

# The SHORT WAVE Magazine

VOL. XXXI

FEBRUARY, 1974

NUMBER 12

*Have you done your sums?*

## TRIO + PARTRIDGE

## = PARTRIDGE PACKAGE

## = A COMPLETE RADIO STATION

FOR ANY LOCATION AT A PRICE LITTLE, IF ANY MORE THAN THE COST OF THE TRIO ALONE!!!

# FREE

Headphones or Speakers; Suitably Terminated Connectors; Handbook; Carriage; Insurance. In addition a JOYSTICK V.F.A.; JOYMATCH A.T.U.; feeder external mounting insulators are supplied FREE or greatly reduced when you buy a PARTRIDGE PACKAGE.

A PARTRIDGE PACKAGE constitutes a COMPLETE RADIO STATION—ready to use however confined your domestic space. The World renowned TRIO range of Communications Receivers and Transceivers, the WORLD RECORD, internationally patented JOYSTICK V.F.A. (all band aerial) only 7' 6" long (assembled) and a JOYMATCH aerial tuning unit, a pair of matching headphones or internal speaker, plus accessories, go to complete your READY TO USE RADIO STATION at a price that truly represents VALUE FOR MONEY! H.P. FACILITIES WHERE POSSIBLE—24 HOUR DELIVERY (MON.-FRI.) ADD £4.00—OUR RISK!

PARTRIDGE PACKAGE	(Write for details of more Partridge Packages)	PACKAGE PRICE
No. 1 with Gen. Coverage AM/CW/SSB (MW/SW) 9R59DS Receiver	(£46.75)	£64.52 (Save £14.28)
No. 2 with Amateur Bands 80 thru 10m. AM/CW/SSB JR310 Receiver	(£82.50)	£90.97 (Save £24.77)
No. 3 with Amateur Bands 160 thru 10m. plus 2m. AM/CW/SSB JR599	(£145.75)	£159.07 (Save £19.86)
No. 4 with Amateur Bands 80 thru 10m. TS/PS 515 Transceiver, 180w.	(£231.00)	£231.00 (Save £39.50)
No. 5 TX599 160w. 80 thru 10m. Transmitter SSB/CW/AM	(£176.00)	£176.00 (Save £35.09)

**NOTHING TO PAY!** **OUR RISK** Access/Barclaycard orders accepted by 'phone  
 JOYSTICK V.F.A. £13.75; JOYMATCH TX/RX A.T.U. 111A 1.6-32 MHz £13.75; JOYMATCH A.T.U. 111 RX only 500 kHz-32 MHz £13.75; JOYMATCH A.T.U. LO-Z500 TX/RX 500w SSB (PA input), Built-in RF meter £19.91; Communications 8Ω headphones (suitable TRIO, EC10 etc.) £3.14; Matching Speaker (with instructions for internal fitting in 9R59DS and JR310) £2.00; TRIO: Linear Amplifier TL911 £172.15 PLUS £32.50 worth of Partridge equipment FREE; TRIO TR2200 2m personal transceiver £87.45 PLUS £17.50 worth of Partridge equipment FREE; TRIO TR7200 2m car transceiver £142.45 PLUS £28.50 worth of Partridge equipment FREE; Spare set valves for 9R59DS £2.35; OA2 Mains Stabiliser 74p; 9R59DS £46.75 (VAT incl.) plus FREE Speaker del. OUR RISK.

Amazing "DX-CRYSTAL SET" £2.42 incl. unique aerial. Free with your Partridge package.  
**NEW: AMTRON QUALITY KITS**—send for brochure and prices.

**PARTRIDGE BUDGET LINE**  
 Artificial Earth—solves receive and transmit earth problems (as used on North Sea Oil Rigs!) £5.80; Aerial Bandswitch—tuned aerial for domestic receivers £5.80; A.T.U. KIT—for use with transmitters and Communications Receivers £5.80; (assembled £7.01); Mini SWR Bridge—1.8 to 180 MHz, 2 kw P.E.P., 75 or 50Ω SO239 sockets; 1:1 to 1:3 ratio, 80 x 30 x 30mm £5.60. (All prices quoted INCLUDE V.A.T., CARRIAGE, PACKING, INSURANCE.)

Send 3½p stamp for full illustrated details. Special TRIO brochures (state which) 3½p stamp extra.  
**NO V.A.T. ON OVERSEAS ORDERS!** Carriage and insurance extra overseas orders

BOX 4



G3CED — G3VFA

FOR EXPERT ADVICE AND INFORMATION  
 Telephone: 0843 62535 or 02839 evenings and weekends

# Western Electronics (UK) Ltd

TOTTON  
SOUTHAMPTON

## CO LANDS END TO JOHN O'GROATS

No matter where you live you may like to consider the following facts about our service . . .

**CONVENIENCE.**

If you are buying all you have to do is drop us a line or telephone and quote your Access or Barclaycard number ; we'll do the rest promptly.

**AFTER SALES SERVICE.**

No need to go even 10 miles to your nearest dealer ; we will collect your equipment by Securicor from your own doorstep and save your petrol, precious time and money. This is done FREE OF CHARGE on all warranty work. So whether you're in "bonny Scotland" or the "Welsh Hills" or "down the road" you won't find a better service than that from WESTERN ELECTRONICS.

**SERVICE DEPT.**

It's a "pretty tatty" room from which they operate, there's no denying that but the situation is forced upon us by our local planners! However, for TEST EQUIPMENT we have the best such as the latest Hewlett Packard 8554B DC to 1.2 GHz spectrum analyser, Racal and Yaesu frequency counters, Dymar calibrated signal generator, Telonic sweep generator and many other items. What you also should know when your equipment is serviced it is done by the finest STAFF ; all are qualified personnel with a B.Sc. or HNC.

**DELIVERY.**

All orders are normally dealt with the same day as received and Communication equipment too heavy for post is despatched by Securicor with whom we have a contract for daily collections and delivery on the next working day. This is the quality of service which we initiated and of which we are still the leaders.

OUR AIM IS YOUR PLEASURE



## YAESU MUSEN (UK) MAIN DISTRIBUTOR

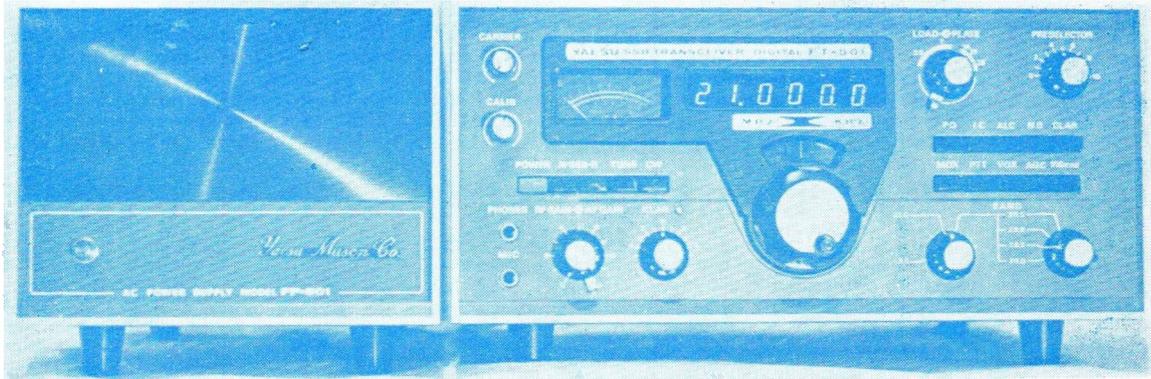
YAESU's 200 Channel 2m. FM

SIGMASIZER 200

Ex-Stock at £198 (inc. VAT/Carr.)

