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1975

35 PENCE

Vol. XXXI

No. 8

THE

SHORT WAVE

MAGAZINE

WORLD WIDE
COMMUNICATION

FOR THE RADIO AMATEUR AND AMATEUR RADIO

TRIO

All band receiver QR666

Listen to the world on LW, MW and all short wave bands from 160m. to 10m.



The QR-666 meets all requirements set for modern all-band all-mode receivers, and its outstanding performance will convince every serious radio amateur or SWL. Its special features: advanced solid-state circuitry, outstanding input sensitivity and selectivity, multiple receiving modes, simple operation controls, high reliability, modern design and an attractive price.

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.

Worldwide Reception—The QR-666 features a total of six receiving ranges: LW from 170 to 410 kHz, MW (BC) from 525 to 1250 kHz, four continuous shortwave ranges from 160m. to 10m. (1.25 to 30 MHz) covering all important radio amateur bands and commercial shortwave bands from 75m. to 11m. A special bandspread dial scale facilitates precision tuning of radio amateur stations in 500 kHz band sections. An optional FM Tuner QR-6FM covering the standard FM broadcast band from 88 to 108 MHz can be installed any time with minimum wiring work.

Optional Dials—The QR666 is now available with bandspread dial, calibrated for all the international short wave broadcast bands.

Exceptional Receiving Quality—The multiple-tuned front end with FET complement guarantees an input sensitivity of 1 μ V on the 80m. band in AM, SSB and CW mode, 3 μ V in the MW and LW range and 5 μ V in the FM range. Careful selection of interstage coupling and ceramic filters in the IF stage account for the QR-666's excellent selectivity and image ratio.

All-mode Reception—The continuously adjustable BFO allows reception of SSB and CW stations. Now you can listen into the conversations between radio amateurs from all over the globe—maybe this will stimulate your interest in the fascinating world of shortwave radio and sooner or later you'll become a radio amateur yourself. Commercial shortwave stations usually operate in the AM transmission mode. The QR-666 takes advantage of that and features a special AM noise limiter which eliminates undesirable interference and assures perfect reception of commercial shortwave stations from all over the world. The broadband LW range not only covers Droitwich Radio on 200 kHz, but also ships at sea, shorebound naval stations, beacons, etc.

Full Range of Extras—Large, easy-to-read drum-type dial scales for coarse and bandspread tuning; illuminated S-meter; pushbutton switches for mode and range selection (AM, AMNL, SSB/CW, FM and FM/AFC with automatic frequency control); factory-wired adaptor for fast and easy installation of the optional FM Tuning Attachment QR-6FM; RF and AF gain controls; provisions for installation of the optional 500 kHz crystal marker generator QR-6MK for fast and accurate dial calibration; built-in speaker and output jack for extra speaker or earphones; automatic switching from line to battery operation and vice versa with dial light dimmer; choice of line operation with 110/240v. AC, 50-60 Hz or battery operation either from external 12v. DC battery or eight built-in 1. 5 volt "D" cells.

If you are a keen SWL or a radio amateur newcomer—the QR-666 is exactly the right all-band all-mode receiver for you.

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



TRIO

LOWE ELECTRONICS

BELCOM

LINER 2

R115E

The brilliantly conceived and designed Liner 2 has revolutionised 2m. sideband and is responsible for the enormous increase in activity. It combines the advantages of switched channels with direct frequency readout (e.g. Channel 20 is 145.20 MHz) with the ability to tune between channels with the V.X.O. In addition the provision of R.I.T. which enables the Rx to be tuned to a kHz or two either side of the Tx frequency is a useful feature. The V.X.O. gives, as one would expect, crystal stability which, coupled with an extremely effective noise blanker makes mobile operation a delight without detracting from its use (with an AC p.s.u.) as a base station. The matching power supply unit R115E is a new uprated design which provides a fully regulated low ripple 13.5v, DC supply at 3.4 amps. Acting also as a base stand for the Liner 2, the two units combine to make a first-class home station. The Liner 2 comes to you complete with matching microphone, mobile mounting bracket with all fixing screws, spare power leads and fuses.

If you want to operate SSB on 2 metres, there is no better value than the Liner.

PRICE (excl. VAT) LINER 2 £145

R115E £21



The LA106 will of course match any rig such as the TS700, FT220, IC210, in any mode, F.M., A.M., C.W., or SSB, provided that the drive power is around the 10-watt level. Using a rugged valve in the PA allows you to get away with occasional misuse (just try a high power solid state amplifier into an unmatched load!) and gives very low intermod. products.

High Power, High Performance, Modest Cost.

BELCOM

LA106

2M LINEAR

Frequency Range : 144-146 MHz
Modes : SSB, F.M., C.W., A.M.
Input Power : 180W. p.e.p.
Drive Power : 10W.
Receiver preamplifier adjustable gain up to 10 dB
Accessory Supply : 13v. 2.5A. regulated
Power Supply : 240v. 50 Hz.
Dimensions (mm's) : 315 x 148 x 280
Weight : 12 kgs.

A reasonably priced, compact, high performance linear for 2m. SSB/F.M./C.W. operation. 10W. of drive for more than 180W. input gives your signal the extra kick to get it out of the noise. Built-in receive preamplifier with adjustable RF gain and using helical filters for extra selectivity and reduced intermod. from out of band signals. Built-in regulated 13v. 2.5A. supply for Liner 2 or any similar drive unit.

PRICE (excl. VAT) £165

REPEATER NEWS

After much head scratching and deep discussion it has been decided that the Matlock repeater on R67 will be a broadband linear device. Since coverage of the Matlock Area has to be largely in a North/South direction due to the Derwent Valley, the repeater will favour these directions.

In order to ensure that the repeater would be ultra-reliable, it was designed to eliminate as many electronic devices as possible so that maintenance would hardly ever be needed. To meet these requirements, i.e., full band coverage if necessary, no maintenance, linear operation and directional coverage, an enormous amount of highly technical development work has been undertaken. The final design consists of two 14 element cross polarised Yagis mounted back to back with a short length of low loss feeder connecting them together. This gives an overall gain of 28-30 dB in the North-South direction and, of course, will accept any mode of operation. The system is working quite well but with such a high gain, isolation between input and output has to be carefully maintained or the system will go into uncontrolled oscillation. On one occasion, when propagation conditions were good, the signal from G3ZYC set up such a strong feedback that the front elements of the South facing array melted.

Fortunately, being close to the Rolls-Royce aero engine plant at Derby, we have been able to replace these elements by ones machined from RB211 turbine blades which although glowing red hot, will allow the system to keep operating. Obviously, anyone attempting to duplicate such a repeater should beware of standing in front of the aerials to avoid radiation burns.

It should be noted that the normal 600 kHz split between the input and output frequency is not necessary on this repeater. When using 144.2 as the input frequency, access is by Leonid ping.

Anyone visiting the Matlock area should look out for the array which is on Goon Low at ZN99X.

See you on "8."

73
G3PCY

SEE IT ALL AT GRANBY HALL — OCT. 30. 31, NOV. 1

LOWE ELECTRONICS

BELCOM FS1007P

FEATURES

- ★ BUILT-IN LOUDSPEAKER
- ★ 16 CHANNEL SCANNING
- ★ INDIVIDUAL CHANNEL SKIP FACILITY
- ★ PRIORITY CHANNEL OPERATION WITH FRONT PANEL CRYSTAL SOCKET
- ★ MANUAL OR AUTO SCAN
- ★ SWITCHABLE HI LOW POWER
- ★ SWITCHABLE 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 AC/DC POWER SUPPLIES
- ★ 10 WATT TRANSMITTER
- ★ 0.3μV. SENSITIVITY
- ★ FITTED 3 CHANNELS



The FS1007P is the latest in the Belcom line of FM 2 metre equipment. This is the transceiver that not only offers every conceivable feature to the operator but also is completely at home in domestic surroundings due to attractive new styling.

Basically, the FS1007P is a 16 channel, 10 watt, scanning FM transceiver. Full automatic or manual facilities with channel skipping and priority channel operation ensure complete operator control.

With all the features listed above and fitted with eight channels, the FS1007P is a must for the amateur who will not settle for anything but the best.

SECONDHAND GEAR

FR400 SDX ...	... . . . .	£175
TS900 + PSU ...	... . . . .	£420
SE600 ...	... . . . .	£425
IC210 ...	... . . . .	£150
LA2 2m. Linear	... . . . .	£105
YC355 Counter	... . . . .	£60
FT200 + p.s.u.	... . . . .	£200
EUROPA ...	... . . . .	£70
EC10 Mk. II ...	... . . . .	£75
LINER 2 ...	... . . . .	£125
TS510 ...	... . . . .	£175
FR50B ...	... . . . .	£60
FL50B ...	... . . . .	£60
KW1000 ...	... . . . .	£140

SECONDHAND EQUIPMENT

SELLING ?

All secondhand gear sold by a dealer carries 25% VAT on the full selling price. Why not eliminate this by letting us collect and sell your equipment quickly on commission?

BUYING ?

By eliminating the dealer, you do not pay VAT on the purchase but you have our assurance that any equipment which we sell on commission has been thoroughly checked and aligned in our workshops and will carry our 12-month warranty. Contact us for details of current stocks.

SUNDRIES

Don't forget that we normally carry a wide range of station accessories and equipment from all major manufacturers.

HALLICRAFTERS

VENUS SLO-SCAN

J-BEAMS

KEYS AND MONITORS

ROTATORS

MICROPHONES

CABLES AND CONNECTORS

MICROWAVE MODULES

HY-GAIN GALAXY

G-WHIPS

KEYERS

CLOCKS

HEADPHONES

HEAD OFFICE

BRANCH OFFICES

AGENTS

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

39 Pound Street, Carshalton, Surrey. Tel. 01-669 6822

Soho House, 362-4 Soho Road, Handsworth, Birmingham Tel. 021-554 0708

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

MICROWAVE MODULES LIMITED

144MHz Mosfet Converters

UPDATED SPECIFICATION

The overwhelming response to the introduction of our 144 MHz SSB receiver converter has indicated the requirement for a tightly specified converter for use with modern highly accurate 28-30 MHz receivers. To this end we have now standardised the design of our 28-30 MHz Converter using a zener-stabilised 116 MHz crystal oscillator, giving a typical read-out error of better than 1 kHz. The converter is now available in the two versions, with and without the local oscillator output facility.

MMCI44/28

Price £18.90 inc. VAT

MMCI44/28 LO (with 116 MHz output) Price £19.90 inc. VAT

SPECIFICATION

Noise figure : 2.8 dB max.	Gain : 27 dB typ.
Image rejection : 65 dB typ.	
Crystal oscillator : 116 MHz (zenerized)	
Frequency error at 144 MHz : 3 kHz max.	
Power supply : 35mA at 12 volts.	
116 MHz o/p power : 5mW min. (LO o/p version)	

We have extended our popular range of single conversion converters to include the following I.F.s :
9-11, 12-14, 14-16, 18-20, 24-26, 27-7-29-7, 28-30 MHz
Price £18.90 inc. VAT

144 MHz DOUBLE CONVERSION MOSFET CONVERTER

I.F.s available ex-stock : 2-4, 4-6 MHz Price inc. VAT £18.90
This unit was developed to meet the heavy demand for a converter suitable for use with receivers having better performance at lower frequencies. It uses two dual-gate mosfets mixers, both fed from the output of a 70 or 71 MHz crystal oscillator. Selectivity is obtained at the first I.F. in the 74 MHz range, thereby overcoming the usual problems associated with low-I.F. single conversion converters.

144 MHz DUAL OUTPUT PREAMPLIFIER

This two-stage mosfet preamplifier has two separate isolated outputs, for feeding two receivers, for example. The gain is 18 dB, and the noise figure is 2.8 dB. The noise figure is individually optimised on each unit using our new automatic noise measuring equipment.
Price inc. VAT £11.30

70 MHz MOSFET CONVERTER

I.F.s available : 4-4.7, 14-14.7, 18-18.7, 28-28.7 MHz
Price £18.90 incl VAT

70 MHz CONVERTER FOR SSB

I.F. 28-28.7 with 42 MHz osc. output (similar to 144 MHz version above) Price £19.90 inc. VAT

SOCKETS

All our equipment (apart from 1296 MHz) is fitted with Belling-Lee sockets. Optionally all equipment can be supplied from stock fitted with BNC sockets (50 or 75 ohms). Extra charge.
£1.00 inc. VAT

STOP PRESS

We have just been appointed as exclusive UK representative for KLM Electronics of California. See their exciting range of VHF/UHF Power Amplifiers at the Leicester Exhibition, October 30 and 31 and November 1.

432 MHz POWER SOURCE

A simple and efficient method of producing power is provided by the use of our MMV432 varactor tripler. This unit, when driven by a 144 MHz transmitter (AM, FM, or CW), converts this power with high efficiency to 432 MHz. A pi-network in cascade with an L-network matches the input impedance to the low impedance of the diode. A similar circuit is used as the output network to provide optimum filtering of harmonics.

Spectrum analysis of other varactor tripler designs leave us in no doubt that our unique design concept alone achieves the necessary high degree of unwanted harmonic rejection as specified below.

MMV432

Price £21.90 incl VAT

MMV432 SPECIFICATION

Output Power at 432 MHz : 14 watts typical (for 20 watts drive at 144 MHz)
Bandwidth : 430-440 MHz at — 1 dB
Typical Harmonic Performance :
Fundamental — 30 dB
288 MHz — 50 dB
576 MHz — 40 dB
Others — 60 dB

432 MHz MOSFET CONVERTER

I.F.s available ex-stock : 14-16, 18-20, 24-26, 28-30, 144-146 MHz
Price inc. VAT £22.60

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

1296 MHz CONVERTER

This converter has been developed using an extension of the micro-strip techniques that have been well proven in our 70 cm. converter design. Two versions of the design are available using either a 96 MHz or 105.66 MHz crystal to produce I.F.'s of 144-146 MHz or 28-30 MHz respectively, corresponding to the 1296-1298 MHz band. We are using crystals of a very tight tolerance to minimise the offset that would otherwise be very noticeable when using a high-performance 28-30 MHz tunable receiver. The multiplier chain uses three BFY 90 transistors and the mixer is fabricated using a pair of MA 4882 Schottky diodes in a balanced hybrid ring configuration. The I.F. head amplifier uses a selected low noise dual-gate mosfet to give an overall noise figure which is typically better than 8.5 dB, and a gain of 25 dB. Microstrip UHF circuitry ensures repeatability of this high performance design. The unit is housed in the same die-cast box as the rest of our range of converters and is fitted with 50 ohm BNC connectors for optimum UHF performance. The converter operates from a nominal 12v. supply and is available in negative earth version only.

Price inc. VAT £29.90

1296 MHz VARACTOR TRIPLER

Maximum input power at 432 MHz : 24 watts. Typical output power (at maximum input) : 14 watts. Price inc. VAT £31.30

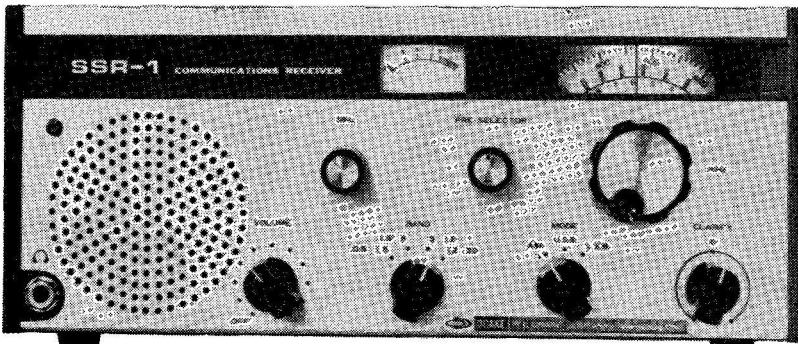
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Just around the corner from West Hampstead Underground Station

NEW DRAKE SSR-1 RECEIVER



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

UK PRICE £225, EXPORT PRICE £185 INC. SURFACE POSTAGE

SPECIFICATIONS

Frequency Coverage : 0.5 to 30 MHz in 30 ranges each tunable over 1 MHz range with a dial having 10 kHz graduations.
Reception Modes : CW, USB, LSB, AM.

Sensitivity : At least 10 dB S + N under the following conditions :

MODE	FREQUENCY	INPUT LEVEL*
SSB	0.5-2 MHz	1.0 μ V
	2-30 MHz	0.3 μ V
AM	0.5-2 MHz	3.0 μ V
	2-30 MHz	1.0 μ V

(AM : 1000 Hz at 30% modulation)

* These voltages are 1/2 the open circuit signal generator voltage, i.e., the voltage read on the meter of a HP Model 606 Generator. Capable of 200 mW output on SSB at 2 MHz with input signal of 0.5 μ V and 2 Watts output with 5 μ V input.

Output : Less than 5% at 2 Watts.

Audio Distortion : Within 5 kHz at all frequencies.

Calibration Accuracy : Selectivity :

BANDWIDTH

MODE	BANDWIDTH
SSB	3 kHz \pm 25%
AM	5.5 kHz \pm 25%

Image Rejection : Greater than 50 dB.

IF Rejection : Greater than 50 dB at fd below 20 MHz.

Antenna : Greater than 40 dB at fd above 20 MHz.
Self-contained telescopic whip antenna. External connection to terminal strip. (75 ohm input impedance—unbalanced.)

Audio Output Provisions : Internal 8 Ohm speaker and phone jack on front panel that disables speaker when plugged in.
External mute jack (RCA type) that provides normal reception with closed circuit and mute with open circuit connections.

Power Supply : 8 type "D" (1.5-v.) dry cell batteries. Tapped transformer to provide operation from 117v. \pm 15% or 240v. \pm 10%–20%. 50–60 Hz source with automatic switch over to batteries when AC line is disconnected.

Current Consumption : Less than 100 mA quiescent at 12v. DC.
Momentary push button to light when on battery operation. Always on for AC operation.

Dial Lights :

Clarifier : Tunes minimum of \pm 2 kHz and maximum of \pm 5 kHz.

Size : 13in. (33 cm.) wide, 11in. (28 cm.) deep, 5.5in. (14 cm.) high.

Weight : 14 lb. (6.4 kg.).

SEND SAE FOR DETAILS

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

RADIO SHACK LTD.

OPEN 5 DAYS 9 until 5 p.m. Sat. 9 until 1 p.m.
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Just around the corner from West Hampstead Underground Station

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47 WARRINGTON ROAD, LEIGH, LANCS. WN7 3EA

TEL: 052 - 35 76790

We are situated on the A754. Turn at the Greyhound Motel on the A580 (East Lancs. Road). Easy access to the M6-M61, M62-M63-M56. Thanks to all our old customers who have followed us to our new premises. Nice to see so many new customers from far and wide who have found it so easy to call in. No parking problems. Shop hours : 9.30 to 5.30, Mondays to Saturdays. Full demonstration facilities in the "Shack" away from normal business activities.

ELECTRONIC DEVELOPMENTS

We are pleased to announce that we have now incorporated ELECTRONIC DEVELOPMENTS into our organisation. We shall now be sole manufacturers of the very popular range of 2 and 4 metre Transverters, Linear amplifiers for 2 metres and 70 cms. All items from stock.
 2 and 4 metre Transverters, £110.00 2m. Linear Amp £104.00 70 cms. Linear £45.62

S and J Ltd. Equipment

In August we introduced the first of our own products. The SWL Antenna Tuning Unit. This sold so well we ran out of stock in two weeks. All reports have been first class results. With its 50 switched and tunable positions, two antenna inputs for single wire or co-ax all in a small neat cabinet this is a winner. We know that hundreds of listeners using odd lengths of wire, etc., were not getting the best results from their receivers that we produced this in demand to many clients.

SWL Tuner Mk. I Price £14.25, including postage.

The second item we introduced was the VHF Absorption Wavemeter Mk. I. Frequency coverage 65-230 MHz. This also ran into problems of demand outstripping supply but now we can deliver from stock at £16.00 including postage. These are just two of the many items we shall be introducing onto the market in the new few months. We hope to keep prices as stable as possible, whilst imported goods are climbing.

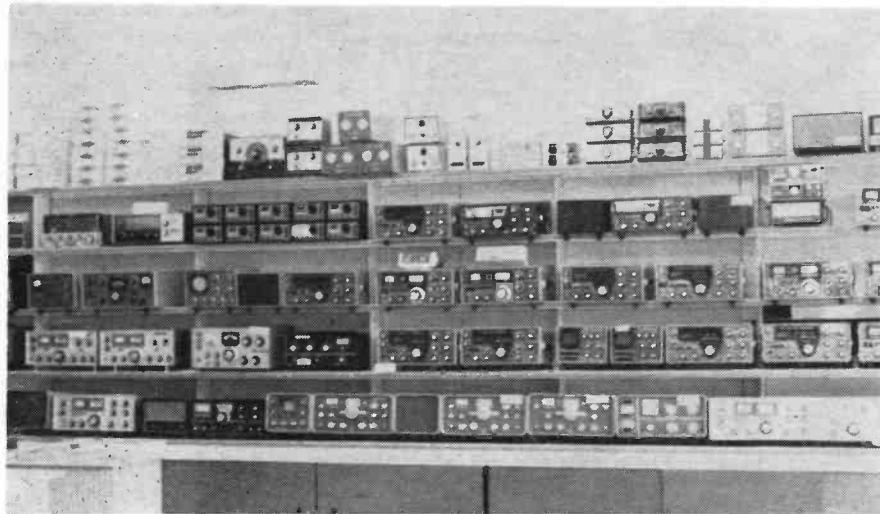
We are stockists of all the most popular makes of equipment available from most of the worlds leading manufacturers. All items carry full warranty. We can arrange for free delivery in some areas.

YAESU — DECCA — HY-GAIN — DRAKE — OMEGA — C.D.R. — BARLOW WADLEY, ETC.

