that multiband aerials respond as well to your harmonics as to the wanted signal. Our Z Match will provide harmonic attenuation as a bonus. Price is only £28.00.

All prices include 12½% VAT and delivery. 12 months guarantee on all units. We offer same day COD (£50 limit)

**VHF CONVERTERS 2 METRES, 4 METRES, 70 cms.,
SATELLITE BAND, MARINE BAND FROM STOCK**
Our own and independant tests confirm that our converters have the edge on performance of any available.

SENTINEL DUAL GATE MOSFET CONVERTERS

- ★ N.F. 2dB. Gain -30dB.
- ★ Very high tolerance crystals, 5 p.p.m. for calibration accuracy.
- ★ Strong signals and overvoltage and reverse polarity protection built in.
- ★ Standard I.F.s are: 2 metres: 28-30 MHz, 2-4 MHz, 4-6 MHz, 4 metres: 28-28.7 MHz.
- ★ Size only: 2½" x 1½" x 3" long except 2-4 MHz and 4-6 MHz which are double conversion and 4" long. Price only £18.00 and ex-stock

SENTINEL X 2 METRE CONVERTER

A deluxe version of the Sentinel. Performance spec. is the same but it contains an internal mains power supply and a front panel RF gain control.
★ Size: 5" x 1½" front panel, 4" deep.
★ Stock 2 metre I.F.s 28-30 MHz, 2-4 MHz, 4-6 MHz. Price: £22.00 ex stock.

SENTINEL 2 METRE CONVERTER KIT, 28-30 MHz IF ONLY

A well proven kit supplied with printed circuit board drilled and with all coils mounted to make assembly easy. Price: £11.50, ex-stock and IF it doesn't work send it back with £2.25 and we will fix it. YOU CAN'T GO WRONG!

SENTINEL MF Another Dual Gate MOSFET 2 metre converter which converts to medium wave in 2 switched bands. Price: £20.00 ex-stock.

2 METRE OR 4 METRE PRE-AMPLIFIERS These can be supplied for Satellite and Marine Band from stock. Other frequencies to order. Two models to choose from:

SENTINEL LOW NOISE FET PRE-AMPLIFIER

- ★ This pre-amplifier uses a selected low noise FET to provide the ultimate in sensitivity and selectivity.
- ★ Isolated supply lines, compatible with any equipment.
- ★ Low noise figure—1dB. High gain—18dB.
- ★ Size: 1½" x 2½" x 3". Price: £8.72 ex-stock.

PA3 DUAL GATE MOSFET PRE-AMP

- ★ Small about 1 cubic inch, printed circuit board pre-amp. Now incorporated in thousands of transceivers.
- ★ Low noise figure—2dB. Gain 18dB. Price: £6.27 with fitting instructions.

70 cm. U.H.F. CONVERTERS AND PRE-AMPS

SM 70 70cm. to 2 metre FET converter. This is a very high performance 70cm. converter at a very attractive price. Size: 1½" x 2½" x 3". N.F. 3.5dB. Gain 30dB. Price: £18.00 ex-stock.

SM71 70cm. (432 MHz) PRE-AMPLIFIER

Selected FETS give a noise figure of -3.5dB and a gain of 18dB. Size: 2½" x 1½" x 4". This unit is also available on other frequencies, e.g., 400 MHz region for satellite or radio astronomy use, for which it was originally developed. Price: £10.00 ex-stock.

ACCESS



BARCLAYCARD



H.P. or C.W.O.

JUST PHONE YOUR CREDIT CARD NUMBER FOR SAME DAY SERVICE

If you require more detailed information or help, we are a telephone call or a letter away, so do not hesitate to ask
You can call in anytime to inspect or collect equipment. Paul, G3MXG.

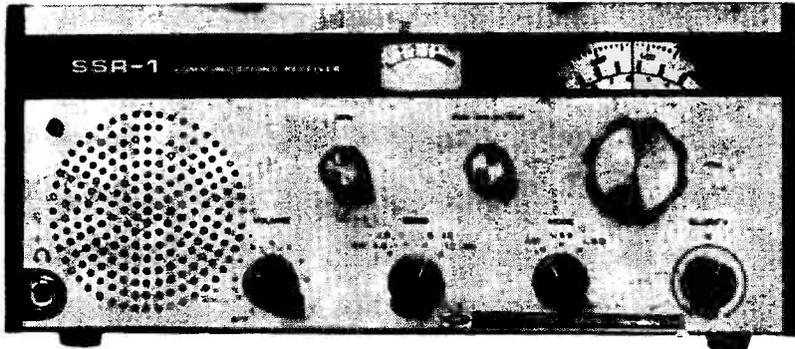


DRAKE

Radio Shack Ltd

®

SSR-1 COMMUNICATIONS RECEIVER



● Built-in Telescopic Antenna

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

TRIED AND TESTED WITH MANY THOUSANDS ALREADY IN USE. (SAE FOR DETAILS). £202.50 inc. SECURICOR DELIVERY

We are offering the following items at reduced prices. They are ends of lines and stock we want to clear to make room for new lines. We have no literature on them and cannot enter into correspondence, so we offer them to callers only. They are all brand new and boxed.

Caringella ACA-1 audio compressor	£32.00 (£45.00)	Robot 70A to B kit	£50.00 (£75.00)
ACA-1K audio compressor (kit)	£22.00 (£31.50)	Venus SS-2 Monitor	£197.00 (£250.00)
STR-1 standard time rx.	£40.00 (£56.25)	Venus Camera	£240.00 (£280.00)
STR-1K standard time rx. (kit)	£30.00 (£42.75)	Venus F-1 sgl. frame cassette	£2.50
Waters 372)Clipreamp	£13.50 (£18.50)	Venus T-C checkerboard tape	£3.75
Hallcrafters HA-1 keyer	£45.00 (£65.00)	Venus T-G grey scale tape	£3.75
Robot 70B Monitor	£280.00 (£330.00)	Venus P-1 polaroid adaptor	
Robot 80A Camera	£225.00 (£260.00)	Venus V-1 viewing hood.	

Prices in brackets are usual retail prices.

The following are amongst our used equipment. All have been checked and are in g.w. order. No literature is available.

Trio TL-911 linear amplifier	£150.00	GEC BRT-402 rx. miniature valves	£90.00
Creed 75R teleprinter	£40.00	Trio JR-599 custom special rx.	
KW 201 receiver	£110.00	Arac 2m. and 10m. receiver	£80.00
KW 108 monitorscope	£70.00	Arac 2m. transmitter	£99.00
Hammarlund HQ-170 receiver	£135.00	Collins MP-1 DC p.s.u. for KWM-2	£50.00
Grundig Satellite receiver	£105.00	Eddystone EC-10 marine model	£200.00

SAE FOR DETAILS PLEASE

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

RADIO SHACK LTD. 188 BROADHURST GARDENS LONDON, NW6 3AY

OPEN 5 DAYS 9—5. CLOSED 1—2 p.m.
 SAT. 9—12.30 p.m.
 Giro Account No. 588 7151

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

ELECTRONICS

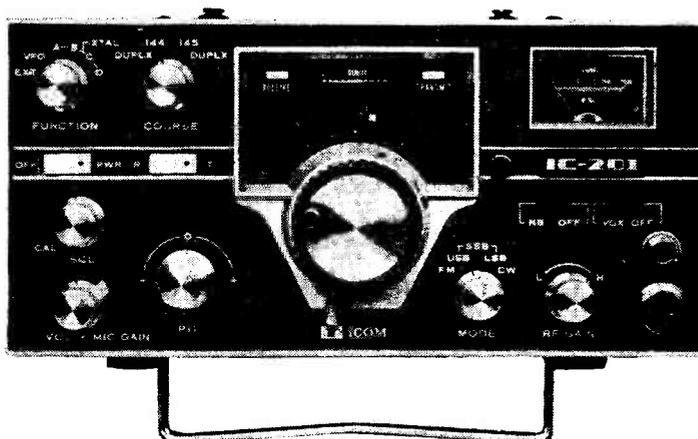
DAVE
G4ELP



IC-201

THE MULTI-MODE RIG THAT
SETS THE PACE IN LUXURY
AND QUALITY

£357.75 inc. VAT



ICOM IC-201 £357.75 inc. VAT

The luxury multi-mode rig which was described in full in our advertisement in May, providing full 2 metre coverage on FM, SSB and CW using its ultra stable VFO. Full facilities for Repeater and reverse repeater use at the flick of a switch, built in automatic crystal controlled one burst fitted by us, full break-in facilities on CV and VOX are but a few of the excellent facilities found on the increasingly popular IC-201. Send for further details or leave a message on our ansafone during the evenings.

ICOM IC-202 £161.10 inc. VAT (rechargeable batteries £18 extra)

This new rig from the ICOM stable is going to be another winner. You have a hand-held portable, giving 3 watts output on SSB or CW, with VXO tuning giving you continuous coverage from 144.0 to 144.4 and the option of other frequencies if you use crystals in its spare sockets. Add a linear and you have a beafy base station. To introduce this excellent transceiver it is offered at a price of £161.10 INCLUDING VAT. Send for a data sheet for further details—just the thing for going portable this summer! SEE RAD COM AND JUNE SWM FOR REVIEW.

ICOM IC-3PA £42.18 inc. VAT

The perfect companion to convert your ICOM mobile into a base station. Provides 13.6v at 3.5A. Well regulated, with automatic electronic overload.

ICOM IC-225 £250.00 inc. VAT (still some at £225 without crystal controlled tone burst)

The ultimate luxury in 2 Meter mobiles. Comes FITTED with 80 channels to suit the 2 meter band-plan, complete with crystal controlled tone burst and repeater facility. Nothing else to buy unless you want reverse repeater which can be obtained by adding ONE extra crystal. Covers all the UK simplex and repeater channels and provides a very clean signal by virtue of its excellent PLL circuitry. Send for further details of this and the rest of the excellent range of ICOM equipment.



See ICOM at your nearest agents by telephoned appointments :-

LONDON—Terry, G8BAM
01 556 9355

WALES—Tony, GW3FKO
0222 702982

NORTH—Peter, G3TPX
022678 2517

SCOTLAND—Ian, GM3DOX
078783 3223

MIDLANDS—Tony, G8AVH
021 329 2305

CHESHIRE—Gordon, G3LEQ
0565 4040

HULL—Tony, 0482 886392

DEVON—Bob, G3 PQH qthr.

AUTHORISED IMPORTER OF ICOM AMATEUR RADIO EQUIPMENT IN THE UNITED KINGDOM
FREE SECURICOR DELIVERY ON ALL TRANSCEIVERS
NOTE OUR TELEPHONE NUMBER CHANGED

THANET ELECTRONICS

34 CLIFF AVENUE, HERNE BAY
KENT (02273) 63859



We also stock MICROWAVE MODULES products and REVCO antennas for mobile

HIRE PURCHASE TERMS AVAILABLE

Complete the coupon and we'll send you our complete, new catalogue.



The new Heathkit catalogue is now out. Full as ever with exciting, new models. To make building a Heathkit even more interesting and satisfying.

Clip the coupon now (enclosing a 10p stamp for postage) and we'll send you your copy to browse through.

With the world's largest range of electronic kits to choose from, there really is something for everyone.

Including our full range of test equipment, amateur radio gear, hi-fi equipment and many general interest kits.

And, if you happen to be in London or Gloucester, call in and see us. The London Heathkit Centre is at 233 Tottenham Court Road. The Gloucester showroom is next to our factory in Bristol Road.

Heath (Gloucester) Limited, Dept. SW-96 Bristol Road, Gloucester, GL2 6EE. Tel: Gloucester (0452) 29451.

The new Heathkit catalogue. Out now FREE.

To: Heath (Gloucester) Limited, Dept. SW-96, Gloucester GL2 6EE. Please send me a Heathkit catalogue. I enclose a 10p stamp for postage.

Name _____

Address _____



Record-breaking Space-saving Antenna

The JOYSTICK VFA (Variable Frequency Antenna—a six-band, patented omni-directional antenna of extreme flexibility) is a MUST for confined locations—at the worst it can stand in the corner of the shack and still do its stuff! But space problems or no... what you need most is EFFICIENCY.

In recent test runs, using extreme QRP and under poor current sunspot conditions, the VFA produced good QSO's with FOUR continents. The makers claim that its low angle radiation conserves the precious watts going out and the equally desirable microwatts coming in on receive. High angle radiation, however, so scatters your signal power that stoking up becomes the order of the day. And then what happens? Harmonic radiation and risk of TVI is on the increase... QRO men beware! The name of the game is to achieve solid communication efficiently at the minimum power... we claim the winning name for this game is JOYSTICK!

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

SYSTEM 'A' £32.40

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

SYSTEM 'J' £38.60

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

PARTRIDGE SUPER PACKAGE

COMPLETE RADIO STATION FOR ANY LOCATION

Comprising: the NEW R.300RX (with Xtal Marker) Headphones, VFA, System "A," all connecting cables. Delivery: Securitor (our risk). **ASSEMBLED IN SECONDS! BIG CASH SAVINGS! — OR R300 ONLY £168.75 INCL.**

£189.00

PRICES INCLUDE V A T,
INSURANCE AND DELIVERY
BY POST OR CARRIER



Just
Telephone
Your
Card Number



Tel.: 0843 62535 (or 62839 after office hours)

Many other Partridge super products
on our list

Send stamp for details and expert advice

BOX 4

PARTRIDGE
BROADS TAIRS HEAT ENGLAND
ELECTRONIC

G3CED

G3VFA

SHORT WAVE MAGAZINE

ADVERTISERS' INDEX

	Page
Amateur Electronics (G3FIK)	402
Amateur Radio Retailers Association ...	438
Ashley Dukes (Honda) ...	439
Baginton Electronics ...	437
B. Bamber Electronics <i>back cover</i>	
J. Birkett ...	434
British National Radio and Electronics School ...	436
C. & C. Electronics ...	446
Cambridge Kits ...	445
Catronics Ltd. ...	443
Colomor Electronics Ltd.	439
Datong Electronics Ltd. ...	435
Derwent Radio ...	438
Doram Electronics ...	395
G3HSC (Rhythm Morse Courses) ...	439
G.W.M. Radio Ltd. ...	446
Hamgear Electronics ...	439
Heath Ltd. ...	400
Heller Electronics ...	439
D. P. Hobbs Ltd. ...	445
J. Yu ...	435
K.W. Communications Ltd.	436
Lowe Electronics	
<i>Front cover, inside front cover,</i>	<i>385, 386</i>
S. May Ltd. ...	439
M.H. Electronics ...	439
Microwave Modules Ltd. ...	431
Mosley Electronics Ltd. ...	438
Partridge Electronics Ltd.	400
P.M. Electronic Services ...	437
Radio Shack Ltd. ...	397
R.A.F. Association ...	447
R.O.R. Services ...	439
R. T. & I. Electronics Ltd.	433
Small Advertisements ...	442-446
Solid State Modules ...	396
South Midland Communications Ltd. ...	392, 393, 394
Spacemark Ltd. ...	444
S.S.B. Products ...	439
Stephens-James ...	390, 391
Strumech Engineering Ltd.	387
S.W.M. Publications	
<i>Inside back cover,</i>	<i>440, 441, 448</i>
Tape Talk ...	445
Technical Associates ...	442
Telford Communications ...	444
Thanet Electronics ...	398, 399
T.M.P. Electronic Supplies	445
J. & A. Tweedy Ltd. ...	447
Reg Ward & Co. Ltd. ...	447
Waters & Stanton Electronics ...	432
Western Electronics Ltd. ...	388, 389
W. H. Westlake ...	447
Chas. H. Young Ltd. ...	433

(GB3SWM)

ISSN: 0037-4261

Vol. XXXIV

SEPTEMBER, 1976

No. 395

CONTENTS

	Page
Editorial ...	403
Communication and DX News, <i>by E. P. Essery, G3KFE</i> ...	404
Sideband Translator for Top Band ...	409
Easy Quad for Fifteen Metres, <i>by F. C. Smith, GW2DDX</i> ...	410
Do You Know That ...	412
Reduced Space Aerials for Twenty, <i>by F. G. Rayer, G3OGR</i> ...	413
Antennascope ...	414
Speech Amplifier-Clipper, <i>by I. D. Poole, B.Sc., G3YWX</i> ...	415
"SWL"—Listener Feature ...	417
E-M-E From WA6LET ...	419
Book Review—ARRL <i>Electronics Data Book</i> ...	420
VHF Bands, <i>by N. A. S. Fitch, G3FPK</i> ...	421
The Month with The Clubs — <i>From Reports</i> ...	425
Courses for The R.A.E. ...	429

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

Advertising: Charles Forsyth

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

Annual Subscription: Home: £4·80, 12 issues, post paid
Overseas: £4·80 (\$10·00 U.S.), post free surface mail

Editorial Address: Short Wave Magazine, 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.

AMATEUR ELECTRONICS UK

YOUR FIRST CHOICE FOR YAESU MUSEN!



**AND THE
SUPERB
FT-221**

SSB/FM/CW/AM
2 Metre
Transceiver



(Ex-stock)

WHEN YOU BUY FROM AMATEUR ELECTRONICS UK YOU HAVE THE CERTAIN KNOWLEDGE THAT YOU ARE PURCHASING YOUR YAESU MUSEN EQUIPMENT FROM A YAESU MAIN AGENT WITH EXTENSIVE STOCKS OF MAIN ITEMS, ACCESSORIES & SPARES. EVERY SALE IS BACKED UP BY A FIRST CLASS SERVICE DEPARTMENT AND YOUR WARRANTY SERVICE IS SECURICOR COLLECTED AND RETURNED. NO COMPANY CARRIES LARGER STOCKS—NO COMPANY HAS BETTER CONNECTIONS WITH THE FACTORY.

The Sensational ATLAS-210-215X

**STEP INTO THE
FUTURE WITH
AN ATLAS!**

DON'T TAKE OUR WORD
FOR IT—LISTEN ON THE
BANDS & ASK AN ATLAS
OWNER FOR HIS OPINION



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

CREDIT TERMS: New Low Deposit, Trade-ins Welcomed

BRANCH AMATEUR ELECTRONICS UK—COASTAL, 316-318 NORTHDOWN ROAD, CLIFTONVILLE, KENT. THANET (0843) 22060
Telephone KEN McINNES, G3FTE for courteous attention
AGENT WALES & WEST—ROSS CLARE, GW3NWS, CAERLEON 42232



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

**021-327 1497
Telex 337045 6313**

The SHORT-WAVE Magazine

EDITORIAL

SMALL ADVERTISEMENT COLUMNS

For many years now, we have regularly carried a large volume of Reader Small Advertising. It is through these columns that the second-hand (or "used") value of much equipment of radio amateur interest has been established. In some cases the trend has been up, and in others down, and there are also those items that seem to change hands regularly at about the same price — the AR88 receiver being an example.

At a charge of 5p a word, minimum 70p (which gives you 14 words, name and address to count) you cannot go wrong by using our Small Advertisement pages for anything radio you want to buy, sell or exchange.

SPECIAL-EVENT STATIONS

Bridgend: At the Recreational Centre, Sept. 11-12, GW3EOP/A to be operated by the Port Talbot Amateur Radio Society for the South Wales Model Show — which has to be seen to be believed, they tell us! — with SSB on all bands, but mainly using 80/40/20m. Special QSL card for all contacts. R. Bray, GW4ESV, 8 Cerise Close, Aberavon, Port Talbot (6712), Glam.

Stafford: From the Staffs. Wing, Air training Corps Exhibition, at R.A.F. Station, Stafford, signing G4ATC on 160/80/20/2m., also operating on the ATC's own HF/VHF channels for the two hundred or so ATC squadrons active on their networks. In charge of the radio arrangements is V. J. Reynolds, G3COY, QTHR.

TWO HUNDRED MILLION MILES

In all that has appeared in the public print about the American space-craft landing on Mars, and the conjectures surrounding the possibilities of life on that gloomy planet, little has been said about the stupendous feat of electronic engineering that has made the exploration possible. A signal takes about 19 minutes to cover the distance (remarkable enough in itself) and not only have we seen some convincing real pictures but intricate tests and experiments are being carried out, and watched, by remote control across the 200-million-mile path. Such an achievement must surely rank as one of the milestones of man's progress in Science — beside it, the object of the exploration seems of relatively small importance.

COURSES FOR THE R.A.E.

Following from the notice on the Editorial page, July, we list on pp.429-430 of this issue more than 40 scheduled courses of instruction for the Radio Amateur's Examination, up and down the country. Though the List shows good coverage, there are still many "gaps" — those able to fill them by offering similar courses should let us have details as soon as possible, for publication in the next issue. Because most courses start in September or early October, there is not much point in publicity for them later in the year.

"RF AMPLIFIER FOR THE SEVENTY CENTIMETRES"

In a comment on this article in the July issue, G8FMK suggests that if resonance of the line inductors around 432 MHz cannot be obtained, L3 should be 1½-in. bent to ¼-in. radius; L4 also to ¼-in. but 2 ins. long; L5 made half-wave of 16g. (3¼-in. long) spaced ⅜-in. centres; and L6, 1½ ins. in the arms, at ¼-in. radius. Of course, at frequencies of this sort, minor difference in constructional form can have a considerable effect — so the comment by G8FMK (who finds this PA very good on 432 MHz) is helpful and interesting.

HARDLY BELIEVE IT!

At a certain Engineering Institute, the head is a Mr A. C. Mains and one of his current students is a Mr D. C. Circuit — and we are assured that this is not a fabrication, the name of the College of Technology concerned having been given. In a way, though, this is no odder than the name of a colleague of ours, many years ago, who was the operator of secrecy radio equipment and whose real name was W. T. Cypher — and that was actually his job!

FORTHCOMING RALLY DATES

Peterborough: On Sept. 19 at Walton School, Mount-steven Avenue, talk-in by G3DQW on two-metre channels S0 and S20.

Torbay: For August 29, venue changed to Haldon Race Course, four miles out from Exeter on the A38, sign-posted, with talk-in on 160/80/2m., also 70 cm., call sign not mentioned.

Harlow: On Sept. 26, at Netteswell School, details from T. Robinson, G3WUX, 5 Rectory Road, Harlow, Essex.

*Austin Forsyth
G6FO*

COMMUNICATION and DX NEWS

LAST month, we were complaining about the heat; as your scribe sits down to write this, the temperature is rather more comfortable and Twenty is not over-burdened with noise of the natural variety; while Eighty your scribe has not listened, not so much from fear of a busted eardrum from static, as from the fact that, at last, the pundits have been proven right—a bird flew into the aerial at the far end about 11.45 one night, resulting in a mighty twanging noise, and broke the span off at the very far end. But that's the first time the 28g. has been brought down by animal life in ten years.

It's a pity some people took umbrage at the writer's comments on GB3LO and the FM-simplex boys, by extending it to include the other users of two metres; so let it be clear that G3KFE was not and is not anti-VHF, but very much concerned at the activity going on with GB3LO and on the simplex channels as regards jamming and deliberate license-breaking by certain stations, most of whom would appear in fact to be plain pirates. As for 80m. the QRM'ing of DX at the HF end, and the operation of AM stations in the CW portion of the band, are the only real gripes, and the former is largely—at least when the writer's been listening—not so much from G's as from other EU's. As for the nattering that goes on, the pundits may be boring, they may be technically off-the-beam on whatever they are discussing—but that is their opinion and they are entitled to it, and rag-chewing, provided it is within the terms of the licence is fair and legitimate operation. Piracy, obscenities, and jamming of a repeater is *not* legitimate operation.

The Bands

Let us start with Ten, which has been showing us during the summer just how much can happen even when one is right at the bottom of the sunspot cycle; recall that Ten-Metre Activity Day back in the Spring, and the odd reports since? Well now, the promised Autumn event is now *firmed up*, as October 3, times 0001z to 2359z, and the rules of the game are essentially the same

as before, saving that this time it is suggested the CW operators use the first 100 kHz, and the Phone men stick to the area 28.5 to 28.6 MHz, simply so as to reduce the situation we had last time where some folk got left out of the activity because they were sitting on frequencies which were not being searched. Exchange reports plus a serial number, although this is *not a contest*, but a propagation study; the serial numbers will help the organisers to collate the gen from the various logs sent in. Last time some 400 U.K. stations took part, in addition to many from other countries and parts of the world—let's see if we can double this level of activity this time. Send a summary of stations worked/heard, plus comments on band conditions and propagation as it seemed to you, to David Whitaker, 57 Green Lane, Harrogate, N. Yorks. And, for the record, may we comment that David is a long-time SWL and the brother of G3IGW; he himself has monitored the band through the summer and found a surprising number of countries—some 70 have been logged this year so far, and in July the following were noted: FM7WR, YN1FWN, HBOLL, TI2TB, KP4EAJ, YV4BDB, YS1MAE, PZ1AE, A9XBC, 9Y4NP and VP9AD.

G2HLU (Reading) found plenty of interesting stuff round Europe, all on CW, with the best "DX" worked as a UB5; that other OT, ex-G2XC (Horndean) has gone up from the Heath HR-10B to an SB-303, which he has just finished. Ted looked through his old logs, and reckons he can never recall so much Sporadic-E propagation back in 1947/48—this year he has never failed to find Ten open *whenever* he has listened in daylight, even though it be only to Italy!

The spider-like handwriting of G3DNF (Leeds) (his description!)—takes us to task for wondering about G3RJV last time; Gordon remarks that the latest issue of the quarterly *Sprat* is to hand just in time to miss last month's deadline! On a different topic, G3DNF describes Ten as being "catch as catch can!"—but after several weeks of fun, the band

E. P. Essery, G3KFE

died *just* in time for the QRP Contest. That's old man Murphy again.

GW4BLE (Newport, Gwent), found the odd opening to the 'States in the early evenings, plus the S9 EU's and the odd one from South America, adding up in all to VE1XV, W1-4, YV4BDA, YV4BDB and 8P6BN.

G3NOF (Yeovil) is yet another one who remarks on the number of 10-metre openings this year; for him it has been lots of G's and EU's during the day, with W's audible, weakly but clearly, from 2000 right through till the small hours. Don worked HI8MOG, W3IK, W3KDD, W3VUH, W4IWZ, W5UDK/1, W8MUS/8, W8ODW, W1QZH, W3RNI, WB4YFK/4 and W2HWH /3, for his crop this month.

G4EAN (Nottingham) writes in; he runs an FT-101B plus outboard VFO, an FL-2100B Linear and a TH3 beam up on a Versatower; he operates from his bedroom; all contacts SSB, the operating approach is one good long session, say, once a week, rather than the same amount of time spread over short daily sessions; one long session produced twenty-odd contacts on Ten, while the best of the month's crop was SV1AE.

Now Fifteen

With all this activity on Ten, one would expect Fifteen to show even more liveliness; and, always bearing in mind that we have been sitting in the bottom of the sunspot cycle, and with mainly "low Normal" conditions predicted, "conditions" are, in part at least, a reflection of activity, and activity has been up—so conditions have seemed better! And, of course, it has to be admitted that there does seem to be an increase in the proportion of sunspot activity out towards the solar poles, which would seem to indicate we are at or near the bottom. And, of one thing we may be certain—the only way from the bottom is *UP!*

One correspondent, ex-G2XC, says he hasn't heard 21 MHz during a sunspot maximum for comparison, but after what he reads of other folk's

To celebrate its 30th anniversary, the Gibraltar Amateur Radio Society ZB2A, established ZB30ANV at the local John Mackintosh Hall. Here we see G8B1 (from Welwyn Garden City, Herts., and the founder of the R.A.F. Amateur Radio Club on the Rock) operating an FT-101 transceiver under the ZB30ANV call. He flew out to Gibraltar specially for the occasion.



views, he gains the impression that his attic aerials are doing even better than he had at first thought. Comparing his results for June against those mentioned here last time; allowing for nine days away at the start of the period, listening for about 30 minutes from 1515z for the Solent group sked with ZS6CR, and again for an hour or so later in the evening, Ted logged 15m. CW from EA9AQ, YV3VU, WB8RUQ, 4Z4NUT and 9J2BO, while SSB accounted for A9XBC, CE3RC, CE7BF, CP6CZC, CT3AF, CX4BD, CX4CR, EL2R, HK3PA, KP4EIC, KP4CH, KZ5LU, a gaggle of LU's and PY's, OA4AZB and OA4HW, PZ1DR, UK9AAN, East Coast W/K's, ZD7SD, ZD9BT working GB2SM, ZE1FD, ZP5PK, ZS6's, 4X4HT, 5N2NAS, 5Z4NH, 5Z4PG, 5Z4RG, 8P6AJ, 9G1HC, 9G1HZ, 9G1KB, 9J2WR, 9Q5DM, 9Y4AB and 9Y4OK. For July it was essentially the mixture as before saving that in addition D2AZB and D2ARM, FG7AM, VE's and such, indicated that the propagation was inclining more East-West than in the previous month.

G2HLU indicates he has had the "odd small pieces of luck," in which category Harold includes ZP5AO for an all-time new one.

G3WKF (St. Austell) is a new correspondent who paid the penalty last time round by writing direct at

the last moment—instead of to the Editorial address. G3WKF, it seems, is getting a bit bored with VHF, and having gear available, it seemed an idea to get away on the HF's. A home-built 21 MHz Quad was built, but it was found to be a bit of a brute to set up and adjust. So, back to the drawing board, and this time the Mark II had remote adjustment of the gamma match and the stub by way of a couple of those one r.p.m. model-maker's motors, which require no more steam than that provided by a U2 battery. A local field was chosen for a /P effort with the Quad at 54 feet, and the following were worked during a week: PY2BGA, 9Q5DM, 9J2GA VQ9R, CE4DR, VP5F, ZP5ZI, W8JAC, 9X5JB, 8P6FX, CE4KX, CE2AZ, KV4AD, WA2VFA, 9G1JR, LU5HFO, CE3AUL, ZC4DH, ZS6BLI, EA8CK, FG7TD, some more LU's, 9J2WR, PZ5AA, and—most interesting—9J2CJ using five watts of SSB to a good high beam. One gets the feeling that maybe G3WKF will stick around on HF for a while!

G3DNF has been busy with the soldering iron and the QSL chores, since the DL QRP contest, but he did manage to snag the odd one that was kind enough to appear in his receiver pass-band, such as TF3IRA, the Club station of the Icelandic Amateur Radio Club, worked with Gordon's three watts.

GW4BLE says he only had three days on the band, so his log is hardly representative—but it seems very so to this scribe, carrying as it does references to C31HD, C31MS, D2ALB, G3ZRS/MM off ZS3, KP4ECH, LU4AIW, LU8MBV, ZE3JO, ZS3BL, 5Z4RG and 9J2WR. Recently, meeting the brother of ZE3JO, your scribe got news of one who used to be a regular correspondent.

In contrast to most of the others, G3NOF seems to have picked all the wrong times this month, he having heard only Europeans; although the grapevine had told him others were about, in particular early afternoons and late evenings, Don managed to draw a blank—the first one that G3NOF has reported on 21 MHz since your scribe started in on this piece years ago.

G4EAN had just one session on Fifteen, on July 11, when he connected with SM6ATK/P3, HK3DBZ and OZ6AZ.

Maritime Mobile

G3ZGC/MM reports on his latest trip. He rejoined *Esso Scotia*, GZJG, on July 8, and at the time of writing was on the track to the Persian Gulf and back with the same old FT-75 which Richard now calculates to have done 250,000 miles with the ship. His letter was dated July 29, from Capetown, and his contacts

seem to have split between 21 MHz, on which he hooked JG1MRB/MM on a tanker *Hida Maru*, JENN (heading for JA from the Persian Gulf) and Forty on which most effort has been expended, with DJ7KP/MM on a sailing yacht on Lake Constance worked, plus G3ZRS/MM (*Clan Robertson*, GMVE, trading G-ZS and back). Time after time the band has been full of G's and EU's on Forty, and call after call has yielded no reply whatever, save that Richard did manage a 459 from G3LIK after a QSY from Twenty; of course as G3ZGC/MM is the first to say, the BCI is heavy in Europe on 7 MHz—true enough, but a good attenuator at the front-end of the receiver can work wonders!

Twenty

Action, all action! Well, not quite as exciting as that, maybe, but tending in the right direction at least. G3KFE had a few listens on the HF end of Twenty for A4XGQ in the evening but heard nothing of him—not surprisingly when one realised Alan was on “the other” shift and so operational at 0615! A4XGQ is the only station active on Masirah, the RAF station being out of use, but his problem is being within very close proximity of a QRO BC station, with his Quad looking straight through the BC aeriels to see the U.K.

That last paragraph was written 24 hours ago, and in the meantime, who should have written in but—A4XGQ! Alan has stuck to two-way SSB, and his list, all taken with the beam fixed on the U.K., includes, naturally, lots of Europeans, also EL2EN, EP2MY, HZ1SH, JV9CS, JY6TC, MID, R3FL, SV1KT, TA1ZB, UA6DDV, UA9TN, UW9UM, U5ARTEK, VK, VQ9HCS (Astove), WB6EWH/VQ9, VU2HI, WA9EEV/VQ9, YB2CR, YK3IBA, ZC4AU, 4S7DA, 5B4CW, 5Z4LW, 6W8AAD, 7X4MD, 9H1EV, 9H4B, 9J2BL and 9K2DP. An annoying gotaway was 5X5—the only one still around, who was mistaken for a 4X4, the latter country being *verboten* to Masirah ops under their licence terms; however, a suitable word of consolation has been passed to the 5X5.

G2HLU complains that often when he goes to Twenty the band is “duff,” but admits that it is not always thus—Murphy has to sleep

sometimes! At these times the TS520 CW has rattled the cans at W6's and W7's, a KL7, FC9UC, JA5PL, JW5NM and ZS5EL; and of the first three prefixes mentioned there were even the odd occasion when they were hooked by a CQ call.

QRP on Twenty for G3DNF with two watts yielded C31JX, UH8HBM and YV5ANT—which must take him close to a two-watt WAC.

The only time the beam was turned from its usual Westerly heading by GW4BLE was when he was looking for Bill Rindone from Geyser Reef—more anon about Bill's doings—and the westerly heading gave contacts with CP8AT/M, HC2WF, HC5EE, HK4DF, HK6BRK, LU2CF, NG2USA and VP5ZZ/MM off HI8-land; and a plus while “resting from the contest” as one of the GW4ENT operators in AL7HCN for Steve's only second ever KL7.