Beat the band-plan planner and invest in this 200 Channel synthesised transceiver then you cover the whole of 2m. in 10 kHz steps. Operates on 12v. DC or AC with FP2.

## YAESU's NEW WINNER! FT-501 (Ex-stock)



**YAESU PRICES (Carriage free by Securicor) including VAT. (All Ex-Stock)**

HF TRANSCEIVERS	
FT-75	£126.50
FP-75	£27.50
DC-75	£27.50
FT101	£297.00
FT-101B	£328.90
FT-FP200	£209.00
FT-401	£291.50
FT-501	£368.50

HF TRANSMITTERS	
FL50 + VOX	£86.90
FL400	£181.50

VHF TRANSCEIVERS	
FT-2FB	£107.80
FP-2AC PSU	£29.70
FP-ACB + Batts.	£42.90
FT2 AUTO.	£172.70

HF RECEIVERS	
FR50 + CAL.	£73.70
FR400DX	£148.50
FR400SDX	£192.50

FREQUENCY COUNTERS	
YC-355 30 MHz AC	£106.70
PSU	£106.70
YC-355D 220 MHz AC	£132.00
DC PSU	£132.00

REMOTE VFO	
FV50 for FT75/FL50	£30.80
FV-101	£46.20
FV401	£46.20

SPEAKERS	
SP101, 400, 401	£12.10
SP101P Phone Patch	£28.60

LINEAR AMPLIFIERS	
FL2000B 1200w.	£181.50
FL2100 1200w.	£181.50
FL2500 2kW	£143.00

ACCESSORIES	
YD846 Hand Mic.	£5.00
YD844 Table Mic.	£14.30
FAN, FT-101	£9.90
CW Filter, FT-101	£17.60
Mobile Mounts	£6.60
FF50DX L.P. Filter	£9.80
Yaesu Log Book	55p
Crystals, FT-2FB	per pair £3.96
Catalogue	20p

# Western Electronics (UK) Ltd TOTTON SOUTHAMPTON

introduce . . .

the most comprehensive range of FM equipment  
by a specialist VHF/UHF manufacturer  
**STANDARD RADIO CORPORATION**

*Now look at this terrific range!*

**144 MHz**

**CV110 VFO**



The CV110 is a remote VFO for the C140 Transceiver and has a centre tuning meter plus RIT ( $\pm 5$  kHz) and CAL tuning to accurately calibrate the VFO.

**C140 TRANSCIVER**



2½" high! The microphone has two switches, the normal PTT switch plus the MEMO switch. A flick of the switch and the transceiver overrides the Channel selector and you can transmit or receive on another frequency. The C140 takes the CV110 Remote VFO or SY-200 Synthesizer and comes complete with microphone, line filter and mounting hardware.

**SY-200 SYNTHESIZER**



The SY-200 is a 200 Channel synthesizer unit plus 1 priority channel and 3 Memo channels. The size of this is the same as that of the C140.

The C140 is a 10w. 12 Channel transceiver + 1 Memory Channel and measures only 3½" wide x 3

**C826MB TRANSCIVER**



**CV100 DUAL VFO**



The C826MB is a 12 Channel 10w o/p. unit. Tone burst and separate transmit and receive crystals permit repeater operation and are readily accessible via a hinged lid underneath. Receiver sensitivity is excellent being 0.4 uV or less (20-dB quieting). Transmitter and receiver test sockets are fitted at the rear for servicing. The C826MB has provision for the CV100 dual VFO giving separate VFO's for transmitter and receiver operation. Each 826MB carries its own test certificate so you get guaranteed performance. Line filter and microphone are included. The CV100 has a centre signal meter and calibrate (CAL) position to zero the transmitter onto the receiver's frequency.

C146A is a 2W 5Ch. Hand transceiver with tone burst and the capability of repeater operation. Ni-cad batteries and many accessories are available (but not fitted) making this superbly built unit is the finest available. Complete with leather case and fitted crystals on 145-00 and 145-15.

**432 MHz**

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

**PRICES (Carriage/VAT Paid)**

CV100, VFO for C826MB	... ..	£33-50
CV110, VFO for C140...	... ..	£45-50
C140, 2m. Transceiver	... ..	£119-90
C146A, 2m. Hand Transceiver 5 channel	... ..	£89-90
C 826MB 2m. Transceiver	... ..	£135-00
SY-200 Synthesizer	... ..	£96-00
C 430, UHF Transceiver	... ..	£159-90
C432, UHF Hand Transceiver 5 channel	... ..	£114-00

**ACCESSORIES**

C-12/230-SAE AC PSU/SPKR. for all models	... ..	£23-50
C-12/230-6E AC CHARGER for C146A and C432	... ..	£3-00
Ni-cad Batteries, set to 10	... ..	£12-00
2-205K remote speaker for all models	... ..	£9-00
CAD external antenna coupler	... ..	£1-95
CAT08E, Rubber flexible antenna	... ..	£2-75
CMPO8 External microphone for C146A and C432	... ..	£9-00
CMPO2 Telephone handset for all models	... ..	£25-25

The Standard Radio Corporation produce only VHF/UHF Communications equipment and in this field they excel. All transceivers have automatic final protection circuits and are very well engineered. Because of the quality, the units are not cheap but nevertheless you will find their prices highly competitive and you have many advanced design features not found elsewhere. Delivery is ex-stock at the time of going to press but some callers at Totton have already "snapped-up" some of our initial stock! We regret the Standard accessories are only available to purchasers of Standard Transceivers.

**VHF EQUIPMENT (Prices Carriage/VAT Paid)**

BELCOM, Lincor 2 145-25-48 or 144-1 0-34 Ex-Stock	... ..	£132-00
BRAUN SE600 Digital 2M AM/FM/SSB Transceiver	... ..	£780-00
FDK Multi 2000	... ..	£264-00
TEMPO 6N2WE 2KW 144 MHz SSB/FM amplifier	... ..	£438-90
12v. DC Amplifiers 502 (50w o/p)	... ..	£62-70
802 (80w o/p)	... ..	£107-80
1002-3 (100w o/p)	... ..	£130-90

**CDE ROTATORS.** By bulk buying a full container load of rotators we have been able to keep prices of the new AR30 and AR40 to a minimum and these should arrive by February. Help us to help you by buying direct from us and keep prices down.

**CATALOGUE (20p.) OF TOWERS, ANTENNAS, ROTATORS AND COMMUNICATIONS EQUIPMENT**

**Western Electronics (UK) Ltd**

Agents: G3ZUL Droitwich (090 57) 4510  
G3PRR Chesham (02405) 4143

Hours of business: 9-5:30; 9-12:30 (Saturdays)

OSBORNE ROAD TOTTON SOUTHAMPTON SO44DN  
TELEPHONE: TOTTON (04216) 4930 or 2785  
CABLES: 'AERIAL, SOUTHAMPTON'



# MICROWAVE MODULES LIMITED

11 CRANMORE AVENUE, CROSBY, LIVERPOOL L23 0QD Tel: 051-928 1610 9 a.m.-8 p.m.

## UNITS FOR 144MHz . . .

### 144 MHz MOSFET CONVERTER

I.F.s available ex-stock: 14-16, 18-20, 24-26, 27-29-7, 28-30 MHz. Price inc. VAT **£16.72**

This design has been optimised to obtain the best sensitivity possible with the latest diode protected dual gate mosfets. Both RF stage coupling and oscillator injection circuits use band pass transformers to maximize performance across the band.