We try and keep the full range of equipment in stock at all times. Full information and current price lists available on request with s.a.e. We do not claim to be "Sole" importers for any range of equipment (although we could). We do claim to have one of the widest ranges of equipment available, all guaranteed air tested, available to the amateur whether he be licensed or just a listener. Our secondhand equipment range changes rapidly, but we are always in the market for good used equipment. On the spot cash payments made for good clean equipment. We can arrange on the spot HP or Credit facilities if you call. Part exchanges are welcome at all times.

PART OF THE RANGE OF EQUIPMENT WE OFFER FROM STOCK

**SEE OUR FULL RANGE AT THE AMATEUR RADIO RETAILERS ASSOCIATION EXHIBITION AT THE
GRANBY HALLS, LEICESTER, 30th and 31st OCTOBER, 1st NOVEMBER, 1975**



We hope to introduce a few-new models. We will have the latest Solid State Communications receiver from the Drake Co., The SSRI. Full coverage 500 kHz to 30 MHz. Who knows what else may arrive by then . . .

Send S.A.E. for information on any product. Postage extra on all items, carriage by arrangement

FOUNDER MEMBER OF THE AMATEUR RADIO RETAILERS ASSOCIATION

PLEASE NOTE THE ABOVE PREMISES WILL BE CLOSED DURING THE WEEK OF THE EXHIBITION

**508-514 ALUM ROCK ROAD
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6313**

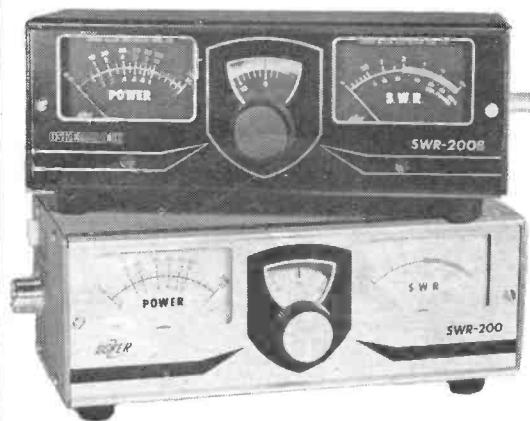


FREE SECURICOR DELIVERIES ON ALL MAJOR ITEMS



**AS DIRECT IMPORTERS OF YAESU,
SWAN AND ATLAS EQUIPMENT PLUS
MANY OTHER PRODUCTS, WE SHALL
BE SHOWING ALL THE LATEST MODELS
ON STAND 21 AT THE LEICESTER
EXHIBITION**

**SEE THE NEW FT10IE
AT LEICESTER !**



**BE SURE YOU TAKE HOME
AN OSKER !**

THE FAMOUS OSKER SWR-200
NOW EX-STOCK AT £21 PLUS
£1.68 VAT OR THE NEW
SWR-200B (DRAMATIC BLACK
FINISH) AT £22 PLUS £1.76 VAT
(pp 75 pence)

A COUPLE OF STAMPS (WE'LL PROVIDE THE ENVELOPE) WILL BRING YOU OUR LATEST USED EQUIPMENT LIST OR INDIVIDUAL INFORMATION ON SPECIFIC ITEMS—21 PENCE BRINGS THE LATEST GLOSSY SWAN OR YAESU CATALOGUE (FULLY REFUNDABLE AGAINST EVENTUAL PURCHASE)

NEW BRANCH ! WE ARE PLEASED TO ANNOUNCE THAT OUR NEW BRANCH★
AMATEUR ELECTRONICS UK-COASTAL★316-318 NORTHDOWN ROAD, CLIFTONVILLE,
KENT, IS NOW FULLY OPERATIONAL UNDER THE DIRECTION OF KEN McINNES G3FTE
AND WILL CATER FOR LOCAL CUSTOMERS AND VISITORS TO THIS PART OF THE
ENGLISH COAST.

TELEPHONE: THANET (0843) 22060

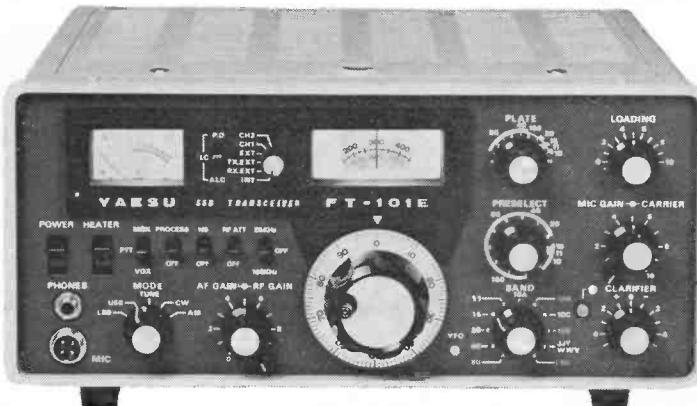
AGENTS : SCOTTISH—RON TURNER GM8HXQ WISHAW 72172
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AMATEUR ELECTRONICS UK



Western

NOW, MORE RADIO FROM THE RADIO COMPANY



YAESU PRICES (Carriage free by Securicor) including VAT

HF TRANSCEIVERS

FT-75B 10-80m, 120w.	£206.25
DC-75B DC PSU for FT-75B	£50.00
FP-75B AC PSU for FT-75B	50p
FT-101B 10-160m, 260w.	£412.50
FT-101EE latest model	£443.75
FT-101E "101EE" + Rf processor	£487.50
FT/FP-200 10-80m, AC only	£312.50
FT-201 10-80m, AC/DC	£387.50
FT-401B 10-80m, 500w.	£393.75
FT/FP-501 10-80m, Digital	£500.00

LINEAR AMPLIFIERS

FL-2000B 1200w. 10-80w.	£262.50
FL-2100B 1200w. for 101B/E	£262.50

FOR PROMPT DELIVERY, IT'S WESTERN'S, OF COURSE

Used Equipment

USED EQUIPMENT (3 months guarantee). Securicor delivery £4.50 Prices exc. VAT

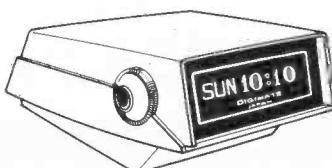
DRAKE R4B, mint	£175.00
DRAKE T4XB, mint	£175.00
DRAKE TR4, AC & DC PSU's	£250.00
FDK Multi-B and VFO	£168.00
HEATH, SB-303, very good	£168.50

HEATH, SB-401, very good	£128.50
HEATH, SB-200, as new	£128.50
KW2000B, very good	£240.00
SEIDENSHA, 2m. 80w. FM Amp	£45.00
STANDARD, C140, as new	£78.50

STANDARD, SY-200	£69.00
STANDARD, CB26, excellent...	£88.00
TRIO, JR-310, excellent...	£85.00
TRIO, JR-310 + 160m.	£88.50



NEW! AC-3
Remotely operated Antenna Switch
No extra cables required!
The AC-3 enables one of 3 antennas to be remotely selected using a single co-axial feeder. No multi-cored cable is required. Handles 500w, pep up to 150 MHz. Connectors: UHF. Without doubt this is the best 3-way remotely operated switch we have ever seen.

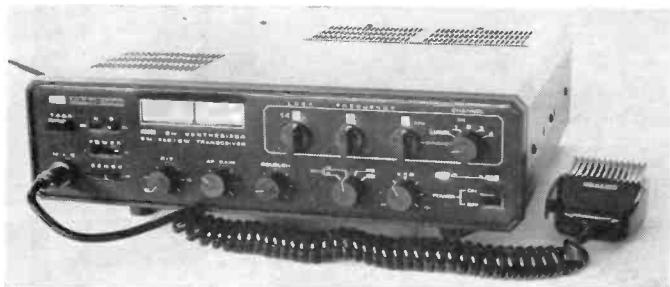


BATTERY CLOCK
£11.25 (inc. VAT)

This operates for about 6 months on one battery (provided). Ideal Christmas present for the shack or XYL. Available in red, blue, orange, ivory, and brown; list your choice in order of preference.

Electronics (UK) Ltd

NOW AVAILABLE EX-STOCK! THE FDK MULTI-2000

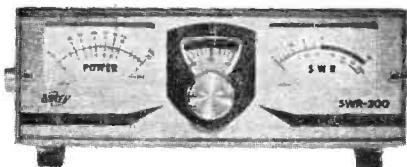


**2m. SSB/FM, CW 200 Ch. SYNTHESISED
AC/DC TRANSCEIVER**

- * Full cover 144-6 MHz.
- * VXO gives full coverage between 10 kHz spacing.
- * Rapid change of frequency and mode is possible.
- * RIT (Receiver Incremental Tuning) allows receiver to be tuned without moving the transmit frequency.
- * 600 kHz Repeater shift works on all frequencies.
- * Tone access built-in.
- * Fitted narrow FM Filter.

SUPERB VALUE AT £362.50 inc. carriage (Securicor) and VAT

OSKER POWER METER £24.84 including VAT/Postage



6 dB GAIN COLINEAR . . . the real performer

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

If you are a serious 2m. operator and you have yet to be convinced about the superb performance, then give our Sales Manager a chance to tell you a true story!

The G6-144A (shown right) Base station model is £43.75 inc. VAT, and the CGT-144 Mobile model (OK at 100 mph!) is £31.25, and has 5.2 dB gain.

G6-144A

★ NEW! 500 MHz FREQUENCY COUNTER	£270.00
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Western Electronics (UH) Ltd

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PROFESSIONAL PERFORMANCE



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Monitor your transmissions 10-160m. two-tone test generator incorporated to ensure optimum linearity for SSB.



KW 2000E Transceiver covers all HF Bands 10-160 metres (10 metres in 4 Bands), 500 kHz VFO. SSB/CW. Outstanding TX audio quality. Excellent receiver signal/noise figures. Includes VOX, break-in CW, 100 kHz and WWY calibrator. Reliable 6146's in P.A.



with
KW



KW 107
Antenna Tuning System. Incorporates E-Z match, SWR/RF Power meter dummy load, Antenna switch. High power version KW 109 is available.



KW 1000 Linear Amplifier. 10-80 metres. 120 watts PEP input max. Designed to be "driven" by KW 2000A/B/E or other Unit of similar power rating. In-built 2.5 Kv. PSU. PA tubes pair T160L. Very quiet in operation.



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

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With an antenna just 230 cm long!!—Only the WORLD RECORD PARTRIDGE VFA gets away with it—it works better in the clear

HONESTLY!!!

*These are VFA USERS claims, and remember, SWL's, A GOOD TRANSMITTING AERIAL IS AN Equally GOOD Receiving AERIAL
—You sure can't work 'em if you can't hear 'em!

ZLIASY worked GC3EML on the 20m. band with "JOYSTICK lying ON FLOOR OF SHACK!" G2BAH (ex G4CJN), Kendal, reports: "I happened to be listening on 80m. and heard someone in Manchester testing. We established a strength 8 qso each way. He had a *VFA laying on his kitchen table and was making tests to see if it would load up, etc. An old timer, a G2 and 2 letters, so he knew what he was doing."

G3ZDR worked a W3 on 20m. using a *VFA and a PM3A with 2 watts.

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P.W. "ON THE AIR" feature reports "Terry Gilbert sends a log of a VERY RARELY reported station, Radio Afghanistan on 15195 at 1130. This goodie was pulled in via a Cedar CR70A and JOYSTICK".

THE PARTRIDGE VFA SYSTEM to put **YOU** in the WORLD RECORD class is —

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VHF 2 and 4 Metre Whips — Ex stock.

FM 2 METRE MONITOR RECEIVERS (ex. VAT)

Lowe 2m. 6-channel monitor receiver (less xtals) ...

Lowe 2m. fitted 6 xtals ...

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ESTABLISHED 1958

NEW

The FT221 is the eagerly awaited multi mode(AM, FM, USB, LSB, CW) 2m. transceiver offering super stable phase locked VFO or 11 crystal controlled channels from 144 to 148 MHz, repeater up and down shifts (600 kHz) with tone burst (at the flick of a switch), small size (11½" x 5" x 8"), mains or 12v. (3A) operation, excellent selectivity (SSB 2-4 kHz with 1:7:1 shape factor and for FM the optimum 12 kHz), serviceable plug-in boards, high sensitivity, clean transmitter spectrum, front panel adjustable VOX and mic. gain, 100 kHz crystal calibrator, a sensitive squelch (0-3uV), clarifier offering IRT and IRT with ITT (makes FSK easy), switchable "S" and centre zero tuning meter, Noise blanker, etc., etc.



FT221 £318.50



EX-STOCK £170

NEW

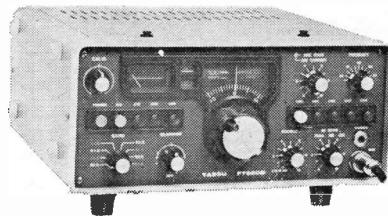
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The FTC212 is a 4m., 12 channel, FM, 10W output, transceiver. It offers the best in modern VHF design. The low image response, single conversion receiver using a Mosfet RF stage coupled via a 3 section helical filter to FET mixer, which is driven by (as in the transmitter) a low noise FET crystal oscillator. The 10.7 MHz IF is processed by a crystal filter and then 2 isolated ceramic filters for unrivalled stop-band performance. Two IC limiters feed the separate IC discriminator. Automatic final protection (AFP) is provided along with RF sensing LED transmitter indicator. Mic, accessories and 3 channels (70.2, 70.26, 70.375 MHz) are supplied.

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The FT620B features full 1 kHz resolution VFO coverage across 50-54 MHz in 8 ranges, SSB (selectable), AM, CW (build your own FM modulator) 4 crystal controlled channels in each band segment, receiver clarifier, noise blanker, build-in AC and 12v. DC power supplies, mic. supplied. The exceedingly low level of spurious emissions and the 50 MHz output makes this unit highly suitable for use as a drive source transverting to 4, 2 or 70 cms, and/or parametrically up converting to 70 or 23 cms.

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For further instalments on this F.M. Trilogy a second-hand price list, or new price stock list. Telephone : 04216, 4930 or write.

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17 YEARS OF PROFESSIONAL EXPERIENCE



The FT200B is one of today's "best buys". Its features compare favourably with markedly more expensive units. 260W. PIP (SSB/CW), 75W (AM), 1 kHz read out on all bands, 3.5-4 to 28.5-29 MHz (3 optional 10m. crystals available), sensitivity -5uV for 10dB s/(s+n), selectivity 2.3 kHz (6dB), 4 kHz (60dB), 1.75 : 1 shape factor, solid state gear driven FET VFO with excellent linearity, 100 kHz calibrator, VOX/PTT, clarifier (± 5 kHz) break in CW keying and sidetone monitor. The pre-mix oscillator gives superb signal handling and low noise capability of a single superhet whilst at the same time retaining a 9 MHz IF, with high image rejection and single range VFO stability.

EX STOCK
YD844 £13
FV200 £42
FT200B £170
FP200B £44



YC355D

KNOW YOUR FREQUENCY WITH A YC355D

The YC355 series counters are available in two models. The basic counts to 35 MHz and the "D" to 200 or over. The YC355D outlines the advanced IC techniques and the dual range system provides an accurate 8 digit read-out using only the 5 tubes insuring minimum cost with maximum performance. Built-in AC and DC power supplies enable complete portability, and the use of epoxy circuit boards ensures reliable operation for years to come.

EX STOCK YC355 £104 YC355D £125

KNOW YOUR SIGNAL IS CLEAR WITH A YO100

The YO100, the multi purpose monitor scope, offers the facilities of monitoring the transmitted signal (through line) 18 to 50 MHz on power levels from 10 to 500 watts. The IF of the receiver or transceiver can be monitored (3-18 MHz standard, 455 kHz or 9 MHz options). AF and RF trapexoid patterns can be displayed. The unit facilitates RTTY tuning, built in 1.5 to 1.9 kHz oscillators are suitable for Post Office two tone output measurements.

EX STOCK £93



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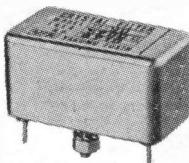
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LOW PRICE CRYSTALS AND CRYSTAL FILTERS

individually supplied with ± 6 dB, (25dB), 60dB bandwidths, ripple factor and insertion loss.

9 MHz

YF90M600 600 Hz

... £13.00

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... £13.00

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... £11.00

YFI07M2·4 2·4 kHz

... £12.00

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... £13.00

YFI07M12 12 kHz

... £12.00

Carrier Crystals HC18/U

... each £1.50

Carrier crystals HC18/U

... each £1.50

10.7 MHz

FT-2F (52 MHz Rx, 6 MHz Tx)

£3.50 pair £2.00 each

... £13.00

144 (-15, -25, -36, -48, -60, -70, -80)

145 (-08, -09, -68, -84, -90)

Simplex

S (0, 12, 16, 20, 21, 22, 23, 24)

Duplex (Normal repeater)

R (0, 1, 2, 3, 4, 5, 6, (7), (8), 9)

Inverse Repeater

IR (0, 1, 2, 3, 4, 5, 6, (7), 8, 9) Rx

IR (0, (1), (2), (3), (4), (5), (6), (7), (8), (9)) Tx

FT220 Channel crystals £2.20 each

8 (-00, -125, -150, -175, -225, -25, -5, -575)

Trio 2200 £3.50 pair, £2.00 each

Simplex and Duplex

FT-2FB (14 MHz Rx, 18 MHz Tx)

£3.50 pair or £2.00 each

144 (-15, -20, -30, -36, -40, -50, -60, -70)

145 (-09, -32, -44, -51, -90)

Simplex

S (0, (1), (2), (16), (20), (21), (22), (23), 24)

Duplex (Normal repeater)

R (0, 1, 2, 3, 4, 5, 6, (7), (8), (9))

Inverse Duplex

IR (0, 1, 2, (3), 4, 5, 6, 7, 8, 9) Rx

IR (0, (2), (3), (4), (5), (6), (7), (8), (9)) Tx

C146A and C826MB

£3.50 pair, £2.00 each

S (20, 21, (22), 23, 24)

R ((5), 6, 7)

FT-200 10A, 10C, 10D at £2.00 each

Special Offer (for MORSE MEN)

145-12T 12 MHz HC25/U only £1.00

SUB STANDARDS

10 kHz HC13/U £2.50

1 MHz HC6/U £4.50

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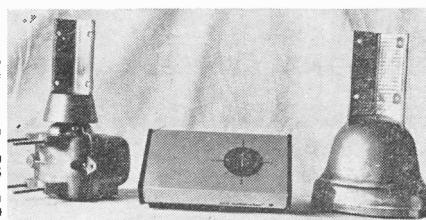
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SHORT WAVE MAGAZINE

(GB3SWM)

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*Austin Forsyth
G6FO*

WORLD-WIDE COMMUNICATION

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

ONCE more into the breach, dear friends—and that is what it has been at times during the last month. A bit of a baffle, with static quite heavy even on the HF bands, weather pretty up-and-down albeit fairly dry at least in these parts and conditions somewhat the same. This old scribe stuck to Twenty, and it has to be admitted that there was not a single occasion on which the rig was switched on in the evenings when there was not some activity going on at the CW end (and at the other end for that matter). After the comparatively long spell of below-normal and low-normal predictions, the few days prior to this being written and for the next couple of days have been high-normal or above normal, with the odd fade-out predicted just to liven things up; and the predictions seem to have lived up to their promise. There is also the thought that maybe the upturn is not so far away as the earlier predictions would have made it. We hope, and hope!

Coming Events

All through November, if the planning comes out right, VK5XX will be in Niue complete with well broken-in transmitter—we hear it is around forty years old! Anyhow, he has crystals for 7007, 7010 and 7011 kHz, and will be on these frequencies, plus 14014 kHz, CW of course. A fairly low-powered SSB/CW rig covering 80/10m. transceive will also, weight limits permitting, go along. Anyway, the main quantity of the ZK2-action will be CW, so if you need it and haven't punched a key in years, this is a good chance to do a bit of brushing up!

Alabdra activity this year, previously planned by VQ9D, has for the moment founders. The old bogey again—the saltmine! Work is the curse of the DX'ing classes, undoubtedly.

Activity from TT5AC, scheduled for the week when this piece was being written, has been postponed—Chester may have shown up by the time this gets into your hands, or may not be able to do so.

3B9DA is said to be putting out a potent signal from Rodriguez, much better than could have reasonably been expected—which might be nothing more than a temporary lift in conditions.

Now a bit of history which has a bearing on the future—the recent Fernando de Noronha activity by PY0YS and PV0AQL which gave the majority of a total of 2000 QSO's to Europe. Sad to say, when they got back PY0YS found that in his absence his wife and son had been in a serious motor accident and so while she is still recovering in Rio de Janeiro is there no question of the promised operations from Atol das Rocas or St. Peter & St. Paul Rocks. Maybe at the end of the year, maybe in November, but not before. Meanwhile we offer our sympathies to PY0YS and his family in their misfortune.

The attempted 3V8 operation by OH3XZ came to nought, the problem being the granting of a licence; and locals confirm all the 3V8 licences are in fact off the air.

Upper Volta remains on the wanted list for many. It is understood that XT2AA and WIAM managed to sort out a sked and clear some 50 stations. We gather XT2AA is by no means keen on DX chasers, but WIAM will add you to the list for a sked for the price of an s.a.e. to him, getting the word out to you when a firm sked approaches. All you need to do then is to hope the sked is kept and that the conditions for propagation will be OK. There seems little or no chance of catching this chap out in the open and working Upper Volta through the normal bash-and-crash which seems to be part of the DX'ers idea of sport.

In the way of New Ones, we hear that on January 1, 1976, there will be a complete separation of the Gilbert and Ellice group, the latter being renamed Tuvalu and having the prefix VR8 assigned. It is believed that VR1AT will become VR8A, subject to official confirmation; and it should be a "new country" by the usual standards. Then of course there is the talk about Bougainville seceding from the Papua-New Guinea Territory as and from September 1. Again, talk has it that Cabinda, which is an enclave of Angola and within the Congo, has proclaimed its independence. There could be some more activity for the long-suffering searchers for new countries . . . And, yet again, in the Azores there is talk that if Lisbon continues unstable politically, they may secede. How many more are in the pipeline?

That proposal for a Coral Sea Dx-pedition by a group of VK's has been postponed until March 1976, due it is said to weather conditions.