The summary picture from G3NOF shows the band opening to W6, W7, VE6, VE7 at 0600 on some days and on others to the Pacific; KH6's and KL7's for example. East Coast W's have been heard as early as 0900, the KL7 and W7 signals having been heard at odd times to 1300. During the day there has been very short skip, with S9 G's, and little heard of VK/ZL. Around 1600 there have been some short-path openings to JA, while the evenings have been occupied by North and South Americans. G3NOF's SSB signals penetrated to A4XGQ, AA7JAA, AA7UQV, AB6MRY/KL7, AH3GK, AL7HCN, AL7HRP, AL7HRN/6, AD5FVA, AD5TCI,

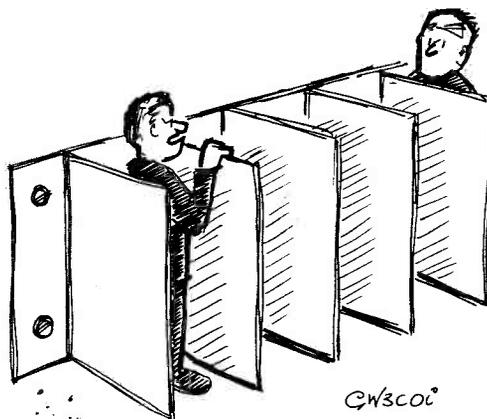
C31KA, C31KM/P, CT6CAL, CZ20 (the Olympic Games station), D4CBS, FW8CO, G3ZRS/MM (off West Africa), HRISO, IF9HLO, IH9HLO, IL7WTI, JA1EQD, JA3WQH, JA9ED, K5OVC, K7RSC, KH6HDT, KH6HHN, KL7HCN, KL7IEU, KL7IPU, PE2EVO, R1SKW, TR8BJ, VE6AKG, VE6HT, VE7AQF, VE7BC, VE7BGK, VE7BVH, VE7COI, VE7DSR, VP1MPW, VR3AH, VU2HI, various rare W7's, VQ9P, 3D2AJ, 9J2GF, with gotaways in the form of FO8DO, FO8EX, KA6RI, VR3AK and 5W1AX.

G4EAN managed CZ20, VE1AZN, AB2WOU, ZB2RB (G3VGV and XYL G4EYL), and a first-ever CW QSO with EA1DN.

G4DJY (St. Annes-on-Sea) is a Joystick user who sticks to CW only at the 120-watt input level. Before his holidays Peter made it to various parts of W/K, CZ2RV (VE2RV during the Olympics), OY2H, followed by a break for holidays and a session in one of the U.S. contests which produced a great string of different States (with C31JX neatly stitched in the middle for variety), KV4CI/MM2, VE5BX, TA1ZB, another fine assortment in the YV contest including one with the “unlikely” sounding call of CX1EK/AC4 (shades of AC4RF!), LG5LG, and 4J4A.

Another Joystick user is G4EVO, who buckles it to a five-watt CW rig and works all round Europe and occasionally into Russia-in-Asia.

G4CQK (Walton-on-Thames) is playing happily with a Heath HW-8



“ . . . and this is the heat-sink for my new PA ”



For the R.N.A.R.S. Mobile Rally in June at H.M.S. "Mercury", Petersfield, Hants., the prizes were presented by Mrs. D. O'Reilly, wife of the Captain of "Mercury", the well-known Royal Navy training establishment. When this was taken G3VLL (Doncaster) was getting his for the best home-built /M rig—and there were some 160 cars on the ground for the event, bringing more than 500 people.

QRP rig, with, as he puts it "not much to report," but no doubt he got quite a kick out of working VE3GSZ with three watts on 14 MHz.

Odd Comments

G2HKU had a fall in front of a car, and in twisting to avoid it wrenched the ligaments in his foot which put him *hors de combat*. However, three weeks later G2HKU got back on the air after his XYL had brought down the PM2B to his bedside, and spliced numerous lengths of coax to extend the aerial down from the shack. Although the CW is a bit shaky (Ted having to hold the key in one hand and use it with the other), some QSO's have been made, with G2NJ, PAØPN, ON4GU and DK7PM.

Some interesting experiments with S-meters have been done by Ted, ex-G2XC, who seems well set on the way to making a come-back after all those years when the ticket was allowed to lapse. He noted that signals on the SB-303, after the meter had settled (which, incidentally seems to take a longer time than other specimens of the breed), could

be Q5 and but S0 on the meter, and so carried out an interesting little experiment with a signal generator and attenuators and the receiver tuned to maximum on an unmodulated signal. The attenuation was increased until the meter just dropped to zero, at which point the signal was still quite readable. With AGC off, a VOM connected on the speaker and switched to its dB range, the input was further reduced until inaudibility was reached 14 dB of signal input lower. Thus, Ted concludes, the signal which *just* moves the S-meter is in fact S3, so he uses this as a correction-factor. A good point this; after all, the signal-strength reading scale as it is quoted in the books starts from S1, while every setmaker seems to calibrate his S-meter by taking S9 as the starting-point. Since we are talking about dB's, we are talking about *ratios* and the two methods *must* give different answers throughout the range.

A note of congratulation to G4EAX (Long Eaton) who, despite imminent marriage, continues to press on with Top Band as the Table

will show; but by the time our next deadline comes round John will have achieved the happy state and we must wait and see how Amateur Radio fares!

Cray Valley group celebrate their 30th Anniversary in October, and it is as part of this celebration that they will have GB3OCV on the air throughout October on the HF bands, with a commemorative QSL. In addition, Top Band enthusiasts can play in a contest they are holding on October 17—all details from G3YWO, with an s.a.e.

G3RJV (Calverton) found himself encouraged by what he heard on the few occasions he could get on the bands, even though he could himself not work out of Europe, while an /P day brought, as he put it, "more sunburn than DX!" However, to return to the QRP Activity Weekend arranged for September 25-26! For this, the QRP chaps are going to see how much they can work each other—not a contest but an *Activity*. They will be congregating around 3540, 7040, 14065, 21040, and 28040 kHz, plus/minus say, five kHz, so give 'em a chance by avoiding QRM at these

TOP BAND COUNTIES/COUNTRIES

Starting date, November 1, 1975

Call	AM	CW	SSB	Countries	Total
G4CZE	76	72	69	11	228
G4EAX	58	50	84	10	202
G4CBQ	23	86	71	13	193
GM3YOR	2	130	18	28	178
GW3WMY	71	80	—	10	161
G4EPL	17	46	78	10	151
G4AEJ	62	52	14	8	136
G4AYS	30	30	—	7	113

Scoring is on the following basis: one point for a county on SSB, two per county on CW and three per county on AM. In the case of an AM/SSB contact claim two points, scored in the AM column by the AM station and in the SSB column by the SSB end. No other cross-mode contacts permitted.

frequency areas for the weekend.

The YL Net about 3705 kHz on Saturday mornings got off to a good start, we hear through the grapevine; keep it going, girls, and we hope you get some more "attenders" on the net—eleven till noon, is the time.

We have the results of 1975 CQ WW Phone and CW Contests to hand, thanks to W1WY. It looks as if the U.K. participation was higher than for many years. Looking at the Phone section, G3LNS was fifth in the all-band single-op. section, while in the single op. single-band entries we see G3WJN at the top of the 21 MHz pile and G3XYP fourth on 14 MHz. On CW, G2BOZ came sixth on 28 MHz, with G3HCT doing the same on 14 MHz, while G3HTA was sixth on 3.5 MHz, and GD4BEG second on Top Band. Congratulations to all, and to the large number of people who put in entries from U.K.

DX Doings

Eventually WB7ABK managed to get clear of the Sudan, and opened up from Geyser Bank under the call-sign YMØAA, which made for quite a lot of confusion, this being a Turkish prefix—as Bill was signing /TA when he was in Turkey doubtless the ticket followed him on after his departure! His next move was to be to go to D6A, but at this writing your scribe has not heard him from there.

Ex-A35AF reported on from

ZK2AR was ex-A35AF, doing a brisk trade. However, he is not there permanently, and hopes to operate from another Pacific location before returning home to JR1ATU, where all his QSL's should be sent.

Time will be running short when you read this if you want to work 4JØKAA, being a commemorative from Wrangel Is., with QSL's to UA3AFX or UA3GM. This operation is to terminate around September 8.

A quick look at the Contest Calendar of W1WY shows the European Phone over the weekend of September 11-12, and on October 2-3 the VK/ZL/Oceania first leg, the second leg coinciding on October 9-10 with the RSGB 21/28 MHz contest, for which we would hope as many as possible will get on Ten and use the band. And, of course, the last weekend in October is the CQWW DX Phone contest with the CW leg on the last weekend in November.

The LF Bands

This long, hot summer has not been all that encouraging on the LF bands; your scribe usually decides whether to look at 'em on the way home, from the amount of static that is audible on the MW car radio. Whence, of course, a shortage of reports.

There is much to be said for putting plenty of wire down into the garden, reports G2BJY, anent our descrip-

tion of his aerial last month—it not only does the RF good, but it seems to grow big cucumbers too (one of Geoff's was so big he had to get help to lift it out of the frame!).

G2HLU mentions one early session on Forth, when he worked CO2SM for a new one and also VK3MR-of-the-rhombics, who said that conditions were very poor, giving Harold some consolation for his 339 report!

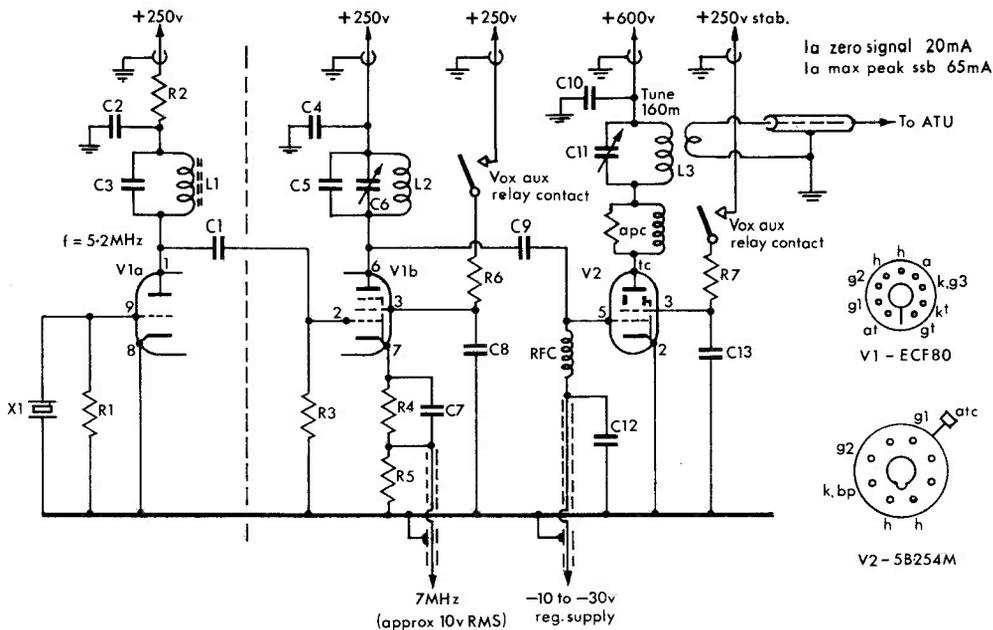
G2NJ (Peterborough) had quite a crop of contacts with the QRP folk; one of the most interesting was with G5OJ (Ewhurst) who had 1.2 watts to a breadboard transmitter using a single old Ediswan PV625X dull-emitter triode (!) and another with G15DX who's aerial was down for hay-cutting but who was getting out very well with a Joystick. On Eighty G4EVO seems to have covered most of nearer Europe with his QRP CW and Joystick, getting quite good reports all round.

G3RJV has been fully occupied keeping the QRP Club "on the road" and working, but now that holidays are once more with us, he will doubtless put the rig back on the air firmly and unearth some more DX—certainly George promises to appear for the QRP Activity weekend.

In an interesting (but late!) report G4EDG (Newton Abbot) discusses Forty which, he says "produces some amazing DX either late at night or early in the morning." With a home-built three-band trap vertical having numerous radials and an FT-560, he lists some very impressive CW/DX results, from Australasia round to the distant W/VE areas. But he admits to being much bothered by the thoughtless, inconsiderate and ineffective operating of numerous EU's (he gives the palm to the YU's for this general liddery) who spoil, among others, a good QSO of his with rarity 9A1TCO.

Big Switch

Is where we go QRT for another month and give you the deadline date—it's September 13, arrival, addressed as ever to "CDXN," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.



Circuit to obtain SSB output on Top Band, from a 7 MHz Sideband drive source. Mixing is in the ECF80, with the CO side on 5.2 MHz; as mentioned in the text, other frequency combinations can be selected to produce the 1.8 MHz LSB drive for the PA (which could be any other suitable type, such as an 807 or a 6146). Values and current readings to be expected are for the 5B/254M, which is a miniaturised version of the 807. If the 7 MHz SSB drive is obtained from a Sideband transmitter running straight, it is essential to keep the input to the mixer down to about 10v. r.m.s.—this can be done by feeding the SSB Tx output into a dummy load, and tapping off the required drive by a potentiometer network across the load.

SIDE BAND TRANSLATOR FOR TOP BAND

CONVERSION DESIGN USING HF PRIME MOVER

THOSE thinking of embarking upon SSB operation on the 160-metre band—and already possessing an SSB transmitter working on higher frequencies—could hardly find anything simpler or more convenient than the circuit shown above.

It is an oscillator-mixer arrangement using two readily available valves, as being the easiest approach to match in with most existing equipment—hence, an ECF80 driving a 5B/254M, with Sideband drive to Cathode 2 of the ECF80. The 5B/254M is a robust valve, like the 807, which could be substituted without significant circuit changes.

Construction

The small translator was built on a standard aluminium chassis measuring 12ins. x 8ins. x 2ins. with the long side going from front to rear. The oscillator-mixer was to the rear and in-line construction followed with the amplifier valve next and the tuning coil and capacitor to the front. There was sufficient room for the ATU to be mounted beside the tank circuit had this been required, although for the writer's particular layout it was more

Table of Values

Sideband Translator circuit for Top Band

C1 = 2.7 μ F	R5 = 75 ohms, 1w.
C2 = .005 μ F	R6 = 47,000 ohms, 1w.
C3 = 60 μ F	R7 = 1,000 ohms, $\frac{1}{2}$ w.
C4, C7, C8, C10, C12, C13 = .01 μ F	RFC = 2.5 mH RF choke
C5, C9 = 100 μ F	Xtal = 5.2 MHz
C6 = 50 μ F	APC = 5t. spaced on resistor body
C11 = 15-400 μ F	L1 = To tune 5.2 MHz with C3
R1 = 47,000 ohms, $\frac{1}{2}$ w.	L2 = To tune 1.8 MHz
R2 = 47,000 ohms, 2w.	L3 = To tune 1.8 MHz
R3 = 100,000 ohms, $\frac{1}{2}$ w.	V1 = ECF80
R4 = 680 ohms, $\frac{1}{2}$ w.	V2 = 5B/254M

convenient to have it remote and feed the energy from the tank over co-axial cable to the ATU.

The output of a K.W. "Viceroy" Mark II SSB exciter was fed into the mixer on 7 MHz and as this was using lower sideband and the crystal injection for the conversion frequency was also on the lower side, the lower sideband would appear on Top Band. Everything tuned up exactly after the GDO had set the coils; more than adequate drive was obtained from the mixer into the 5B/254M for AB1 operation—in fact, the grid meter could be run up to 4 mA with full carrier insertion and at this the output could be loaded to well beyond the limit. At 40w. p.e.p. input the linearity is excellent and well below the distortion level. Reports received have

indicated that the signal is very clean and entirely acceptable in every way.

Alternatives

So straightforward is the circuit that it requires no explanation in detail, and it can be copied easily and with confidence as shown here. It might be useful, however, to comment on one or two alternatives which could be tried, as it is not everyone who has a 7 MHz exciter with the correct sideband output at the right power level. Some SSB transmitters of older design had upper sideband on the 7 MHz range and this would require a 9 MHz crystal to be used in place of the 5.2 MHz of the lower sideband set up. Again, if the SSB rig has only 14 MHz output with upper sideband, then a 16 MHz oscillator will do the trick quite nicely. A word about the signal frequency drive levels: Only about 10 volts RMS is required across the terminating resistor in the mixer cathode and this is just about right for most exciters using 6CL6's or the like as Class-A amplifiers. But if the output of the SSB transmitter is something like a pair of 6146's then perhaps the easiest way of doing things is to terminate the transmitter in its dummy load and then to reduce the RF voltage across this

load to 10 volts or so by means of a series condenser between the "hot" end of the load and the 75-ohm mixer terminating resistor. This may not be economical in the sense of power consumption, but at least the main rig is not disturbed in any way and is operating under correct loading and output.

For the more adventurous, it will be obvious that a little drive can be filtered off before the linears of the HF rig and the linear PA disabled when Top Band operation is desired. How the drive at 7 MHz is derived is of little consequence as long as it does not exceed the 10 volts or so required. It is also wise not to have too much drive at the conversion frequency from the crystal and the 2.7 μF coupling capacitor C1 was found to be adequate for the HT used on the oscillator anode, measured as 100 volts. The fussy ones might like to stabilise this voltage, of course, and it would be a useful refinement for those whose mains are not too steady.

If this article has given some readers ideas about using the same sort of approach for VHF purposes, the writer would say—please do not try it. A very different type of design must be adopted for VHF to keep unwanted products down to a safe level.

EASY QUAD FOR FIFTEEN METRES

DESIGN AND CONSTRUCTION

F. C. SMITH (GW2DDX)

HAVING tried many ideas for antennae, some good, others not so good, the lack of space necessitated something compact but efficient. The two-element Quad is a good DX design, but its construction is something else!

How to get a Quad built and airborne with the least trouble gave the writer food for thought. Finally, he came up with the *Easy Quad*: Easy to construct, Easy to get aloft, and cheap to build. To the amateur who has a thin purse and little garden space, this easy Quad could be the answer, and from a DX angle it undoubtedly works. It requires only one person to construct and erect it, and can be hoisted to the top of a thirty-three foot mast in short time, rotated by hand, and when it blows hard can be lowered to a few feet above ground level.

A point of interest is to the diamond shape. The greater the physical separation of the high-current points in the two half-waves, the lower the angle of maximum radiation in the vertical plane. Thus, this configuration of the Quad elements gives a bonus.

Materials

Wire for the elements can be twin lighting flex; the heavy gauge is ideal. This can be split into two single strands to double the length. Four seven foot by half-inch canes will be required for the centre span (make sure they have no cracks or splits in them) and two five foot seven inch by one inch thick canes for the top and the bottom sections. One-inch canes ensure strength for

hoisting, and at the bottom the cane is heavy enough to keep the wire elements taut. A five foot seven inch ali. tube one inch thick is needed for the boom, together with two cross-sections, each four foot six inches, also one inch thick. The canes are slotted into these cross-sections, as in sketch herewith. Two angle-alloy T-pieces are also needed to assemble the middle structure, as in the drawing. A three-inch ring fitted to the mast is anchored to the centre of the boom, thus ensuring the boom stays centred on the mast when hoisted.

Construction

Having measured out the wire elements, eleven foot five inches, each leg, place the boom (assembled) on the ground (or garage roof), insert the four canes and having drilled the ends as per drawing run a short piece of 1/6" wire through and twist around the tube to lock the canes. Place the one-inch top cane across the boom, run the aerial wire through the insulator and lock it. If this is not done the wires will slide out of plumb. Now measure eleven foot five inches to the cross canes and again secure, making sure the wire cannot slip. Having done this to both the driven element and the reflector, you can now hoist the structure about ten feet in the air. Bring in the trailing wires and fix to the bottom cane. The method of fixing may be left to the constructor; insulators or barrier strip can be used here. Fit the thirty-inch stub to the reflector and a 72-ohm flat line to the driven element, hoist the aerial and when about twelve feet from the ground the Quad can be tuned up in the normal way by using a step ladder.

Results

The tuning of the Quad follows normal practice, details which can be found in the *Amateur Radio Handbooks*. The important dimension is the physical length of the sides of the array. This having been satisfied, the

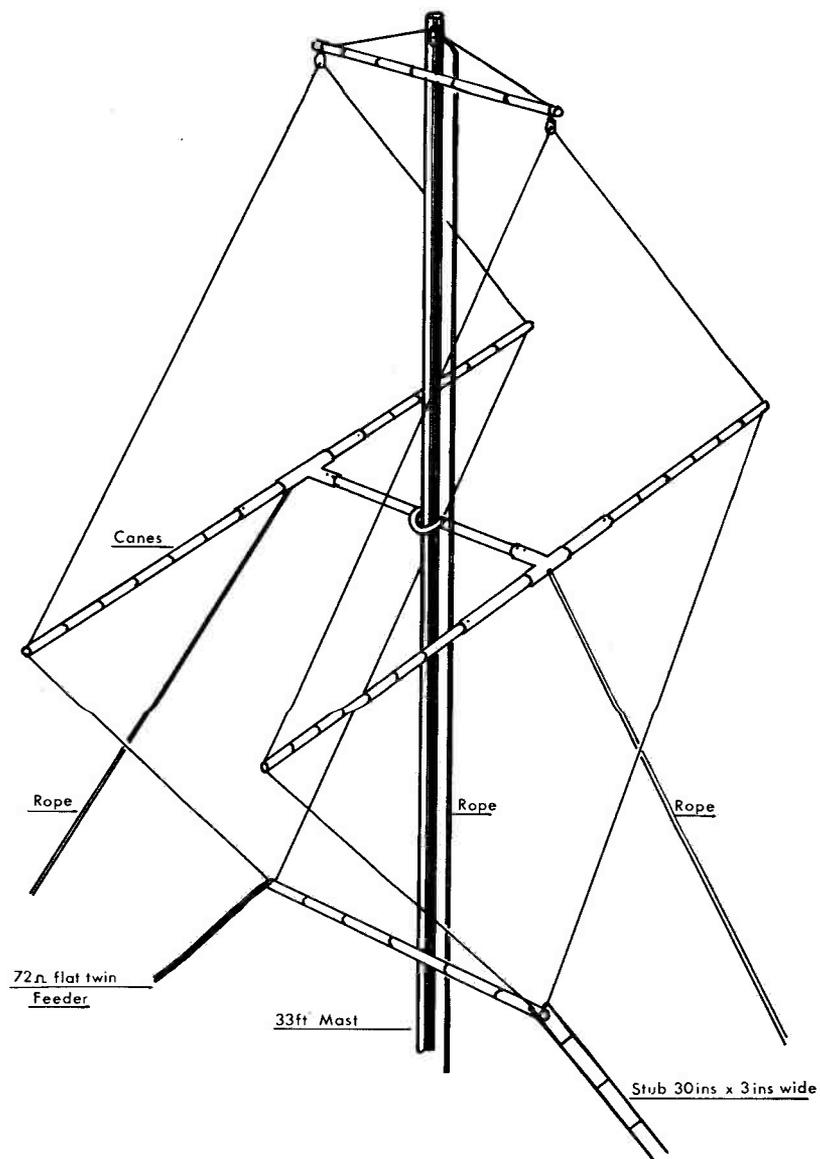
A
614

Fig. 1

Fig. 1. General layout of the Quad for 21 MHz. Dimensions are: Sides, 11ft. 5ins.; Element spacing, 5ft. 7ins.; Feed impedance, 70 ohms (flat-twin); Stub, 30ins.

(continued overleaf)

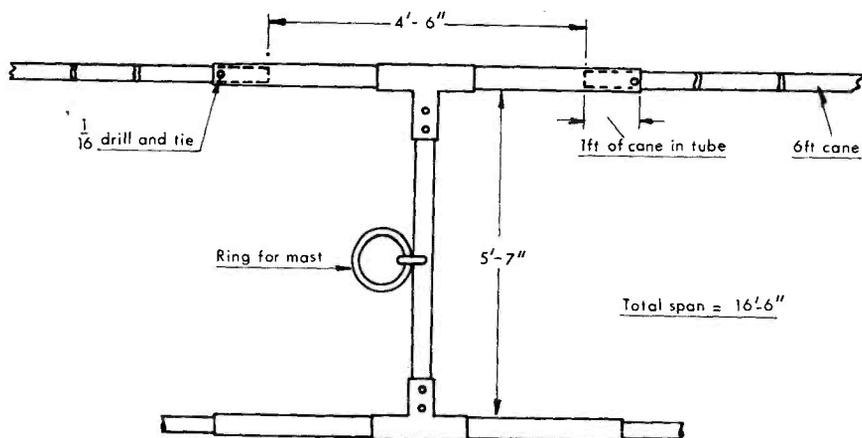


Fig. 2

Fig. 2. Details of the boom fitting, described in the text.

tuning of the stub will optimise forward gain or front-to-back ratio with no difficulty.

The Easy Quad described here compares favourably with the three-element Yagi, signal reports being much the same when working DX stations using the three-

element beam. The Quad at a height of $\frac{3}{8}$ -wavelength to the bottom element gives a good account of itself, ZS, ZE, 5Z4, OD, 4X4, W and ST having all been worked, this when the band has been only partly open for DX. It is proposed to add 10-metre elements at a later date by interlacing for when Ten starts to open up. For an antenna costing under five pounds, the Easy Quad seems not a bad proposition.

Do You Know That —

— Cheap flexible drives, capable of working through angles, can be contrived from discarded lengths of fractured speedometer cable. Just cut off the required piece, heat its ends, and force them into paxolin tube (or plastic-type insulant), to which the mechanical connections can be made. Old speedo. cable can often be had for the asking from repair garages, or at minimal cost from a car-breaker's yard.

— Mis-alignment of the central element of a coax socket during soldering (caused by the insulation going soft under heat) can easily be prevented by putting a spare coax plug into the socket while the inner is being soldered. This will not only hold the middle pin rigidly in the correct position, but will also act as a partial heat-sink during the actual soldering operation. The work should be allowed to cool off to normal temperature before the plug is pulled out, when it will be found that the central insulator has set hard again, leaving the socket pin accurately centred.

— Any multi-meter type of test set having a DC range of about 0-10 mA can be adapted for comparative field-strength measurements by wiring a suitable RF choke in series with a diode, this network then being put across the meter terminals. The instrument is aperiodic and can be used on any amateur band if a short pick-up rod is fitted to the junction of the diode and the RF choke.

— Strong single nylon fishing line used as end insulation with 33g. nickel-plated piano wire, obtainable

as model aircraft control line in 150ft. lengths, will make, together, a strong and almost invisible aerial for LF-band working at heights of 30-40ft. These ingredients are available at any of those shops combining sports goods and model supplies—and no reasonable neighbour could object to such an aerial passing over his garden.

— The resonance point of any mobile aerial can be altered by as much as 100 kHz (on 160m.) by adjusting the angle from the vertical through up to 45°. This can avoid the necessity for capacity hats, adjustable top sections, tapped coils, or other impedimenta.

— The few volts needed to power an odd piece of transistorised equipment, e.g. the microphone preamp. for a modulator unit, can easily be derived from a spare LT winding on any small transformer by using a cheap transistor as a diode half-wave rectifier, working into a 100-ohm resistor as a surge limiter with 1000 μ F of smoothing.

— A quick RF choke for Rx purposes can be contrived by using a discarded 465 kHz IF transformer with the parallel condensers removed. One such can will provide two chokes and the inductance will be in the order of 1-2 mH.

— If needing to play 7 $\frac{1}{2}$ i.p.m. tape on a 3 $\frac{3}{4}$ i.p.m. tape deck, the diameter of the capstan spindle can be doubled by overwinding it with insulating sleeving, or anything similar. A permanent adaptor can be made from a piece of plastic rod exactly double the diameter of the capstan, drilled to be a tight fit on the capstan spindle. The result will be found quite satisfactory.

— When loading a quarter-wave end-fed aerial—such as a wire of about 130ft. for Top Band working—a low-wattage bulb with a shorting switch, inserted in series with the aerial and as close as possible to the feed point from the Tx, will glow when maximum RF current is flowing in the aerial; thus, it is a very useful indicator for tune-up purposes. While actually transmitting, the bulb should be shorted out (using the switch). It will also serve as a rough guide to modulation—the bulb should flash under modulation.

— Adaptors for plugging HC6U-type crystals into FT-243 holders can be made from HC6U sockets by soldering half-inch lengths of tinned copper wire on to the inside of the solder-tags. If wire of about 16g. is used, it will be necessary to do a little bending and shaping to ensure a snug fit.

— Guaranteed jam-proof nylon and fibre pulleys, impervious to weather and very suitable for aerial installations of all sorts, can be obtained from any shop supplying the needs of yachtsmen and small-boat enthusiasts. These shops also carry very useful lines in cordage and swivel fittings, adaptable to amateur aerial installations.

— A car headlight dip-switch makes an excellent foot-operated control for a relay-actuated Tx/Rx change-over system. New switches can be obtained from most garages doing repair work, while used switches can be found in any car-breaker's yard for a few coppers. The contacts should be carefully cleaned, and the switch solidly mounted, so that it will with stand constant foot control.

REDUCED-SPACE AERIALS FOR TWENTY

PRACTICAL CONFIGURATIONS

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

A DIPOLE cut for one band, fed with co-ax and plugged directly into the transmitter, is probably about the easiest aerial to use. It is, of course, the yardstick against which the gain of other aerials is measured, but is good for general purposes and by the writer has been found to give satisfactory contact with JA, VK and other DX, using a K.W. 300w. p.e.p. transceiver. (No doubt multitudes of dipole users know this.) Over the holiday period there was occasion to use dipoles needing even less space, and two are shown here.

Inverted-Vee

This is shown in Fig. 1. With a high, straight dipole about 33ft. is the calculated length for the middle of the 14 MHz band. Each leg of the Vee was initially 16ft. 9in. as shortening is easier than soldering bits on. The SWR was 1.5:1 at 14.05 MHz and 2:1 at 14.15 MHz, so clearly this was a little too long for the site. Overall length should be reduced about 3in. for each 100 kHz on this band, so 2in. were cut from each end. SWR was then 1.1:1 at 14.05 MHz, 1.3:1 at 14.15 MHz, and 1.8:1 at 14.25 MHz, so another 2in. were removed from each end, leaving 16ft. 5in. legs. The SWR then came down to 1.2:1 at 14.05 MHz, nearly 1:1 at 14.15 MHz, and about 1.2:1 at 14.25 MHz, so this was suitable and regarded as being about as near as one could get.

The actual aerial is 7/22 wire, and the lower ends were about 4ft. above ground (easy to reach). The co-axial feeder is 52-ohm.

L-Aerial

This is shown in Fig. 2, and has one leg vertical, and the other horizontal 2ft. from the ground. This particular height suited the supports available, and can be changed, the aerial being pruned if necessary to suit. It was found that lengths of 16ft. 2in. were needed here, and gave under 1.4:1 SWR from 14.05 to 14.25 MHz. This SWR is good enough for all practical purposes. The feeder is again 52 ohm.

Supports

With legs at 90° to each other, and bottom ends 4ft. high, the apex of the inverted-V is about 15½ft. above ground. Similarly, the top of the vertical in Fig. 2 needs a support about 18½ft. high.

These heights are not very great, but it is helpful to have the aerial as far as possible in the clear, or at least to avoid too much earthed structure close to the aerial legs. Fig. 1 was found satisfactory with the whole sloping somewhat so that a cord could run to a chimney. A wire from the chimney to a high adjacent support, to raise the aerial as in Fig. 1, was also used. This was the method employed for Fig. 2, to get the vertical straight up.

Both aerials gave satisfactory all-round results, and can be fitted up in quite a small space—about 24ft. for Fig. 1, and 17ft. for Fig. 2.

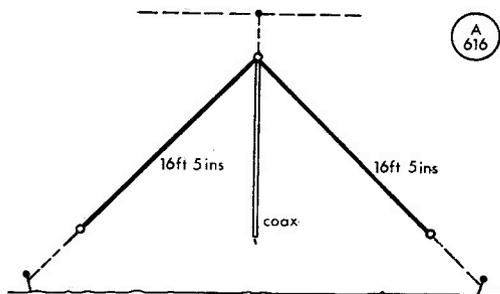


Fig. 1 Inverted V for 14MHz band

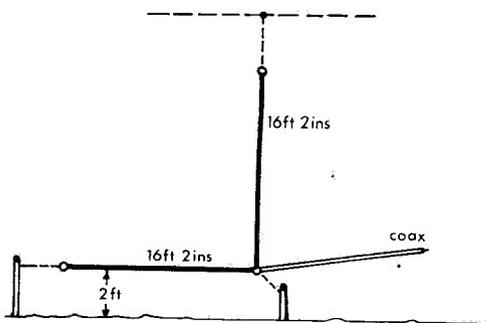


Fig. 2 L Aerial for 14MHz band

ANTENNASCOPE

FOR AERIAL MEASUREMENTS

THE device described here was originated by W2AEF and published in *CQ* some years ago. He called it the "antennascope" and it has appeared in various guises since. In effect, it is an easily constructed and calibrated aerial test meter for impedance measurements, and is used in conjunction with a GDO as the RF power source.

Normally, the range of impedances in which we are interested for aeriels and feeder lines is about 50-400 ohms, and this is easily accommodated by the circuit shown here. As can be seen, it is a bridge arrangement, and is not particularly frequency-conscious except in the VHF ranges. Calibration is effected on the resistor R1, against resistors of known value connected across the "Test Z" point, with the GDO coupled to the input side at some convenient frequency—say, 14 MHz.

In operation, the unknown feeder—or aerial-feeder combination—is connected at Z and, with the GDO supplying RF at the frequency of interest, R1 is adjusted to produce a minimum reading on the meter M. If R1 has been correctly calibrated, that reading will be the impedance of the load. It follows that, in a resonant system, it should be possible to see impedance changes as a mis-match occurs when the GDO is swung over a wide frequency range. Similarly, the mis-match or impedance variation can be checked as the system is changed from band to band. Indeed, this aerial test meter will make all sorts of startling revelations once its multifarious applications have been grasped!

To Construct

The circuit should be made up neatly as a single unit in a small box, with the meter M mounted in conjunction with R1 working against a marked scale, and having terminals for the "Test Z" connections with a probe for the GDO link.

For R1, a good-quality composition type resistor should be used and the diode D can be any semiconductor having a high backward and low forward resistance. The meter is shown as 0-100 μ A, but in fact a less sensitive instrument could be used if the RF driving power is increased (as from a VFO) and the diode will stand more current. In practice, however, it is better to keep these elements "sensitive," as thereby calibration will be more accurate and better impedance readings obtained.

