

# The SHORT WAVE Magazine

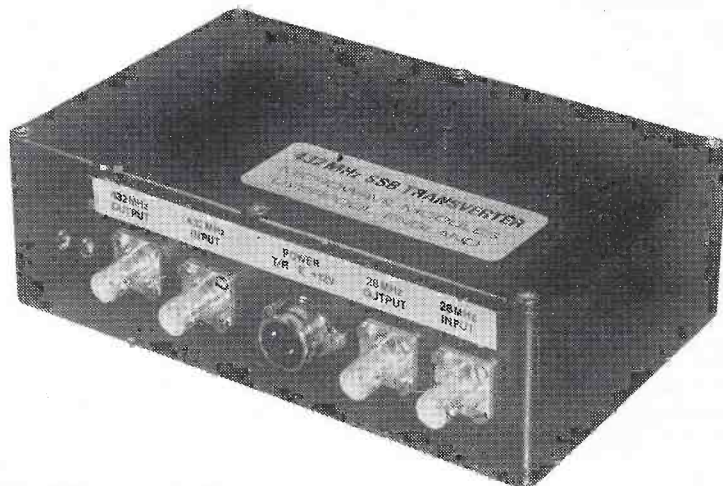
VOL. XXXIV

NOVEMBER, 1976

NUMBER 9

INTRODUCING . . .

## THE MICROWAVE MODULES TRIO !

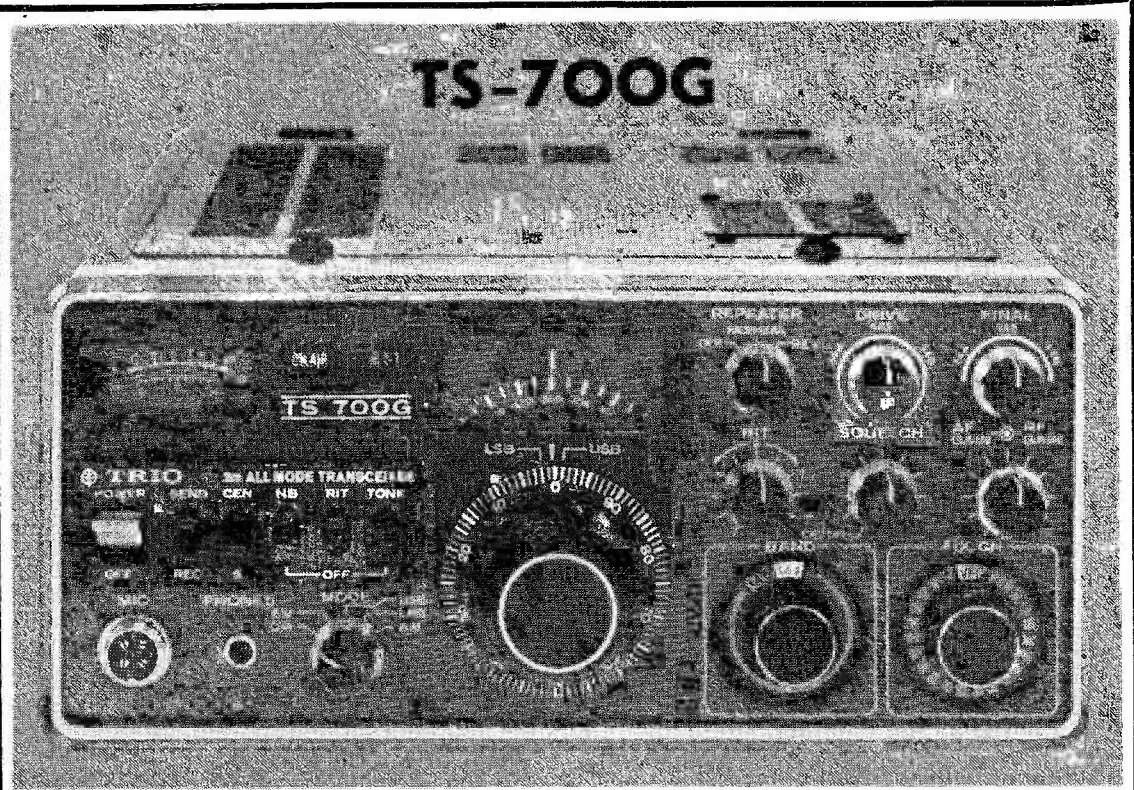


- |                   |   |  |
|-------------------|---|--|
| <b>MMT144/28</b>  | — | 28 MHz to 144 MHz all-mode solid state linear Transverter                    |
| RX                | — | Gain : 30 dB N.F. : 2.5 dB   |
| TX                | — | Required input : 500mW Power output : 10 watts continuous                    |
| PRICE             | — | £8.50 inc. VAT   |
| <b>MMT432/28</b>  | — | 28 MHz to 432 MHz all-mode solid state linear Transverter                    |
| RX                | — | Gain : 30 dB N.F. : 3.0 dB   |
| TX                | — | Required input : 500mW Power output : 10 watts continuous                    |
| PRICE             | — | £94.50 inc. VAT  |
| <b>MMT432/144</b> | — | 144 MHz to 432 MHz all-mode DOUBLE CONVERSION solid state linear Transverter |
| RX                | — | Gain : 10 dB N.F. : 3.0 dB   |
| TX                | — | Required input : 10 watts Power output : 10 watts continuous                 |
| PRICE             | — | £126 inc. VAT  |

All three transverters are similar in appearance to the pictured MMT432/28, and are housed in a highly durable black diecast case. The high power linear amplifier stages are housed in a separate internal compartment, thus ensuring excellent electrical and thermal stability. Low noise receive converters and low distortion transmit mixers are used throughout the range, and the use of the latest state of the art power amplifier transistors provide a reliable 10 watt continuous power output from all three models. Just a phone call will put you in touch with our experienced sales and technical staff, who will be pleased to assist you with any queries you may have.

Incidentally, all of our products are fully guaranteed for 12 months.

**MICROWAVE MODULES LIMITED**  
**BROOKFIELD DRIVE, AINTREE, LIVERPOOL**  
**L9 7AN**  
**TEL.: 051-523 4011**



**TS-700G**

In case you hadn't noticed, the TRIO TS-700 has a new look. Now updated and incorporating all the features which made it the most sought after transceiver on 2 metres, it now includes additional refinements which you, the keen radio amateurs, have requested.

The basic concept remains the same; a complete 2 metre station package operating from a.c. mains or 12v. d.c. supplies, providing full VFO coverage of the 2 metre band with facilities for 22 crystal controlled channels for popular repeater and net frequency working. The same TRIO design standards such as the ultra linear PA operation resulting from the use of an inverter derived 20 volt supply, are still used. The same supply is also used to feed the driver and the audio stages of the receiver. TRIO's acknowledged leadership in the quality audio field has been put to good advantage in their amateur equipment. Everyone comments on the clean crisp audio quality of the TS-700G both on transmit and receive.

The main refinements can be summarised as follows:

- ★ New improved received front end system contributes to a new standard of sensitivity; 0.25µV for 10dB S + N/N ratio on SSB, 20dB quieting for 0.4µV on FM. This is the best receiver on the market today.
- ★ New FM IF strip with narrower filter for European market.
- ★ New centre zero tuning meter for FM.
- ★ Automatic tone burst.

- ★ New 100 kHz calibrator with automatic disconnection of antenna to remove confusing outside signals. Automatic transmitter disable in CAL. mode.
- ★ New logarithmic S meter.
- ★ New repeater and reverse repeater operation at the turn of a panel switch. Operates on either VFO or crystal controlled channels.
- ★ New improved audio system for FM and AM transmit. The use of fully balanced mixing at all stages of frequency conversion guarantees a clean signal free from unwanted products. The power output of the transmitter is normally between 15 and 18 watts and this, in conjunction with the TRIO amplified ALC system, gives you an outstanding signal. Just listen to 2 metres and judge for yourself which rig always sounds the best.

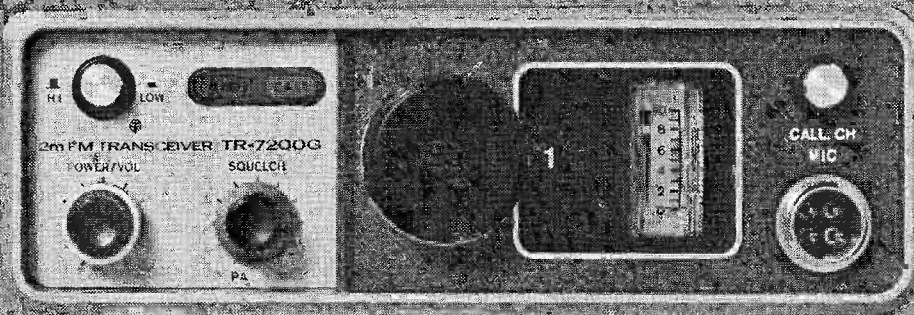
If you are considering your once only rig for 2 metres, then the TS-700G has to be your logical choice. Backed by the largest company in Japan making amateur radio equipment, and the best service facilities in Europe at Lowe Electronics, the TS-700G SSB/FM/CW/AM transceiver has to be the all time best buy.

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



# 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  $0.3\mu\text{V}$  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  $0.5\mu\text{V}$ . 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

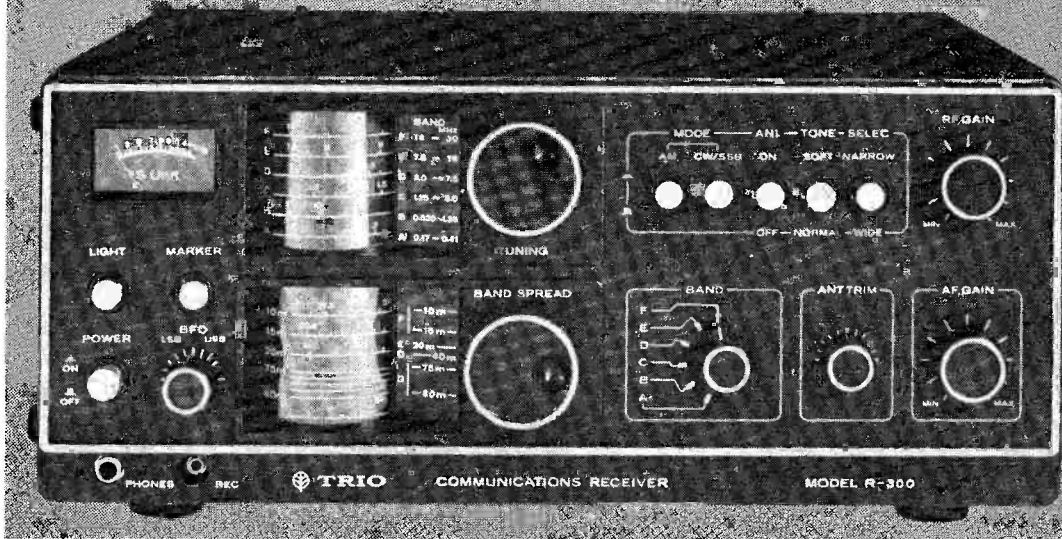
The 22 channel dial is engraved with all R and S channel numbers so you don't have to wonder "did I put R6 in chan 11 or 12?". It also, incidentally, has channels designated A, B, C, etc. for your Raynet or local frequencies. The LED under the channel number is RF powered and only lights on the channels 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.

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

 **TRIO**

# 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 multi-band 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.

**Modern Solid-state Circuitry**—guarantees instant operation without warmup time and optimum stability. A total of 20 transistors and 24 diodes is employed, including FET's in the front end, mixer and buffer circuits which account for the excellent input sensitivity, cross modulation and spurious response and for distortion-free, crisp and clean reception of even the weakest signals. It doesn't matter whether you listen to an expedition transmitter station in the antarctic, an amateur radio station in South America or to Radio Luxemburg, reception is always perfect and a real pleasure.

**Outstanding Input Sensitivity**—The dual-gate MOS-FET 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 2817/2430

 **TRIO**

# LOWE ELECTRONICS



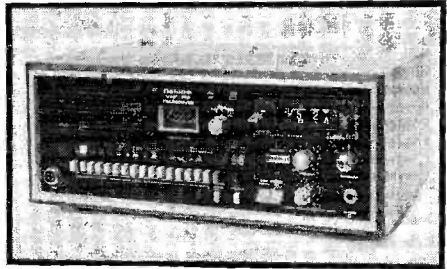
## NR-56 FM RECEIVER

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.
- ★ Built-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 £34.00 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 ★ S meter ★ RF output meter ★ centre zero tuning meter ★ RX fine tuning control ★ built-in SWR bridge ★ built-in digital clock with alarm and auto switch on ★ built-in loudspeaker ★ 10W TX ★ 0.3µv sensitivity ★ superb styling and finish.



★ STILL ON SPECIAL OFFER. WRITE OR PHONE 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 55mm) 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 today. 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 1) 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
A8XL	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

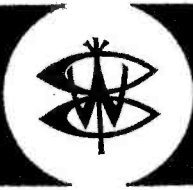
Alan GW3YSA, 35 Pen-Y-Waun, Efail-Isaf, Nr. Pontypridd. Tel. Newton Llantwit 3809

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**



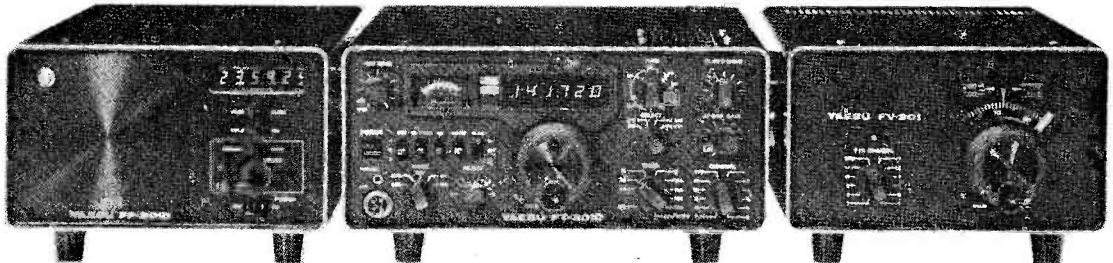
# Western

**Western**  
**The Leaders**

WITH/FOR



The outstanding **NEW GOLD LINE FT-301D**



**FP-301D**  
**ALL SOLID STATE**

**FT-301**  
**300W PEP**

**FV-301**  
**DIGITAL DIAL**

- 6-Digit Readout ● All Modes—SSB/CW/AM/FSK ● 160—10 metres ● TX & RX Clarifier ● RF Feedback ● 3-position AGC ● Rejection Tuning ● Built-in DC Power Supply ● Optional AC Power Supply and Speaker unit, 24 Hr. Digital Clock ● Noise Blanker ● RF Speech Processor ● Computer Type Plug-In Module Construction ● Size : 11in. (w.) x 5in. (h.) x 13½in. (d.) ● Light Weight : 22 lbs.

The Model FT-301D is a precision-built, all solid-state, compact high performance transceiver of advanced design. All circuits are fully transistorised with ICs and FETs for reliability. A wide-band tuning system with preset pass band tuning combined with wide-band amplifier eliminates final amplifier tuning for band change. Also available as an option is an automatic CW identifier (programmable).

*Whether you judge it on price, performance or operational features, the FT-301D comes out a winner!*

(The new FT-301D does not replace the FT-101E but we are stocking the "D" model instead of the low power "S" model intended for the Japanese home market. Prices : FT-301D, £624.37 ; FP-301, £84.38 ; FV-301, £73.13 (inc. VAT).

and the new 2m. FM/AM/SSB FT-221R Ex-stock £425.35 (inc. VAT)

**YAESU PRICES (inc. Carr./VAT)**

**H.F. TRANSCIVERS**

FT-75B 10-80m. 120W. ... £219.38  
 FP-75B AC PSU/SPKR for FT-75 ... £52.88  
 DC-75B DC PSU for FT-75 ... £54.00  
 FT-101E Latest FT-101 + RF proc ... £482.63  
 FT-101EE as above less RF proc ... £448.88  
 FT-101EX ... basis model ... £410.63  
 FT-101E ... £410.63  
 FT/FP200 10-80m. 260W. £325.13  
 FT-301 10-160m. 12v. DC £624.38  
 FT/FP-501 10-80 dig. 500W. £562.50

**H.F. RECEIVERS**

FRG-7 0.5-30 MHz AC/DC £162.00  
 FR-101S 10-160m. AC/DC £325.13

FR-101S Dig as above + dig readout ... £435.38  
 FR-101D 2, 4 & 10-160m. gen. cov. ... £427.50  
 FR-101D Dig as above + dig readout ... £525.94

**VHF TRANSCIVERS**

FT-221R SSB/FM/CW/AM £425.35  
 FT-224 fitted 10 ch. ... £210.38  
 SIG-80R 80 Ch. FM 2m. ... £247.50  
 FTV-250 2m. Transverter £156.38  
 FTV-650 6m. Transverter £132.75  
 FTV-650B 6m. Transverter £155.25

**H.F. TRANSMITTERS**

FR-101 10-160m. 260W. p.e.p. ... £365.63  
 FR-101 RF above + RF proc £398.25

**ACCESSORIES**

YO-100 monitor scope ... £139.32  
 FV-101B VFO or FR-101E £63.00  
 SP-101B speaker, FT/FR-101 £18.00  
 SP-101PB phone patch/SPKR/SWR ... £39.38  
 YP-150 power meter ... £47.52  
 FV-200 VFO or FT-200 ... £63.00  
 FV-401 VFO for FT-401 ... £63.00  
 FP-2AC AC PSU/SPKR for FT2 ... £50.63  
 FP-2AC/B AC/SPKR/Battery YC-355D Freq. counter 200 MHz ... £95.63  
 YC-500E Freq. counter ... £154.44  
 YC-500S Freq. counter ... £322.92  
 YC-500J Freq. counter ... £172.80  
 FL-2100B 10-80 1200W. linear ... £288.00

YC-601 digital display ... £118.80  
 RF Processor ... £47.25  
 YD-844 table microphone ... £20.25  
 YD-846 hand microphone ... £8.44  
 YM-86 hand microphone ... £8.44  
 FF-50DX L.P. Filter 1.2kW ... £16.88  
 FAN for FT-101 ... £12.38  
 MMB 2A/UTO Mobile brackets FT2 auto ... £9.00  
 MMB 101 bracket for FT-101 ... £12.38  
 MMB 221 bracket for FT-221 ... £12.38  
 QTR-24 24 hr. battery clock ... £15.38  
 Filters, connectors, log books, etc. P.O.A.

Please note that due to the devaluation of the pound we reserve the right to amend these prices.

**FOR THE VHF ENTHUSIAST WE ALSO OFFER**

**BRAUN** The "Rolls-Royce" AM/SSB/FM/CW Transmitter!

This is the "all-singing all-dancing" unit with two digital readout units to enable you to transmit and receive on different modes, split frequency or transceive. This is a highly flexible unit and all for a mere £899 + VAT!

**TEMPO** 6N2 2KW 2M linear amplifier

Just feed this unit 10 watts of drive and get a "juicy" 400W. pep output! With 100W. drive you are liable to melt the co-ax to the antenna! This is the unit you need to let you get full legal (UK) output and loaf along in bottom gear all for only £399 + VAT!

**USED EQUIPMENT (prices inc. VAT)**

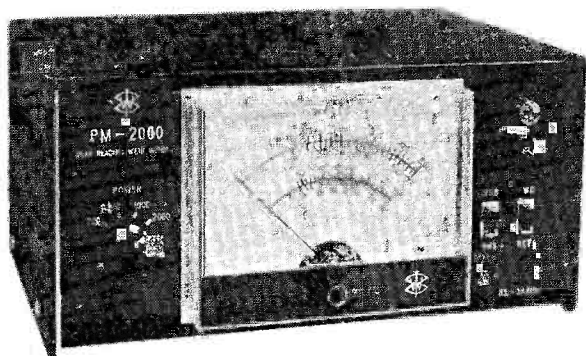
Drake SPR-4 general coverage receiver fitted SNE, AM and Marine band crystals and DC power cord. Mint ... £421.88  
 Eddystone EC10 Mk. 2. Very Good ... £100.13  
 Heath HW-202 ... £80.00

Multi-8 AC/DC 24ch. 2M transceiver ... £142.25  
 Multi-8 VFO dual Tx/Rx VFO ... £45.00  
 SSM 2M AM Tx ... £28.13  
 Trio TS500 and PS500 ... £168.75

Yaesu FT-224 2M FM Tx ... £111.38  
 Drake SSRI Receiver. Very Good ... £151.88  
 FR-101D Digital. Mint ... £415.00  
 FR-101D. Very Good ... £300.00

# Electronics (UK) Ltd

## SSB OPERATORS REJOICE!....at last ....it's UNIQUE....it's our PM-2000.... a true PEAK READING WATTMETER



- ★ MEASURES ACCURATELY
- ★ PEAK ENVELOPE POWER ON SSB
- ★ RMS WATTS ON AM/CW
- ★ S.W.R.

Gone are the days of oscilloscopes, calculations or embarrassment when the Home Office man asks what power you run!

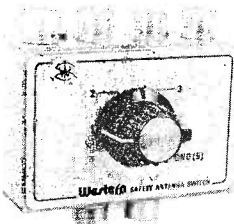
INTRODUCTORY PRICE:  
£48.60 (inc. VAT)

The PM-2000 is a precision built in-line wattmeter providing P.E.P. and R.M.S. power indication. This new design (Pat. applied for) employs a flat frequency response directional coupler which enables forward and reflected power also to be measured from 3.5-30 MHz.  
With a SSB Transmitter the output power occurs only sporadically during voice transmission and has no direct relationship between the peak and average power. The ratio of peak coverage power varies widely with voices of different characteristics.  
The power contained in the signal at the maximum peak is the basic transmitter rating and is the peak envelope power (usually called p.e.p.). This makes the peak reading wattmeter essential for SSB.  
General power meters indicate average or R.M.S. values and are calibrated using a continuous sine-wave signal which a voice modulated signal definitely is not. Such a power meter is meaningless in terms of "p.e.p."  
The PM-2000 indicates accurately the p.e.p. which is four times the single-tone level.  
SPECIFICATION: Power range: 0-200, 500, 1000 and 2kW; Impedance: 50 ohms; Frequency range: 3.5-30 MHz; Measuring Accuracy: 7%; Power source (SSB ONLY): 100/117/234v. A.C. Overseas enquiries invited.

### YET ANOTHER 'Western' PRODUCT WITH QUALITY UP AND PRICE DOWN.

#### NEW 5-WAY ANTENNA SWITCH MODEL ASW-1

- ★ Handles 1-2 kW.
  - ★ Earths antennas not in use.
  - ★ Fitted YAESU style knob.
  - ★ Mounting holes for wall or equipment.
- £8.85 (incl. VAT/P. & P.)



#### NEW WESTERN PRODUCTS INCLUDE:

- TRAPPED DIPOLES
- BALUNS
- INSULATORS

AND MORE ITEMS ARE ON THE WAY  
OVERSEAS TRADE ENQUIRIES INVITED

## Western Electronics (UK) Ltd

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DAVID SMITH, G4DAX, WATFORD 42619

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LOUTH: Open 9-1.0, 2.0-5 p.m. MON.-FRI. Sat. by appointment.  
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LEICESTER: MAY'S HI-FI, CHURCHGATE, Tel 58662. Open  
MON. SAT. 9-6 m., CLOSED THURS





# Western

Whether you wish to . . .

## Elevate... .. with the TELESCOPIC TILT-OVER WESTOWER

### BUYING A TELESCOPIC STEEL TOWER ?

... then here are a few facts which you should consider :

Firstly, the head load (horizontal load due to wind) which will be placed on the top of the tower should be determined and the manufacturer of your antenna can tell you what the head load will be at a particular wind speed, e.g. 100lbs. (45Kg.) at 75 m.p.h. This means that when the wind is blowing at 75 m.p.h. you would need a HORIZONTAL pull of 45Kg. to restrain the antenna. The actual weight of the antenna is usually a factor of much less importance and is ignored. If you wish to have an installation which is rated at 100 m.p.h.—then the wind load on the antenna will be much greater than 100lbs., 175lbs. in fact. Obviously, a stronger tower would be required to take this additional load.

But there is the second consideration. At what wind speed would you like the structure to be safe? No doubt the answer you have in mind is "about 150 m.p.h." That way, it will never fall down! However, economics must come into the picture and the costs go up very considerably in achieving strength.

There is a British Standard Code of Practice (CP3, Ch5, Pt2.), which relates to the "Wind Loading on Structures" and they recommend Basic Windspeeds of about 85 m.p.h. for the London Area to as high as 110 m.p.h. for Edinburgh and 120 m.p.h. for the North of N. Ireland. This "Basic Windspeed" is the maximum gust speed likely to be exceeded on the average only once in 50 years at 10m. above ground in open level country. An average figure for England is therefore 100 m.p.h. Commercial installations are designed to this standard and we recommend a minimum design speed of 75 m.p.h. for an amateur installation. Most towers currently advertised in this magazine carry the stated headload at 60 m.p.h. ONLY! This is why they blow down with no aerial on or when only partly raised! Oh! Yes, we could mis-lead you into thinking that the WESTOWER is considerably stronger by saying, "Withstands winds of up to 145 m.p.h.!" So, it may win no aerial on! But what good is that? Remember, "AT WESTERN OUR AIM IS YOUR SATISFACTION." So, if you want a good sound installation you'll be wise to deal with "WESTERN"; we'll be pleased to advise. Because of our considerable experience in this field we have now designed and manufactured our superior quality product AND—IT COSTS LESS! QUALITY UP and PRICE DOWN—that can't be bad! All Towers come complete with winches, ropes, head unit to take the rotor and full erection details.

- Designed by Chartered Engineers to BS CP3, Ch5, Pt2.
- Constructed of High Quality Special Alloy Steel
- Fabricated Using the Latest Electronically Controlled Techniques

#### HERE'S HOW THE "WESTOWER" COMPARES :

HEIGHT	"WESTOWER"			Brand X			Brand Y		
	MODEL	PRICE	HEAD LOAD	MODEL	PRICE	HEAD LOAD	MODEL	PRICE	HEAD LOAD
40'	2S/FP	£189	275lbs.	A	£208	185lbs.	A	£250 +	50lbs.
60'	3S/FP	£230	175lbs.	B	£246	125lbs.	B	£280 +	50lbs.
80'	4S/FP	£345	1000lbs.	C	£366	60lbs.		(+Carr. extra)	

(Prices include carriage. Headloads taken from manufacturers' current literature)

FROM THIS YOU WILL SEE THAT A 60' "WESTOWER" IS 40% STRONGER AND COSTS LESS!  
THEN THERE IS THE "WESTOWER" HEAVY DUTY WHICH TAKES ITS FULL HEAD LOAD AT 100 M.P.H.

Westower. . . . the stronger one!

## Rotate... .. with EMOTO ROTORS

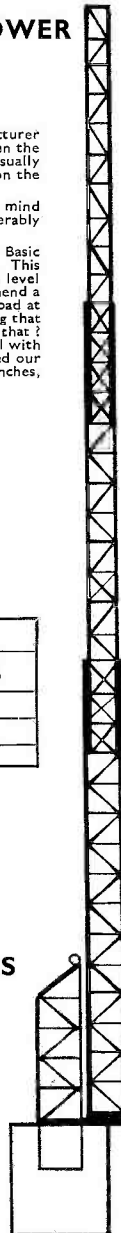
DOES YOUR ANTENNA TURN IN THE WIND ?  
DOES YOUR CONTROL UNIT "CUT-OUT" AFTER ONLY A FEW REVOLUTIONS ?  
... THEN STEP-UP TO A RELIABLE EMOTO ROTOR

We have been in the business long enough to know your requirements for a first-class antenna rotor, and we have gone "over-board" for the EMOTO range. There are many brands of antenna rotors, some of them completely unsuitable for the majority of amateur applications, and for this reason we do not stock them.