Operating Tactics

Ever a vexed question, particularly with the unsuccessful ones.

Long Island DX Association recently ran a "contest to develop DX-pedition Operating Practices" with prizes of subscriptions to LIDXA Bulletin, won by respectively K3RLY, W2QHH and W8CSG. From the various entries, a broadsheet has been written, collating all the useful information—this should be required reading for any operator planning a major show. On the reverse, some hints for the hunting types. Most of what is said is so obvious seen in print, but for many, maybe, not so obvious until mentioned! For example, Hint 1 says that it is wise to keep yourself informed in as many ways as you can—nearly all DX-peditions tend to show up a couple of days late(!) and nearly all DX-peditions are rumoured to have been cancelled. Don't believe the rumours for at least a couple of days after the proclaimed starting date. (2) Again pretty obvious—be around early; the first hour is often quiet compared with later when the Heavy Brigade get in on the act. On the other hand, don't count on leaving working him to the last day—gear has been known to fail and propagation likewise. (3) Follow the DX-peditions instructions. (4) The eternal one, this: How to decide, once you have heard him, where to call in order to have best chance of raising him. This is so often repeated that we will not do so again, but confine ourselves to saying you have to find out his operating pattern by hearing the chaps he works to have a chance of spotting on him. (5) This is good sense: Stand by when requested so as to let the chaps who have a limited propagation period get a look-in. And if he is giving directional calls for some place else, again don't call him. (6) Don't try for the expedition until the pile-up has thinned out a bit if you don't actually need him for an award. (7) Keep the QSO as short as possible; the QSL information will be given at regular intervals, or you can get it from the DX bulletin of your choice. Finally, having run (7) and (8) together we come to (9). If a station seems to be causing deliberate interference don't let him know how successful he is. Disregarding him is frustrating him, and getting the QSO through annoys him even more! In other words, "take no notice" of the QRM, even if it is bothering you! A very good point this last. Finally, if anyone wants to pin a copy of the broadsheet on the wall, or use it in planning a DX-pedition, drop a line with an IRC to LIDXA, Box 73, Westbury N.Y. 11590, and no doubt they will be pleased to send you one. Thanks to W2GKZ for a sight of this effort.

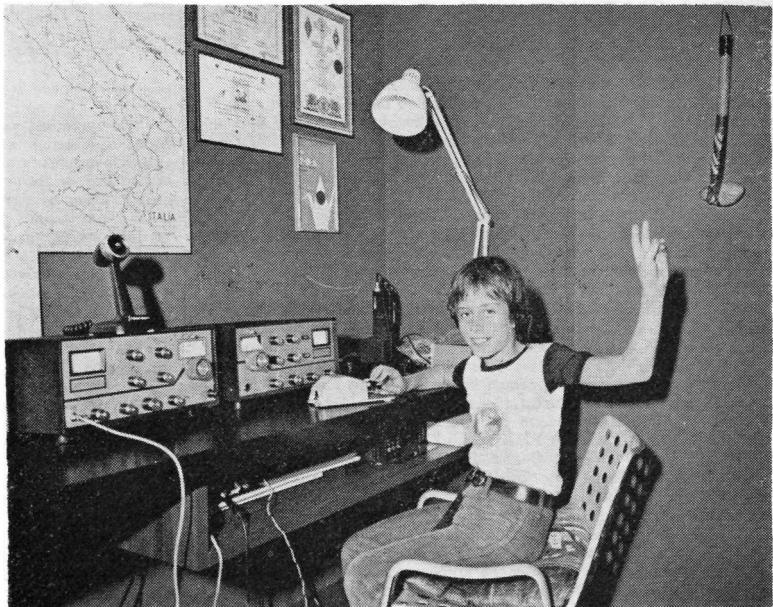
The Bands—From Top

Here we must start with G2BJY (Walsall) who sent in an eight page summary of his activities and findings; Geoff was a little worried about his interpretation of the rules of the game being correct, he having noticed that your old scribe in his usual bumbling fashion had loosely referred to areas as counties, and such-like errors. But he abided by the rules as they were published and scored from there. Geoff kicked off by attacking the CW part of the problem, then rebuilt his ten-metre SSB rig to Top Band and dealt with the SSB stuff, after which came AM. Originally, for this, an old screen-modulated rig was used (with all the attendant problems of keeping the output reasonably linear) and five counties were gained this way, after which the home-brew Hi-Fi was robbed of his amplifier, the two 6L6's fed into an SCR-522 modulation transformer and away he went for the rest. Conditions were pretty fair up to March this year and then they started to deteriorate. Some of the SSB operating made his hair stand on end—but, says Geoff, in fairness, the same stations were perfectly operated when he worked them for points. This one fears is often true—ragchewing between local stations does often generate sloppy operating which is cast off instantly when a hint of a distant station is in the air. In the summing-up, G2BJY found it all great fun for the first nine months, but towards the end got sick of talking and yearned for his key again! On a more personal note: The year of operating Top Band has made many new friends, and more visitors than he has had for many a day; living alone and retired, Geoff obviously appreciated this very much indeed.

For ourselves, we could conclude the G2BJY story by commenting that, though he led the field right to the end, he not only had the bare ten watts, but had an aerial system which most people would have dismissed as not adequate to work the rest of Walsall. Once again, it proves that the size of your garden is no criterion of your aerial-farming ability, and on the other hand that good operating will make the contacts even under a handicap.

Another one with a handicap was G4AYS (Moira) who stuck all through to six hundred milliwatts and a single crystal, with an RG-1 receiver plus homebrew audio filter, all into a bent 120-foot aerial

Station of I2DMK, Marco di Marco, Via Pascoli 60, 20133, Milan, with the junior op. at the controls. Marco has recently been signing IM0DMK from Maddalena, whence he made 3,500 QSO's—and is now dealing with the QSL's!



about 35 feet high fed through a series ATU. In his final list it is quite remarkable to see how far his signal could range—nothing like G2BJY's excursion to W1 for instance but as far as one could reasonably go and yet stay in the British Isles.

GM3YOR (Kirkcaldy) has been on shifts and so has not been able to make any additions to his score recently; but that has moved his focus elsewhere as will in due course be told.

G2HKU (Sheppey) found the only way to make his shack tolerable was to stick fast to the QRP and let the toast-making linear stay off! Thus, his only contacts on Top Band, for which he hasn't a battery-powered rig, were SSB with PA0PN and CW with OK1DFP.

As far as your scribe was concerned, Top Band was largely a matter of getting the little rig to produce a T9 note under keying. It was found—which we should have thought about in the first place!—that if one coupled the little beastie into the aerial as hard as one did the old KW-2000B, the thing would show a clean stable carrier and plenty of it; but it didn't want to be keyed, being possessed of a fiendish chirp, too slow to make the signal copiable, and thought at first to be nothing to do with the Tx but a function of the monitoring receiver. However, reduced loading cleared the problem, but to see where we were going with the loading-up we had to invent a QRP field-strength meter once the KW rig had left the shack. Net result, two useful CQ's and one sked, none of which produced a QSO—so we still don't know for sure we're getting out!

Eighty

G2BJY has now let his Top Band activity lapse and is turning his attention to Eighty. For this band, the scheme is to use the VFO from the Top Band rig to drive a push-push power doubler to a comfortable eighty watts from a pair of 807's. This is getting out well around Europe, but no real DX has been heard as yet to have a try at. A recent QSO of interest was with G5ADE, Bob in London, who was last worked as K1SDS/AM over Naples back in 1966.

QRP was the word from G2HKU, and conditions were such that all he found was a selection of G's. On a different tack, having made his peace with the hedgehogs and the rabbits as related in the last couple of CDXN issues, he now has another problem—the starlings have taken to pinching the loose wire ferrules for the part erected mast—when they land on the lawn and get caught in the mower!

Glenrothes Club, says GM3YOR had a go in the WAE CW Contest; Eighty yielded contacts with EP2, FP0, VE1, VO1, W1-3, UL7, UK9 and 4X4, using the call GM4DOF to a dipole at ninety feet.

G4DGU is normally to be found on Seventycentes, but he has done a bit of QRP on Eighty with three watts to a BLX67 (UHF PA device) in a transceiver, and was quite surprised to see a mention of his call last time. This, he asserts, gives him the chance to say a "thank you" to all the folk who have been so patient in working the

very QRS G4DGU/P signal—it seems to have got out very nicely in daylight and also to have been quite copiable even through the evening QRM. Good for Chris, and let us hope he sticks at it; CW may be regarded as outmoded, but it is still a great pleasure as a change from Phone, once one gets stuck in and has a go. After all, G3KFE was originally /T, and gradually slid down to Top Band CW and SSB; after saying for years he would never touch a key, he tried it for a bet, stuck at it, and now probably enjoys CW more than Phone!

G2NJ (Peterborough) next with the news that G5NX is off to VK again, for the 23rd time; no G5NX/LA/MM this trip, though, as he goes by air. On a different tack, his question about the "Levy" aerial resulted in a letter from G3KPO in the Isle of Wight, to say that this is the name the French give to the doublet with tuned feeders, so popular in pre-War days. Incidentally, G3KPO enclosed a card showing his new QTH, perched 300 feet up on the cliffs in the Isle of Wight and looking straight out to sea—a FB take-off for DX!

On now to G3CED/G3VFA (Broadstairs) who copied off his log for the month just before whistling off on holiday, minus rig—his XYL is like most in that she doesn't see the point of taking radio on holiday. Anyhow, to get to the meat of it, G3CED stuck to 600 milliwatts throughout the period, made 34 QSO's on Eighty, mainly in Europe or U.K., all on the Joystick system. George seems to average about seven contacts a day during the week and rather more on Sundays.

Perhaps our last comment for this space should be allowed to G3RJV, who is now in at the new QTH at Calverton, Notts; his rig is set up, and by the time we are in print no doubt G3RJV will have aerials back up and operational, having shifted the immediate chore of getting the latest QRP Club magazine out to the members. Reading through it, one is struck by the number of QRP enthusiasts there are about, on the one hand, and their keenness on the other. An article appears on DSB—that mode which the Home Office told us a few months ago was not legal—along with a footnote which points out that after enquiries to the Home Office about their odd ruling and the reasoning behind it, they retracted, saying it was an error within their organisation!

Forty Metres

Still marches on producing, for those who care to look, its fair share (and sometimes more) of DX, particularly down at the CW end.

GM6RV (Stevenson, Ayrshire) has held a ticket for many years and is now retired, to spend his time either cultivating three-quarters-of-an-acre of garden, in the greenhouse, or in the shack. He was in a road accident last April which resulted in breaks in both shoulders, skull and a "disc" in the shoulder region, and hence a three-month horizontally-polarised summer. However, Bill is back up and about and has renewed most of the aerials as his own part of the physio-

therapy. Now, in the week prior to his letter, he had been able to get up on his own and therefore into the shack. The first session was 0600-0800 on September 5, and a CQ brought back ZL3LM, VK3MR, VK3BAT. Next morning the queue consisted of VE7UZ, VE3GPT, KL7AI, W7ZMD, K6OS and YV3AGT. On the day of writing, GM6RV's stint was shifted a little, to 0630-0830, and this time back came WB2VZF, K6NR, W7ZMD again, VK3XU and KL7FA, plus a questioned C31IL. The aerial farm at GM6RV consists of a full-wave loop for Eighty, plus a couple of 520-foot long-wires at almost right-angles to each other. The loop is also used on 7 MHz where the SWR is awful but the current maxima are in the middle of the vertical portions which is what matters! Perhaps the main reason Bill likes Forty is that there are no real challenges in Amateur Radio today with everything, right down to a Wimdom aerial being available in the trade—he reckons the only challenge left is the QRM on Forty!

We only noticed three forty-metre entries in the G3CED log, and one of those was a call to a YZ5CYL who was only 339 anyway—to call a chap like that with 600 milliwatts is to be taken as pushing one's luck a little. The other two were both F contacts of which one was lost when his signal disappeared in the QSB—the fading affects the big signals as much as the little 'uns'!

Now to G2HKU who seems to have been using the Big Rig a bit more: SSB to PT2AMT, PY2DOF and ZP5CF, plus F0AHC/FC, UK9BCD, VK3MR, W3HMQ and W4BX.

GM3YOR mentions he has found a certain amount of enthusiasm for Forty, and Drew indeed had several sessions in the early mornings; he found CW most interesting and worked CR4BS, K1FEB, KP4DJE, LC1J, LUFAN, PY7AMX, W2HUG, W3ORT, W4UJP, WA2LNQ, UA9WBY and UC2OBK, with CX9BT, PY4BXQ, YV4IR, ZL2AGY and ZL2LM all heard. This was the home station; as to the Club operation in the WAE CW Contest, Forty produced scoring contacts with HP, LU, OA, VE1, VE3, VE7, VO1, VK2, VK3, VK7, PY1, PY2, PY4, PY5, PY7, PY8, all W call areas (save for some reason WØ), UA9, YV1 and ZL1-4. The aerial on Forty for the contest was a vertical dipole with the top at the ninety-foot mark.

Scouts and Amateur Radio

First and foremost, we must mention the dates for this year's Jamboree-on-the-Air—the week-end of October 18 and 19, 1975. No doubt all the *organised* groupings for J-O-T-A are well set up by now, but there are many "casual" contacts made in this activity too, who might otherwise forget the dates.

But you know, the Scouts are always looking for ways to do a Good Turn, and their latest world-wide one came when delegates to the World Scout Conference in Copenhagen in August generated a unanimous resolution; the proposal was from New Zealand and the seconding came from Jordan, and it is worth repeating word for word.

TOP BAND COUNTIES

October — September

Callsign	AM	CW	SSB	Total
GD4BEG	97	142	99	338
G2BJY	73	138	66	277
GM3YOR	39	130	49	218
G4CBQ (<i>home</i>)	56	46	68	170
G4CBQ (<i>Univ.</i>)	105	8	22	135
G4AKY	—	94	24	118
G4BOH	9	70	30	109
G4BWP	27	70	—	97
G4AYS (<i>QRP</i>)	—	82	—	82
GSBHR	9	60	—	69

Each county may be worked once in each mode. AM contacts count three points, CW two points, and SSB one point. AM contacts made by changing over from SSB are not allowed, neither are cross-mode contacts, saving that AM/SSB contacts will be allowed as two points for the mode the station was using, i.e. the SSB station will claim his two points under the SSB heading and the AM station his two points under the AM heading. New U.K. County designations apply, as listed on p.97. Starting date October 1 1974, CLOSING SEPTEMBER 30, 1975. Final listings for this Ladder will appear in the next issue.

Reporting the HF Bands

"Co-operation with Amateur Radio Service. The 25th World Scout Conference requests all member organisations: (1) To urge their Governments to resist any attempt to reduce the number and size of frequencies presently allocated to the Amateur Radio Service and (2) To co-operate with their National Amateur Radio Organisations in any actions to that end."

That statement comes from a group covering 14 million souls, scattered over 86 countries, and is the result of our help in JOTA over the years since it was first thought of (by G3BHK) back in 1958. As usual, U.K. Scout Groups will be looking for the co-operation of local amateurs for what is essentially an all-band QSO Party.

The British section is led by G3BHK (Ascot) who writes to pick out a few points about their activities. Weakish single letter transmissions in the CW end of Eighty may well be from Scandinavia, where fox-hunting is becoming very popular, particularly with the Scouts; they are pretty low-powered but sometimes, up in the mountains, they may "get out" better than expected. Then 7X2BM/S, which was one of four 7X stations to add the /S to their calls from May 1 to July 31, to commemorate the 30th Anniversary of the formations of "Scouts Musulmans Algériens." There is an award associated, for details of which we must refer you to G3BHK as space begins to press upon us; he is QTHR. Another Radio Scout call is VQ9SS/C; and Les himself had just got back from a session on LC1J right at the time he wrote. LC1J was quite clearly a roaring success from the Amateur Radio point of view, not so much maybe just as a station, but more for showing the Scouts of so many countries an activity they may not ever have had the chance to see at home, and so making clear what Amateur Radio is all about.

Still on the Scout theme, we have a letter from VS6BL who points out that their JOTA station will be signing VS6AJ and operated from the top of the famous Peak in Hong Kong. In addition, they mention their own Activity Weekend, namely December 6-7, when as many of the VS6 stations as may be activated, thus making it more possible for the rest of the world to have a go for the Hong Kong Firecracker Award. Details on this from VS6BL, R. D. McCurrach, HARTS, Box 541, Hong Kong.

Twenty Metres

Conditions of late have been definitely a little up most of the time, though not brilliant of course.

G3NOF (Yeovil) was on leave last time round and missed out on a report—a most unusual event, but justified at a holiday-time! Don reports shortskip as quite prevalent; around 0630 conditions to VK were good, with Pacific stations there at 0830, together with VE8 and KL7. W's have started as early as 1030 and stayed in till the small hours of next day. VE6-7 were heard in the early mornings, and again in the evening; W6-7 early in the morning, around 1600, and again sometimes at 2300. In the afternoons S.E. Asia was quite good. Of course there were gotaways, such as KH6GKD/KB6, KB6CU, KS6ET and VR1PE, but SSB was worked with C6ABK, C9MAF, EP2MJ, F0ATY/FC, FC9UC, FP0YY, DK5WL/HB0, IB0DMK (Maddalena Is.), IH9LAW, K7ABV (Montana), KG4DS, KL7HOT, KL7IED, LC1J, OH0PA, VE3HEY/SU, VK2XG, VK5TI, VP9HM, VS5DB, XE1APA, XJ5XV, W6RTN, W6UWM, W7KSA, WA7OBH (both Montana), YJ8DV, ZL1KN, 4S7ZW, SZ4GK, 6W8DG, 8P6FU, 9V1SN and 9V1SO.

GM6RV uses his long-wires on Twenty, weather conditions being such that keeping the old Quad in the air became an impossible task—for example, ten miles away at Prestwick 27 gales were registered in January! One short session only has been taken on Twenty since Bill has been able to get into the shack again, and this one gave ZL1IR, KL7GCK, VE5YA, ZL2AZ and JA8VJL/MM, in the Alaskan area.

The QRP at G3CED/G3VFA has still been kept at the 600 milliwatts level, and many contacts have been made. Most, of course, have been the usual run of the mill EU's with 579 or so reports; however it was mortifying to lose a QSO with JH2NYZ when that station had been raised only to be gazzumped by a UK4 with cloth ears so George could not copy his report back. On the other hand, there was another W, in the shape of W2DB, who was quite excited about the contact, but as George generously notes in his log "It takes more operating skill to *read* QRPP than it does to inflict it!" Nonetheless, the continuing G3VFA saga should make it clear to all the faint-hearts who claim their reason for not operating on the HF bands is that they can't afford, or haven't got the space, to put up a beam. Let them learn to operate, and *try*!

Daniel Wolverson, Hornsea, North Humberside, a member of the local Amateur Radio Society, passed the last R.A.E. and is now busy with the Morse, a full ticket being in prospect. Nothing special about that, you may think—but Daniel has but 12 years, is probably the youngest candidate to have passed the R.A.E., and has to wait till he is 14 before he can be granted a licence! We have the impression that he is going to make a name for himself in Amateur Radio.



GM3YOR next, and he only made two contacts of any note, with JA3HZT for his first JA from home, and WB2OZW, both on CW. From the GM4DOF club set-up, there were CX, FP8, FR7, HR, HK, KL7, LU, KP4, OA, PJ2, TI, UL7, UA9, VQ9, 4X4, PY, ZS, VK3, ZL1, VE1-2-3-5-6-7, VO1, JA1-2-3-4-5-6-7-8-0, and all W call areas. The TH3 beam was up at ninety feet for this exercise.

G2HKU stuck to SSB for his QSO's, working CT2BS (Terceira Is.), A4XVI (Masirah), F0HI/M/FC, KH6IJ, HB0ARC (a YL), and ZB2FX.

Fifteen & Ten

With the uplift in conditions noted elsewhere, it had to be that some extra life would appear on these bands.

G3NOF did not make any contacts on Ten metres but he did take time to do a spot of monitoring. Ten does seem to be producing openings, though not, of course, regularly, with Europeans at odd times during the day and South Americans popping up as late as 2100z; Sunday afternoons are said to have been productive on Ten. As to 21 MHz, it has opened up from 0700 until, sometimes, 2200. In the mornings there have been Europeans and some Africans, followed on occasion around 1100 by openings to JA-KG6-KR6. W's have been noted at various times from noon onwards although conditions in that direction were variable; some W6 and W7 were found in the evenings mixed with Africans, and the latter have been audible as late as 2000z. The contacts recorded by G3NOF included C5AR, DK5PF/HB0, K5YYH, JR6RHU, OE2SCL/YK, W6KPC,

WA1RGV/KG6 (Guam), WB5DDI, ZC4ADH, ZD7SD, ZD8RW, ZS1OU, ZS6AW, 7Q7BC, 7X3OM, 6W8MW, 9J2DT, 9J2CJ, 9Y4NP, 9Y4PH, 9Y4RH.

Another one to look at Ten was GM3YOR. Drew found the conditions better earlier in the month, though even at that he only heard Europe and nothing in the DX line; beacons were not often audible either. SSB QSO's were made with OK3DG, OH6MS and EA3VM. GM3YOR did not try 21 MHz from home, but during the WAE CW activity with the Glenrothes Club CW reports were exchanged with CE, CX, LU, PY, UA9, VQ9, ZE, ZS, W6, W9 and 4X4.

G3VFA activated his 600 milliwatts and Joystick on 21 MHz, but not it seems thinking Ten worth the bother. On Fifteen the little rig seems to have found its way round most of Europe, and on at least one occasion swapped equal 579 reports, and on another gave a chap with 180 watts 579 against his report on the QRP of 589!

Other Points

Back to this question of Phone operating in the CW end of the band. First off, G2CAS comes up with his list of offenders; one lot he dubbed the "Laughing Jackass Group" with the rider "Listen, you'll see why that title!" We did, and we do; try it, dear readers, and see what you think—they start about 0845 for about an hour, and sit anywhere between 3570 and 3590 kHz.