Under usual conditions, chassis-earthing is sufficient—that is to say, bonding the earthy side of the circuit to the box is enough. But if the device is to be used in a static layout—as when a GDO is incorporated and the instrument is used as a regular test meter on the bench—a physical earth should be provided and the calibration carried out under these conditions.

To Calibrate

In the ordinary way, a calibration done at around 14 MHz will hold good for the HF bands, 7-28 MHz. But if the LF bands are wanted, either separately or as well, it would be better to calibrate with the GDO

feeding in RF at about 2.5 MHz, and to scale R1 accordingly.

The method of calibration is simple: With the GDO providing RF drive, a series of carbon resistors of known value from 10 ohms upwards should be connected across the "Test Z" points and R1 adjusted till the meter reading is a minimum, thus balancing the bridge; this minimum setting of R1 corresponds to the value of the resistor in circuit, and hence to the load impedance on the device. By repeating the procedure over the range of R1, either its dial can be marked with the appropriate values, or a graph could be drawn against the R1 scale settings. There is no more to it than that.

If the meter tends to read too high, either R4 should be increased in value or the GDO coupling loosened—and the reverse if good readings cannot be obtained on a 0-100 microamp. scale. It is not possible to be specific about what readings can be expected, because they will be affected by the degree of GDO injection and the sensitivity of the meter.

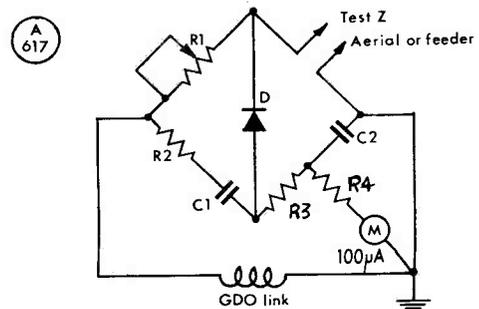
To Use

Any load impedance to be measured must be of the two-terminal variety, *i.e.*, it is not possible to measure the impedance of an end-on single-wire type of aerial, though the tuned circuit with which such an aerial is being worked could be checked.

Otherwise, it is simply a matter of "finding resonance" on R1, and the operation of the test meter is as that of a GDO when checking a tuned circuit.

To measure a length of feeder line, take a section of the line which is short in relation to the frequency—say, 10 feet in the case of an 80m. system. With the far end of the line shorted, tune the GDO for a dip reading. Then take the short off the line, and adjust R1 for minimum. That value is then the impedance of the line in that frequency area.

By thinking out the possible applications, numerous tests and experiments can be carried out, either on existing systems or on projected aerial-feeder layouts.



Circuit of the device described in the text, and known as the "antennascope" after the original design by W2AEF. It is calibrated against non-inductive resistors of known value, and in use the bridge is balanced when minimum meter reading is obtained by adjustment of R1. The instrument works with a GDO as the RF power source and the method of use is somewhat similar to that of a GDO. Values are C1, C2 500 μ F; R1, 500-1000 ohm linear potentiometer (see text); R2, R3 200 ohms; R4, 1000 ohms; D, OA81 or similar.

Precautions

Never apply more than the loose-coupled RF output of a GDO or VFO to the device. During the calibration process, make checks at different input frequencies; if the response is not flat over a wide frequency range, suspect R1 to be giving a slight tuning effect. If results are erratic during calibration, especially at HF, try screening R1. While calibrating, make sure that the test resistors really are within a few per cent of the marked value; if these resistors can be bridged beforehand, so much the better; wirewound resistors of any value should be avoided for test purposes, even for the LF bands.

For VHF operation, the device should be built low-

loss, with R1 in a screened compartment and on an extension spindle. The calibration frequency (GDO or VFO input) should be in the frequency area over which the device is to be used, e.g. at about band centre in the case of the TV channels.

As shown here, the circuit has not been tried on frequencies higher than the amateur bands up to 70 MHz. Two significantly different sets of calibration values were obtained—with the same set of test resistors—at 2 MHz and at 60 MHz input frequency. Between 6 MHz and 18 MHz input frequencies, the difference was negligible—which brings us back to the original point that 14 MHz is a good calibration frequency for the HF bands.

SPEECH-AMPLIFIER CLIPPER

USING 741 OP. AMP.

I. D. POOLE, B.Sc. (G3YWV)

WHEN the author decided to get back on two metres and the opportunity of buying an old ship-to-shore radio telephone came the chance was taken. There was a fair amount of scope for modification, and in spite of the fact that it used valves it looked a good start. The unit consisted of two separable sections, each containing a Tx and Rx, but the top one (which it was decided to use) did not have its own PSU or speech amplifier. The power unit was easily knocked up out of bits from the junk box and supplied 300v. for the valves and 20v. smoothed for the low-voltage sections.

As far as the modulator was concerned it was decided to construct something which gave good results whilst not costing too much. Although RF clipping is undoubtedly better than AF clipping it was not thought that the (very much) extra expense would be worthwhile.

Design Considerations

Not only was it thought necessary to introduce some form of clipping but also to limit carefully the frequency response.

As the circuit had to drive a valve reactance modulator an output of about 30v. peak-to-peak was needed. It can, however, be very easily modified to give less output, as described later.

It was also thought as well to limit the frequency-response both before and after clipping—afterwards to ensure that the high frequency distortion introduced by the clipping is removed, and before to allow only the wanted portion of the speech to be clipped and hence introduce less distortion.

The cut-off of all the CR networks limiting the high frequency response was designed to be 3 kHz—the lowest frequency for a listener to differentiate between words like “cottages” and “sausages.”

The low-frequency response was tailored so that the cut-off was slightly above the standard 300 Hz, for two reasons. First, the lower frequencies contribute very little to the *intelligibility* of the signal, tending only to add a “naturalness” to it; and secondly, when clipped, the lower frequencies introduce harmonic distortion

which is within the audio band.

Owing to the fact that harmonics are generated when clipping takes place the high-frequency response has to be limited above 3 kHz. The networks used to achieve this give an overall roll-off of 12 dB per octave, which is thought to be adequate.

As there was a likelihood of using a tone-burst for repeater operation, it was decided to have one of the operational amplifiers as a virtual earth mixer. Owing to the fact that the tone-burst does not require clipping it meant that the mixer had to be the second stage.

Circuit Description

The supply voltage available for the amplifier was 20v. only, and as the 741's require dual supplies these are simulated by R1 and R2 for X1 and R7 and R8 for X2.

The gain of the first stage is about 100. This is determined by R3 and R4. C4 increases the feedback at high frequencies and therefore reduces the gain, giving a top cut. C3 increases the feedback at low frequencies, and C1 is designed to give a cut-off at just above 300 Hz. The effect of both C1 and C3 is to give a total roll-off of 12 dB per octave at low frequencies. C2 is included to give the input some protection from RF picked up on the microphone lead.

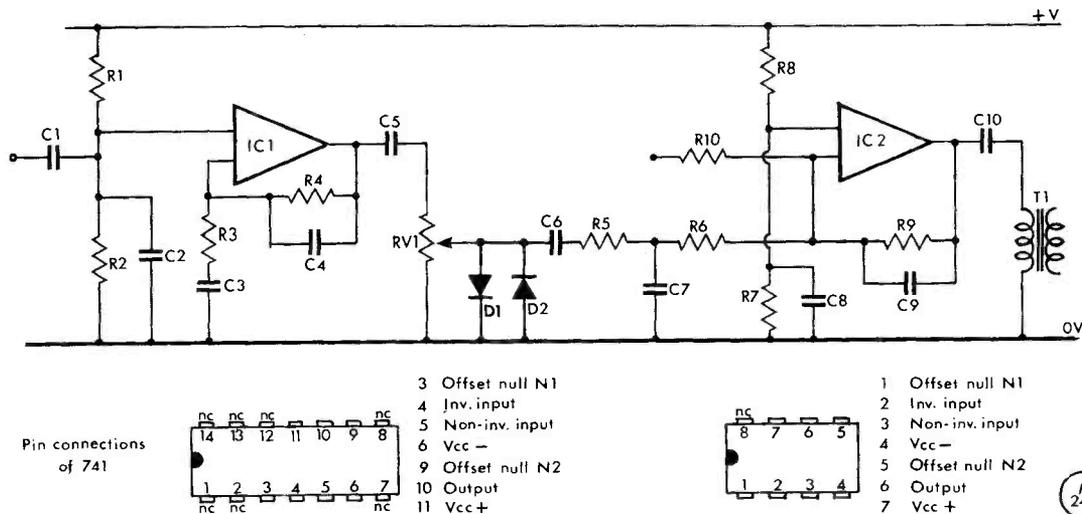
D1 and D2 provide the clipping and should for this circuit be germanium. As their turn-on voltage is about 0.2 volts the total audio voltage at this point will be about 0.4 volts peak-to-peak. RV1 provides some adjustment of the amount of clipping.

Whereas X1 was used in a non-inverting configuration, X2 is used in the inverting one, and can therefore be used as a virtual earth mixer to combine the audio from the clipper and the tone burst. The gain of this stage is given by:

$$A_v = \frac{R_9}{\text{input resistance}}$$

This is again modified by the capacitors in the circuit. The input resistor is effectively R10 for the tone-burst, and R5 + R6 at low frequencies for the clipped audio. C7 and C9 serve to give a high frequency cut-off at about 3 kHz to remove the unwanted distortion products.

The circuit as shown gives about 15 volts peak-to-peak on the output terminal of X2. This can be decreased by decreasing R9 and increasing C9 by the amount by which one needs to decrease the gain. T1 was a step-up transformer to enable the 30 volts peak-to-peak to be



Circuit of the speech amplifier-clipper using 741 Op. Amp., with circuit of the 741M inset.

obtained, whilst using a 20-volt supply. It is thought that most people would not want this, and it can be substituted by the actual load.

Construction

As with most audio circuits, the layout of this unit is not very critical. The author's unit was built up on .1 matrix board, which meant that any modifications could easily be made. The components used were from the junk box and hence many of them are not critical, especially the electrolytic capacitors—most of which are wide tolerance. The capacitors used to tailor the frequency response are, however, a little more critical, 10% or so being quite adequate.

The supply is not critical, although it should be well decoupled to earth through a large capacitor. It could be increased, but it should not exceed 30 volts.

The value of R10 depends upon the output from the tone burst. It is a relatively simple matter to calculate the value, or it can be determined by trial and error—after all the proof of the pudding is in what it does and not what it is calculated to do!

Conclusion

In practice the unit has given good results and reports of a punchy signal have been obtained. Obviously, an RF clipper would have produced better results, but at much greater cost.

Table of Values

Fig. 1 Circuit of the Clipper-Amplifier

C1 = .01 μ F	R1, R2, R7, R8 = 100,000 ohms
C2 = 47 μ F	R3 = 1,500 ohms
C3 = 0.22 μ F	R4 = 150,000 ohms
C4 = 330 μ F	R5, R6 = 1,200 ohms
C5, C6, C10 = 6.8 μ F	R9 = 22,000 ohms
C7 = .047 μ F	D1, D2 = Germanium diodes
C8 = 10 μ F	X1, X2 = SN72741, LM741 or similar
C9 = .002 μ F	



“ These miniature rigs are all very well, but ”

SHORT WAVE LISTENER FEATURE

By Justin Cooper

Rx PROJECT POSTPONED—SOME INTERESTING TECHNICAL QUERIES—NOTES AND NEWS— LATEST LADDER POSITIONS

AS our Project, discussed last time out in this space, looks like developing into a full-length article, it is being deferred until space becomes available, which should be in the next issue or two. It is only when starting on an idea like this that one realises how much ground there is to be covered, even for a simple design. So it stands over for the time being.

In the meantime, there is much of interest in the current mail and it should be mentioned here that readers are always free to discuss their own particular problems, to be dealt with in this feature for the interest and (we hope) the edification of the generality of readers.

However, we can *not* undertake to conduct any correspondence with readers individually—life is full enough as it is!—the idea being that if you have a problem, technical or otherwise, our attempted solution of it is quite likely to be helpful to others involved in some similar difficulty.

The Mail

We start with *J. Waters (Derby)* who has the “oldest moan in the business”—lack of replies to SWL reports in the shape of return of QSL cards. Of course, the point here is the question of the *value to the recipient* of such reports; most reasonably active amateurs on the air have had more than enough of the “You are S9-plus while working VK’s, as heard from the next street, and please can I come and view your station, and collect my QSL in person” variety of reports, and they tend to be ruthless in pitching these into the shack w.p.b. unanswered! However, once in a while comes a report that is *worth* a reply—for example, the chap who reports to a DX station that he was S9 in U.K. and way above any other signals from the area, even though he was getting no reply to his CQ calls; or that the caller was getting multitudes of replies but did not seem to be hearing any of them, even though his listening frequency was clearly stated. For a DX-pedition the thing to do is report on *several* QSO’s, giving signal strengths of both ends if audible, the way the DX signal was fluctuating, the degree of liddery on the frequency, how his signal varied when he swung his beam in another direction, and so on; some of the best reports give this sort of gen in graphical form, along with comments on Wx, band conditions and the receiving set-up. Always a report to a station who is getting no replies, or only local ones but is being heard at a distance, is far more likely to net a QSL, other things being equal.

A second new chum is *L. West (Slough)*, who has had an interest for a long time, which came to fruition by way of the purchase of an FR-101S. Initially, there was “a piece of wire,” and a two-metre converter was fed from

a ground-plane aerial, but more recently an 18AVT has been put up and RAE results are awaited; meantime the Morse is being brushed up to standard for a test in August.

W. Bingham (Carrickfergus) always sends his letter in without a full name on it, which means some research to find who it refers to! (Letters with just a Christian name are no help at all—we cannot possibly remember them all!) However, once more we have managed to sort it out; one query in this list is that of the N-series prefixes—these are of American origin and quite an assortment have been heard of late.

A suffix query comes in from *R. G. Williams (Borehamwood)* who heard “WA7RAF/MM Region One,” and “WB9LTW/MM Region Two” and wonders? The “region” bit is a reference to the part of the world in which the ship was at that time—the world is divided into three “regions” of which, roughly, U.S.A. and the Americas comprise Region Two, Europe is Region One, and the rest of the world Region Three.

T. Scrimshaw hails from the Northfield area of *Birmingham*, and at the ripe old age of twelve, he listens on a Bush VTR178 multiband receiver, with which he gets carrier-injection facilities for SSB reception by using a modified Tandy kit. The next move is to get a slow-motion drive to make tuning a bit easier.

P. Wells (Colne) is somewhat confused by the previous reference to the OE50 prefix as being like the U.S. A-series; the point we were trying to make was that both are “special calls” assigned for some commemoration or other in the respective countries.

J. M. Devereux-Colebourne (East Garston) found a particular interest in hearing VK9XI on Christmas Island, he having been, in his time, District Commissioner there. Now, at 73 years of age, he has embarked on self-training for RAE, there being no courses anywhere near he can attend; but, starting from no knowledge, John hopes to be on the air and operating with a G4 call within a year—and all this writer can say is he wishes more old-timers would “have a go” and get their tickets.

R. W. Roberts (Mold) is pleased that we are trying a receiver project, and says he wants a simple two-metre converter to go with such a receiver. No need for this old scribe to do anything here—it was done, in its essentials, last month (p.353) albeit with germanium transistors. These should receive much more care in the solder-

ANNUAL HPX LADDER (Starting date January 1, 1976)

SWL	PREFIXES	SWL	PREFIXES
G. Ridgeway (Ardleigh)	494	R. G. Williams	(Borehamwood) 255
S. T. Bowen (Kippax)	442	C. K. Verstage	(New Zealand) 219
R. A. Charlesworth	(London N.22) 302	R. Staples (Lymm)	214
P. Wells (Colne)	295	P. Ramsay (Stevenston)	203
L. West (Langley)	275	P. Polanyk (Coventry)	200

Starting Score 200, in accordance with HPX Rules.

ing than is needed with silicon-based devices, and heat-shunts used as necessary. For de-soldering anything on a printed board, use a suitable tool such as the suction type, three variants of which are available from Doram, and doubtless many other suppliers. With these one just depresses the plunger, offers the tool *and* the iron to the PCB until the solder runs, and then press the red button which soaks the molten solder up into the tool. From here it can be removed simply by depressing the plunger once again. And, of course, for such things as IC's and transistors which are fitted at the proper spacing on the board, it is the easiest thing in the world to turn up a suitable bit (to heat all the pins at once) in the lathe, to fit whatever soldering iron one prefers.

Another technical problem hits *K. White (Stockton-on-Tees)* who has fitted a mechanical filter to his FR50B and finds the insertion loss is nearer 20 dB than the 7 dB figure quoted for the filter. Quite likely; there are the losses in the terminations at each end to consider, not to mention the need for a *complete* re-alignment, and the "apparent" loss due to the reduced noise output, the latter being for all practical purposes directly related to the IF bandwidth. Certainly, before making any try at adding an extra gain stage, one should do *reliable* measurements of the *sensitivity* of the receiver in terms of microvolts EMF (or PD, if you prefer), which is a darn sight more important than mere gain, which should never be allowed to be excessive; for good performance excess is almost worse than not enough. On a different point, SWL White has been told that the colour TV line time-base QRM he suffers will cost £70 for the GPO to investigate, and then they couldn't *do* anything about it anyway. This sounds a little like the old, old story from the old soldier; the more so as the local Rediffusion coaxial cable for the "pipe TV" system runs under the eaves! The quickest answer would probably be some very strong letters to some high places with carbon-copies to *all* the recipients.

A. Probin (Burnley) has gone from a 66-footer to a 132 wire which he claims is a "fantastic improvement." More than likely, the real reason can be found in the direction in which the longer wire has its major lobes (and indeed minor ones, come to that); they are now probably pointing in more preferred directions. It should be noted when talking about loaded verticals for Eighty, that they have a quite narrow bandwidth, and they also tend to favour DX, which is not necessarily all that desirable on 3.5 MHz.

E. W. Robinson (Bury St. Edmunds) has finally made the 1000 HPX mark, which pleases him no end. YU8DX was a "special" to mark the 120th anniversary of the Yugoslav scientist Nicola Tesla (he of the Tesla oscillator and many other electrical inventions, who worked mostly in U.S.A.); and the D6A DX-pedition, who was listened to for over an hour and didn't give his own call sign in all that time—but he heard it from his callers enough times! San Hutson did a good job putting Moroni on the air, and since he was operating within the licence conditions, if identification was certain he should be claimed—but only if you are sure you heard D6A, which implies you must have heard both ends of at least one QSO.

A. J. Botley (Croxley Green) has returned to the fold after eight years, and now has to make do with a bed-frame as the aerial, coupled to an HA-500 receiver.

R. Carter (Blackburn) has found things uncomfortably hot, and then suffered breakage of a Rx drive cord, which took three goes to rectify—first time wrong way round, second time right but too slack, and third time lucky! That is an *easy* victory where some drive-cords are concerned!

ON4UN has made a list of sunrise and sunset times for every country in the world, a copy of which has come into the hands of *J. Fitzgerald (Gt. Missenden)*; a very useful document for chasers of the DX, as these times often are good, and always are the best times for DX on the lower frequency bands. In John's case, it yielded UL7BC at 0007 on Eighty SSB—UL7 sunrise time—the first time he tried it.

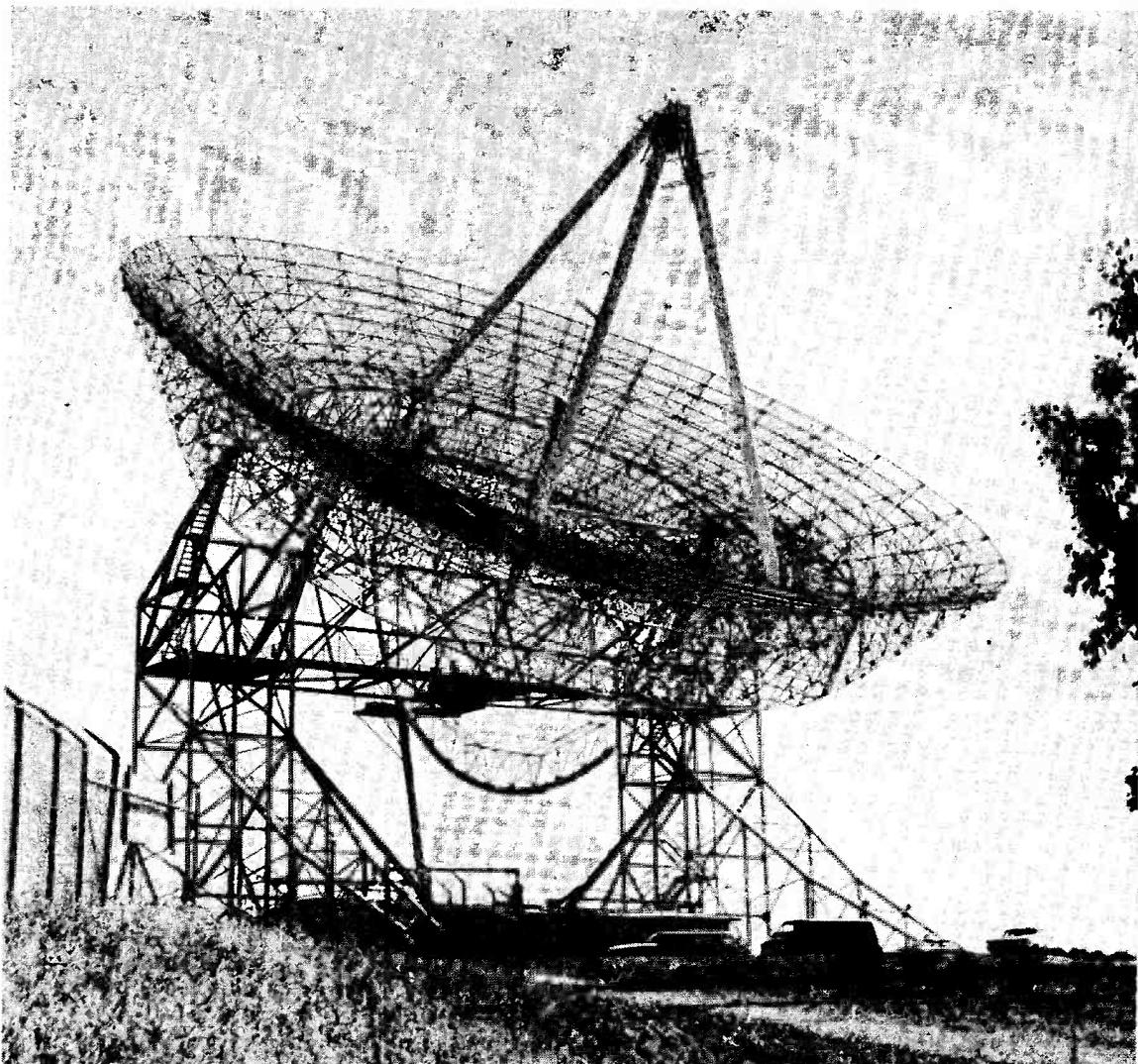
Like so many, *H. M. Graham (Harefield)* has a shack in a small upstairs bedroom, and found it too hot for listening for prolonged spells even with an open window. However, he heard a lot of Europeans on Ten and a couple of South American stations. Maurice keeps a record of zones and countries heard each month, and has done so for years; it shows that, with the sole exception of 1976, every year since 1965 has seen March as the best month.

P. Barker (Grangetown) is getting ready for a move to a new house 1½ miles away, which takes him from 75 feet above sea level to 320ft.—but there is Tunstall Hill a couple of hundred yards to the Southwest, bearing a trig. point saying 368 feet. This may be a bit of a block at VHF, but it would be wise to wait and see, as J.C. suspects that Paul has picked about the right height to take advantage of refraction over the crest of the hill—and in any case there will be more space for the delightful activity known as aerial-farming.

R. Mackean (Liverpool) should have his RAE pass slip in by the time this reaches print—he hopes. And if that desirable objective is attained he will start with a G8 call—as he is only 14 yet, he reckons the Morse can wait a little. An interesting one heard on the bands recently was ZV1IG/P—this, if genuine (and one sees no reason why not), would hail from PY-land, as the Prefix List indicates. Roy has been listening to the GB3MP repeater, and notes it is having some minor teething troubles, such as early timing-out. One just hopes its troubles are all technical ones—listening to the London repeater makes one feel sick at times!

Finale

And that, *mes amis* has to be it for this time. Meantime, we have to acknowledge letters and Table entries from: *B. T. Mackness*, Dagenham; *T. Wilson*, Peterhead; *M. Law*, Chesterfield; *K. A. Whiteley*, Castleford; *M. C. P. Bennett*, Datchet; *P. C. Jane*, East Looe; *N. A. Phelps*, Devizes; *M. J. Quintin*, Wotton-under-Edge; *M. Gibson*, Barrow-in-Furness; *A. Glass*, Plymouth; *A. F. Roberts*, Kidderminster; *B. F. Hughes*, Worcester; *M. Rodgers*, Harwood; *G. F. Gullis*, Ogbourne, St. George; *G. Ridgeway*, Ardsleigh; *W. H. Smyth*, Hartlepool; *L. Gibson*, Barrow-in-Furness; *R. Shilcock*, Kingswinford; and *J. H. Sparkes*, Trowbridge; thanks to you all for the interesting chat and data, and we'll see you again next time round, for which the deadline must be to arrive first post on **September 23**, addressed to "SWL," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.



E-M-E FROM WA6LET

SEVENTYCEM MOON REFLECTION TESTS, STANFORD RESEARCH INSTITUTE, CALIFORNIA, MAY 1976

VICTOR FRANK, WB6KAP, reports that in January 1976 there were plans for E-M-E tests on 1296 MHz using the 150-foot dish at the Stanford Research Institute in Menlo Park, California. By March it was apparent that the station and feed were not going to be ready in time so instead it was decided to carry out further work on 432 MHz, adding a number of scientific tests to demonstrate the characteristics of the Earth-Moon-Earth communication path.

It was planned to request special temporary authority from the Federal Communications Commission (FCC)

Looking at the Moon—the aerial used by the WA6LET group (Stanford Research Institute, Menlo Park, Calif.) for their May 1976 moon-reflection tests on the amateur 70-centimetre band. In spite of the lack of advance (European) publicity, some considerable success was achieved—see article herewith. The aerial itself, adjustable in azimuth and elevation, is U.S. Govt. property and can only be used by special dispensation. It is hoped to run a further series of tests on 432 and 222 MHz (the latter band is available to amateurs in the U.S.) and to be able to give better advance notice; as it was only one U.K. station sent in a "heard" report.

to use the 20 kilowatt klystron amplifier at Stanford tuned to 432 MHz so that E-M-E reception would be possible for most of the 432 MHz DX enthusiasts. These were to be one-way tests consisting of two minutes of AØ for chart recording signal strength against time, followed by 50 microsecond pulses at 50 pulses per second to allow

measurements of pulse dispersion, and CW groups at various power levels.

The possibility of running tests on 222 MHz simultaneously was considered. As the six-inch, rigid coax feeding the circularly polarised horn were to be used for the 432 MHz high-power tests, nothing could be placed in front of the horn. So it was thought that feed antennae could be placed around the sides of the horn and still illuminate the dish properly. Two 2-ele. rear-fed Yagis were constructed for a 222 MHz linearly polarised feed and equipment were borrowed, an exciter from WB6TJO and an amplifier from WB6NMT.

The week before the tests involved many hours of work on the 222 MHz system by K6OJM, W6YFK, WA6KKK, WB6KAP and WB6TJO. By noon on the Friday, the systems were being tested on the Moon. Echoes were received on 432 MHz but not on 222 MHz. When the 222 MHz feed was removed, it was discovered that the front-to-back ratio was about unity so reflector lengths were adjusted and the front-to-back ratio brought up to 10 dB.

Feeder Troubles

Unfortunately, it was not possible to use the 20 kW klystron, after all, so at moonrise on Sunday—about 1000 UT—the first AØ and variable power tests on 432 MHz were staged, varying the power from 1 kW down to 25 watts in 3 dB steps. The first contact was at 1014 UT with F9FT. No 222 MHz echoes were received and this was discovered to be due to a failed antenna change-over relay at the feed. More 432 MHz AØ and variable power tests were carried out at 1400 UT and half an hour later the 222 MHz feed system was lowered and checked. The malfunctioning of the changeover relay was found to be due to too much voltage drop in the line to the coil. Increasing the supply to 36 volts cured this. By 1530 UT,

WA6LET was back on the air, but still no 222 MHz echoes were detectable. After more AØ and variable power tests at 1800 UT, the last contact was with JA1VDV who could not copy the SSB signal. The last echoes were heard at 1935.30 UT.

Results

During 8½ hours of operation, WA6LET made 64 two-way contacts on 432 MHz with 53 different stations in 12 countries and 14 states. Five were on SSB with K2UYH, K5CE, VE7BBG, F2TU and F3NQ. Of the stations, 28 were new to WA6LET on 432 MHz. The countries worked were F, I, JA, LX, OK, ON, OZ, PA, SM, VE, VK and W. The only British station to send in a report was G8AXU. The 14 amateurs manning WA6LET were W6HDO, K6OJM, K6ZX, K6TZX, W6VG, W6YFK, WA6BMR, WA6DIA, WA6KKK, WA6UAM, WB6JZY, WB6KAP, WB6TJO and K7CAD/6.

A *post-mortem* revealed that the 222 MHz feed antennae were spaced about one wavelength apart. It is suspected that this wide spacing, combined with coupling between the feed elements, the horn and supporting structure, messed up the pattern, proving that one cannot just put up any old feed for E-M-E work.

It is not considered appropriate to use this half-million dollar U.S. Government facility for more tests similar to those already carried out. Future tests could be in new bands, like 50, 222, 1296 or 2304 MHz or with new equipment or techniques. And next time it is hoped to be able to give more advanced warning of the tests, so that there can be full U.K. participation.

In conclusion, it must be said that conducting these E-M-E tests is somewhat like having a baby. There is some joy, some suffering and a lot of work involved. The length of time is about the same. "Two" per band is probably more than enough!

N.A.S.F.

BOOK REVIEW

ARRL "ELECTRONICS DATA BOOK"

THIS is a new publication from the American Radio Relay League, who have originated so much that is good and practical in the way of technical and semi-technical material in the field of Amateur Radio.

The *Data Book* treats in depth the data for RF circuitry, L/C/R networks, broad and narrow band inter-circuit transformer design, antennae and feeders, and shows a large selection of "thumb nail" solid-state circuits. With this goes a great wealth of tabular matter—such as dB equivalents to voltage, current and power ratios; RF circuit data; a reactance nomograph; table of L/C constants, numerous formulae, inductance data for all types of coils, chokes and toroids; and much similar information of the sort one needs to look up or check.

The solid-state circuitry includes more than 50

designs involving transistors of numerous types, for AF, RF and switching applications. A useful chapter deals with what might be called engineering, construction and testing, with circuits for several test instruments.

In general, this is the sort of book which will not only find a place on any experimenter's work-bench but (like many other ARRL publications) would also undoubtedly be of great practical value to many professional electronics engineers and designers working in the field of radio communication—and, at the price, for these days it is very good value for money.

It is in large format (11 × 8½ in.), of 128 pages, well produced and clearly printed, copiously illustrated in line and adequately indexed, and the writing is (as with all ARRL publications) in straightforward language.

ARRL Electronics Data Book, price £2.90 inclusive of postage, from: Publications Dept., Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ.

VHF BANDS

NORMAN FITCH, G3FPK

VHFCC Award

BY now the callsign 9H1CD must be a very familiar one to readers of this column and to two-metre operators in particular. Henry Souchet from San Gwann in Malta has made several hundred QSO's this summer via *E*'s and, since he only QSL's direct, has accumulated the necessary 100 cards for his VHFCC quite quickly, to gain certificate No. 265. The equipment at 9H1CD consists of a *Braun* SE-400 Digital transceiver driving a QQV06-40A linear amplifier, the aerials comprising a bay of four 11-ele. Yagis. Henry was first licensed in 1970 and is a graduate of the University of California (in Viticulture and Enology), holding the post of adviser to the Maltese government on the matter.

New readers are reminded that the VHF Century Club certificate may be claimed for 4m., 2m., and 70 cm. separately. A list of 100 confirmations should be sent to the address at the end of this feature. *Do not* send any QSL's. You will then be asked to produce six cards, picked by us at random and, upon verification, your Certificate will be issued. Only applications from one, fixed location can be considered, which rules out portable operation. Also, no repeater or satellite contacts are eligible. If you have two, fixed QTH's you may claim your VHFCC from both.

Contests

The Microwave Contest on June 19/20 attracted entries on all six bands. No points/QSO's details are available but in the 1.3 GHz section, the winner was G3EEZ/P, with runner-up G3JXN. First place in the 2.3, 3.4 and 5.7 GHz sections went to GW8ADP/P, the respective runners-

up being G3EEZ/P, G3BNL/P and G3EEZ/P. On 10 GHz, top man was G3KSU/P with GW4BRS/P in second place. There were two entries on 24 GHz.

In the Region 1 VHF contest on June 20, the multi-operator section was won by the North Liverpool Radio Club, with 3293 points. In the single operator section, leading station was G4CZP with 2600 points. The "Outside Region 1" section was won by G4ESK with 384 points.

At the beginning of the 144 MHz QRP contest on July 25 there was a brief *E*'s opening during which GW3WRA/P worked IT9TAI (GY66c) which helped Stuart achieve the substantial score of 1150 points. He mentioned 155 QSO's to GW3UCB/P's 160 but that the latter's total was probably under 1000 points. There was little time for monitoring the band at G3FPK in this event but it seemed that conditions were average after the *E*'s at the start. A few of the signals were below the standard one would have expected, suggesting that some operators thought that the limitations of

G8HHI	—	—	69	69
G3BW	—	21	47	68
GC8AAZ	—	11	54	65
G4CIK	—	—	61	61
G8KLN	—	—	60	60
G8KSP	—	—	60	60
G4AEZ	—	15	44	59
G3FIJ	—	19	39	58
G8HAF	—	—	55	55
G8KKX	—	—	55	55
OZ9IY	—	—	53	53
G8JJR	—	—	52	52
GD3YEO	—	—	52	52
G8LHT	—	—	48	48
GW8HVP	—	—	48	48
G4EYL	—	—	41	41
G8ITS	—	1	39	40
G8JEF	—	—	40	40
G8JEF/A	—	—	38	38
G8JAH	—	1	35	36
G8JAJ	—	—	24	24
G8JKA	—	—	21	21

Starting Date January 1, 1975. No satellite or repeater QSO's. "Band of the Month" is 23 Centimetres.

QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G3JXN	16	49	65	130
G3COJ	10	45	54	109
GD2HDZ	6	19	41	66
G8IFT	5	15	34	54
G4DKX	2	—	61	63
G8FUF	1	72	159	232
G4DGU	1	35	66	102
G8BKR	1	6	73	80
G2AXI	1	33	44	78
G3POI	—	—	150	150
G4BWG	—	22	108	130
GM4CXP	—	19	102	121
G3CHN	—	—	118	118
G3FPK	—	—	117	117
G4CDF	—	—	109	109
G4BAH	—	14	89	103
G8GML	—	26	70	96
9H1CD	—	—	95	95
G8HVV	—	—	86	86
G6UW	—	—	80	80
G3XCS	—	9	67	76
G8GII	—	11	62	73

TWENTY-THREE CENTIMETRE ALL-TIME TABLE

Station	Counties	Countries	Total
G4BEL	38	10	48
G3DAH	28	8	36
G3JXN	28	5	33
G3NHE	24	5	29
G4BYV	17	9	26
G4ALN	20	5	25
G3JVL	21	4	25
G3COJ	17	6	23
G6NB	19	4	23
G3OBD	20	3	23
G8ARM	20	2	22
GD2HDZ	9	5	14
G5DF	13	1	14
G8AOD	11	2	13
G8FMK	12	1	13
G8EOP	5	4	9
G8AII	7	2	9
G8ABH	7	1	8
G8FJG	7	1	8
G8GNZ	4	2	6
G8IFT	3	1	4

restricted power could be overcome by shouting louder!

On the eve of the contest, the GW3WRA group were rather perturbed to hear another group operating from their site. Fortunately the other Club agreed to move. G3SEK, chairman of the VHF Contests Committee, pointed out to your scribe during a subsequent QSO that, if said Club had not moved, they would have been disqualified under rule 4, since they did not have permission to use the site. Ian has suggested that, when contemplating use of a new site, Clubs check on previous contests to see if that particular QTH locator appears in the logs.

The conditions during VHF NFD seem to have been much as was mentioned in last month's column, as borne out by the entries. Moreover, it seems that some groups suffered violent thunderstorms which knocked out stations on 23 cm. and 70 cm. A few lowered masts and repaired to the nearest pub!

Forthcoming Events: Sept. 4/5 from 1600-1600 GMT is the time for the Two-Metre Open and Listeners' contest, coinciding with the Region I IARU 144 MHz event. The weekend Oct. 2/3 is the UHF/SHF affair in Region I, 432 MHz and above, again 1600-1600z.

The Cray Valley group inform us that they are running a Club two-metre contest, open to all comers, on October 10—details from G3YWO, *QTHR*.

BARTG have their RTTY (teletypewriter) event on two metres on Sept. 11 and 19th—in this case, information from G8CDW, *QTHR*. In both instances, an s.a.e. for return would be appreciated.

Liner Clinic

Many *Liner-2* owners have discovered that with the noise blanker switched in when there is a very strong station operating in the two-metre band, the signal appears to "splatter" no matter what channel it is tuned to. Many operators—including your scribe—have been accused of having enormously wide transmissions by *Liner-2* owners, many of whom had no idea it was their own noise blanker which caused the manifestation!

Gregg Gilman, G3SCP, has suggested a cure for the problem which,

as can be seen from the diagram herewith, is simply some decoupling of the supply to the audio IC driving the speaker. The surgery requires removal of the speaker to get at R125. The reason for the trouble is that the noise blanker diodes clip a very strong signal in the IF passband, causing harmonics galore which find their way into the "HT" supply to the output IC. The additional decoupling effects a cure. Remove R125 and replace by R125a, 2,200 ohms and R125b, 1,200 ohms, bypassed by C, 15 μ F. Next month, space permitting, "The Blown Power Fuse Saga" and its cure.

Satellite News

As reported last month, the June 16-18 QRP tests on *Oscar 7*, Mode-B were very successful. Accordingly, AMSAT has decided that every Monday when *Oscar 7* is on Mode B should be QRP Day and users should restrict their *e.r.p.* to *ten watts maximum*. This means that those using the several available transverters in the ten-watt class "bare foot" will have a chance to experiment with satellite communication with small aeriols. /

For those new to *Oscar 7*, this satellite is available every day except Wednesday which is reserved for special experiments for which AMSAT permission is required. On odd days of the *year*, *O-7* is on Mode A, which means transmitting to it in the band 145-85-145-95 MHz and listening for signals in the 10m. band from 29-4-29-5 MHz. Mode B occurs on even days of the *year* during which one transmits in the band 432-125-432-175 MHz the downlink in the 2m. band being 145-975-

145-925 MHz *inverted*. Normally, stations use USB on the uplink for both modes which comes down as USB on 10m. but LSB on 2m.

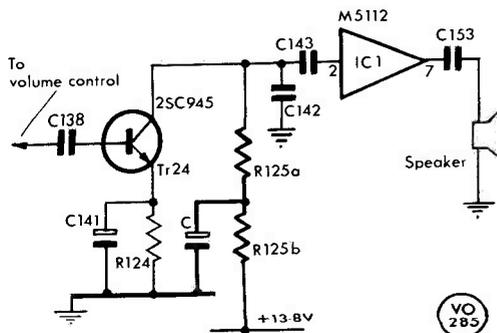
The schedule for *Oscar 6* is now Monday, Thursday and Saturday, ascending orbits, *i.e.* when the satellite is travelling from South to North, which are late afternoon and evening passes. *O-6* is a 2/10m. transponder the uplink QRG's being 145-9-146-0 MHz, the 10m. downlink from 29-45-29-55 MHz. Orbital information for both satellites is transmitted in the Sunday morning by GB2RS and also in more detail on Sunday evenings on 144-28 MHz from 7.30 p.m. local time by G8GSI (New Malden, Surrey).

Phase 3 of the satellite program will be a highly elliptical orbit spacecraft with an apogee of 39,000 km. and perigee of 1,460 km. It seems this will not be launched until 1980, due to the non-availability of a suitable launch vehicle. Meantime, an interim satellite to back up *O-7* could be put up in late 1977, perhaps with a 21/29 MHz transponder aboard, in addition to another 145/29 MHz relay.

AMSAT-UK plans to construct a micro-processor device to turn the RTTY and Morse telemetry from the satellites into a visual display on the TV screen. G8CSI (*QTHR*) would like to hear from anyone with expertise in this field for assistance in designing the hardware and software—quite an undertaking!

DX-Peditions

The abundance of *E's* news last issue precluded detailed comment on the June Scottish expedition by the Cambridge University Wireless



Society members. Nigel Hoult, G4CIK, sent some interesting notes on the trip. They started in Cumbria on June 11 in bad weather and only a few, Northern stations were worked. The next site was near Kilsyth (XQ80d). Although it looked good only thirty 2m. QSO's and two on 4m. were achieved, maybe due to its being a Saturday evening. For the next two days' operation from a farm near Port Ellen on the Isle of Islay in the Strathclyde region produced 115 contacts on 2m. and eight on 4m. G, Gl, EI, ON and PA stations being worked.

After Islay they returned to the mainland to Fife and discovered that GM8AGU/P was operating from their intended site! On the following day, the stations were on continuously in good conditions, which were best around 10 p.m. when F1CF and F6ECI near Paris were worked. GB3PI was accessed by a 2-watt, hand-held transceiver feeding a 6-ele. beam! This proved the best site of the trip with about 120 2m. QSO's and six on 4m.

At the writer's suggestion, they then travelled up to ZR square with a take-off "... just like that of GM8FFX..." This site produced 65 stations on 2m. and only 4 contacts on 4m. The final site was in the Borders region, near GM4CXP's location. Some 45 stations were worked during the Region 1 contest on the 20th, including four EI's. That was the only day when 4m. was very active, resulting in 20 QSO's. The final result was 288 QSO's on 2m. and 40 on 4m. with 9 countries worked on 2m., and lots of counties. The only station to work them every day on 4m. was G6WR in Whitehaven.

The G3SCP visit to Luxembourg was a disappointment since there is not one report from any reader who worked Gregg. The trip was well planned and it may be that conditions were not good enough for working back into the U.K.

Four Metres

EI7CV (Co. Dublin) writes asking what frequencies other than 70-26 MHz are in common use in the U.K.? Sean says that a number of Dublin amateurs are getting 4m. FM gear ready and would like to work G stations when the conditions permit.

At present, 70.48 MHz is in common use but the latest plan is to adopt 70.5 MHz as the calling channel, with 70.475 and 70.525 MHz as working channels. It is recommended that this plan be used.

G4BYP (Liverpool) added his seventh country to this year's score in VHF NFD—Guernsey—and increased the counties score to 34. Incidentally, you may count Irish Republic counties as well as U.K. ones. GD2HDZ (Laxey) also used the event to good effect to double his countries score and more than triple the previous counties tally.

Conditions during the 4m. Portable contest, Aug. 7/8 were "up and down" according to G3DAH (Herne Bay). Mike reckons that all signals sounded good excepting one portable who was grossly overmodulated. G4BWG (Peckham) added 17 counties and three countries in 60 QSO's to his total so far and thought that activity could have been better. G4DWZ (Golders Green) worked GW4ABR/P at a QRB of about 250 km. using just 200 milli-watts and Peter is claiming a record of 1.25 km. per milliwatt unless anyone else has done better!

Two Metres

Once again, there has been a good deal of *Sporadic E* propagation this past month and the writer is more than ever convinced that this phenomenon is more common on 2m. than has so far been expected. As this is the one mode where the e.r.p. and location are less important than being on at the right time, the low power operator has an excellent chance of working long distances. Also, the "grape vine" seems to work very well the moment there is the slightest whiff of *E*'s about and a dead band suddenly springs to life.

This summer, the pattern has usually been that Belgian stations have begun an *E*'s session before it reached the U.K. G8BAH (London) has often maintained an "open line" to ON to stations who monitor European DX TV channels and FM broadcast stations. Thus, Bob has been in on the act from the first minute. Experience has shown that *E*'s can build up very quickly, perhaps within half an hour of its starting on 10m. Some operators have monitored the 4m. band listen-

ing for East European broadcast stations to reveal *E*'s. However, lack of such stations does not necessarily indicate no *E*'s, just that it may not be towards that direction. Useful indicators are Italian Band FM stations and Spanish TV on VHF. *E*'s communication is often very localised. You may hear a station only 20-30 miles away giving an S9-plus report to a distant station you cannot even detect, whilst at other times, certain DX stations are being worked over a wide area.

As expected, 9H1CD (HV03e) has been in on most of the July *E*'s sessions. In a recent letter, Henry covered the *five-hour* opening of July 21 during which he had 146 contacts with 11 countries: 44 DL, 8 DM, 28 F, 39 G, 3 GC, 4 GW, 1 OE, 6 ON, 7 OZ, 1 PA and 5 SM, to bring the QTH square score to 95. The first QSO was with OE3UP at 1512z and the last at 2004z with F1DYS. Henry asks we should make it clear he only QSL's direct and his address is: H. G. Souchet, "Davis" 29/2, San Gwann, Malta—and in view of the hundreds of cards, an IRC would be appreciated.

G3XCS (Cornwall) wrote, "I imagine that by now reports of Sporadic-E are a 'drug on the market'." During the July 21 opening, Colin worked IW2AFR/A (HY40h), IT9TAI and 9H1CD between 1822 and 1957z. On the 24th, another smaller opening brought I4EAT/P (FE60f) at 1801. To prove the point about high power not being essential for successful *E*'s QSO's, G8BKR (Bristol) reports working IT9TAI with 10 watts on the 25th, John's first DX by this mode. He reports hearing the IT9 work G6GN, GW4BXE, GW8FTA and GW8JLY. G8BKR mentions good tropo conditions in the earlier part of July, especially between 0600 and 0800z, when DL, ON and PA stations were worked.

G8KLN (W. Sussex) was in on the July 21 *E*'s and exchanged 5-and-9 reports with IT9PLT (HX77h) at 1740z and also contacted 9H1CD again. Alan also heard the brief opening on the 24th. A tale of woe from GM4CXP who "... found it a lean month after the tropo faded out around teatime on the 9th." Derrick fed his FT-101B with 12 volts, the wrong way round, which didn't do it much good, after which

the front end of his transverter blew up. The old *Liner-2* was temporarily pressed into service. He then experimented with an *IC-202* until that gave up the ghost. He has promised the locals that, if any more mishaps occur, he will take up golf! A classic case of Murphy working overtime, OM?

At G3FPK, the July 21 *E's* event lasted, off-and-on from about 1530 to 1950z. Stations heard/worked were exclusively in the Malta, Sicily and Southern Italy areas. The beam was turned to Iberia and a couple of CQ calls made but no replies were heard. Subsequently, G3YFO told your scribe of a 15m. QSO he had had with CT4ES (Lisbon) who mentioned that several two-metre addicts there had heard and called G3FPK and a G4!

Proof of the very widespread nature of the July 21 event has come via G4BAH, whose Belgian friends worked SV1DH in LZ square, and UB5KKS in OI both on SSB. SV1DH raised 40 stations using 10 watts as his linear was out of service. One of our French readers, F5ZA, worked the SV1, QRB about 2426 km. Other DX stations on were 9H3Z in Gozo Is. (HW) and IC8EGO (HA32g) on Capri, missed by G3FPK but worked the next day on SSB via *Oscar 6*; obviously a keen fellow. GC8AAZ (Jersey) worked IT9PLT on the 21st at 2005z, for a new one and had two more contacts with 9H1CD, on the 21st at 1950z and the 24th at 1730z.

G3CHN (Devon) and EI9Q (Waterford) called CT2BS on CW in the late evenings during the month but not a whisper was heard from him. OY5NS has been worked by

PAØCIS and other PA's but G3BHW's QSO with Niels was ruined by scores of PA stations calling whilst Eric was trying to get his report through to Torshavn. The G3PMH/P team will be QRV from rare QTH square AN in the two-metre open event and those seeking VM should listen for EI9BG (Co. Clare) on 144.2 MHz SSB/CW on Sunday mornings with EI9Q.

Seventy Centimetres

Full of enthusiasm for the band is G4BAH but Bob is very disappointed at the general lack of activity. For example, on the evening of August 9, the Danish beacons were coming in well but there was no sign of any DX being around, let alone worked. This leads to the suggestion of an activity period each week. How about Friday evening from, say, 2000 local? G4BYP, an habitual entrant in the Three-Band Annual Table, has now added 70 cm. capability although Alan admitted to somewhat primitive aerial arrangements. GM8LBC (Aberdeen) says that he will be staying in Plymouth from about Sept. 13, equipped for FM on SU20, 433.50 MHz, and would welcome some contacts.

Twenty-Three Centimetres

GD2HDZ is claiming a G1/GD "first" for his QSO with G13VPK/P, on July 3. Any challengers? During the good conditions at the beginning of July, Arthur had a second contact with PAØVV. He is one of the few readers who has up-dated his All-time 23 cm. score to 9 counties and 5 countries. G3DAH and G3JXN have jumped up to second and third place respectively. It is a pity that the GigaHertz operators seem to be

reluctant to inform us very often of what they are doing.

Repeaters

G8IWA reports that GB3NA on R3 is now back on the air from the original site until the Home Office gives the "thumbs up" to the move to the new location, which should give better coverage to the North. Progress on GB3HU on RB10 continues slowly. The secretary of the Tyne & Wear Repeater Group, G3URE, reports that meetings are held on the 2nd and 4th Wednesdays of each month. Details of the group and its proposed repeater on R5, GB3TW, from J. W. Thexton, G3URE, *QTHR*.

Beacons

The 70 cm. Sutton Coldfield beacon, GB3SC, is now operating well on its new QRG of 432.89 MHz. On 2m. DLØPR (EO54d) was a good signal at G3FPK on the night of Aug. 9 on 144.910 MHz and it is nice to have GB3ANG back again on its new frequency of 144.975 MHz.

Band Plan

Lately, a few AM and FM stations have been operating in the SSB allocation of the 2m. band, presumably seeking cross-mode contacts. It would seem sensible for any SSB station answering CQ calls to suggest a QSY to the multi-mode section of the band, 144.5-144.9 MHz.

Deadlines

That's it for another month. All your reports and claims for the October column by **Sept. 8** and for the issue following, by *Oct. 8* to "VHF Bands," *SHORT WAVE MAGAZINE*, BUCKINGHAM, MK18 1RQ. *73 de G3FPK*.

PHOTOGRAPHS ALWAYS WANTED

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

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

Send to: Editorial Dept., *SHORT WAVE MAGAZINE*, BUCKINGHAM, MK18 1RQ.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for October issue: September 9)

IN the writing of this piece, one often receives comments in the mail about this-and-that; and one also notices that a change of secretary following an AGM results in the disappearance of a Club from the lists, sometimes for long periods, before they again surface with a report. Now, the Secretary File maintained by the writer serves two purposes—the obvious one of providing him with a card-index from which to make up the address panel, and the secondary (but equally important) one of providing a reference list when a letter comes in from a new reader asking for some help and advice. In such cases, a part of our advice is "Join the local Club, because there you will be able to get to know your locals who can help you solve your problems as they arise." This is fine, when we can give, with that advice, the address from the file in the knowledge that it is up-to-date. On the other hand, if it isn't, or we don't know for certain, then time has to be spent punting around for more recent data, or at worst, we have to say that we don't know of a Club, or that there used to be one but we don't know whether it still exists.

So—the moral of this little tale is simple. Please, Mr. Secretary, when you are elected to the job, make your first task to advise us, with the name of your Club, your own name and address and telephone number, and any other information you feel to be appropriate, even if you don't mean to report regularly. For the rest, we need to have the gen on your next month's activities, dates, venue and so on. And, for those readers who are of the opinion that the "Clubs" space is wasted, please remember that each month there are people who come into Amateur Radio by the mere fact of joining the local Club and so being encouraged into RAE, Morse maybe, and a licence of their own—all because they "saw it in this place."

Reports—National

Our first one in this classification is A.R.M.S., looking after the interests of anyone who holds a /M licence, or is a mobile-operating SWL. The current issue of *Mobile News* contains a nice balance between the current craze of two-metre FM, HF mobiling, rallies, Oscar 6 and 7 working with QRP, and details of a tone-burst unit for the TR-2200G and a shift unit for the Storno Viscount to enable use on more than one channel.

Radial is the newsletter of the R.A.I.B.C. group, catering for those among our ranks, SWL or aspiring amateur or licensed, who are blind or otherwise handicapped; here we are to mention a change of Secretary, with G3NOB handing over to G2CLP, whose address will be found in the Secretaries' Panel. May we just add that if you know of a blind or handicapped person interested in Amateur Radio, please put them in touch with R.A.I.B.C., who through their "supporters" do so much to help; and if you can find the time to do a bit of supporting yourself, they could do with you as well!

Now we come to the low-power fans; here the group

is the G-QRP Club, who have just come out with another issue of their Newsletter *Sprat*. As usual, full of "meat" and possibly one of the most interesting newsletters consistently to hit this desk; many a member has cause to bless the "reprint" service, covering all sorts of articles in hard-to-get back numbers of various magazines—the latest one is the Tucker-Tin SSB rig by ZL2AMJ. Over the weekend September 25/26, there will be a QRP Activity weekend, details of which will doubtless be in CDXN.

BARTG (British Amateur Radio Teleprinter Group) offer a new edition of their booklet for beginners in this art, *RTTY The Easy Way*, and report that their GB2ATG news bulletin broadcasts on 2/80m. are attracting increasing audiences—reports are still very welcome, to establish use and coverage.

West—and More Westerly

In this section it is our pleasure to be able to report the formation of a new group in Northern Ireland—Carrickfergus and District YMCA. G18KZU says that they get together once monthly at the YMCA Hall, Lancasterian Street, Carrickfergus; get the September date from him (*see* Panel) as it is intended to discuss a winter programme, and, hopefully, to have a talk organised as well. We wish them every success in their efforts.

Now to Torbay, where they are glad to say the membership is still rising and they get holiday visitors; look out for them operating at Exeter Spastics Fayre on September 18, using G3NJA; or go to the meeting at Bath Lane (rear of 94 Belgrave Road), Torquay on September 25, when there will be a talk on Components by ITT.

Plymouth have revived their *QUA Newsletter* with an improved print. From it we read that they are still at the Virginia House, Breton Side, on the first and third Tuesdays of each month—September 7 being down for a surplus sale.

Now to Cornish, who foregather on September 2, at the SWEB Clubroom, Pool, Camborne, to hear G3NPB talk on "My Favourite Aerials." Don't know about G3NPB, but the writer's favourites are all ones he can't dream of putting up!

The informative *Newsletter* from Hereford gives their next meetings as being on September 3 and 17 at C.D. Hq., Gaol Street, their usual place. Interesting events are arranged by this group, that in July having been a "radio evening out" with portable gear, involving an operating competition; more than 20 members turned out for this.

Wirral have meetings on September 1 and 15, 7.45 p.m., at the Sports Centre, Grange Road West, Birkenhead; they show a list of 39 licensed members and, judging from their *Newsletter*, cover a wide range of Amateur Radio activities.

Midlands

Our first stop can well be at Derby's Hq., 119 Green Lane. There is a Surplus Sale on September 1, and G2CVV will talk on the History of the Licence on the 8th. Direction Finding takes up September 15—we presume this will be an outdoor event although it is not stated specifically—and the Ladies' Night on the 22nd will be a Cheese-and-Wine Party. Finally, there is the 29th, and

for the first time in many moons, they have "to be announced" against this item.

Over to **South Manchester**, where the VHF types are again getting together on Monday evenings at the Club shack, Greeba, Shady Lane, Baguley. As for the formal meetings, these are taken on Friday evenings at Sale Moor Community Centre, Norris Road, Sale. Looking at the Friday evening efforts, there are usually a couple of Activity Nights, and the rest are given over to talks, film shows and so on—get the latest details from G8GDM, as Panel. Or . . . why not go along one Friday evening?

At **South Birmingham** there is a Film Show, down for September 1 at Hampstead House, Fairfax Road, West Heath, to which they say visitors will be welcome.

The same hand, G8BHE, is also on the committee of the nearby **Midlands** group, and so their news comes together. Midland are at Room 110, University of Aston, Gosta Green, Birmingham. September 21 is the date booked, and they will hear G4ELO talking about Test and Measuring Equipment.

There is always something of interest in the **Cheltenham RSGB** group *Newsletter*, quite apart from the meeting detail; but it is the latter we are interested in. The venue is the Old Bakery, Chester Walk, which is behind the Public Library in Clarence Street, and it is always the first Thursday in the month. Thus, September 2

is down for G2BAR to come and talk about, and display, Slow-Scan TV. Looking forward to October, we notice that the normal rule is broken, as the date is the 14th; this is *not* a regular alteration, but just applies in October.

At **Peterborough**, the Radio and Electronics Society (there is another group in the area) have their place in the Scout Hut, Occupation Road, on Friday, September 17. As their rally is on the 19th, it isn't too hard to guess what they will be doing—preparing and discussing preparations for that Rally.

On September 23 **Northampton** will be at their Hq. in Spencer Dallington Community Centre, Tintern Avenue (off Gladstone Road). The speaker will be none other than G5UM, and his theme "1000 metres to 10 GHz." Older readers will doubtless recall that G5UM was the motivator of the old Welwyn group, and advocate of VHF for miles around that centre; had he remained there, we feel sure the Welwyn Club would still be thriving

Northern

Our first task is to advise that the **Star** group have managed to find themselves a new place—this is at Raglan Road, Woodhouse, Leeds, and we are told that Club meetings are from 10 in the morning to ten in the evening on Sundays!

Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W3 8LB.
 A.R.M.S.: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey, CR2 1EZ.
 B.A.R.T.G.: J. P. G. Jones, GW31GG, 40 Lower Quay Road, Haverfordwest, Dyfed, SA62 4LR.
 CARRICKFERGUS (YMCA): C. Morrison, G18KZU, 3 Donegall Park, Carrickfergus, Co. Antrim.
 CHELTENHAM (RSGB): G. D. Lively, G3KII, 26 Priors Road, Cheltenham (34785), Glos.
 CHESHUNT: R. E. Chastell, G8LNM, 4 Fairley Way, Cheshunt, Herts., EN7 6LG.
 CORNISH: S. Halfyard, G4EIS, Studio 12, Rosewall Terrace, St. Ives (3376), Cornwall.
 CRAY VALLEY: M. Tripp, G3YWO, 57 Cathcart Drive, Orpington (38199), Kent.
 CRYSTAL PALACE: G. Cluer, G4AVV, 27 Patterson Road, Upper Norwood, London, SE19 2LD (01-653 4340).
 DARTFORD HEATH D/F: via A. Burchmore, G4BWV, 49 School Lane, Horton Kirby, Dartford, Kent (address of Hon. Sec. required).
 DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby (21931), DE3 7GE.
 ECHELFORD: R. S. Hewes, G3TDR, 24 Brightside Avenue, Laleham, Staines, Middlesex.
 EDGWARE: P. D. Ling, G4BZY, 42 Greencourt Avenue, Edgware, Middlesex (01-952 2495).
 FARNBOROUGH: C. Beezley, G4FEA, 90 Giffard Drive, Cove, Farnborough, Hampshire, GU14 8QD.
 GLENROTHES: A. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife, KY1 2LH.
 HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford (3237).
 MIDLAND: A. L. Walton, G3ZKQ, 243 Barnes Hill, Birmingham (021-427 3088).
 NORTHAMPTON: S. J. Purser, G8GHZ, 2 Dobson Close, Great Houghton, Northampton (61794).
 NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax (44329), West Yorkshire.
 PETERBOROUGH: L. Critchley, G3EEL, 36 Waterloo Road, Peterborough, Cambridgeshire.

PLYMOUTH: E. A. P. Swainsbury, G4EJO, 106 Plymstock Road, Plymouth, South Devon, PL9 7PJ.
 QRP CLUB: Rev. G. C. Dobbs, G3RJV, 8 Redgates Court, Main Street, Calverton, Nottinghamshire (Woodborough 3920).
 R.A.I.B.C.: H. Boutle, G2CLP, 14 Queen's Drive, Bedford, MK41 9BQ.
 SCARBOROUGH: C. H. Whitaker, 1 Ryefield Close, Eastfield, Scarborough, North Yorkshire, YO11 3DN.
 SHEFFIELD: B. Nabb, G4EFZ, 32 Hallamshire Road, Sheffield, 10, South Yorkshire (304939).
 SHEFFIELD (Clubs Association): B. Flounders, 24 Birley Spa Lane, Sheffield, S. Yorkshire.
 SILVERTHORN: C. J. Hoare, G4AJA, 41 Lynton Road, South Chingford, London, E4 9EA (01-529 2282).
 SOUTH BIRMINGHAM: N. Gutteridge, G8BHE, 68 Max Road, Quinton, Birmingham, B32 1LB (021-422 9787).
 SOUTHDOWN: B. Chuter, G8CVV, 15 Coopers Hill, Willingdon, Eastbourne, East Sussex, BN20 9JG.
 SOUTH MANCHESTER: C. Scholefield, G8GDM, 57 St. Werburgh's Road, Chorlton-cum-Hardy, Manchester, M21 1UN.
 STAR: T. Leeman, G4BUU, 599 Dewsbury Road, Leeds, West Yorkshire.
 STEVENAGE: P. Tewkesbury, G8IUG, 267 York Road, St. Nicholas, Stevenage (721398), Hertfordshire, SG1 4HD.
 SURREY: S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon, Surrey, CR2 8PB (01-657 3258).
 SUTTON & CHEAM: A. Keech, G4BOX, 26 St. Albans Road, Cheam, Sutton, Surrey (01-644 4157).
 TORBAY: M. Yates, G3UIQ, Top Flat, 23 Waverley Road, Newton Abbot (3025), Devon.
 VERULAM: B. H. Pickford, G4DUS, 130 The Drive, Rickmansworth, Hertfordshire.
 WHITE ROSE: R. R. Hughes, G4DZI, 3 Primley Park Crescent, Leeds, West Yorkshire, LS17 7HY.
 WIRRAL: H. Crofts, G3DLF, 3 Barmouth Road, Wallesey (638 2515), Merseyside.
 WORKSOP: D. L. Rush, G4CRE, 87 Rydal Drive, Worksop, Nottinghamshire.
 YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

At the Cornish Radio Amateur Club Rally in July at Camborne Tech., they again had a visiting party of Communicators from Cudrose Air Station to give some Morse testing, under CRS Rhodes (standing, left), with Wren radio operators Carole Shaw, Linda Beard and Diana Ford.



The other Leeds group, **White Rose**, have their home at 83 Armley Town Street, and may be found there on any Wednesday evening. Tip for finding them: Look for a house next door to the pub between which two places people can be seen going with empty (or full, as the case may be) glasses!

Glenrothes are one of the few GM Clubs to report and we are told they have a room at Provosts Land, Douglas Road, Leslie, every Wednesday evening, and on the first Sunday evening in the month there is the formal, which on September 5 is the AGM.

The **Scarborough** Secretary was so taken with the details of the Club activity at the recent "Fair of the Century" (in which they made a very good showing) that he quite forgot to tell us the details of the venue or the dates! So—we must refer you to him, at the address in the Panel; and once again take the chance to stress that the essential details like Hq. address and meeting dates should *never* be left out—we have hundreds of Clubs on file, and just can't expect to recall all the details, even if there were no changes—but there are changes here and there almost every month to take into account as well! So, *please*, give us the date, the Hq. address, and the Secretary's name, call sign and QTH every time.

We understand that the **Northern Heights** chaps are hard at work readying themselves for the coming years with a complete set of 1976/77 activities. That is quite something when you realise they are to be found every Wednesday evening at the Peat Pitts Inn, Ogden, Halifax, not to mention various outside activities.

With the present high postal charges it is very surprising that there are not more groups of Clubs who decide to put out their information jointly, as for example is done (as we have said) by Midland and South Birmingham; another case comes to notice with the Association of **Sheffield Amateur Radio Clubs**. From their Newsletter, we have it that **Workshop** are every Thursday evening at the Anchor Inn, while **Sheffield** have September 20 at the Sheaf House Hotel. As the two college groups will be

back in action, it is fitting that the Association AGM and Trade Fair should be down for October 4, at Room 3106, Sheffield Polytechnic; and doubtless the Secretary of the Association can put you in touch with the Poly. or the University groups should you be interested after the new term has started.

Every Friday evening *except for the third in each month* is the routine for **York**, the place to home on to being the British Legion Club, 61 Micklegate. Looking a little farther ahead, there is the Annual Dinner on October 29, plus a couple of exhibition stations before that, to keep them amused.

Down South

Quite a while since last we heard from **Stevenage**, still meeting as of yore in the Hawker Siddeley Dynamics canteen, Gunnels Wood Road, Stevenage; it's a good few years since your conductor asked G5JJ if this could be done—he agreed, it was organised and within weeks both of us left both the firm and the district! However, to the matter of today, or rather of September 2; Jimmy Mathews, G6LL, is coming out of hiding to talk to the lads about some of the intriguing uses to which radio was put during the War. Then, on September 16, there will be another meeting, for which the topic is yet to be announced.

First we must congratulate the Secretary at **Farnborough** on changing from G8KUY to G4FEA. As for the meetings, these are down for September 8, when Ron Ham will be talking about "the hissing phenomenon"—the amateur discovery of Solar radio waves, and September 22 which is still to be filled.

September at **Crystal Palace** is down for G8GKQ to speak, on a subject to be announced; however, their *Newsletter* space was a trifle short and so the actual date and the venue were not mentioned, for which we must refer you to G4AVV at the address in the Panel.

We were nearly in a twist over the **Silverthorn** gen, as the front cover of the *Newsletter* and the covering

For 85 (Southgate) Sqdn. ATC event on June 26, the Silverthorn Radio Club operated GB3ATC very successfully.



letter got parted from the rest of the material they sent in! Anyway, it all came out in the end and we can say that they have Hq. at Friday Hill House, Simmonds Lane, Chingford, where they get together weekly in a permanent shack and lecture room—the other details can be obtained from G4AJA, as Panel.

Sutton & Cheam have a place at the Sutton College of Liberal Arts, Cheam Road. We cannot, at the time of writing, confirm the actual dates for September on, as these were under negotiation at the time of their letter; however, we believe they will be aiming at the third Tuesday in each month. Meantime, this being the case, we feel that should you wish to attend, you ought to check with the Hon. Sec.—see Panel for his address.

It looks like the first and third Thursday for **Cray Valley**, the former being the “main” session and the other one an informal, at Eltham United Reformed Church Hall, 1 Court Road, London, S.E.9. September 2 is their Ladies’ Night, with a film-slide show, and the 16th is one of their popular Natter-Nights. During October, CVRS celebrate their 30th anniversary and to mark it, they will be operating GB3OCV on the HF/VHF bands, with a special QSL card to commemorate contacts; they also have a two-metre contest on October 10 and another on Top Band on October 17. Details from Secretary G3YWO, with an s.a.e. please.

At Rosedale Sports Club, the **Cheshunt** lads are hoping to get a permanent building organised on the plot, for a shack and between-meetings gatherings. For the moment, we give the September Wednesday data: On the 1st, operation of the Club station and some CW practice, with a talk entitled “Firm Control of smaller sprogs” by G3OJI on the 8th. Then on the 15th there is a repeat of the first meeting, and on the 22nd an Open Discussion on Topical Events. Finally, on September 29, G4DCP and G8KYF will talk on “Simply Sound.”

For **Acton, Brentford & Chiswick**, on September 21, the scheme is for the members to report on their holiday activities. This one is at Chiswick Trades and Social Club, 66 High Road, Chiswick..

Down to the South Coast now, to **Southdown**, and the Victoria Hotel, Latimer Road, Eastbourne, on September 6. The subject was not finalised at the time of their letter, they being maybe more pre-occupied with the return visit they were paying to Radio Club de Normandie over September 25/26.

Dartford Heath D/F have been silent for some time now, and it was nice to see the familiar cover in the

pile again. They have Hq. at the Scout House, Broomhill Road, Dartford, where the meetings are arranged to cover all sorts of activities besides the outdoor D/F interest, and indeed they are also actively on the hunt for new members. Try September 10 for the Club night, or alternatively there is an SSB Field Day on 4/5, or they may be found—some at least—at the Loughton D/F event on September 26.