Most likely your present antenna rotor will turn your antenna and hold satisfactorily, but it just will not hold it stationary under strong wind conditions, i.e. YOUR ROTOR LACKS SUFFICIENT BRAKE TORQUE, the ability to hold the antenna still whilst a gale is blowing. HERE IS WHERE THE EMOTO SCORES—Take a close look at the comparison figures. Then compare the prices of all the rotors and you will have to agree that the EMOTO 102 LBX and EMOTO 1100 MXX are the best value.

Finally, EMOTO ANTENNA CO. is not a new company. They have been making rotors for many years. So have no fears about this being a new and untried product.

Having obtained samples (all rotors are individually tested by EMOTO before despatch) and had them tested by an independent authority SOUTHAMPTON UNIVERSITY, we are now confident to recommend them as THE FINEST ROTORS AVAILABLE. The 1100 MXX received the following comment from the University: "Very rigid, NO SLACK, WELL MADE, GOOD DESIGN." NEED WE SAY MORE!

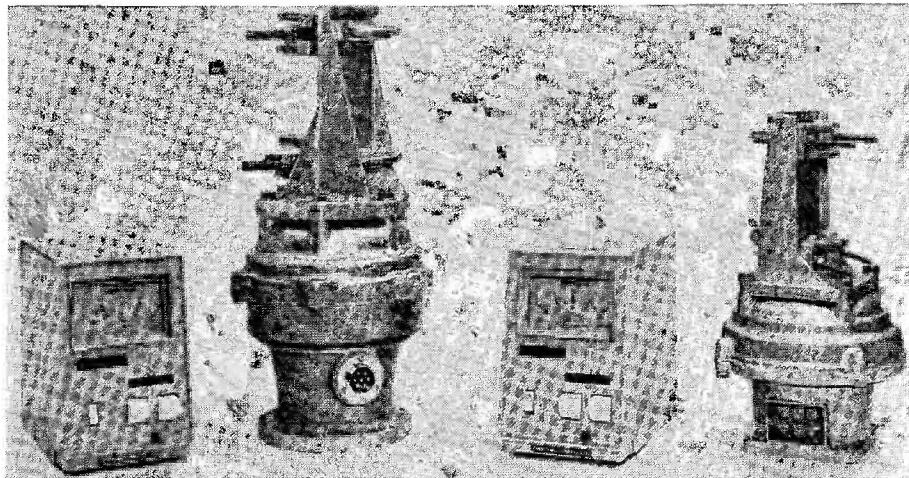




# Electronics (UK) Ltd

**EMOTO FEATURES :**

- ★ SUPERIOR BRAKING TORQUE
- ★ CONSTANT BEAM INDICATION
- ★ BETTER REMOTE OPERATION
- ★ LESS POWER LOSS THAN LOW VOLTAGE TYPES
- ★ ROBUST DESIGN
- ★ STAINLESS STEEL HARDWARE



**COMPARISON OF ROTOR BRAKE TORQUE FIGURES (kg. cm.)**

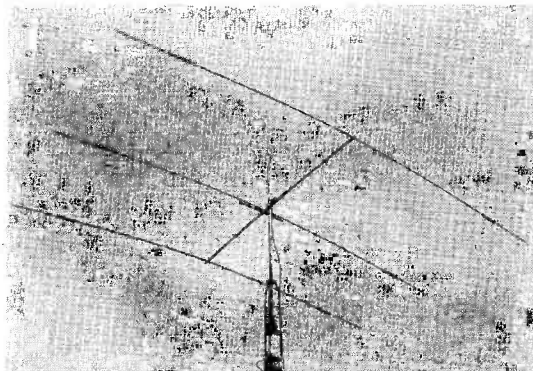
CDE Model	Torque
AR30	575
AR40	920
CD44	1,152
HAM-2	4,025

EMOTO Model	Torque
102LBX	1,500
1100MXX	10,000

**PRICES (inc. VAT) :**

102LBX	£61.88
1100MXX	£129.38
1211	£6.75
1215	£14.63
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The **WESTERN "PENETRATOR"**

**DX-33 for 10-15-20m.**

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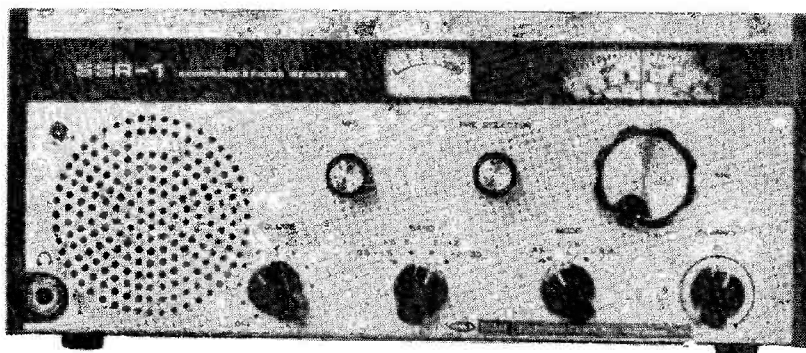
The wattmeters negligible insertion loss allows continuous monitoring of either forward or reflected power for fast accurate tune up, as well as continuous checking of transmitter-antenna performance.



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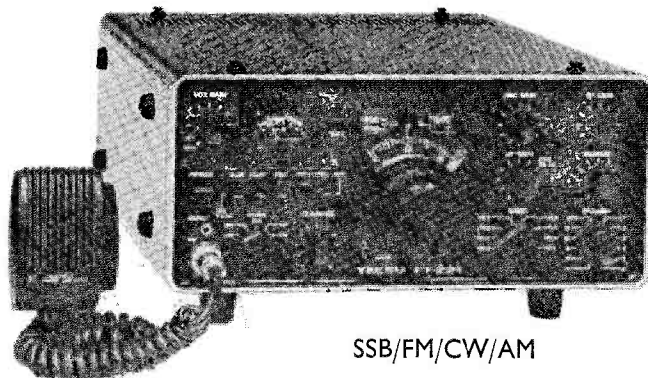
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2 METRE  
TRANSCIEVER**



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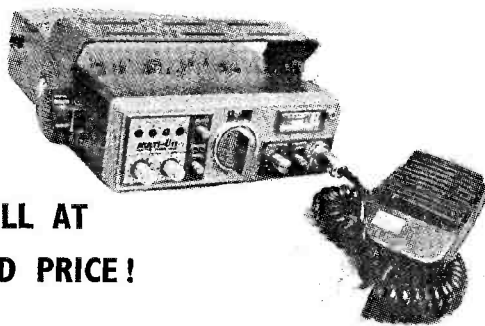
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The transceiver with a specification far in excess of its competitors at a price you can afford! Fitted every U.K. repeater channel plus SU8 and SU20, £229, including VAT and delivery.

REMEMBER—auto scan means safer driving.

## 2-Way channel scan

plus 23 fixed channels  
**MULTI-U11**

- All solid-state . . . no tubes.
- Triple conversion receiver.
- Two stage crystal filter.
- Two RF stages w/dual gate MOS FET.
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- Multi-function metering: Power out/"S" units. Also switchable to FM centering.
- Auto or manual scan (Four channels), transmitter and receiver.
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- Available solid-state amplifiers boost output 70-160 watts.
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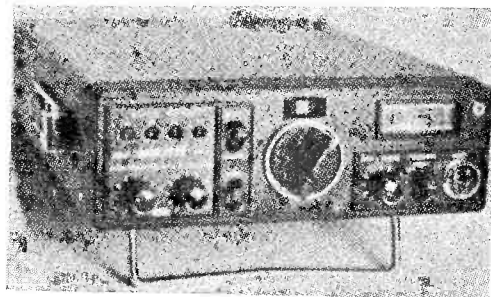
### 70cms-A COMPLETELY NEW CHALLENGE

... FOR YOU AND "FDK"

Anybody monitoring 70 cms. since the new repeater band plan was agreed cannot have failed to notice the new 70 cms. repeaters now appearing on the band. There are now as many repeaters on 70 cms. as there are on 2 metres and there are more to come! The new FDK Multi-U11 is packed with features to allow you to explore the UHF spectrum. Already voted the best 70 cm. transceiver in Japan, the powerful 10 watts transmitter matched by the extremely sensitive receiver ensures peak performance. Its smart appearance and compact size make it ideal as either base station or mobile rig. For those not familiar with 70 cms. it is worth remembering that 100 Hz error at 12 MHz produces 3.6 KHz error at 70 cms.! All FDK Multi-U11 are carefully adjusted and maintain a very high stability but other rigs may not be quite so stable, that is why INCREMENTAL RECEIVER TUNING IS ESSENTIAL if QSO's are not to be lost and ignition noise kept to a low level—don't consider any transceiver not fitted with this control. For full specification details send S.A.E. today.

**FDK**

### MULTI-II 2M FM



THE NEW TOP PERFORMER FOR 2M FM MOBILE  
Fitted all U.K. Repeaters + SO and S20 £199-68

**FDK**

### MULTI-II

If you thought that all 2 metre fm transceivers were much the same you are in for a surprise when you take a look at FDK's Multi-II. Packed with a host of state of the art features similar to the 70 cms. transceiver above, the 4 auto-scan channels ensure safe driving—programme it for your favourite channels and sit back and wait for the signals to appear.

**FDK**

### NEW MODEL

**MULTI-2700.** All mode 230v./12v. D.C. Digital 2m. transceiver including "OSCAR" facility. £449 inc. VAT.

### NEW MODEL

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**REMOTE VPO FOR MULTI-II.** Complete coverage 144-146 MHz plus 600 kHz repeater shift. £89-00 inc. VAT.

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**NEW THIS MONTH—**

**EL40X.** De luxe 80/40 dipole including balun and inverted 'v' kit plus corrosion-proof copper aerial wire and all fittings—79ft. long ... £27.00 (n/c)

**Q-TRAP.** Economy version of the above dipole without balun, inverted 'v' kit and fitted standard copper wire ... £14.62 (£1.00)

**MFJ.** The superb audio filter boards with 3 stages of selectivity down to 80 Hz complete with all hardware to mount into rx or cabinet ... £14.62 (50p)

**MICROWAVE MODULES.**

New transverters for 2 metres and 70 cms.  
 28 MHz in 144 MHz out ... £85.50  
 28 MHz in 432 MHz out ... £94.50  
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**TESTED TRADE-INS**

Collins 75-S1 rx 80-10m. ... £179.00  
 KW77 rx + spkr. 160-10m. ... £125.00  
 KW2000 tcvr. + AC/DC psu 160-10m. ... £145.00  
 Eddystone 730/4 rx 5-30 MHz ... £125.00  
 Eddystone 888A rx 160-10m. ... £125.00  
 Eddystone 750 rx 5-30 MHz ... £65.00  
 FT560 tcvr. 500w. 80-10m ... £275.00  
 FT501 tcvr. digital 500w. ... £375.00  
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 Q-Trap coils only ... £7.98 (50p)

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 FR101DD as above with digital counter ... £540.00 (n.c.)  
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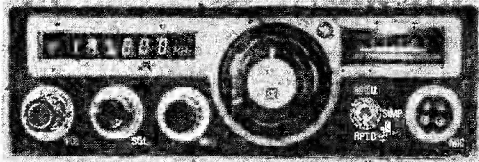
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# South Midlands

ESTABLISHED 1958 — OVER 18



## DIGITAL II now with SCANNER FAULTIMATE 2m. FM

The Digital II offers complete 5 kHz step coverage across 2 metres and now with the Scanner 33, 25 kHz channels from 145 MHz upwards covered in around 10 seconds. It offers full lock and lockout on all channels. The scanner stops on a required channel for 10 seconds, then unless locked moves on. The bright digital readout comes from 6 seven segment LEDs. Selectric 10 or 1 watt output for simplex or duplex (up and down shifts), across 144-146 (rx to 149 MHz) from a tiny 6½" x 2" x 7½". Easily underdash mounted with the supplied mounting bracket, or slipped in place of the broadcast wireless. For strong handling, and low noise the R.F. mixer, first IF (16.9 MHz) second mixer (and LO) are all FET's. The front end is tuned by varicaps by the DC output of the P.L.L., with superb selectivity provided by a 15 pole (±8 kHz at -6dB ±15 kHz at -70dB) Ceramic filter. LED lamps indicate if the P.L.L. is unlocked or the squelch open. The V.C.O. is directly modulated (for exceedingly linear deviation). Unitary 6 circuit block construction (for serviceability and screening). Selective calling socket (mic/LS/PTT etc.) on rear panel.

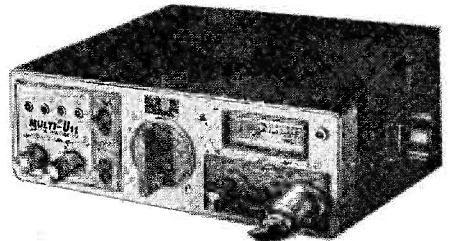
## THE MULTI UII A NEW DIMENSION IN SEVENTY CMS.

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 crystallised up. "Two R.F. stages in the receiver provide great sensitivity (0.5V 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 1.2A (0.6 or 0.3A Rx) and has a netting of new crystal facility. Other features include, diode RF switching R.L.T., "on the air" lamp, PO meter, 5 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 ½W of audio immunity to image and IF break-through, offers performance to rival all walkie-talkies and many mobile 10W sets. The KP202 is supplied with telescopic whip, leather handle/whip case and F type plug. Accessories include automatic (R channels only) crystal tone burst (£10.00), flexi stubby antenna (£5.75), leather case (£4.75), base charger KCP25 (£11.25), set of 10 ni cads (£8.50), F to UHF adaptors, (£1.45) F plugs, spare whips, spare hods, etc.

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

## NEW FROM SMC AMPERE & KLM SOLID STATE LINEARS (VHF & UHF)



SSB/CW/FM, 12v. DC 10W. drive, RF sensing with manual override—"micro-strapline techniques."

NEW HIGH POWER MODEL—  
PA144/160/BL 160Vv. output, £155 + VAT.



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

APB82A 145 MHz 80W. output £95.00  
APB57A 432 MHz 45W output £95.00

## ROTATORS

Ex-Stock in Totton for fast delivery  
VAT—Rotators 12.5%. Cable and dely. 8%  
Carriage (BRS or post) FREE. Securicor delivery £1 extra (mainland)  
All rotators supplied complete with appropriate control box and instrs.

## CDETROTORS

AR30 Light VHF/UHF £37.50  
AR40 VHF and Light HF £43.50  
AR33 De luxe control AR40 £49.75  
CD44 Medium duty £89.00  
Ham II Heavy duty £119.00

STOLLE ROTORS  
2010/220 Automatic £41.25

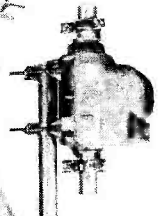
BEARINGS  
CD562 CDE £4.25  
RZ100 Stolle (ballrace) £10.00

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



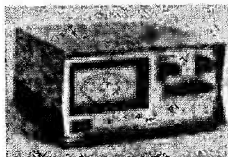
RZ100



2010/220 and Cont. Box STOLLE



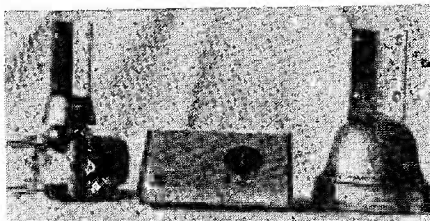
KP202  
KCP12



CD44/HAM II



AR33  
CDE



AR30

AR30/40

AR40/33



PLEASE NOTE THESE PRICES DO NOT INCLUDE VAT (8% or 12½%)  
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.



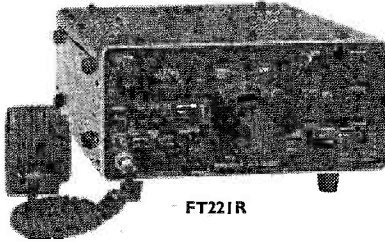
# Communications Ltd

YEARS OF PROFESSIONAL EXPERIENCE



## YAESU MUSEN 2-YEAR GUARANTEE 24-HOUR SECURICOR SERVICE

### The New FT221R Ex-Stock in Totton



FT221R

Remember only the FT221R gives you full 4 MHz coverage and optional auxiliary shift or repeaters. Why? — 432 — 436 MHz and a 1.6 MHz shift for SSB, CW, FM SIMPLEX, FM REPEATER on 70 cms. with the new MMT/432/144.

The FT221R design offers an unparalleled level of technical sophistication, combining latest "state of the Art" techniques with extreme reliability and ease of operation. One look at the construction: plug in boards throughout (with presets positioned for easy access) one glance at the circuitry and you will be convinced that the FT221 may have rivals but no peers. The final frequency is derived via single signal frequency mix from 10.7 MHz. The tunable component is produced by a 133 MHz voltage controlled oscillator (VCO), phased locked to the sum of: the temperature compensated 8 MHz VFO (one of the J1 fix crystals and the nonupled 14 MHz band for repeater shift crystals). This VCO cleans the oscillator spectrum, markedly reducing spurious, both on receive and on transmit, the DC control voltage from the VCO is applied to 8 varicap diodes, in both the transmitter and the receiver, effectively electrically ganging the RF tuned circuits to the VFO and Band crystals. Thus both the transmitter and receiver are always fully on resonance even when using the repeater facility. This narrow band technique further improves the transmitter output spectrum and the receiver's immunity to overload, reducing continual tweaking of pre-selectors obsolete.

If for any reason the VCO should not lock, the "S" meter and dial lights flash, both transmitter and the receivers' audio are disabled.

The transmitter employs: a balanced FET mixer, RF derived ALC (which is fed to the two first mosfet TX I.F. amplifiers) preventing over driving and allowing operation at full rated output on low DC supply.

The driver is generously rated and the PA stage is the newly developed 2N5591, a device with high linearity and an amazing 70W, power dissipation capability that is rated by its manufacturer to withstand any VSWR irrespective of phase angle.

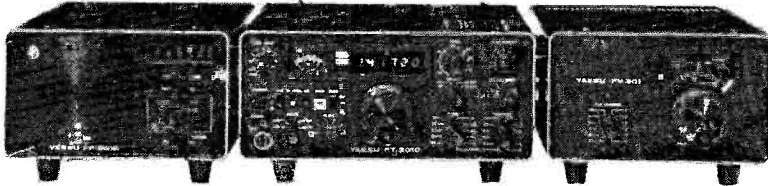
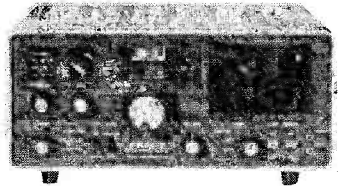
The sensitive receiver offers a remarkable immunity to overload. The Mosfet RF stage is AGC controlled, the FET mixer feeds a transmitter then an I.F. amplifier. This band limited signal, of the correct level, is presented to the noise blanker gate (before any serious pulse stretching occurs) and hence to either the quality crystal filter on SSB or the 10.7 MHz to 455 kHz mixer for F.M. Designed for the serious amateur, it also offers a unique double push tone burst, repeater up and down shifts of 600 kHz and any other shift (to 1 MHz), a socket (mic, PPT, LS 12v, etc.) full provisions for a linear amplifier (relay make and break and ALC sockets) with the spectral purity that allows you to use one with a clear conscience.

"The rig here is a FT221R—need one say more!"

### The FRG7, General Coverage Receiver Ex-Stock

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 10 dB, S + N/N) (SSB) and stable (within 500 Hz 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.

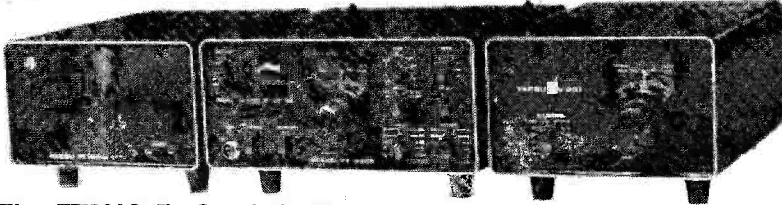


### THE GOLD LINE

FT301S 10W., FT301D 100W.

### The FT301D Demo Model Available — 6 week delivery

The FT-301D 200W, PIP, with digital readout (to 100 Hz), SSB (2.4 kHz), AM (kHz), CW and FSK (600 Hz), Passband IF tuning (rejection), 3 position AGC, optional mains PSU with, if required, a 1/24 digital clock and a programmable CW identifier.



### The FT301S Ex-Stock in Totton

The FT-301S 10W, output, employs a pre-mix VFO and single signal conversion to 9 MHz IF using MOSFETS in the RF and mixer stages followed directly by a roofing filter for sensitivity coupled with dynamic range. SSB (2.4 kHz SF 1:7 : 1) and CW (600 Hz SF 2:1).

The New FT-301 transceiver range (with options installed) offers:—Full solid state, 12v. DC working, external matching mains power supplies with speaker, and an external VFO are available. Plug'n board construction, 160-10m. operation in 500 kHz segments, MSF and CB receive, RF speech processor, noise blanker, front panel controlled VOX (with M.O.X.) and P.P.T., semi break-in keying with side tone, clarifier with separate ON OFF switch, 11" x 5" x 13½", 25 kHz crystal calibrator, internal VFO or 11 crystal per band (or external VFO with same facility) 3W. audio to internal or external speaker.

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# South Midlands

ESTABLISHED 1958 — OVER 18

## SMC for SPEED AND SERVICE

### The SMC73 New General Coverage Receiver

The SMC73 is an all Solid State, mains and 12v., communications receiver covering 550 kHz to 30 MHz (without gaps) in four ranges. Frequency readout is by two silk screened illuminated aluminium dials, tuned by coaxial spun aluminium knobs, the larger for general coverage, the inner for amateur band (10-80m.) band spread (set by use of internal 3.5 MHz crystal calibrator).

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



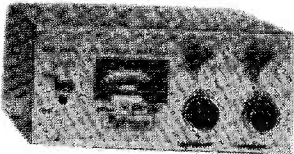
SMC 73  
Ex-Stock ONLY £105 (+ VAT)

### The New Astro 200, Digital synthesiser solid state 200W. transceiver



### Astro 200 Revolutionary H.F. Transceiver

To pack an entirely modular construction, 10-80m., digital readout transceiver in a box 2'8" x 9'5" x 12'3" is remarkable enough, but with a 0.2µV sensitivity and 100w. output from transistors with the boast of —stability better than 20 Hz/hour, from an electronically tuned (press switches with no other moving parts) 100 Hz. digital synthesiser, good RX front end filtering, TX TVI proofing, unwanted sideband at -60dB, carrier at -50dB, RIT, clarifier (±50Hz) inbuilt SWR bridge, semi band in CW with sidetone, etc., etc. The ASTRO 200 surely establishes a new plateau of sophistication.



**RF SPEECH PROCESSOR KPI2**  
Audio to audio, via 10.7 MHz mains powered, illuminated meter, FT-101. FT2 plugs suitable all phone modes superb on FM.

Ex-Stock in TOTTON  
£53.50  
P. & P. 40p (+ 8% VAT)

### WORLD TIME CLOCK QTR24 From YAESU

Battery powered, gives local time around the world.

Only £13.00 (+ 8%)



### NEW 432MHz Transverter

From Ten, Six or Two metres (a '101 a '620B or a FT221R)

Tx Balanced dual gate Mosfet mixer 5 linear stages, 10 watts output. Rx Cascade low noise R.F. Mosfet mixer.  
MMT432/2B or /50 ... £84.00  
MMT432/144 (Converts to 28MHz) £112.00 (P&P, extra, VAT 12½%)



MMT432

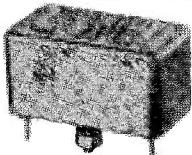


### Lightning Arrestors

Gas discharge (90v. strike), 50 ohms, SO239 fittings. Up to 1:1 VSWR, 1 GHz, 0.2dB loss, 5KA, surge 5A AC.

Ex-Stock. Post and packing 20p. VAT 8%  
NSK75 Low price ... .. £7.50

### LOW PRICE CRYSTAL FILTERS AND CRYSTALS (£3.75 pair or £2.00 singles) P&P 20p VAT 12½%



YF FILTER

YF30F350	350Hz F(T) 101 CW	£16.00
XF30C	600 Hz F(T) 101 CW	£18.75
XF30A	6 kHz F(R) 101 AM	£18.75
YF30F12	12 kHz F(R) 101 AM/ FM	£16.00
YF107M600	600 Hz 10.7 MHz CW	£16.00
YF107M2-4	2-4 kHz 10.7 MHz CW	£16.00
YF107M12	12 kHz 10.7 MHz FM/AM	£16.00
YF90M600	600 Hz 9 MHz CW	£16.00
YF90F12	12 kHz 9 MHz FM/AM	£16.00
	10.7 Carrier crystals HC18/U ea.	£2.00

### YAESU

FT2F, FT2FB, FT2 AUTO, FT224	
(6, 18 MHz Tx and 14, 52 MHz Rx)	
SIMPLEX SO 12, 16, 19, 20-24	
DUPLEX RO -R9	
including all IIR and IRT.	
FT200 (B) 10m....	£2.20
10A, 10C, 10D	

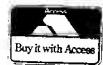
### OTHERS

TR2200 (G), C146A, C826 MB.	
(12 MHz Tx and inc. 44 MHz Rx)	
SIMPLEX SO, 20-24	
DUPLEX R3 - R7	
Selection of inverse receive	
CONVERTER CRYSTALS ...	£2.20
38-666 (2m.), 42 4m.), 50.5 (70 cm.)	

Send large SAE for FREE Yaesu Catalogue & 22-page Stock/Price/S.H. Lists



PLEASE NOTE THESE PRICES DO NOT INCLUDE VAT (8% or 12½%)  
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 £25. Holders of current U.K. callsigns (where references have been provided) can be speedily cleared or normal H.P. at competitive rates available.





# Communications Ltd



YEARS OF PROFESSIONAL EXPERIENCE

## S.M.C. SINGLE STOP SOURCE FOR YOUR STATION

### VERSATOWERS

Telescopic, 20' sections with full fitting facility allows for easy antenna maintenance and alterations. The relatively low unit weight and superior design of ground post allows easy and cheap installation often without resort to concrete.

### ALIMASTS

**TELESCOPIC LIGHTWEIGHT**  
3, 2 or 1-5m. Quick lock sections.  
Many versions 6 to 21 metres.  
Rigging extra. Carriage £2 VAT 8%  
7 x 2m. £38-75 6 x 3m. £42-50  
4 x 3m. £28-50 7 x 3m. £35-75

### HAMTOWERS

**SELF-SUPPORTING**  
Galvanised lattice 10' sections  
Free-standing with climbing steps.  
Carriage £3-50 Ex-Stock 8% VAT.  
30' c/w base grillage ... £164-60  
40' c/w base grillage ... P.O.A.