However, on the other side of the plate we have a letter from G3OHK (Seaton, Workington) who makes out a case in the defence

of these operators. He himself is retired, and feels there is no reason at all why he and his friends should not chat about what they like when they like. Fair enough, and he makes the point that he himself never operates below 3.6 MHz on Phone; but he can understand the frustration of people who can't find a slot in the Phone section, and so their reason for sliding into the "empty territory" between 3.5 and 3.6 MHz. Again fair enough, but if that is so, why not do their rag-chewing on CW? What would happen if all the CW operators on Eighty took the Bandplan at its word and slid smartly up into the Phone end and sat on some Phone net? The CW men could do just that according to the Bandplan and still be in the right—but they don't act in such an ill-mannered way. When it all comes down to the bottom, the chaps who try to hide behind the fact that the Bandplan is voluntary as an excuse for carving up other people by operating outside their own slot, are just demonstrating the homespun truth that Manners maketh Man today, just as it did when William of Wykeham first coined the phrase 600 years ago. If these intruders are so anti-social, why then they do but demonstrate their lack of upbringings, whatever their age, whether they come from Bolton or Birmingham or Bristol. But all praise to the generosity of G3OHK for taking the trouble to try and defend these chaps even though he destroys his own case by admitting that he wouldn't go in for their sort of thing.

A complete change of tack now, with G3IAD's letter; Neville has been running SS/TV from his Nottingham QTH for a couple of years, having been settled there since 1969, before which he was maybe better known as VS6CE, VQ5GC, VQ4GC, VQ3GC, 5H3GC, VQ2VB and 9J2VB. Neville is now up to a score of 91 countries and 48 states worked two-way in the slow-scan mode, which he finds after 30 years of Amateur Radio to be the most interesting facet he has opened up yet. To give some idea of the activity, G3IAD says he has managed WAC on slow-scan in a period of five hours during the first weekend in September. Other recent contacts have included FP8DG, FP8DF, VU2KV, 9V1RA, 9V1QM, ZF1GC, HM1AQ, 8RIX, ZL2APM, VP2AB, VP2AR, KL7HAB, KL7IAG, CN8HD, CX2GB, W9NTP/CE0, CE3AQX and FR7AB. The aerial used for all this was not a beam but a rotary Vee dipole, presumably—Neville does not specify—for Twenty.

That note back in July from G3FWE was spotted by CY6AVO, the other end of it, and John writes to indicate how the Calgary Award has progressed. Only three Europeans have qualified, G14BUJ being one of them. The award has gone to about a couple of hundred W/VE chaps, as might be expected, also 50 VK's, 25 ZL's, two JA's, but nothing from South America or Africa, and only a few Caribbeans.

From our part of the world you have to score ten points, at a point per CY6 station, saving that working the Club stations or through a satellite gains more points. Why not drop a line to CY6AVO? The address is John Ower, 2009 Tecumseh Road, Calgary, Alberta, Canada, T2T 5CB, and he has plenty of award certificates left!

A special-activity station, GB3CTC, will be operational during the week December 8-13 from Coventry Technical College to celebrate the 40th Anniversary of the foundation of the College. It is being set up by the College Club who foregather informally in the Winfray annexe each Monday where there are extensive lab. and workshop facilities, a shack, and amateur TV gear being set up on 70 cm. and 23 cm. Sounds quite a Club.

Vale

We have no less than three losses to mourn this month—from G3HCM in Shipton-On-Stour we have word of the death of G3YHW, J. H. Onions, who was first licensed just after the War as G3DJ0, but let it lapse and went through R.A.E. and Morse in 1969 to get back into the game on his retirement.

The other two chaps are both mentioned by G2HKU, and are G3IUD who died on August 16, and G3SUK, passed away on July 29. All these chaps will be sorely missed by their friends.

QSL Corner

We have some more on offer: From G2HKU, we have CT2BS, who wants his cards via WA4CAD and not the Bureau; F0AHY goes to DJ0UP, and A4XVI to GM4DLC. G3NOF takes up the thread with the following: C6ABK, to P.O. Box 8688, Nassau; FC6CXT to F6CXT; XJ5XV to the VE5 Bureau; KB6CU to P.O. Box 1158, Canton Is. 96736; OH0PA to OH1PA; C9CIC to Box 135, Pemba City; IB0DMK to I2DMK; VS5DB to JA2KLT; F04TY/FC to DK7MW; OE2SCL/YK to the OE Bureau; 9Y4RH to Box 714, Port-of-Spain; CSAR to G3LQP; 9Y4NP to ISWL Bureau; DK7PF/HB0 to DJ7OM; 9J2MH to VE3AUM; 9J2CJ to DK6XF; 6W8MW to P.O. Box 1646, Dakar; YJ8DV to ZL3OJ; JY9GDC, c/o British Embassy, Amman; and 9X5SP to DL8OA.

AR VA

We seem to have had quite a long over this month, and hope everyone's news has been fully taken in. For next time, the deadline will be as usual, 17 days before publication date, making it October 14 latest to arrive, addressed to CDXN, *SHORT WAVE MAGAZINE*, BUCKINGHAM, MK18 1RQ. 73 es BCNU.

* * * THE MOBILE SCENE * * *

SOME CLOSING SHOTS



Station signing GB2APF, at the Apple Pie Fair, Marldon, near Paignton, Devon. Operators were G3VTQ, G3UIQ and G8GCS, of the Torbay A.R.S. The event attracted a large public attendance, with many visitors to the Torbay display.

For the Derby Mobile Rally on August 17, they had the usual large turn-out in fine and warm weather, and also the customary monster sale, here seen being conducted by Tom Darn, G3FGY.



General view of the car park on the occasion of the Derby Mobile Rally, with the buildings of Rykneld School in the background. This is always one of the events of the Rally Season, organised by the Derby & District A.R.S.—with years of experience, they know how to put on a good show.

For the Torbay A.R.S. Mobile Rally at Newton Abbot, they had an attendance of 550 in 200 cars, some 40 of them fitted /M, mainly on two metres. The talk-in station signed GB2TMR and the attractions included a radio-controlled model aircraft display. This can be counted as a very successful occasion for the Torbay group.



LINE TERMINATION IN AERIAL DESIGN

DISCUSSING THEORY, FACT—AND THE MYTHS

C. C. DRUMELLER (W5JJ)

ALMOST any good text on transmission lines will tell you about the effect of terminations that do *not* match the characteristic impedance of the line. Also almost all will stop when they've told you about the five classic terminations. These are (*a*) An open circuit, (*b*) A short circuit, (*c*) A resistance equal to the line impedance, Z_0 , (*d*) A resistance greater than Z_0 , and (*e*) a resistance less than Z_0 .

Just why they stop there is hard to say, for these five do not define the load seen by a large majority of coaxial transmission lines used by stations in Amateur Radio! What usually *is* "seen" is a complex load, one involving resistance plus either capacitive reactance or inductive reactance.

Let's pause for a moment and consider why the antenna most often forms a complex load. There are, of course, some types of antennas that present little reactance. Usually these are of the travelling-wave types, non-resonant varieties such as the rhombic or the Beverage. Resonant antennas, the garden variety most of us use, such as the half-wave Hertz or the quarter-wave Marconi, display reactance at their feed points when operated at other than their resonant frequencies. Consider, for the moment, a half-wave Hertz antenna cut for 3850 kHz. Have it centre-fed and mounted approximately 0·15 wavelength above an ideal ground. It will then present a load to its feedline of very nearly 52 ohms, and that load will be purely resistive. Such a termination would be ideal for use with the type of cable most often encountered in Amateur Radio.

However, few radio amateurs operate their stations on a single frequency. Most of us roam over a quite wide range of frequencies within a band. Suppose we move the transmitter frequency from 3850 kHz to 3750 kHz. The antenna now is too short to resonate on the operating frequency. Instead of presenting a purely resistive load, it now acts as if the resistance had a value of capacitance in series with it—just how much

capacitance, or, better stated, capacitive reactance, depends upon several factors. Perhaps the most significant of these factors is the ratio of length to diameter of the antenna wire (or other conductor). The larger the diameter, the less will be the intrusion of reactance. Of course, when you make that diameter larger you also affect both the feed point resistance (make it lower) and the resonant frequency (also make it lower).

Had you made the move from 3850 kHz to 3750 kHz, you would have caused the feed-point impedance to appear as a resistance in series with an inductive reactance (or inductor).

Feed Point Impedance

So we've seen that as we've departed from the resonant frequency of the Hertz antenna, the feed point impedance changes in nature, from purely resistive to partly-resistive, partly-reactive. Not only the nature of the load changes but also its magnitude.

At 3850 kHz the wavelength is 77·92 metres. A height of 0·15 wavelength would be 11·688 metres or 38 feet and 4·1 inches, a reasonable figure for an antenna owned by an operator who doesn't also own an interest in a structural steel company. Not all antennae offer such an ideal relationship between height and the impedance of their feedlines. Therefore we must be aware of the effect of line terminations.

Perhaps it is best to start with a review of the five classical graphs showing the effect of terminations upon the voltage along a transmission line. Such graphs are usually plotted from data obtained by passing a voltage probe detector along a length of slotted transmission line, often encompassing at least one wavelength. These data normally are plotted right to left, using the load as the right-hand (starting) point. The plot is identified in terms of electrical degrees, with 0° being, of course, the starting point. A point a quarter-wave back from the load, that is, to the left of the load, is marked as 90° , a half-wave back, 180° ; a full-wave back, 360° .

Reflected Wave

As all texts tell us, an RF wave originating from the generator (off-scale to the left of the graph) contains voltage and current manifestations. These are in phase coincidence; therefore they represent power. Should this wave continue on down the transmission line, undiminished, for an infinite distance, this relationship would

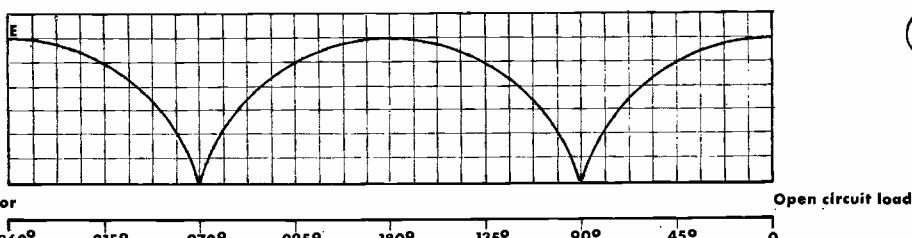


Fig. 1

Fig. 1. Voltage standing waves on transmission line terminated in an open circuit. Note that the position of minimum voltage points is more easily established.

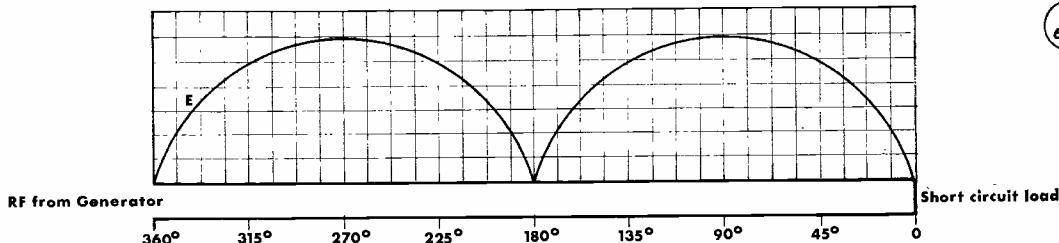


Fig. 2

Fig. 2. Voltage standing waves on transmission line terminated in a short circuit—note that the minimum voltage points are more sharply defined than the maximum points.

be unchanged. The transmission line, though, has a termination. If this termination is purely resistive, and if that resistance is of a magnitude that precisely equals the characteristic impedance of the line; then all the power contained in the wave (called the incident wave) is dissipated in the load. This doesn't happen often! More often, for one reason or another, part of the power "bounces off" the load (is reflected back). This reflected wave is unlike the incident wave in that it has its voltage and current phasors 180° out of phase. The reflected wave travels back to the generator, where it adds to the incident wave and loses its identity.

The analysis of the interaction between the phasors depicting the incident wave and those for the reflected wave although complex is highly interesting. It's not too rough when the assumption of a lossless line is made; without this, it can be downright hairy! Fortunately, for the amateur HF bands, such an assumption is valid. Keep in mind that the length of transmission line always should be thought of in terms of wavelength (not feet) and that for lines less than several wavelengths, losses are too low to worry about.

You need only to glance at a series of graphs, Figs. 1-5, which depict the results of the interactions between the voltage phasors. These are the five classic graphs, ones that should be as familiar as A B C. Let us now go to another series of graphs, shown in Fig. 6. These show the transmission line equivalents of discrete components, such as capacitors and inductors.

Now look at the information we've collected. The antenna, which, at its feed point, can be considered as a resistor ranging from a few ohms to over a hundred ohms; it also may have either a capacitor or an inductor effectively in series with that resistance. Graphs of the

voltage along a transmission line, ranging from the extremes (Figs. 1 and 2) to the almost fictitious "matched line" (Fig. 3) to the moderate in-betweens (Figs. 4 and 5). Taking the transmission-line equivalents of capacitors and inductors, let us see what they can tell us about real-life situations involving antennas and feed lines.

The graphs of Fig. 6 show how short sections of transmission lines behave as lumped components, giving the effect of capacitors or inductors. The latter two portions of the series depict the effect of using reactive components as line terminations. These reactive components can be either the real article or short sections of lines. It doesn't matter, because the effect is just the same. The important thing to notice in Fig. 6 is how a reactive load affects the Voltage Standing Wave pattern. Several effects are shown. Note that the voltage goes to zero at the minimum spot. This is as though the load were zero or infinity, as depicted in Figs. 1 and 2. Note also that the relative position of the minimum voltage point is shifted laterally, the direction of the shift being determined by the nature of the reactance.

As mentioned earlier, real-life loads most often consist of resistance plus reactance. Be sure to remember that only the resistive component of this impedance can accept power; therefore it is only that component of the antenna load that affects the ratio between E_{min} and E_{max} , which, in turn, determines the Voltage Standing Wave Radio (VSWR).

Line Termination

With these facts in mind, let's talk about the truly important effect of line terminations. It's not the VSWR that might be brought into being, at least, not directly. In the HF spectrum (3 MHz to 30 MHz) the dissipative

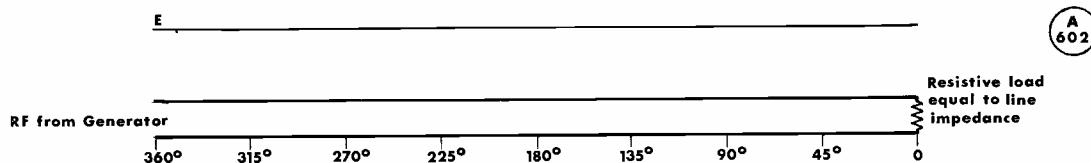


Fig. 3

Fig. 3. Plot of voltage on transmission line terminated in a pure resistance equal to the characteristic impedance of the line—this assumes a "lossless" line, a valid assumption with short lines measured in terms of wavelengths.

A
601

A
602

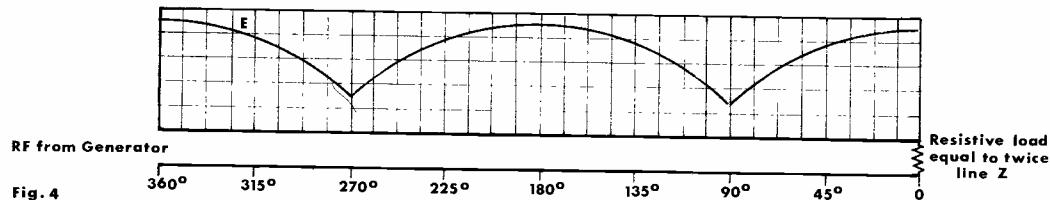


Fig. 4

Fig. 4. Voltage standing waves on a line terminated in a pure resistance of twice the line impedance. Note that the minimum voltage points are at the same position as in Fig. 1, but the magnitude does not go to zero, nor is the maximum voltage as high.

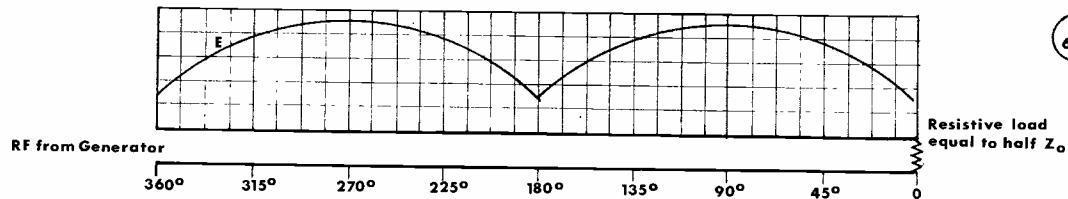


Fig. 5

Fig. 5. Voltage standing wave on a transmission line terminated in a pure resistance of half the impedance of the line. The position of minimum voltage points correspond with those of Fig. 2, differing only in magnitude.

losses engendered by a reasonable VSWR, say 5 : 1 or less, are too low to give concern unless one is using a feed-line many wavelengths long. The real concern lies with having a load acceptable to one's transmitter.

It is not difficult to design a transmitter that will function properly with a wide range of antenna loads. To build such a transmitter, however, costs a bit more

than for one with a quite limited scope. In today's highly competitive market, manufacturers cut costs wherever they can . . . and today's buyer has been conditioned to accept as "state of art" transmitters that will load into purely resistive loads of between 25 ohms and 100 ohms (2 : 1 VSWR). Fortunately, most transmitters with tuned outputs will cope well with a greater range of

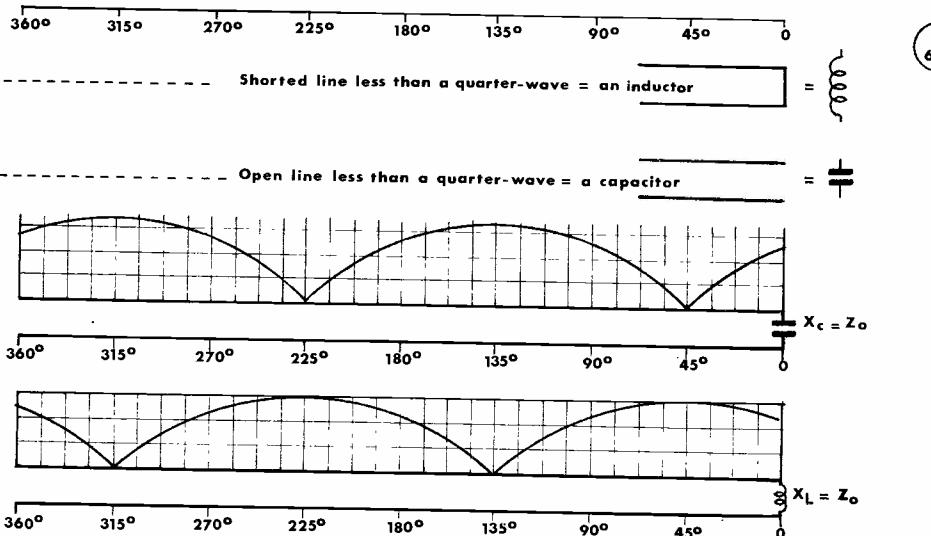


Fig. 6(C)

Fig. 6(D)

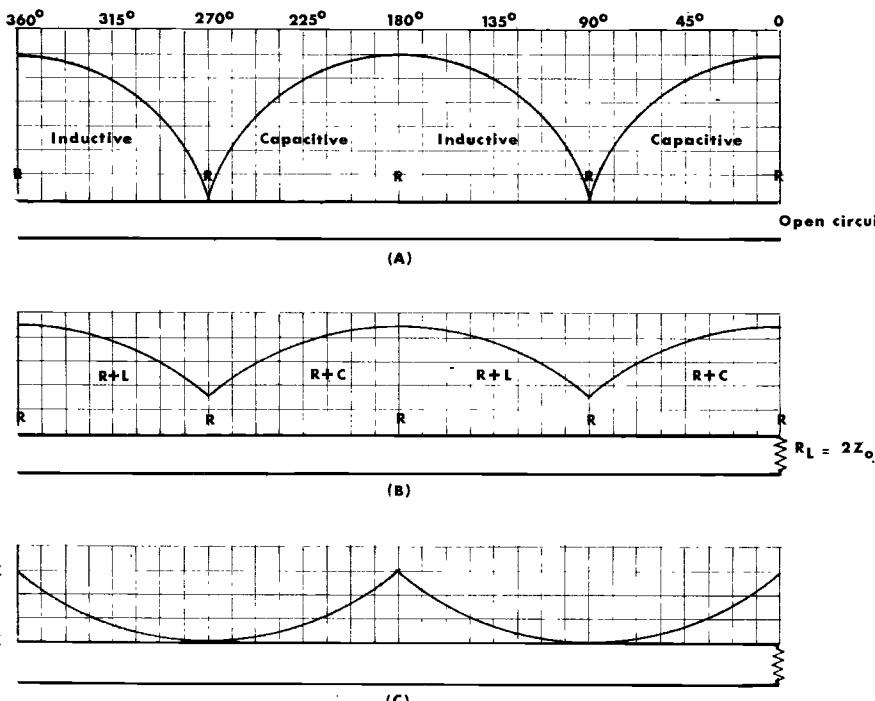


Fig. 7

Fig. 7. Plots of reactance, resistance plus reactance and impedance on a line—see text.

resistances and even with a moderate amount of reactance. This is not true of transmitters having untuned outputs, a breed increasing in numbers and popularity. So with one of these, be prepared to accept certain limitations!

Why is the element of reactance so important? Because very many antenna-feedline combinations result in a load being presented to the transmitter that departs from the ideal of 52-ohms non-reactive.