### 144 MHz DOUBLE CONVERSION MOSFET CONVERTER

I.F.s available ex stock: 2-4, 4-6 MHz. Price inc. VAT **£16.72**

This unit was developed to meet the heavy demand for a converter suitable for use with receivers having better performance at lower frequencies. It uses two dual-gate mosfet mixers, both fed from the output of a 70 or 71 MHz crystal oscillator. Selectivity is obtained at the first IF in the 74 MHz range, thereby overcoming the usual problems associated with low-I.F. single conversion converters.

### 144 MHz 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 2.8dB. The noise figure is individually optimised on each unit using our new automatic noise measuring equipment. Price inc. VAT **£9.90**

### 144 MHz AM TRANSMITTER (as reviewed in May edition of Rad Com).

5 watt six channel crystal controlled. Supplied with crystal for 145 MHz. Price inc. VAT **£35.75**

### CRYSTALS

We now stock crystals (72 MHz range) for our 5 watt Transmitter on the following frequencies: 144.3, 144.7, 145.0, 145.5, and 145.7 MHz. Price inc. VAT **£2.75**

## UNITS FOR 432MHz . . .

### 432 MHz MOSFET CONVERTER

I.F.s available ex-stock: 14-16, 18-20, 24-26, 28-30, 144-146 MHz. Price inc. VAT **£19.91**

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

### 432 MHz VARACTOR TRIPLER

Maximum input power at 144 MHz: 20 watts. Typical output power (at maximum input): 14 watts. Price inc. VAT **£19.25**

This unit has very low level harmonic output, and capable of AM operation at the 50% power level. Each unit is aligned using swept-frequency and swept-power drive sources, the output of each unit being monitored on one of our spectrum analysers. Great attention is paid to harmonic suppression and linearity. All harmonics are greater than 40 dB down on the wanted output.

## ALL WITH UNCONDITIONAL 12-MONTH GUARANTEE AND FREE SERVICE

The above modules, and all our other products, are available ex stock direct from us, and from our many retail outlets. Our equipment is widely used by University Research Departments, MPT Departments, and in industry, and has even been selected by the Ministry of Overseas Development for inclusion in aid programmes to underdeveloped countries.

## For The Benefit Of Overseas Readers, We List Our Agents In The Following Countries:

Denmark: Sono Akustik, Store Kongensgade 46, 1264 Copenhagen, Denmark.

France: Vareduc-Comimex, 2 Rue Joseph-Riviere, 92400 Courbevoie, Paris, France.

Germany: UKW-Berichte, D-8520 Erlangen, Gleiwitzer Strasse 45, West Germany.

Holland: S. Hoogstraal Elektronika, Almelo, Oranjestraat 40, Holland.

Italy: STE, Milano, Via Maniago, 15, Italy

U.S.A.: Spectrum International, P.O. Box 0184, Concord, Mass. 01742, U.S.A.

ALL EQUIPMENT EX-STOCK—ALL PRICES INCLUDE POSTAGE



**SSB-ers:**

## increase talk power, cut "splatter"

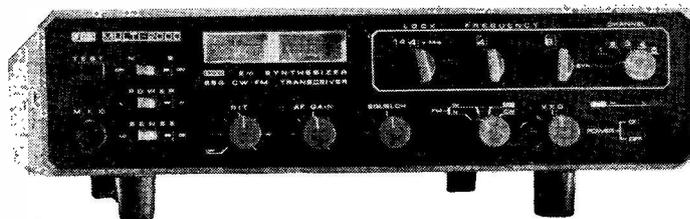


Our 444 base station microphone not only gives you increased talk power, but cuts "splatter" (and QRM complaints) to an absolute minimum! It has superbly tailored response, with sharp cutoffs below 300 and above 3,000 Hz and a rising response characteristic for maximum intelligibility. The 444's rugged, reliable Controlled Magnetic element has been proved in safety communications, and other tough professional communications applications. It delivers a clean signal to the transmitter at levels as high as crystal units! (And, unlike crystal and ceramic units, the element is totally immune to the effects of temperature and humidity.) The 444 also features an adjustable height stand that makes for comfortable "ragchewing" sessions, an optional-locking bar for push-to-talk or VOX operation, and a practically indestructible Armo-Dur® case. Write:

Shure Electronics Limited  
Eccleston Road, Maidstone ME15 6AU



# F D K MULTI-2000



**F.M.  
S.S.B.  
C.W.  
£230 + VAT.**

Full coverage of 2m. CW, FM and SSB. 200 channel phase locked oscillator (10 kHz steps) with VXO gives full coverage both Rx and Tx. 5 crystal channels for repeaters, local nets, etc.

Digital readout, effective noise blanker, both AC and DC operation, centre reading discriminator meter 10W output.

U.K. AGENTS **LOWE ELECTRONICS**

119 Cavendish Road, Matlock, Derbyshire, DE4 3HE

## Waters & Stanton Electronics

### MINI-BEAMS

A "best seller." No QTH is too small :  
20-15-10 metres  
6ft. turning radius  
Wide bandwidth  
Within the next few weeks all models should be available at the following stockists :-

1.5 kW rating  
No traps  
Choice of models

#### Mini-Beam Stockists

Amateur Radio Shop, 13 Chapel Hill, Huddersfield.  
Holdings, 39/41 Mincing Lane, Blackburn, Lancs.  
J. & A. Tweedy Ltd., 79 Chatsworth Road, Chesterfield, Derbyshire.  
S. May Ltd., 12/14 Churchgate, City Centre, Leicester.  
Amateur Radio Bulk Buying Group, 20 Thornton Crescent, Old Coulsdon, Surrey.

### TRIO HF EQUIPMENT

#### New Low Prices

TS515 Transceiver plus p.s.u. ... ..	£231-00
TX599 Transmitter ... ..	£176-00
JR599 160-2 metre receiver ... ..	£165-00
9R59DS All band receiver ... ..	£51-75
TL911 2kw Linear ... ..	£172-00

### VHF

**J-BEAMS.** Most models ex-stock.

**STOLLE ROTATORS** plus cable.

### MICROWAVE MODULES

2 metre converters. 4-6 IF and 28-30 IF ... ..	£16-72
70 cm. converters. 28-30 IF ... ..	£19-91

### SOLID STATE MODULES

2 and 4 metre converters. 4-6 IF and 28-30 IF ... ..	£15-12
70 cm. converters. 144 MHz IF ... ..	£15-12

### DON'T FORGET

★ Barclaycard welcome—simply quote your number.  
★ Full H.F. Facilities—20% deposit—up to 3 years to pay.  
★ All our Prices include VAT.  
★ Securicor 24 hour delivery available.

### "MAGNUM SIX"

The only R.F. Speech Processor available in the U.K. Up to 400% effective power increase—Send S.A.E. now.  
Models to suit Collins, Heath, Yaesu, Trio and Drake.

★★ Less than half the price of a linear and just as effective !