The new Hq. of **Surrey** at *T.S. Terra Nova* was duly shown off to the families of the members on August 4, by way of a cheese-and-wine party. Meantime, the matter in hand—the dates are the first and third Wednesdays in September, the first one being the formal.

Our **Echelford** newsletter is not quite up-to-date, but it does contain the essential information, namely that the Hq. is at St. Martin’s Court, Kingston Crescent, Ashford, Middlesex, and that they are there on the second Monday and the last Thursday of each month. Sadly, the forward dates column doesn’t go far enough for our needs, but doubtless something will have been fixed up by the due date.

It is the second and the fourth Thursdays of each month, we are assured by the **Edgware** Secretary, that matter. Those are the dates when you are to head for Watling Community Centre, 145 Orange Hill Road, Burnt Oak. In September, the first session is an informal, and on September 23, G4CRG and G4CRJ will demonstrate electronic coding and decoding of Morse.

At **Verulam** the last informal of the summer season, at Salisbury Hall, London Colney, takes place on September 9—future months’ informals will be at the R.A.F.A. Hq. in St. Albans. As for the main meetings, these are at the Market Hall, St. Albans, where on the 23rd, G3JKB will be talking about Antennae and ATU’s.

Finis

We’ve come to the bottom of the heap again, and so it remains for us to tell you that the deadline for next time, with all the dope and doings for October, will be to arrive not later than first post on **September 9**. Send it all to “Club Secretary,” **SHORT WAVE MAGAZINE**, BUCKINGHAM, MK18 1RQ. Till next time, 73.

COURSES FOR THE R.A.E.

TO qualify for a U.K. amateur transmitting licence, it is necessary to pass the Radio Amateur Examination, held in December and May each year. It is Subject No. 765 in the syllabus of the City & Guilds of London Institute, 76 Portland Place, London, W1N 4AA, from whom can be obtained a set of question papers for recent years, at 30p post free, with the current syllabus.

Also available for those who want to know is an official pamphlet entitled *How to Become a Radio Amateur*, free on application to: Home Office, Radio Regulatory Division, Amateur Licensing Dept., Waterloo Bridge House, Waterloo Road, London, SE1 8UA. This gives essential basic information.

For the Subject No. 765 examination itself, courses are offered at various centres all over the country, mainly on a part-time evening-class basis and usually at nominal fees, these courses coming under the Local Education Authority. Some are, however, organised by local Clubs and other such interested bodies. They all have the same objective: To prepare, from scratch, candidates who wish to qualify for a licence.

Most instructors themselves hold amateur licences and in many instances are also qualified teachers, with years of experience in taking R.A.E. classes. In addition to the listed Courses, local Clubs also run R.A.E. classes in Theory and Morse—so always find out if the Club in your locality is offering R.A.E. instruction.

Passing the R.A.E. without the Morse qualifies only for the Class-B licence, confined to VHF operation, with G8/3 callsign, e.g., G8XYZ, Full licences are in the G4/3 sequency, i.e., G4ZZZ.

Following is the First List of Courses as notified to us in time for this issue. Further lists will be published as notifications are received.

Notices should be set out in the form shown here, and addressed to: "R.A.E.," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

Aberdeen: At the Technical College, course instructor GM4EKC. Apply S. Sutherland, GM4BKV, 67 Greenfern Road, Aberdeen (691716).

Bangor, Co. Down: At the Technical College, classes starting 20 Sept., twice weekly on Mondays and Thursdays, 7.0-9.0 p.m., enrolment from Sept. 8. Details from the College or the tutor, C. A. Billington, GI3WSS, *QTHR* or *Hollywood* 4277.

Barry (Glam.): At College of Further Education, Colcott Road, Tuesday evenings 7.30 p.m., starting Sept. 21, enrolment Sept. 13-15. Course fee £7, or £4.50 (under 18). Lecturer in charge, D. H. Adams, GW8VBP.

Bath: At the Technical College, enrolment as soon as possible, instructor P. A. Bubb, G3UWJ.

Blackburn: At the College of Technology and Design, Feilden Street, instructor H. Leeming, G3LLL.

Borehamwood: At the College of Further Education, Elstree Way, on Wednesdays, 7.0-9.30 p.m., enrolment evenings Sept. 8-9, with G. L. Benbow, G3HB, as lecturer.

Bridgnorth: At the College of Further Education, Stourbridge Road, on Monday evenings, starting on Sept. 20.

Brooklands: At the Technical College, Heath Road, Weybridge, enrolment Sept. 13-15, course commencing Thursday, Sept. 23, fee £7.50, or £3.75 for under 18's.

Burgess Hill: At the Adult Education Centre, Marle Place, Leylands Road, on Tuesdays, 7.30 p.m. Also a Basic Course on Electronics. Tutor, Richard Canning, G6YJ, as in previous years.

Burton-on-Trent: At Needwood High School, Rolleston-on-Dove, enrolment Sept. 16, evening, class starting Sept. 21, 7.30-9.30 p.m., fee £2. Course instructor, D. Reynolds, G4BPW.

Bury: At Mosses Youth & Community Centre, Cecil Street, enrolment Aug. 31 and Sept. 7, 8.0 p.m., for course commencing on Sept. 21. Further details from J. Clifford, G4BVE, 10 Arley Avenue, Bury.

Camborne: At the Cornwall Technical College, on Monday evenings, 7.0-9.0 p.m., starting Sept. 20.

Canterbury: At the College of Technology, apply to the College.

Chesterfield: At the College of Technology, apply Course Organiser, at the College.

Crawley: At the Sarah Robinson School, Ifield, enrolment Sept. 17, 7.0-9.0 p.m., for Monday evening courses, 7.0-9.0 p.m., starting Sept. 27. Further details from the tutor, R. Scivens, G3LNM (*Crawley* 22540).

Dudley: At the Technical College, Tuesdays and Wednesdays 6.30-8.30 p.m., enrolment evenings Sept. 7-8. Details from Dept. of Electrical Engineering and Science.

Durham: At the Technical College, Framwellgate Moor, classes starting Sept. 20, prior enrolment essential. Course instructor J. Greenwood, G3ZJY.

Eastbourne: At the College of Further Education, enrolment Sept. 6-9, for course starting on Sept. 20. Further details from M. B. Welling, G3ZFE, 29 Hawkstow Crescent, Hailsham, Sussex.

Farnborough (Hants): At the Further Education Centre, Cove School, St. John's Road, on Thursdays at 7.30 p.m., starting on Sept. 30. There will also be a Morse course. For details apply The Principal, at the Centre.

Gosforth: At the Secondary School, Gosforth, starting in September, on Tuesday evenings, 7.0-9.0 p.m. Enquiries to the Principal at the School (*Tel: Newcastle-upon-Tyne* 668439); class instructor D. R. Loveday, G3FPE. The R.A.E. will be held at the School.

Hemel Hempstead: At the Dacorum College, Marlowes, on Tuesday evenings, 6.0-9.0 p.m., starting on Sept. 14. Enrolment Sept. 6-7, evenings. Further details from the course tutor C. Burke, G3VOZ (*Tel: Hemel Hempstead* 833300).

Ilkeston: At the Dept. of Technology, South East Derbyshire College, on Wednesday evenings, 7.0-9.0 p.m. Apply T. Nixon, Dept. of Technology.

Kesgrave (Ipswich): At the Adult Centre, Modern School, enrolment evenings Sept. 14-15, fee £4.50 for ten-week course, classes starting Sept. 21, 7.20 p.m., instructor R. Morgan, G3FVP.

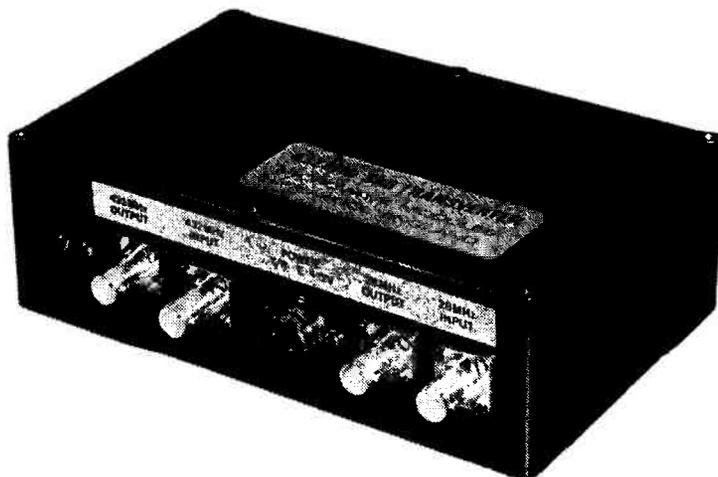
- Knottingley, Yorks.:** At the High School, on Tuesday evenings from Sept. 21, 7.0 p.m., enrolment evening Sept. 16.
- London (Acton):** At the Technical College, High Street (opposite Acton Town Hall), enrolment evenings Sept. 9, 13, 15, 6.15-8.15 p.m., classes start Sept. 22, 6.30-9.0 p.m., inclusive fee £6.50, course instructor W. G. Dyer, G3GEH.
- London (Beckenham):** At the Adult Education Centre, on Wednesdays 7.30-9.30 p.m., starting Sept. 22, enrolment forms obtainable from the Principal, 244 Croydon Road, Beckenham.
- London (Chingford):** At the Adult Education Centre, Simmons Lane, enrolment and commencement of course Sept. 20, 7.30 p.m., fee £6. Instructor A. P. Foss, G8EAY (Tel: 01-500 6034).
- London (Eltham):** At Hill School, S.E.9, on Tuesdays 7.30-9.30 p.m., commencing Sept. 21. Enrolment forms from the Principal, Institute Hq., Art Centre, Haimo Road, Eltham.
- London (Finsbury):** At Shelburne Radio Club, White Lion Street, Angel, N.1, classes starting Sept. 6. Enquiries to Tutor, G3SLF (Tel: 254 8528), R. Cummings.
- London (Harrow):** Class at Hatch End High School, Pinner Road, enrolment Sept. 18, morning, and Sept. 21, evening, at Nower Hill High School, Pinner Road, fee £11.70, inclusive Morse tuition. Classes start Sept. 29, 7.0-10.0 p.m.
- London (Highgate):** Grafton Radio Society Course, as in previous years, at Holloway Institute Annex, Highgate Hill, enrolment Sept. 13, course starting Sept. 20, 7.0-10.0 p.m., lecturer B. C. Bond, G3ZKE (Tel: 485-7065).
- London (Ilford):** At the County High School, Cranbrook Road, starting Sept. 29, enrolment evenings Sept. 13-16, fees £7.50 or £3.75 for juniors. Course instructor W. G. Hall, G8JM.
- London (Paddington):** At the Institute, Amberly Road (off Harrow Road, No. 18 bus), enrolment Sept. 13, 6.30-9.0 p.m., classes starting at the Institute on Sept. 23. Instructor, D. T. Busby, G8ELB (Tel: 864 4411, Ext. 39), for information.
- Manchester (Openshaw):** At the Technical College, Whitworth Street, commencing Sept. 21, 6.45 p.m., enrolment Sept. 6-8. Course includes Morse, and is conducted by A. B. Langfield, G3IOA, and E. Horne, G8IYX. An advanced course is also offered for licenced operators wishing to progress beyond the R.A.E.
- Manchester (Swinton):** At Moorside High School, East Lancashire Road, on Thursday evenings, starting Sept. 30. Details from P. Whatmough, G8BFP (794 3700).
- New Ollerton (Notts.):** At Dukeries Comprehensive School, commencing Sept. 21, 7.0 p.m. Enquiries to C. J. Morgan, G8LPX, 113 Henton Road, Edwinstone, Mansfield.
- Princes Risborough:** At the Adult Education Centre (County Secondary School) Theory Class on Mondays 7.0-9.0 p.m., instructor R. Whiting, G3POF, and Morse on Thursday evenings, under S. Ford, G4ACV. Classes begin on Sept. 20, enrolment Sept. 8-9, or first meeting of class.
- Scunthorpe:** Amateur Radio Club course at Grange Farm Hobbies Centre, Franklin Crescent, starting in September. Information from H. Holmes, G3MSB, at the Centre.
- Sheffield:** At King Edward Lower School, Darwin Lane, Sheffield 10, on Wednesday evenings, starting on Oct. 6, 7.0 p.m. Apply J. Bell, G3JON (Tel: 367774), for details.
- Shirehampton (Bristol):** Held by the Radio Club at Twyford House, High Street, classes in Theory and Morse will start early in October. Apply for details to R. W. Andrews, G4BWB, ffiTHR, or ring 426486.
- Slough:** Classes in Theory, Morse and Advanced amateur radio techniques at the Langley College of Further Education. Apply for details E. C. Palmer, G3FVC, Dept. of General Studies, Station Road, Langley Tel: Slough 49222).
- Walsall:** At the College of Technology, St. Paul's Street, with tuition in Theory, Morse and practical work. Further details obtainable from the College office, or ring 25124.
- Wigan:** At the Adult Education Centre, Parson's Walk, enrolment Sept. 6-9, 6.30-8.30 p.m., fee £8.70 for 30 weeks, course starting Sept. 20, 7.0-9.0 p.m. Instructor, T. Austin, G3RCA.
- Wirral:** At Birkenhead Technical College, Borough Road, on Thursday evenings, 6.30-9.0 p.m., enrolment early September at the College, instructor L. Roberts, G3EGX.

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

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

MICROWAVE MODULES SET THE STANDARD ONCE AGAIN!

We are pleased to announce a 2 metre solid state transverter, MMT144/28, similar to our highly successful 432 MHz transverter, MMT432/28, which is in use around the world for satellite and terrestrial communication. This 144 MHz unit is fully compatible with any 28 MHz drive source, and provides 10 watts continuous power output from extremely robust power transistors capable of withstanding severe mismatch. The combination of a balanced mixer incorporating protected dual gate MOSFETS, to produce a spurious-free linear signal, and a low noise receive converter makes the unit ideal for all modes of transmission at 144 MHz, particularly where a high degree of linearity, stability and sensitivity are of prime importance. Due to their linear mode of operation both transverters will successfully accept SSB, FM, AM or CW signals for conversion from 28MHz up to 144 MHz and 432 MHz respectively.



Housed in a highly durable diecast case, this transverter is similar in appearance to the pictured 432 MHz transverter, MMT432/28.

In both transverters the 10 watt power level developed by the transmit section is switched by a PIN-diode change-over relay which has a through loss in the receive or transmit mode of less than 0.2 dB.

SPECIFICATION

	MMT144/28	MMT432/28
Frequency coverage	144-146 MHz	432-434 MHz
DC power requirements	12 volts nominal	12 volts nominal
Current consumption	2.2 amps. peak	2.2 amps. peak
Power output	10 watts continuous rating	10 watts continuous rating
Drive requirements at 28 MHz	500 mW or 5 mW	500 mW or 5 mW
Level of spurious output	-65 dB	-65 dB
Receive converter gain	30 dB	30 dB
Receive converter noise figure	Better than 2.5 dB	Better than 3.0 dB
Power socket	5 Pin Din	5 Pin Din
RF input/output sockets	50 ohm BNC	50 ohm BNC
Size	187 x 120 x 53 mm.	187 x 120 x 53 mm.
Weight	800 g.	800 g.
Price	£85.50 inc. VAT	£94.50 inc. VAT

MICROWAVE MODULES LIMITED

**BROOKFIELD DRIVE, AINTREE, LIVERPOOL
L9 7AN**

TEL.: 051-523 4011



FAST AND FRIENDLY MAIL ORDER

BY PHONE Simply telephone your Barclaycard or Access No. for immediate despatch.
BY POST State clearly your requirements enclosing cheque or postal order.
CALLERS You are always welcome to come and inspect the equipment at our show-rooms.

FOR ALL ENQUIRIES PLEASE ENCLOSE STAMPED ADDRESS ENVELOPE.



STOP PRESS!
 NEW SHIPMENT OF LATEST IC22A
 TRANSCEIVERS
 10 UK Channels + Tone Burst
 English Handbooks



£159 DELIVERED FREE

Other Models:

IC21A	£195
IC201	£354
IC202	£161

MICROWAVE MODULES

MMC 2m. conv. IF 2-4 4-6	£18.00	(36p)
28-30	£18.00	(36p)
MMC 70 MHz conv. 28-30	£19.80	(36p)
local osc.	£19.80	(36p)
MMC 2m. conv. 28-30 + local	£19.80	(36p)
osc.	£19.80	(36p)
MMC 70cm. conv. 28-30 or	£19.80	(36p)
144-146	£24.30	(36p)
MMC 1296/144 or 28-30	£66.00	(36p)
MMDO 50 50 MHz counter	£27.00	(36p)
MMD 500P 500 MHz pre-scaler	£94.50	(36p)
MHT 432/28 70cm. transverter	£94.50	(36p)

LF ANTENNA SYSTEMS

EL40X compact 80/40 dipole	of luxe with balun, hardware, inv. "V" brackets	special protected copper wire, etc.	£28.12	(n.c.)
Q-Trap compact 80/40 dipole	kit 79ft.	Q-Trap coils only	£14.62	(£1.00)
			£7.98	(50p)

STATION ACCESSORIES

MFJ audio filter boards 80/110/180 Hz	£14.62	(50p)
Shure 444 table microphone	£17.94	(£1.00)
Shure 201 hand microphone	£8.44	(50p)
Drake low-pass 1kW filter 80dB	£14.75	(75p)
SWR single meter	£9.85	(50p)
SWR dual meter	£12.65	(50p)
Katsumi electronic keyer	£18.00	(50p)
Morse keys	£7.87	(50p)
ferrite rings 14" for a.f.	30p	(8p)
HP3A high pass tv filters	£2.53	(15p)
Set of 10 HP7 ni-cads	£9.72	(75p)
Set of 9 HP11 ni-cads	£16.20	(£1.00)
Balun insulator 50 ohm (beams or dipole)	£8.43	(50p)

YAESU MUSEN EQUIPMENT

FT10E transceiver. 160-10m. 230/12v.	£482.62	(n.c.)
SPI01B matching speaker console	£17.43	(£1.25)
FV101B matching remote vfo	£61.31	(£1.25)
FT200B transceiver 80-10m. 260w.	£264.37	(n.c.)
FP200B matching AC p.s.u.	£60.75	(n.c.)
FL101 transmitter 260w. 160-10m.	£365.62	(n.c.)
FR101S receiver standard 160-10m.	£336.37	(n.c.)
FR101D receiver de-luxe 160-2m. plus short wave broadcast	£438.75	(n.c.)
FR101DD as above with digital counter	£540.00	(n.c.)
FL2100B linear 1200w. input	£279.00	(n.c.)
YPI50 dummy load/wattmeter	£47.52	(£1.00)
Yo100 monitor scope	£127.44	(£1.50)
YC355D 200 MHz counter	£150.12	(n.c.)
FT221 2m. ssb/cw/fm/am transceiver	£403.87	(n.c.)
YD844 cable microphone	£20.25	(75p)
YD846 hand microphone	£8.43	(75p)

SOLID STATE MODULES

2m. or 4m. Europa transverter 200w. pip	£98.50	(n.c.)
2 or 4m. converters IF 2-4/4-6	£16.88	(n.c.)
28-30	£16.88	(n.c.)
70cm. converter IF 144-146	£8.72	(n.c.)
2m. boxed pre-amp	£6.27	(n.c.)
PA3 2m. miniature pre-amp board		

WATERS

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

VHF ANTENNAS BY JAYBEAM

4Y/4M 4 element yagi	£9.56	(£1.75)
5Y/2M 5 element yagi	£6.07	(£1.00)
8Y/2M 8 element yagi	£7.87	(£1.00)
10Y/2M 10 element yagi	£15.52	(£1.50)
PB110/2M 10 ele. parabeam	£18.45	(£1.50)
PBM14/2M 14 ele. parabeam	£23.62	(£1.75)
5XY/2M 5 ele. crossed yagi	£11.58	(£1.25)
8XY/2M 8 ele. crossed yagi	£14.83	(£1.50)
10XY/2M 10 ele. crossed yagi	£19.96	(£1.75)
Q4/2M 4 ele. quad	£11.81	(£1.50)
Q6/2M 6 ele. quad	£15.75	(£1.75)
D5/2M 5 ele. slot fed	£11.13	(£1.25)
D8/2M 8 ele. slot fed	£15.07	(£1.50)
XD/2M crossed dipoles	£8.15	(£1.00)
UG/2M ground plane vertical	£5.88	(£1.00)
HO/2M Mobile halo head only	£2.58	(50p)
HM/2M Mobile halo with mast	£3.09	(£2.75)
PMH/2C 2 way phasing harness for circular polarisation	£4.05	(75p)
PMH2/2M 2 way phasing harness for 2 metre antennas	£5.56	(75p)
PMH4/2M 4 way phasing harness	£12.94	(£1.00)
SVMK/2M mounting kit for vertical pol. for 2 slot feds.	£3.09	(75p)

NIHON DENGYO

Liner-2 Mk. II 2m. ssb covr. 12v.	£184.50	(£2.50)
Liner-430 70cm. ssb covr. 12v.	£296.25	(£2.50)
DC	£200.25	(£2.50)
LA-106 2m. 100W. linear	£31.50	(£2.50)
RI15E reg. p.s.u. for liner-2 & 430		

TRIO

HC2 ham clock	£13.50	(48p)
QR666 general coverage receiver	£163.13	(£2.50)
QR6-FM tuner to match QR66	£627.00	(36p)
Extra charge for fitting	£5.63	
QR6MK 500 kHz crystal marker	£11.25	(36p)
Extra charge for fitting	£2.25	

UHF ANTENNAS BY JAYBEAM

DB/70cm. 8 ele. slot fed	£12.71	(£1.25)
PBM18/70cm. 18 ele. parabeam	£15.46	(£1.50)
MBM48/70cm. 48 ele. multibeam	£17.10	(£1.50)
MBM88/70cm. 88 ele. multibeam	£22.89	(£1.75)
12XY/70cm. 12 ele. crossed yagi	£23.51	(£1.50)
PMH2/70cm. 2 way phasing harness	£4.66	(75p)
PMH4/70cm. 4 way phasing harness	£9.67	(£1.00)

MOBILE ANTENNAS BY JAYBEAM

TAS 2m. 5/8th glass fibre whip with 4m. of cable	£9.45	(£1.00)
U5 70 cm. colinear 5-6dB gain and 4m. of cable	£15.19	(£1.00)

NEW "MULTI" 2m and 70cm. FM TRANSCEIVERS IN STOCK



Both fitted 7 channels
 COMPARE THE PRICES!
 COMPARE THE SPECIFICATION
 Multi-1 2m. 23 ch. + 4 auto. £199.68
 Multi-U11 70 cm. 24 ch. + 4 auto. £229.50
 S.A.E. for full details.

MINI-PRODUCTS

HQ-1 10-20m. compact 1.2kW yagi	£84.37	(2.00)
C4-10-20m. compact 1.2kW vertical	£38.25	(2.00)

ROTATORS

AR30 antenna rotator	£32.90	(£1.50)
AR40 antenna rotator	£43.31	(£1.50)
CD44 antenna rotator	£85.32	(£1.75)
HM 11 antenna rotator	£129.37	(£2.00)
CD bearing	£4.21	(50p)
Stolle 2010 antenna rotator	£45.00	(£1.75)
Stolle 2030 antenna rotator	£49.50	(£1.75)
Stolle alignment bearing	£11.25	(50p)

HY-GAIN ANTENNAS

12AVQ 10-20m. vertical 2kW	£36.62	(£2.00)
14AVQ 10-40m. vertical 2kW	£51.97	(£2.00)
18AVT/WB 10-80m. vertical 2kW	£72.45	(£2.00)
TH3 JNR 10-20m. yagi 600W	£108.00	(£2.00)
TH3 Mk3 10-20m. yagi 2kW	£154.12	(£2.50)
BN86 balun 2kW	£13.50	(50p)

WATERS & STANTON ELECTRONICS

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



ALL PRICES INCLUDE VAT

CARRIAGE CHARGE IN BRACKETS

AGENTS: G3XTX J.R. Electronics, 198 Collier Row Lane, Romford, Essex. Tel.: Romford (0708) 68956

G3OQT Bredhurst Electronics, Willowbrook, School Lane, Bunbury, Cheshire. Tel.: (Bunbury) 0829 260708



Monday to Saturday 9 a.m.-5.30 p.m. Early closing Wednesday

AMATEUR RADIO - G3VfV

CHAS. H. YOUNG LTD., 170-172 Corporation Street, Birmingham B4 6UD. Tel. 021-236 1636

ICOM

IC225 80 channel 2m. Transceiver	£247.50 (£1.50)
IC3PA 12v. DC PSU	£42.18 (£1.50)

EDDYSTONE

990R 27-240 MHz CW/AM/FM 12v. DC or 110/240 AC	£1,057.05 (£3.00)
EC10 Mk. 11 Gen. Coverage Receiver	£202.44 (£2.50)
EB37 L/W M/W-22MHz	£202.44 (£2.50)

AERIAL FEEDERS AND WIRE

T3234 50 ohm coax	46p mtr. (2p mtr.)
UR67 50 ohm coax	50p mtr. (3p mtr.)
UR43 50 ohm coax	17p mtr. (1p mtr.)
14 SWG H/D Copper Wire (140ft. approx.)	£3.30 (£1.00)
Hanks of PVC Aerial Wire (150ft.)	£1.00 (50p)

RAYMART

3" Ribbed Ceramic Insulators	27p (9p. each)
Centre T. Piece Insulators	27p (9p. each)
ML2 Polythene Cord 200 lb. B.S. (170 yds. approx.)	£1.75 (75p)
ML4 Polythene Cord 400 lb. B.S.	5p per mtr. (1p mtr.)

MANUALS FOR EDDYSTONE RECEIVERS OVER 70 TYPES. PLEASE ENQUIRE

SERVICE

WE SPECIALISE IN THE SERVICE OF EDDYSTONE RECEIVERS AND CAN ACCEPT OTHER MAKES OF COMMERCIALY MADE COMMUNICATION EQUIPMENT

Postage may be rounded if a number of items are being ordered. Minimum postage 50p. Please make sure there is sufficient postage.

● **Midland Agents :**
for **EDDYSTONE, JOSTY KITS, J BEAM, ICOM.**

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.



JAYBEAM AERIALS 4 metre 4Y/4M 4 element	£9.56 (£3.00)
2 metre 5Y/2M 5 element	£6.07 (£2.00)
8Y/2M 8 element	£7.87 (£2.00)
10Y/2M 10 element	£15.52 (£2.00)
5XY/2M 5 element crossed	£11.59 (£2.00)
8XY/2M 8 element crossed	£14.51 (£2.00)
10XY/2M 10 element crossed	£19.97 (£2.00)
Q4/2M 4 element quad	£11.81 (£2.00)
D5/2M 5 over 5	£11.14 (£2.00)
Q6/2M 6 element quad	£15.75 (£2.00)
D8/2M 8 over 8	£15.07 (£2.00)
XD/2M Crossed dipoles	£8.16 (£1.50)
UGP/2M Ground Plane	£5.55 (75p)
HO/2M Halo (Head only)	£2.59 (50p)
HM/2M Halo (with 24" mast)	£3.12 (50p)
1/2 Whip Glass Fibre with cable	£9.45 (75p)
Bantex 1/2 whip	£7.15 (£1.50)

MICROWAVE MODULES

70 MHz Converters 28-28.7 MHz IF	£18.00 (50p)
136 " " 28-30 " " "	£18.00 (50p)
144 " " 2-4 " " "	£18.00 (50p)
144 " " 4-6 " " "	£18.00 (50p)
144 " " 28-30 with 116 MHz Output	£18.00 (50p)
432 " " 28-30 MHz IF	£19.80 (50p)
432 " " 144-146 " " "	£19.80 (50p)
1296 " " 28-30 " " "	£24.30 (50p)
1296 " " 144-146 " " "	£24.30 (50p)
432 " Varactor Tripler	£19.80 (50p)
1296 " " " "	£27.00 (50p)
144 " Preamp (2 outputs)	£11.70 (50p)

R. T. & I. ELECTRONICS LTD.

where equipment is fully overhauled

HEATHKIT Comanche MRI and HEATHKIT Cheyenne MT1 complete with 12 volt P.S.U. and Speaker	£90.00 (£4.50)
EDDYSTONE 680X G.C. RECEIVER.	£100.00 (£4.00)
TRIO JR310 B.S. RECEIVER.	£90.00 (£3.00)
EDDYSTONE 770U	£160.00 (£3.50)
HAMMERLUND SP600. G.C. Receiver	£180.00 (£4.00)
NATIONAL HRO 50T. Receiver	£140.00 (£4.00)
NEW EDDYSTONE 9905 250-850 MHz	£800.00 (£4.00)
EDDYSTONE EC10 Mk2. Receiver	£140.00 (£2.50)
EDDYSTONE EB35...	£100.00 (£2.50)
K.W. Vespa. Mk2. Transmitter	£105.00 (£4.00)
K.W. 204 Transmitter	£180.00 (£4.00)
K.W. Vanguard Transmitter	£50.00 (£4.00)
PAN ADAPTOR BC1031A 455/465 KHz	£60.00 (£3.00)

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, £62.46; Model 8, Mk. 5, £66.75; Model 40, Mk. 2, £62.46; Model 72, £25.63; Multimeter Mk. 5, £22.15; Standard Leather Carrying Case (Models 7, 8, 40), £12.50; Ever Ready ditto, £14.50; Multimeter Leather Case, £6.46; 30KV D.C. Multiplier for model 8 or 9, £16.73; Pair of Long Reach Safety Clips, £2.46; Model EA113 Electronic Avo £123.63; Model 272 Electronic Avo, £43.86; Model TT169 Transistor Tester, £26.13. 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, £10.90 (60p); Rubber Earpads for same, 70p per pair (20p); 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: 12% VAT must be added to all prices, new and secondhand, except Test Equipment which is 8% inc. carr. and packing.

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

FREE SHURE MIC. WITH EVERY KW TRANSMITTER or TRANSCEIVER purchased

At R.T. & I.

- ★ We have full H.P. facilities.
- ★ Part exchanges are a pleasure.
- ★ We purchase for cash.
- ★ We offer a first-class overhaul service for your electronic equipment, whether you are an amateur or professional user.
- ★ We have EASY Parking facilities.
- ★ We welcome your enquiries for specific items which although not advertised, may very well be in stock.

PARTRIDGE "JOYSTICK" New improved VFA. £17.25. Joymatch 111A £17.75 Joymatch 111B, £15.76. LO-Z500X, £21.86. Joymatch A.T.U Kit £7.17. A.T.U. Kit Assembled, £8.67. Artificial earth and bandwit ch £7.17. Note—Partridge prices include postage, packing and VAT.

TRIO EQUIPMENT.

New Trio R-300 Receiver, in stock £50.00 (3.00)
All Bands with xtal calibrator.

SHURE MICROPHONES, 444T, £21.98 (75p); 444, £17.28 (75p); 401A, £9.18 (60p); 201, £7.56 (60p); 202, £8.10 (60p). 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.

TKN METERS: TM500, £19.75 (75p), TW20CB, £23.75 (50p), TP55N, £14.50 (60p), Model 700, £39.75 (75p), also cases for same.

PHILIPS PM2403 ELECTRONIC MULTIMETERS, £35.00 (£1.00), etc., etc.

We also supply **PHILIPS & LABGEAR COLOUR TV TEST EQUIPMENT**, including Colour Bar Generators, Cross Hatch Generators, Degaussing Coils, Oscilloscopes, CRT Testers, Transistor Testers, etc., etc.

KW EQUIPMENT: (Don't forget your FREE mic. with every Tx. and Txcr. 1) KW2000E & P.S.U., £32.00 (£3.50); KW202, £210.00 (£2.50); KW204, £290.00 (£3.00); KW1000 Linear, £230.00 (£4.00); KW107, £68.00 (£1.50); KW E-Z MATCH, £25.00 (80p); KW109, £80.00 (£1.50); KW108 Monitor Scope, £85.00 (£3.00); Speaker for KW202, £18.00 (50p) KW103, £16.00 (50p); KW Antenna Switch, £6.00 (25p), etc.*

R. T. & I. ELECTRONICS LTD.

Ashville Old Hall, Ashville Road, London E11 4DX Tel. 01-539 4986

NEAREST STATION: LEYTONSTONE (Central Line)

J. BIRKETT *Radio Component Suppliers*

25 THE STRAIT . LINCOLN . LN2 1JF

Telephone: 20767

VHF STRIPLINE Low Noise NPN Transistors like BFR 90 at £3 each	TEXAS DARLINGTON PNP Power Transistors at 35p Texas 800 volt 2 Amp Plastic TO 3 NPN TRANSISTOR 50p each, 3 for £1.10	VHF DUAL GATE MOS FETS like 40 673 33p each, 4 for £1.10
---	---	---

SUB-MINIATURE DISC CERAMICS. 50v.w. 22pf, 33pf, 100pf, 220pf, 1000pf, 2200pf, 4700pf, .01uf. All at 20p doz.

TEXAS PNP POWER DARLINGTON TRANSISTORS.

Type TIP 117 at 35p

TEXAS 800 Volt 2 Amp POWER TRANSISTORS. NPN at 50p, 3 for £1.10

1 POLE 21 WAY ROTARY SWITCHES at 65p

50 AC 128 TRANSISTORS. Branded but untested for 57p

1000uf 40v.w. CAPACITORS size 1½ x 1" at 3 for 35p

BF 177 100 Volt 120 MHz 600mw. NPN TRANSISTORS. 6 for 57p

200 PIV 3 Amp PLASTIC WIRE ENDED DIODES at 15p each

SPECIAL OFFER OF RESISTORS. 5% Carbon Film ½, ¼, ⅓

Watt assorted 20 different odd values in lots of 200 for 80p

FT 243 CRYSTALS. 8040 kHz at 75p, 8100 kHz at 75p, 7620 kHz,

7720 kHz, 7966.7 kHz, 8233.3 kHz, 8300 kHz, 8366.7 kHz, 8483.3

kHz, 8583.3 kHz, 8650 kHz, 8716.7 kHz. All at 40p each

1000uf 40v.w. ELECTROLYTICS. Size 1½ x 1", 3 for 35p

PLASTIC TRIACS. 50 PIV 6 Amp at 15p, 400 PIV 6 Amps at 60p.