To see one reason why, look at Fig. 7, which is much like Fig. 1 but with some significant details added. The second portion is like Fig. 4 but with the additional information. Looking at Fig. 7A you'll note three significant items. At 0° , 90° , 180° , 270° , and 360° the line "looks like" a pure resistance to a generator hooked on to any of these five points. Of course, the resistance appears as infinite at 0° , 180° and 360° ; and as zero at 90° and 270° . But the important thing is that it is non-reactive at these points. Looking further, you'll see that from 0° to 90° it "looks like" a pure capacitive reactance, between 90° and 180° as a pure inductive reactance, and that these conditions are repeated every 180° down the full length of a line.

Of course, we don't make much practical use of open-circuited lines; so let's look at Fig. 7B to see what a transmitter would "see" at the sending end of a typical transmission line. This'll give you a clue as to why some people put such great trust in "magic" lengths of feed lines! With only "eyeball evaluation" you can see

that between approximately 60° and 75° the voltage doesn't deviate drastically from that of a matched line, as shown in Fig. 3. The area between approximately 105° and 120° shows the same small voltage variation but with opposite reactive component. And as depicted in Fig. 7C, the impedance along the line varies roughly in the same manner as does the voltage. Now, it should be clear that a line cut to one of these lengths (or at half-wave intervals farther on down the line) has a strong probability of presenting an acceptable load to the average transmitter having a tuned output. This suggests that feedline length may be an important factor in enabling a transmitter to load properly. It is, but only if the line's termination is not matched to the line. With a matched termination, line length is immaterial excepting only for the factor of attenuation. Line attenuation is important in the UHF and VHF bands but can be ignored in the HF and MF ranges unless extraordinarily long runs are made.

Loading

Still another facet of the effect of reactance must be considered. Most transmitters using valves in the final stage and having a tuned output circuit use either a *pi* or *pi-L* net to perform the dual function of providing frequency discrimination and effecting an impedance match between the feedline and the load impedance demanded by the PA. The valves want a purely resistive load. When the plate tank circuit is tuned to resonance,

all reactance is cancelled. But with a feedline attached, some additional reactance is coupled in. This must be cancelled by an equal and opposite reactance provided by the plate tank circuit. Usually a variable capacitor is the tunable component, and in some instances this capacitor must be varied so much in an attempt to cancel the induced reactance that it cannot bring the plate circuit into resonance. And, as you know, a non-resonant plate tank can cause PA valves to draw excessive (and sometimes fatal) plate current.

This leads into the domain of the facts and myths relating to the effects of line mal-terminations and their ancillary VSWR's. The facts are simple: Besides the mal-tuning resulting from the effort to cancel induced reactance, the extremes of C and L used to transform very high or very low values of feedline load impedance to that demanded by the PA may result in excessive circulating current in the tank. This can (and does) cause coils to get so hot as to melt their supporting material and collapse. At the other extreme, the voltage developed across a very small value of output capacitance may be high enough to cause flashing across its plates. These effects, though are seldom encountered.

Reflected Power

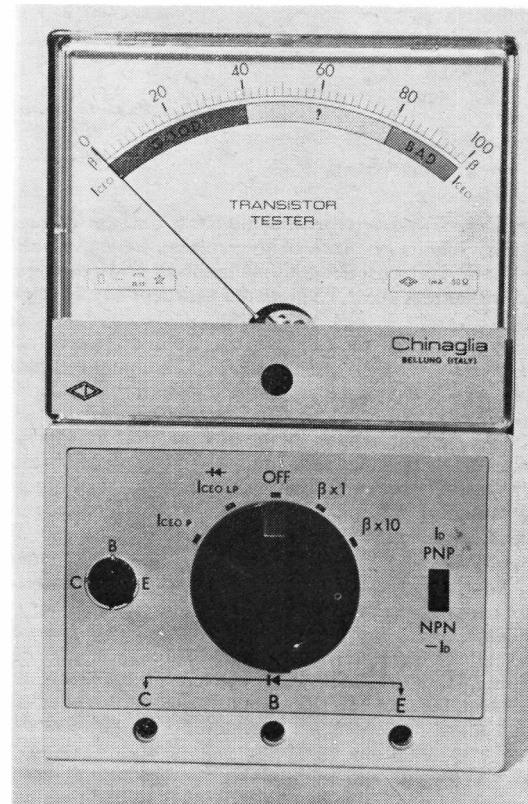
Which brings us next to the myths. The hoary one of reflected power being lost power has been so thoroughly punctured by many writers that we'll skip it as being unworthy of mention! Another one, often heard, tells of blown valves. In well over a half-century of association with amateur and professional radio, this writer has never encountered an authenticated instance. It's easy to see, however, if one were a bit slow in one's reactions, a plate circuit detuned to draw excessive plate current could "cook" a valve quickly!

Still on the subject of myths, there are several relating to measuring VSWR that die slowly. One is that accurate measurements can be made only at the junction of feedline and antenna. This, like many old wives' tales, has a basis of fact. If a transmission line is long, in terms of wavelengths, line attenuation will mask differences between the voltage of the incident wave and that of the reflected wave, thereby causing the indicated VSWR to be less than it really is. This is a matter of consideration only when line attenuation is high, a factor seldom encountered on the amateur HF bands. The other slowing-dying myth holds that valid VSWR measurements can be made only at designated spots along the transmission line, usually stated at quarter-wave or a half-wave, depending upon who's relating the tale. Here, again, there's a slight basis of fact. If you're interested in knowing what is the feed-point impedance of your antenna, and you're exploring this quest with some form of an RF impedance measuring device, such as a Noise-Bridge, an Antennascope, etc., the restriction holds true. That is, the actual feedpoint impedance can be measured only at the feed-point or at half-wave intervals back down the transmission line. There are ways of making correction factors so as to enable measurements to be taken at any point along a line, but these are too complex for casual inquiries.

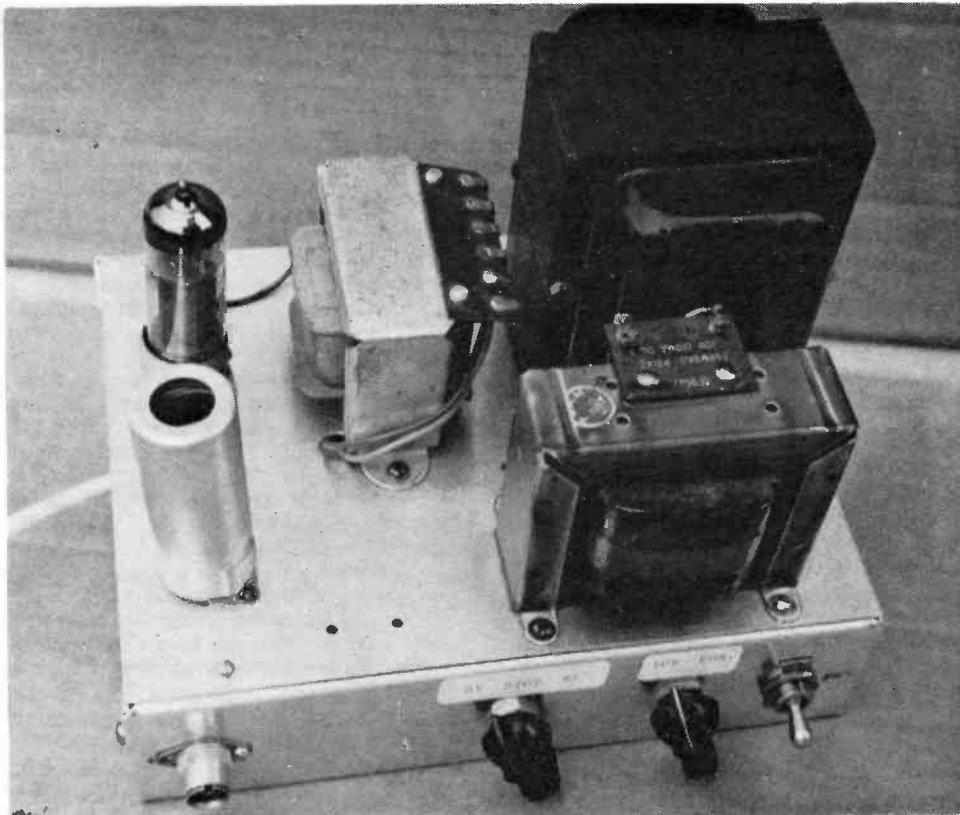
But don't confuse these feed-point measurements with VSWR appraisements. The magnitude of the VSWR is

ascertained by comparative measurements of the incident wave and the reflected wave, sampled by some variety of directional coupler. These waves co-exist at all points along the line; therefore the ratio between the two may be ascertained with equal ease and accuracy at any point along the line.

The effect of transmission line terminations may be summed up in five simple statements. The termination must contain a resistive element in order to accept power. If the magnitude of the resistive component does not equal the characteristic impedance of the line or if the termination contains a reactive element, a portion of the generator's power will be reflected back to the generator, where it is added to the forward power for another assault on the load. The presence of reactive components in the termination will cause the positions of voltage minimum and maximum points to be shifted from their expected locations on a line. Mal-termination causes appreciable power losses in lines that are many wavelengths long, negligible losses in moderate-length lines. The most weighty effect of mal-termination often lies in creating a sending-end impedance that is not compatible with capabilities of the transmitter.



Neat new transistor tester, by Chinaglia. Shows leakage over a wide range and also beta gain (0-100, 0-1000) of n.p.n. and p.p.n. types, with a colour indication between "good" and "bad". It is a neatly-packed instrument, offered by Chinaglia, 19 Mulberry Walk, London, SW3 6DZ.



COMPACT MODULATOR/PSU

FOR TEN-WATT DUTY

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

THIS small modulator and power supply is used with a number of RF units which operate at a power level of up to about 10 watts input to the PA. The modulator/power supply and RF section together form a transmitter for one band only, but the utility of the equipment is increased by making the RF sections all suitable for the same power supply. This input has been run on Top Band, with a 5763 PA, on 28 MHz and 70 MHz, again with a 5763, on 70 MHz with a QQQV03-10, and on 144 MHz also with a QQQV03-10.

Transmitting equipment of this kind has a number of advantages. At this power level snags in obtaining components and in adjusting the units are unlikely, while the equipment is relatively simple to build, and will not cost much. A maximum input of 10 watts to the PA may appear a bit meagre to those habitually running a few hundred watts p.e.p., but it is of course the maximum allowed for 160m. and can do good work on HF and VHF. It is substantially powerful enough to avoid the

disappointment which can arise with flea-power milliwatt rigs. In fact a few watts are often run by the writer on 80m., which is by no means a favourable band for low power.

The circuit is completely straightforward, should function without difficulty for years, and it is proposed to deal with it a little more in detail than may seem justified, because it is easily modified to make use of alternative items which may be to hand, and might with suitable RF section be the first equipment of a newly-licensed operator.

Modulator

The circuit involves a double-triode V1A/V1B, followed by the output pentode V2. It is intended for the usual general purpose crystal mike. C1 is primarily to keep stray RF from V1A. A high-*mu* 12AX7 (ECC83) furnishes quite a lot of gain, so that normal talking gives adequate modulation. With this power, it is felt better to have no audio gain control, this being replaced by a habit of talking in about the same voice at about the same distance from the mike. If such a control is wanted, replace R3 by a 500K pot. with slider to connection 2, V1B. If gain is normally too high for your voice, C4 can be omitted.

A 12AT7 may be adequate, but a 12AU7 is a low-*mu* valve. Some of these latter types have been seen re-

stamped as "12AT7" and "12AX7" valves as cheap surplus.

C3 and R5 are not essential but help avoid instability as well as clearing any slight hum from the HT supply. Some people juggle with C2, C5 and C7, in particular, to suit their voice.

V2 is an EL84, rated to give just over 5 watts with a 250v. supply, which is ideal here. A 6BW6 is almost as good, if to hand, but has a lower mutual conductance, and needs a 240-ohm bias resistor.

Fortunately the modulation transformer T1 presents no problem. Transformers for a single EL84 to QQVO3-10 are readily obtainable as surplus, and are equally suitable for modulating a 5763 or other PA taking about the power mentioned. It is also possible to use choke modulation. For this, use the primary of a substantial mains receiver speaker transformer as the modulation choke, taking HT to the PA from V2 anode, connection 7. A tapped transformer, as in the diagram, is also suitable; this is providing a 1 : 1 ratio, the centre-tap going to HT. The optimum load for V2 is about 5K, and the modulating impedance of the PA will be roughly this also—but if a multi-ratio transformer is used it will be found that moderate changes in ratio have little if any apparent effect on results.

With a Class-A modulator of this type, operation which would cause bad over-modulation and splatter with a powerful push-pull modulator is more likely to cause reports of bad speech quality instead, which is a warning to back off the mike a bit.

Power Section

This is intended to give 150 mA at 250v.—55 mA for the modulator, 50 mA for the PA ($40 \text{ mA} \times 250\text{v.} = 10\text{w.}$, plus 10 mA for the screen grid) with 45 mA over for oscillator and driver stages. This is obtained from a Parmeko 250/0/250v. 150 mA transformer with two 1N5054 rectifiers, SR1 and SR2.

No doubt other transformers could be perfectly satisfactory. Should the spares box also yield a 5U4G or other suitable rectifier and the transformer have a heater winding for it, this can be just as suitable as the silicon rectifiers.

The choke is 10H. 240-ohm DC, but need not be exactly this. With capacitor input and no power to waste for a bleeder, the voltage naturally rises as current taken is reduced. It is only possible to avoid this by a means such as using choke input (making necessary a larger voltage transformer) and it does not seem to be too important in actual use. Within limits, the voltage can be reduced by increasing the values of the resistors in series with the rectifiers, or raised by reducing these values.

Switching

It was found convenient in the long run to provide change-over switching, and a 3-way switch is fitted for this purpose. In the "receive" position, HT is removed from all transmitter stages. In the "spot" position, HT is available for oscillator and driver stages. SR3 with C10 also give current for an aerial change-over relay. This allows tuning up for PA grid current, adjusting the VFO of a 160m. Tx, or locating the frequency on the

receiver. With the switch in the "transmit" position, HT is also put on the PA via T1. Thus this switch gives control of any RF section used.

With some equipment it is handy to be able to tune up at low power, so the low/normal switch is provided for this. This changes to choke input as well as bringing in a series resistor, so that a two-metre or other PA can be initially adjusted with reduced voltage.

This general arrangement has proved satisfactory and convenient. Also, bearing in mind that receiver/amplifier transformers and chokes are rated for continuous service some over-running has occasionally been allowed for intermittent use, with no apparent ill effects.

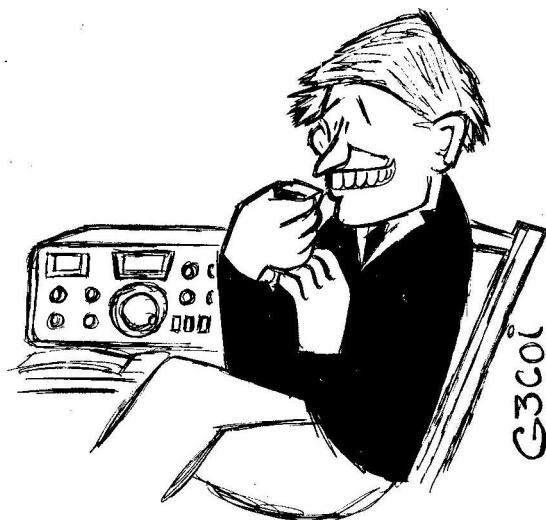
Construction

Once again, this need not be exactly as photographed. A neat, well ventilated case would possibly be an improvement for those who prefer this type of construction, while an HT current meter could be included, too.

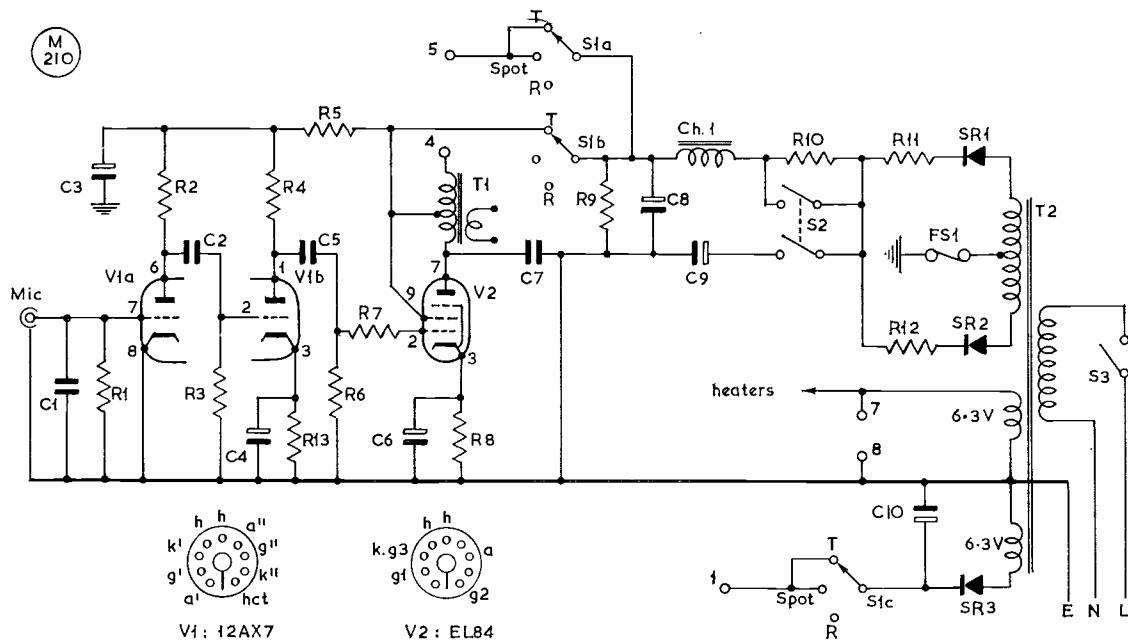
However, the unit was constructed on a chassis as shown, with an octal valveholder at the back. Here, point 1 is for the relay, 4 for the PA, 5 is HF to earlier stages, 7 is for all heaters, and 8 is chassis return.

The mike input socket is near V1A/V1B, and audio circuits run against the chassis. Tag strips are used to support the smoothing capacitors and other items. Sufficient detail for the layout should be seen from the under-chassis illustration. A 3-core mains cord is anchored to a tag strip (earth to chassis) and the plug has a 3A fuse.

If the equipment is to be handled by other people, the choke and transformers ought to be of the type having all tags under the chassis (if a protective case is not provided). The bottom of the chassis can then be closed by screwing on a plate with rubber feet and ventilation holes.



"... Always keep smiling here ..."



Circuit diagram of the Modulator/PSU

Testing

There is unlikely to be any difficulty or snags. Assuming that the expected HT voltage is obtained, the audio section can be tested either with a direct load such as a loudspeaker, or in use modulating the RF section. If a speaker-type transformer is not fitted for T1 (so that a 2/3 ohm or other speaker cannot be matched) it will be necessary to employ a temporary speaker matching transformer. Alternatively, if testing with an RF unit, load the latter into a lamp or resistor, and listen to speech with a receiver. Avoid overloading any stage in the receiver—this may make it necessary to remove the receiver aerial connection, as well as turning back RF and IF gain controls, what is necessary in this direction depending on the equipment.

In all cases the speaker must be clear of the microphone, or howling "round the loop" will occur. Speech should sound strong and clear with no hum, distortion, or other apparent defects.

RF Section

Typical units running about 10 watts would have a VFO, buffer, and PA for the LF bands, or crystal oscillator, multiplier-driver, and PA for VHF. Some suitable units will be described later.

An identical modulator circuit was used for some time for screen-grid modulation of a 150w. transmitter, with good results.

Circuit of the Modulator/PSU

$C_1 = 100 \mu\mu F$	$R_6 = 470,000 \text{ ohms}, \frac{1}{2} \text{w}$
$C_2 = .002 \mu\mu F$	$R_7 = 47,000 \text{ ohms}, \frac{1}{2} \text{w}$
$C_3 = 4 \mu\mu F, 350 \text{v.}$	$R_8 = 200 \text{ ohms}, 1 \text{w.}$
$C_4 = 6 \mu\mu F, 6 \text{v.}$	$R_9 = 150,000 \text{ ohms}, 1 \text{w.}$
$C_5, C_7 = .01 \mu\mu F$	$R_{10} = 1,000 \text{ ohms}, 5 \text{w.}$
$C_6 = 50 \mu\mu F, 25 \text{v.}$	$R_{11}, R_{12} = 130 \text{ ohms}, 2 \text{w.}$
$C_8 = 32 \mu\mu F, 450 \text{v.}$	$R_{13} = 2,700 \text{ ohms}, \frac{1}{2} \text{w.}$
$C_9 = 16 \mu\mu F, 450 \text{v.}$	$SR_1, SR_2 = 1 \text{ amp.}$
$C_{10} = 250 \mu\mu F, 12 \text{v.}$	1kV p.i.v.
$R_1 = 1.2 \text{ meg.}, \frac{1}{2} \text{w.}$	$SR_3 = 1 \text{ amp.}, 25 \text{v. or similar}$
$R_2 = 220,000 \text{ ohms}, \frac{1}{2} \text{w.}$	$V_1 = 12AX7$
$R_3 = 560,000 \text{ ohms}, \frac{1}{2} \text{w.}$	$V_2 = EL84$
$R_4 = 100,000 \text{ ohms}, \frac{1}{2} \text{w.}$	
$R_5 = 22,000 \text{ ohms}, \frac{1}{2} \text{w.}$	

Notes: Centre-tapped speaker transformer, rated 5 watts or larger, for T1. Choke, 120-150 mA, 10 Hy., 250 ohms. T2, 250-0-250v., 150 mA, with heaters 6.3v. 4A and 6.3v. 1A (heater load is about 3 amps.). Chassis 6 x 8 x 2in. deep.

Components

Few things are more troublesome than finding that one or two essential components are difficult to obtain. This should *not* be so in the present instance. In fact, many junk boxes should provide at least some items. At the time of writing, the EL84/QQVO3-10 modulation transformer was 90p from *Garex Electronics*. A chassis with flanges to allow attaching an extra 6 x 8in. flat plate is available from *Home Radio* ("universal chassis"). All the other items have many possible sources.