**GOTHAM QUADS.** 20-15-20 metres. All metal (£1-50) **£27-50**

<b>NEW</b>	<b>COMPACK 80/40 DIPOLE</b>	<b>£9-90</b>	<b>NEW</b>
<b>NEW</b>	S.A.E. for details		<b>NEW</b>

<b>NEW</b>	<b>NEW</b>
THE SUPERB <b>CWF-28X AUDIO FILTER UNIT</b> FROM U.S.A.	
SWITCHED SELECTIVITY DOWN TO 80Hz BANDWIDTH.	
CONVERTS SSB TRANSCEIVERS FOR CW USE AND ENHANCES SSB IN WIDEST POSITION. COMPLETELY ENCASED SMART UNIT. SIMPLY PLUG IN PHONE SOCKET. WIDELY ACCLAIMED IN THE STATES AS THE BEST AVAILABLE.	
<b>NEW</b>	S.A.E. for details. <b>NEW</b>

### SUNDRIES

High Power Wightraps ... ..	(p.p. 20p)	£3-68
"Milliwatt" subscription QRP journal ... ..		£1-60
1 1/2" ferrite rings ... ..		23p
HP2A TVI filters ... ..		£1-43
50 ohms coax... ..	yd.	15p
300 ohm feeder ... ..	yd.	7p
PL259 plugs (genuine amphenol) ... ..	ea.	35p
Insulators ... ..	ea.	10p

**HOCKLEY AUDIO CENTRE . 22 SPA ROAD . HOCKLEY . ESSEX**  
Tel. 03704 6835

# LOWE ELECTRONICS

MAIN DISTRIBUTOR FOR YAESU MUSEN EQUIPMENT

Head Office and Service Department (Bill G3UBO, Alan G3MME and John G3PCY)

**119 Cavendish Road, Matlock, Derbyshire, DE4 3HE**

Telephone : 9 a.m. - 9 p.m. Matlock 2817 or 2430

**Southern Sales** (Dave G8FAY)  
Goring Road, Steyning, Sussex.  
Telephone : Steyning 814466.  
Just off the A283 on the Shoreham side of the village.

**Midland Sales** (Peter G3XWX)  
Soho House, 362-364 Soho Road,  
Handsworth, Birmingham.  
Telephone : 021-554 0708

Just off Exit 1, M5—follow the A41 into town for 1½ miles to the Regal (Bingo Hall) Cinema. We are directly opposite, on the first floor. Within easy reach of the South-West or North-East by Motorway.

## NO PROBLEM PARKING AT ANY BRANCH

In addition to the above shops, which are open 9 to 5.30 Tuesday to Saturday, we have part-time Agents who are available evenings and weekends :—

**John G3JYG**  
16 Harvard Road, Ringmer, Lewes,  
Sussex.  
Telephone Ringmer 812071

**Sim GM3SAN**  
19 Ellismuir Road, Baillieston,  
Nr. Glasgow.  
Telephone 041-771 0364

**Alan GW3YSA**  
35 Pen Y Waun, Efail Isaf,  
Nr. Pontypridd, Glam.  
Telephone Newton Llantwit 3809

So, wherever you are, we have a branch or a part-time Agent not too far away. At Matlock, the Branches, or our Agents you will see and can try out the best in both new and second hand, H.F. or V.H.F. along with every conceivable accessory for the complete station.



## SIGMASIZER

In addition to holding all Yaesu H.F. equipment in stock, along with an unbeatable selection of second hand gear, we have the finest range of modern 2m. equipment in the country. As well as the Inoue, FDK, and Liner 2 advertised elsewhere in this issue we stock the Yaesu FT-2FB, FT-2 Auto, Sigmasizer, FDK Multi 7, Multi 8 and Multi VFO. The Sigmasizer is of particular interest to the F.M. enthusiast and we can supply this with either 200 channels 10 kHz apart, or, to conform with European standards, 80 channels 25 kHz apart. It is fitted with a tone burst and has two additional push button channels which may be programmed for any frequency (simplex or duplex) within the sigmasizer range. As standard they are programmed for the Repeater (145.15 Tx/145.75 Rx) and reverse repeater (145.75 Tx/145.15 Rx) but any channels may be incorporated to order. All this is in addition to the normal 80 or 200 channels. With the Sigmasizer you need never buy another 2m. crystal and this fact alone is worth the price of £198 to include V.A.T. and Securicor delivery.

Further details may be obtained from Matlock. Our catalogues are free but we would appreciate postage, etc., so please send 8p in stamps for our V.H.F. catalogue, 8p for our H.F. catalogue, 3½p for second-hand list, or send us 15p in stamps and we will send the lot.

STOP PRESS : VENUS SSTV IN STOCK

# TELECOMMUNICATION INTERNATIONAL AGENCY LTD.

**MURPHY FM 40 TR.** 12 channel FM transceiver for the 2MTR enthusiasts. Double conversion RX 0.5uV input for 20 dB. Sig./noise. Less than 1 dB. increase in AF output for 100 dB. change. >0.5uV. Tx output into 50 ohms >35 watts. Deviation adjustable 0-15 kHz pre-emphasis characteristic from 300HX to kHz relative to 1 kHz. Supplied complete with microphone, holder, etc. For further details send S.A.E. Price **£127.00** £1.50 carriage.

**MURPHY FM40 PA.** Add on RF amplifier. 10 watts input >35 watts into 50 ohms output. Aerial changeover carried out by RF sensing amplifier, will operate with as little as ½ watt input. Operated on 12.5v. DC. For further details send S.A.E. Price **£35.00** £1.00 carriage.

**LINER 2** Add on amplifier module comprising of 40 watt PEP amplifier and mosfet preamp for the RX extremely simple to use with any liner 2, but could be easily adapted for use with any TX/RX requiring more power and better sensitivity. Spec. Spec.:-RX preamp gain 20 dB NF <2.5 dB. Power Amplifier. 10 watts PEP input for 40 watts PEP output. Power requirements 12.5v. DC. Price **£62.50** £1.00 carriage.

**TWO TONE GENERATOR** Latest IC techniques used. An essential piece of equipment for achieving the maximum from your SSB equipment whether home made or manufactured. For further details send S.A.E. Price **£18.50** 50p carriage.

**2MTR MOSFET CONVERTERS** Overall gain of 30 dB. NF. <2.5 dB unit requires 12v. 20-30 MHz if output (others can be supplied on request). Kit and instructions **£8.00**. Built and tested **£12.50** 50p carriage.

**MURPHY ROVERS** High and low band HYBRID TX/RX. AM. QQVO3-10 PA. Transistor. 1F, inverter, audio, PSU, etc. Ideal mobile for 2 MTRS. Supplied with all accessories, in good condition. Boot Mount Price **£11.50** £1.25 carriage. Dash Mount Price **£15.00** £1.25 carriage.

**BASE STATIONS** QQVO3-20A in final, mid band ideal for converting to amateur use. Good condition. Price **£20.00** £2.00 carriage.

**ULTRA** Solidstate VHF TX/RX. Lowband dash or boot mounter 12½ kHz. As new. Price **£40.00** £1.50 carriage.

**GEC COURIERS** AM high band 1½ kHz in leather cases, complete with batteries and charger. 2 only at:— **£80.00** £1.50 carriage.

**DC STAB. SUPPLY** Small compact mains operated stabilised DC supply. Giving 12.5v. at 5 amps. Ideal for running mobile equipment as a base station. Price **£12.50** 75p carriage.

**NEW SLEEVED DIPOLES** Superb construction fit into 2" mast\* ideal for base station aerial. Price **£13.50** £1.00 carriage\*

**VHF WHIP AERIALS** Fibre glass aerials. Ideal for ¼ wave on 2MTRS. Please state band to be used when ordering. Price **£2.50** 50p carriage.

**MICROPHONES** New SG brown. Dynamic microphones PTT operation, robust construction with curly flex. Price **£2.50** 35p carriage.