DIACS for Triggering at 25p

20 ASSORTED TUNING VARACTOR DIODES. Untested

for 45p

JACKSON TUNING CAPACITORS TYPE C 802. 10pf at

75p each

FM I.C.'s like TAA 570. Untested with data, 5 for 57p

JUNBO LEDS. Red or Green at 15p each

2000 PIV 100mA SILICON DIODES at 7 for £1

5 MHz CRYSTALS. 10X type at 50p each

X BAND GUNN DIODES with data at £1.65

MULTI-TURN CERMET 20 TURN TRIMPOTS. 10, 20, 50,

100, 200, 500 ohms, 1K, 2K, 5K, 10K, 20K, 50K, 100K, 200K,

500K, 1 Meg, 2 Meg. All at 30p each. 4 for £1.

WIRE WOUND 20 TURN TRIMPOTS. 10, 20, 50, 100, 200,

500, 1K, 2K, 5K, 10K, 20K. All at 20p each

PLASTIC POWER TRANSISTORS. MP 8112, NPN at 15p,

MP 8512 PNP at 15p

COMPRESSION TRIMMERS. 10pf, 30pf, 50pf, 150pf, 750pf,

1000pf. All at 6p ea

40 ASSORTED WIRE WOUND RESISTORS. 1 To 10 watts

at 57p

100 Assorted Sub-miniature ½, ⅓ watt RESISTORS 17 different values at 57p 25 Ohm 3 Watt CARBON RESISTORS at 12p each	GLASS ENCAPSULATED CRYSTALS 28 kHz, 91-4565 kHz, 126-690 kHz, 630 kHz, 149-98 kHz, 3000 kHz All at 40p each 10XAJ Band Edge Markers 7 MHz, 8 MHz at 75p each	100 Sub-miniature DISC CERAMICS 50v.w. values From 3-3pf to .01uf Assorted at 57p
--	---	---

AUDIO I.C.'s. SN 76001 at 55p, TBA 611B at 65p, TBA 641A at 80p, SN 76013ND at £1, TBA 800 at 85p

100 ASSORTED SILVER MICA CAPACITORS at 57p

200 ASSORTED TUBULAR CERAMICS for 57p

SN7400 DIGITAL I.C.'s. 5 for 50p

SN 7490 DIGITAL I.C.'s. 3 for £1

OP-AMPS 741. 8 Lead DIL. 5 for £1

1 GHz NPN TRANSISTORS. Type BF 271 at 15p each

BF 180 or BF 181 RF TRANSISTORS. 4 for 60p

AF 114, AF 115, AF 116, AF 117, AF 118. All at 22p ea.

BC 107, BC 108, BC 109. All at 6 for 50p

80pf WIDE SPACED TRANSMITTING CONDENSER

at £1.85

12-24 VOLT CRYSTAL OVENS at £1 ea.

20 ASSORTED BRANDED 250mw. ZENERS at 75p

20 STC 750mA ASSORTED BRANDED SILICON DIODES

at 50p

6 ASSORTED 1 OX 80M CRYSTALS for £2.16

MOTOROLA 2N 3055 POWER TRANSISTORS at 55p ea.

50 ASSORTED TRANSISTOR ELECTROLYTICS at 57p

20 SILICON PHOTO and PHOTO DARLINGTON TRAN-

SISTORS. Untested at £1

NEW BOOKS. Constructing simple Short Wave Receivers at

60p. Building Simple Transistor Test Gear at 75p

BF 224 400 MHz NPN TRANSISTORS. 6 for 57p

DIVIDE BY 2 300 MHz COUNTERS with data at 80p

BRANDED 10 WATT ZENERS. 15, 18, 22, 33, 56, 100 volt.

All at 30p ea.

VHF FILTER SOLDER-IN FEED THRO's at 20p doz.

MULLARD 455 kHz VERSION OF LP 1175 FILTER with

data at 55p

5200 kHz CRYSTALS. 10XAJ Case at 60p ea.

10 8uf 300v.w. ELECTROLYTICS for 57p

SN 7400 I.C.'s at 6 for 50p

5195 kHz CRYSTALS. 10XAJ Case at 60p ea.

GERMANIUM TRANSISTORS. AC 141K, AC 142K, AC 153K,

AC 176K, AC 187K, AC 188K. All at 20p ea.

2N 2369A or 2N 2368 at 15p ea.

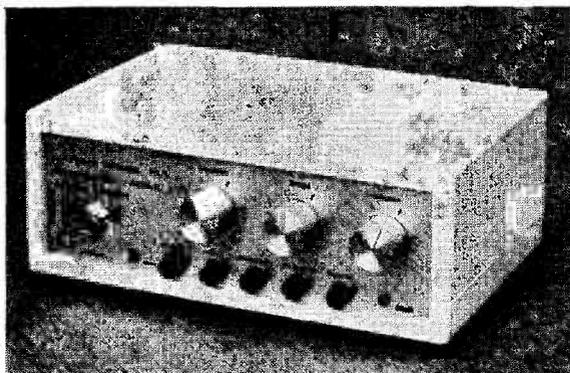
500+500+17+17pf TUNING CAPACITORS with S.M. Drive

at 38p

Please add 20p for Post and Packing on U.K. orders under £2.

FETS Like 2N 3819 BE 5565 at 20p each, 6 for £1	VHF Power Transistors Unmarked Good 2N 3866 40p each, 3 for £1 Unmarked Good VHF Power 2N 3375 at £1 each	High Capacity Tuning Varactor Diodes 180 TO 300pf Untested, 3 for 30p BA 102 at 20p BB 110 at 15p BB 121 at 15p MV 1636 at 25p 20 Assorted Untested Tuning Varactor Diodes for 45p
--	---	---

ADVANCED TECHNOLOGY FOR THE DISCERNING AMATEUR



FREQUENCY-AGILE AUDIO FILTER MODEL FL1

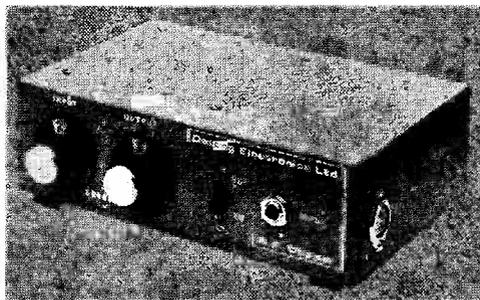
Fast becoming a classic, Model FL1 delights and amazes all who hear it in action. This unique product improves any receiver and is installed simply by connecting in series with the receiver's loudspeaker. It offers the following advanced features:

- * A notch filter which tunes itself for fully automatic removal of unwanted whistles in phone reception. With Model FL1 in circuit you can ignore tune-up whistles.
 - * Fully variable bandwidth tailoring for enhancing phone reception in the presence of interference and sideband splatter.
 - * Band pass filtering with fully variable centre frequency and bandwidth (1000Hz to 25Hz) plus a.f.c., for the kind of CW reception which you would not have believed possible.
- Supplied with connectors and full instructions. Ready-made connecting leads also available.

Price £47.50 plus 12½% VAT (£53.44 total)

All Datong products are designed and built to professional standards using high quality components and glass-epoxy printed circuit boards.

FOR DETAILED INDEPENDENT TEST REPORTS OF MODEL FL1, PLEASE SEE RADCOM JUNE 1976 AND SHORT WAVE MAGAZINE JULY 1976.



UNIVERSAL R.F. SPEECH CLIPPER

Still unmatched after two highly successful years, the "Datong r.f. Clipper" has become the standard by which other speech processors are judged. It is used the world over by serious DXers and professionals. As reviewed in Rad. Com. (Aug. 1974) and Short Wave Magazine (July 1975).

- * Comparable to a linear for improving your SSB DX potential, the Datong r.f. clipper introduces negligible distortion, while raising your average radiated power. A Datong and a linear put your signal in the multi-kilowatt class.
- * Gives true r.f. clipping yet with no installation headaches. Simply connects in series with the microphone.
- * Works with virtually any make of transmitter.
- * Equally effective for FM and AM as well as SSB.

Model RFC (illus.) price £38.88 plus 12½% VAT (£43.74 total) Also available with Jap 4 pin connector and complete with matching output lead, inclusive price, £41.90 plus 12½% VAT (£47.14 total). Please state pin connections required.

Fully aligned and tested P.C. Module, Model RFC/M : price £19.50 plus 12½% VAT (£21.94).

DATONG ELECTRONICS LTD.
11 MOOR PARK AVENUE, LEEDS LS6 4BT. TEL. 0532-755579

synonymous with excellence antenna specialists

ANTENNAS FOR EVERY REQUIREMENT FROM 27 - 512 MHz

Listed below are examples from their wide range of products

ASP201	½W, 108-512 MHz mobile ant.	£2.80	ASP655	130-174 MHz ½W 3dB Gain DC grounded base station ant. Power capability 100W. Termination SO-239. Complete with mounting brackets for masts up to 1½" O.D. Available Now (plus 75p carr)	£13.75
ASP629	½W, 130-174 MHz 3 dB gain, DC grounded mobile ant.	£6.59	ASP659UK	425-440 MHz 5 dB gain base station collinear. Power capability 100W. Termination female "N" type connector. Complete with mounting brackets for masts up to 1½" O.D. Available soon.	
ASP677	½W, 140-174 MHz 3 dB gain mobile ant.	£12.87	ASP680UK	144-148 MHz 6 dB gain base station collinear, DC grounded, power capability 350W. Length approx. 12". Weight approx. 4 lbs. Rated wind velocity 118 mph. Termination Male "N" type connector. (plus £2 carr.)	£45.00
ASPE667	425 440 MHz 5 dB gain Collinear mobile ant.	£16.10	ASP701UK	430-440 MHz 12 dB gain DC grounded base station collinear. Power capability 250W. Length approx. 18". Weight approx. 9.5 lbs. Rated wind velocity 128 mph. Termination male "N" type connector. Available now. (plus £2.50 carr.)	£100.00
ASP749UK	½W, 144-174 MHz 3 dB gain, Disguise mobile ant.	£24.50			
ASP619	Hi-Band Splitter	£14.50			
K-203	No hole boot mount, suitable for ASP201, ASP677, ASPE667, easily adaptable for ASP629 (plus 50p PP)	£3.20			
ASP332	Gutter mount suitable for use with ASP629, ASP393, complete with 10' RG-58U cable and PL-259 connector	£7.00			
ASPR332	Gutter mount suitable for use with ASP677, ASPE667, easily adaptable for use with other antennas. Complete with 10' RG-58U cable and PL-259 connector	£7.00			
New Magnetic Mount	Fits ASP629, ASP393, ASP677 and ASPE667. Complete with 10' RG-58U cable. Introductory Price	£7.95			

AVAILABLE FROM —

BEDFORDSHIRE
ALAN R. MORRIS, G4ENS
25 Felstead Way, Luton
Tel.: Luton (0582) 414179

WALES
J. J. DOYLE, G4SJEV
54 Bryncaew, Cadoxton, Neath, Glam.
Tel.: Neath (0639) 2942

SCOTLAND
IAN McKECHNIE, GM CX
41 Westerlea Drive, Bridge of Allan,
Stirlingshire
Tel.: Bridge of Allan (078683) 3223

Please add 12.5% VAT to above prices

LONDON
LEE ELECTRONICS LTD.
400 Edgware Road, London, W.2
Tel.: 01-723 5521

TERRY BARNETT, G8BAM
7 Cochrane Court, Leyton Grange,
London, E.10
Tel.: 01-556 9366

AVON
D. G. SMITH, G3UUR
277, Bloomfield Road, Odd Down, Bath
Tel.: Combe Down (0225) 833433

REVON ELECTRICAL SERVICES
48 Novers Park Drive, Novers Park, Bristol
Tel.: Bristol (0272) 669454

KENT
THANET ELECTRONICS
34 Cliff Avenue, Herne Bay
Tel.: (02273) 63859

CHESHIRE
BREDHURST ELECTRONICS
Willowbrook, School Lane, Bunbury, Tarporley
Tel.: Bunbury (0529) 260708

YORKSHIRE
THE AMATEUR RADIO SHOP
13 Chapel Hill, Huddersfield
Tel.: Huddersfield (0484) 20774

NICK SHEARD, G8KLY
Leeds
Tel.: Leeds (0532) 535143



J. YU 2I, LANGLEY AVENUE, SURBITON, SURREY, KT6 6QN

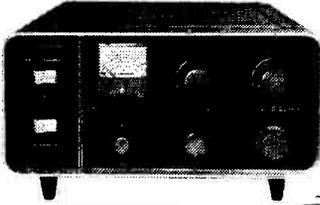
PROFESSIONAL PERFORMANCE

with

KW

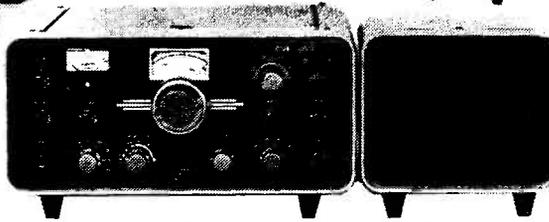
KW 1000 Linear Amplifier. 10-80 metres. 120 watts PEP input max. Designed to be "driven" by KW200 A/B/E or other units of similar power rating. In-built 2.5 Kv. PSU. PA tubes pair 6160L. Very quiet in operation.

KW 204 Transmitter. Well known for really good audio quality (SSB) and a favourite with CW enthusiasts. 10-160 metres. Reliable PA tubes (2 x 6146).



KW 202 Receiver
One of the finest Amateur Band Receivers on the market. SSB filter and "Q" Multiplier. Excellent sensitivity and stability. Two speed tuning 10-160 metres.

Write or phone for catalogue.



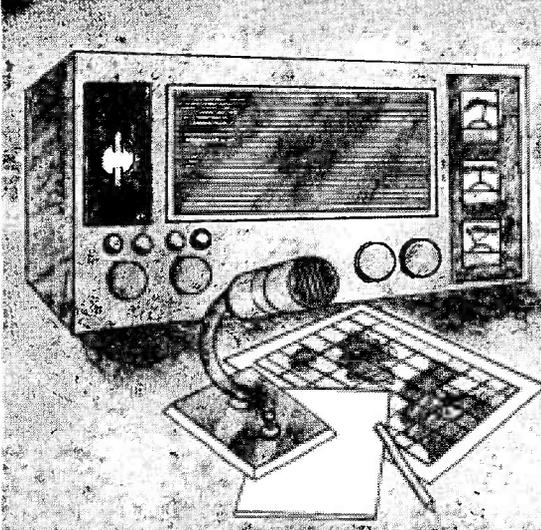
Other KW Favourites—
KW E-Z Match ATU ;
KW 103 SWR/RF Power Meter ; KW 108 Monitor scope ; KW 109 Supermatch Units ; KW 107 and 109 Supermatch Units ; KW Antenna Mk. II ; Stockists for Hy-CRO Rotators, Shure Microphones, etc. KW Spares are normally stocked for a date of manufacture of equipment.



Communications Products
DECCA COMMUNICATIONS LTD

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

Cramptons Road Otford Sevenoaks Kent Tel. Sevenoaks 50911



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.

Free!

Brochure, without obligation to:

BRITISH NATIONAL RADIO & ELECTRONICS SCHOOL,

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

NAME _____

ADDRESS _____

(Block caps please)

WAA

P.M. ELECTRONIC SERVICES

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

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

VAT—PRICES EXCLUDE VAT WHICH SHOULD BE ADDED AT THE RATE OF 12½% EXCEPT IN THE CASE OF TEST EQUIPMENT CRYSTALS 8%—OVERSEAS ORDERS (inc. Eire and Channel Isles) NO VAT CHARGEABLE

2M TX & RX CRYSTAL AVAILABILITY AND PRICE CHART

CRYSTAL FREQUENCY RANGE USE (Tx or Rx) and HOLDER	CRYSTALS FOR THE NEW 70 cm. CHANNELS												
	4 MHz-TX-HC6/U	6 MHz-TX-HC25/U	8 MHz-TX-HC6/U	10 MHz-RX-HC6/U	11 MHz-RX-HC25/U	12 MHz-TX-HC25/U	14 MHz-RX-HC25/U	18 MHz-TX-HC25/U	36 MHz-TX-HC6 & 25/U	44 MHz-RX-HC6/U	44 MHz-RX-HC25/U	52 MHz-RX-HC25/U	72 MHz-TX-HC25/U
144-030	b	b	b	b	b	b	b	b	b	b	b	b	b
144-4/433-2	...	...	...	...	...	...	...	...	...	...	...	...	...
144-480	b	b	b	b	b	b	b	b	b	b	b	b	b
144-600	b	b	b	b	b	b	b	b	b	b	b	b	b
144-700	b	b	b	b	b	b	b	b	b	b	b	b	b
145-000/SO	b	b	b	b	b	b	b	b	b	b	b	b	b
145-050/R2T	b	b	b	b	b	b	b	b	b	b	b	b	b
145-075/R3T	b	b	b	b	b	b	b	b	b	b	b	b	b
145-100/R4T	b	b	b	b	b	b	b	b	b	b	b	b	b
145-125/R5T	b	b	b	b	b	b	b	b	b	b	b	b	b
145-150/R6T	b	b	b	b	b	b	b	b	b	b	b	b	b
145-175/R7T	b	b	b	b	b	b	b	b	b	b	b	b	b
145-200/R8T	b	b	b	b	b	b	b	b	b	b	b	b	b
145-300/S12	b	b	b	b	b	b	b	b	b	b	b	b	b
145-350/S14	b	b	b	b	b	b	b	b	b	b	b	b	b
145-350/S16	b	b	b	b	b	b	b	b	b	b	b	b	b
145-500/S20	b	b	b	b	b	b	b	b	b	b	b	b	b
145-525/S21	b	b	b	b	b	b	b	b	b	b	b	b	b
145-550/S22	b	b	b	b	b	b	b	b	b	b	b	b	b
145-575/S23	b	b	b	b	b	b	b	b	b	b	b	b	b
145-600/S24	b	b	b	b	b	b	b	b	b	b	b	b	b
145-650/R2A	b	b	b	b	b	b	b	b	b	b	b	b	b
145-675/R3A	b	b	b	b	b	b	b	b	b	b	b	b	b
145-700/R4R	b	b	b	b	b	b	b	b	b	b	b	b	b
145-725/R5R	b	b	b	b	b	b	b	b	b	b	b	b	b
145-750/R6R	b	b	b	b	b	b	b	b	b	b	b	b	b
145-775/R7R	b	b	b	b	b	b	b	b	b	b	b	b	b
145-800/R8R	b	b	b	b	b	b	b	b	b	b	b	b	b
145-950/S38	b	b	b	b	b	b	b	b	b	b	b	b	b

PRICES : (a) £2.36 (b) and (c) £2.90 + VAT (12½%)

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

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

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

JAPANESE AND AMERICAN EQUIPMENTS

With the ever increasing popularity of Japanese equipments we have further expanded our range of stock crystals. We can now supply for YAESU (FT2F, FT2FT, FT2 Auto, FT244), most of the ICOM range and the TRIKENWOOD range.

We can also supply from stock crystals for the HEATHKIT HW202 + HW170

4m. CRYSTALS for 70-26 MHz — HC6/U

TX 8-7825 MHz and RX 29-7800 MHz ... at £2.36 each + VAT (12½%)
RX 6-7466 MHz ... at £2.00 each + VAT (12½%)

CRYSTALS FOR THE NEW 70 cm. CHANNELS

GET SWITCHED ON! to the NEW British 70 cm. Band Plan, with repeaters on RB2 (434-65/433-05), RB4 (434-70/433-10), RB6 (434-75/433-15), RB10 (434-85/433-25), and RB14 (434-95/433-35) and simple channels SU8 (433-20), SU16 (433-40), SU18 (433-45) and the new calling channel SU20 (433-50). SU12 (433-30) is designated for RTTY use. N.B. RB = Repeater British System, SU = Simplex UHF.

We are stocking the following channels for the new band plan: RB2, RB4, RB6, RB10, RB14, SU8, SU18 and SU20 (Tx&Rx) for use with: PYE UHF Westminster (W15U), UHF Cambridge (U10B), Pocketone (PF1) and STORNO CQ/L/COM 662 all at £2.36 + VAT (12½%). For the PYE U450L Base Station we have all the above TX crystals plus SU8R and RB14R at £2.36 + VAT (12½%). The other RX crystals for the U450 Base Station together with the remaining SU channels for all the above equipments are available as per class (b) 2 metre crystals.

10-245 MHz "ALTERNATIVE" IF CRYSTALS £2.36 + VAT (12½%)
For use in PYE and other equipments with 10.7 MHz and 455 kHz IFs to get rid of the "birdy" just above 145.0 MHz. In HC6/U, HC18/U and HC25/U.

CRYSTAL SOCKETS—HC6/U HC13/U and HC25/U (Low loss) 16p + VAT (12½%) plus 10p. P. & P. per order (P. & P. free if ordered with crystals).

CONVERTER/TRANSVERTER CRYSTALS — HC18/U

All at £3.00 + VAT (12½%). 38-6666 MHz (144/28), 42 MHz (70/28), 58 MHz (144/28), 70 MHz (144/4), 71 MHz (144/2), 95 MHz (432/52), 96 MHz (1296/432/144) 101 MHz (432/28), 105-6666 MHz (1296/28) and 116 MHz (144/28).

CRYSTALS SPECIALLY MANUFACTURED FOR AMATEUR USE TO CUSTOMERS REQUIREMENTS

In either code PE (±0.003% at ambient) or code ID (±0.005% 0 to 60°C) in HC6/U 1.5 to 2.6 MHz, £3.00 + VAT (12½%) and HC6/U 2.6 to 105 MHz and HC18/U and HC25/U 4 to 105 MHz, £3.60 + VAT (12½%). Delivery usually 4-5 weeks. Fundamentals (1.5-21 MHz) will be supplied to 30pf circuit conditions, and overtones (21-105 MHz) to series resonance conditions unless otherwise specified. For details of closer tolerance crystals please send S.A.E.

TEST EQUIPMENT FREQUENCY STANDARD CRYSTALS—100 kHz in HC13/U, 1 MHz and 5 MHz in HC6/U and 10 MHz and 10.7 MHz in HC6/U and HC25/U all at £2.50 plus 8% VAT.

BURNS ELECTRONICS

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

MODULAR COMMUNICATIONS SYSTEMS "MCS"

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

ANZAC MD-108 DOUBLE BALANCED MIXER

5-500 MHz supplied with full details for only £5.30 plus VAT (12½%)

CRYSTALS FOR PROFESSIONAL USE

CRYSTALS TO COMMERCIAL SPECIFICATIONS

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

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

CRYSTALS IN STOCK: £2 each, 25% discount 10 or more: FT243, 10XJ, 10XM, kHz. 4257 4422 4427 4435 4465 4654 4682 5010 5137 5491 5499 5506 5521 5566 5589 5604 5611 5649 5659 5671 5687 5692 5700 5722 5880 5890 5910 5920 6000 6010 6018 6020 6021 6026 6032 6040 6043 6046 6050 6051 6054 60656076 6087 6093 6098 6101 6104 6110 6112 6121 6126 6132 6143 6148 6151 6154 6157 6159 6162 6165 6171 6176 6187 6193 6196 6198 6200 6210 6220 6221 6227 6243 6254 6265 6276 6287 6298 6310 6312 6321 6326 6332 6335 6337 6343 6348 6362 6365 6371 6376 6382 6387 6390 6398 6404 6407 6409 6412 6415 6421 6432 6435 6443 6447 6448 6454 6460 6465 6472 6476 6485 6487 6493 6496 6497 6498 6510 6521 6522 6532 6535 6537 6540 6543 6547 6554 6565 6573 6582 6587 6597 6598 6607 6610 6621 6632 6635 6637 6640 6643 6649 6651 6664 6667 6677 6700 6705 6715 6721 6727 6730 6737 6740 6748 6750 6751 6754 6760 6765 6770 6780 6783 6790 6793 6800 6829 6851 6871 6937 6945 6973 6990 and 1000's more in HC6/U, kHz. 2157 2159 2163 2165 2170 2172 2174 2176 2207 2209 2210 2212 2214 2216 2219 2223 2226 2442 2449 2454 2552 2604 HC6/U, 2028 2142 2144 2146 2148 2153 2158 2662 2665 2671 2680 2684 2688 2695 2710 2718 2737 2757 2758 2762 2769 2783 2786 2985 3139 3143 3154 3158 2620 2624 2626 2635 2643 2647 2650 2654 2658 2662 2665 2671 2680 2684 2688 2695 2710 2718 2737 2757 2758 2762 2769 2783 2786 2985 3139 3143 3154 3158 3161 3169 3181 3182 3192 3188 3196 3203 3207 3210 3217 3221 3253 3256 3258 3263 3266 4368 3271 3273 3276 3452 3459 3466 3467 4695 4788 5526 5559 5943 5946 6523 6549 6569 6602 6605 7174 7547 7558 8465 8700 8707 3092 3098 3103 3109 3114 3120 3125 1313 3127 3142 3148 3153 3159 3164 3170 3175 3181 3187 5946 6523 6549 6569 6602 6605 7174 7547 7558 8465 8700 8707 3092 3098 3103 3109 3114 3120 3125 1313 3127 3142 3148 3153 3159 3164 3170 3175 3181 3187 3192 5980 5933 8150 8200 8220 8350 8400 8450 8500 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 44275 45275 46275 47275 48275 49275 50275 51275 52275 53275 54275 55275 56275 57275 58275

CRYSTALS TYPE BT8 £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 6681 8841 8842 8845 8854 8862 8871 8879 8896 8930 8932 8916 8947 8967 8973 8983 kHz.

S.A.E. ALL ENQUIRIES

COVENTRY AIRPORT

Phone (0203) 302449

BAGINTON ELECTRONICS

(G3TFC)

LEICESTER

1976



AT THE GRANBY HALLS LEICESTER

THURSDAY 1200-2000
FRIDAY 1200-2100
SATURDAY 1000-1800

28, 29, 30 OCTOBER

ADMISSION TO THE FINEST EXHIBITION OF AMATEUR RADIO EQUIPMENT AND ACCESSORIES

30p

CONCESSIONS FOR CLUBS AND STUDENTS. SAE FOR RATES TO G3FGY. QTHR.

THE AMATEUR RADIO RETAILERS ASSOCIATION

For Your Antenna!

TOWERS
ROTATORS
COAX
ROPES

Send for HANDBOOK containing full details of Antennas and other technical information. 33 pages 40p. Refundable upon purchase of Antennas.

SOME ANTENNAS

Mustang	3 Elements, 10, 15 and 20 metres	£82.50
TA-33 Jr.	High Power Model incl. Balun 3 Elements, 10, 15 and 20 metres	£73.00
TA33 Jr.	3 Elements, 10, 15 and 20 metres	£64.00
TA32 Jr.	2 Elements, 10, 15 and 20 metres	£44.00
TA31 Jr.	Rotary dipole, 10, 15 and 20 metres	£27.50
ELAN	3 Elements, 10 and 15 metres	£53.00
TD-2	Trap Dipole 40 and 80 metres	£25.00
TCD-2	Trap Dipole 40 and 80 metres compressed	£28.50
V-3 Jr.	Trap Vertical 10, 15 and 20 metres	£20.50
Atlas	Trap Vertical 10, 15, 20 and 40 metres	£36.50
SWL ANTENNAS		
SWL-7	Dipole 11, 13, 16, 19, 25, 31 and 49 metres	£19.50
RD-5	Dipole 10, 15, 20, 40 and 80 metres	£19.50
Orbit	Vertical 11, 13, 16, 19, 25, 31 and 49 metres	£33.00

MOSLEY ELECTRONICS LIMITED

196 Norwich Road,
New Costessey,
Norwich, NR5 0EX
ENGLAND

Administrative Address only

(All antennas available ex works carriage and VAT extra)

DERWENT RADIO

COLUMBUS RAVINE, SCARBOROUGH Tel. SCA 65996
Showroom open Tuesday/Thursday/Friday/Saturday

ALUMINIUM BOXES WITH LIDS

18 SWG all sizes in inches. P/P less than 4" 14p, larger 22p		
2 x 3 x 1 ... 30p	6 x 3 x 2 ... 45p	2 x 5 x 2 ... 42p
3 x 3 x 1 ... 32p	7 x 3 x 2 ... 52p	3 x 5 x 2 ... 52p
4 x 3 x 1 ... 35p	8 x 3 x 2 ... 55p	6 x 5 x 2 ... 57p
5 x 3 x 1 ... 35p	9 x 3 x 2 ... 57p	7 x 5 x 2 ... 60p
6 x 3 x 1 ... 37p	10 x 3 x 2 ... 60p	8 x 5 x 2 ... 62p
7 x 3 x 1 ... 40p	2 x 4 x 2 ... 41p	9 x 5 x 2 ... 66p
8 x 3 x 1 ... 41p	4 x 4 x 2 ... 45p	10 x 5 x 2 ... 68p
9 x 3 x 1 ... 42p	5 x 4 x 2 ... 49p	2 x 6 x 2 ... 45p
10 x 3 x 1 ... 44p	6 x 4 x 2 ... 52p	6 x 6 x 2 ... 60p
2 x 3 x 2 ... 38p	7 x 4 x 2 ... 57p	7 x 6 x 2 ... 64p
3 x 3 x 2 ... 41p	8 x 4 x 2 ... 60p	8 x 6 x 2 ... 67p
4 x 3 x 2 ... 42p	9 x 4 x 2 ... 62p	9 x 6 x 2 ... 72p
5 x 3 x 2 ... 43p	10 x 4 x 2 ... 64p	10 x 6 x 2 ... 78p

CRYSTALS. A couple of hundred in various bases to be cleared at 1p for £1.30 plus postage. Our selection.

Amperol PL259 ... 52p	2,000 ohm headphones ... £1.62
SO239 ... 52p	Low impedance headphones ... £1.40
Reducer ... 15p	phones ... £1.40
PL259 p.t.f.e. ... 65p	Morse practice oscillator ... £1.62
Plug to plug connector ... 40p	QSL display strips ... 75p
Mosfet 3N140 and 3N141	10 Decon p.c. pen ... 95p
Foot control switch ... £1.20	Danco coils, most in stock
200 new capacitors ... £1.00	Danco catalogue ... 20p

HAM RADIO MAGAZINE. We have several hundred copies of various back numbers in stock at 35p each. S.A.E. FOR LIST. Three sample copies, our choice £1 plus postage.

QSL CARDS QSL CARDS QSL CARDS
10p stamp for quality samples and price list.

SHORT WAVE MART

WANTED GOOD SHORT WAVE COMMUNICATIONS RECEIVERS AND TRANSMITTERS FOR CASH

Second hand items available

Barlow XCR 3 ... £115.00	Grundig Satellite ... £115.00
Eddystone EC 10 Mk 1 ... £65.00	Hesh GFI ... £30.00
Tric 9RS 9DE ... £56.00	Star SR 700 ... £89.00
Tric 9RS 9DS ... £58.00	EC 10 mains psu ... £9.00

COLUMBUS RAVINE, SCARBOROUGH

HONDA GENERATORS AT KEENEST PRICES!



300-4000 Watts AC, 6-24 Volts DC. Other makes 1-3000 KVA, Mains Transfer Switches.

National & SHARP MICROWAVE OVENS INPUT 1250-2800 WATTS

KEENEST PRICES Include U.K. delivery. Open Tues-Sat 10.30-1.30, 2.30-6.30 (Ansafone out of hours)

Ashley Dukes Farncombe St, Farncombe, Godalming (Tel 23279) Surrey.

G3ACQ Offers:—

All WESTERN ELECTRONICS goods—Yaesu standard etc We have a tunable 1 to 300MHZ Absorption Wavemeter at £8.95 inc. VAT. J. Beams Stolle Rotors. SOLID STATE MODULES converters and transverters. Large stock of surplus Crystals.

Please write with S.A.E.

S. MAY (Leicester) LTD.

12 - 14 & 27 CHURCHGATE, CITY CENTRE, LEICESTER
Telephone : Leicester 58662

HAMGEAR

Twelve years solely in H.F. preselector design and production. Our latest units having Three stages of amplification, a built-in A.T.U. and switchable regeneration to squeeze the last bit of signal from your antenna.

Send for full details of these units and antenna experiments using them. Please send three 6½p stamps.

2 CROMWELL ROAD, SPROWSTON, NORWICH

SEMICONDUCTORS — INTRODUCTORY OFFERS

OC71, 10p; 2N4427, 80p; 2N3866, 70p; CA3028, £1.00; 2N5913, £1.20; 2N5945 (4W, 8dB), £8.00; 2N5946, £11.00; 2N5641, £4.00; ZTX327, 60p; 40964, £1.40; 40965, £1.50; 2N3375, £2.00; OC202, 10p; 2N5180, 35p; 2N3553, £1.20; BLY33, £1.50; 2N5590, £4.50; 2N5591, £7.00; 2N3632m, £2.00; 2N6080, £4.50; 2N6081, £5.50; 2N6082, £8.00; 2N6083, £9.00; 2N6084, £12.00; 2N5642, £8.00; 2N5643, £10.00; BFY50, 20p; BC108, 10p; BC183L, 10p; BLV739, £3.00; 2N3055, 40p; 2N3478, 40p; 40673, 60p; 3N201, 80p; 3N202, 90p; MPF102, 40p; 40841, 50p; BC167A, 10p; BSY90, 30p; 2N3904, 10p; 2N3906, 10p; Integrated Circuits: CA3011, 50p; CA3014, 80p; CA3018, 70p; CA3032, 80p; MC1550G, 50p; MC1596G, £2.00; CA3000, £1.00; CA3089E, £2.00; SL620/30C, £2.00, 6-channel, 2m. 12V FM TX board. Phase modulator 5kHz deviation max. Microphone sensitivity 4mV (impedance your choice). All harmonics 50dB down. Sent for evaluation, P. & P. 30p. 1W min. out, £10 each. MC1741CG, 80p; 2N3819, 40p; 2N2270, 40p; 3 C.T.C. Transistor line up for 70cm linear £33.00 5mm. coil former with core 10p; miniature RF chokes, 10p. 2N5862 or similar transistor (90VV peak at 2m.), £15.00 2N6166 or similar transistors (100VV peak at 2m.), £17.00. BA150 Diode 30p. Data on any item 20p. 5-2 MHz ssb crystal fitters, £15.00. RS12 Reed relay, £1.20. All prices inclusive. Minimum order £1.00. Mail order only.

HELLER ELECTRONICS

49 Blossom Way, Hounslow, Middx., TW5 9HB

MORSE CODE TUITION

C90 CASSETTE For AMATEUR RADIO EXAMINATION PREPARATION SPEED SLOWLY INCREASING FROM 1 to 12 w.p.m. COMPLETE WITH INSTRUCTION BOOKLETS AND PRACTICE PAD, £3.