### TELOMASTS

**TELESCOPIC GALVANISED**  
10' Telescopic galv. steel mast with  
guy rings, etc., or c/w full rigging.  
Carriage £2 Ex-Stock VAT 8%  
30' £22-85 or £41-75 c/w rigging  
40' £29-75 or £33-75  
50' £37-95 or £69-95

### TELETOWERS

**TELESCOPIC GALVANISED**  
Carriage and rigging (RK) extra  
42' £121-00 (RK £28)  
57' £174-00 (RK £28)  
79' £224-50 (RK £48)  
101' £303-50 (RK £76)

### COAX RELAYS

12 v. DC, 50 ohm, Silver plate,  
Ex-Stock. P. & P. 30p VAT 8% only.  
Power Crosstalk at 5000 MHz  
XX120 50W 30dB Cable entry £8-50  
CX130 300W 40dB BNC sockets £18-25  
CX600N 600W 40dB N sockets £21-75

### COAX SLIDE SWITCHES

Up to: 1kW, 1-5 GHz, 0-3dB loss, 1:2:1 VSWR,  
50dB isolation, 50 ohm "N" or "PL" fittings  
available.  
Ex-Stock P. & P. 30p. VAT 8% only.  
TWS 120 I in 2 out Nickle SO239 ... £4-90  
TWS 150G I in 5 out Gold SO239 ... £10-45

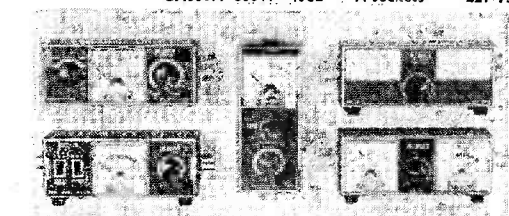


### AEC METERS

SWR, Power (Pr), Field Strength (F.S.)  
(P. & P. 40p VAT 8% ONLY)

Unless stated — SWR (±10%), 1-5 to 160 MHz, 50/75 ohm)

- SWR10 (TLH) single meter horizontal type ... £8-15
- SWR20 (BLH) 50 ohm F.S., Pr. 10 and 100W, F.S.D. (±10%) £9-90
- SWR40 (Centre) single meter Vert. type with F.S. ... £7-80
- SWR50A (TRH) SWR (±5%) 3-5 MHz up, Pr to 1 kW (±20%) £9-60
- SWR50 (BRH) as SWR50A (300µA) but 100µA meters ... £11-20



### HY GAIN HF RANGE

(Carr. £1-£2.50) VAT 25%

- 8N86 1: ferrite Balun ... £12-00
- 103BA 10m. 3 element ... £43-50
- 153BA 15m. 3 element ... £54-50
- 203BA 20m. 4 element ... £103-40
- 402BA 40m. 2 element ... £146-00
- 18V 10-80 Load Vert. ... £24-50
- 12AVQ 10-20m. Trap Vert. £33-50
- 14AVQ 10-40m. Trap Vert. £47-50
- 18AVT/WB 10-80m. Vert. £64-50
- TH32MK 111 10-20m. 2 ele. £94-00
- TH31NR 10-20m. 3 ele. £96-00
- TH3MK 111 10-20m. 3 ele. £137-00
- TH6DX 10-20m. 6 ele. total £164-50
- HY QUAD 10-20m. 2 ele. £151-80
- DB1015A 10-15m. 3 ele. £99-00
- LA1 Lightning arrester gas £20-30
- LA2 Lightning arrester spark ... £3-30
- HY TOWER 10-80m. Vert. ... £162-80

### BANTEX VHF WHIPS

(Carriage 90p) VAT 12½%

- 70ft ± 70 MHz fibreglass £4-00
- 144ft ± 145 MHz FG or SS £13-50
- 85ft ± 145 MHz ... £6-35
- BGA FG ± 2m. fibreglass £8-75
- BGA SS ± 2m. s'less steel £8-50
- B5U £32 MHz ... £5-00
- UCL Mid loaded ... £8-00
- TLM Trunk link mount ... £5-25
- M8 Magnetic base ... £8-50
- Standard base unwanted deduct... 50p

### ROPES

(Carriage Extra) VAT 8%

- 3mm. HT steel ... yd. 13p
- 5mm. HT steel ... yd. 20p
- X150 Rustproof 150m. £10-85
- 7 x 18g. Galvanised 100' £7-20

### AERIAL INSULATORS

(Post Extra) VAT 12½%

- 2 1/2" polyprop ribbed ... 14p
- NT1 1 1/2" polyprop ribbed ... 45p
- SMCP1 8" carbon polyprop 85p
- 3" porcelain ribbed 33p

### AERIAL WIRE

(Carriage Extra) VAT 8%

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

### COAX PLUGS

(Post and Packing Extra) VAT 8%

- PL259 Standard UHF plug 48p
- PL259 P.T.F.E. UHF plug 55p
- UG175 Reducers ... 13p
- 258 Back to back ... 80p
- SO239 Socket 2 hole ... 37p
- Right angle adaptor ... £1-20
- Right angle adaptor 90p
- Phone plug/SO239 59p

### CABLES

RF FEEDERS (Carriage Extra) VAT 8%

- RG8/U 50 ohm heavy ... yd 35p
- UR57 75 ohm heavy ... yd 36p
- 75 ohm Flat twin ... yd 8p
- 300 ohm Ribbon ... yd 9p
- UR39 75 ohm medium ... yd 24p
- T3278 ohm Distribution ... yd 30p
- UR43 50 ohm Solid Cent. ... yd 15p
- UR76 50 ohm Strand Cent. ... yd 15p

### CUSHCRAFT VHF OMNI

(Carriage 95p) VAT 12½%

**RINGO RANGER ARX** 6dB gain (over 1/2"), ultra low angle radiation, excellent 50 ohm match, uses 3 x 3 in phase and 1/2 stub. 145 MHz version approx. 9" 6" (& 1 1/2 lbs.) 432 MHz approx. 3" 6" (illustrated centre left).

- ARX2 Ringo Ranger 145 MHz ... £21-50
- AR2 3dB Ringo Vert. ... £12-75
- AR25 QRO AR2 ... £15-00
- CX1000 29 MHz Ringo £25-75
- ARX450 Ringo Ranger 432 MHz ... £21-50
- ABW144 2m. Big Wheel £14-50
- ABW125 ABW harness £7-30
- ASQ1 2m. Squalo ... £11-75

### JAYBEAM 70 (4m), 144 (2m), 432 (70)

(Car. £1, VAT 12½%)

- D5/2m. 5 over 5 slot feed £9-90
- DB/2m. 8 over 8 slot feed £13-40
- 5XY/2m. 5 ele. crossed £10-30
- 8XY/2m. 8 ele. crossed £12-90
- 10XY/2m. 01 ele. dross £17-75
- 5Y/2m. 5 ele. yagi ... £5-40
- 8Y/2m. 8 ele. yagi ... £7-00
- 10Y/2m. 10 ele. long yagi £13-80
- 14Y/2m. 14 ele. long yagi £17-85
- Q4/2m. 4 ele. quad ... £10-50
- Q6/2m. 6 ele. quad ... £4-00
- PBM10/2m. 10 ele. Para £16-40
- PBM14/2m. 14 ele. Para £21-00
- D8/70 8 over 8 slot feed £11-30
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- MBM48/70 48 ele. Multi £15-20
- MBM89/70 89 ele. Multi £20-35
- 12XY/70 12 ele. crossed £20-90
- 4Y/4m. element yagi ... £8-50
- PMH2/70 2 way harness £4-15
- PMH2/4m. 2 way harness £6-60
- PMH2/C Circ. phasing ... £3-60
- PMH2/2m. way harness £4-95
- JBL15/59 2" Joint sleeve £3-37

### SMC TRAPPED DIPOLES

(Post 45p) VAT 12½%

- S500W P.I.P. 14 SWG ... £19-60
- HP 1K P.I.P. 14 SWG ... £21-75
- P500W P.I.P. Cu/Terylene braid c/w 75' feeder, etc. £21-75

### MOSLEY TRI-BAND BEAMS

(Carriage £2-50) VAT 12½%

- TA33 3 ele. 200W R.M.S. £64-00
- MUSTANG 3 ele. ... £82-50
- TA32 2 ele. 300W A.M. £44-00
- MUSTANG 2 ele. ... £66-00

### GEM QUAD

FIBREGLASS QUAD (Carr. £2-00) VAT 12½%

- GQ2E 2 element ... £95-00
- GQ3E 3 element ... £147-00
- GQ4E 4 element ... £195-00
- CK1Q 1 ele. Conv. kit £35-00

### G WHIP

HF MOBILE (Carriage 90p) VAT 12½%

- Tribander 10-20m (+ LF) £14-61
- Multimobile 10/20m + MM £18-06
- Flexiwhip 10m (+FF) £12-42
- Basement 1/2" hole mount £2-20
- LF40, 80 or 160 ... £4-87
- MM40, 80 or 160 ... £4-87
- FF15, 20, 40, 80 or 160 ... £5-04
- Telescopic whip for coils £1-50

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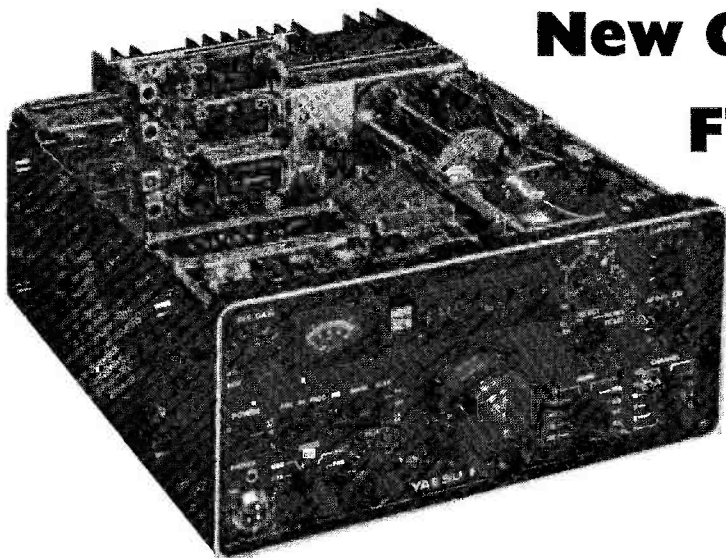
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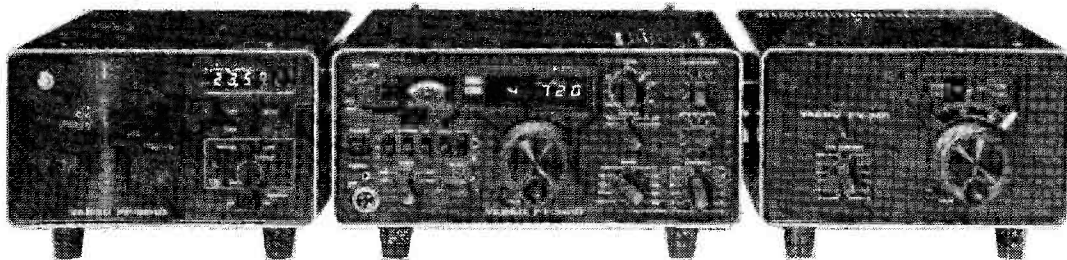
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Darton (022 678) 2517  
T Howarth Jones GW3THP,  
Pontypriddin (035 287) 846  
Mervyn Anderson G1SWWY,  
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# FROM YAESU – The Outstanding New GOLD LINE FT-301D



**ALL SOLID STATE  
200W PIP  
DIGITAL READOUT TRANSCEIVER**



- 6-Digit Readout ● All Modes—SSB/CW/AM/FSK ● 160 thru 10 Meters ● TX & RX Clarifier ● RF Feedback ● 3-Position AGC ● Rejection Tuning (Tunable I.F. Crystal Filter) ● Built-in DC Power Supply
- Optional AC Power Supply and Speaker Unit with 12 or 24 Hr. Digital Clock ● Noise Blanker ● RF Speech Processor ● Computer Type Plug-In Module Construction ● Size : 11in. (w) x 5in. (h) x 13½in. (d) ● Light Weight : 22 lb.

The Model FT-301D is a precision-built, all solid-state, compact high performance transceiver of advanced design.

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(GB3SWM)

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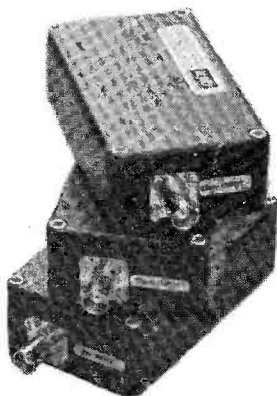
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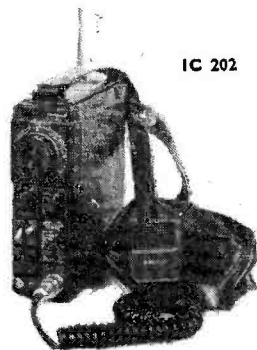
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# The SHORT WAVE Magazine

## EDITORIAL

### **Autumn**

While in many respects the general outlook as winter approaches is bleak, as far as Amateur Radio is concerned we can be a good deal more optimistic.

The bands are opening, and larger numbers of radio amateurs than ever before will be using them—to communicate “across the parish or across the world,” as our saying goes. The extraordinary variety of radio amateur activity will once again be demonstrated—LF, HF, VHF, DX, Phone, CW and SSB; to say nothing of RTTY, A/TV, Mobile, Construction, Operation and Contest working, each with its own type and category of adherents. Amateur Radio has long since progressed beyond the stage where even a well-qualified and experienced AT-station operator can expect to be expert, or even knowledgeable, in every one of its aspects.

Today, there are things going on in the VHF/UHF regions which are as a closed book to those who keep to our HF bands. There is DX being worked on these bands which would astonish those whose only experience is DX on HF. There is high-priced commercial equipment being installed in numerous amateur stations, and also individual constructional work going on of a very high standard of professionalism and workmanship. (There is also the other kind of construction, which often gives results just as good!)

So, as what has been promised to be “a long, hard winter”—in more senses than one—begins to close in on us, we can be grateful for the solace, relaxation and pleasant distraction that Amateur Radio will afford.

*Austin Forsyth  
G6FO*

## COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

ONCE again we have had a fair month, all things considered. Not only have there been some sunspots to be seen, but a significant proportion of them have been in the high latitudes associated with the new cycle; and indeed there were times during the latter-end of September when sunspot figures as high as the twenties were being noted. On the other side of the coin we are running into the period when the *forecast* smoothed sunspot number runs at a level eight right through into next July—but this old scribe has it in his old bones that we are, as it were, on the turn into the new cycle right now. Let's just hope there's enough money left in the kitty to renew our tickets next year!

Many readers will be subscribers to the Geoff Watts *DX News Sheet*; they will by now know that he has been ill, and has been suffering failing eyesight, to the extent that he has been given an Awful Warning by his doctor as to the consequences of continuing his activity of the past fifteen years. At the time of writing it begins to look as though Geoff will attempt to continue a service to U.K. readers, but will have to give up the terribly time-consuming foreign readership and the problems of dealing with the financial side, where DXNS has kept the Bank well exercised, and given Geoff an average 72-80 hour week. Cutting back to serving only G's and the odd copy to the foreign news bulletins, will reduce the readership by 80% and the currency problems by 90%—but Geoff will need all the support he can get if he is to keep going. The Prefix List will be kept going—a list which gives for each country its DXCC status, the normal prefix, any special prefixes, the ITU callsign block allocation, the continent, the CQ Zone Number and the ITU Zone number; not to mention full information of Antarctic stations, USSR Klub stations, obsolete prefixes used during the past five years and much more, along with ample space for recording every new prefix, ITU allocation and so forth as they arise. Fifteen pages of it, for 35p a time, one dollar,

or five IRCs, all useful for either SWL or licensed amateur. (G. P. Watts, 62 Belmore Road, Thorpe, Norwich, Norfolk, NR7 0PU).

### Ten Metres

Quite a representation this time, one way and another. Nice to hear again from GM3RFR (Baltasound, Shetlands), who after a spell during which other activities had to take priority, is now back to the main interest as it were. Sam uses a Delta-loop for 14/28 MHz, and notes U.K. contacts—and G is a fair way from Baltasound, come to think of it! Incidentally, and an interesting thought, four more chaps on the island (Unst) have passed R.A.E. and one of these also the Morse test; which will make eleven amateurs, or one per hundred of the population of the island! Should it not be re-named Radio Amateur Island??

G3ZGC/MM wrote from PJ3-land this time, and mentions Ten. One QSO was with ZS6BNU, maybe better known as G3VUQ, who said he would QSY to Ten; G3ZGC/MM was at 10° S., 01° W., in the middle of nowhere and on an apparently dead band—but ZS6BNU showed as S9, and was followed by ZS100, for the latter's first QSO on Ten and the first signal he had ever even heard on the band! Then on September 12 there was a QSO with G3HVA at Tadley, when Richard heard Don working other G's but no DX. Again on the 19th the band opened up, absolutely crammed with EU's, when G3ZGC/MM was near FY7, but his calls netted no result—may be they weren't listening for any DX!

Interestingly enough, the next report, from GW4BLE (Newport, Gwent) makes reference to a short-skip opening on September 19! It seems Steve heard lots of G's and Europeans during this opening, but no DX. A dozen QSO's were knocked up during the October 3 Ten-Metre Activity Day, but Steve had to lay off to help with the aeriels for the GW4ENT Contest Group to play in the CQ WW effort. Turning to the contest itself, Ten really came into its own, rather

towards the end, with assorted Europeans plus contacts with EL, PY, ZB2, ZD7, ZE's, lots of ZS's, 6W8, 7P8, 4Z4, 9G1, 9H1 and 9J2.

On the other side of the coin, G4DMN, now away from school and at Liverpool University, tried his hand at the Activity Day and only managed one station.

Old-timer at the DX game G3NOF (Yeovil) always keeps an eye on the bands, and his patience this time was rewarded in that during the few days prior to his report the 1100-1700 period showed signals on Ten as far south as ZS, plus South Americans in the evenings, so that Don raised EL2T, F6DYG, ISOLYN, ISOUSU, PY2ELV, ZB2BL, ZE1BL, ZE8JY, 7P8AC, 9G1LZ, 9J2CB and 9J2WR.

SWL Dave Whitaker operated with brother G3IGW, and at the time of his letter was mildly peeved that he hadn't chosen the following week (October 10th) when the band was much better for DX pretty well all day; but that's the luck of the game. The number of logs were somewhat down on the April session, and David himself, with the help of G3IGW's EA12 receiver and three-element beam at 52 feet only logged 43 stations plus a couple not completely copied; starting his watch at 0815z, nothing was heard for 45 minutes and it was 0940 before things began to really liven up, from which time there was an hour-long opening into SM, OH, UA2, UA3 and UQ2, with the lunch-time period pretty quiet, and the only real DX as 9G1JX at 1651z; other reporters mention 9G1LZ, ZS3BL, ZE1EV, ZE1CX and 5V4AH. At the time David took off the cans at 1800, the band was starting to, show signs of life from the direction of PY.

### Fifteen

Naturally, with Ten "showing" as it has been, we could reasonably expect 21 MHz to be a little livelier; and of course free from that monstrosity from Poltava that afflicts Twenty.

G4EAN (Nottingham) it will be recalled, was last month looking

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George Craiu, YO3RF, P.O. Box 1395 Bucharest, Roumania, is a keen CW/DX operator and holds several good contest awards.

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forward to the results of his tower-erecting exercise—no way! Work is ever the curse of the DX classes! While the odd contact was made on Twenty, Ian managed to choose all the wrong times for a listen on 21 MHz, and found nothing worth the waste of RF.

Ex-G2XC (Horndean) has become a right 21 MHz fanatic, and Ted notes an increasing tendency for East-West propagation, with W4's often heard in the early afternoon, and other interesting loggings such as AP2TN, calling CQ on 21.239 MHz with CW!, TJ1BB, VP8HA, a hefty 59 plus signal from VU2DK, XT2AG, YN1KG, YS1JL, ZF1IK, 9M2DQ and 9N1MM; and at 0840 one morning YB2CR, YB0ACB and VK6WT were all heard working A4XVK on CW.

Another "returner to the fold" from GM is GM3CFS (East Mey, Caithness) who has very much the same set-up as he did when he was on Eday Island; a large inverted-Vee with the apex at 70 feet, some smaller Vees under it, a couple of sloping Top Band dipoles and a 3/8 lambda Marconi. Jim reckons very little to Fifteen, but during WAE he did knock up SSB QSO's with ZE1BL, VU2DK, UD6HB, CR9AJ, PY5YC, LU8AJG, EL7F, 4Z4LF, UG6GAF; and on CW there were ZSSWT, XE1FR, JH6MHE/MM (in the Red Sea), VO1KE, FG7XA and SV1DB.

"Just beginning to open up," pines G4DMN, who, on the very

morning of his letter worked WB4KNL and WN2DFE as his start to the 21 MHz season. That opinion seems to about summarise G3NOF's feelings too; Don notes the odd W4 opening and the early-evening ones now and again into Africa; he worked 9G1LZ and 9H1CH.

GM3RFR reckons he is probably a "solitary" in his use of five watts p.e.p. of SSB for DX-ing, fed into, in his case, phased verticals, with which 21 MHz yielded SSB contacts to 4X4, GC, 9X5, SV, 9H and 6W8. However, GM3RFR would be pleased to hear of anyone else flogging along the uphill path to a QRP SSB DXCC—he has 51 countries in so far. On that score, there is at least one W who holds a QRP DXCC of which several of the "rare ones" are SSB QSO's; the story appeared in the January 1976 *CQ Magazine* and shows the handsome "pot" W2GRR got with it.

GW4BLE comes next; Steve found 15 metres in excellent shape on occasion, and up to October 9 had worked EL7F, JH6OKK, KP4DKC, LU2AFH, LU2HCO, OA4AFP, various PY's, UL7, VP1TL, all the "common" (i.e., East and Middle) W call areas, ZE1BL, ZP5GH, ZP6AT, ZS3LK, ZS5EF, ZS5TR, ZS5ZY, 4Z4LF, 5U7AG, 5Z4HZ, 5Z4NZ, 5Z4QQ, 7P8AC and 9L1JM. In addition there was quite a reasonably good netting on the band in the Contest, for which it

seems Saturday was a bit better than Sunday.

### Twenty

Has, as always, carried the weight of the DX traffic. However, the Poltava Pestilence has continued to be a nuisance world-wide.

G4EDG (Newton Abbot) seems to have been rolling steadily down hill, pushed by high winds and well lubricated by unwanted water! Initially it was a small matter of a gale and an aerial which set things rolling; it was a couple of weeks before that problem was resolved, and in the meantime use was made of forty feet of wire five feet above ground level fed through an L-match on 7 MHz. However, once the aerial was back up, the water got in to the 7 MHz trap and put paid to it once again, thanks to capillary action in a beehive trimmer! Thus the situation remained at the time of writing, and so, for Twenty, recourse was had to an *indoor* dipole, with which new States in the form of North and South Dakota, Oklahoma, Wyoming and Arizona were all booked in! It all now awaits suitable weather, and the New Trap to end All Traps will be installed, and let the weather do its worst!

G4DIY (St. Helens) found the band in excellent shape saying for the Poltava Pestilence, which he likens to a time-bomb ticking away. One night, Ron decided on a little experiment, and tuned up the band *very* slowly, using both the

Q-Multiplier and the MFJ filter together, working everything heard calling, and all new ones, none of 'em above S1 on the meter. As he says, it's quite amazing what is there to be found if only you can slive off the mush! All were CW of course (100 watts input) new ones being VP2EEM, VP5TI, VU2TS, 9K2DR, 9L1CD, LU7WH, LU7DDH, 4X4CJ, and KV4CI, plus all W call areas other than W5, VE's, PY1BOA, PY5BXW, JA, JH, JR1NRP twice and the gotaways included VK2JUP, HI7's and DU.

The G4DJY (St. Annes-on-Sea) story this month came in two parts; the log, passed on by G3CED, and a separate letter containing some home-spun philosophy. Peter is hoping—as do many of us—that to hear of DX worked by chaps with simple aerials will dispel the very widespread idea that no-one can work DX without a beam, and no-one can get permission for a beam; which rules out DX chasing for the U.K. amateur. No Sir, it's just not true! Peter would like to know just what everyone else uses in the way of gear, to help him compare his results with others; his own set-up is a Joystick bought second-hand as a stop-gap, which has so far netted him 99 countries, of which 96 were taken on CW, which is the preferred mode despite the sad fact that there is more DX about on Sideband, against which G4DJY sets the better operating manners of the CW end of the band. His log for the current month shows all continents worked, HI8NQG just as the band was fading out, PY, LU, all sorts of W's, UA0AN, 4Z4MQ, UK0SAA, UK9CAE, UD6HB, UK9AAN, VE's, UL7, ZE, ZS, 9G1JX, EL7F, UH8HAI, OH0DX, UI8OK, HK3CTJ, more AU9's, and pretty well all W call areas and AJ3AA, who had knocked up 2990 contacts since they previously worked, during which time G4DJY had found time for 126 and felt "active" at that!

Also by way of G3CED came the log of local G4EVO, who, as we have remarked before, is a senior citizen and ex-commercial, who has taken to Amateur Radio and CW operating like the proverbial duck to water, running just five watts of

## TOP BAND COUNTIES/COUNTRIES

Starting date, November 1, 1975

Call	AM	CW	SSB	Countries	Total
G4CZE	85	76	77	11	249
G4EAX	58	50	84	10	202
G4CBQ	23	86	71	13	193
GM3YOR	2	130	18	28	178
G4AEJ	65	54	38	8	165
GW3WNY	71	80	—	10	161
G4EPL	17	46	78	10	151
G4AYS	43	92	—	8	143

Rules as before, final scores to be in the next issue—Ladder terminates on October 31, 1976.

CW into a Joystick, mainly on Eighty but on occasion on Twenty, on which band G4EVO circulated pretty freely around Europe, over to the States several times, and within a whisker of Asia as we define it in the Amateur Radio sense.

G3CED himself of course, is G3VFA (Broadstairs) and he implies business must be looking up because he has new batteries for the rig and is back up to two watts! George was only able to get on at odd times for a few minutes, however that didn't stop him putting a signal over the Pond to W1BFT, and turning up the most naive pirate in years—this joker was signing ZD4NVL!

As we mentioned earlier, G4EAN didn't get much chance to try his new tower out for size, but he did show three contacts on 14 MHz; SM5CHV, LU6DIN and EA8NF.

Pressing on with the story, we come next to GM3CFS, who used CW to take WA6EGL/VQ9 (Chagos), A4XVK, FC9UC and ZL3GQ, plus SSB with 8P6GN, HI8MOG, ZP9AC, 6W8FP and ZP5GH.

G4DMN says his aerials fire across a marsh—the estuary of the River Dee is at the bottom of his garden! This gives the beam a good take-off over the marsh even though it is only at 20 feet, and the 18AVT has been installed as near to the marsh as can safely be. The Bicentennial WAS was "mopped up" by the end of July, and other stuff of interest included AC5NVU, F6HN/W6, a JA5 the rest of whose call is unreadable (Richard has invented a new shorthand, we reckon!), KL7IEU, KL7IRN, KL7MF, HK0DMA (San Andres), K6MF, K0IEA, some assorted

commoner W-zeros, W6OCU, K7TTJ, VP2KJ, ZE1BL, some 4Z4's and 9Y4UU.

Next we have the analytical report from G3NOF, who heard nothing from the Pacific in the mornings and not many VK's or JA's. East coast W's have been heard as early as 1000, with the Western Reaches showing between 1400 and 1700; around 1500 there have been openings to S.E. Asia, and Africans as far down as ZS in the early evenings. SSB was, as usual, the preferred mode, and it raised AP2AC, FOHN/W6, HI8CDS, HI8EDS, HI8MOG, K7OXB (Utah), TA2EH, VE1APY/SU, W6USG, W6YX, W7PJ (Oregon), W7RLL (Montana), WA7BLE (Utah), ZS1DZ, ZS1EZ, ZS1GM, ZS1LM, ZS6APO, 4S7CF, 9G1LZ, 9J2GF and 9V1NR.

G3ZGC/MM says he has no comment to make on Twenty because it would need another page to itself! That seems a somewhat double-edged phraseology—does he refer to the QRM or the QSO's, we wonder?

Up there in Baltasound, GM3RFR managed SSB QSO's with his QRP to TF, 5X5, 6W8, JW, EA8, EA6, 9Y4, UA9, EA9, HB0, UL7, VE4, OH0, all with the delta loop.

GW4BLE maintained his normal pattern of operating mostly in the early evenings with the odd look round at breakfast time; the latter produced some good long-path signals into Oceania, this being far better than the short route from his QTH. The stuff worked on SSB included CT3BDA, D4CBS, FM7AV, several HI8's, TD76GI, VP2DQ, VP9A, long-path VK's, 4Z4LF, 6W8FP, 8P6FU and 9G1JX. During the contest, the first ninety



minutes were pretty awful, thanks to the fluorescent lamp next door playing up, and his contention that the take-off is poor to the East was well proven.