**HAND SETS** New SG brown handsets. Price **£5.00** 65p carriage.

<b>TRANSISTORS Etc.</b>	PL 259 Sockets ... ..	21p
PT 4176D 44 watts ...	BNL Free Sockets ... ..	15p
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**Cambridge AM10D** Circuits of Tx, Rx, Inverter, etc., **55p** post paid.

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**PC Boards** (made by Solartron), containing minimum of 40 x BC107 on mounts (therefore longer leads), plus hundreds of min. ¼w. resistors (preferred values), caps. and diodes, good quality and good breakdown value. Not to be confused with common boards containing unknown, unmarked, large components, etc. **ONLY £1.00 per pack**.

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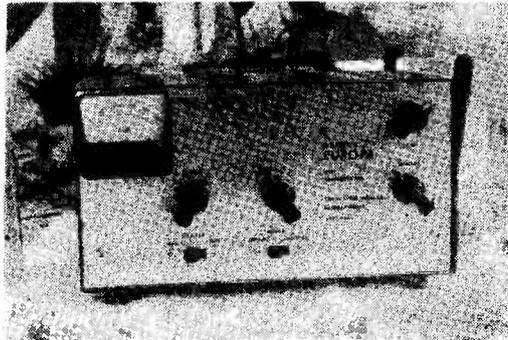
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As you will have seen from the new 2 metre band plan the SSB section is shown from 144.15 to 144.5 (385 kHz) with a footnote to the effect that the upper limit is flexible—extending up to 145 MHz. This, of course, recognises the fact that the use of SSB as a dx communication mode is growing as quickly on 2 metres as it did on the H.F. bands several years since. It is, therefore, important that your equipment can cover the whole band. The Europa will give you complete 2 metre coverage with 28-30 MHz H.F. equipment.



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To obtain any of our products. We can dispatch by return of post. (The postal service appears to have returned to normal). We give same day C.O.D. service. You can call in here any time to look at the gear. Or visit any of our retail distributors. Queries? Write or ring if you have any questions. Normal H.P. terms available. Paul G3MXG.

# AMATEUR ELECTRONICS G3FIK



**BIRMINGHAM 021-327 1497 021-327 6313**

Despite the new credit restrictions we are still able to offer on-the-spot hire purchase facilities at excellent interest rates and whilst the deposit has now risen to one third of the total purchase price please remember that your existing equipment taken in part exchange may well more than cover this.

This month we have a new selection of used equipment and have been successful in purchasing a complete batch of RACAL RA17 RECEIVERS and, as far as we know, are currently the only source in the country for these famous sets. To the RACAL enthusiast it would be unnecessary to extol the virtues of this incomparable receiver but for the uninitiated suffice to say that the RA17 is a professional general coverage communications receiver WITHOUT EQUAL regardless of price. This receiver has a superb specification as far as stability, selectivity, sensitivity, etc. etc. but its one outstanding feature is a 1 kHz read-out from 500 kHz to 30 MHz which coupled with its fantastic band spread gives the wonderful advantage of handling and performance on the amateur bands far superior to that found in many so-called amateur band sets—and all this in a general coverage receiver! For what it is worth, an RA17 has been the only RX in the shack of '3FIK for the last three years and it is as delightful to use now as the first day it was installed, which is an exceptional situation in our somewhat fickle hobby.

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Racal RA17 Receivers. Excellent condition ...  
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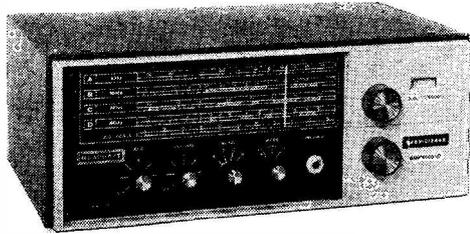
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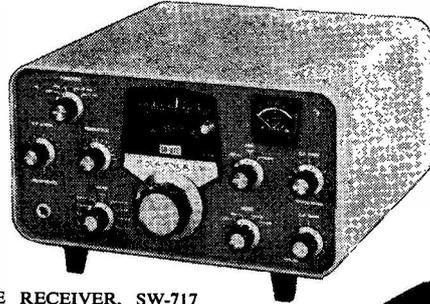
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SW-717



SB-313

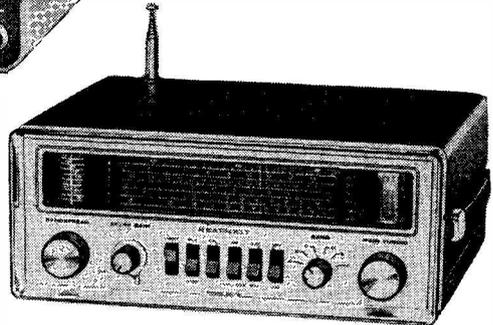
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GR-78

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SB-313 specification: Frequency range (MHz) 3.5 to 4.0, 5.7 to 6.2, 7.0 to 7.5, 9.5 to 10.0, 11.5 to 12.0, 14.0 to 14.5, 15.0 to 15.5, 17.5 to 18.0, 21.3 to 21.8. Intermediate frequency (IF) 3.395 MHz. Frequency stability less than 100 Hz per hour after 10 minutes warm-up under normal ambient conditions. Less than 100 Hz drift for  $\pm 10\%$  line voltage variation. Sensitivity: less than 0.5 microvolt for 10 dB signal-plus-noise ratio for SSB operation. Selectivity AM 5.0 kHz at 6 dB down. 15 kHz maximum at 60 dB down (crystal filter supplied). SSB 2.1 kHz 6 dB down, 5.0 kHz maximum at 60 dB down (crystal filter available as an accessory). CW 400 Hz at 6 dB down, 2.0 kHz maximum at 60 dB down (crystal filter available as an accessory). Image rejection: 60 dB or better. IF rejection 3:395—greater than 55 dB. 8:595—greater than 40 dB. Spurious response: all below 1 microvolt equivalent signal input except at 10.0 MHz and 15:375 MHz. Dial accuracy: electrical—within 400 Hz after calibration at nearest 100 kHz or 25 kHz point. Visual—within 200 Hz. Calibration every 100 kHz or 25 kHz. Dial backlash: no more than 50 Hz. Antenna input impedance: 50  $\Omega$  nominal unbalanced. Audio output impedance: matching speaker 8  $\Omega$ . Matching headphones low impedance. Audio output power: 4 watts at less than 10% distortion. Muting: open external ground at Mute socket. Power requirements: 105 to 130 or 210 to 260 volts A.C., 40 watts max. Overall dimensions: 7 15/16" H x 12 1/4" W x 14" D.

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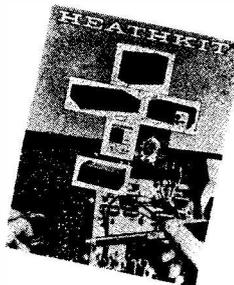
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**NOTE:** 10% VAT must be added to all prices, new and secondhand, inc. carr. and packing.