Contests

Results: The 432 MHz Open contest in May last was won comfortably by GW3UCB/P operating near Wrexham, who had more than twice the points of the runner-up, GW8AWM/P. Once again, the GW portables led in an Open event. Conditions were described as "moderately good" although this was not the impression gained by your scribe, who is in a better position than many to record Continental activity. As we reported at the time, the best cross-Channel signal came from ON5FF/P who ploughed a lonely, if impressive, furrow for most of the time. G3NHE (Sheffield) is to be congratulated on a convincing win in the fixed station section of the event.

The 144 MHz Portable contest at the end of May and beginning of June attracted a considerable number of entrants and a fair amount of DX was reported, most of it Continental. Leading station was once again a visitor to GW, GW3WAS/P, the call of the Lichfield ARS, who had a 250 point lead over the runner-up, G8BXQ/P.

Coincidental with the 2m. event, was the Microwave contest, and the drop in the entries, although fairly small, may be attributed to this fact. G3WDG/P operating in Wiltshire led overall with band winners as follows: 23cm.—G4BEL; 13cm.—G8ADP/P; 9cm.—G8AGN/P; 3cm.—GW4BRSP/P who amassed an astonishing total of 3,215 points. It was good to see a strong entry from GM, six of them in the first 21 places, which is a very creditable effort in view of the difficult terrain and the small number of stations equipped for these microwave bands.

Conditions were fair for the VHF NFD event, and activity appeared to be high on all bands. Long-haul paths were subject to much, at times quite rapid and deep, QSB. The path to Scandinavia, so easily accessible recently, was closed and Continental DX was restricted in both time and distance, early morning producing the best result as far East as DL. Considerable use was made of CW on all bands, a sure indication that propagation was not all that good, and once again very few AM or FM signals, other than on 23 cm., were to be heard. Contests these days are becoming largely SSB events. Although there was some GI and GM activity on 4m. and 2m., contacts with those countries were hard to come by from the South, although the signals from the GW portables were very strong at times. Operating was generally good, just a few gabbler and a few jumpers of the gun, and on only two occasions were really poor transmissions logged, both on two metres.

Forthcoming Events: Contests to the end of the year are as follows:—October 5/6—UHF Open; October 26—70 MHz Fixed Station; November 1/2—144 MHz CW; November 16—432 MHz Open; and December 7—144 MHz Fixed Station. No indication has yet been given of any Cumulatives.

VHF Today

As this is the last offering of "VHF Bands" from G3DAH, it seemed appropriate that it should include a brief review of some aspects of these frequencies as they appear today.

Operating Modes

Most significant is the upward surge of SSB and FM activity, the latter uniquely on Two. As far as the former is concerned, the increase is due in the main to the advent of the Liner-2 on 144 MHz, which has

VHF BANDS

A. H. DORMER (G3DAH)

completely revolutionised the band, a secondary factor being the publication of transverter designs which enable single, and usually commercial, transceivers to generate RF which can be mixed to produce outputs on all the VHF and some of the UHF frequencies. It is very unfortunate that in spite of detailed operating instructions issued with commercial gear and the exhortations of many authorities, SSB transmitters are so often so badly misused, sometimes unwittingly but, all too frequently, deliberately. There might be some excuse for those in the transitional period between AM and SSB equipment, in that the practice of tuning for maximum output may die hard, and also for those who are newcomers to Amateur Radio and therefore lack experience, but the metamorphosis should be brief, and the impression remains that much more needs to be done in Clubs and in the technical press to instruct the uninitiated in the procedures to be adopted to produce the best results as well as by individuals who, by their reports and advice given over the air, can do so much to help the novice. It is to be regretted that some reports these days are far from honest, and consequently of little help to the recipient, and so do nothing to clean up our bands—and we all know from personal experiences how much they need it! In the writer's view, there is a good case for a probationary period with limited power for the newly licensed, or even the introduction of a variant of the old AA licence, before permitting anyone who happens to have the price of the valveholders to go on the air with a badly adjusted, overdriven pair of 4CX250B's.

The popularity of FM these days stems from the discovery that this mode, in many cases, eases the TVI situation and from the advent of the Occidental "Black Box." It remains an established fact that frequency modulation is unsatisfactory for long-haul DX working, however good the quality may be when transmitter and receiver passbands match and signals are at the S9 level. A few years ago there was another advantage in that, with suitable reduction in the deviation, the FM signal could readily be multiplied to give access to higher frequency bands, but this bonus has largely disappeared now that the use of the FM mode is dwindling rapidly and SSB becomes the order of the day. However, above 145.0 MHz FM has come into its own. There were many criticisms at the time the decision was taken to allocate the upper half of the 2m. band for virtually exclusive FM simplex and duplex use, but in the event this seems to be generally welcomed. Plenty of surplus British, and new Japanese, equipment is available—it is rare to come across home-constructed gear for this purpose—and so

for many this arrangement has provided an easy initiation into the world of Amateur Radio. A criticism which may be levelled against it is that it has reduced the urge to experiment with original designs and concepts, a field in which, in some spheres, the amateur has, in the past, been able to compete successfully with the professional, and so has denied to many the satisfaction of bringing original work into practical use. Perhaps more than any other factor, push-button FM, the "Fun Mode" as it has been described, has changed the whole aspect of Amateur Radio from being a serious hobby into light entertainment. The reader must judge for himself whether this is a good or bad thing.

The decline of AM on the VHF bands is almost complete and CW, whilst still being the most efficient method generally available to amateurs for long-distance communication, is less used than it deserves outside contests.

Beacons and Repeaters

The increase in the number of beacons available both in this country and abroad, must be welcomed, the more so in view of the handicap of indecision and confusion in the international planning of them. There was a time when it all seemed quite straightforward. A proposal was made, a licence obtained, finance arranged (almost entirely from private pockets) the transmitter was constructed by individual effort, a frequency which was not dictated by band plans was selected and the device went into operation and was kept that way by devoted beacon keepers. Today, frequency co-ordination is of paramount importance, and a sensible arrangement has put this under the control of one authority as far as high power beacons are concerned, but the situation is still bedevilled by too frequent changes in the allocation of sub-bands for them and by the lack of central finance. As indicators of propagation and as an alignment aid for converters these beacons provide a unique service, although their use is often neglected. Their versatility would be enhanced if they carried other than callsign information, as do some of the Continental beacons from which one can obtain meteorological and allied data.

The introduction of repeaters has brought about more acrimony, abuse and general discussion than probably any other single factor in the history of Amateur Radio. Initially, the idea seemed attractive—they were to be sited so that the poorly placed fixed station could communicate more easily and mobile-to-mobile ranges could be extended. In the event, however, many have been planned to cover large centres of population where direct contacts are easily made and the devices themselves have been as much abused as used. A large proportion of QSO's made through the repeaters could, and should, have been made direct on one of the FM duplex channels and just why jamming of the input frequencies and other inanities is condoned by inaction against the offenders remains incomprehensible to many. Inevitably, some sort of code of practice will arise from usage (as is the case with GB3PI) but much firmer control is needed in other cases. On the credit side, the design and construction of these devices represent a significant advance in amateur technology and as such are of value. Of importance also is compatibility with Continental installations, which implies common Tx/Rx spacing, tone access fre-

quencies and input/output channel frequencies. On 2m, this situation is satisfactory but the introduction of repeaters on 70 cm, using frequencies which lie outside the communication segment of the band is a retrograde step which cannot be justified by technical argument. The Home Office ruling that repeater installations must be separated by 100 miles irrespective of terrain, power output or antenna radiation pattern is a handicap to the development of a logical system and it is to be hoped that the situation can be remedied by speedy consultation.

Band Plans

The introduction of plans for the amateur bands has not always received the support from users that they merit. Inevitably, changes have been criticised either because of a personal resistance to modification of established patterns, on the grounds of expense or on the basis that the terms of the licence entitle an operator to transmit on any frequency he may choose as long as it lies within the limits of the frequencies allocated for amateur use. If accepted, and carried into practice, these arguments could only lead to chaos, and the introduction of a "Mode" plan as opposed to the old geographical plan, however desirable the latter may have been, was inevitable in view of the advent of repeaters and the proliferation of fixed-frequency FM devices. If the United Kingdom was not to be isolated from the rest of Europe, band planning had to be subject to international agreement under the auspices of the IARU and some surrender of national preference accepted.

The current plans take account of the, sometimes conflicting, requirements of the majority of users and also safeguard the minority interests. They are not without their imperfections. It is doubtful whether calling channels are still required for other than specific, specialist activity, such as EME, RTTY, etc. They are seldom used for their designated purpose, but rather as working channels and, since this practice is unlikely to decline, could well be eliminated. The plans are not mandatory, and it is questionable whether they could, or should, be. Since they are not, they can only be operated successfully by voluntary acceptance and the disregard of their provisions or usurpation of specific frequencies for purposes which do not conform with the general framework, has caused, and will continue to cause, friction. The strongest criticism which has been levelled against them has been of too rapid change and it is to be hoped that current plans will require little or no amendment within the next five to ten years. At least they have removed one major source of discontent, in that the "Black Box" versus "All-mode" controversy has lost most of its impetus with the introduction of mode segregation above and below 145.0 MHz.

Operating

A disagreeable feature of the bands today is poor operating, and this includes not only procedures but also the radiation of bad quality signals. There is a growing tendency to break in on a QSO in progress, a practice all too familiar to HF band operators, to transmit before checking that a specific frequency is not in use and to clutter up the calling channels when other, clear frequencies are available. Breaking-in, unless with the specific purpose of contributing to the QSO in progress, is often irritating to the "breakees" and frequently leads to a

situation, particularly in the case of a multiple QSO where, because of geographical locations, not all parties can hear one another without a great deal of antenna rotation, and in some cases not even then. It induces frustration and is time-wasting. There is seldom any justification for this practice—much better to wait for a QSO to finish before calling in. Minor infringements of the licence regulations are also prevalent in spite of the fact that newcomers should all have passed the R.A.E., which requires them to be familiar with its provisions, and that old hands should know better. More poor operating occurs in contests than at any other time and it still does not seem to be apparent to many that gabbled callsigns, long "CC" calls without frequent identification, failure to use phonetics, over-abbreviated procedures and no indication of location, particularly in the case of portables and those whose callsigns do not yet appear in the callbook, will lose rather than gain contacts.

There can be no excuse for radiating a poor quality signal. Agreed that, unless one is monitoring the signal the whole time, the occasion can arise when a fault suddenly develops in the transmitter which is not immediately apparent to the operator. It behoves all of us to assist by drawing attention to the situation and perhaps suggesting a remedy, but there seems to be a reluctance to do this. Could it be that our own transmissions are not above suspicion? It is an accepted fact that a linear amplifier cannot be set up perfectly to give maximum undistorted output without adequate test equipment, sometimes of a very sophisticated type, but not enough seems to be done by many operators to follow even the most basic of principles for minimum distortion. To quote just one example, an operator in QSO was heard to complain that his poor quality signal was due to the fact that he had inadequate drive to his linear in that he could only get 10 mA of grid current!! There is obviously a case for more, informative articles in the technical press on the adjustment of linear amplifiers without expensive test equipment, and for more to be done in Clubs to instruct the newcomer. Acceptable results can be realised without access to a professional laboratory by the observance of simple facts such as avoiding grid current in Class-AB1 linear, matching inputs and outputs, tuning for undistorted output rather than for maximum smoke, following manufacturers' instructions in respect of per-

missible ratings of components and above all recognising that the efficiency of an AB1 linear is about 35% and that anything higher than that is likely to consist of signal plus undesirable distortion products. It may be mentioned here that none of the QQVO series of valves, so popular as low power linear, has a manufacturers' rating for SSB service, so special care should be taken in their use in this mode.

Trends

The trend on all amateur bands from 4m. to 23 cm. is towards transceive SSB operation, with the exception of co-channel, FM working on 2m., and this is likely to continue, leading to the eventual disappearance of AM and FM for DX working, as is the case on the HF bands. At higher frequencies, wideband FM is likely to remain the order of the day for some time to come, with more stable oscillators, higher output powers and other forms of modulation, such as pulse, just round the corner. There is a growing disenchantment with conditions on 2m. and now that commercial, and suitable designs for home-constructed, transverters are available there is an obvious, and very welcome, increasing occupancy of 70 cm., a band which can give equally as good, and sometimes better, DX than can 2m. The 10 GHz band has been given a great boost recently, largely due to the enthusiasm and success of Scottish amateurs, and there are indications that other Gigahertz bands are not attracting the same attention, despite an harmonic relationship with lower frequency allocations.

In this brief survey it has not been possible to deal with many other, but perhaps less contentious or specialised aspects of Amateur Radio activities, but it may be noted that SS/TV, EME, M/S and satellite operations are all on the increase. The appearance of a geo-stationary satellite, now in the planning stage, may well revolutionise DX operating patterns. TV appears to be in a state of decline, particularly as far as high quality colour is concerned, and this was inevitable in view of the loss of part of our frequency allocation on 70 cm. A logical development from this is an exodus to 23 cm. for A/TV.

Of utmost importance in the future is to put our own house in order, to raise Amateur Radio above the Tony Hancock level, to use to the full the bands we have and to resist, to our utmost, any attempt to deprive us of our traditional frequency allocations. As much can be done by example as by

NEW CONTRIBUTOR—"VHF BANDS"

We are glad to be able to announce that with effect from the forthcoming (November) issue, the new contributor in charge of "VHF Bands" will be Norman Fitch, G3FPK. Already experienced in the specialised field of Amateur Radio journalism, he is active on the VHF's and has ideas of his own as to future developments. Generally speaking, the feature will be conducted on the same lines as before—as originated many years ago by A. J. Devon and continued by G3DAH. The address for correspondence will remain, as usual: "VHF Bands," Short Wave Magazine, Buckingham, MK18 1RQ, with a closing date for readers' letters to this address of October 10.

long hours of discussion round a table.

News Items

Four Metres: Several readers have reported a Sporadic-E opening on this band on August 10. Indeed, around 1900z, Continental FM broadcasts were coming through at astonishing strength, but no contact with ZB2 has been claimed.

Two Metres: Good to hear GB3VHF back on the air again on the usual frequency. The old 4 MHz xtal stage has now been replaced with one using a 72 MHz xtal and this seems to have cleared the trouble with breakthrough from the high power, BBC transmitters on the site.

Agreement has now been reached with the appropriate authorities for the transmission of RTTY news bulletins. These are planned to take place at 1200 hrs. Local Time on Sunday mornings on 144.6 MHz using the callsign GB2ATG and will initially be radiated from the Home Counties only, with beam heading (probably) of North and South-west. Speed will be 45 bauds, narrow shift. Although the final arrangements have yet to be made, the starting date is likely to be near the end of October.

There have been several good openings to Scandinavia during late August and early September. G3FPK (Purley) caught three of them including SM7BYU in GPO5g—

worked on the key. G8ELS (Herne Bay) reports working OZ, LA and SM on the same date and, surprisingly enough, made several contacts with mobiles through the Danish repeaters!

Bob Dixon has one of the most Northerly QTH's in the country and is now QRV on the band with Magnum-2 and 8-ele. beam from Wick, Caithness. He has SSB with the call GM3ZDH, and so far has not been able to work anything South of the border—so there is a challenge for you! The address in the latest callbook is no longer valid, so if you want to write for a sked use: R. A. Dixon, P.O. Radio Station House, Newton Road, Wick, Caithness.

G3POI has renewed an interest in MS work and contacted SM3BYA in IVO6j during the *Aquarids* on July 28, and during the *Pereids* between August 10-14 made it with YZ3ZB in HG30d, YZ3DBC/P in IG21f, SM0DRV/5 in HRO6e and SPSJC in KM65c. He heard, but did not work, UA3TCF and UA1WW.

Seventy: Like so many of us, GD2HDZ wonders where all the activity is on this band when it is wide open. On several evenings he was copying GB3SC at S7-9 but no other signals to be heard. Why is it that more operators do not monitor the beacons and open up when they are above average signal strength?

GI8HXY (Co. Down) asks much the same question, but was able to raise some activity on August 2 when he got into an FM net of GW's and had 5 & 9 QSO's with five of them. GB3SC was then at S8 and G3EHM (Stoke-on-Trent) was 5 & 9 + 40 dB working GD2HDZ who was 5 & 4 at 2240z.

G3BW, up in Whitehaven, Cumbria also finds the going hard, but is maintaining a sked with G3AUS in Newton Abbot. 100% success is not claimed, but they have made it on several occasions, and this might be a nice one to listen for. QRB, by the way, is 270 miles!

General

A supplement to the booklet *GB3LO without Tears* is shortly to be published by the U.K. FM Group (London). It has been prepared by Mike Foster, G8AMG, who was responsible for much of the work on the design and construction of this repeater and will deal with innovations to it and describe in detail the parameters for operation in Modes 1, 2 and 3. It should be available this month, price 7p, from: Richard Street, U.K. FM Group (London), Code 12, 3 White Hedges, London, W13 8JB.

A group known as the "Repeaters User's Council—UK" has been formed to deal with all questions arising from repeater operations and interested parties are invited to contact the secretary, G8FYQ, QTHR. G8FYQ is also hon. secretary of the London Weekend Television Radio Club, G4AQI, who are responsible for the transmission of *Oracle* data over the Company's TV transmitters. We learn that a suitable design for a decoder for this system is to be published shortly.

Finally, I should like to thank all those who have expressed, either by letter or over the air, their appreciation of the work of this Column over the past years, and fully acknowledge that, without their support, it would not have been possible to compile it at all. So, for the last time, cheers and *vy 73 de G3DAH*.

THREE BAND ANNUAL VHF TABLE

January to December 1975

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
GD2HDZ	48	5	68	11	36	6	174
G3DAH	47	5	49	9	39	11	160
G3ZMD	34	3	64	16	32	9	158
G2AXI	32	3	49	11	29	8	132
G4BWG	38	3	58	16	13	3	131
G4BYP	48	5	64	12	—	—	129
G3BW	—	—	69	11	38	5	123
GM4CXP	23	5	70	15	6	3	122
GM8FFX	—	—	93	14	6	6	119
G3FJJ	43	4	45	10	6	3	111
G3BHW	—	—	55	16	30	9	110
G4CZP	—	—	84	15	—	—	99
G5DF	48	6	—	—	33	10	97
G4C1K	15	1	60	15	—	—	91
G8IAT	—	—	77	13	—	—	90
G8BKR	—	—	64	14	8	2	88
GI8HXY	—	—	70	9	5	3	87
G4AJE	—	—	50	13	17	5	85
G3FPK	—	—	66	15	—	—	81
GI3JLA	13	5	44	11	3	3	79
G8ABH	—	—	40	11	21	5	77
G8EOP	—	—	40	12	20	4	76
G8INL	—	—	60	12	—	—	72
G4AEZ	11	3	20	9	18	7	68
GD3YEO	—	—	55	12	—	—	67
G8GLS	—	—	54	10	—	—	64
G8GHZ	—	—	50	9	3	1	63
GW8HVP	—	—	54	9	—	—	63
G8FMK	—	—	26	2	25	4	57
G8FWB	—	—	47	8	—	—	55
G8GII/P	—	—	47	7	—	—	54
G4DNJ	—	—	45	8	—	—	53
G8JKA	—	—	42	6	—	—	48
G3EKP	10	3	24	5	1	1	44
G4AIR	29	4	7	2	—	—	42
G4AGE	—	—	23	9	6	1	39
G8JAJ	—	—	29	6	—	—	35
GW8GLG	—	—	30	3	—	—	33
GW8FKB	—	—	—	—	18	6	24
G4BKY	—	—	8	2	—	—	10

The Table shows claims to date from January 1, 1975 and will close on December 31, 1975. All claims should be sent to: "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ as soon as possible after the start of a new month.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for November issue: October 10)

THIS is the time of year when the thoughts are turned to the late autumn programme of activities—and that means, and has done for many years now, MCC. The 30th Magazine Club Contest is down for the weekend November 15-16, and the full set of rules is given herewith; unchanged from the formula used last year, that having shown itself to be fair and reasonable. Notice a couple of points: This is an activity to show up skill in the CW art, *not* just a CW contest. Secondly, please make your logs up into a fair copy—it is bad enough to read through the tea-stains, beer-marks, blots etc., to write out your own fair copy, so just imagine what it is like to flog through fifty to a hundred logs in the same state—have a heart for the adjudicators!

Deadline for the logs to be in is first post in Monday, December 1, allowing a fortnight for entries to be made.

Brass Tacks

Which seems an appropriate phrase to use in connection with the realists up North—though any boat-owner will tell you how many "brass" screws can be picked up with a magnet!

Top of the heap is Bury & Rossendale, who are based on the Mosses Community Centre, Cecil Street, Bury on Tuesday evenings; the "main" meeting is the second in each month, the others being informal. At the time they wrote the Hon. Sec. was buzzing around sorting out his autumn list of things to do, so we have no firm programme to report.

At Harrogate & Knaresborough a change of HQ. is to be noted; it will be the College of Art, probably on the second floor of the Annexe at 5 Victoria Avenue, every Monday. An enquiry either at the College of Art or the annexe (they are opposite one another) should find them OK if a last-minute change of room has occurred.

It's an "every Wednesday" routine at the White Rose HQ., 83 Town Street, Armley, Leeds 12, where at the time of writing alterations to the HQ. were being carried on. However on October 15, member G3XUD will be telling them all about Antarctica, where he was VP2NS. Then for October 22 and 29, G8EFF will be tackling Logic—Basic first and then Nand Logic. Their Mobile Rally date for next season has already been fixed—Sunday, April 4.

Not so very far away is the Star club, who are to be found at the New Inn, Bramley Town Street, Bramley, Leeds 13, every Wednesday. At the moment a main activity is collecting old radio gear of the pre-War period for an exhibition they are putting on soon—if anyone has anything of interest in this line, G4BUU would be pleased to pay cost of transportation or postage as appropriate.