We have news of the GI trip by GM3YOR and GM3OLK, who had a whale of a time cut short by the seamen's strike threat, which shortened their time in Armagh and caused the complete omission of Co. Down. The start was in Antrim, where they managed to drop into a Ballymena Club evening. All the sites sorted out by the GI boys were easily accessible by road, and Drew wonders that more GI expeditions are not mounted. On Twenty they worked a total of fifty stations, including a JA and a W2.

WB80WM (Canton, Ohio) writes that while he knows he's not exciting DX for G's, it is to him when—running two watts to a vertical aerial with an HW-7—he works G3DBL on 14 MHz, and it was solid copy both ways.

G3RJV has four to five watts to an indoor dipole or a Joystick, but has been somewhat pressed for time and only managed to work the Europeans; the surprising thing is that in general the reports were so much the same as he used to get in his QRO days.

#### Forty

This is, as always, a band that sorts out the men from the boys! Even if you don't like it, there can be no doubt that learning to work DX on Forty is probably the very best possible way to develop skilled

operating technique, if only for the reason that the QRM and noise makes it vital to get the very best out of the receiver and the operator's own built-in crystal-filter ears. However, as with most things, it is practice that makes perfect. G4EDG, reduced to forty feet of wire five feet above ground, managed to raise KV4CI and ZL4NH, and hear all sorts of interesting stuff including YK5AAA; when the aerial—the ground-plane, that is—was fixed, the first QSO was with JR6RRD, followed by W1-2-3-4-8, ZL's, UH8HAS, 4X4CJ, and SV10D for a new one, after which spurt the trap failed.

GW4BLE has his dipoles back up for Forty and Eighty, but has noticed some TVI, the TV Relay company not yet having finished work which they should have done last season—the moral of which is to keep at the blighters, as by now they have probably forgotten what they had to do anyway! Thought: someone should write a book entitled "How to be your own Progress Chasers." Anyhow, GW4BLE spent an hour in the VK/ZL/Oceania contest which raised him VK7GK, ZL1BOQ and ZL4IJ, all on SSB.

For 7 MHz, GM3RFR has a compressed dipole of *two feet* length into which he pokes his QRP SSB and ventures on Forty; LA, OZ, and GW have so far been added to the total. Another thought: Sam should come up to Leicester armed with a hand-held QRP SSB rig and

this aerial, and showed the army of twits who work each other from opposite ends of Granby Hall on S20 that the same order of power, the same size of box, and the same sort of aerial length can work out of England! Mind-bending stuff, specially for the FM'er!

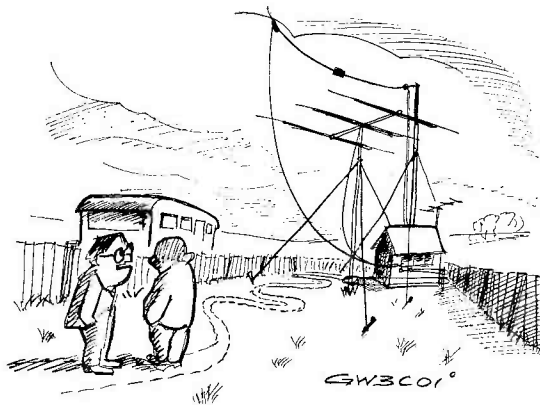
A real 7 MHz buff is G3ZGC/MM, although of course it must be admitted he carries his "good location over salt water" around with him. On the question of /MM stations, Richard mentions ELØV, captain of a 1958-vintage oil tanker, and ELØR in command of the *George M. Keller*, who had just been told his call had been changed to ELØEF/MM, by EL2S, who happens to be the guy who allocates the EL call signs; it seems that the abolition of the one-letter calls occurred back in July but news has not yet found its way to all the itinerant call sign owners, so EL2S is telling 'em as he finds 'em. However, to return to serious 40-metre matters: The part of the trip between the Cape and Aruba, from whence Richard wrote, was very fruitful indeed in terms of 7 MHz, with G3ISV, G4AYO, G3LW, G3FNFJ, G4DJN and G3LIK, not to mention one CQ which resulted in a pile-up with UA's, SP's, YU's, G's, EA, OE and VE all replying, made from near Ascension Island! An odd thing, though, is that whenever Richard is hearing the station well, the other chap is having trouble to copy, and when the other bloke is saying Readability Five, it's Richard who can't copy!

GM3CFS stuck to CW on Forty by far the easiest way, and hooked UL7CAD, UA9AAB, K4IEX and W4LG.

Even the QRP boys sometimes venture on to the band, G3CED for instance, although during the current month George seems to have only used 40m. during daylight hours, when things are much saner, and he was able to put his couple of watts out over most of Europe, thereby saving his main energies for Eighty.

#### Eighty

Which is where we are now going, following the G3CED/G3VFA and QRP Club types who inhabit it. G3KFE had a couple of listens-round and found things quite fair in mid-evening; this of course at the



"... Yes, his caravan does spoil the view..."

CW end, he never having plucked up the nerve to try phone on the band. However, this has been brought to an abrupt stop by the aerial coming down in the gales of the last few days—when first we put up that 28-gauge wire, there was a little silvery-leaved bush beneath the span, which has now grown into a big tree, tall enough to have an outgrowth capable of catching the wire as it moved in the wind, and holding it down, so when the blow stopped the wire was stretched bow-string tight—and one can hardly expect 28 gauge copper wire to pull a tree over . . .

The QRP Club Activity Weekend went down well, with the segment about ten kHz either side of 3550 chock-full of QRP operators at times, particularly on the Sunday afternoon. G3RJV summarises: G8PG worked GI3XZM, G3RJV, G5FF, G3DNF, G4CQK, G4DEP, G3JFS, G3ZDW and G3LGX, all QRP-QRP Club members, not to mention hearing others, and noting G6PG calling CQ QRP. GI3XZM seems to have concentrated on QRP stations outside U.K. and managed to find PAØKSB and ON5AG, before bumping into the other QRP club members and working them. GM30XX up in Edinburgh divided his QRP time between 14 MHz and Top Band, with a two-watt PA and dipole on the former, which got out as far as UA9; the same power and a crystal on Top Band resulted in QSO's with G4CUY and OL4ATY. All of which is not to say that the QRP chaps do not have their spiritual home on Eighty and CW—the Phone QRP men are rare birds, as GM3RFR has noted elsewhere, and one suspects that part of the fun of QRP is in getting back to the simple ways and getting the same, good, results.

G2NJ (Peterborough) was one of the group and Nick remarked on the strong MCW signal in the middle of the band in the last week of September, at one stage using the call "QRA de B2E," and sending five-letter cypher groups—one things for sure, the operators were at least *human* because there were the odd erasures just to prove it! On another

tack, G2NJ remarks on a couple of amateurs, both *ex* sea-going operators and of World War One vintage, who still bang away merrily at 25 w.p.m. and ragchew; and on a contact with G3ACC, to whom, a long time ago, he was one of her first QSO's.

From QRP to QRO—GM3YOR and GM3OLK made a total of 168 contacts on this band during their trip to GI; and already they are of a mind to start planning for another expedition next year—any suggestions?

Eighty for G4DMN gave CW contacts with VP1MPW, WN3ZMY, ZL1BIL, ZL4KF (who was an incredible 59 plus signal at 0750 local time!) and 5B4PW.

G4EVO seems to have very largely stuck to inter-G working with his QRP, although one does notice the odd QSO with stations in the outer darkness beyond the sea—a suspicion creeps in that G4EVO is beginning to make so many regular friends on the band he won't have time for DX!

On to GW4BLE, who tried out his dipole again by working lots of Europeans; the only DX was a quick blast at ZL2BT just to prove the knack is still there.

Instead of the two-foot vertical mentioned before, GM3RFR goes the whole hog to four feet for his eighty-metre vertical! That it gets out is evidenced by the QRP SSB contacts with G and OH.

GM3CFS stuck to his key for 3.5 MHz working, and it helped him to raise TF3YHN, UK9FER, and G3UYV/MM when the latter was off the Libyan Coast.

So—in summary, Eighty has been almost all about QRP—how this activity has transformed a band that for so long had been *in limbo* as far as DX reports go!

### Top Band

The GI trip by GM3OLK and GM3YOR resulted in a total of 139 contacts—well down on previous years when, for example, G3SVK on one of his trips could raise darn nearly that number each night; but it is a reflection on the way 160m. activity has fallen off in recent years.

G4AYS (Moir) promised a fight-

ing finish to his Top Band ladder entry, and sure enough he did just that with his RG1 and 600 *milli-watt* rig, or an AT5 for QRO and AM Phone—you can't get much simpler than that!

### Comment?

All sorts of bits and pieces here. Over November 20/21, 1900z on Saturday to 0600 on Sunday, the OE's are having their *Top Band Contest*; the OE allocations are 1823-1838, 1854-1873, and 1879-1900 kHz; score one point for each QSO and a multiplier for each country prefix worked, or two for each OE prefix worked. Contact exchange is the usual RST plus serial number, mailing deadline December 15, to Landesverband Salzburg des Oe.V.S.V., c/o OE2LOL, Pfeifferhofstrabe 7, A-5020 Salzburg, Austria.

On January 1, there is another contest by the DL AGCW for all CW power levels. Detailed information on this can be had from DL7DO, 1 Berlin 15, Dusseldorfer Str. 15; and their QRP contest comes up on January 17/18, from 1500z to 1500z, taking a nine-hour break in no more than two periods to give 15 hours operating. Entries by February 15 to Hartmut Weber, DJ7ST, d-3201 Holle, Kleine Ohe 5; or G3RJV says they can be sent to G8PG for onward transmission *en bloc*.

Last time we mentioned ON4UN and his print-out of sunrise/sunset times; but we forgot to mention the cost of ten dollars per book, three for 25 dollars, five for forty dollars, and some optimists sent John a couple of IRC's in hopes! If you want one of these very worthwhile 100-page jobs, find *your own* latitude and longitude as exactly as you can, and send this information, your own address and the boodle, to ON4UN—if you send cash *register it*—address as given last month.

The rest will have to wait for next time; and we must sign and give you the deadline as **November 9**, and addressed as always to, CDXN, SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ. And, don't forget, it's about the peak of the year as far as conditions go, this month, so you should have *lots* of DX!

# ONE-LUNG FOUR-BANDER

## SINGLE-VALVE CC/CW TRANSMITTER

THE bands 15-80m. can be worked with about 20 watts input, and on CW at the least it will take you all round Europe—it may even give DX on the HF bands with a reasonable aerial system. With no VFO'ing to worry about, it is simply a matter of keeping the station receiver on the transmitting frequency till a wanted station is heard calling. With band occupancy as it is today, there will be no shortage of QSO's. The sophistication and complexity of many modern transmitter designs must prove rather frightening to the newly licensed amateur having only limited resources and little constructional experience. Rather than first buying a new (or second-hand) commercially built transmitter the beginner is urged to acquire some practical know-how by building and putting on the air his own simple rig, such as that described here.

By digging into a reasonably well-stocked junk box its cost need not amount to more than a few pounds, and if care is taken with the aerial tuning arrangements world-wide contacts can be expected.

### Circuit

No originality is claimed for the circuit—one Old Timer upon seeing the transmitter remarked that the replacement of his double-superhet station receiver by an 0-V-1 would just about duplicate his own station as it was circa 1930!

An 807 beam-tetrode is used in a Colpitts crystal oscillator circuit with its anode tuned to a harmonic of the crystal frequency. This point is important, for should the anode tank circuit resonate at the crystal frequency there is a risk of excessive feedback, with consequent crystal heating and probably fracture. The power on the actual CO side is quite low, between 1½ and 2 watts, and providing the feedback condenser C1 (Fig. 1) is adjusted correctly there will be no danger of crystal damage. It is *not* recommended that miniature crystals be used; the older (and cheaper) 10X types are more robust and better suited to this kind of circuit.

L1 can be a tapped winding as shown in Fig. 1 or plug-in units may be used with perhaps greater

efficiency. If a tapped coil is decided upon the link winding L2 must be free to be moved along L1 to the tap points as bands are changed. The parasitic suppressor APC is always needed when using 807 valves and should not be neglected.

At first, cathode keying was attempted on the prototype transmitter but bad clicks and some chirp appeared. No amount of click filtering helped, so screen keying was

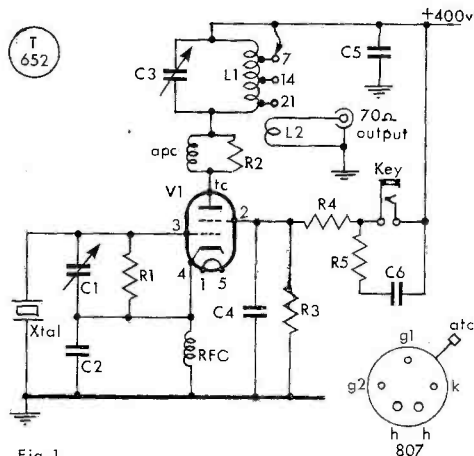


Fig. 1

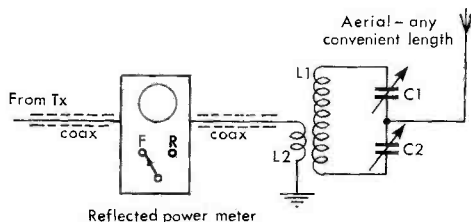


Fig. 2

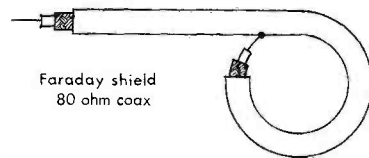


Fig. 3

### Table of Values

Fig. 1. Circuit of the Single-Valve CC Transmitter

C1 = 3/30 $\mu$ F Philips trimmer	R1 = 47,000 ohms, 1 watt
C2 = 120 $\mu$ F silver mica	R2 = 33 ohms, 1 watt
C3 = 150 $\mu$ F variable, low-power Tx type	R3 = 15,000 ohms, 10 watt w/wound
C4 = .002 $\mu$ F ceramic, 500v. wkng.	R4 = 7,500 ohms, 10 watt w/wound
C5 = .003 $\mu$ F mica, 1,000v. wkng.	R5 = 330 ohms, 1 watt
C6 = 0.1 $\mu$ F paper, 1000v. wkng.	APC = 6t, 18g. enam. wound over R2
	Xtal = 1.75 MHz, 3.5 MHz or 7 MHz to suit band (see text)
	RFC = 2.5 mH Rf Choke

### COIL DATA

L1 = 22 turns 20g. at 16tpi on 1½in. diam. former. Tap at 5t. for 21 MHz, 9t. for 14 MHz and 14t. for 7 MHz.

L2 = 2 turns at HT end of L1, or single turn Faraday shield (see Fig. 3).

Fig. 1. Circuit of the single-valve transmitter. It is a simple 20-watt CW job capable of good results on four amateur bands—indeed, it will give worldwide contacts and involves no complications because it is crystal-controlled.

Fig. 2. Suggested ATU arrangement for the simple transmitter described in the text. To obtain maximum efficiency, an SWR meter should be included on the aerial side, as shown here. The circuit components are: C1, C2, 300  $\mu$ F; L1, plug-in coil for the band; and L2 is a single-turn Faraday link, as shown in Fig. 3.

Fig. 3. A screened link winding (Faraday shield) can be made from ordinary coax cable. The end of the inner conductor is soldered to the outer braiding at the start of the link turn—and that is all there is to it.

resorted to and the trouble disappeared. R3 is an important element in the keying circuit for it helps to maintain the screen at the correct voltage (between 250v. and 300v.) and also eliminates all chirp from the signal. A simple click-filter using R5 and C6 seems quite effective. Remember to wire the key jack so that the body of the key connects to R4 which is at earth potential in the key-up condition. No meter is shown, but one should be connected between HT positive and C5. A 100 mA instrument would be suitable.

### Construction

Almost any layout or form of construction can be used. The original transmitter was put together on two pieces of plywood, the 807 being mounted horizontally in order to reduce anode lead length and to make the unit small and compact. Should the constructor wish to follow the more orthodox chassis-and-panel layouts no difficulties should be encountered providing the tank coil L1 is horizontally positioned an inch or so above the metal chassis. A final point is to keep the leads to the RF bypass capacitors C4 and C5 as short as possible to prevent the generation of unwanted VHF resonances.

### Setting Up

The circuit as shown is based upon an HT supply voltage of 400v. If a PSU with this voltage is not available a lower HT supply may be used with of course a reduction in the power input. Alternatively up to 500v. HT is permissible, it then being necessary to adjust the values of R3 and R4 to prevent excessive screen voltage, the screen being the plate of the CO. If chirp is to be avoided with a single-valve transmitter of this type the power pack must have good regulation and be generously rated. In this circuit, the total cathode current of the 807 at 400v. is 45-50 mA and a power pack using choke input rated at 200 mA would be ideal.

Initially, a dummy load consisting of a 10-watt lamp should be used for test purposes. Always tune the anode circuit to a *harmonic* of the crystal frequency, i.e. for operation on 14 MHz or 21 MHz use a 7 MHz crystal; it is surprising how much output can be realised even when tripling in the output tank circuit. The station receiver, suitably muted, can be used to check for chirp or key clicks. The feedback condenser C1 should be adjusted to the minimum capacitance required to maintain oscillation, consistent with a good note and clean keying. Too little capacity here will give rise to chirp or lag when keying; too much can produce crystal heating.

### Aerial Tuning

With low-power transmitters it is essential to get every available watt into the aerial system. In order to do this an effective ATU and an SWR meter will be needed. If the SWR on the output coax is not known it is possible to "lose" as heat in the cable half or even more of the RF output power. Dangling a neon on the ATU coil is just not good enough for accurate matching and setting up. Reflected power meters need not be expensive nor complicated instruments, and simple but effective designs can be found in the *Handbooks*.

Fig. 2 shows an aerial tuning arrangement used successfully for many years. An advantage of this

system is that almost any random length of aerial can be loaded. Should difficulty in matching occur it often means that the impedance of the aerial at the station end is either too high or too low to be accommodated by the ATU. This can be easily overcome by adding a few feet of wire to the lead in.

It should be possible by adjusting C1 and C2 individually (Fig. 2), always maintaining resonance, to find a point where the SWR drops to a very low figure. If a ratio lower than 1.5:1.0 cannot be obtained, the link couplings at the transmitter and the ATU can be moved and the whole procedure repeated. Twenty minutes spent tuning up properly can give hours of operating ease and good signal reports, and the settings of C1 and C2 should be noted for future reference and easy band changing.

### TVI

In order to minimise the radiation of high order harmonics the link windings on the transmitter and the ATU are made from coax in the form of Faraday shields (Fig. 3). With this precaution and in view of the power levels, TVI ought not to be a problem. In fringe areas, of course, more adequate screening and a low-pass filter may be required.

### Conclusion

Instead of an 807, a 5B/254M, as on p.409 of the Sept. issue, will work satisfactorily in the circuit. No doubt other tetrodes could be used, but they should not be run at voltages in excess of their normal ratings.

The little transmitter as described has provided hours of pleasant and even exciting operating, and has been a welcome change for a somewhat jaded SSB exponent! Reports received have averaged S7 on all bands and S9 reports are not uncommon. All Europe can be raised easily, and the best DX to date has been a 559 report on 20m. from a W6 *via* the long path. This works out at something like 1,000 miles per watt without any elaborate aerial system—just 125 feet of wire strung from an upper window to a tree in the garden. Another advantage of this rig is that little receiver tuning is required—just sit on your Tx crystal frequency and wait for them!



\*... thinking of changing to separates here ...\*

## DC-AC INVERTER

OPERATION FROM 12-VOLT  
SUPPLY — 50-WATT OUTPUT

P. BURNETT (G4BLL)

THIS simple unit was evolved initially with one prime function in mind—to run the *Venus* SS2 Monitor from a 12v. battery on portable excursions with SS/TV equipment to various mountain-top sites. However, it was soon found to have other uses when on one particular foray it was discovered that the special lead connecting the speaker output from the *Liner-2* to the monitor had been left behind—with a little improvisation wires were soldered directly across the output jack—the small soldering iron being powered by the inverter, and all this in the midst of a snow storm!

The circuit, Fig. 1, is simply a self functioning switch producing square-wave output. Construction and layout of components is not critical and the form adopted by the writer is shown in the photograph below. Care should be taken to connect the transformer leads as shown but if the unit fails to operate reverse the transistor base connections. The 2N3055 transistors work quite happily and were found not to require very large heat sinks. The only adjustment which may be necessary is the value of R2 to ensure reliable starting—values between 2.2 and 6.8 ohms should be satisfactory. Once the correct value has been determined use as high a rating as possible in order to keep the surface temperature down; in the writer's case metal-clad resistors were used and bolted to the chassis.

If difficulty in starting is experienced it will probably be due to too wide a spread in the parameters of the 2N3055 transistors used and it may be necessary to

find a matched pair but first try a 4.7  $\mu$ F reversible electrolytic across the base and collector of one of the transistors.

Output voltage regulation was found to be quite acceptable, varying from 255 volts no-load to 220 volts under full load (50 watts) conditions, but this unit may not be suitable for loads requiring a very heavy starting current.

The unit was built on a chassis measuring 5in. x 5in. x 2in. though a somewhat smaller chassis could be used. Observe the usual precautions regarding correct battery polarity—or alternatively buy in a good stock of 2N3055's!

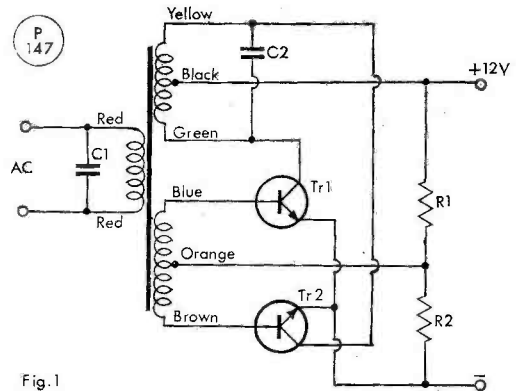
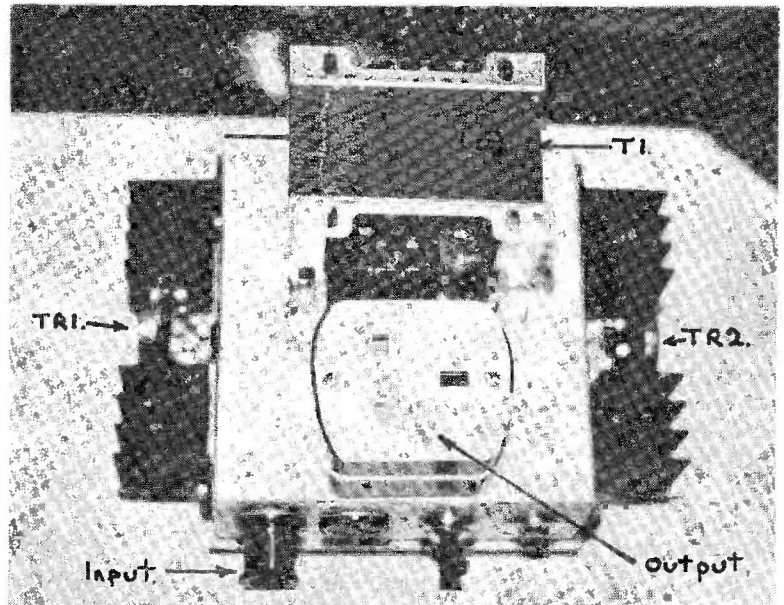


Fig. 1  
Circuit of the DC-AC Inverter discussed in the text. Values can be: C1, 0.47  $\mu$ F, 600v.; C2, 0.25  $\mu$ F, 150v.; C3, 4.7  $\mu$ F, 150v. (see text); R1, 100 ohms; R2, 5 ohms; T1, suitable transformer; Tr1, Tr2, 2N3055.

General construction of the Inverter described in the text.



## SOME PRACTICAL IDEAS

### FOR THE GDO AND THE S-METER

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

#### MORE USE FOR THE GDO

A GRID dip oscillator, or its semiconductor equivalent, is a fairly regular item in the average amateur station. Except for general usage, such as checking the resonant frequency of a multiplier or aerial, it often stands idle. It can, however, be employed for other purposes, and especially to obtain indications of the values of unknown inductances and capacitances.

As modern grannies know, resonant frequency for  $\mu\text{H}$  and  $\mu\mu\text{F}$  =

$$\frac{10^6}{2\pi \sqrt{LC}} = \text{kHz.}$$

In other words, multiply inductance in  $\mu\text{H}$  by capacitance in  $\mu\mu\text{F}$ , find the square root of this, multiply by 6.28, then divide 1,000,000 by what you have got, to obtain the frequency. This is the situation in Fig. 1. But as we want to find L, or C (not the frequency) we can change this to—

$$L = \frac{25,330}{f^2 C} \quad \text{or} \quad C = \frac{25,330}{f^2 L}$$

where frequency  $f$  is in megahertz, which avoids unnecessary noughts. So if we know L or C in Fig. 1, and the resonant frequency, we can find the unknown C or L, as the case may be.

#### Finding L

C can be a 1% silver mica capacitor likely to give resonance in one of the GDO ranges. As example, we have a choke from some old VHF equipment which is wound for  $\frac{3}{4}$  in. with fine wire, turns side by side on a  $\frac{3}{8}$  in. rod. C can be  $20\mu\mu\text{F}$ . The GDO shows, nearly as we can see, a dip at 5 MHz;  $5 \times 5 \times 20 = 500$  and dividing 25,330 by this gives nearly  $51\mu\text{H}$ .

If you have a resonant frequency chart on which you can put a straight-edge across inductance, capacitance and frequency this gives a close answer without arithmetic.

The limits over which L can be found, with reasonable values for C, depend on the GDO coils available. If L is cored, keep it, and especially the core, as far from the GDO coil as possible.

#### Finding C

For this, L needs to be known. To avoid buying a coil of known fixed inductance, one can be wound, using the formula for turns in a single layer. Or set the GDO to 1.59 MHz, as near as may be known, connect  $100\mu\mu\text{F}$  1% for C, and arrange turns for resonance, to obtain  $100\mu\text{H}$ . This will allow about 7.5 MHz to 800 kHz on the GDO to cover  $5\mu\mu\text{F}$  to  $400\mu\mu\text{F}$ . A  $10\mu\text{H}$  coil will extend this to about  $3500\mu\mu\text{F}$ .

An alternative way to find C is shown in Fig. 2. VC1 should be up to the maximum value wanted—say  $500\mu\mu\text{F}$ . L1 is a few turns so that with VC1 closed, the GDO will give it dip at some handy frequency—say 5-7 MHz. A few known 1% capacitors are then connected at X. Each time open VC1 to restore the dip,

and mark the scale of VC1. In this way a full scale can be drawn up, filling in by estimate. To find an unknown value, close VC1, tune the GDO to its dip (without too tight coupling), connect the component across terminals X, and open VC1 to find the dip, reading from VC1 scale.

VC1 and L1 ought to be in a plastic or insulated box, to protect L1. This method can be used for very small values, if VC1 is about  $25\mu\mu\text{F}$  or  $50\mu\mu\text{F}$ .

The usual GDO will not be closely calibrated, or may not be too accurate, so check with the station receiver if possible.

#### As Signal Generator

If modulation of the signal is not essential, and too much is not expected in the way of accuracy of calibration, the GDO can have its uses as a signal source. As example, suppose a two-metre converter has been set up insofar as its oscillator section is working correctly, and it is feeding into the receiver. If the receiver is set on the expected band, and the GDO is tuned around 145 MHz, it should come through on the receiver as a carrier, or operate the S-meter. With the GDO warmed up and set a little apart from the converter, this signal will do well for preliminary adjustments of the 144-146 MHz circuits.