MORSE KEY AND BUZZER UNIT for sending practice, £3. Prices include postage, etc.

M. H. ELECTRONICS

12 LONGSHORE WAY, MILTON, PORTSMOUTH, PO4 8LS

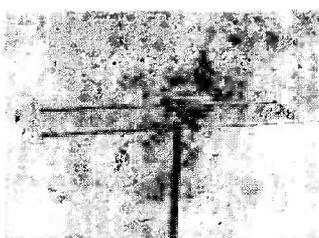
G3EKX S.S.B. PRODUCTS G3EKX

RACAL RA17. RX. + S.S.B. Adaptor + L.F. Converter. All in a cabinet + Home built Pan Adaptor. (Working order.) Caller only ... BARGAIN OFFER £325.00
CODAR CRYOA — £33 **HEATHKIT GR64 — £35**
TELETYPE 15. TX., RX. + Perforator and large cover. (Lot of 6.) Condition as brand new ... Offers!
XTALS, XTALS. 15,000 in Stock (New) S.A.E. Pse. 6146, 6146B, 6HF5. Matched pairs in Stock !!!

TOWN QUAY . TRURO

CORNWALL Telephone 0872-862575

2 METRE 2 EL. PORTABLE BEAM.



- COMPACT
- LIGHTWEIGHT
- 5-6 dB gain
- 25dB front to back ratio
- S.W.R. better than 1.5 to 1.0
- £7.70 plus £1 p. & p.

R.O.R. SERVICES

KENSINGTON CHAMBERS, MERIDALE ROAD, WOLVERHAMPTON, WEST MIDLANDS

ALL VALVES & TRANSISTORS

Call or phone our Mr. Stefan for a quotation 01-749 3934

We are one of the largest stockists of valves etc. in the U.K.

COLOMER ELECTRONICS LTD. 170 GOLDHAWK ROAD LONDON W12

MORSE MADE EASY BY THE RHYTHM METHOD!

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 surface mail £1 extra). For further details of course Ring 01-660 2896 or send 7p stamp for explanatory booklet to:—S. BENNETT, G3HSC (Box 14) 45 GREEN LANE, PURLEY, SURREY

a selection of specially recommended titles

* SIMPLE, LOW-COST WIRE ANTENNAS, by W. Orr W6SAI	£2.90
* A GUIDE TO AMATEUR RADIO, 16th Edition (RSGB)	£1.15
* HAM RADIO, A BEGINNERS' GUIDE	£2.50
* THE RADIO AMATEUR'S EXAMINATION MANUAL 6th Edition (RSGB)	£1.15
* PRACTICAL WIRELESS CIRCUITS, 18th Edition	£2.45
* WORLD RADIO TV HANDBOOK 1976	£5.00
* RADIO AMATEUR OPERATORS HANDBOOK (Data)	85p
* WORKING WITH THE OSCILLOSCOPE	£1.85
* AMATEUR RADIO TECHNIQUES, 5th Edition (RSGB)	£2.47
* TRANSISTOR AUDIO & RADIO CIRCUITS, 2nd Edition (Mullard)	£3.00
* TOWERS' INTERNATIONAL TRANSISTOR SELECTOR	£3.45
* VHF/UHF Manual, 3rd Edition (RSGB)	£5.60
* VHF HANDBOOK, by W. I. Orr W6SAI (New Edition)	£3.90
* RADIO VALVE AND SEMICONDUCTOR DATA, 10th Edition	£2.35
* TELEPRINTER HANDBOOK (RSGB)	£6.70
* TEST EQUIPMENT FOR THE RADIO AMATEUR (RSGB)	£2.35

(all prices include post/packing)

Available from **SHORT WAVE MAGAZINE**

Publications Dept..

34 HIGH STREET, WELWYN, HERTS., AL6 9EQ Telephone: Welwyn 5206/7

SIMPLE, LOW-COST

WIRE ANTENNAS

by William I. Orr, W6SAI

This excellent and thoroughly recommended handbook, is the publication on the practical approach to building aerials. After starting with aerial fundamentals there are discussions and descriptions of ground-plane, end-fed, DX dipole, vertical and wire beam antennas, plus coverage on a universal HF antenna system and working DX with an "invisible aerial"; the SWR meter and coaxial cable also have chapters to themselves.

The whole book is presented in an authoritative immensely clear, readable and enjoyable manner with the emphasis on the practical throughout—to the extent that even the chap who can hardly strip a piece of co-ax need not feel at all left out! Just as practical for the SWL, too!

192 pages

£2.90 inc. post

Order from:

Publications Dept.

SHORT WAVE MAGAZINE LTD.

34 High Street, Welwyn, Herts. AL6 9EQ.

HAM RADIO

A BEGINNER'S GUIDE

by R. H. Warring

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

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

152 pages

£2.50 inc. post

Publications Dept.

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

BEGINNER'S GUIDE TO RADIO

(7th Edition)

For many years "Beginner's Guide to Radio" has been extremely popular as an introduction to the subject of radio-and-how-it-works. The many advances made in recent times have rendered a new edition necessary.

This seventh edition has been completely rewritten and brought up-to-date to take account of the latest techniques and methods, and covers every aspect of the modern radio scene, while including the important basic information necessary for the newcomer to the subject.

The reader is guided from the first principles of electricity and magnetism, through radio waves, modulation and radio components, including valves and transistors, taking in radio transmitters and stereo broadcasting, and ending with hi-fi reproduction.

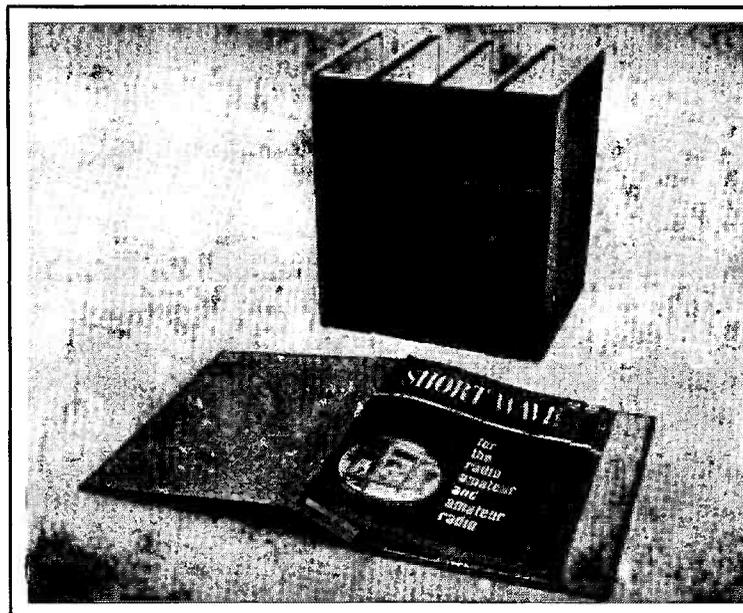
The book will be of interest to all who wish to understand the how-and-why of radio, whether it be for a hobby or a profession.

194 pages

£2.60 inc. post

Publications Dept.

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



CREATE YOUR OWN REFERENCE LIBRARY

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

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

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

Price £1.75 (incl. P & P)

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

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

RADIO AMATEUR HANDBOOK (ARRL 1976)

53rd Edition

This HANDBOOK, the most widely used manual of communications theory, design, and construction, contains descriptions of the latest solid-state devices and their application. The construction projects included cover the entire field of Amateur Radio interest. Written in a no-nonsense style, the HANDBOOK appeals to beginners and advanced amateurs alike. This new edition contains nearly 700 pages, including index. Priced at £5.30, also available in a hard-covered cloth bound edition at £7.65 (including postage).

Order from

Publications Dept.
SHORT WAVE MAGAZINE LTD.
34 HIGH STREET, WELWYN
HERTS., AL6 9EQ

BETTER SHORT WAVE RECEPTION

by William I. Orr W6SAI and Stuart D. Cowan W2LX
New 4th Edition

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

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

160 pages

£2.98 inc. post

Order from:

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

TECHNICAL ASSOCIATES

COMMUNICATION AIDS

AUDIO COMPRESSOR ★ Suitable for SSB/AM/FM ★ pure compression, no clipping! ★ 24 to 26dBs of compression, with less than 1% distortion ★ fast attack time in the order of 200 microseconds ★ variable decay time, on front panel ★ variable noise gate on front panel prevents ambient noise level tripping vox or being tx in pauses in speech ★ all functions routed to output in "off" position ★ goes between mic and tx no mods involved ★ these compressors have been tested alongside commercial rf clippers, the only difference at the receiving end was far superior audio quality, £21-00 + VAT (12½%) + 50p P.&P.

RX PEAK AND NOTCH FILTER ★ no gimmicks ★ all integrated circuits ★ will clear QRM in seconds ★ 1 watt o/p stage ★ headphone socket ★ goes between RX and loudspeaker ★ by-pass switch ★ can be used in series with our famous band-pass filter ★ notch-width control for optimum width of notch ★ tune control allows you to put the notch or peak where you want it ★ runs from internal PP9 battery or any supply from 9V to 15V ★ will also peak up CW signals, £23-00 + VAT (12½%) + 50p P. & P.

RX BAND PASS FILTER ★ 9 integrated circuits ★ 1 watt O/P stage ★ headphone socket ★ 8 switched positions of filter ★ high pass—2.5kHz-2.00kHz-1.5kHz-200Hz-180Hz-110Hz-80Hz ★ Bandwidths selected for optimum readability on AM, SSB, FM, CW ★ can be used in series with our peak and notch filter, giving the operator total control over bandwidth and QRM conditions ★ makes the poor RX superb and the superb RX better ★ runs from internal PP9 battery or any supply from 9V to 15V £23-00 + VAT (12½%) + 50p P. & P.

ATL CALIBRATOR ★ A de-luxe unit with seven ranges down to 1 kHz ★ switch selected from front panel ★ 1 MHz-500Hz-100 kHz-50 kHz-10 kHz-5 kHz-1 kHz ★ Radiates from its own 8 inch ant. ★ Markers usable from 1 MHz to UHF ★ Complete with ant., ready to use, just connect a 9v. battery, £19-00 + VAT (8%) + 25p. P. & P.

NEW PRODUCTS (Out Mid August) Printed circuit modules ★ fibre glass circuit boards ★ assembled and tested ★ complete with control pots and rotary switches. **TYPE A.C.I.** Audio compressor, assembled. Tested and three pots., spec. as above, £11-50 + 12½% VAT + 50p P. & P.

TYPE B.P.I. Band pass filter, assembled. Tested. Complete with eight position rotary switch, spec. as above, £12-50 + 12½% VAT + 50p P. & P.

TYPE P.N.I. Peak notch filter. Assembled and tested, complete with two pots., spec. as above, £12-50 + 50p. P. & P. + 12½% VAT.

THE TECH ASSOCIATES PRE-SELECTOR. Peaks all signals. amateur bands + broadcast bands ★ tunable from 1.6 MHz to 31 MHz ★ three switched bands ★ R.F. gain control to prevent strong station overload ★ S.O.259 I/P and O/P sockets ★ two transistors. F.E.T. R.F. amp + bi-polar emitter follower for 50-75Ω O/P ★ two types available.

★ **TYPE 1** with ant changeover relay for transceiver use, £26-00 + 12½% VAT + 75p P. & P.

★ **TYPE 2** for S.W.L. without ant. relay, £23-00 + 12½% VAT + 75p P. & P.

S.A.E. with all enquiries.

Exports welcome.

TECHNICAL ASSOCIATES

83 SCOTLAND WAY, HORSFORTH, LEEDS, YORKSHIRE

Tel. HORSFORTH 586735

SMALL ADVERTISEMENTS

("SITUATIONS" AND "TRADE")

9p per word, minimum charge £1.50. No series discount. All charges payable with order. Insertions of radio interest only accepted. Add 50% for Bold Face (Heavy Type). Box Numbers 25p extra. No responsibility accepted for transcription errors. Replies to Box Numbers should be addressed to The Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ.

TRADE

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

Save £100: FR-101D, three months old, selling for customer. — Holdings, 39/41 Mincing Lane, Blackburn, Lancs., BB2 2AF. (Tel: 59595/6).

Clearance Sale: Unrepeatable Offers. **FT-220** two-metre FM/SSB/CW/VFO transceiver, new and unused, only £240, plus VAT. **FT-101B/FT-227B** 10-160m. SSB transceiver, new, but slightly defective, hence only £275 plus VAT. **TS-145**, two-metre 1-10w. mobile FM transceiver, with two frequencies, new and unused, only £98 plus VAT. **FM 144-10 SXR-11** new mobile 1-10w. FM synthesised digital transceiver, covering the two-metre band in 5 kHz steps, with repeater shift and narrow-pass filters, only £180 plus VAT. **TA-101F** VHF band transceivers, new but old stock minus xtals, £180 plus VAT. **Fritzell FB73** seven-element beam for 10-15-20m., manufactured in Germany to the highest possible standard, new and unused, £145 plus VAT. Offers considered for all these items. For further details or information, write or phone: — **Communique, 129-131 Park Road, London, N.W.8** (Tel: 01-402 0186).

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

Vintage radio: Receivers, valves, components service sheets, books and magazines, 1920-1950, send s.a.e. with enquiries or 50p for full catalogue. — **Tudor Rees, 64 Broad Street, Staple Hill, Bristol, BS16 5NL.** (Tel: Bristol 565472).

Amidon Toroidal Cores, W2AU Baluns, and Used Equipment, send s.a.e. to GW3TMP, QTHR, Tel: 035-287 846.

Yaesu, Hy-Gain, Cushcraft, Jaybeam, etc., all Amateur Equipment needs supplied, S.M.C. agent.— GW3TMP, QTHR, Tel: 035-287 846.

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

October issue: Due to appear September 30. Single copies at 45p post free will be sent by first-class mail for orders received by Tuesday, September 28, as available. — **Circulation Dept., Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts, AL6 9EQ.**

Aerial brackets: Limited offer 18-in. wall brackets, price £1.75 plus 75p carriage, U.K. only. — Ballards, 108 Camden Road, Tunbridge Wells, TN1 2QX.

READERS' ADVERTISEMENTS

5p per word, minimum charge 70p, payable with order. Add 25% for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 25p extra. Replies to Box Numbers should be addressed to the Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ.

READERS

For Sale: Heathkit HW-202 2-metre FM mobile transceiver, complete with tone-burst and 5/8 mobile whip, excellent condition. Offers invited. — Ring Ham, 0272-423020 (Bristol) after 6 p.m.

Sale: Collins 75A4, 10-160m., CW/SSB/AM, all filters, late model, plus superb Collins Velvet-Vernier slow-motion drive, in original and mint condition, with manufacturer's technical bulletins, transit case and manual, £225. Pye AM-10D Cambridge High-Band, 12.5 kHz filter, with mounting cradle, unmodified, mint condition, £45. Pye Base on two metres, excellent, £25. TS-700G, brand new and tested but unused, plus J-Beam 5/8 mobile whip, £365. **Wanted:** KW-107 and low-pass filter. (Lancs.). — Box No. 5522, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

Wanted: Hallicrafters S.27C in repairable condition. — Sykes, 30 Bridge Street, Louth, Lincs.

Selling: Pair of high-frequency transmitter/receivers, six channel, BFO, 6v. mobile, £50 or near offer. — Barnes, 58 Windsor Avenue, Hillingdon, Middlesex.

Selling: Liner-2, very good condition, recently checked over by suppliers, complete with mic., mobile mount and power cord, £125 — Cousins, G8FCU, Wylholme, Gorefield Road, Leverington, Wisbech, Cambs.

Wanted: IC-700R receiver, must be a good one. Details and price please. — Ring Taylor, Telford (0952) 505050 evenings.

Sale: Eddystone 840C receiver, with Joystick antenna and tuning unit, mint condition, £60. Buyer collects (North London). — Ring Seel, 01-804 4357.

Wanted: Versatower, prefer 40-ft. but consider 60-ft. post mounting. — Syme, G4DMN, Heronsgate, Manorial Road, Parkgate, Wirral, Merseyside, L64 6QW. (Tel: 051-336 2386).

Sale: Icom IC-202 SSB 2m. portable transceiver, as new, £135. — Stewart, GM4DHJ, QTHR. (Tel: Paisley 9010).

Selling: Heathkit SB-101, with matching speaker, PSU, SB-640, external VFO and mic., £260. Monitor-scope SB-610, £70. SB-200 linear, £130. All immaculate. Together £450. — Ring Jackson, G3CDE, Guildford 75236.

Selling: Trio JR-310 Rx, coverage 160-10m., SSB/AM/CW, fitted 10AZ CW mechanical filter, very good condition, with manual and speaker, £75. Pye AM 10DV Cambridge complete with new xtals for 145 MHz, and 5/8 mobile whip, £25 or near offer. — Munt, G3KTA, QTHR. (Tel: Burgh Heath 58758).

For Sale: Trio 9R-59DS, £55 cash. Buyer collects. — Wood, 78 Barrowgate Road, Chiswick, London W4 4QP.

Sale: Yaesu FR-50B Rx, with 160m. coil, modified to accept 2m. converter by Lowe Electronics, £80. — Anthony, 2 Cleavley Street, Eccles, Manchester. (Tel: 061-788 9133 after 6 p.m.).

Sale: Heath HW-32A transceiver (less PSU), recent factory service, £65. — Ring McCudden, GM4DLU, Alexandria 56118.

For Sale: Trio JR-500S receiver. — Ring Godber, Leicester 416796.



HIGH STABILITY OPTION FOR DIGITAL FREQUENCY METER

For the professional user and others requiring a highly stable reference oscillator, a high stability version of the Catronics model DFM5, using a temperature controlled crystal oven oscillator, is now available.

Frequency stability is better than ± 0.1 ppm over the temperature range 0 to $+60^{\circ}\text{C}$ after a 5-minute warm-up period.

Model DFM5/S 7 digit, 200 MHz frequency meter with oven—£160 + VAT (8%).



VHF COMMUNICATIONS

Now published—the 1976 SUMMER edition, which includes designs for—

23 cm. TRANSMIT CONVERTER
23 cm. RECEIVE CONVERTER
NOTES ON ATV TRANSMITTERS
FM HAND-HELD TRANSCEIVER (Pt. II)
DIGITAL MULTIMETER (Pt. I)

Send £1.00 for a copy of this edition or £3.75 for a year's subscription.

VHF COMMUNICATIONS is the English language edition of the German publication UKW-BERICHT, a quarterly amateur radio magazine especially catering for VHF/UHF/SHF technology. It is published in

Spring, Summer, Autumn and Winter. All special components required for the construction of the described equipment, such as printed circuit boards, coil formers, semiconductors and crystals, as well as complete kits, are available for despatch direct from Germany. Many of the printed circuit boards, in addition to a few selected kits, are stocked in the UK. A price list of kits and materials is available—send for your copy.

Orders to: VHF Communications at address below.

AMATEUR RADIO BULK BUYING GROUP

TROUBLED WITH TVI ?

New delivery of 1½in. ferrite toroids NOW available at 30p ea. (+20p post).

REMEMBER —

WE HAVE NOW MOVED

to New, Larger Premises—

COMMUNICATIONS HOUSE (Dept. 619)

20 WALLINGTON SQUARE,
WALLINGTON, SURREY, SM6 8RG

Telephone: 01-669 6700

NEW SAMSON ETM-3C C-MOS KEYS

1 μ A battery drain—Why switch off?

- Self-completing dots/dashes/spaces. ● Can be used either as normal electronic keyer or as an iambic mode squeeze keyer.
- 8-50 wpm. ● Constant 3:1 dash-dot ratio. ● 6 C-MOS ICs and 4 transistors. ● Plug-in PCB. ● Long battery life—typically 1 μ A drain when idling—Built-in battery holder for 4 x 1.5v batteries (but will work over 3-10v. range). ● PCB has both a read relay (250v., 0.5 amp., 25w. max.) and a switching transistor (300v., 30 mA max.)—either keying method can be used. ● Has the well-known fully-adjustable Samson precision twin keying lever assembly. ● Operate/Tune button. ● Sidetone oscillator. ● Grey case 4" x 2" x 6". ETM-3C, £54.15.

BUILT FOR DEPENDABLE MARINE AND COMMERCIAL SERVICE

JUNKER PRECISION HAND KEY

A superbly engineered straight key used for many years by professionals afloat and ashore. With this key you can't help but send good morse. Free-standing—no screwing down. Front and back contacts—fully-adjustable gaps/tension. Key-click filter. Hinged grey cover, £25.24.

BAUER KEYING PADDLE

Single-paddle unit on 1½" x 2" base for home-built EI-bugs. Adjustable gaps/tensions, £8.95.

88 mH TOROIDS

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

All prices post paid UK and include 12½% VAT.

Please send stamp with enquiries.

SPACEMARK LTD.

THORNFIELD HOUSE, DELAMER ROAD
ALTRINCHAM, CHESHIRE
(Tel: 061-928 8458)

★ BUY BRITISH ★

Help our Balance of Payments

For your 2 metre All Mode Transmitter—Tunable I.F.—Converter—Aerial Filter or 200 MHz Frequency Counter.

The only British Manufacturer of complete and integral professionally built VHF amateur equipment, who is determined to continue the struggle against apparently overwhelming oriental competition.

**BRITAIN CAN BE GREAT AGAIN
HELP US DO IT**

S.A.E. for further details of all Units or to our Agent

Reg Vincent Hoddesdon 64285 (Evenings)

TELFORD COMMUNICATIONS

78B HIGH STREET, BRIDGNORTH, SALOP, WV16 4DS
Tel.: 074-62 4082

PRACTICAL WIRELESS SERVICE MANUAL

(12th edition)

This book is a comprehensive guide both for the service engineer and hobbyist. The emphasis is placed on test and repair procedures and theory and circuitry is included to make easy reference to the text. This work covers receivers, components and valves, servicing, detector stages, alignment, FM receivers, radiograms and audio equipment, tape recorders, semiconductors, cabinet finishing and repairs, instruments, workshop techniques; facts, figures and formulae. An essential book for all connected with radio servicing.

228 pages

£2.45 inc. post

Publications Dept.

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

RTTY Sale: Creed 7E teleprinter, excellent order, £20. Delivery, or carriage extra by arrangement. — Michaelson, G3RDG, QTHR. (Tel: 01-455 8831).

Sale: IC-22A, mint condition, fitted R3-R7, input R7, S0, S20-S24, recently purchased, best offer over £140 secures. — Cross, G4DXG, QTHR. (Tel: 01-679 3215).

Wanted: Sphinx transmitter, 90 watts SSB, with control box, in good condition and with no mods. Also 100 kHz marker crystal. — Hurst, G3JJU, 31 Avondale Road, Fleet (5831), Hants.

Selling: FT-101B, £350; FV-101B, £40; SP-101B, £10. 'QM-70' transverter, 200 watts p.e.p., £70. IC-22A, 13 channel including Raynet, £120. "Radio & Television Servicing", 10 vols. 1965 to 1976, £40. Microwave Modules 70cm. converter, 14-16 MHz IF, £10. 10XY/2m. beam, unboxed, £15; 18-AVT/WB, £40. — Payne, G8FCA, QTHR. (Tel: Hitchin 50519).

Offering: Sommerkamp FT-250 HF transceiver, as new, complete with all 10-metre crystals and PSU. Also QM-70 Products 2m. high-power transverter. Offers? — Askey, G8JNN, QTHR. (Tel: Plymouth 62202 after 6.30 p.m.).

Selling: HW-101 transceiver, almost new, with SSB and CW filters, HP-23B PSU and SB-600 speaker, £258. HW-100, HP-23A PSU and SB-600, excellent performance, £165. — Beekar, G3WY. (Tel: Evesham 45497).

Wanted: Communications receiver in perfect working order, must be in East Anglia area. Details and price please. — Pretty, Priory Crescent, Fressingfield, Diss, Norfolk.

Wanted: HQ-1 Mini-Beam, in good condition with instructions. — Trickey, G4DCX, QTHR.

For Sale: Sommerkamp FR-100B receiver, coverage 10-160m., 100-400 Hz filter, handbook, £95. Trio JR-500S receiver, 10-80m., with handbook, no mods., £55. Yaesu FP-400 speaker and cabinet, as new, in makers' carton, £8. Heath "Mohican" receiver, £40. All good condition and "or near offer". Buyers collect. — Ring Tew, 01-648 5895 business hours.

For Sale: S-52 'scope, good, £30. Nombrex 31 RF signal generator, fair, £3; ditto audio, erratic, £2. 70cm. PA with lash-up PSU, £5. CDE autorotor, £5. SWR/power meter, £2. LFC20 xtal filter, £1. Xtals: HC6U on 53.275, 50p, HC25U on 17575, 17562.5, 17621.8, 18006.4, 18042.7, £1. Car cartridge player, £3. Any reasonable offer together or separately. — Jarvis, GM8APX, Dall, Rannoch, Perth. PH17 2QH. (Tel: 08822-379).

Offering: K.W. Atlanta, 300 watts, with PSU, mic., and handbook. Offers? — Rayer, G3OGR, Longdon Heath, Upton-on-Severn (2244), Worcs.

Sale: IC-22A two-metre FM transceiver, £125. — Knox, G4CPD, QTHR. (Tel: Bradford 630266).

For Sale: IC-21 FM transceiver, fitted 145, S20, S21, S22, R6 and R7 channels, with mic. and handbook, £100, FB. 5/8 mast mounted whip, £5. Heathkit HW-7, £25. — Stampton, G3ZDR, QTHR. (Tel: Gravesend 63284 evenings).

Selling: R.C.A. AR88D, good condition, £45. Buyer collect, or sent Securicor plus cost. — Bottomley, G6TZ, QTHR.

Sale: Heath RF-1U signal generator, £20. IT-12 signal tracer, £10. Both in very good condition and "or near offer". — Newman, 37 Chalgrove Road, Thame, Oxon. (Tel: 084421-4200).

Selling: HRO-M with PSU and 8 coils (100 kHz-30 MHz), UX valves, good working order, £25. — Barratt, 59 Gilpin Avenue, London S.W.14. (Tel: 01-876 6347).

For Sale: Yaesu FT-224 mobile 2m., many extra channels, new, boxed, £135. FR-101 de luxe digital receiver, new, boxed, £375. HF 2 kW linear, commercially built, £165. BC-221 frequency meter, £20. **Selling:** KW-2000E, as new, recently re-aligned by K.W., £250. **Wanted:** TH3 Jr. or similar tri-band beam. — Macfarlen, GM3GJB. (Tel: 0324-23608, Falkirk).

October Issue: To appear Thursday, September 30, single copies at 45p post free will be dispatched first-class mail on receipt from printers. Orders by Tuesday, September 28, with remittance to: Circulation Dept., Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

Selling: Trio TR-7010 with stabilised PSU, pre-amp. and extra xtal, hardly used, £170. — Davies, G8HBQ, QTHR. (Tel: Leeds 656888).

Wanted: Drake type T4-X transmitter. Buyer will service if required, and collect if possible. Spot cash. (S. Humberside). — Box No. 5525, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

Bargain: Liner-2, 40w. linear, stabilised PSU, £140. Also Heath GDO, £12. 8/8 70cm. slot, £8. — Hardy, G8EYV, QTHR. (Tel: Nottingham 251455).

For Sale: VHF Marine receivers: MS-2 pocket receiver on four channels (auto scanning), £50. MR-2 pocket receiver, 12 channels, 6 crystals fitted, £40. Monitor AS-6 on 6 channels, £40. Sentry pocket AM receiver with 3 crystal-controlled VHF frequencies, £35. All sets are new and can be adjusted to operate between 144-158 MHz approx. **Transmitter 200mW., crystal controlled voice or bleep transmission, printed board in die-cast box, built-in batteries, 4-in. by 2-in. by 1-in., 145 MHz crystal fitted, £38. — Mulhall, 9 Cedar Grove, Ardglass, Co. Down, N. Ireland BT30 7SF. (Tel: 039-684 461 after 6 p.m.).**

Wanted: CR-100 or similar type receiver, must be in mint condition. Also AR88D main tuning dial. Details and prices please. (Tyne and Wear). — Box No. 5526, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

Selling: Eddystone 888 Rx minus CW filter, product detector fitted, with S-meter, £55. AR88, no mods., new manual, £37 — Ring Handy, Coventry 22201.

QRT Sale: Liner-2, pre-amp., accessories, £120. Stabilised PSU 13.8v., 6A., 6/12/24v., £10. AR-40 rotator, £32. J-Beam 6-ele quad, £12; both as new. SWR-50 bridge, £6; connecting cables supplied. Or the lot for £175. Dummy load, TVI filters, co-ax switch/relay, books mags., junk - s.a.e. for list. — Wickstead, G8IXB, QTHR. (Tel: Maidenhead 26010).

Sell or Exchange: Nordemende "Globetrotter Amateur" portable Rx, FM/AM/CW/SSB, amateur band-spread and general coverage, 0.5-30 MHz. **Want good valve Rx, R.109 or W-H-Y? — Smith, GM4DNM, St. Ninian's, Cardenden, Fife. KY5 0JG.**

Selling: Marconi TF-936 impedance bridge, £35. TF-934 deviation test set, 2.5-100 MHz, 500 on harmonics, £22. TF-958 valve voltmeter, £14. Testers T.M.S. No. 8, £12. Wayne-Kerr CT-375 impedance bridge, £45. BSR audio oscillator, £12. Carriage extra. (Sheffield). — Box No. 5523, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

Selling: Swan 300B Cygnet transceiver, complete with mic., instruction book, V/SWR bridge, multi-band trap dipole with co-ax, and Swan IC AF unit, all as new, £280 or near offer. — Cottrell, 74 Church Lane, Gorleston, Great Yarmouth NR31 7BG.

G4DSG

G3HEO

D. P. HOBBS LTD.**THE COMPONENT SPECIALISTS**

Trio QR666 communications Receiver, £145-00.

Inoue. Mains Power Unit for IC22A, £35-00.

Inoue IC201 FM/SSB/CW Transceiver. £318-00

Liner 2 SSB 2 metre Transceiver, £145-00. Power supply £21-00

Yaesu FT200 HF Band Transceiver £255-00 with power supply.

QM70 Products. 28/144 MHz Solid State Transverter. 2 watts output. Linear and clean output, £41-40.

28/432 MHz 10 watt output Transverter, £76-80.

28/144 MHz High Power Transverter up to 200 watts P.E.P. Input. 2-IF outputs, £88-80.

144 PA50. All Solid State 50 watts RMS. Output 2 metre. Linear Amplifier will accept F.M. SSB, AM, CW, £44-00.

432 VLA Linear Amplifier providing up to 50 watts RMS output, £33-60.

2FM70. 70 Cms. or 2 metre at the flick of a switch, £46-40.

MICROWAVE MODULES

144 Converters 2-4, 4-6, 14-16, 28-30 MHz output, £16-00.

70 MHz Converters, £16-00. 70 Cms. Converters, £17-60.

1296 MHz Converters, £21-60.

2 metre Pre-Amp, £9-04. 1296 Varactor Tripler, £25-04.

432 Varactor Tripler, £17-60.

432 Transverter, £84-00.

All above plus 12½% VAT

50 MHz Counter, £61-11. 500 MHz Prescaler, £25-00.

All above plus 8% VAT

Also in Stock : Jaybeam Aerials, Denco Coils, Bantex Aerials, Die-Cast and Alum. Boxes and thousands of components.

PART EXCHANGE WELCOME ACCESS OR BARCLAY CARD
11 KING STREET, LUTON, BEDS.
Telephone 20907

"XG8" MORSEMASTER CASSETTES**ONE TAPE — ONE HOUR — ONE SPEED**

Speeds:— 4, 5, 6, 7, 8, 9, 10, 11, 12, wpm

Types:— CODE, or P.L., or FIGURE EXERCISES
State SPEED(S) and TYPE(S) required

Single cassette — £3, or any three for £7-95

Also available : BEGINNER PACK (2 tapes), £5-60



P.O. Box 99, Milton Keynes MK3 5BR
Tel. Milton Keynes (0908) 77710

HOW'S YOUR LINEAR?

Still linear? Flat topped? Carrier balanced? Bias okay? CHECK all FAST with a TWO TONE OSCILLATOR (and 'scope). Also switches to SINGLE TONE for audio testing, Morse practice, etc. EASY to make, all parts, case, PCB, instructions, money back assurance, ONLY £5-50 inc. post, £6-70 airmail.

CAMBRIDGE KITS

45 (SJ) Old School Lane,
Milton, Cambridge

T.M.P. ELECTRONIC SUPPLIES

YAESU HY-GAIN W2AU BALUNS AMIDON TOROID CORES

As New Used Equipment

FTDX401 with CW filter £280-00

FLDX500 transmitter £180-00

HW-101 with CW filter and HP23 AC PSU £190-00

All above serviced, realigned and tested. Carriage extra

3 Bryn Clyd, Leeswood, Mold, CH7 4RU, North Wales
Tel.: Pontybodkin 846 (STD 035 287)

C&C electronics



10 WEST PARK, LONDON SE9 4RQ

Telephone: 01-852 9397

●CRYSTALS

We shall be exhibiting at the following events during August and September: Derby, Peterborough, Harlow and Welsh Amateur Radio Convention.

MADE TO ORDER CRYSTALS. 50 kHz to 216 MHz.

CRYSTALS SUITABLE FOR MOST AMATEUR REQUIREMENTS

Holder styles HC6/U, HC18/U, HC25/U 1.5-21 MHz fundamental, 21-105 MHz overtone. Delivery approx 4 weeks. Specification 50ppm 0-60° or 30ppm at ambient. (Please state required tolerance and I/P capacity on fundamentals). Prices: 1.5-2.6 MHz, £3.28; 2.6-105 MHz, £2.75—5% discount for 5 or more crystals. Special rates for Club bulk purchase schemes including free supply of crystals for U.K. repeaters. Please note crystals below 4MHz not available in HC18/U or HC25/U at the above prices.

SURPLUS CRYSTALS FOR SALE

HC25/U for 2 metres at £1.00 per crystal.
6 MHz X24 for 144.3, 144.36, 144.6 and 145.4.
18 MHz X8 for 144.3, 144.6 and 145.
52 MHz +107/3 for 144.6 and 144.36.
HC6/U for 70 cms. at £1.20 per crystal.
8 MHz X54 for 433-025, 433.55 and 431-350.
12 MHz X36 for 433-025, 433.55 and 431-350.
13 MHz X32 for 433-550.
30 MHz —10.7/14 for 434-625 and 433-550.
11 MHz —10.7/36 for 433-550.