North of the Border now, to Ardeer who haven't written in for years; however, it is obvious from their letter that things are booming at Ardeer Recreation Club, Amateur Radio Section, Stevenston, Ayrshire. Tuesday evenings through the winter will be set aside for R.A.E. and Morse tuition, and the Thursday evenings used for normal meetings, a good programme of activities having been fixed up. Visitors and newcomers are very welcome here—for more data, contact the Secretary, *see Panel*.

At Spalding, they are to run an exhibition station signing G4DSP during Oct. 2-4, for the local Arts & Leisure Festival. Operation will be on HF/SSB and AM/FM on two metres. On Oct. 10 the regular meeting at the Teachers' Centre, Knight Street, Pinchbeck, will deal with electronic keyers. Then, on Oct. 30, they take coach for the Club visit to the Amateur Radio Exhibition at Leicester.

Nation-Wide

This heading covers quite a lot of both special-activity and general-interest groups.

R.A.I.B.C. are they who cater for the Amateur Radio interests of those who are blind or otherwise invalided (the full members) together with those who get the full members on the air, or through R.A.E., or go and visit them to talk radio, or provide transport to a mobile rally or whatever (these are the Supporters). This month all members of whatever grade are mourning the loss of their old treasurer for so many years, G3ESR. For details of membership and what you can do to help, contact G3NOB—*See Panel*.

The current R.N.A.R.S. *Newsletter* is a 34-page compilation covering the period February to July this year and carries a great deal of news of Service interest, for members either still in the Royal Navy or retired. There is an appropriate leavening of humour and some useful technical material. The latest listing shows that they have about 500 members, under nearly 30 prefixes from across the world. The secretary will always be pleased to hear from prospective members with Service connections.

Westward

We hear that the main interest at Chippenham is, at the moment, getting everyone going on Four Metres. However, they have the weekly meeting to fall back on, every Tuesday evening at the Boys High School, Hardenhuish Lane, Chippenham. More details from Secretary G3UFW or, if you are in the area at evening or weekend, try 70-26 MHz with a call.

At Torbay there have been many visitors, of whom the latest was DK6EN and his XYL from Essen. Others have been from GM and GW. Five of the locals clicked at the May R.A.E., four of whom are going for the Morse while the other one has settled for a G8 call. The formal meeting for October will be on October 26, when there will be a slide show, at Bath Lane, rear of 94 Belgrave Road, Torquay.

Saltash are still at the Burraton Toc H Hall, Warraton Road, Saltash, where they have October 3, when G4DHA talks about Repeaters and FM; October 17 for a Junk Sale; and November 7 for the Annual General Meeting.

October for Cornish means a change of venue, for this month only, to Cornwall Technical College. October 2 is the date, and the topic is VLF, to be given by G3PPT. For November 6 they are back again at the usual SWEB Clubroom, Pool, Camborne.

Midlands

October 21 at Midland is the date for their AGM. This, as always for the group, takes place at the Midland Institute, Birmingham—and any Brummie will tell you where that is!

A note from the Loughborough Secretary points out that there is a likely move of HQ. during October or even before. This being the case, for details of the weekly sessions, and any programme arrangements, not to mention the vital address, get in touch with him—his name and address appear under the appropriate heading in the Panel.

The *Newsletter* editor for Wirral wonders whether any one reads his offering, as nobody commented on his two clangers in the previous Newsletter; we answer that we do read it, we did spot the mistakes, and we were too polite to remark on them, having made worse boos ourselves too many times! However he never forgets to mention the HQ. address at the Sports Centre, Grange Road West, Birkenhead, nor that the meetings are on the first and third Wednesdays in each month at 7.45. From about 7.30 for half an hour they have Morse practice, for which bring your own pencil and paper.

Another Club to run Morse practice before the lectures is South Manchester, on Friday evenings at Sale Moor Community Centre, Norris Road, Sale. October 3 is down for the VHF NFD inquest, and the 10th for a talk on Communications in Antarctica by G3SVW. Then on October 17, G2AKR will be indulging in "More Reminiscences of the Good Old Days," while Films take up October 24, then the subject of QRP, by G3FNM, fills the October 31 programme time. In addition to all this, the VHF and D/F groups have their own sessions at the Club shack, "Greeba," Shady Lane, Manchester 23. Visitors are welcome to all these. Looking forward a little, the Annual Dinner is set for November 7, at the Bowdon Hotel, Langham Road, Bowdon—tickets at £3 from the Secretary.

If you are in Hereford on the first or third Friday of the month, why not drop in to the club HQ. at County Control, Civil Defence HQ., Gaol Street? They seem to be a keen and lively group, and we understand they have just had a sizeable group of members gain possession of R.A.E. Pass slips—Good for them!

(over)

WARNING—MCC!

With rules and timing as last year, the 1975 Top Band Magazine Club Contest will be played off over the week-end November 15-16. Rules in this issue.

Every Thursday evening at the Sherwood Community Centre there are meetings of the Amateur Radio Club of Nottingham; there is definitely to be another "forum" on October 2, but at the time of his letter the Hon. Sec. had not firmied anything up for the remaining October dates. Incidentally, our congratulations to him on passing the Morse; as the club call is G3EKW he has elected to wait until he can have G4EKW for himself in place of his present G8IPH call.

It only seems yesterday that G4AEJ joined the ranks of reporters, from Solihull, but this time he tells us his two years are up and from next time we shall have a new commentator on their activities. For this month the meeting is on October 21, for the AGM, at The Manor House, High Street, Solihull.

Among the many new calls on the membership list at Derby we notice Ann, G8KMB and Jenny, G8KMC, both active on two metre SSB and stirring things up on the band somewhat. As for the meetings, these are normally on Wednesdays at 119 Green Lane, Derby; for October we notice on the 1st a Surplus Sale, and on the 8th G3VGW's talk on Outside Broadcasting which was postponed from back in July. Then on October 15 Tom Darn, G3FGY, will talk about "History in Shoe Box," and on the 22nd there is a Cheese-and-Wine Party at Hq., with an Open Meeting on October 29. Incidentally, Derby always arrange for any alterations to the programme to go out on Radio Derby, on medium wave and VHF in the Wednesday "Diary" programme.

South

Always the biggest clip for some reason—a far higher proportion of the Clubs in the South-East are prepared to report in, if not regularly at least occasionally. Why?

Anyhow, our first report this time is Verulam, where a new starting time is to be noted, namely 7.30 for 7.45 p.m. on the third Wednesday in the month, at the Market Hall, St. Albans. However, we are out of sync. with the newsletter so we can't tell you exactly what goes on. In any case, since Verulam, like so many other groups, have had a considerable rise in room rental to bear, we suggest a contact with G3YHY—see Panel—before attending lest there be a last-minute change of venue.

At Bishops Stortford there are, luckily no such problems to contend with, so they just turn up on the third Monday in each month for the talk, film show or whatever. For October, it seems likely that they will have the Joystick man, G3CED, coming to tell them all about the way it works and the results to be obtained from it. The Hq. is the same as it has been throughout the life of the Club, namely the British Legion, Windmill, Bishops Stortford.

It is sad to hear of Clubs closing down, and we have heard of too many lately—the latest one is Purley, but we are pleased to hear that some of the keen types have formed another Club, called Coulsdon Amateur Transmitting Society, who will be getting together on the first Thursday of each month at the 10th Purley Scout Hut, opposite Rickman Hills, Chipstead Valley Road, Coulsdon, starting at 8.0 p.m.

Nearby Surrey have duly noted the death of the Purley group and been saddened thereby. However, they still seem to be on form even though their Newsletter does not give us the October doings—for this, and the venue, you will have to contact G3FWR, as Panel.

At Horsham on Wednesday October 15, they have Mr. K. Best coming to give a talk about "Weather and Local Forecasting" which should be of considerable interest to the VHF/UHF enthusiast. It will be given in the Hq. at the Civil Defence building, Moons Lane, Brighton Road, Horsham; refreshments available, a large car park, and a welcome to visitors.

One of the Clubs that seem to soldier on year after year with never a problem is at Crystal Palace. This time the date to book is October 18, at Emmanuel Church Hall, Barry Road, London S.E.23 at 8.0. The Talk will be about Facsimile transmission, of pictures and so on, but we do not at the time of writing have any news as to who will be giving the talk.

A very brief newsletter from North Kent lets us know that they get together on the second and fourth Thursday of each month at St. Mary's Institute, 2 North Cray Road, Bexley.

A discussion on Contest Procedures is the entertainment for Acton, Brentford / Chiswick on their session of October 21. This one is, as usual at the club Hq. at Chiswick Trades and Social Club, 66 High Road, Chiswick, London W.4.

Cray Valley is another lot whose Newsletter does not go far enough ahead to tell us the October doings. But the essential information is there; the first Thursday in the month is the formal session, and the third Thursday allows time for nattering. As for the venue, try Eltham United Reformed Church Hall, 1 Court Road, London S.E.9. Doors open 7.30, giving a little time for socialising before the lecture.

We had to search a bit in the Echelford newsletter to find the

MCC—THE THIRTIETH

TOP BAND CLUB TRANSMITTING CONTEST R U L E S

- Object:** Clubs to work one another and also geographical counties, U.K. and Eire.
- Dates:** Saturday-Sunday, November 15-16, 1700-2100z (eight hours in all).
- Band, Power and Mode:** Top Band, ten watts, CW only.
- Callsigns and Identification:** Clubs to use their own c/s (or that of a nominated member) and identify themselves as a Club, e.g., "G3ASR Clb", in all contacts. Counties may be indicated by abbreviations, e.g., "HMB" for Humberside, "WMid" for West Midlands, etc.
- Scoring:** Count 3 points for each Club worked once in each session. Score double points for contacts between Clubs G/EI, G/GC, G/GD, G/DI, G/GM, G/GW. Similarly, Clubs in EI, GC, GD, GI, GM and GW take double points for Club contacts between these prefixes.
Take 2 points for each different county worked, but for once only over both sessions. Hence, Leicester Club would give five points to a G/Club in another English county worked once, and would take $6 + 2$ for working a GM/Club once, or $12 + 2$ if that Club was worked during both sessions. Non-Club stations make one point, score for their county multiplier and may be worked once each session. EU contact also count one point only.
- Multiplier:** Is the total number of different U.K./Eire geographical counties worked once each only. EU countries score once as additional multiplier.
- Logs:** To be legibly set out on one side only of quarto or foolscap sheets, with Club callsign used and name on each sheet, under the following heads: (A) Date: (B) Time: (C) Station worked: (D) RST given: (E) RST received: (F) QTH/Name Club worked; enter "non-C" for non-Club: (G) QTH non-Club; (H) County, or EU country: (I) Points claimed for QSO: (J) Tick opposite each QSO claimed for multiplier credit.
At foot each page, total points claimed for that page. Column headings may, if desired, be (A), (B), (C), etc. as given above. Logs set out in any other form will not be accepted.
- Disqualification:** This will be at the discretion of the invigilators and could include a consistently bad note (rough or chirpy), signs of deliberate interference, use of excessive power, or over-driving a transceiver resulting in strong key-clicks or a spread of spuri.
- Contest Call:** Use "CQ MCC" only when calling up. Shortened callsigns used in course of QSO will disqualify.
- Final Tabulation:** The last log sheet to show the total of QSO points claimed, figure taken for Multiplier, and resulting grand total, e.g., 2384 points times 10 counties equals 23,840 points claimed. Give also details of equipment used, dimensions of aerial and callsigns of operators.
Include a general statement on the Contest itself—experiences, comments, criticisms or suggestions.
- Entries:** Addressed "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ, must be posted to arrive not later than **Monday, December 1**. Results in full will appear in the February, 1976 issue of SHORT WAVE MAGAZINE, due out on January 30. The Editor's decision is final on all matter affecting the Contest.

Names and addresses of Club Secretaries reporting in this issue:

- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH,
188 Gunnersbury Avenue, London, W3 8LB.
- ARDEER: A. F. Smyth, GM3XNE, 4 Afton Place, Ardrossan,
Ayrshire KA22 7JD. (0294 67326.)
- BISHOPS STORTFORD: C. Harlow, G8BTK, Thorn Cottage,
Old Mead Lane, Henham, Elsenham, Bishops Stortford,
Herts.
- BURY & ROSSENDALE: M. Howarth, G8ECM, 11 Worthington
Avenue, Heywood (65911), Lancs.
- CHILTERN: F. S. G. Rose, G2DRT, 84 Cock Lane, High
Wycombe, Bucks. (Penn 4240.)
- CHIPPENHAM: J. Stevens, G3UFW, Langenhoe, Rowde,
Devizes, Wilts.
- CORNISH: H. Webster, G3XTF, Crandale, Gillyfields, Redruth
(6905), Cornwall.
- COULSDON: N. Moyes, G8KJM, 23 Ellenbridge Way, Sander-
stead, South Croydon, Surrey. (01-657 2548.)
- CRAY VALLEY: M. Tripp, G3YWO, 57 Cathcart Drive,
Orpington (38199), Kent.
- CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook
Crescent, London, SE23 3BN. (01-699 6940.)
- DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover,
Derby (2193), DE3 7GE.
- DUNSTABLE DOWNS: C. W. Stedman, G3XWS, 10 Wych-
wood Avenue, Luton (27789), Beds., LU2 7HU.
- ECHLFORD: J. H. Ellis, G2FNK, 18 Georgian Close, Lea-
croft, Staines (54828), Middlesex.
- HARROGATE & KNARESBOROUGH: D. Boniface, G8IBB,
11 Holmefield Road, Ripon, North Yorks.
- HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Here-
ford, Hereford & Worcester.
- HORSHAM: R. J. Polley, G3PYC, 81 Beech Road, Horsham,
West Sussex, RH12 4NW. (Telephone via G4AZQ, Horsham
739725.)
- LOUGHBOROUGH: J. S. Smith, G4DZL, 91 Anson Road,
Shepshed, Loughborough, Leics., LE12 9PT.
- MIDLAND: A. L. Walton, G3ZKQ, 243 Barnes Hill, Birming-
ham, B29 5UJ.
- MAIDENHEAD: E. C. Palmer, G3FVC, 37 Headington Road,
Maidenhead (20107), Berks., SL6 5LA.
- MAIDSTONE YMCA: G. H. Taylor, G4BNI, 26 Valley Drive,
Loose, Maidstone (43976), Kent.
- NORTH KENT: R. Wells, G4ARQ, 12 Bullbank Road, Bel-
vedere, Kent.
- NOTTINGHAM: M. C. Shaw, G8IPH, 50 White Road, Notting-
ham, NG5 1JR.
- R.A.I.C.: Mrs. R. Shepherd, G3NOB, 59 Pantain Road,
Loughborough, Leics., LE11 3LZ.
- ROYAL NAVAL A.R.S.: Lt. P. Gadsden, G3MTP, Signal
School, H.M.S. *Mercury*, Leydene, Petersfield, Hants.
- SALTASH: I. Forse, G4DHA, Penlan, St. Stephens, Saltash
(3219), Cornwall.
- SILVERTHORN: C. J. Hoare, G4AJA, 41 Lynton Road,
South Chingford, London, E4 9EA. (01-529 2282.)
- SOLIHULL: L. G. Boswell, G4AEJ, 170 Kestrel Avenue, Yardley,
Birmingham, B25 8QX.
- SOUTH MANCHESTER: C. Scholefield, G8GDM, Silverdale,
57 St. Werburgh's Road, Chorlton-cum-Hardy, Lancs.,
M21 1UN.
- SPALDING: R. Harrison, G3VPR, 34 Park Avenue, Spalding,
Lincs.
- STAR: T. Leeman, G4BUU, 599 Dewsbury Road, Leeds 11.
- SURREY: S. A. Morley, G3FWR, 22 Old Farleigh Road,
Selston, South Croydon, Surrey, CR2 8PB. (01-657 3258.)
- TORBAY: M. Yates, G3UIQ, Top Flat, 23 Waverley Road,
Newton Abbot (3025), Devon.
- VERULAM: H. Young, G3YHY, 93 Leaford Crescent, Watford
(25633), Herts., WD2 5JQ.
- WHITE ROSE: K. R. Robson, G3VTY, Flat 7, 34 St. James
Drive, Horsforth, Leeds.
- WIRRAL: H. I. Crofts, G3DLF, 3 Barmouth Road, Wallasey,
Merseyside.

programme in "Forthcoming Events" among the small bits. However it is there—October 8 for a Film Show and October 25 when they are hosts to the Sutton and Cheam and Thames Valley Clubs for an inter-club Quiz. The only snag is that this time there was so much news to put in the newsletter that they forgot to mention the HQ. address—for that, refer to the Hon. Sec., see Panel.

The change of HQ. mentioned recently as being needed by Chiltern has indeed come to pass and they are now based on the High Wycombe Sea Scouts T. S. *Jaguar*, which is in London Road, on the Chestnut Avenue corner, right by the site of the old railway bridge. The date to reserve is October 29, and the speaker will be a Mr. Hewes (could that be G3TDR, we wonder?) talking about using Varicaps for receivers and excitors.

Maidstone YMCA have a regular place at the Y Sports-centre, Melrose Close, Maidstone, every week. On October 10 and 24, G3XUN takes R.A.E. and Morse; October 3 is a Junk Sale, and October 17 a talk by G3ORP on aerials for confined areas, leaving October 31 for a Club Forum.

The British Red Cross Hall, The Crescent, is Maidstone's HQ. on October 2 and 21. On the first date, G3UKS will be talking about Propagation and Band Usage, while on the second session there will be a talk by a speaker from the Post Office.

Weekly on Fridays is the Silverthorn routine, at Friday Hill House, Simmons Lane, Chingford. Among the coming events we note in October the AGM and in November the Construction Contest.

Dates were still a bit in the air when they reported, so for the latest information, get in touch with the Secretary.

Having mentioned Silverthorn, our next reporter promptly announces a talk by Silverthorn member G2HR. This group is at Chestnut and they are based on Rosedale Sports Club, Andrews Lane, off Goffs Lane, Cheshunt, where they can be found every Wednesday evening. October 1 is down to G2HR as already mentioned, and on the 8th they have a general natter and CW practice. More CW and preparations for JOTA occupy the 15th, and for the 22nd we note G4DCP will be discussing "Aerials for Restricted Spaces—some Problems and their Solutions." Finally, October 29 for more CW and a general natter.

Dunstable Downs have meetings fixed weekly till January 16, on Fridays at 8.0 p.m., the venue being Chews House, 77 High Street South, Dunstable.

Adios Again

We have come to the end of another month's pile of letters and reports. For next time, you should be telling us all about the November doings—not to mention The Plan which will guarantee you Victory in MCC!—to arrive 21 days before publication date, as usual, giving you October 10—to be safe, aim for the 9th. Address it, as always, to "Club Secretary," *SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ*. CUAGN.

**Subscription rate to Short Wave Magazine is £4.80
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NEW QTH's

This space is for the publication of the addresses of holders of new callsigns, or changes of address, in EI, G, GC, GD, GI, GM and GW of stations not already listed. All addresses published here will appear in the U.K. section of the American "CALL BOOK" in preparation. Please write clearly and address on a separate slip to QTH Section. Be sure to give correct County designation and post-code. In the case of direct subscribers needing Change of Address, please state for card index adjustment. Address items for this space to: "New QTH Page," *SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.*

EI6CV, P. Ronaghan, Moynehall, Cavan, Co. Cavan, Eire.

GW3EOP, Port Talbot Radio Club, c/o 24 Connaught Street, Port Talbot, West Glamorgan, SA13 1ET.

G3GYU, J. Wild, 1/3 Square Street, Ramsbottom, Bury, Lancs., BL0 9BE. (*Re-issue.*)

GW4DOO, A. V. Kenyon, 24 Connaught Street, Port Talbot, West Glamorgan, SA13 1ET.

GW4DRN, T. J. Jones, 28 Rees Street, Gelli-Pentre, Rhondda, Mid-Glamorgan, CF41 7NF.

G4DTE, E. Endersby, 20 Wellesley Road, Cliftonville, Margate, Kent.

G4EAE, C. E. Wilson, 15 Barnsdale Road, Allerton Bywater, Castleford, West Yorks.

G4EBG, B. Meredith, 33 Kent Avenue, Rawmarsh, Rotherham, South Yorks., S62 7JX.

G4EBY, G. M. Head (*ex-G8GIP*), 5 Woolvers Way, R.A.F. Station, Locking, Weston-super-Mare, Avon, BS24 7DW.

G4EFJ, A. H. Johnson, 20 Lodge Close, West Green, Crawley, West Sussex, RH11 7ER. (*Tel. 0293 21668*.)

GM4EGE, R. J. Scott (*ex-GM8ILE*), 1 Edderston Road, Peebles, Borders, EH35 9DT.

G4EGJ, P. McKee, 55 Beechwood Avenue, Ruislip, Middx.

G4EGM, R. Webster (*ex-G8JIB*), 4 Lincoln Way, Rainhill, Prescot, Merseyside.

G4EGQ, P. J. Pennington (*ex-G8DRS*), 146 Elms Vale Road, Dover, Kent, CT17 9PN. (*Tel. 0304 203000*)

G4EHQ, M. J. Holley, 1 Beluncle Cottages, Stoke Road, Hoo, Nr. Rochester, Kent, ME3 9LX.

G4EHS, J. L. Dowsett, Highview, 8 Chequett Close, Callington, Cornwall, PL17 7HQ.

G8FHV, B. J. Jenkins, 39 Taylor Street, Woolwich, London, SE18 6ER.

G8KCD, F. P. Knight, 23 Fawn Road, Plaistow, London, E13 9BL.

G8KDP, N. V. Wright, 29 Wealdview Road, Heathfield, Sussex, TN21 0XA.

G8KDV, A. Heath, 20 Windrush, Highworth, Nr. Swindon, Wilts.

GM8KJY, I. D. Campbell, 35 Radernie Place, St. Andrews (4688), Fife, KY16 8QR.

G8KIO, C. K. Hawkins, Eshby, 44 Tarn Moor Crescent, Skipton (3978), North Yorks., BD23 1LT.

G8KKK, R. A. Ledgerton, G2ABC, o/b/o Cornish Radio Amateur Club, Westlea, Hugus Road, Threemilestone, Truro, Cornwall, TR3 6DF.