With a little care, it can also give a signal in the 30-1.8 MHz range, for receiver adjustment (but not calibration), if a signal generator is not available.

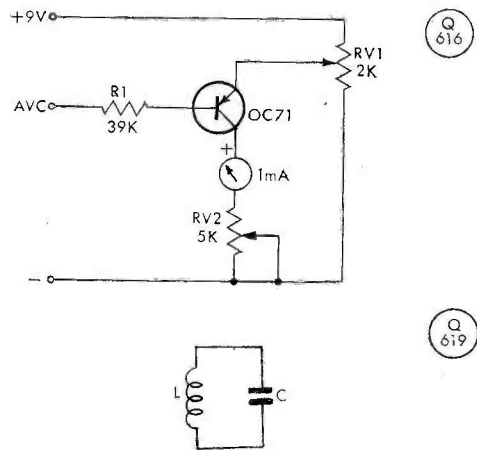


Fig.1 Method of finding Inductance or Capacitance

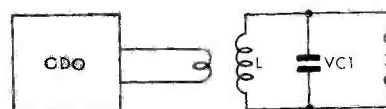


Fig.2 Direct reading of small capacitance

Above, S-meter circuit for receivers having n.p.n. transistors. Below, uses of the GDO for inductance-capacity measurements. Note: VC1 should be shown as a variable capacitor.

## TRANSISTORISED S-METER

A tuning meter or S-meter is not usually a feature of many transistor receivers. It will be found easy to add one, using the circuit shown. The few items (except for the meter) can be mounted on a tag strip. Whether or not the meter itself is fitted on the receiver panel, or in a separate case, is a matter for individual choice. With commercially-made equipment, the separate case is recommended.

The indicating instrument can be a 1mA S-meter, or a similar type of 0-1 mA instrument. Readings obtained are comparative, as they clearly depend on the receiver gain, type, of aerial and so forth. They are thus useful for peaking up an aerial tuner, comparing aerial-earth systems, and similar applications—such as signal levels between stations.

### How it Works

The circuit is intended for receivers having a negative earth line. These have n.p.n. transistors in which the

automatic volume control bias moves negative to reduce gain with strong signals. R1 picks up this bias for the p.n.p. transistor. Here, more negative bias increases collector current, which flows through the meter.

In many receivers an AVC point can be found at the audio gain control. RV1 should be set so that collector current is just beginning to rise, with no signal tuned in. RV2 is to reduce sensitivity, as without it many signals are likely to give a full-scale reading. It can later be measured and replaced by a fixed resistor, the value being chosen so that a very strong signal gives a reading of about three-quarters full-scale. RV1 can be fixed and variable items in series, provided the whole chain is not over about 2000 ohms.

It is intended that the circuit run from the receiver supply, 9 volts. Other p.n.p. transistors can be tried, if to hand.

For a receiver using p.n.p. transistors, with a positive earth line, the transistor must be changed to a BC108 or similar n.p.n. type, and polarity of supply lines and meter reversed.

## TONE BURST UNIT

### COMPREHENSIVE DESIGN FOR REPEATER OPERATION

I. J. DILWORTH, B.Sc. (G3WRT)

WHILE many tone burst oscillators have appeared in the literature, these have usually consisted of a simple oscillator with relatively crude tone-burst length adjustment.

A comprehensive Tone Burst unit is presented here which allows accurate adjustment of the tone-burst length and a time-out burst which is only applied to the receiver audio stages and not through the transmitter modulator. The unit can be built for around £2 and can be easily wired into existing transmitters and receivers with the minimum of effort. Power can be taken from any convenient supply within the range 6-12 volts capable of supplying approximately 20 mA.

Fig. 1 shows the block diagram of the unit. A Signetics 555 integrated circuit timer is used as a 50-second (adjustable) oscillator, this triggers an MOS type Monostable, duration of which is adjusted for the required tone-burst length, nominally 0.5 second. The output of this monostable gates another 555 IC wired as a 1750 Hz oscillator, the 0.5 second burst of output from pin 3 of this IC is applied to a transistor switch and attenuator. The time constant switching Tr1 base is such that the first tone passes unattenuated but the second (reminder tone) is effectively shorted to earth via R3 and does not modulate the transmitter. However, the tone is passed to the receiver audio stages via R2; here both tones pass irrespective of the state of Tr2, and so may be heard through the speaker. To ensure that C4 is discharged fully and rapidly when returning to "receive," either a spare relay contact, from the transmit-receive relay is utilised (*i.e.* make-to-earth on "receive"),

or if you are all solid-state Tr2 can be included to fulfil the same function. Applying a positive voltage to the base of T2 via R13 during receive periods.

Reference to the circuit diagram Fig. 2 will show one method of arranging for the tone burst unit to be active only on repeater channels. Assuming the channel selector switch provides a supply voltage on one set of wafer contacts this can be done automatically. The supply to IC2 only is routed via a relay contact that is make on "transmit"; small-signal type diodes *e.g.*, IN916 can then be wired to Repeater channels on the selector switch. Note the supply can be permanently connected to IC1, IC3, Tr1, etc.

### Adjustment of 1750 Hz Oscillator

Connect pin 4, IC3, to the positive rail via a 100K resistor. This will produce a continuous tone and VR2 can now be adjusted to give a 1750 Hz output at R2. With the unit working, adjust VR3, IC2, for the required time (*i.e.* the reminder-tone time); the range will be approximately 50-80 seconds dependent on the value of capacitor C5, bearing in mind the tolerance of electrolytic capacitors. In any event it should be possible to set

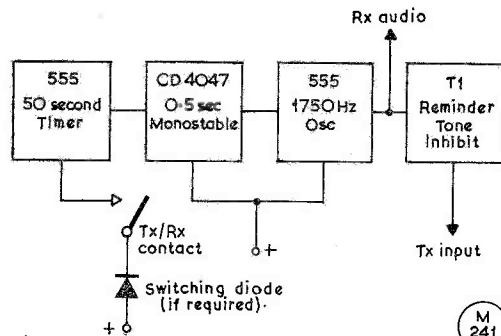


Fig. 1

Fig. 1. Block diagram of the G3WRT Tone Burst Unit.

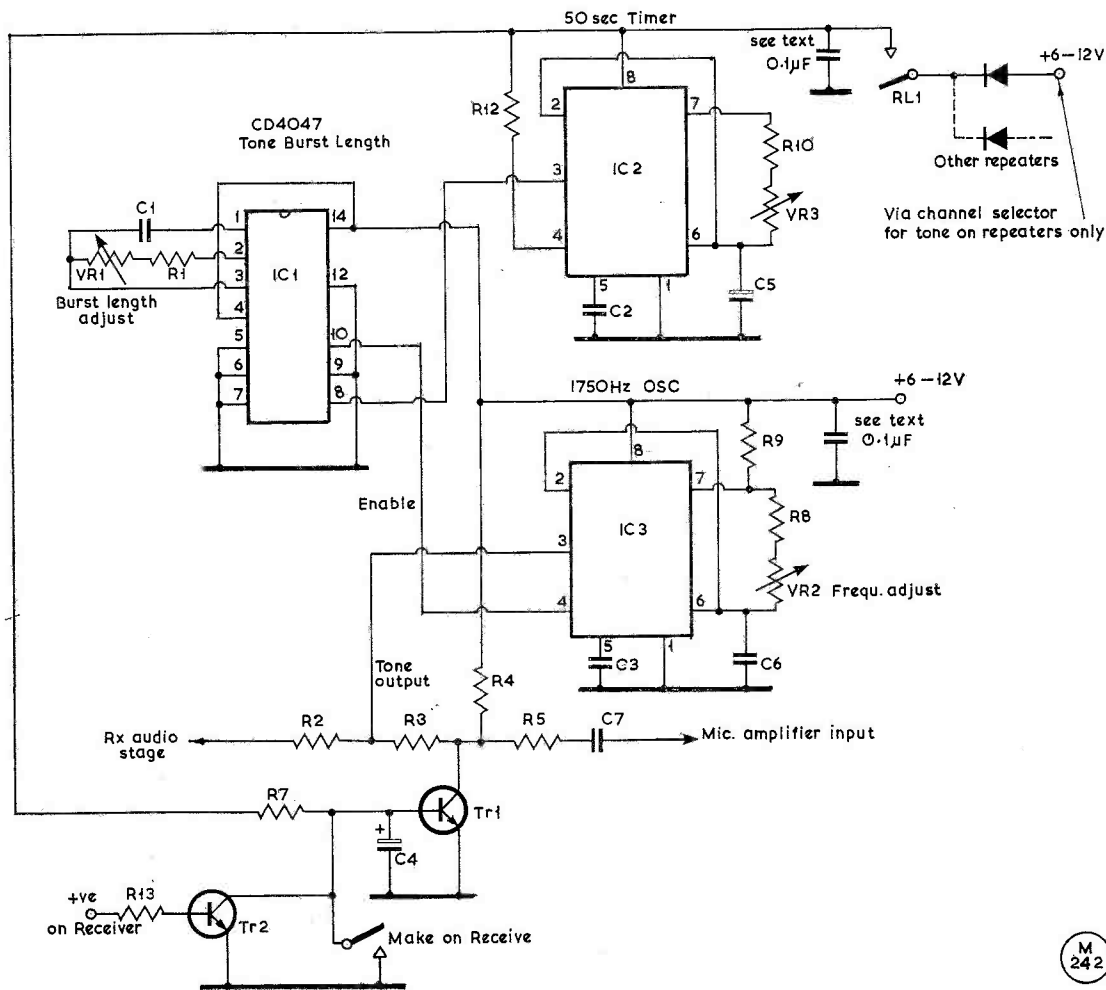


Fig. 2. Circuit of the Tone Burst Unit.

the time to the required period. Similarly VR1, IC1, is adjusted for the required tone burst length. Resistor R6 will vary according to the sensitivity of the microphone amplifier and may need adjusting or omitting. The resistor should be set so as to produce approximately 50% deviation by using a 10K preset and substituting the nearest preferred value. It is not normally necessary to deviate fully the transmitter on tone bursts and may cause spreading if the proper limiting is not incorporated in the modulator.

Should the access tone of some repeaters be altered in the future, as might well be the case; then, RV2 IC3, can be removed and a wire routed to a selector switch with several variable resistors, each adjusted to the required frequency in conjunction with R8. No decoupling of the power supply has been indicated in the circuit diagram. The prototype was found to operate satisfactorily without any actually on the board. How-

### Table of Values

Fig. 2. Circuit of the Tone Burst

C1, C2,	R3 = 220,000 ohms
C3, C6,	R5 = 47,000 ohms
C7 = 0.1 $\mu$ F, poly.	R6 = see text
C4, C5 = 100 $\mu$ F, elect.	R7, R13 = 82,000 ohms
IC1 = CD4047, or equiv.	R8 = 3,300 ohms
IC2,	R9 = 1,200 ohms
IC3 = Signetics 555	R10 = 150,000 ohms
Tr1,	R11 = 68,000 ohms
Tr2 = BC109	VR1 = 1 meg. linear
R1 = 1.8 megohm	VR2 = 1,000 ohms
R2*, R4,	VR3 = 100,000 ohms
R12 = 100,000 ohms	

\*R2 may need adjusting. All resistors rated 1/8th watt.

ever, this depends on the impedance of the power supply and it is suggested that at least a 0.1  $\mu$ F be placed somewhere on the board as a precautionary measure against noise on the line; additional decoupling may be required in the event of any RF field getting into the unit, via the supply.



# • • • SWL • • •

## SHORT WAVE LISTENER FEATURE

By *Justin Cooper*

### RECEIVER DESIGN CONSIDERATIONS — THE MAIL AND TABULAR MATTER — DISCUSSING FILTERS — READER COMMENTS

LAST time out, the "SWL" piece was somewhat compressed, by the shortened preamble and the absence of the All-Time Ladder. Essentially, what happened was just that your scribe came to the conclusion that the Project was going to take an inordinate length of time to go through if we were to cover the sort of points that are of interest to anyone thinking of a first exercise in the fascinating arts of construction of home-built gear good enough to be of use on the bands on the one hand, and acceptable in appearance on the other, the while using the simplest possible design. Thus, he is working on a piece which will in due course appear as an article or maybe a series, depending on how the Editor sees the space situation at the time, and in more detail than could be decently covered here. In addition, we may well look at some of the "kit" possibilities, and the ease or otherwise of getting them going "off the kitchen table." In addition, this time, the Ladders are both back, and for good measure we have reprinted the HPX Rules.

Now, since we have been talking about receivers, and indeed since your scribe took over this piece years ago, we have never looked at just what a receiver is. This it is proposed to remedy.

Essentially, a "receiver" is a device which will look at the minute signals—microvolts or even less—offered to it by the "aerial," using both these terms in the broadest sense. We can amplify the signal at radio-frequency, or we can "detect" the information carried on the radio-frequency signal and amplify that information, or we can take the radio frequency signal, change it to some other more-or-less radio frequency (which is why we call it the "intermediate frequency") and amplify it before detecting and extracting the signal information. Take the simplest case: The old-time crystal set and cat's-whisker, which is just a detector only, and so was used within a few miles of the transmitters of the time, so that the recovered information—the "audio frequency"—could be heard, albeit weakly, in headphones as sensitive as could be obtained.

Now, the first snag is that the "aerial" will pick up not only the signal we want it to pick up, but all others, from extra-long waves right through to the microwave bands, to a greater or lesser degree. Thus we have to sort out the wanted signal from the others, and reject all the unwanted stuff. To do this means first that we have to use tuned circuits (coils and capacitors) to select the desired signal, and amplifiers to amplify the signal on the one hand and to separate the tuned circuits on the other. Here we hit the second snag; there is no such thing as a truly *linear* amplifying valve or transistor or FET. Thus we have to devise a circuit that will be as

linear as possible, because if we don't, and *two* signals manage to hit the amplifier at the same time, the result will be that the two frequencies will come out on the other side *plus* sum and combination products of both frequencies and their harmonics; both the harmonics and the "mixing" process resulting from the non-linearity of the valve/Transistor/FET used. We can make a circuit that will cope with this problem admirably on small signals, but once we go over the limit of the linear range of the amplifier, the distortion increases rapidly, as any hi-fi exponent will tell you; and the use of "negative feedback" which will improve the linearity of the response within the working range will also increase the rate at which distortion increases as you go "over the top." If, by accident or design, you have some positive feedback, the stage will either oscillate wildly, or in a mild case will accept only a much smaller input signal before it produces its maximum undistorted output.

So, we have three possible states in which to effect our amplification between the minimum signal we want to look at and a sufficient level or output in the phones or speaker for our purpose; we can amplify at the signal frequency, at some intermediate frequency, or at audio. From the point of view of a small signal, there really isn't a lot in it. A so-called "direct conversion" receiver is essentially a tuned circuit feeding a product detector, with nothing but audio amplification after the detector—and a 0.2  $\mu$ V signal is clearly audible in the headphones; you'll neither need nor want to go much below that level

### HPX LADDER

(All-Time Post War)

SWL	PREFIXES	SWL	PREFIXES
<i>PHONE ONLY</i>		<i>PHONE ONLY</i>	
W. Bingham	(Carrickfergus) 1621	(Ogbourne St. George) 847	
S. Foster (Lincoln)	1596	B. T. Mackness (Dagenham)	817
K. Kyezor (Irechester)	1573	M. Rodgers (Harwood)	800
R. Shilvock (Kingswinford)	1500	C. K. Verstage (Old Basing)	800
J. Fitzgerald	(Gt. Missenden) 1396	P. Rooney (Liverpool 4)	725
R. Carter (Blackburn)	1396	A. C. Roberts (Shepshed)	719
B. Hughes (Worcester)	1353	L. Gibson	(Barrow-in-Furness) 708
P. C. Jane (East Looe)	1313	D. Taylor (Harborne)	673
M. J. Quinton	(Wotton-u-Edge) 1303	J. Aspinall (Leeds 6)	641
K. A. Whiteley (Castleford)	1254	M. Gibson	(Barrow-in-Furness) 606
M. Cuckoo (Herne Bay)	1192	M. Law (Chesterfield)	605
A. W. Nielson (Glasgow)	1183	S. Budd (Worthing)	603
H. A. Londesborough	(Swanland) 1145	M. Barton	(Market Deeping) 553
G. W. Raven	(London, S.E.13) 1075	S. T. Bowen (Kippax)	510
J. H. Sparkes (Trowbridge)	1070	<i>CW ONLY</i>	
E. W. Robinson	(Bury St. Edmunds) 1035	A. Glass (Plymouth)	1240
Mrs. J. B. Jane (East Looe)	1028	N. A. Phelps (Devizes)	1209
M. C. P. Bennett (Datchet)	991	H. A. Londesborough	(Swanland) 940
H. M. Graham (Harefield)	925	A. F. Roberts	(Kidderminster) 465
P. Barker (Sunderland)	890	T. Grimbleby (Hull)	400
G. F. Gullis			

Starting Score 500 for Phone, 200 for CW. Listings in accordance with HPX Rules, and include only recent claims.

on the HF bands, and it is quite as good as a good conventional superhet. Thus, clearly, our choice must take other factors into consideration, of which by far the major one is the performance of the receiver (and don't we, as SWL's, know it!) when listening to a tiny signal in the middle of a band-full of big signals. In the 1976 context, we have literally volts of assorted RF reaching the aerial terminal of the receiver from any reasonably efficient aerial system. In the case of the superhet or the direct-conversion receiver some of these may be on frequencies such as are tunable—image or second channel interference, it is then called—but there will be dozens of others, and if just *one* of these is big enough to drive the receiver into a state of non-linearity in any stage, then the products of mixing of all the others will appear as noise, and bury the wanted signal. Any stage may offend in this respect, but the most likely one is a mixer or the product detector, and on the other hand a stage operating as a mixer will in general be, of itself, noisier than the same device in a straight amplifier. Thus, we need to have enough gain ahead of the mixer to overcome its noise contribution, and then go immediately into a very selective stage where the essential response of the receiver is generated—indeed, the ideal case would be that of an aerial going straight into a crystal or similar filter to remove all the unwanted signals and so kill the problem, but of course this is impracticable. As a result, modern design feeds the aerial to an attenuator which is variable from zero-loss to some maximum figure, and out of the attenuator to the mixer, with no RF stage as such; the use of a balanced mixer takes care of the risk of radiating the local oscillator signal and at the same time helps with the main problem. Straight out of the mixer we go and into the filter, whether IF or audio—and only then do we begin to amplify, when all the unwanted signals have been filtered away.

The above has talked about the ideal situation; and if one looks at receiver design over the past, say, fifty years, we see a reflection of the designer's mind as he seeks to balance the variable factors one against the others with the means available to him at that time; from the pioneer happy to receive any signal, to the point when weak signals were audible from all over the world, and a simple reacting detector was the accepted best answer. Then telephony became popular, and thus the HRO receiver evolved, with two RF stages and a 455 kHz IF; the two RF stages to cover the mixer noise on weak signals, and to try and keep the images down to an acceptable level. That was the state at the end of Hitler's War, and the tale since then has been on the one hand of ever-rising received signal strengths, thanks to SSB and the use of beam aerials on the one hand, and megawatts of power into gainy aerials on the BC bands, and on the other the development of better mixer stages both as to noise level and as to their ability to cope with big signals; and of filters of suitable shape factors for use at ever-higher frequencies. And, of course, SSB, when it came on the scene in a big way, caused many people who had never considered mixer design and oscillator stability in detail to apply themselves to the problem in the design of SSB amateur rigs, and to use the knowledge so gained on the next receiver project they tackled.

## The Mail

Most of the ruminations of the preceding paragraphs were produced by reading the letter from *J. Fitzgerald (Gt. Missenden)* who has recently changed his 9R-59DS to a JR-599 receiver from the same, Trio, stable. Those with long memories may recall that John for years used

## HPX RULES

- (1) The object is to hear and log as many *prefixes* as possible; a prefix can only count once for any list, whatever band it is heard on.
- (2) The /M and /MM suffixes create a new series; thus G3SWM, G3SWM/M and G3SWM/MM all count as prefixes, and where it is known to be legal, /AM also.
- (3) Where a suffix determines a *location* the suffix shall be the deciding factor, thus W1ZZZ/W4 counts as W4. Where the suffix has no number attached, e.g. VE1AED/P/SU, VE2UJ/P/SU, they are arbitrarily counted as SU1 and SU2 respectively, and the same holds good for similar call signs.
- (4) When the prefix is changed both the old and the new may be counted; thus VQ4 and SZ4 both count.
- (5) The object is to hear *prefixes* not countries, thus there is no discrimination between say MP4B and MP4K which count as one prefix.
- (6) Only calls issued for Amateur Radio operation may be included. Undercover and pirate call signs will not be credited, nor may any MARS stations be claimed.
- (7) G2, G3, G4, etc., all count separately, as do GW2, GW3, GW4, etc., and in the same way K2, W2, WA2, WB2, WC2, WN2, all count separately, even though they may be in the same street.
- (8) Send your HPX list, in alphabetical and numerical order showing the total claimed score. With subsequent lists, it is sufficient to quote the last claimed score, the new list of prefixes, and the new total. Give your name and address on each sheet, and send to "SWL," SHORT WAVE MAGAZINE, BUCKINGHAM, if possible to arrive before the SWL deadline for that particular month.
- (9) Failure to report for two consecutive listings, i.e. four months, will result in deletion from the Table, although there is no objection to a "Nil" report to hold your place.
- (10) Starting score 200. Phone Table is mixed AM/SSB, with a separate CW Table. No mixed Phone/CW Table, nor will AM-only or SSB-only entries be accepted.
- (11) Lists will be based on those shown in the current SHORT WAVE MAGAZINE list of Countries and Prefixes, dated September 1973, and with the current edition of the *DX Zone Map*.

Cost of the "DX Zone Map," with the latest Prefix List as a loose supplement, is £1.50 post free. The Map is for wall mounting, 35 x 25 ins., in four colours. Prefix List alone is 25p. Orders to Publications Dept., Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ.

to make do with a couple of transistor portable radio sets, one to receive and the other as the carrier insertion oscillator, before finally going to the 9R-59DS some years ago. As a result, he describes vividly the difference in the performance obtainable, as like going from a push-bike to a family car to a super-sports model; and the effect of the attenuator in the front-end is "amazing on Forty in the early evening, when the Red Army Choir are around." John listens on all bands from 1.8 MHz right up to 430 MHz—not a bad span of frequency!

Another 9R-59 user is *S. Foster (Metheringham)* who takes his score in the HPX Table up to 1596 by way of a few short spells at the receiver's time for Stew, like so many of us, having been at a premium.

Old-timer *K. Kyezor (Irchester)* explains his absence from our lists for a while as being due to his being away from home for 15 weeks; and at the time of his letter he was preparing a complete new HPX List which will no doubt come in for next time.

Still with the old-timers—to "SWL" at least—we come to *A. W. Nielson (Glasgow)*, who has been demonstrating the excellence of vertical aerals by his use of the TV array for his rare listening sessions, as the Table shows. Arthur intends to revert—when he can get around to it—to the Windom aerial used at his previous QTH, which was 33 feet of 14g. copper wire, with a single-wire feeder of 18g. tapped on at 11 feet from one end, but he wonders about alternatives to the downlead, as he would prefer to use, say coaxial cable with both conductors joined, or even to "open" the aerial and feed one end to the core and t'other to the screen of the cable, and still retain the multi-band characteristic. The single-wire fed Windom aerial is resonated by the length of the top; and the SWR on the feeder depends on its wire gauge and position relative to the centre of the aerial, it tending towards the centre as the feeder wire is made of thicker material. However, the snag for the modern SWL is that the Windom works nicely, given a good earth plane, on the *even* harmonics of the design frequency, which distressing characteristic effectively leaves out 21 MHz if you cut the thing for any of the other bands; but of course in practice, when you try to operate the system on 21 MHz, the "flat-top" refuses to energise, and then the length of the feeder becomes an interesting factor as if it is correct, then it becomes the aerial in its own right on 21 MHz. However, you need to have some old texts if you are to play with Windoms—we had to go to a war-time issue of the ARRL *Antenna Handbook* to get the full story. More modern books either ignore the Windom, or just skate round it by way of a given design, although the last edition of the *Radio Communication Handbook* covered it and its variants, such as the double-Windom, the VSIAA approximation and split feed arrangements, in fair detail.

*D. Taylor (Harborne)* notes the absence of his name from the lists last time, and wonders! A check at this end indicates that OM Taylor's letter and score could not have arrived, as the card-index still shows a score of 626 whereas if the letter had come in we deduce the card would have said 651.

#### CW Leaders

*H. A. Londesborough (Swanland)* seems to have stuck very largely to the CW ends of the band, with consequent

## ANNUAL HPX LADDER

(Starting date January 1, 1976)

SWL	PREFIXES	SWL	PREFIXES
G. Ridgeway (Ardleigh)	494	P. Polanyk (Coventry)	277
L. West (Langley)	414	R. G. Williams	(Borehamwood) 255
D. W. Waddell (Herne Bay)	404	C. K. Verstage	(New Zealand) 219
P. Wells (Colne)	403	P. Ramsay (Stevenston)	203
R. A. Charlesworth (London, N.22)	302		

Starting Score 200, in accordance with HPX Rules. All prefixes to have been heard in 1976.

profit to his CW ladder total; and the All-Time Phone score in consequence advanced less quickly—it looks as though the CW Table will soon have three over-one-thousand scores on it.

Oddly enough the very next letter we picked up was from *N. A. Phelps (Devizes)*, who also is in the top bracket of the CW Ladder and this time goes up to 1209 with a list that combines a nice mixture of the near and the distant, demonstrating that it is often only when one gets near the top that the Europeans are rated worth logging space! On the other hand, such as BV2A are rare DX in the true sense, the more so now that Tim's beam is a wreck and he is operating with dipoles to put a pretty weak signal into U.K. for us to wrinkle out.

Next we have three Table-entries without comments, two from *L. and M. Gibson from Barrow-in-Furness* and the other from *M. Cuckoo (Herne Bay)*; and these are followed by *P. Wells (Colne)* who notes the addition of a dual-gate mosfet converter for 144 MHz which now sits in front of the Trio 9R-59D as the main receiver; at the moment there is quite a lot of local activity thanks to the building of the GB3RF repeater, which will be sited at the school Paul attends.

Two-metre converters are popular in Lancashire, it seems—here we have *A. Probin (Burnley)*, who has tacked one on to his 9R-59D and is using it for the moment with a ground-plane—but thoughts are being turned to a beam, either eight-element Yagi or maybe a six-element Quad. Allan notes the comments on the Moel-y-Parc repeater by *R. Mackean* last time and includes in his letter a summary of the operating characteristics of the repeater. He feels that the apparent short time mentioned is almost surely due to failure to access the repeater properly, thus in the process failing to reset the timer. You can't blame the repeater if you don't give it the correct feed!

Once an SWL, always an SWL is often the case. *D. W. Waddell (Herne Bay)* used to listen but then his shack was taken over by the junior ops, which put him out of business (for thirty years!) till he had them all safely married off and could claim his shack back. To celebrate, he pensioned off the old CR-100 and lashed out on a Yaesu FRG7, fed by quarter-wave wires for 14, 21 and 28 MHz; Demi-Quads for each band are planned to fill the loft space more fully! SWL Waddell recalls the SLP's of those early post-war years, on this or that band, and hankers after some more—why not, indeed?

(cont'd over)

### About Filters

*M. C. P. Bennett (Datchet)* has been laid up since early August, with more time for listening. Mike has also been doing some reading, and wonders about the audio peak and notch filters, and band-pass devices at audio, which are advertised. Well, now, first go back and re-read the preamble to this piece, for by now you have a vested interest! If you think about it again, if there is no non-linearity in front of the filter and after the aerial, they will indeed do all that is claimed for them; but since they are usually buckled to the *output* end of the audio section of a superhet receiver, they are so late in the chain of things that they are usually happily "ringing" on the noise generated by non-linearity earlier on in the receiver *unless* the operator is skilled enough to realise this and adjust his receiver accordingly. Incidentally, Mike was one of the lucky few who managed to hear Bill Rindone on Geyser Reef, YM0AA.