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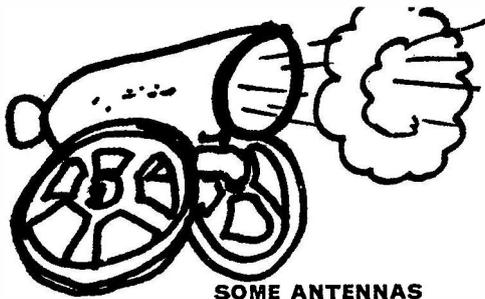
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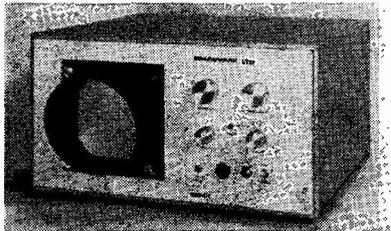
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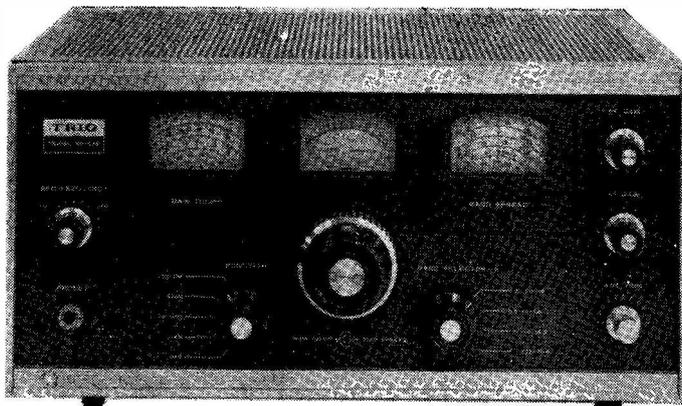
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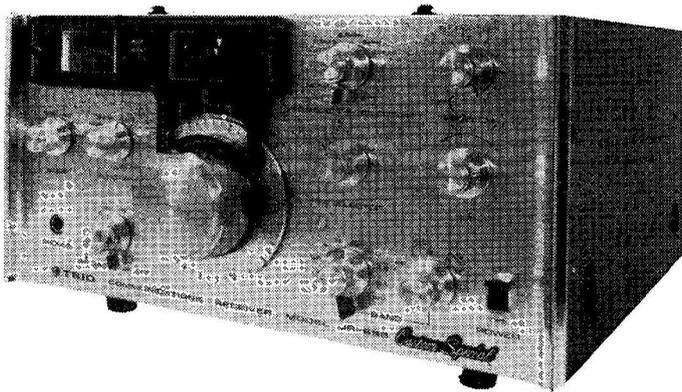
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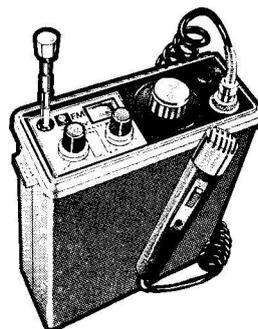
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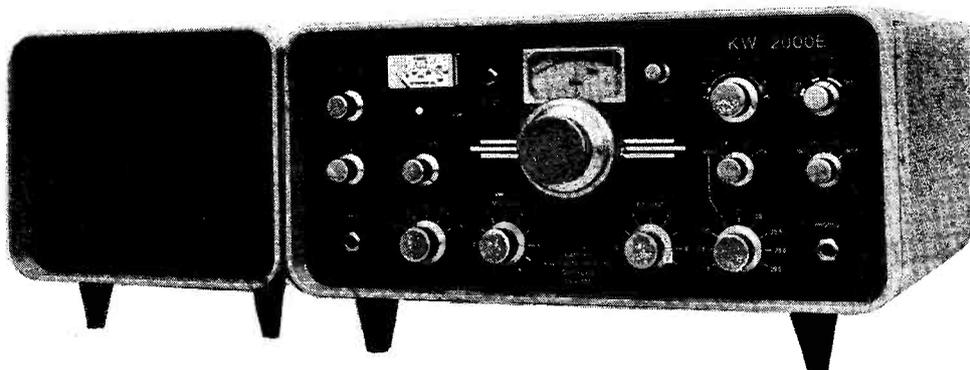
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E D I T O R I A L

***Difficulties***

Again with this issue, we have had to contend with the dislocation caused by the current industrial frustrations—the short-time working, the power restrictions and the delayed mails, directly affecting periodical production. As well as these immediate troubles, there is an impending shortage of paper, with a steep price increase forecast.

As ever, it is not made clear to the public at large that the mails are directly affected by the rail go-slow—it means, roughly, that because of the Sunday stoppage on the railways, mail posted on Friday for outside the local area may not be delivered till Tuesday, whatever class it may be stamped.

It is also not understood by people generally that while newspapers can continue publication unaffectedly, periodical production comes under the three-day work control. Since printers normally work a six-day week, there is only about half the time to get through the usual amount of work.

\* \* \* \* \*

Not only is this issue late, but we have also had to curtail much advertising in order to reduce the setting and machining work involved in its production. And so it will have to continue until things return to normal.

In the circumstances now prevailing, we can give no guarantee of future publication—all we can say is that we will continue to do our utmost to maintain a monthly appearance and, in the event of an issue having to be missed (which seems quite likely on present form) all direct subscribers will, of course, have their subscriptions extended accordingly—and that alone would be a considerable office chore, to be avoided if at all possible.

*Austin Forsyth  
G6FO*

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# COMMUNICATION and DX NEWS

*E. P. Essery, G3KFE*

AS this comes to be written, many DX'ers are all but shut down for fear of wrecking PA valves by under-running heaters, or because of the reduced input attainable under lower-voltage conditions, or having to work at times normally reserved for DX'ing because of the impact of the three-day week, or a station receiver less than usually stable under varying voltage conditions, or even TVI caused by low voltage applied to rig or TV set. It's all due to the elaborate ritual dance called politics—but when these antics result in an inability to work DX, well now, that is quite another matter altogether. While radio amateurs in this country are forced to stand idly by, wailing and gnashing their teeth, there are perfectly good DX-peditions going begging for contacts. Someone should explain about amateurs, and we could perhaps be exempt from all these rules and regulations about saving fuel. Sorry, it's just a pipe-dream, after looking outside, finding the gales have broken off a couple of radials, rain is pelting down and generating S7 static, and the game seems hopeless!

But all is not lost; we still have our faithful band of supporters from round the globe, some of whom at least have taken pen to paper to recount their profits and losses.

## Twenty Metres

When all else fails, and hope is all but gone of working the elusive DX-pedition, this is where they lie and wait. Thus, G2BON (Aldridge)—who, incidentally, has been a reader since the very first issue of the *Magazine* and has therefore "seen off" a brace of previous DX correspondents(!)—found his rig to be "in need of a de-coke and a new set of plugs" and so stayed mainly on Twenty SSB where the gremlins seemed to be least active. This way, he worked KP4DOK, SM4CGA/YV5, WB4QWM/MM1, UK7GAA, VE3EWY, VE1EL, VK2LW, VK3ART, UN1CC, CI1GV, 9Y4CR, 4W1BC, A4XFD,

WB2WOZ/MM2, CE2NM, TF3OJ, VE2CSJ and UL7IAF.

GM3CFS (Eday Island, Orkney) sends in a very welcome report from his part of the world. Jim is in a caravan, exposed to the elements from all directions, and with winds which most of us would shudder even to think of! Any question of beams or Quads is out, and indeed at the time of writing there was an RV4 vertical with a permanent bend in it caused by wind-pressure. The GM3CFS solution to the aerial problem is the use as main aerial of an inverted-Vee of 416 feet at 60 feet high, fed with 600-ohm feeder, backed up by smaller 1½-wavelength Vees to fill in the nulls. Such a set-up, of course, needs space, and strength—so far it has withstood three storms gusting to hurricane force but has needed the feeders repairing three times. During the *CQ WW CW* contest, Twenty for GM3CFS was best represented by his contacts with KH6CD, TU2EB, 9G1HE and PJ8WW.