G8KLI, G. Thompson, 49 Widney Avenue, Selly Oak, Birmingham, B29 6QE.

G8KLN, A. Floyd, 95 Old Worthing Road, East Preston, Littlehampton, Sussex, BN16 1DU.

G8KMB, Ann Buckley (*XYL/G3VOW*), 23 Hazel Drive, Spondon, Derby, DE2 7DS.

G8KMC, Jennifer Shardlow (*XYL/G3SZJ*), 19 Portreath Drive, Darley Abbey, Derby, DE3 2BJ.

G8KME, P. Grimshaw, 55 Combe Street Lane, Yeovil (4773), Somerset, BA21 3PD.

G8KMG, L. H. Hipkin, 92 Webb Rise, Stevenage, Herts., SG1 5PD.

G8KMH, L. Kellett, 31 Haldon Avenue, Teignmouth, Devon.

G8KNP, F. Cassidy, 55 High Bank Road, Droylsden, Manchester, M35 6FS.

G8KNT, D. G. Jones, 36 Moor Lane, Woodford, Cheshire, SK7 1PP. (*Tel. 061-439 5426*.)

G8KNV, P. W. Johnson, Cricketers Hotel, Bagshot, Surrey.

G8KOC, R. Backham, Tynrabbie, Avon Road, South Wootton, Kings Lynn, Norfolk, PE30 3LS.

G8KOQ, N. Morris, 92 Birch Road, Walkden, Worsley, Greater Manchester, M28 5EG.

G8KPY, D. P. Pratt, 32B Coleraine Road, Blackheath, London, SE3 7TQ.

G8KQB, S. Prior, Box Tree, Minster Lovell, Oxford, OX8 5RZ.

GM8KRL, I. C. H. Prescott, 64 St. Albans Road, Edinburgh, EH9 2PG.

G8KRR, A. C. Foster, B.Sc., M.P.S., 23 Ghyllroyd Drive, Birkenshaw, Bradford, West Yorks., BD11 2ET.

GW8KSE, W. C. Salisbury, 28 Dyke Street, Brymbo, Wrexham, Clwyd, LL11 5AH, North Wales.

GW8KSFK, A. P. Salisbury, 28 Dyke Street, Brymbo, Wrexham, Clwyd, LL11 5AH, North Wales.

G8KSL, R. Cleaver, 3 Woodfield, Lacey Green, Aylesbury, Bucks., HP17 0QQ.

CHANGES OF ADDRESS

DL2AH, Capt. J. T. Worrall (*G3XBA*), O.C. L. Troop, 21 Signal Regt., R.A.F. Laarbruck, B.F.P.O. 43.

G2BZQ, R. Q. Marris, Danavox Inc., Pentagon Park, 4550 West 77th Street, Suite 321, Edina, Minneapolis, Minn., 55435.

G3FGP, R. L. Brooks, 10 The Oval, New Barn, Longfield, Kent.

G3FSD, G. W. Bolton (*ex-GM3FSD*), 25 Dovecote, Lakes Lane, Newport Pagnell, Bucks.

G3FTQ, A. Frost, 11 Ingleboro Drive, Purley, Surrey, CR2 1ED.

G3HGJ, D. M. Foster, 7 The Glen, Durdham Park, Bristol, Avon, BS6 7JH. (*Tel. 0272 34455*.)

G3IOR, P. J. A. Gowen, 17 Heath Crescent, Hellesdon, Norwich, Norfolk, NR6 6XD.

G3LTF, P. K. Blair, Little Pools, 1 Potter Street, Harlow (415051), Essex, CM17 9AD.

G3LXQ, D. L. Gallop, 4 Volunteer Road, Theale, Reading, Berks.

G3RJV, Rev. G. C. Dobbs (*QRP Club*), 8 Redgates Court, Calverton, Notts.

G3SKE, W. J. Pope, 47 Paget Street, Gillingham, Kent. (*Tel. Medway 575747*.)

G3TLV, G. C. Wyns, Hill View, Sproston Hill, Wrenbury, Nr. Nantwich, Cheshire, CW5 8HH. (*Tel. Aston 445*.)

G3UEA, Univ. of East Anglia, Norwich Radio & Electronics Club, c/o P. J. A. Gowen, G3IOR, Floor 1, School of Biological Sciences, University Plain, Norwich, NR4 7TJ.

G3UKV, M. I. Vincent, 9 Sleaford, Long Lane, Telford, Salop, TF6 6HQ.

G3VNJ, C. H. Fowler, 69 Arundel Drive, Carlton-in-Lindrick, Worksop, Notts., S81 9DL.

G3VTA, P. Royle, 109 Warrington Road, Leigh, Greater Manchester, WN7 3XF.

G3WMB, M. K. Bacon, The Retreat, Elm Green, Wareside, Nr. Ware, Herts.

G3YGB, J. C. H. Coleman, 49 Compass Court, Upper Spon Street, Coventry, West Midlands.

G3ZYE, R. Bellerby, 104 High Street, Lindfield (3187), Haywards Heath, Sussex.

G4AHH, C. Hayward, Haynes House, High Street, Whittlebury, Towcester, Northants. (*Tel. Silverstone 350*.)

GM4BHT, G. P. Matthews (*ex-VE3BGR*), 93 Obsdale Park, Alness (2483), Ross-shire, IV17 0TR.

G4BON, B. A. Strutt, High Ridge, Brewood Road, Coven, West Midlands, WV9 5DA.

GM4BOV, C. M. Smith, Craigton Croft, Glenmoy, Kirriemuir, Angus, DD8 4NB.

G4BYA, P. A. Graham, 12 Shepherds Mount, Compton, Nr. Newbury, Berks., RG16 0QZ.

G4CMG, T. G. Milne, No. 1 QM Qtr., Stoughton Barracks, Guildford, Surrey, GU2 6PS.

G4CMH, D. Spendlove, 4 Ashford Close, Harwood, Nr. Bolton, Greater Manchester, BL2 3JY.

G4CMT, R. C. Andreang, 6 Beech Avenue, Bilton, Hull (0482 54140), Humberside.

G4DGH, R. G. Caid, 1 Stilland Farm Cottages, Chiddingfold, Surrey.

G4DQS, A. V. Lee, 19 Greenbank Avenue, Saltdean, Brighton, Sussex.

G4DUQ, P. A. Keane, 6 Brunels Way, Highbridge, Somerset, TA9 3LF.

GM8AKB, G. W. Rolland, 8 Craigiefield Crescent, Penicuik, Lothians, EH26 9EQ. (*Tel. 0698 72299*.)

G8GGR, Mrs. C. M. Coleman, 49 Compass Court, Upper Spon Street, Coventry, West Midlands.

G8IMF, M. Connah, 135 Sevenfields, High worth, Swindon, Wilts., SN6 7NQ.

G8JMH, N. J. C. Howard, The Old Post Office, 19 Church Street, Langham, Oakham, Leics., LE15 7JE.

G8JMO, D. J. Robinson, 19 Highfield Road, Attleborough, Nuneaton, Warks., CV11 4PW.

G8KCE, V. Cunningham, 8 Viney Close, Eastfield, Peterborough, Cambs., PE1 5LS.

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GM3WTA Name *Kinnersley-Taylor*. "*GM4DZK*" Should be *GM4DXZ*.

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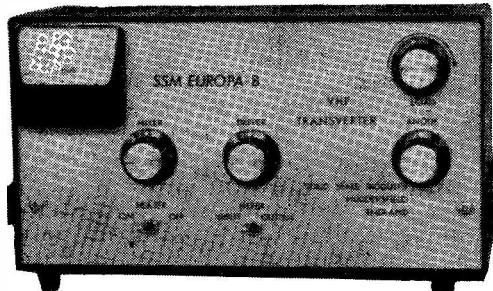
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See Rad. Comm. (August 1974) and S.W. Mag. (July 1975) for reviews of this equipment.

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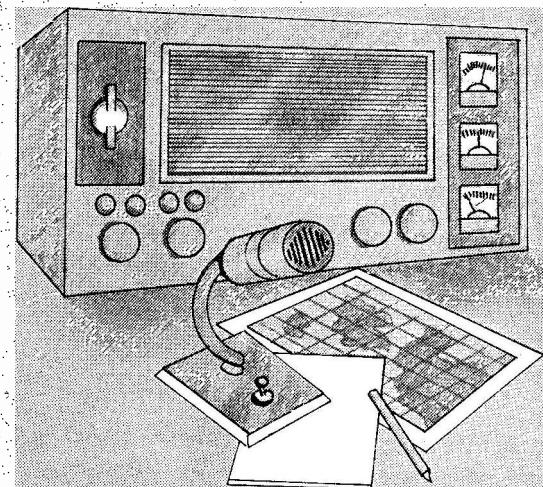
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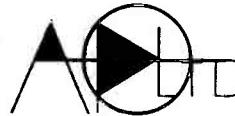
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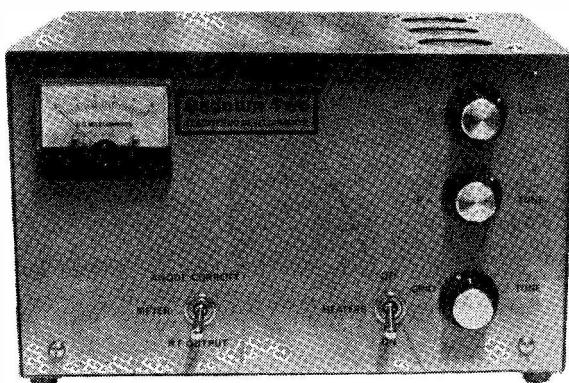
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144-030	b	b	b	b	b	b	b	b	b	b	b	b
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144-480	a	b	b	b	b	b	b	b	b	b	b	b
144-600	a	b	b	b	b	b	b	b	b	b	b	b
144-700	a	b	b	b	b	b	b	b	b	b	b	b
145-000	a	b	b	b	b	b	b	b	b	b	b	b
145-050/R2T	a	b	b	b	b	b	b	b	b	b	b	b
145-075/R3T	a	b	b	b	b	b	b	b	b	b	b	b
145-100/R4T	a	b	b	b	b	b	b	b	b	b	b	b
145-125/R5T	a	b	b	b	b	b	b	b	b	b	b	b
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145-175/R7T	a	b	b	b	b	b	b	b	b	b	b	b
145-200/R8T	a	b	b	b	b	b	b	b	b	b	b	b
145-350	a	b	b	b	b	b	b	b	b	b	b	b
145-400	a	b	b	b	b	b	b	b	b	b	b	b
145-500/S20	a	b	b	b	b	b	b	b	b	b	b	b
145-525/S21	a	b	b	b	b	b	b	b	b	b	b	b
145-550/S22	a	b	b	b	b	b	b	b	b	b	b	b
145-575/S23	a	b	b	b	b	b	b	b	b	b	b	b
145-600/S24	a	b	b	b	b	b	b	b	b	b	b	b
145-650/R2R	a	b	b	b	b	b	b	b	b	b	b	b
145-675/R3R	a	b	b	b	b	b	b	b	b	b	b	b
145-700/R4R	a	b	b	b	b	b	b	b	b	b	b	b
145-725/R5R	a	b	b	b	b	b	b	b	b	b	b	b
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Sale: Two-metre converter, IF 28-30 MHz, Telford Communications model G8AEV Mk. II, price £10.—Ring Houghton, Worcester 354679.

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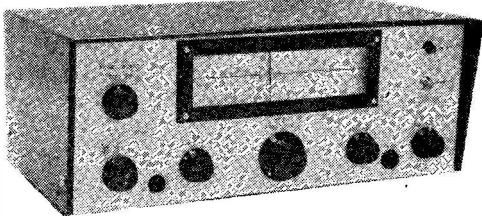
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Wanted: CR-100, B.40 or similar cheap receiver, also Lafayette HA-230 or Trio 9R-59DS Rx, must be cheap.—Box No. 5447, Short Wave Magazine, Ltd., 29 High Street, Welwyn, Herts., AL6 9EE.

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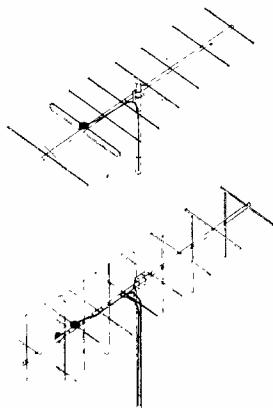
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1mA METERS 2" square, plastic front (these have a paper scale stuck over the original marked 0-1mA, which is easily peeled off, and an internal 18K resistor which is easily removed) £1.75 each, or 2 for £3.00.

3 SWITCH PUSH-BUTTON UNITS (3 x 2 pole 2-way min. push-push switches, + buttons, mounted on one unit), 40p.

DIE CAST BOXES (approx. size in inches)

4.8 x 2.8 x 1.5	75p
4.8 x 3.8 x 1.5	85p
4.8 x 3.8 x 2	£1.00
6.8 x 4.8 x 2	£1.45
4.8 x 3.8 x 3	£1.55
6.8 x 4.8 x 4	£2.25

VALVEHOLDERS, mixed bag of 10 for 50p.

ARROW 10A, 250v, black plastic rocker switches, 4 for 50p.

16-DIL IC SOCKETS, 4 for 50p.

MINIATURE MICROSWITCHES, with roller spring, 2 for 50p.

SILICON RUBBER SLEEVING, 25 yds. for 25p.

XTAL OVENS, 80°C. or 10°C., state which, 35p each.

BASES FOR XTAL OVENS, HC6U or 2 x HC25U, state which, 10p each.

LEAD SUPPRESSORS (10 k ohm) for mobile, plug leads, 4 for 50p.

MIXED WASHERS, per pack, 15p.

5A MAINS CIRCUIT BREAKERS, 75p each.

HASH FILTERS (for mobile supply leads), 2 for 40p.

HEAVY DUTY 15-way turret tag-strips, 5 for 30p.

SPEED NUTS, per pack, 20p.

PERSPEX COIL FORMERS, 1 1/4" x 1/2" dia., 5 for 25p.

TURRET TAGS, 1/16" dia., 25p pack.

ROTARY SWITCHES, min. 4 pole 2 way, 2 for 50p.

TELEPHONE TYPE EARPIECE INSERT, 50p.

REEDS (for reed relays). Single-pole make, 5 for 30p.

MULLARD TUBULAR CERAMIC TRIMMERS, 1-18pF, 6 for 50p (as featured in Rad. Comm. Jan., page 25).

ICs, some coded, 14DIL type mixed, untested, 20 for 25p.

BLACK PLASTIC KNOBS, 7/8" dia., 1/2" spindle, 4 for 50p.

RING MAGNETS, 7mm. inside dia., 20 for 50p.

25-WAY ISEP PLUGS and SOCKETS, 40p. set (1 plus + 1 skt.). Plugs and sockets sold separately at 25p each.

TO3 TRANSISTOR INSULATOR SETS, 10 sets for 50p.

VHF RF chokes (wound on 2x2K 1/2W. resistors) 5 for 35p.

Small Chrome handles, 1/2" dia., 1 1/2" between holes, 1" clearance, tapped 4BA (with screws and washers), 2 pair for 40p.

Relays, single pole change over, 20v. DC, approx. 1 1/2" x 1 1/2", 35p each.

AT LAST WE HAVE A STOCK OF THE TRIMMERS YOU'VE ALL BEEN ASKING FOR!

2-6pf. 10mm. circular, ceramic trimmers (for VHF/UHF work), 3 pin mounting, 5 for 50p.

3 pin min. MAINS PLUG AND SOCKET, 40p set.

PC BOARD WITHDRAWAL HANDLES, mixed cols., 8 for 50p.

SOLDER, 20SWG, 60/40 alloy approx., 8 yds., 25p.

COILS on 7/8" dia. 1 1/4" long paxolin formers, 5 for 20p.

ALL BELOW — ADD 8% VAT

MAINS TRANSFORMERS

All 240v.input, voltages quoted approx. RMS (Please quote Type No. only when ordering)

TYPE 10/2 10-0-10V at 2A, £1.50.

TYPE 125BS approx. 125v. at 30mA, 65p.

TYPE 28/4. 28v. at 4A, 125v. at 500mA, £4.00.

TYPE 63/1. 6.3v. at 1A, 85p each, 2 for £1.50.

TYPE 129. 400v. at 20mA, 200v. at 10mA, 6.3v. at 500mA, £1.25.

TYPE 72703. 400v. at 10mA, 200v. at 5mA, 6.3v. at 400mA, £1.25.

TYPE 70462. 250-0-250v., 50-0-50v., 6.3v., £1.75.

RADIOSPARES 500-WATT AUTO TRANSFORMER, 100/110/150/200/240, 250v., tapped input and output step up or step down facility, ex new equip., £6.00.

IDEAL TRANSFORMER FOR YOUR LINEAR. Main input, 1185-0-1185v. at 360mA output, supplied with matching choke 8H at 380mA, oil filled potted, high quality type. Transformer and choke, £13.00.

PLUGS & SOCKETS

PL259 PLUGS (PTFE). Brand new, 50p each, or 5 for £2.25. Reducers for above, 15p each.

SO239 SOCKETS (PTFE). Brand new (4 hole fixing type), 50p each or 5 for £2.25.

N-TYPE PLUGS, 50 ohm, 60p each.

N-TYPE SKTS. (4 hole chassis mounting, 50 ohms, small coax lead type), 50p each.

BNC PLUGS. (Amphenol, new, packed), 35p each. (4 for £1.20).

GREENPAR (GE35012). Chassis Lead Terminations. (These are the units which bolt on to the chassis, the lead is secured by screw cap, and the inner of the coax passes through the chassis), 30p each, 4 for £1.00.

BULGIN FLAT 2-pin FLEX CONNECTORS. Non reversible, 40p each.

MAINS LEAD AND SOCKET as used on Continental Test Equipment. New, 50p each.

EDGEWISE METERS, 50 microamp FSD, centre zero, but can be left hand zero'd display area 1 1/2" x 1 1/2", smart modern appearance, £1.50 each.

1 1/2" Polythene chassis mounting fuseholders, 6 for 30p.

LES Lamps, 24v. 1.2W. 10 for 40p.

MULTITURN POTS, 10 turn, 1/2" spindle (ex-equipment), following values available, 2 Kohms, 5 Kohms, 400 Kohm, £1 each.

24v. MIN REED RELAYS, encapsulated single-pole make, 2 for 50p.

NEW MULLARD SCOPE TUBES, DN7-78 3" face, complete with CRT base and mu-metal screen, £8.50 each.

VALVES

QVVO3/20A (ex equipment), £3.00.

QVVO3/10 (ex-equipment), 75p or 2 for £1.20.

2C39A (ex equipment), £1.00 each.

QVVO2/6 (ex equipment), £1.00 each.

4CX25B (ex equipment), £2.10 each.

4X250B (ex equipment), £1.50 each.

DET-22 (ex equipment), 2 for £1.00.

ALL BELOW — ADD 8% VAT

Ferrite Coils on 7/8" dia. ferrite rings, 3 for 50p.

Heatsinks. (Approx. 3" x 4" x 2" high). 12 fins (drilled for 1 x T03 transistor). Brand new. Sorry, sold out.

VARIABLE STABILISED PSU solid state, 240v. AC input, Output 2-24v. DC at 50mA + 32v. at 50mA (approx.). Size: 7 1/2" x 4" x 2 1/2" (voltage controlled by external 5k ohm pot). (Less 5k ohm pot), £5.00 each. 5k ohm pots, 3 turn, for above, 75p each.

MOBILE CONVERTER. 24v. DC, input, 13.8v. at approx. 3.5A DC output, fully stabilised, £3.50 each.

ALL BELOW — ADD 25% VAT

HIGH QUALITY SPEAKERS. 8 1/2" x 6" elliptical, 2" deep, 4 ohm, inverse magnet, rated 100W to 16Watts, £1.50 each, or 2 for £2.75. (Quantity discount available.)

ELECTROLYTICS

DUBILIER ELECTROLYTICS, 50μF, 450v., 2 for 50p.

DUBILIER ELECTROLYTICS, 100μF, 275v., 2 for 50p.

PLESSEY ELECTROLYTICS, 470μF 63v., 3 for 50p.

TCC ELECTROLYTICS, 1,000μF 30v., 3 for 60p.

PLESSEY ELECTROLYTICS, 1,000 μF 180v., 40p each, 3 for £1.

DUBILIER ELECTROLYTICS, 5,000 mfd at 35v., 50p each.

DUBILIER ELECTROLYTICS, 5,000μF 50v., 60p each.

DUBILIER ELECTROLYTICS, 5,000 mfd at 70v., 65p each.

ITT ELECTROLYTICS, 6,800 mfd at 25v., high grade, screw terminals, with mounting clip, 50p each.

PLESSEY ELECTROLYTICS, 10,000 mfd at 63v., 75p each.

PLESSEY "CATHODRAY" CAPACITORS, 0.04μF at 12.5kV DC, screw terminals, £1.50 each.

TV PLUGS (metal type), 6 for 50p.

TV SOCKETS (metal type), 5 for 50p.

TV LINE CONNECTORS (back-to-back skt.), 5 for 50p.

DIN 3-pin LINE SOCKETS, 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.

I Meg. Lin. POTS 1/2" plastic spindle, 2 for 50p.

50k ohm lin. POTS, 1/2" plastic spindle, 40p each.

BSY95A TRANSISTORS, 6 for 50p. BCY72, 4 for 50p.

PNP AUDIO TYPE TO5 TRANSISTORS, 12 for 25p.

OC200 TRANSISTORS, 6 for 50.

BFY51 TRANSISTORS, 4 for 60p.

BYX 38/300 Stud Rectifiers, 300v. at 2.5A, 4 for 60p.

TCC Plastic block capacitors, .047 at 250v., 50 for 60p.

TCC Plastic block capacitors, .022 at 400v., 50 for 60p.

IF CANS, 1 1/2" square, suitable for rewind, 6 for 30p.

IF CANS, 1 1/2" x 1 1/2" x 1", suitable for rewind, 10 for 30p.