On to *E. W. Robinson (Bury St. Edmunds)* who is the first SWL in the clip to mention that horrid noise on 14 MHz and emanating from Russia, which was mentioned last month by G3KFE in his piece; but it was no deterrent when the DX was there to be taken, and whenever the band opened for DX, the Robinson ears were alert to snap up whatever was to be had, as is to be expected from one of the over-1000-heard group.

*S. Budd (Worthing)* comes straight into the All-Time HPX Ladder with 603 prefixes claimed, which will be reduced a little by some mis-readings of Rules—see the Rules Box in the current issue, Steve, and you will see where you have come unglued.

*H. M. Graham (Harefield)* had a holiday on Exmoor, without a receiver, and recalls just one fine day followed by gales, torrential rain and all the rest of it, and a drop of 15° in the temperature overnight! Such is the nature of Murphy's Law. Maurice tries each band and reports one South American opening, on August 6. On 21 MHz it was more or less the same story again, but 14 MHz as always coughed up with something of interest, notably 9N1MM for an all-time new country and prefix, and quite a lot of assorted DX from all round. On the subject of HAB and QSL's, Maurice has given up—at 13p a go plus the cost of the card and the two envelopes for no return, it was considered to be just not worth it, so now they are just logged for shack reference.

*P. Rooney* finds himself at *Worcester College, Oxford*, with an examination to face in October, which seems a fair enough reason for a *Nil* report. It looks like the pressure will go on now until next June at least, which ought to give the sunspots time to show a bit of life.

*Cri-de-coeur* from *J. Aspinall (Leeds)* who wants to get a sight of an SX17 Manual—if anyone can help, get in touch with him direct at 34 Cross Speedwell Street, Leeds, LS6 2SG. Meantime, the old box has had to be carted about from room to room if any listening were to be done. In fact Joe managed to make some new ones on Eighty and quite a string on Twenty.

*Les West (Langley)* is pleased with himself, as at the time of writing he had passed R.A.E. and was booked for the Morse the end of the same week as his letter; so by this writing he is G4FKC—congratulations! He is equipped on the receiving side with gear for all bands from 1.8 MHz right through to 430 MHz—and he says

that it doesn't matter which band he listens on, there is always some twit gabbling his callign so that no SWL can get it hence correctly—and we suspect that it may also be the reason for many cases of QSL's not being replied to between licensed amateurs, and for many outraged claims of "piracy" where all that is happening is just that everyone the station works miscopies the call as something else, "someone else" then being flooded with QSL cards for, to him, phoney contacts.

Not much listening done, says *R. Carter (Blackburn)*, blaming the weather largely; but we notice "his not much" still produced the odd new Prefix to take him up near the 1400 mark.

### Join The Club

*A. H. Watson (Sittingbourne)* has the old problem for the starting listener of how to winkle them out and how to locate their frequency accurately on a general-coverage receiver—which boils down to having a calibrator and a fair idea of what are spurious responses. However, we reckon reader Watson is being a bit defeatist in the "learning" line—a lot can be learned by attending the local group, which looks to be either Medway or Maidstone YMCA.

*D. Kirkpatrick (Glasgow)* wants us to tell him what to put in the shack and where to buy—all we can say on this one is basically every SWL's interests are different, so everyone must make his own choice. As to the buying, any trader carrying the ARRA membership should be first-class. To decide just what you really want is again a matter of joining the local Club, and getting to know who owns what—they are sure to be proud enough of their rigs to invite you to come and have a listen if you are civilised in your approach, and you can compare at leisure over several months. But don't spend too much money at first—you will surely change your Amateur Radio interests before you finally settle into your own furrow of activity. Here, of course, the Club would probably be West of Scotland, but there used also to be a Radio Club of Scotland based on Glasgow.

Claims only are also acknowledged from *S. Bowen, Kippax; B. F. Hughes, Worcester; R. Shilcock, Kingswinford; B. T. Mackness, Dagenham; P. Polanyk, Coventry; K. A. Whiteley, Castleford; and Mr. and Mrs. Jane of East Looe*, which last couple were sitting right at the bottom of this month's pile—seems quite a while since we had any *news* from some of the folks on this last list!

### Claims

Readers are reminded that they should put in their claims, in accordance with the HPX Rules in this issue; and your old J.C. likes to hear how you are getting on, and to try and answer your questions in this piece.

### Deadline

Will be **November 16, latest**, as by the time the piece is completed we shall be running into the Christmas mailing rush, and deadlines are also there lurking in wait for your J. C. to meet. Address 'em all to "SWL," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ. 73 de J. C.

Station	QTH LOCATOR SQUARES TABLE			Total
	23 cm.	70 m.	2 m.	
G8FUF	1	75	163	239
G3POI	—	—	158	158
G3CHN	—	—	124	124
G3FPK	—	—	122	122
G4CDF	—	—	109	109
G4BWG	—	22	108	130
GM4CXP	—	20	103	123
9H1CD	—	—	102	102
G4BAH	—	32	92	124
G8HVV	—	10	91	101
G6UW	—	—	85	85
G8BKR	1	6	78	85
G3XCS	—	11	75	86
G8GML	1	33	74	108
G8IWA	—	17	74	91
G8HHI	—	—	69	69
G4DGU	1	35	66	102
G4DKX	2	16	66	84
G3JXN	16	49	65	130
G3COJ	15	49	63	127
G8JJR	—	—	63	63
G8GII	—	11	62	73
G4CIK	—	—	62	62
G8KLN	—	1	61	62
G8HAF	—	—	60	60
G8KSP	—	—	60	60
G2AXI	1	34	57	92
G8KKX	—	—	55	55
GC8AAZ	—	11	54	65
G3FIJ	—	23	53	76
OZ9IY	—	—	53	53
GD3YEO	—	—	52	52
GW8HV	—	—	48	48
G8LHT	—	—	48	48
G3BW	—	21	47	68
GD2HDZ	8	24	45	77
G4AEZ	—	15	44	59
G8ITS	—	1	43	44
G4EYL	—	—	41	41
G8JEF	—	—	40	40
G8EOP	8	36	38	82
G8JEF/A	—	—	38	38
G8SAH	—	1	35	36
G8IFT	5	15	34	54
G8LLG	—	1	24	25

G8JAJ	—	—	24	24
G4CIK/A	—	1	23	24
G8JKA	—	—	21	21

Starting Date January 1, 1975. No satellite or repeater QSO's. "Band of the Month" is 2m.

THIS issue marks the first anniversary of your scribe's chronicling of events in the VHF/UHF world. Time both to thank the regular correspondents for their continued support, and the newer contributors. Without your enthusiasm, there could be no "VHF Bands" feature in the present form. During the past year, we have enjoyed numerous fine openings via extended tropo., aurora and sporadic-E. In addition to the fun-aspect of working new countries, counties and QTH squares, the detailed reporting of anomalous propagation periods has a serious scientific purpose. Let us hope that the coming year will be just as exciting and rewarding.

**VHFCC Awards**

First of all an apology since two 2m. VHFCC's bearing serial number 262 have been issued inadvertently. To correct matters, would the following members please add one to the serial number of their respective certificates; G8HTE, G8HQN, EA5IG, 9H1CD, G4EYL and G4BBA. On checking through the complete records, it appears that two VHFCC's with serial number 197 were also issued at the end of 1973.

Peter Chilcott, G4BBA, from Peterborough, receives 2m. VHFCC No. 268. His QSL's were from 11 countries and all but two of the contacts were made using a 2-ele. clover-leaf aerial at 25ft. The present aerial arrangement is a 6-ele. Quad on a 40ft. *Versatower*, and he runs an *FT-401/Europa B* set up. Peter is on 4m. too and hopes to be on 70 cm. by the end of 1976. He also transmits slow Morse practice sessions at 8 p.m. on Wednesdays and Fridays and at 3 p.m. on Sundays, beaming south-west from Peterborough, on 144.25 MHz using the call G4EHW.

VHFCC No. 269 for 2m. activity goes to Alan Sammons, G8IZN, from Barking, Essex. Licensed in August, 1974, he was, "... thrown in the deep end ..." for his *debut*

# VHF BANDS

NORMAN FITCH, G3FPK

on the band during VHF NFD. Initially, a *Liner 2* and 8-ele. Yagi at 30ft. were used, the former being replaced by a *TS-700* last January. Alan has plans for two 8-ele. Yagis for 2m. and an 18-ele. *Parabeam* for 70 cm. plus a two-element array for 10m.

No. 270, again for 2m. operation, has been awarded to M. Woodman, G8JEC, from Milton Keynes, who got going in 1974 using 1½ watts of AM from a *BCC 69* to an 8-ele. Yagi. Present equipment is a *Yaesu FT-220* and 6-ele. Quad at 30ft. Incidentally, it is getting on for two years since a claim for a 4m. VHFCC award was received. Any claimants?

**Contests**

The 4m. Open and Listeners' Contest in August was won by the South of Scotland VHF/UHF Contact Group, using their call, GM4DMZ/P, with G3JYP/P runner up. The fixed section of the affair was won by our regular correspondent Arthur Breese, GD2HDZ, with G4AGE in second place. *Forthcoming Attractions:* The 432 MHz Cumulative Contest has four more sessions to go, on Nov. 4, 12, 20 and 28, from 2030-2230z. The 144 MHz CW Contest starts at 2000 GMT on Nov. 6 and is a five-hour affair, whilst the 144 MHz Fixed Contest is scheduled for Dec. 5, presumably 1000-1800z as last year.

**Beacons**

To date, nothing has been heard at G3FPK of GB3DM, the Durham beacon, on its new frequency of 144.935 MHz. Roy Stevens, G2BVN, has kindly forwarded an up-to-date list of IARU Region I beacons operating in the 28 MHz to 10 GHz bands. The QRG of the Lerwick beacon is given therein as 144.955

MHz but G2BVN suggests its reactivation might be delayed, consequent upon the death of GM3AEL.

Correspondence with F8SH (Dept. 22) has revealed some information on the French beacon scene. Serge is beacon keeper of F3THF, which used to be on 144-002 MHz. It had to be switched off due to interference it was causing to the French Weather Satellite Service. The new QRG will be 144-905 MHz, the QTH remaining at Lannion in YI13d, and it is hoped to avoid any more problems. The new QRG for the Belfort beacon, in DH15g, is 144-985 MHz. A third 2m. beacon, F5THF, has been allocated 144-955 MHz. In the 70 cm. band, F6UHF, located at Sadirac in the Gironde, was reported on 432-020 MHz this summer. Its output is 10 watts to an 11-ele. Yagi bearing 15°. The new QRG is listed as 432-870 MHz.

Can any reader clear up this mystery? OZ8SL, who is the E's co-ordinator for Denmark, reports hearing an FSK beacon on 144-375 MHz on July 12 between 114 and 1135 GMT. This signed "MOI." The occurrence was mentioned by OZ9IY and referred to by F8SH. Your scribe at first thought it might be a VOR aircraft beacon, operating in the 108-118 MHz band, being received as an image. However, a careful check through the VOR lists did not reveal an "MOI." This signal was also heard last year bearing due south from OZ8SL.

#### North Atlantic Project

Serge Canivenc, F8SH, is IARU Region 1 Sporadic-E Coordinator. Some readers may have seen his painstakingly researched report on the famous E's opening of July 4, 1965. He is now involved in the *North Atlantic Project*, an on-going investigation into long distance E's propagation in this area, which he proposed to the 1975 IARU Conference in Document WA59. On this side of the Atlantic, the proposal to set up a 50-1 MHz beacon at Lannion (YI13d) with the call sign F3THF has just received the full "go-ahead" from the licensing authority, the D.T.R.I. TDF, the first French TV network, had already given their permission.

In recent summers, U.S.A. and Canadian stations in the 50 MHz band have been heard in England,

whilst in the Azores, both American and European FM stations on much higher frequencies have been also received. To quote F8SH, "So it seems that a continuous and careful observation of the 50 MHz band during the months of May, June and July of each year could bring some results, if the number of observers would be sufficient." Accordingly, any readers equipped to monitor this band are invited to contact F8SH, either directly or *via* this feature. Serge will be pleased to provide a circuit diagram of a suitable 50 MHz converter and to advise on aerials. He will also send out report sheets. This unique project is worthy of the full support of all VHF enthusiasts. It is worth reiterating that this is the kind of research which can produce a wealth of data *at no cost to the taxpayer*, for a change, since amateurs work for the love of it and not for pecuniary gain. F8SH's QTH is; 6 Rue Pont-Hél , F-22700 Perros-Guirec, France.

#### Scandinavian News

Julian Macassey, OZ9IY, forwarded details of the Scandinavian Activity Contests, but his letter arrived just too late for the October issue. In Denmark and Sweden, the *first Tuesday* each month sees the 2m. contest from 1800-2300 GMT. Repeater contacts do *not* count, but there is an FM section in this all-mode event. Exchanges consist of signal report and QTH locator. The Danish 70 cm. Activity Contest takes place on the *first Thursday* each month at the same time but Julian thinks the SM's have their version on a different day. He mentions five FM stations on the Faroe Islands in addition to OY5NS on SSB, including the satellites.

#### The World of Oscar

Decoding the telemetry sent down from *Oscar 6* has revealed it is getting hotter. This is due to its being in a period of maximum sunlight, when the batteries receive more charging energy from the solar cells. Accordingly, the operating schedule has been extended to permit Sunday morning use of *descending* orbits again, in addition to the usual Monday, Thursday and Saturday *ascending* ones.

There seems to be confusion as to what is meant by ascending and descending orbits. An orbit starts when the satellite crosses the Equator, travelling northwards and this part is known as the *ascending node*. Since for all intents and purposes, an orbit takes 115 minutes, the ascending node takes one-quarter of this period, or 28-75 minutes. As far as we are concerned in the northern hemisphere, the *descending node* is that 28-75 minutes during which the satellite travels from the nearest it is to the North Pole, southwards till it crosses the Equator. It follows, therefore, that many orbits which are within range will, by this definition, change from ascending to descending, or *vice versa*. Thus these orbits of 0-6 should only be used during the appropriate node, which often means starting or stopping use part way through a pass.

As reported last month, the 0-6 telecommand station is operating from Guildford in the 2m. band. For maximum life of the satellite's batteries, it is essential to command the spacecraft into the desired on or off mode. Because of the tendency for 0-6 to switch itself on and off at random, it seems that the command signals are being transmitted for the entire pass of every orbit within range. The command signal is detectable over about a 150 kHz bandwidth and quite understandably a number of users of frequencies in the affected part of the band are demanding that something be done.

No doubt, part of the trouble is that no publicity was given beforehand that this signal would appear from time to time without any form of identification. Consequently, there were many rumours about what it was, ranging from the PA stage of an ambulance service base station "taking off" to, "I think it's some form of death ray they are testing!" To put the problem in perspective, to prolong the service life of 0-6 it is essential to command it positively for the benefit of users throughout the world. Against this must be seen the inconvenience caused to a relatively small number of amateurs in a somewhat sparsely populated part of the band.

Starting on October 4, AMSAT had decided that every Monday

when *Oscar 7* is in Mode "B" should be QRP Day. The idea is that all users limit their power on the 70 cm. uplink to *ten watts e.r.p.* so as to give the QRP folk a chance to get into the satellite. Sad to report, the result on Oct. 4 was chaos! Time and time again, it has been proved that it is *not* necessary to use high power to access 0-7, yet still there are many who, either through ignorance or sheer cussedness, continually do. All this does is to activate the AGC in the receiver so that it does not receive, and therefore, retransmit weaker signals. Please note that 0-7 will be on Mode "B" QRP on Nov. 1, 15 and 29 and at fortnightly intervals, thereafter.

Stations worked recently at G3FPK using 0-6 and 0-7 mode "A" include EA6BW, CN8HD and ZB2BL on SSB and OX3AB, TU2EF and 4X4MH on CW, plus the usual Europeans, W's and VE's. On the evening of Oct. 11, SV1AB was putting in a loud signal on the 10m. downlink. New stations to listen for include 9G1LZ, and HBØN on CW 0-7B. 9H1CD is reported on mode "B" now.

In addition to the orbit information broadcast over GB2RS and given out by G8CSI on the Sunday net from 1930 local on 144-280 MHz SSB, the RTTY news bulletin transmitted by GB2ATG on Sundays at 1230 and 1245 on 144-60 MHz AFSK provides this information.

AMSAT has advised that the JAMSAT transponder due for launch in June, 1977, will employ an uplink band of 145-85-146-00 MHz, the downlink being 435-1-435-25 MHz.

#### DX-Peditions

Drew Givens, GM3YOR, has sent an account of his recent Ulster portable foray with GM3OLK and which ended a little early because of the threat of the Seamen's stoppage. The trip got off to a good start from Co. Antrim, using the Ballymena Club site at Larne. On 4m. stations in Oxford and Devon were worked and on 2m. some London stations on Aug. 29. After that, VHF conditions were rather poor. Following the Antrim stint, they moved to Counties Londonderry, Tyrone and Fermanagh, ending up in Armagh. The conditions varied from day to day and they found it increasingly difficult to work any great distances

### THREE BAND ANNUAL VHF TABLE

January to December 1976

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G3BW	62	7	65	14	40	6	194
G2AXI	49	7	61	15	42	8	182
GD2HDZ	51	6	60	12	41	7	177
G5DF	43	5	63	13	30	9	163
G4BWG	44	6	64	21	19	5	159
G3FIJ	43	7	54	14	31	10	159
G3OHC	24	3	56	12	46	9	150
G3XCS	41	7	59	17	18	5	147
GM4CXP	16	4	70	19	20	9	138
G4BYP	41	7	58	9	18	5	138
G8HBQ	—	—	69	13	43	8	133
G3BOC	52	7	60	13	—	—	132
G8GML	—	—	61	13	38	10	122
G4AEZ	32	6	46	12	13	3	112
G8GII	—	—	54	16	25	6	101
G3FPK	—	—	75	21	—	—	96
G8BKR	—	—	72	13	6	2	93
G4DKX	14	2	45	13	4	7	85
GD3YEO	9	6	57	13	—	—	85
G3ILO	—	—	58	18	6	2	84
G8EOP	—	—	28	8	35	9	80
G8KLN	—	—	53	14	1	1	69
G8HHI	—	—	54	13	—	—	67
G8ITS	—	—	48	13	—	—	61
G8KKX	—	—	45	13	—	—	58
G8KSP	—	—	47	11	—	—	58
G8HAF	—	—	46	10	—	—	56
GC8AAZ	—	—	26	10	10	5	51
G8IFT	—	—	20	5	12	4	41
G8JAJ	—	—	31	6	—	—	37
G8GLS	—	—	18	4	—	—	22
G8LGZ	—	—	9	3	2	1	15

into England, the further west they travelled. For the 2m. Open contest on Sept. 4/5, they were in Fermanagh making but 36 QSO's.

The equipment comprised an FT-101B with *Europa* transverters for 4m. and 2m. The aerials were a 4-ele. Yagi for 4m. and an 8-ele. for 2m. All the sites were arranged by local GI amateurs, were easily accessible by road, with very good take-offs in all directions. Drew and Dave wish to thank these

GI's, the members of the Ballymena Club who made them most welcome at their meeting, and all those they managed to work. On 4m. they had 46 QSO's and on two metres, 301. Readers with ideas for a similar trip next year should contact GM3YOR (QTHR).

G3NYY's trip to the Scilly Isles at the beginning of September was more successful than earlier visits this year. Walt tried no less than five sites before concluding that a

place called The Garrison on the S.W. side of St. Mary's was the best for the easterly direction. During the weekend, 120 QSO's were concluded on 2m., the best DX being GM4DMZ/P in Dumfries and Gallo-way and GM4AVH/P in Borders in the early morning of the Sunday of the Open contest. Walt work a dozen London stations on CW, plus G8FBG on SSB. It was easy to raise South Coast stations and there were a fair number of Midlands stations on in the contest. Consistently good signals were G3OZE/P, G3PMH/P, G4BPO/P, and G8BBC. 75% of the stations heard were worked with the *Liner 2* and 8-ele. Yagi, but Walt was rather disappointed that more people did not beam his way.

### Meteor Scatter

G4DSC was the only reader to report any details of recent MS experiments. Dennis's achievements should certainly encourage others who might otherwise assume that a shack filled with lots of sophisticated equipment running high power to ambitious aerial systems is necessary for success. In the *Perseids* he concluded QSO's with SM5BSZ (JT41f), OE3UP (HI70j), SM4COK (HT56f), and SMØDRV/5 (HR06e). The gear comprised a tape loop for high

speed audio keying of an FT-200 to a transverter running a QV06-4 40A delivering 50 watts CW output. The aerial was a crossed 10-ele. Yagi, circularly polarized. Dennis mentions plans for a digital keyer and 4CX250B linear.

### Band Reports

Conditions this past month have been atrocious resulting in few reports being received. So these will be mentioned individually rather than band by band. G2AXI (Basingstoke) profited from the Welsh tour by G8IZS and G3ONP, which provided a further 9 points for his annual table score, other successes being EI9Q and G3NYY/P on 2m. G3BW (Whitehaven) hopes soon to have some RF on 23 cm.; the only station Bill has heard so far is GD2HDZ. His best DX on 70 cm. included G3PMH (Herts.), G3VPK (Essex), G4BPO/P (Ipswich) and G8GP (London) during the Oct. 2/3 UHF affair.

At G3FPK, the Sunday noon skeds with GM8FFX and others have usually resulted in at least 50% copy in flat conditions. At this time of the day, however, it seems that slow-rate, deep fading is prevalent. For an hour or so during the morning of Oct. 10, propagation to

the west was good enabling a solid CW contact with EI9BG in Co. Clare to be concluded. G3XCS (Saltash) reports things as having been very quiet in his part of the "Celtic Fringe" but that the G3ONP/G8IZS operation from Wales, "... provided a very welcome period of activity and I was pleased to work them on 4m., 2m. and 70 cm. at each of their stops. I felt that their brisk but courteous style of operating without fuss or histrionics, was a model of how such exercises should be conducted." May we add that Colin's own reports are also models of concise reporting.

G8BKR (Bristol) worked EI6BD in Dublin on 2m. and got the impression from him that 2m. activity in the Republic is on the increase.

### Deadlines

That's about it for this month. Let us hope that our prophet from Laxey is right and that next month we shall be able to report results of a fine extended tropo. opening and an *aurora* or two for good measure. In any case, everything to "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ by Nov. 5 and for the January edition by Dec. 10. 73 de G3FPK.



Ken Perfect, G3FIK, principal of Amateur Electronics, Alum Rock Birmingham, was present at a recent ten-day Foreign Dealers Convention arranged by Swan Electronics, Oceanside, California, for whom his firm are U.K. agents. Ken (seated right in this picture) reports that he was very impressed by the Swan set-up and organisation—and the whole visit was a most memorable occasion, not least by reason of the unbounded hospitality and friendship shown him by the Swan Electronics people.



## THE MONTH WITH THE CLUBS

### By "Club Secretary"

31st ANNUAL MCC

The 1976 Magazine Club Contest (MCC) will take place over the week-end December 4-5, evenings 1700-2100z. Rules appear in this issue.

BY now, 'most every club in the country will be well set in their autumn activities—and MCC this year is one of them! All the Rules, dates, and so on, are on this page, which should give you plenty of time before the "off" to study the form as to your best operators, the best site for operations, best gear and so on; the rules this year are slightly altered with a view to possible clarification and simplification from the point of view of the member who gets lumbered with the job of making up the entry from the rough copy all covered with tea and jam stains! This had traditionally been a good clean contest, and good clean fun—see you on *Top Band* in MCC!

#### The Mail

Now we come to the reports, this time taken straight down the clip as they come in. To start with, the **Bishops Stortford** crowd still have their place booked at the British Legion Club for the third Monday in the month; November 15 is down for the Constructor's Trophy for which a good turn-out of entries is expected. Looking forward to December, they have a talk by G3XJE from the Mullard Radio Astronomy Observatory, his topic being "LDE's—the UFO's of Radio." Just in case readers wonder what an LDE is, the term refers to those odd cases where a radio signal has been emitted and then heard several seconds or more afterwards—just imagine, you have a transmitter with a quite distinctive chirp or click that is unmistakable, and you call CQ with it; then, when you go over, you are astounded to hear in the receiver your only-too-distinctive CQ call still merrily bashing on! This December 20 session is reckoned to be quite a crowd-puller, it being bruited well around the district, so if you intend to make a call, get in touch with the Secretary in advance, if possible.

**Peterborough** have their AGM on November 5—Fireworks night, no less!—at the Scout Hut in Occupation Road. We gather their Rally on September 19 was well-attended and well liked, the visitors coming from as far away as Surrey and as far North as Newcastle-on-Tyne.

At **Harrow** they have a weekly session on Friday evenings, with November 5 being down for Practical, and the 12th for a Bring-and-Buy Sale under G8KXW. The Construction Contest looks after November 19, and on the 26th, there is a Club anniversary dinner to celebrate 30 years of activity.

Yet another November 5 affair is noted, this time at **Bangor** in G1-land; their's is an Annual Surplus Sale, plus trade stands, at the Good Templar's Hall, Hamilton Road, Bangor—visitors always welcomed.

On now to the **G-QRP Club** which continues to gain in strength apace thanks to the wise leadership of G3RJV; in the current issue of their *Sprat* magazine, there is a lot of good meaty stuff—like DJ1ZB on broadband amplifiers and drivers, DK9FN's interesting eighty-

## MCC—THIRTY-FIRST

### TOP BAND CLUB TRANSMITTING CONTEST RULES

- 1. Object:** Clubs to work one another.
- 2. Dates:** Saturday and Sunday, December 4 and 5, 1700-2100z (8 hours in all).
- 3. Band, Power and Mode:** 1·8-2·0 MHz, ten watts DC Input, CW only.
- 4. Callsign and Identification:** Clubs are to use their own callsign, or that of a paid-up member, and to identify themselves as a Club, e.g. "G3ASR Clb" in all QSO's. Counties in which a station is located are to be indicated by a three-letter abbreviation, e.g. HMB for Humberside, WMD for West Midlands, etc.
- 5. Scoring:** Count three points for each Club worked in your own country, six points for a Club in another country, one point for a non-Club station. (Countries include G, GC, GI, etc.).
- 6. Multiplier:** One multiplier point for each U.K. or Eire county worked, one multiplier point for each country worked, once only during the whole contest. A non-Club contact can be claimed as a multiplier, if it meets these conditions.
- 7. Logs:** To include (a) Date; (b) Time, GMT; (c) RST sent; (d) RST received; (e) County abbreviation received, plus "Club" or "non-Club." (f) QSO Points claimed. Each contact claimed for multiplier credit under Rule 6 to be underlined. At foot of each page, note total QSO points claimed on that page. Each page to be legibly set out as above, using one side of the sheet only. At head of each sheet, clearly indicate Club name and sheet number. Pre-printed log sheets will be accepted, provided they meet the above requirements; alternatively, A4 size sheets suitably ruled may be used.
- 8. Disqualification:** A bad note, over-driving of a transceiver resulting in a wide spread of *spurti*, use of excessive power, key-clicks, deliberate interference with another station, or operation judged by the invigilators as being not in the spirit of the Contest, may result in disqualification, at the sole discretion of the invigilators.
- 9. Contest Call:** "CQ MCC," Use of callsigns during a QSO must be within the terms of the licence.
- 10. Final Tabulation:** On the last sheet indicate total QSO points claimed, total multiplier claimed, and final score, being QSO points times Multiplier. On a separate sheet, include a declaration that the station has been operated within the rules of the Contest and of the licence; in addition, details of equipment and aerials used. A general statement of the reaction to the Contest—experiences, comments, criticisms, anecdotes, suggestions.
- 11. Entries:** Address MCC, "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ, and to be posted to arrive not later than December 21. Results in full will appear in the February 1977 issue of the SHORT WAVE MAGAZINE, due out on January 28. The Editor's decision is final on all matters affecting the Contest.

metre rig, a BK circuit from G3DOP, and a most interesting aerial arrangement from G3DNF, and other interesting bits and pieces. Anyone with an interest in QRP should join this group—*Sprat* is now, surprisingly, the only remaining magazine in the world devoted to QRP operation! How odd, at a time of rising interest in low-power operating on both CW and SSB.