Twenty CW is the band and mode for G3UZ (Goring-by-Sea) who has been finding the voltage drops make it difficult to work the DX. However G3UZ did connect with PJ1VD, CX1EK/KP4, FM7WO, PY1NFF, PY7AHO, OD5BZ, SV1WBB, WA3GHC / TF, UD6DJT, UK6AAY, UA6ADF, UK6HAK, UK6HAR, UK6AAR, UA6BH and W6EBG, our old friend of G6QB days.

By looking at the band between the hours of 0800 and 1900z, G3RFG (Henlow) piled up quite an impressive list of DX. He worked CI1ATX, JA2FCM, K1JIV, K4SU, K6WD, K8MNH, K9OTB, TI2MV, UK9UAI, UKØLAK, VE1AQN, VE2UN, VE3EQF, VE4MF, VEXG, W2ZT, W3MIX, W5KC, W6EZM, W6SO, WA6EQP, W7BE, W8CCN, W8LZV, WØFQK and ZS1ANT of Sanae Base, Antarctica. On the gotaway side, Stan notes HP1MN, several W6/K6, VK2HK, VP9GK, ZL1BLS, ZL2AI, ZL4CP, and ZM1ADD.

G2NJ (Peterborough) continues his hunts for the /MM and the QRP stations. This time, on Twenty, Nick mentions G5WQ (Stockport) as having raised JA1LCN/MM, off Tasmania, a tuna-fishing boat; the contact would have been of extra interest to G5WQ who was himself on ships back in 1929.

Not a lot to report, says G2HKU (Sheppey), but Ted still presses on in approved fashion. This month saw the G2HKU signal on all bands down to 14 MHz, on which last he found AX3XB on the key, plus SSB with JH1SJN, ZL1VN, ZL3RS, ZL3SE and 9H1DV.

There are a couple of letters this time from GW4BLE (Newport, Mon.). Stephen only worked one on Twenty in the November period, in VK9ZC (Willis Island), who has now gone QRT. QSL cards for him go via VK3AH, quoting the QSO number; for GW4BLE a card in reply took just a week to appear.

G3YRR (Grimsby) seems to have been somewhat inactive over the last few months for one reason or another, at least in DX terms; however, Charles is not one to stay out of the scene for long, and to make his impact on the bands a little more positive he now has a Mini-Quad swinging proudly over one end of the house. This should give G3YRR the incentive to make a return to the DX trail in evaluating it.

On an entirely different line, G3FYR (Petts Wood) has been looking at his present QTH in terms of its DX possibilities as compared against his earlier ones. His FT-101 + trap dipole gave an interesting *ground-wave* contact when he swapped reports with G3LBQ (Brentwood) over a forty-mile path, both on CW and SSB.

## Now Fifteen

GM3CFS is not the man to be kept away from a contest by the weather, as those who listen on the bands well know; he put in entries for WAE, the 7 MHz affair and of course the *CQ WW Contest*, both



### Forty Metres

GM3CFS used his big Vee to good effect during the *CQ WW CW* contest on Forty, accounting for PJ1AA, 9Z4AA, OX3JW, UK9CCC and W5QQQ/7.

Just one 40m. contact was considered worth a mention by G2HKU this time, this SSB with YV4AGP.

From GW4BLE we note contacts on SSB with TF5TP, PY2ELZ, PY4UP, ZL1AGO, EL8G, YV4TI, TY2DO and 8R1AG, all booked in during two morning sessions with the FR-400DX into the FL-2000B and 18AVT aerial. For the immediate period, Stephen stuck entirely to Forty and found the band excellent during 0730-0830z, with JA and ZL coming in well over the long path. It all added up to CE3ED, CR4BS, CT3AB, CN8CG, CT3AR, CX3CJ, EA6CF, HC2TV, HC2VL, HV3SJ, IT9GPP, two full lines of JA's, LU4AIQ, LU5ACL, LU5EJX, LU6BAB, OA4AHA, OA4ABZ, OA4AHZ, OA4OS, PY1BA, PY2ELZ, PY4PA, PY1ZAE, TG8IA, UC2CS, UR2AO, VK2AVA, VK2WC, VK7GK, W2HCW, W3JXH, WB4CFM, WA0KKA/9, WB8FWQ, XE1LC, YV1EJ, YV4TI, YV6MS, YV7GX, ZL1AGO, ZL1BAF, ZL1BMU, ZL2BCO, ZL1ZL, ZL2BT, ZL4NH, 4Z4ME, 5U7BA, 5U7BB, and 8R1AG. (This is just to show those interested what there is about on 40 metres, and *not* to take up space!).

### Now On Eighty

One of the odd things about amateur-band activity is that while quite a proportion of the world's licensed amateurs at some time or other make the effort to chase DX—and indeed even the non-chaser will go after a rare 'un if it pops up under his nose—there is still a large proportion who do not have any idea of how to keep out of the way of such activities on Eighty, Forty, or Top Band. On Eighty, the CW DX is usually found at the LF end of the band, 3500—3510 kHz, because the DX types realise that 80m. is primarily devoted to nattering and they don't want unwittingly to bust up someone's local rag-chew. This being the case, with modern equipment giving readout accuracy to better than 1 kHz, why is it that a

## Reporting the HF Bands

three-way ragchew should be set up on 3506-3508 kHz, other than pure innocence, or ignorance, or sheer don't-care? The three perpetrators of this enormity are all personally known to your scribe, and he is prepared to bet that they just didn't know what they did wrong, until they were told. On SSB, the DX working is around 3795 kHz, and it is to everyone's benefit for the local natterers to keep clear of that segment—after all, there is plenty of room for all the local traffic over the rest of the band. One could argue about the SSB DX working that one does not like the Net idea as a way of getting the QSO's, but when all is said and done the DX Net does at least conserve band-space by their methods. It is not much to ask for the reverse courtesy also to apply.

On the QRP theme G2NJ continues his hunting out of low-power operators. This time he has CW contacts to note with G3YIO/A, Castle Bromwich, using two watts from a pair of bell batteries and G4BXW in London also on two watts. Nick has made up a list of all the OT's worked in the last three months of 1973, by way of G2, G5 and G6 calls. In the period reviewed the total was about fifty, being of 16 G2's, 24 G5's and 8 G6's. Familiar calls noted among the list were G2UV and G5PP, both recently out of hospital. Best wishes to both of them.

G3RFG in his earlier letter indicated that he had spent some time on the CW end of Eighty in the mornings—his catch included FG7TG, K9UIY, VE3BBN, W2CXM, W3GRS, W3KQF, WA3SWF, W4BTZ, WA4DME, WB4UOA, WB4QNP, W5KFL, W5MCO, W8BQV, W8HRQ, W9BQM, WA0WOA and YV1AD. Nice going for Eighty!

GM3CFS tried the band during the CW leg of the *CQ WW Contest*, and there ran up against 4L8A (Turkoman), WA3GHC/TF and

many W1-W4.

G2HKU used SSB only to hook up with 5B4FF and 9H1BX.

### The Top Band

Still using his "5RV aerial," G2HKU managed to get among the winners on this band—he made a SSB QSO with PA0PN, and keyed with DJ4KWA, HB9AOD, OH1SJ, OK1FCW, OK2SBJ, PA0RCH, GW4OH and VO1KE. Ted obviously thinks it a bit rare to get over the pond on Top Band with his sort of aerial, because he remarks that he caught VO1KE and OH1SJ when they were both calling CQ and before the rumpus got well going!