CRYSTALS FOR POPULAR VHF TRANSCEIVERS

Crystals supplied in 4 weeks to any stated frequency or the following VHF transceivers: Heathkit, Icom Ken, Standard, Trio and Yaesu. Price £2.36/crystal.

100 kHz in HC13/U (same base as HC6/U). Price £2.50.

1000 kHz in HC6/U. Price £2.50.

LOW FREQUENCY STANDARDS (8% VAT)

100 kHz in HC13/U (same base as HC6/U). Price £2.50.

1000 kHz in HC6/U. Price £2.50.

CRYSTAL SOCKETS HC6/U and HC25/U. Price 16p.

All prices include postage to UK and Irish addresses. Crystals supplied to any specification for industrial, mobile radio or marine use, etc. State equipment/specification when enquiring. Please send see with all enquiries.

The above prices are ex VAT. Please add 12½% unless otherwise stated.

G. W. M. RADIO LTD.

All prices include VAT and post/carriage. Discount for callers
AERIAL INSULATORS. EGG type, white china 1½" 6 for £1; Pyrex 2½" 75p each. Compact mains trans. 110/250 to 150-0-150v, 50ma and 6v. 1a. Suitable for TTL/Nixie or BC221 PSU, good used condition, £1.75. KEY TELEGRAPH and Cable Assembly, Z1/5805/99/949/2729, complete 4-pin Plesin plug for Redifon GR410, £3.50. Transmitting capacitors, JB 100pf twin stator, £1.50. STABILISED power supplies, ADVANCE type DC260, 4-12v, at 3a., £6. Complete with data sheet. SGB type "P" headphones, good use condition, £3.50.

PLUG-INS FOR CD1212 'SCOPE. Wide Band 40 Mc/s, £21, Dual beam 24 Mc/s, £26. Solatron CT436 (CD1014) Double beam Oscilloscopes. DC to 6 Mc/s Sensitivity 100 mV/cm. Time base 1 cm/us—1 cm/s, £65. Solatron CD513 single beam £40.

WATCHES. G.S. Smiths, second hand, £9.50. Eterna, £9.50. Lemanja stop 1/5th second, £16.75. All screw back, all overhauled and genuine ex Military. Sent by Registered post.

PERMEABILITY TUNER UNITS. High quality 4 medium 1 long wave push button tuner with manual tuning. Circuit for Hi Fi AM tuner, £1.75.

FREQUENCY METERS BC221 complete charts, no psu, £16.
ISOLATORS, 1-0 GHz. Marconi type F1020-13 £5. 12 volt 4 pin VIBRATORS for 19, 22 or 62 etc. 3 for £1.25.

ASIO Tx UNITS 2-10 Mc/s, £6.
BATTERY CHARGERS. 250 AC input. With information on simple conversion to charge two Ni-Cads at constant current of 25ma. Two jewelled 30ma meters, £3.

SEMI-CONDUCTORS. All brand new with information sheets CA3012 Limiting IF FM amplifier, 2 for £1.50. CA3026 Dual independent differential amplifier, 2 for £1. 2N3632 RF power silicon NPN identical output powers of 10 watts at 260 MHz, £2.50. 2N1671B Unijunctions, ideal for timers, oscillators and thyristor triggering, 60p. BSY95A Logic switch, 10 for 80p. 1N4003 150v. la silicon rectifier, 10 for 80p. 74H00 Fast TTL quad 2 input NAND gate, 2 for 80p. ZTX500 PNP amplifier, 5 for 80p. BSY38, 350 MHz fast switch, 5 for 80p. S1803 RF silicon rectifier, 800v, 750ma, 4 for 80p. 333C 12v. HINIL twin gate and quad inverter, 2 for 80p. 41HF40 silicon power diode, 400v, 40a, 75p, 4 for £2.50. BYZ13, 800v, 20a, 85p, 4 for £2.75.

RADIO TELEPHONES. Cambridge boot mounting, Hi or Lo band with control box and cable only, £25. Vanguard units only single channel valve Lo band, no accessories, £11. Rank TR1005 Low consumption (quick heat valves) Low band "PPI" (approx. 99 MHz) internal speaker and mike, 11" x 9" x 3½", £20. Lo band "P" transistor Vanguards with accessories, £28. Pye Pocketphones PFI for 420 MHz. Less batteries and crystals. Clean and complete, untested, £25 pair (one Tx one Rx).

All Receivers and Test Equipment are in working order at time of dispatch Carriage charges included for England and Wales only Telephone 34899

Terms: Cash with order. Early closing Wednesday.
40-42 PORTLAND ROAD, WORTHING SUSSEX

Exchanges considered. — Taylor, 5 Luther Road, Winton, Bournemouth.

For Sale: Receivers: CR-150, 2-50 MHz; SX.28, 550 kHz-42 MHz; R.1155B; also many old domestic receivers. **Transmitters:** T.1154, 10 watts, 160m.; 150 watts, several bands. **Transceivers:** 62 Sets, 1.5-10 MHz; No. 19 Set; ZC1 Mk.II; 52 Sets. HT power supplies; 1200-0-1200v. transformer. (Leics.). — Box No. 5524, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

Sale: KW-2000E with AC/PSU, as new, £285. Mobile DC/PSU, £35. Microwave Modules MMC432/144 converter, £16. MMV432 tripler, £15. Heath G.D.O., £12. Yaesu desk mic., £12. **Wanted:** FT-75, Westminster W15AM/W15UHF, mobile any condition, or W-H-Y? — Perrin, G4AFY, QTHR. (Tel: Kidderminster 63358).

Exchange or sell: KW-2000B with AC/PSU, KW-103, 18-AVT/WB, all mint, £200 or will split. **Wanted:** FDK Multi-2000, Liner-2 or similar, cash adjustment if necessary. — Ring Cowdery, G3UKB, Welwyn 4454.

For Sale: Stolle Multimatic rotor Type 2030/220, in new condition, £35. Five-ele 2-metre Yagi, £4. Home-built two-metre Mosfet converter, 2-4 MHz IF, excellent little converter, £4. — Ring Turnbull, G4ESA/G8JTO, Portsmouth 28688.

Sale: Two-metre Rx, all modes, assembled from "Arac" modules in Heath SB-200 case, fully tunable 144-146 MHz, includes Solid State Modules Mosfet converter, PA-3 pre-amp., FM disc, AF amp. and main Rx module 28-30 MHz, 12v.DC. Offers? **Wanted:** LA-2 linear amp. in good condition, your price or swap/part-exchange items: LA-106 linear amp., 200w. p.e.p. input, low/high power, all modes, immaculate, only 4 months old, £140. (or might exchange for good hand-held FM transceiver). 14-ele Parabeam, brand new, £14. Datong RF clipper, module assembled in own case (FT-101 mic. socket), £15. Carriage at cost. — Smyth, GM3XNE, 4 Afton Place, Ardrossan, Scotland. (Tel: 0294-67326).

Selling: Heath 10-18U oscilloscope, as new, £25. Trio 9R-59 receiver, excellent condition, £28. CDR rotator, £10. BC-221, original charts, built-in PSU, £12. Taylor 68A signal generator, £12. Heath GDO Type GD-1U, 8 coils, £14. Cash. Buyer collects. — Grigg, G3PRX, QTHR. (Tel: Medway 361433).

Sale: Grundig Satellite 2000 plus SSB kit, perfect, virtually unused, full instructions etc. (new 24.2.76 and cost £225), £135 or near offer. — Taylor, 25 High Brow, Harborne, Birmingham.

Selling: Trio 9R-59DS receiver and SP-5 speaker; also home-built 2m. converter with integral PSU in metal case; Sony stereo headphones, 8-ohm. All in perfect condition, The Lot, £55. — Lee, G5FH, QTHR. (Tel: 0425-2 5974 evenings).

Sale: Liner-2 with pre-amp. and R.115E PSU, £120 or near offer. Pye "Compact", charger, nicads, case, working on 433.2 MHz but Tx needs attention, £35 or near offer. Shure 444 mic., £10. Technical Associates compressor, £11. — Woodhouse, G8DEE, 24 Hurst Park Avenue, Cambridge, CB4 2AE. (Tel: Cambridge 64251).

Wanted: Army Wireless Sets Types 58, 48, 46 and 52; also R.208, R.209, BC-611 handie-talkie and suitcase transmitter. Any other interesting wartime equipment considered. — Morriss, Pippingford Park, Nutley, Sussex.

J and A TWEEDY (Electronic Supplies) Limited

79 CHATSWORTH ROAD, CHESTERFIELD,
DERBYSHIRE

Telephone 34982

THE HAM SHACK, ROUGHTON LANE,
WOODHALL SPA, LINCOLNSHIRE

Telephone 52793

TESTED TRADE IN'S

KW 2000 AC/DC supplies ...	£120.00
KW 2000 A AC/DC supplies ...	£170.00
Eico transceiver 80/40/20 ...	£120.00
Swan 700CX ...	£365.00
Europa B ...	£75.00
Heath SB 610 ...	£75.00
BC 221 ...	£35.00

BARGAIN CORNER

FR101 and FL101 ...	£540.00
Atal 228 ...	£100.00
SSR 1 GC receiver ...	£150.00
Trio transverter ...	£100.00
Slow scan TV complete ...	£375.00

TAVASU MOBILE AERIALS

Complete set ...	£27.00
Single Band ...	£15.45

HY-GAIN AERIALS

14 AVO/WB ...	£45.00
18 AVT/WB ...	£65.00
TH 3jr ...	£79.00
Hq 1 minibeam ...	£79.00

HP a pleasure — ACCESS by telephone — Trade In's

ACCESSORIES

10W Traps ...	£4.00
10W Traps HP ...	£6.00
AR 40 rotators ...	£43.00
TV1 filters ...	£2.00
TE 15 GDO ...	£27.00
KW aerial Switch ...	£7.50
PL 259 ...	50p
SO 239 ...	50p
In line conn ...	95p

GO FM WITH UNIDEN

10w. or 1w. 10 channels ... £168.00

YAESU

Carriage paid to your door	
FT 101 E ...	£482.62
FR 101D ...	£438.75
FL 2100B ...	£279.90
FT 221 ...	£403.87
FRG 7 New GC Rx ...	£146.00
YO 100 ...	£127.44
YP 150 Power Meter ...	£47.52
YC 601 Dig Display ...	£118.80
FT 200 ...	£280.00
FTV 250 2m. trans-verter ...	£156.37
FV 101B ...	£61.31
SP 101B ...	£17.21

RESISTORS . . .

Just arrived 1/2 million carbon film resistors offered in the following packs.

1 watt	11 ohm to 3 K ohm 3-6 K ohm to 6-8 M ohm
1/2 watt	4-7 ohm to 5-1 k ohm 5-6 K ohm to 1-5 M ohm 10 K ohm to 1-1 M ohm
1/4 watt	1 ohm to 9-1 K ohm 11 K ohm to 10 M ohm
1/8 watt	4-7 ohm to 18 K ohm 22 K ohm to 8-2 M ohm
Eighth watt	1-2 ohm to 100 ohm 130 ohm to 9-1 K ohm 33 K ohm to 910 K ohm

150 resistors per pack, usually 5 of each preferred value over the range. PRICE: 60p per pack inc. VAT

Postage: 1 pack 30p, 2 packs 40p, 3 packs 45p, 4 packs 50p, 5 or over 60p. All the above are 1st grade carbon film types which is a very high grade resistor-non-inductive-and because of their superior method of manufacture are rather larger than the common cracked carbon type, given good ventilation they can be run at twice the above wattages. Mixed 5%, 2% and 1% high stability tolerances.

ALSO . . . Bulk lots of any single value available in 1w, 1/2w, 1/4w, 1/8w, 1/10w watt/1/20th watt in most values from 1 ohm to 22 M ohms at 45p per 100 or £4 per 1,000 inc. VAT, post extra.

Send a SAE (large) or stamp for free sample strip of 5 resistors and lists* ALSO . . . Don't forget Coax cables still in stock, examples:—

- UR67 at 25p per metre, post 4p per metre in drums up to 100m.
- UR95 at 4p per metre, post 1p, miniature nylon 50 ohm coax.
- CRYSTALS . . . 25,000 available. S.A.E. for lists.
- New arrivals: 8077 MHz HC6Us ex-equip. £1 each.
- Pye Dash LB Rangers, £6, postage £2.

RESISTORS AND CABLES and lots of other lines at the WELSH AMATEUR RADIO CONVENTION, Blackwood on Sept. 26.

W. H. WESTLAKE, CLAWTON, HOLSORTHY, DEVON
Tel: Holsworthy 257736

REG. WARD & CO. LTD.

(G2BSW)
(G8CA)

KW 108 Mon. scope ...	£85.00
KW 103 VSWR Meter and Combined Power Meter ...	£16.00
KW 107 Combined E-Z Match, VSWR and RF Power Indicator, Dummy Load and Antenna Switch for 3 Outlets ...	£68.00
KW Trip Dipole Coaxial Feeder ...	£26.00
KW Trap Dipole with Balun ...	£29.00
KW 3-way Antenna Switches (for coax) ...	£6.00

YAESU

Yaesu 101E ...	£429.00
FT200B Transceiver and FP200 A/C PSU ...	£289.00
Yaesu FT 201 Transceiver ...	£299.00
Yaesu FR101S RX ...	£299.00
Yaesu FR101D ...	£390.00
Yaesu 401B Tcvr ...	£365.00
Yaesu YO100 Mon. scope ...	£118.00
FT221-2M TCVR: CW/AM/FM ...	

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

SHURE MICROPHONES
Model 444, £19.20 ; Model 201, £8.40.

USED EQUIPMENT :

Yaesu FL101 TX. Mint—few hours use only, inc. speech processor (to be fitted) ...	£130.50
KW 202 Rx ...	£130.00
Yaesu FR 50B (CAL) ...	£70.00
Yaesu FV 101B VFO ...	£48.00
Collins 75S 3B Rx with Auto Trans. ...	£235.00
Trio TR 7010 2m. SSB Mobile Tcvr. ...	£140.62

WANTED

Yaesu FR50B's in good condition. VALVES for YAESU, etc. 6BM8, 6BZ6, 6G8, 6EJ7, 6AV6, 6KD6, 12AX7A, 12BY7A, 12AU7, R.C.A. VALVES for KW and Heathkit equipment, 6146, 6146B, 6HF5, 6LQ6, 6GES, 6EAB, 6GWB, 6GK6, 6CM6, 6CL6, 6CB6, 6BN8, 6HS6, 6EW6, 12BA6, 12BE6, 12B26, 6JS6C, etc., and many other types.
JBeams and Stolle Rotators: 140ft. 14g 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. Wightraps. G-Whips mob antennae, 12AVQ and 18AVT, etc. SWR.10 (Twin Meters). SWR/PWR Meters.

AMTRON KITS

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

Due to currency fluctuations prices of imported equipment are liable to alteration. Add 12 1/2% VAT to all prices except used equipment.

HP TERMS AVAILABLE CARRIAGE EXTRA ON ALL ITEMS
AXMINSTER - DEVON Telephone: 33163

Give for those who GAVE

Thousands of men and women who served in the Royal Air Forces have given their health or even their lives in the defence of Freedom and many of them or their dependants are now in need of help.

Please assist by giving all you can for an emblem during WINGS WEEK or please send us a donation.

PLEASE WEAR THIS EMBLEM DURING



Wings Appeal
During September



Royal Air Forces Association, 43, Grove Park Road, London, W4 3RU.

(Incorporated by Royal Charter and registered under the War Charities Act 1940 and Charities Act 1960).



CALL BOOKS

INTERNATIONAL :

RADIO AMATEUR CALL BOOKS (1976)	
"DX Listings"	£7-05
"U.S. Listings"	£7-70
"G's" only, 1976 Edn.	£1-47

MAPS

DX ZONE MAP (GREAT CIRCLE)	
In colour with Country/Prefix Supplement	£1-50

AMATEUR RADIO MAP OF WORLD	
Mercator Projection — Much DX Information — in colour. Second Edition	£1-00

RADIO AMATEUR MAP OF THE U.S.A. AND NORTH AMERICA	
State boundaries and prefixes, size 24" by 30", paper	77p

RADIO AMATEUR'S WORLD ATLAS	
In booklet form, Mercator projection, for desk use. Gives Zones and Prefixes (New Edition)	£1-75

LOG BOOKS

Standard Log (New Glossy Cover)	£1-05
Receiving Station Log	£1-15
Minilog (New style)	75p

(The above prices include postage and packing).

Available from SHORT WAVE MAGAZINE

Publications Dept., 34 High Street, Welwyn,
Herts. AL6 9EQ - Tel. Welwyn (043871) 5206/7

(Counter Service, 9.30-5.15, Mon. to Fri.)

(GIRO A/C No. 547 6151)

"DX ZONE MAP"

SEVENTH REPRINT !

In four colours, on durable paper for wall mounting, 35in. wide by 25in. deep. Giving essential DX information—bearing and distance of all parts of the world relative to the U.K., the 40 Zone areas into which the world is divided for Amateur Radio purposes, with major prefixes listed separately. Distance scale in miles and kilometres. Time scale in GMT. Marking of Lat./Long. close enough for accurate plotting. Hundreds of place names, mainly the unusual ones, and most of the rare islands.

With Prefix List revised to Sept. 1973
Price £1-50

including postage and special packing in
postal tube to avoid damage in transit.

Publications Dept.

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

Latest 1976 (54th Edition)

CALL BOOK— DX LISTINGS

(i.e. all amateur call-signs outside the U.S.A.)

In this issue . . .

- * 251,481 licensed radio amateurs
- * 76,097 changes in listings
- * QSL Managers around the world
- * Radio Amateur Prefixes of the World, with Map
- * ARRL Countries list
- * Great Circle bearings
- * Standard Time charts
- * World-wide QSL Bureaux
- * Plus much, much more!

560 pages £7-05 inc. postage

Order from :

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

Latest 1976 (54th Edition)

CALL BOOK— U.S. LISTINGS

In this issue . . .

- * 280,919 U.S. licensed radio amateurs
- * Repeater Stations
- * SSTV Directory
- * Zip codes and licence class on all listings
- * Stop press—late QTH's
- * ARRL Countries list
- * International postal information
- * Census of Amateur Radio licences of the World
- * Plus many other features

680 pages £7-70 inc. postage

Order from :

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

Technical Books and Manuals

(ENGLISH AND AMERICAN)

AERIAL INFORMATION

Aerial Handbook (Briggs)	£1-05
Beam Antenna Handbook	£3-20
Cubical Quad Antennae. 2nd Edition	£3-05
Simple Low Cost Wire Antennas, by Orr	£2-90
73 Vertical Beam and Triangle Antennas (E. M. Noll)	£3-20
73 Dipole and Long-Wire Antennas (E. M. Noll)	£3-35
S.W.L. Antenna Construction Projects (E.M. Noll)	£2-25
Antenna Handbook (ARRL) 13th Edition	£3-00

BOOKS FOR THE BEGINNER

Electronics Self-Taught	£2-15
Beginners Guide to Radio	£2-60
Beginners Guide to Electronics	£2-25
Course in Radio Fundamentals, ARRL	£2-13
Guide to Amateur Radio (16th Edition) (RSGB)	£1-15
Ham Radio (A Beginners Guide) by R. H. Warring	£2-50
How to Become a Radio Amateur (ARRL)	O/P
Learning the RT code (ARRL)	70p
Morse Code for the Radio Amateur (RSGB)	40p
Radio Amateur Examination Manual (RSGB)	£1-15
Simple Short Wave Receivers (Data)	£1-00
Understanding Amateur Radio (ARRL)	£1-82

GENERAL

ABC of Electronics	£1-78
Better Short Wave Reception New 4th Edition	£2-98
FM & Repeaters for the Radio Amateur (ARRL)	£3-00
Easibinder (to hold 12 copies of "Short Wave Magazine" together)	£1-75
Guide to Broadcasting Stations (17th Edition)	95p
Ham Radio Notebook	£2-25
Practical Wireless Circuits	£2-45
Prefix List of Countries	28p
Radio Engineers Pocket Book (Newnes) (N.E.)	£1-35
Test Equipment for the Radio Amateur (RSGB)	£2-30
World Radio & T.V. Handbook 1976 Edition	£5-00
World's SW, MW, LW, FM and TV Broadcasting Stations Listing	70p
Walkie-Talkie Radio Operators Guide	£1-95

O/P (Out of print)

T. O/S (Temp. out of stock)

THE ABOVE PRICES INCLUDE POSTAGE AND PACKING

Many of these titles are American in origin

HANDBOOK AND MANUALS

Amateur Radio DX Handbook	£3-30
Electronic Circuit Handbook Vol. 1	£1-73
Electronic Circuit Handbook Vol. 2	£1-73
New RTTY Handbook	£2-75
Radio Amateur Handbook 1976 (ARRL)	£5-30
Radio Amateur Handbook 1976 (ARRL) Hard Cover	£7-65
Radio Amateur Operators Handbook	85p
RTTY A-Z (CQ Tech, Series)	£2-80
Surplus Conversion Handbook	£2-50
Slow Scan Television Handbook	£3-10
Television Interference Manual (G3JGO)	£1-00
Specialized Communications Techniques for the Amateur (ARRL)	£2-25
Practical Wireless Service Manual	£2-45
Advanced Communications Systems	£9-97
Working with the Oscilloscope	£1-85
Know your Oscilloscope	£3-30
Know your Signal Generators	£2-30

USEFUL REFERENCE BOOKS

Amateur Radio Techniques, 5th Edition (RSGB)	£2-47
Engineers Pocket Book, 6th Edition	£1-98
U.K. Call Book 1976	£1-47
Hints and Kinks (ARRL)	£1-60
Radio Data Reference Book (3rd Edition) RSGB	£1-35
Single Sideband for the Radio Amateur (ARRL)	£2-25
Sun, Earth and Radio (Hard Cover)	£2-60
NBFM Manual (RSGB)	£1-13
Q and A on Short Wave Listening	O/P
Electronics Data Book (ARRL)	£2-90

VALVE AND TRANSISTOR MANUALS

ABC of FET's	£1-50
Field-effect Transistors (Mullard)	£2-15
MOS Integrated Circuits & their Applications (Mullard)	O/P
Transistor Audio & Radio Circuits—2nd Ed. (Mullard)	£3-00
Towers' International Transistor Selector	£3-45
Principles of Transistor Circuits (5th Ed.)	£3-43
Service Valve and Semiconductor Equivalents	50p
Radio Valve and Semiconductor Data (10th Ed.)	£2-35
Transistor Pocket Book	£1-70
Popular Valve/Transistor Substitution Guide	£2-10
Integrated Circuit Pocket Book	£2-80

VHF PUBLICATIONS

VHF Handbook Wm. 1 Orr (New Ed.)	£3-90
VHF Manual (ARRL)	£3-05
VHF/UHF Manual (RSGB) (New 3rd Ed.)	£5-60

Amateur Radio Awards (RSGB)	£1-67
Teleprinter Handbook (RSGB)	£6-70

Available from

SHORT WAVE MAGAZINE

Publication Dept.

34 High Street, Welwyn, Herts. AL6 9EQ - Welwyn (043871) 5206/7

(Counter Service. 9.30-5.15. Mon. to Fri.)

(GIRO A/C. No. 547 6151)

B. BAMBER ELECTRONICS

DEPT 5, S STATION ROAD, LITTLEPORT, CAMBS., CB6 1QE

Tel.: Ely (0353) 860185 (Tuesday - Saturday)

CALLERS WELCOME SATURDAY ONLY 9.30-12.00, 1.30-5.00

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 VAT AS SHOWN

ALL BELOW — ADD 8% VAT

SPECIAL OFFER

FREE WELLER 25W (SP25) SOLDERING IRON (worth £3.24 inc. VAT) with all orders over £20.00. Limited period only, send now.

VARIABLE STABILISED POWER SUPPLY, mains input, 0-24V. output, stabilised and current limiting, at 500mA - 32V, at 50mA. Brand new by British manufacturer. Size approx. 7 1/2" x 2 1/2" x 4", complete with external 5kohm 3-turn pot for voltage control. Connection data supplied, £7.00.

50µA (25-0-25µA) EDGEWISE METERS, modern type by Sangamo Western, display area 1 1/2" x 1 1/2" with 2 mounting lugs. (Can be zeroed left or right hand), £1.50 each, while stocks last.

MAINS ISOLATION TRANSFORMERS. Tap to mains input, 240v, at 3A + 12v, at 500mA output. New, boxed, made by Gardners, £12.00.

FLEXIBLE HEATER STRIP, 240v. AC, 150 Watt, approx. 1 metre long (insulated with fibreglass) with mains connector block. Many, many uses, 60p each.

110v. NEONS, screw-in-type 4 for 50p.

PYE MOTOPHONES MFSAM, 3 channel AM. High Band. A nice little dash-mount rig, tunes easily to 2M (size 8" x 7" x 2 1/2" deep) internal speaker, with PTT mike. A self contained, fully transistorised unit. Un-tested, but just out of commercial service. Special Offer price £65.00, while stocks last.

SLOW-MOTION MOTORS (suitable for programmers, displays, etc.) 230/240v. AC input, rotation between 1 and 2 revs. per min. £1.25 each.

HEAVY DUTY RELAYS, 24v. DC operated (will work on 18v.), 3 heavy duty make contacts (around 10A rating) + 4 change contacts + 1 break contact. New, complete with mounting bracket (ideal for switching HT on Line) Many uses for this high quality unit, £1.50 each.

CERAMIC TAG STRIPS (4 on 1 mount), 10 mounts for 50p.

WE NOW STOCK WELLER SOLDERING EQUIPMENT (including the Famous TCPI).

AND SPIRALUX Tools for the Electronics enthusiast, S.A.E. for list.

MINIATURE 50 ohm COAX, high quality, PTFE insulation and blue PTFE cover, solid silver plated inner, and silver plated braid, approx. 3mm overall diameter (ideal for unit wiring of RF stages up to 23cms., etc.), 4 metres for 50p.

ALU-SOL ALUMINIUM SOLDER (Made by Multicore) Solders Aluminium to itself or Copper, Brass, Steel, Nickel or Tinplate, 16SWG with multicore flux with instructions, approx. 1 Metre coil 30p each. Large Reel (approx. 12 Metres) £2.75.

SMALL MAINS SUPPRESSORS (small chokes, ideal for radio, Hi-Fi inputs, etc.), approx. 1/2" x 1 1/2", 3 for 50p.

PYE CAMBRIDGE PC BOARDS (Removed from high band AM10)

RF and Mixer Board, £7.
10.7 MHz IF Board, £1.50.
455 kHz IF Board, £2.
AM AUDIO BOARD, £1.20.
AM SQUELCH BOARD, 50p.

CHANNEL LEDEX SWITCHES, 12v., complete with all trimmers and coils (removed from high band AM10), £4.

CAMBRIDGE Mod Transformer, £1.00.
Mod Driver Transformer, 75p
12/24v. Inverter Transformer, £1.25.
Pack of PA COILS, mostly silver plated, 50p

ALL BELOW — ADD 8% VAT

MINIATURE 2 PIN PLUGS & SOCKETS (Fit into 1/8" hole, pins enclosed, with covers for chassis mounting, or can be used for in-line connectors). Bargain pack of 3 plugs + 3 sockets + covers, 50p.

MIXED COMPONENT PACKS, containing resistors, capacitors, switches, pots, etc., all New (random sample bag revealed approx. 700 items) £2.00 per pack, while stocks last.

PERSPEX TUNER PANELS (for FM Band 2 tuners) marked 88-108 MHz and Channels 0-70, clear numbers, fest blacked out, smart modern appearance, size approx. 8 1/2" x 1 1/2", 2 for 35p.

MAINS TRANSFORMERS

All 240v. input, voltages quoted approx. RMS (Please quote Type No. only when ordering).

TYPE 10/2 10-0-10V at 2A, £1.50.

TYPE 12/5S approx. 125v. at 30mA, 65p.

TYPE 7/20, 400v. at 10mA, 200v. at 5mA, 63p. at 400mA, £1.25.

TYPE 14/4, 14v. at 4A, £2.50.

VHF RF chokes (wound on 2.2K 1/2W, resistors), 5 for 35p.

Relays, single pole change over, 20v. DC, approx. 1/2" x 1 1/2" x 1 1/2", 35p each.

PROGRAMMERS (Magnetic Devices) Contain 9 microswitches (suitable for mains operation) with 9 rotating cams, all individually adjustable, ideal for switching disco lights, displays, etc., or industrial machine programming. (Need slow motion motor to drive cams, not supplied) 9 switch version, £1.50.

TRANSISTORS

TO3 TRANSISTOR OSCILATOR SETS, 10 sets for 50p.

BSX20 transistors (VHF OSC/MULT), 3 for 50p.

BC108 (metal can), 4 for 50p.

BC108 (plastic BC108), 5 for 50p.

PNP AUDIO TYPE TO5 TRANSISTORS, 12 for 25p.

BFY51 TRANSISTORS, 4 for 60p.

BF152 (UHF AMP/MIXER), 3 for 50p.

BYX 38/300 Stud Rectifiers, 300v. at 2.5A 4 for 60p.

BA121 Varicap Diodes, 4 for 50p.

1N914 DIODES, 10 for 25p.

2N3055 type Transistors, OK, but unmarked, 5 for £1.

2N3819 Fet. 3 for 60p.

VALVES

QQVO3/20A (ex equipment), £3.00.

QQVO3/10 (ex equipment), 75p or 2 or £1.20.

2C39A (ex equipment), £1.00 each.

DET-22 (ex equipment), 2 for £1.00.

6BH6 (ex equipment), 2 for 50p.

PLUGS & SOCKETS

PL259 PLUGS (PTFE). Brand new, Packed with reducers, 60p each or 5 for £3.00.

SO239 SOCKETS (PTFE). Brand new (4 hole fixing type), 50p each or 5 for £2.25.

N-TYPE PLUGS, 50 ohm, 60p each.

N-TYPE SKTS. (4 hole chassis mounting, 50 ohms, small coax lead type), 60p each.

GREENPAR (GE30015). Chassis Lead Terminations. (These are the units which bolt on to the chassis, the lead is secured by screw cap, and the inner of the coax passes through the chassis), 30p each, 4 for £1.00.

25-WAY ISEP PLUGS and SOCKETS, 40p set (1 plus 1 skt.). Plugs and sockets sold separately at 25p each.

ALL BELOW — ADD 8% VAT

TUNED COILS, 2 section coils, around 1 MHz, with a black smart tuning knob, which moves an internal core to vary the inductance, many uses, easily rewound, 3 for 50p.

LEAD SUPPRESSORS (10 k ohm) for mobile plug leads, 4 for 50p.

PC BOARD WITHDRAWAL HANDLE'S mixed cols., 8 for 50p.

SOLDER, 20SWG, 60/40 alloy approx., 8 yds., 25p.

1 1/2" Polythene chassis mounting fuseholders, 6 for 30p.

2-6pf, 10mm. circular, ceramic trimmers (for VHF/UHF work), 3 pin mounting, 5 for 50p.

MULTICORE SOLDER, savbit size 12 reel 18swg £1.80.

HEAVY DUTY HEATSINK BLOCKS, undrilled, base area 2 1/2" x 2", with 6 fins, total height 2 1/2", 50p each.

SPECIAL OFFER

XTAL PACKS, 51 MHz range (our selection), HC6U, 10 for £1. SAE for our latest xtal list.

1mM METERS 2" square, plastic fronts (these have a paper scale stuck over the original marked 0-1mA, which is easily peeled off, and an internal 1BK resistor which is easily removed). Sorry, sold out.

Small Chrome handles, 1/2" dia., 1 1/2" between holds, 1" clearance, tapped 4BA (with screws and washers), 2 pair for 40p.

ALL BELOW — ADD 12 1/2% VAT

HIGH QUALITY SPEAKERS, 8 1/2" x 6" elliptical, 2" deep, 4 ohm, inverse magnet rates up to 10 Watts, £1.50 each, or 2 for £2.75 (Quantity discount available.)

ELECTROLYTICS

ELECTROLYTICS, 50µF, 450v., 2 for 50p.

ELECTROLYTICS, 100µF, 275v., 2 for 50p.

ELECTROLYTICS, 470µF 63v., 3 for 50p.

ELECTROLYTICS, 1,000µF 30v., 3 for 60p.

ELECTROLYTICS, 1,000µF 180v., 3 for £1.

ELECTROLYTICS 5,000 mfd. at 35v., 50p each.

ELECTROLYTICS, 5,000µF 50v., 60p each.

ITT ELECTROLYTICS, 6,800 mfd at 25v., high grade, screw terminals, with mounting clip, 50p each.

ELECTROLYTICS, 10,000 mfd. at 63v., 75p each.

PLESSEY "CATHODRAY" CAPACITORS, 0.04µF at 12.5v. DC, screw terminals, £1.50 each.

A large range of capacitors available at bargain prices, S.A.E. for list.

TV PLUGS (metal type), 5 for 50p.

TV SOCKETS (metal type), 4 for 50p.

TV LINE CONNECTORS (back-to-back skt.), 4 for 50p.

DIN 3-pin LINE SOCKETS, 15p each.

3 PIN DIN PLUGS, 15p each.

DIN 6-pin RIGHT ANGLED PLUGS, 20p each.

R/S MIDGET 3 pole, 4-way, rotary switches, 40p each.

MINIATURE EARPHONES with min. jack plug, 2 for 50p.

1 Meg. Lin. POTS 1/2" plastic spindle, 2 for 50p.

50k ohm lin. POTS, 1/2" plastic spindle, 40p each.

TWIN IF CANS, approx. 1" x 1/2" x 1" high, around 3.5 to 5 MHz, 2 separate transformers in one can, internally screened, 5 for 50p.

IF CANS, 1/2" square, suitable for rewind, 6 for 30p.

IF CANS, 1/2" x 3/4" x 1", suitable for rewind, 10 for 30p.

Printed by The Courier Printing Co. Ltd., Tunbridge Wells for the Proprietors and Publishers, The Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ. The Short Wave Magazine is obtainable abroad through the following: Continental Publishers & Distributors, Ltd., William Dawson & Son Ltd.; AUSTRALIA AND NEW ZEALAND — Gordon & Gotch, Ltd.; AMERICA — International News Company, 131 Varick Street, New York. Registered for transmission to Canada by Magazine Post. September, 1976.

Vol. XXXIV No. 7 THE SHORT WAVE MAGAZINE SEPTEMBER 1976