**WAMRAC** have been having a good hard look at their position, by sending out questionnaires to the U.K. and U.S. membership, the answers to which are being discussed in the *Newsletter*, and no doubt thought over carefully by the club executive. Essentially, this group is one of the Methodist persuasion, but other denominations are very welcome as the membership list shows.

**Surrey** get together at *T.S. Terra Nova*, on November 3, for G8TB to talk about Practical Aerial Matching, while November 17 is given over to Progressive Morse under G3EUE, and anything else the members want—but for the address, we have to ask you to get in touch with G3FWR at the address in the Panel.

A new signature appears on the bottom of the letter from **Dartford Heath D/F Club**—they believe in making the YL members work! She tells us that there is a Sunday Hunt on November 7, and a Club night on the 12th, the Hq. address being the Scout House, Broomhill Road,

Dartford, Kent. For more details, contact the Secretary—we believe the Hunt starts are not from Hq.

The November meeting of the **Southgate** group is, as always, on the second Thursday in the month, which makes it November 11, for the G6QM Trophy, which is awarded to the best home-built gear displayed. The venue is the Scout Hut, Wilson Street, near the Green, Winchmore Hill, London N.21. Looking forward to December there is the AGM.

**Verulam** have the fourth Thursday booked at the Market Hall, St. Albans; November 25 should be an interesting one as Marconi Instruments are coming along to talk about "Receiver Measurement Techniques." There is also an informal at the R.A.F.A. Hq., Victoria Street, on the second Thursday each month; again, like Southgate, the December date, 23rd, is down for the AGM with a film show to follow.

Oddly enough, **Reigate**, too, are dealing with receivers in November; on the 23rd they have G3TDR talking about Single Conversion Receivers, at the Constitutional Centre, Warwick Road, Redhill. The informals come up on November 2 and December 7, at the Marquis of Granby, Hooley Lane.

There is a "special" atmosphere at **Hereford** on November 18, when they have booked, instead of the

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

#### NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE:

**ACTON, BRENTFORD & CHISWICK:** W. G. Dyer, 188 Gunnersbury Avenue, Acton, London, W3 8LB.

**A.R.M.S.:** N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey.

**A.R.N.S.:** G3FPK, as above.

**AXE VALE:** N. Whittle, 12 Pauls Ash, Broadenham Lane, Winsham (420), Chard.

**BANGOR:** D. Steele, G14EMS, 59 Donaghadee Road, Millisle (418), Newtownards, Northern Ireland.

**BARKING:** J. R. Wiles, G8JEG, Barking Radio Society, Westbury Recreation Centre, Westbury School, Ripple Road, Barking, Essex, IG11 7PT. (01-599 1103.)

**B.A.R.T.G.:** J. P. G. Jones, GW3JGG, 40 Lower Quay Road, Hook, Haverfordwest, Dyfed, SA62 4LR.

**BISHOPS STORTFORD:** M. G. Long, 17 Lea Close, Bishops Stortford (51768), Herts.

**CAMBRIDGE:** J. C. Worsnop, G4BAO, c/o Cambridge ARC, Corporation Yard, Victoria Road, Cambridge.

**CHELTENHAM (RSGB):** G. D. Lively, G3KII, 26 Priors Road, Cheltenham (34785), Glos.

**CORNISH:** S. Halfyard, G4EIS, Studio 12, Rosewall Terrace, St. Ives (5576), Cornwall.

**CRAY VALLEY:** J. M. B. Tripp, G3YWO, 57 Cathcart Drive, Orpington (38199), Kent.

**CRYSTAL PALACE:** G. Cluer, G4AVV, 24 Patterson Road, Upper Norwood, London, SE19 2LD. (01-653 4340.)

**DARTFORD HEATH D/F:** Miss J. Maggs, 25 Leybridge Court, Eltham Road, Lee, London, S.E.12.

**DERBY:** F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby (21931), DE3 7GE.

**DERBY (Nunsfield House):** I. Cage, G4CTZ, 25 Pershram Drive, Alveston, Derby, DE2 0JU.

**ECHELFORD:** R. S. Hewes, G3TDR, 24 Brightside Avenue, Laleham, Staines, Middx.

**EDGWARE:** P. D. Ling, G4BZY, 42 Greencourt Avenue, Edgware, Middx. (01-952 2495.)

**GLENROTHES:** A. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife, KY1 2LH.

**GUILDFORD:** L. Bright, G4BHQ, 4 Dagley Farm, Shalford, Guildford, Surrey.

**HARROGATE & KNARESBOROUGH:** G. Crosland, G4CWX, 9 Olive Walk, Harrogate, N. Yorks.

**HARROW:** L. Light, G3KDL, 22 Chippenhams Avenue, Wembley, Middx., HA9 6NQ. (01-902 2570.)

**HEREFORD:** S. Jesson, G4CNY, 181 Kings Acre Road, Hereford (3237).

**MELTON MOWBRAY:** R. Winters, G3NVK, 32 Redwood Avenue, Melton Mowbray (3369), Leics., LE13 1TZ.

**MIDLAND:** A. L. Walton, G3ZKQ, 243 Barnes Hill, Birmingham, B29 5UJ. (021-427 3088.)

**MILTON KEYNES:** M. Probart, G8JYW, 29 Agnes Road, Semilong, Northampton, NN2 6EU.

**NORTH STAFFS.:** I. D. McCarthy, G3YBY, 34 Oakhill Close, Upper Tean, Stoke-on-Trent, Staffs., ST10 4JP.

**NOTTINGHAM:** M. C. Shaw, G4EKW, 50 White Road, Nottingham, NG5 1JR.

**PEMBROKE:** M. A. Shelley, GW3XJQ, Woodview, St. Florence, Tenby, Dyfed, SA70 8LS. (*Manorbier 544.*)

**PETERBOROUGH:** L. Critchley, G3EEL, 36 Waterloo Road, Peterborough, Cambs.

**PIONEER:** R. Henderson, GM4DTJ, 2 Burdichouse Avenue, Edinburgh, EH17 8AW. (031-664 3161.)

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**SURREY:** S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croaydon, CR2 8PB. (01-657 3258.)

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**TORBAV:** M. Yates, G3UIQ, Top Flat, 23 Waverley Road, Newton Abbot (3025), Devon.

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**WAMRAC:** L. Colley, G3AGX, Micasa, 13 Ferry Road, Wawne, Near Hull, Humberside, HU7 5XU.

**WESSEX:** G. D. Cole, G4EMN, 6 St. Anthony's Road, Bournemouth (20027), BH2 6PD.

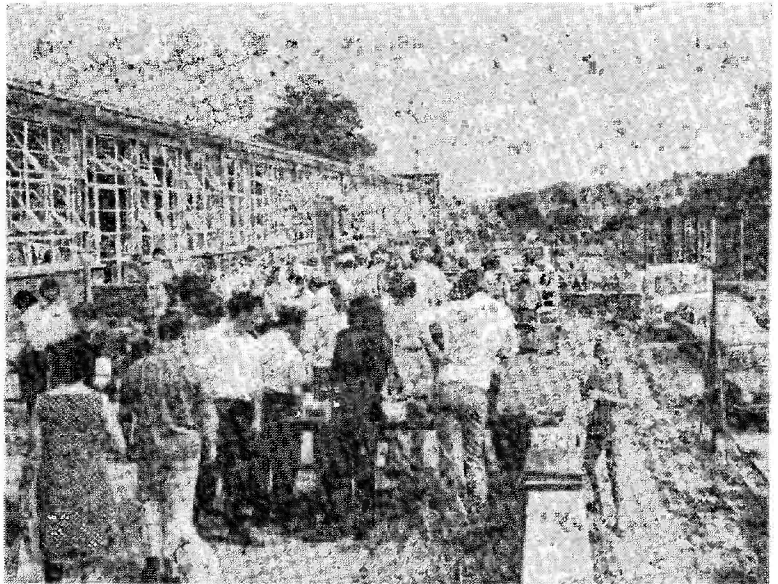
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**YORK:** K. R. Cass, G3WVO, 4 Heworth Village, York.

Reminiscent of our recent **Sunny Summer** — the outdoor stands at the **Derby Rally**, when visitors with their own surplus for sale could hire a table by the hour. The idea certainly caught on, and went down well both with vendors and the Derby & District A.R.S. Over 2,000 programmes were passed out and at least 200 visitors came from distances over 100 miles. As ever, this was a most successful Rally event.



Hq., a room at the Green Dragon Hotel, Broad Street, Hereford, and invited other local clubs to join them in listening to G3FKM and G3HCT, talking about the WARC at Geneva in 1979, Contest working, and RSGB affairs.

November 1 is the date for **Southdown**, when Mr. Eric Varst, late of the IBA will be talking about "Crystals." This one is at the Victoria Hotel, Latimer Road, Eastbourne.

Surprising how many people have noted the absence in the September issue of a note about MCC—this month we unveil the Rules in full—and if anyone says they don't like 'em, your scribe will personally come and breathe 'flu germs all over their Club rig! **Edgware** was one of the observant types; they have Hq. at the Community Centre, 145 Orange Hill Road, Burnt Oak, where in November they have an informal on the 11th, and "to be announced" against 25th in the *Newsletter*—but their later letter indicates that the talk on Colour TV by G3GC has been moved from October to fill this date.

If you are in the **Melton Mowbray** area on the third Friday in any month, you can look for the St. John Ambulance Hall, Asfordby Hill, Melton Mowbray. For November 19, we note a talk on RTTY, by G3UXF.

A new secretary takes up the reins at **Milton Keynes**, and promises to keep us posted of all that goes on there. That's the spirit! The pattern is that they have the Lovat Hall, Newport Pagnell, on the second Monday of each month; and he reckons to have something fixed up by November 8—yes, we know the feeling; you turn up at the ARM, some kind soul proposes you and seconds you into the "hot seat" and instantly the entire meeting demands *instant* action about the next year's programme!

If you are thinking of visiting **Yeovil**, have a care; there is the possibility of a change of Hq. in the offing, so we suggest you get in touch with G4EVI, at the address shown in the Panel. However, if all runs to form, the

arrangements stand as at present, namely every Thursday evening, November 4 being down for G3XFW to talk about Frequency Counters and 18th for G4CFS, who has Slow-Scan TV for his subject.

The Conference Room, Giggs Hill Green Library, Giggs Hill Green Road, Thames Ditton is the Hq. for **Thames Valley**. November 2 starts with ten minutes of Morse followed by the Annual Junk Sale, while for December there is to be a talk on experience for using the G6CJ Stereocode.

**Echelford** have G3MXJ coming along on November 8, while November 25 is being given over to a session by Burns Electronics; both are at St. Martins Court, Kingston Crescent, Ashford, Middx.

A little bit of history is in prospect for the **Nottingham** group; on November 11 G3BA recalls making receivers in P.o.W. camps, while G4DVW talks about Vintage Radio. In between, we see a Forum on November 4, and an Activity Night on the 18th.

We have a change of arrangements to notify for the **Axe Vale** group; from December onwards they will be fore-gathering on the *first Thursday* of each month, at the same Hq. as before, namely the St. John Ambulance Hall, Colyton Road, Seaton, Devon. To start the new arrangements off, G3ECH will be giving a talk on Transceiver Design.

The November 5 date is missed by the **Nunsfield House (Derby)** lads, but they are back in business on the 12th with the AGM. Then on the 19th they have a Junk Sale, with November 26 set for a technical film show. December 3 is also indicated, this being down to G4CTZ, who will be talking about Vehicle Suppression. The Hq., by the way, is in Boulton Lane, Alvaston, Derby.

It's the AGM for **South Birmingham** on Wednesday, November 3, at Hampstead House, Fairfax Road, West Heath, Birmingham, the start at 8.0 p.m.

The same hand writes the note about **Midland**, where their get-together is on November 2, at the Brasshouse

Centre, off Broad Street, Birmingham for an Open Meeting. Then they must wait till November 23 before the chance arises to buy the goodies on display at the Surplus Sale; this one is at Room 110, University of Aston, Gosta Green, Birmingham.

The *Wirral Newsletter* editor is up on his soap-box, criticising the lack of price information in the trade advertisements, and also making the very valid comment that the prices noted are enough to *deter* would-be entrants to our hobby. However, in the next paragraph he admits that a CW rig with a surplus receiver is still capable of working the stuff—naturally, as Pulse Width Modulation is far more elegant than the costly, sophisticated SSB! To meet G3DLF you have to go to the Sports Centre, Grange Road, West, Birkenhead, on the first or third Wednesday in the month—but don't blame *him* for the Pulse Width Modulation crack! November 3 was to be about interference, by "someone who knows" but confirmation was not to hand when the *Newsletter* was written; as for the 17th, that is a Sale of Surplus Equipment.

"How to Get on the Air," by the older members for the newly licensed should provide entertainment aplenty for the **Acton, Brentford & Chiswick** group—and visitors in need of advice are also welcomed. This one is at 66 High Road, Chiswick, London W.4.

Over to **Cray Valley** where November 4 sees a talk and demonstration of RTTY by G8CIU, and the 18th a Natter session preceded by a short business meeting. Eltham United Reformed Church Hall, 1 Court Road, London S.E.9 is the venue.

That group at **York** seem to be forging ahead like a steamroller, with activities here, there and everywhere! The normal Club evenings are on each Friday *except* the third, at 7.30 and visitors are welcome.

The **Guildford** Club wishes it to be known that they are fit and well! They get together at the Model Engineer's Hq., Stoke Park, Guildford on the second and fourth Fridays; on the 26th there is a Surplus Equipment Sale, but earlier in the month, on November 12, Ron Ham will be presenting his talk on "The Hissing Phenomenon." This is a change from the programme as previously arranged, and should be quite an attraction.

The whole idea of the **Sheffield Association** is to enable the various distinct small groups in the area to, as it were, fuse into one for the purpose of attracting top-flight speakers. Thus, from their *Newsletter* we can see that the **Workshop** group can be found every Thursday evening at the Anchor Inn, which evening is also favoured for the combined meetings of the **University** and the **Polytechnic** at the shack on the third floor of the Phoenix, Charles Street; and that the **Sheffield Club** is at the Sheaf House Hotel, Bramall Lane, on November 15, when the home-constructors will be vying for both the Hallam Trophy and the G4JW shield.

Up to Edinburgh and **Pioneer**, who have their weekly Tuesday sessions, as always, at Church Hall, Ravenscroft Street, Gilmerton, Edinburgh; the intention is that the first date in each month will be some sort of formal talk, or whatever, leaving the remaining dates for Morse, operating, construction, and such. We have the feeling that the programme is already lined up by GM4DTJ, with several poor innocent local gen-types about to be

shot-gunned into compliance—and good show, too, if it gets things moving along! Indeed, one could almost say that the measure of the worth of any Club, radio or otherwise, is tied very closely to the arm-twisting abilities of the secretary!

From the **Silverthorn** newsletter, we get it that their weekly sessions are at Friday Hill House, Simmons Lane, Chingford, E.4. As to which evening, we have to refer you to G4AJA, address as Panel.

No less than *four* evenings a week are open for the members of **Barking**: Mondays for constructional work, Tuesdays for Morse practice, Wednesdays given over to closed-circuit TV activity, and the club-night proper on the Thursday. All are at Westbury Recreation Centre, Westbury School, Ripple Road, Barking, and we are advised that on November 25 there is a Film Show already fixed up.

A new pen takes up the story at **South Manchester**, G8GDM having gone off to University after a stint well done as secretary. The main meetings are at Sale Moor Community Centre, Norris Road, Sale; November 12 is the annual dinner (details from G3VIW) and on the 19th G8LUL will be describing a receiver using the Plessey integrated-circuit range. This leaves November 26, on which date there will be a talk about the Intruder Watch and the IARU Monitoring System. The Monday evening sessions at the Club shack, Greeba, Shady Lane, Baguley, continue for the moment, though they are still on the look-out for somewhere to replace this facility, which they are so soon doomed to lose.

**Wessex** (Bournemouth-Pool area) group get together at the Portman Arms Hotel, Ashby Road, Boscombe, on the first Wednesday in each month; there is also a "project evening" on the third Wednesday at the same place, and we gather the committee are compiling a complete year's programme ahead—good for them!

**Derby** are at 119 Green Lane, every Wednesday evening, starting on November 3 with a Surplus Sale, on the 10th having "Technical Topics" and a Video Show on the 17th, all rounded off nicely by November 24's show of components by John Birkett of Lincoln.

Back down to the South-West, where **Torbay** are at Hq. Bath Lane, rear of 94 Belgrave Road, Torquay; on November 27, when G4BZE will be talking about Speech Processing.

GW8BXQ takes the stand on November 26 for **Pembroke**, to discuss Oscar 7 in Mode B, at the Defensible Barracks, Pembroke Dock. In addition to the usual "formal" session, we understand they are also booking the second Friday each month at the same venue to activate GW2OP on various bands.

**Stourbridge** sent a copy of their *Newsletter*, from which we gather that they have G6OI, the Club call, established at Brierley Hill Youth Centre on a permanent basis. In addition, there are formal sessions at the library of Longlands School, Brook Street and informals at the Shrubbery Cottage pub in Heath Lane. The latter comes first, on November 2, and November 15 is the day when G2CVV will be coming from Derby to give his talk on TVI.

**Cambridge** recently had a talk on Amateur TV by G3XSE/G6ANA/T at one end and G8ACN/G6NOX/T at the other, not to mention a film show and a talk on

Filters; they have every Friday at the Corporation Yard, Victoria Road, alternate ones being informal.

**Sutton & Cheam** will be converging on the Sutton College of Liberal Arts, Cheam Road, where they have the Lecture Theatre on November 18—topic not at this time known.

It's the third Saturday in each month at **Crystal Palace**, which gives them November 20, for Part Two of a series of talks on Telephones; this is at Emmanuel Church Hall, Barry Road, London S.E.22.

**Cheltenham RSGB** have the Annual Surplus/Junk Sale on November 4, at the Old Bakery (behind the Library in Clarence Street) Chester Walk.

At **North Staffs.** (who have their own call, G4BEM, which we hope to hear in MCC) they are organising "a full winter programme," involving lectures on the first and third Mondays of each month, and general-interest meetings on the second, fourth and fifth Mondays, with G4BEM on the air—quite a programme! Their Hq. is the Harold Clowes Community Centre, Bentilee, Bucknall, Stoke-on-Trent, and newcomers or visitors are always welcome.

For GB2ATG of the **BART** Group, QSL's in the form of hard copy of the RTTY transmissions have been sent out. They hope that their stand at Leicester will be a meeting-point for members and all interested in Amateur Radio teleprinter operation; their new booklet, *RTTY The Easy Way*, will be on sale and—as they now have some 350 members—a new constitution is proposed for the AGM on November 6.

The recent AGM again produced GM3YOR in the

post of secretary of the **Glenrothes & District Amateur Radio Club**. Their meetings are every Wednesday and the first Sunday of the month, 7.30 p.m. at the Club-Room, Provosts Land, Douglas Road, Leslie—and they will be taking part in MCC.

The current, Sept./Oct., issue of *Mobile News* of the **Amateur Radio Mobile Society** includes, with Rally reports, one on the recent Radcomex exhibition at Alexandra Palace, and a comment on the theme of "Citizens' Band Radio"—which is proving such a worry to many of us. There is also a useful summary of HF Transceiver types, giving essential details.

From America, comes the **Amateur Radio News Service** bulletin, which would be of interest to all who have the task of compiling Club newsletters. Information about this is available through the U.K. representative, as Panel.

That leaves us just **Cornish**, where we have to mention that, for November only, the venue is changed to Cornwall Technical College; on November 4, a Sale of Surplus Equipment, and then in December they are back at the normal SWEB Clubroom, Pool, Camborne.

#### Conclusion

Which is where we say farewell for another month, during which time we hope you will be gathering up all the information for December, ready for a letter to tell us about it, which should be addressed to your "Club Secretary," **SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ**, to arrive **November 5** latest—sorry it's so tight but we also have to meet a deadline if the issue is going to reach you, the reader, in time, 73.

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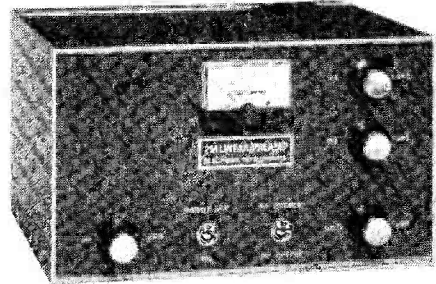
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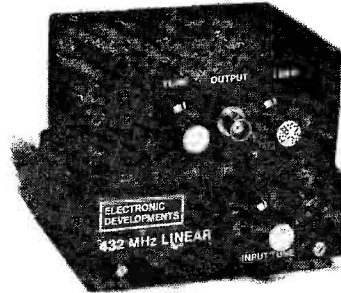
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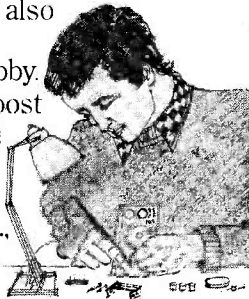
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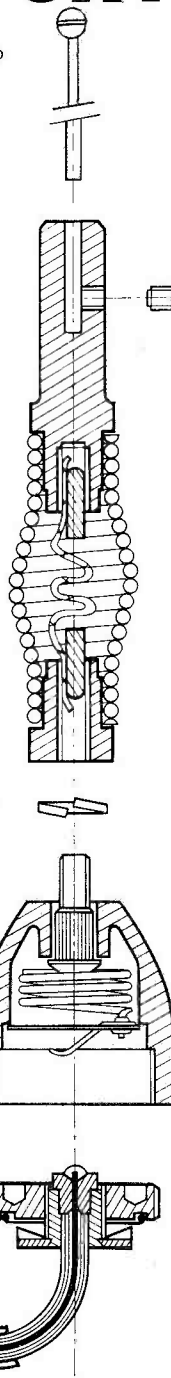
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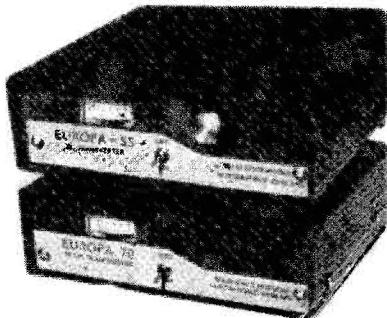
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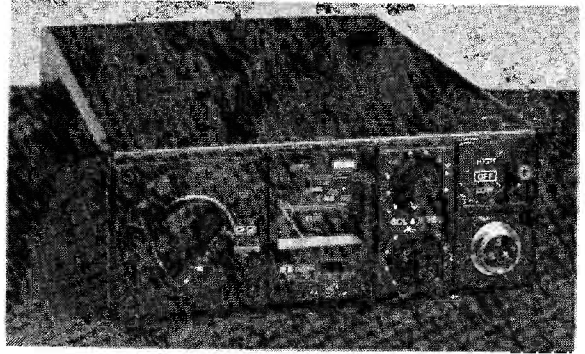
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**IC-225 £250.00 inc. VAT (still some at £225 without crystal controlled tone burst)**

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.



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NOTE OUR CHANGED ADDRESS**



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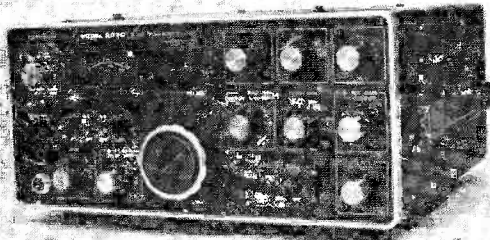


# STEPHENS-JAMES LTD.

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TEL. 052-35 76790

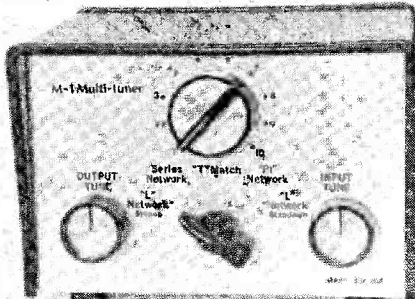
The North West's leading supplier for all your requirements. EASY ACCESS FROM THE M61-62.63—we're 5m. from M6, turn at the Greyhound Motel on the A580 (East Lancs. Road), OPEN 9.30 to 5.30, MONDAY TO SATURDAY.



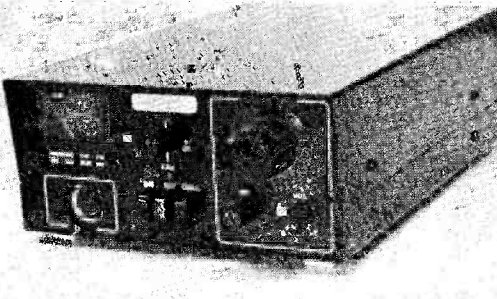
**UNIDEN 2020.** AC/DC power supplies. CW filter. Noise blanker. Blower. Digital and analogue display give direct readout. 2.6146B in PA. 80-10 metres. Receiver is pre-mixed single conversion using phase lock loop oscillator circuit. Separate filters for USB/LSB. Price £495.00



**UNIDEN 2030.** 144-146 MHz FM Transceiver. 12 channels. 12v. DC operation. 10 watt or 1 watt output. Antenna impedance 50 ohm. Complete with microphone and mounting bracket. Price £174.00



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



**AK20, STE.** Latest model from the famous STE Milan range of equipment. 12 channel operation in the 144-146 MHz range. 11-15v. DC operation. 3 watt output. Sensitivity 0.2uv R.I.T. tone burst. Complete with microphone. Price £174.00

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

See our full range of equipment at the Leicestershire Exhibition. Full HP, Credit, Access and Barclaycard facilities will be available.

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Single Meter SWR Bridges (post 45p)	£8.50
Twin Meter SWR Bridge (post 50p)	£12.20
Osker SWR200 SWR/Power Meter (post 75p)	£27.00
Auto-Cq-Sender ... (post free)	£41.11
Eddystone 898 Dial Assembly (post 75p)	£15.00
Drake Low Pass Filter (post 50p)	£15.00
Omega TE-701 Antenna Noise Bridge (post 25p)	£21.00
Omega TE-702 Antenna Noise Bridge (post 25p)	£24.00
Whip antenna gutter bracket (post 25p)	£2.81
UR43 Co-ax 18p metre; UR76 45p metre, post 2p metre; 75 and 300 ohm twin feeder 10p metre, post 1p metre; Heavy duty 75 ohm twin feeder 20p metre. PL269 46p SO239 46p, Cable reducers 15p.	

### LEICESTER 1976



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Eddystone 730/4 Receiver ...	£150.00
Eddystone EC10 Mk. 1 Receiver ...	£68.00
Eddystone EC10 Mk. 2 Receiver ...	£120.00
Sommerkamp FDX500 and VFO ...	£275.00
KW204 Transmitter ...	£225.00
KW202 Receiver ...	£200.00
Trio 9R59DE Receiver ...	£50.00
Trio 9R59 Receiver ...	£40.00
KW 200B Transceiver ...	£222.00
Barlow Wadley YCR 30 ...	£110.00
Heathkit GR78 RX ...	£80.00
FT101B Transceiver ...	£375.00
Heathkit HRI0B Receiver ...	£40.00

We can supply nearly all the equipment from stock. All equipment is sold from the premises. We do NOT supply any agents or agents of agents. All equipment is air tested and carries the normal guarantee. If you want any information on any equipment please send a large envelope or if you prefer send stamps and we will provide the envelope. No use asking for a Yaesu catalogue and sending a 6" x 3" envelope. Part exchanges are very welcome or we will sell your equipment for you on commission. Our secondhand equipment changes rapidly. If you are coming for something you saw advertised 3 MONTHS ago please give us a ring first. We try and main full stocks of all the equipment we advertise but we do occasionally run out of the popular lines.

PLEASE NOTE ABOVE PREMISES WILL BE CLOSED OCT. 26th NOV. 2nd.

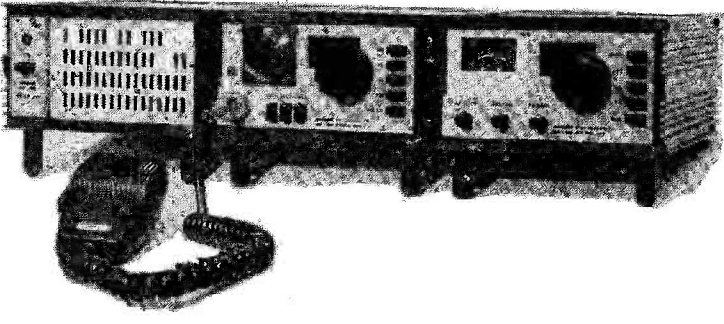
# S.T.E. MILAN VHF EQUIPMENT

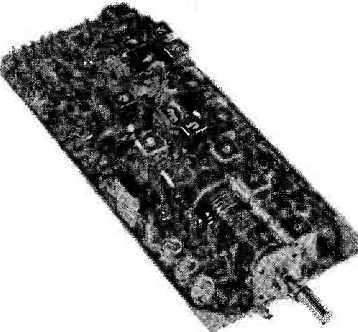
During the last two years the popularity of the range of equipment by S.T.E. has been growing. The ARAC 102 receiver has been a "Best Seller" (have you seen any second-hand?). Later in the year the Atal Transmitter came

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.

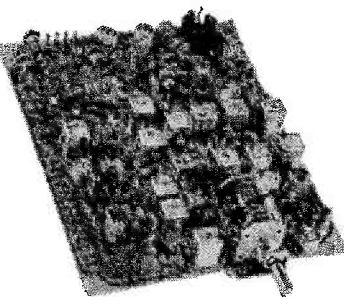
**Price List (includes postage)**

- 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

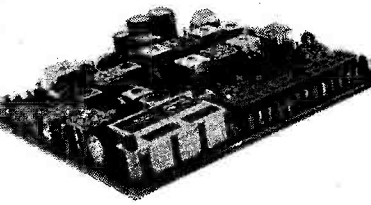
<b>ASP 154</b>	<b>ATAL 228</b>	<b>ARAC 102</b>
		
<p><b>SPEAKER AC POWER SUPPLY UNIT</b></p>	<p><b>144 - 146 MHz AM FM TRANSMITTER with Microphone</b></p>	<p><b>28-30 MHz 144-146 MHz AM-FM-SSB RECEIVER</b></p>



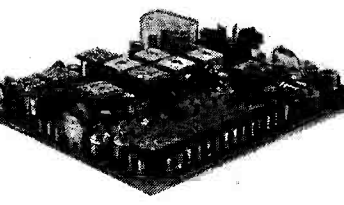
**AR10** Mosfet receiver. 28-30 MHz Double conversion superhet. RF and amplifiers stages are gate protected mosfets for good sensitivity and low intermodulation. Noise limiter and squelch circuit. AM, SSB and CW reception. 12v. DC.



**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.

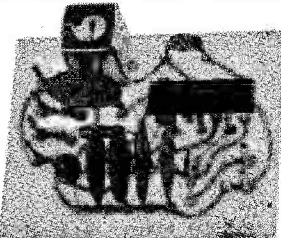


**AT23.** 12 Channel FM Transmitter. 3 watts. 144-146 MHz. Frequency deviation 3-10 kHz adjustable. 12v. DC operated AF input sensitivity 2mV adjustable to 50 mV.

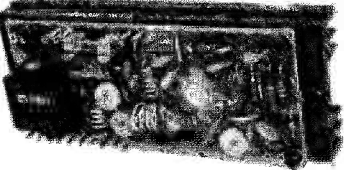
**TWO NEW MODELS FROM S.T.E.**

**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.

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ASP201	1/2 W, 108-512 MHz mobile ant. (plus 75p P.P.)	£3-23	ASP655	130-174 MHz 3dB Gain DC grounded base station ant. Power capability 100W. Termination SO-239. Complete with mounting brackets for masts up to 1 1/2" O.D. Available Now (plus 75p carr)	£14-44
ASP629	1/2 W, 130-174 MHz 3 dB gain, DC grounded mobile ant. (plus 75p P.P.)	£7-61	ASP659UK	425-440 MHz 5 dB gain base station collinear. Power capability 100W. Termination female "N" type connector. Complete with mounting brackets for masts up to 1 1/2" O.D. Available now.	£15-49
ASP677	1/2 W, 140-174 MHz 3 dB gain mobile ant. ....	£13-51	ASPA680UK	144-148 MHz 6 dB gain base station collinear. DC grounded, power capability 350W. Length approx. 12". Weight approx. 4 lbs. Rated wind velocity 118 mph. Termination Male "N" type connector. .... (plus £2 carr.)	£47-25
ASPE462	1/2 W, 420-440 MHz 3dB gain mobile ant. ....	£7-23	ASPN701UK	430-440 MHz 12 dB gain DC grounded base station collinear. Power capability 250W. Length approx. 18". Weight approx. 9.5 lbs. Rated wind velocity 128 mph. Termination male "N" type connector. Available now (plus £2-50 carr.)	£105-00
ASPE667	425 440 MHz 5 dB gain Collinear mobile ant. ....	£16-91	NEW !!	Helical Ants. for the following portables :	
ASP749UK	1/2 W, 144-174 MHz 3 dB gain, Disguise mobile ant. ....	£28-30		Trio TR2200GX ... .. (plus 40p P.P.)	£3-85
ASP619	Hi-Band Splitter ... ..	£16-45		Trio TR3200 ... .. (plus 40p P.P.)	£3-35
K-203	No hole boot mount, suitable for ASP201, ASP677, ASPE667, easily adaptable for ASP629 (plus 50p PP)	£3-70		Icom IC215 ... .. (plus 40p P.P.)	£3-85
ASP332	Gutter mount suitable for use with ASP629, ASP393, complete with 10' RG-58U cable and PL-259 connector ... .. (plus 50p PP)	£8-09			
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 ... .. (plus 50p PP)	£8-09			
New Magnetic Mount	Fits ASP629, ASP393, ASP677 and ASPE667. Complete with 10' RG-58U cable (plus 50p P.P.)	£9-19			

Please add 12.5% to above prices  
We regret to announce that due to the falling pound, we are compelled to increase the prices of Antenna Specialists products by 5% as from NOV. 1, 1976.

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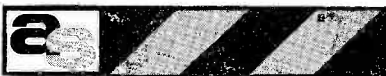
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NATIONAL HRO 50T. Receiver ... ..	£140-00 (£4-00)
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K.W. 204 Transmitter ... ..	£180-00 (£4-00)
K.W. Vanguard Transmitter ... ..	£50-00 (£4-00)
PAN ADAPTOR BC1031A 455/465 KHz ... ..	£60-00 (£3-00)
HEATHKIT Mohican Receiver ... ..	£40-00 (£3-00)
CODAR CR70A. G.C. Receiver... ..	£40-00 (£1-80)
R.C.A. AR8516L. G.C. Receiver ... ..	£240-00 (£4-00)
YAESU MUSEN. FR50B. Transmitter ... ..	£70-00 (£3-50)
HEATHKIT DX40U. Transmitter with VFO ... ..	£45-00 (£3-50)
R.C.A. AR88D ... ..	£90-00 (£4-00)

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

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

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

NOTE: 12 1/2% 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

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All Bands with xtal calibrator.

**SHURE MICROPHONES.** 44AT, £21-98 (75p); 44A, £17-28 (75p); 401A, £9-18 (60p); 201, £7-56 (60p); 202, £8-10 (60p). Full details on request.

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**VALVES:** Please state your requirements.

**ADVANCE TEST EQUIPMENT**—we are agents—your enquiries please.

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**PHILIPS PM2403 ELECTRONIC MULTIMETERS,** £55-00 (£1-00), etc., etc. We also supply **PHILIPS & LABGEAR COLOUR TV TEST EQUIPMENT,** including Colour Bar Generators, Cross Hatch Generators. Degaussing Coils, Oscilloscopes, CRT Testers, Transistor Testers, etc., etc.

**KW EQUIPMENT :** (Don't forget your FREE mic. with every Tx. and Txxr.) 1) KW2000E & P.S.U., £342-00 (£3-50); KW202, £210-00 (£2-50); KW204, £250-00 (£3-00); KW1000 Linear, £220-00 (£4-00); KW107, £68-00 (£1-50); KW E-Z MATCH, £25-00 (80p); KW109, £80-00 (£1-50); KW108 Monitor Scope, £83-00 (£3-00); Speaker for KW202, £18-00 (50p) KW103, £16-00 (50p); KW Antenna Switch, £6-00 (25p), etc.

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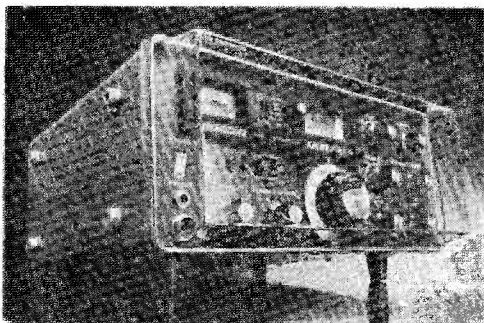
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## SPECIAL EXCLUSIVE OFFER

Perspex Dust Covers designed and manufactured by us to keep your Yaesu equipment in mint condition. Suitable for Models FT101, 101B, FL101, FR101, FT201, FT101E, FL2100, FT277, FT288A, FRG7, etc. Price £4.00 each inc. VAT. Carriage 45p.  
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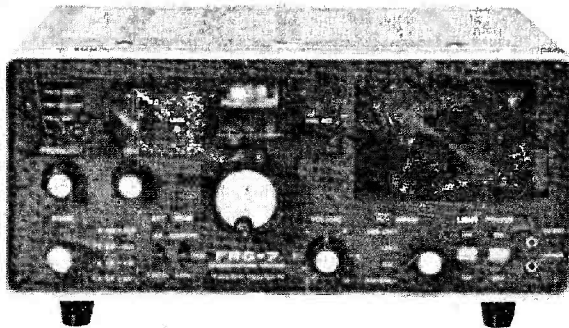
- YAESU FRG.7 Communication Receiver ... .. £148.50
- YAESU HAM Radio World Clock ... (+ P. & P. at 50p) £13.00
- YAESU FT.301S All-Band Mobile Transceiver ... .. £320.00
- YAESU 301 AC Mains Supply/Speaker for above ... .. £70.00
- YAESU FT.221R 2-Metre Transceiver (now fitted for correct Repeater Shift) ... .. £359.00
- YAESU FT.250 2-Metre Transverter ... .. £139.00
- STANDARD 12-Channel 2-Metre Mobile Transceiver (fitted with 50 plus 2 Private Channels). Special Introductory Price £99.00
- Set of 5 Additional Channels if required ... .. £20.00
- Crystal-Controlled Tone-Burst fitted if required ... .. £10.00
- STANDARD C.828 Mobile Transceiver (10 Channels fitted) £149.00
- STANDARD C.146A Hand-held 2-watt 5-Channel Transceiver fitted S.20/S.22) ... .. £99.00
- STANDARD C.430 70cm. Mobile Transceiver ... .. £160.00
- STANDARD C.432 2-watt 5 channel Hand-Held Transceiver (fitted 432, 432-12 and 433-2 MHz) ... .. £125.00
- STANDARD CS.830. 1-watt Marine-Band Hand-Held Transceiver (fitted 6 channels) 6 and 16) ... .. £139.00

- STANDARD CSA Basemaster Chargers (+ P. & P. at 50p) £16.00
- STANDARD Helical Antennas for C.146A (+ P. & P. at 15p) £3.00
- STANDARD Mains Charger Unit for C.146A (+ P. & P. at 25p) £3.20
- MULTI U11 70cm. 10-watt Mobile Transceiver (fitted 8 channels) ... .. £200.00
- 2-Metre Helical Antennas fitted BNC Plug (+ P. & P. at 20p) £3.85
- 2-Metre Helical Antennas fitted PL259 Plug (+ P. & P. at 20p) £3.85
- JVL 2-metre 3DB Base-Station Groundplane Antenna (+ Carr £1) £18.00
- JVL 2-metre 6DB Co-LINEAR Base-Station Antenna (+ Carr. £1.25) £25.00
- MICROWAVE MODULES:**
- MMT.432/28 70cm. Transverter ... .. (+ P. & P. at 50p) £84.00
- MMT.144/28 2-metre Transverter ... .. (+ P. & P. at 50p) £76.00
- Available soon:
- MMT.432/144 Transverter (70cm. to 2 metres).

VAT at 12½% MUST BE ADDED TO ALL THE ABOVE PRICES, WITH THE EXCEPTION OF THE YAESU CLOCK TO WHICH PRICE VAT MUST BE ADDED AT 8%.  
FREE PARKING AT REAR OF SHOP

## FRG-7

£167.00 incl. VAT



**NEW MICROWAVE MODULES FROM STOCK:**  
144/28 Mhz Transverter at £76; 432/144 Mhz Transverter at £112;  
500 Mhz Frequency Counter at £79.65. ALL PLUS V.A.T.

**SPECIAL NOTICE:** Will customers kindly note—We will be closed from 5th to 19th January, 1977, inclusive.

PRINTED BELOW IS AN UNSOLICITED TESTIMONIAL FROM A SATISFIED FRG-7 OWNER  
**TRUE COPY**

Lee Electronics Ltd.,  
Amateur Communications,  
400 Edgware Road,  
PADDINGTON, W.2  
Flat 68,  
496 Lordship Lane,  
DULWICH, S.E.22  
Sunday, 12th September '76

Dear Mr. Lee,  
I would like to thank you once again for the kindness extended to me on Friday last when purchasing the new Yaesu Musen FRG-7 Receiver.  
I arrived home safely, opened the packing-box to find packing to a standard certainly not experienced here in England. The receiver I can assure you is first-class in every way, certainly in finish which I have closely inspected. These Yaesu people have certainly produced the most perfectly made pieces of equipment, the word "pride" has played a great part, and obviously the inspecting department calls for the most high-class completion.  
I have a very poor antenna, only a long wire fitted in the roof space owing to not being allowed to erect an outside antenna in the property. The result even with this disadvantage is fantastic. The FRG-7 is exactly what Yaesu says it is, and it is a great pity that we, with all the years of experience cannot produce the equivalent, and within a reasonable price range. This model is close to the finish of "Collins" and in the Yaesu Leaflet they state that the design has been used with a great deal of concern for the prevention of "DRIFT" and it is a great pleasure to find honesty still exists in the world if only in Japan, as all the stations (amateur) I have not had to retune once the receiver has warmed. I am so delighted with it, I intend writing to the factory to show my appreciation of something which is first-class in every detail, and at a reasonable cost to those interested in amateur radio.  
I was also pleased to transact business with you once again, remembering my previous purchase from you concerning the pick-up and motor which has given great service for the past 3-4 years. The best of good business to you, and with your personality this will increase; as we discussed at some length, the amateur field is and has been calling for someone to "HELP" in its promotion, someone who is prepared to take the trouble to "TALK," not necessarily for that day, but to give confidence to those about to invest in amateur equipment—so like myself—to return to those that do just that.  
So Mr. Lee, sell the FRG-7 with every confidence, it is a very fine example of the future of electronics in all its sophisticated state. The best of luck in every way, hope to come and see you again, certainly I shall give your name to everyone I talk amateur radio to; and thank you kindly for accepting my cheque.

Yours very sincerely,  
(Signed) HENRY F. HOWARD

**NEED WE SAY MORE !!!**

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Size:  $3\frac{3}{8} \times 1\frac{3}{16}$ "  
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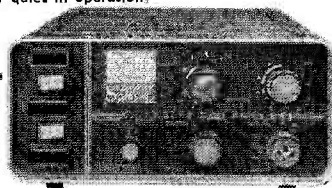
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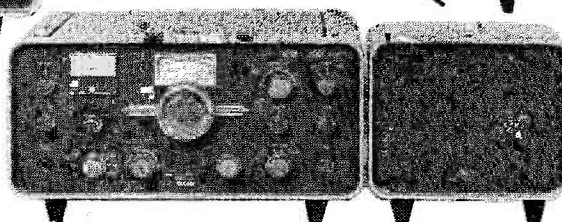
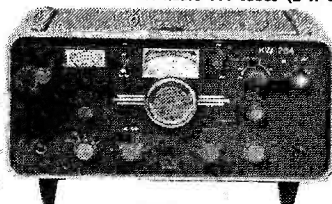
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SYNTHESISER CONTROLLED GENERAL COVERAGE  
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COVERAGE FROM 90 kHz TO 30 MHz

Until now if you owned amateur bands only transceiving or receiving equipment and wanted general coverage reception, you had two alternatives: (1) Spend substantially more than the cost of good amateur bands-only equipment on a general coverage receiver of equipment performance and accept the expensive duplication of hardware; (2) Put up with inferior performance on general coverage and purchase a "low-cost" general coverage receiver.

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CRYSTAL FREQUENCY RANGE USE (Tx or Rx) and HOLDER	CRYSTAL TYPE													
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44-030 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
44-4433-2 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
44-480 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
44-600 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
44-700 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
45-000/SO ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
45-050/R2T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
45-075/R3T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
45-100/R4T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
45-125/R5T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
45-150/R6T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
45-175/R7T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
45-200/R8T ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
45-300/S12 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
45-350/S14 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
45-400/S16 ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
45-500/S20 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
45-525/S21 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
45-550/S22 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
45-575/S23 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
45-600/S24 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
45-650/R2R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
45-675/R3R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
45-700/R4R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
45-725/R5R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
45-750/R6R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
45-775/R7R ...	b	b	b	b	b	b	b	b	b	b	b	b	b	b
45-800/R8R ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a
45-950/S38 ...	a	a	a	a	a	a	a	a	a	a	a	a	a	a

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.

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4m. CRYSTALS FOR 70-26 MHz — HC6/U  
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We are stocking the following channels: RB2 (43-65/43-05), RB3 (43-70/43-10), RB6 (43-75/43-15), SU8 (43-20), RB10 (43-85/43-25), RB14 (43-95/43-35), SU18 (43-45) and SU20 (43-30)—TX & RX for use with: PYE UHF Westminster (W15U), UHF Cambridge (U1QB), Pocketfone (PFI) and STORNO CQL/CQM 662 all at £2.36 plus VAT (12½%). For the U450L Base Station we have the TX crystals for all the above channels plus the RX crystals for SU8 and RB14 also at £2.36 plus VAT (12½%). The RX crystals for RB2, RB4, RB6, RB10, SU18 & SU20 for use in the U450L Base Station, together with the TX & RX crystals for the remaining SU channels (SU12-433-30-RTTY and SU16-433-40) for all the above equipments are available at £2.90 plus VAT (12½%) delivery as per class (b) 2m. items.

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CRYSTALS SPECIALLY MANUFACTURED FOR AMATEUR USE TO CUSTOMERS REQUIREMENTS  
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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 Adapter, RTTY Audio processor, Power units, etc., etc.  
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VHF RX AND DIGITAL CRYSTAL UNIT, TYPE LRE35. Air band receiver with digital crystal controlled tuning. Power requirements. 265-300v. HT, 19v. LT—120v. Bias. Size: 13" x 8" x 8". Weight: 18 lb. With circuits, p. and p. £2.

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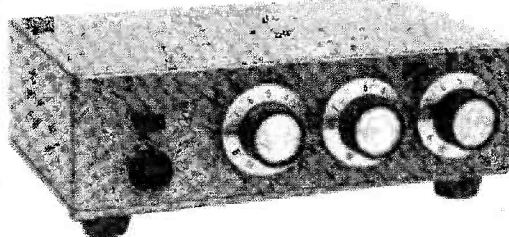
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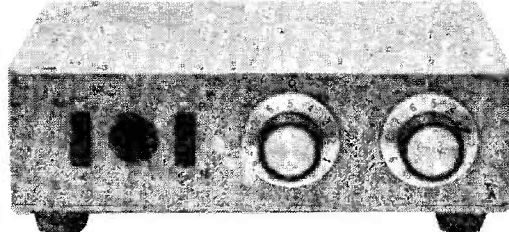
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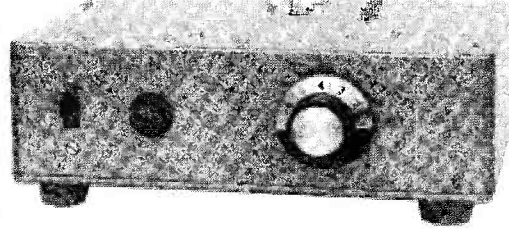
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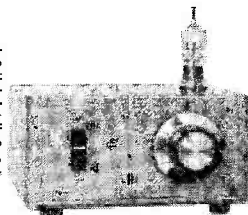
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**Selling:** Heathkit receivers: RA-1, £20; GC-1U Mohican Mk.II, £35. Two-metre transceivers: HW-17A with FM adaptor, £35; HW-30 'Two'er', £15. With manuals or circuit. Buyers collect or pay carriage.—Smith, G8FLH, 7 Brentingby Close, Melton Mowbray, Leics.

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**For sale:** Codar CR-70A, still under guarantee, mint condition, £40 or nearest offer. — Ring Goodier, Cleveleys (Lancs.) 3715 after 6 p.m.

**For sale:** Trio TV-502 two-metre transverter, very good condition, little used, crystallised for whole band, £130 or near offer. K.W. Vanguard, 10-80m., AM/CW transmitter, £25 or near offer.—Ring Cage, G4CTZ, Derby (0332) 71875.

**Selling:** Standard C430 10w. 700/M mobile transceiver, fitted 433.2 MHz coverage, £115. Sony stereo cassette AM, FM, radio, CF620, cost £180, as new, with speakers, £135, buyer to collect.—Todd-White, G3OJZ, QTHR (Tel: Folkestone 58685).

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**Wanted:** Barlow-Wadley XCR-30 Mk.II receiver. Please state age, condition and price.—Fisher, Hamilton House, The Park, Cheltenham, Glos., GL50 2RW.

**For sale:** Eight wave-band Marine communications receiver, coverage 70 kHz to 40 MHz, with internal speaker, headphone socket, BFO, etc., in good condition, £85. Will deliver part-way.—Ring Glover, Farnworth 75345, Lancs.

**Wanted:** Trio 7200G mobile transceiver. Details and price, please.—Ring Kearns, G8LYV, 061-794 5365 (Manchester).

**December Issue: To appear Friday, November 26,** single copies at 45p post free will be dispatched first-class mail on receipt from printers. Orders by Wednesday, November 24, with remittance to: Circulation Dept., Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts, AL6 9EQ.

**Wanted:** Redifon R.145 receiver (as S.W.M., June 1960), with VLF adapter unit; also ex-R.A.F. HF-type radiogoniometer, with manual. Please state condition and price. Can collect suitable instruments.—Box No. 5534, Short Wave Magazine, Ltd., 34 High Street, Welwyn, Herts., AL6 9EQ.

**Selling:** Receivers: AR88, £65; HRO, £40; R.1155, £16.50; VLF, £8.50. New teleprinter, £16.50.—Wright, 249 Sandy Lane, Hindley, Wigan (55948), Lancs.

**For sale:** Grundig Satellite-2000 with SSB unit, three months old, with manual and instructions (reason for sale—cash), £130.—Ring 01-656 9882 after 9 p.m.

**Sale:** Trio JR-599, good condition, new 144 MHz converter with meteor-scatter potential installed, £150. Microwave Modules MM 432/28 converter, £12. Pye AM base Rx, modified for use as 70 MHz aurora-warning Rx, £10.—Bartram, G4DGU, QTHR. (Tel: Steventon (023-584) 330).

**Shack clearance:** Pye Vanguard Rx tunable 2m., AM/FM/CW, control gear, crystals, £23. GR-289 11-channel Hi-band FM transceiver, no crystals, £5. Storno CQF-63 UHF base station, no control gear, £7.50. Nagard 103 'scope, no PSU, £4. Cossor 339 'scope, manual, £5. U.S.A.F. 'scope Type OS-22, £5. TF-195L audio generator, £7.50. Signal generator Type 108, no VR tubes but with 3 GHz klystron, £1.50. W.W.II naval radar strobe unit, £2. Wavemeter, 8-11cm., FB condition with accessories, in transit box, £8. Standard gas noise source, believed working, with PSU, large: offers? Admiralty pattern transformer, 230v. input, 500-0-500v. at 170 mA., 4v. at 4A. output, very conservatively rated, £1.50. Various other odds and ends. Buyers collect please; no cheques. **Wanted:** Tx AN-T271, Rx B.36, B.46 and R.216; TS-175 wavemeter, also any W.W.II German Tx units using RL12P35 valves.—Ring Clyne, G8LIU, Uxbridge 30006, evenings.

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**Sale:** TR-2200G, nicads, charger, S20, S21, R6 and R7, £100. ETM-26 keyer, £30.—Ring Campbell, 0454 416477.

**Sale:** Heath HW-32A transceiver, with mic. and manual (less PSU), good condition, £65 or near offer.—Ring McCudden, GM4DLU, Alexandria 56118.

**Wanted:** NR-56 FM 2-metre receiver. **Sale:** Old measuring instruments, Ohmer, 'Metrohm' earth plate tester, 'Hurn Metrohm' etc., s.a.e. list.—House, 10 Leigh Close, Kenilworth, Warks.

**Selling:** Heathkit DX-40U with VFO, £40. Heathkit SB-10 adaptor, £25. AR88LF, £30. HRO, £30. K.W. Geloso front-end, £15. LM frequency meter, £10.—Ring Parker, G3SYP, Wickham Market 746363.

**Help!!** I wish to buy or borrow handbook and circuit diagram for R.1949 ref. 100/18251 (30-140 MHz) receiver. Also advice on wideband aerial/s welcome.—Beachell, 13 Meadway, Leicester.

**For sale:** ETM-3B keyer, £35. Sinclair digital (black) watch, unopened present, £15. (Norfolk).—Box No. 5536, Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

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**Wanted:** To buy or borrow, circuit diagram and details of power supply for ex-R.A.F. Marconi R.1155 Rx.—Crawford, 24 Main Street, Ballywalter, Co. Down, N. Ireland.

**For sale:** KW-103 SWR/Power meter, 52 ohms, £10. R.S. EL-84 audio output transformer, £3. Both unused. TTC C-3042 SWR meter, 52 ohms, £3. Sansel SE-360 signal tracer/injector, £6. Both mint condition.—O'Dell, 41 George Street, Dover, Kent.

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**Sale:** AR88, good condition with no mods., manual, £45.—Rowley, 44 Oliver Street, Foleshill, Coventry.

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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  $\frac{1}{2}''$  plastic spindle, 2 for 50p. 50k ohm lin. POTS,  $\frac{1}{2}''$  plastic spindle, 40p each.

TWIN IF CANS, approx.  $1'' \times \frac{1}{2}'' \times 1''$  high, around 3-5 to 5 MHz, 2 separate transformers in one can, internally screened, 5 for 50p.

IF CANS,  $\frac{1}{2}''$  square, suitable for rewind, 6 for 30p.

IF CANS,  $\frac{1}{2}'' \times \frac{3}{4}'' \times 1''$ , suitable for rewind, 10 for 30p.