Nice to hear once again from G3SVK (London, E.17) who seems to have been making music instead of dots-and-dashes since last we heard of him. However, Fred got quite a thrill out of the summer Trans-Equatorial Tests, during which he KV4FZ, ZP9AY, LU5HFI, PY1RO and VP8HF for new ones, although the listening sked with ZS6KE on 1912 kHz failed, probably due to the Loran noise at the South African end. ZS6KR is hearing plenty on 1825 kHz, but is not getting over to the U.K.—he thinks because people do not listen at his frequency? HZ1KE, DL2GG/YV5, PY1RO, VE1CD, VE1MX, VE3EK, and W1, W2, W3, W4 call areas have been booked in more recently, also W8, W9 and in Europe OH2BM. This brings the G3SVK countries total to 22, even though Europeans such as GC's, 4U1, HB0, OH0, ZB2, ZC4, 9H1 and so on have yet to be worked.

That special-activity station at Cheltenham Ladies College, signing G3XYL/A, came unstuck on Parents' Day, the reason being the 'flu-type bug, which laid low most of the girls and the staff, and caused the College to be closed at the set time. G3XYL is the geography mistress at the College and wife of G2FWA, well known for his occasional contributions to the *Magazine*.

Activity from the home station has been much more rewarding of late, says GM3YOR (Kirkcaldy), who not only got into the DX on CW but was also pleased to hear some of it being dealt with on SSB. The tally looked something like this: EP2BQ, KV4FZ, K1CPF, W1BB/1 twice, W1HGT, W1MX, W2DEO, W2LWI, VE1AXT, VE1CUD, and VO1KE twice, plus Europeans like OK/OL in quantities, DJØWJ, DLØRZ, OH2BM, PAØHIP, and PAØCC at 1400 one afternoon.

By the time we come to be read, the *CQ WW 160 Contest* over the weekend January 25-27 will be an event of the past, but you have until February 28 to mail your log to "CQ 160 Contest," 14 Vanderventer Avenue, Port Washington, L.I., N.Y. 11050, U.S.A.

G3ORP (Maidstone) stuck to his key, and to the intercontinental stuff, which meant he was able to raise W2UEZ, W2PV, K1NOL, K1RQE, W1TX, WA2WLN/2, K1PBW, W1PL, K2ANR, W1ZLG, W4EX, W2IU, WA4DLM, W1HGT, VO1KE, VE3AZE, VE1CD, EP2BQ, WA4SG (for whom the report was but 359 thanks to QRM from other W4's!) and VE1AXT, the latter being a rather shaky 229-both-ways effort.

An interesting letter from W1BB indicates that JA1MCU and WØBFL made a contact on December 1st, the W also hearing JA3NQ and JA2GQO. It appears that WØBFL used a loop aerial for reception, with his own modifications to help combat the effects of the local Loran, against which the loop gave 40 dB of discrimination—although it is also admitted that the JA was heard quite clearly on the transmitting aerial. For himself, W1BB gonged up country No. 116 on Top Band when he made it to 4X4NJ. During the *ARRL 160 Tests* 4X4NJ worked thirty stations in ten countries and three continents before his PSU blew up just at the sunrise peak period. One assumes that if repairs could have been effected it is likely that 4X4NJ would have been there for the *CQ WW 160* affair just past.

It is a long time since last we heard from GM31AA up in Inverness; however, Jim is still pounding Top Band brass and doing things to get the signal from there to radiate well to DX, and he says it has all been worth while in bringing him more DX on the tough band. We Southerners have to remember not only that radiating a signal from a site up there in the north of Scot-

land is a bigger problem due to ground conductivity, or rather lack of it, but also, and one would think quite as important, there is the time differential which means that the sunrise peak to, say, the U.S.A., occurs at a time when, on that side, people are packing up, thinking the band now closed. It is quite a large time differential, and it would be very interesting to prove the theory by setting up skeds with stations over there and logging results and times of contact as compared with the peak time for we Southerners. GM31AA has actually worked in the last three years 9Y4NN (1970), SVØWE (early 1971), and in January 1972 came contacts with EQ2BQ and K1PBW (on the same day), and then W1BB and W1PL, the latter being now booked in on all six bands. 1973 was more fruitful, K2GNC starting the ball rolling, then came W1SG and VE1MX. The summer 1973 DX tests saw GM31AA catch ZB2A as he started up, followed by contacts with 5Z4KL and PY1DVG. On to November, and QSO's with KV4FZ (after fifteen tries), W1HGT, VO1KE (as early as 1915z—very early indeed) VE1CD, another contact with EP2BQ, and then a winter blizzard

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Shin Masuda, JA2PH, 6330 Sakakibara, Hisai, Mie, Japan, is another of the keen JA DX-operators, running modern gear.

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brought down the aerials and in the process bent a mast so that all DX activity is now stopped until Summer 1974 gives good enough weather to set about repairing the broken mast and installing the Strumech sixty-foot tower. So now, you easy-living 14 MHz DX types, know how it is done on our "Grand-dad's Band"!—which, in fact, is one of the most difficult bands of all in the context of real DX.

### Contests

Slated for February 24, 0900 to 1200z, is the Sheffield Contest, on either 3.5 or 144 MHz, with the 80m. activity confined to 3.650-3.750 MHz. The general aim is for those outside Sheffield to work those *in* Sheffield, and all the details can be obtained from G3PHO, *QTHR*.

For latest details of the GI6YM award, covering all bands, apply G13GTR, *QTHR*.

### QSL Addresses

Mainly from G2BON this time: *WA3UCF/VO2* to *VO2AS*, Goose Bay Amateur Radio Club, P.O. Box 232, Goose Bay, Labrador; *7X2BK*, to *CN8CG*; *HR3JJR*, P.O. Box 207, La Ceiba, Honduras; *HR1SP*, *QSL via W5GTW*; *TJ2MEF*, P.O. Box 754, San Juan, Costa Rica; *9X5SP*, P.O. Box 420, Kigali; *4W1BC*, to *G3SUW*; *VP9HH*, to *W4WWG*; *CE2NM*, P.O. Box 3016, Valparaiso, Chile; and *MP4BJR* to *K9KXA*.

\* \*

Changes to prefixes fall to be mentioned next. P2 comes up now to replace the old call-allocations for Papua and New Guinea. Some stations active out there include P29EM, Port Moresby, Papua; P29CK from New Guinea, P29FH and P29MC.

Another new prefix is the "special" of VX, allocated to VO stations to

commemorate 25 years in the Canadian Federation.

One wonders when we could have a Special Prefix for, say, the G6's still extant who have been licensed for more than 40 years—there are only about 200 of them—or (with respect to Her Majesty) the number of years the Queen has been on the throne, this latter to include the G8's. (After all, this sort of "special commemoration" nonsense is no worse than the way commemoration stamps are now being issued by the Post Office.—*Editor*.)

### More Snippets

G3YRR offers some comments on the SWL's. One such lad was listening to one of Charles's Top Band QSO's, which G3YRR was having difficulty with, as one station had his aerial down and the other was plastered in QRM. Not only did SWL Brian Thompson give a good report to G3YRR, but he also came up with a tape of the whole contact just in case it were needed. A promising lad, who is taking R.A.E. this year. G3YRR reckons that in general the best SWL reports he gets are from the Iron Curtain countries.

\* \* \*

Harking back to our comments in December about the number of SWL's who do not listen on the bands at all until they have got their pass slip for R.A.E., GW4BLE proposes a solution of some interest. Stephen suggests that he learnt no end during his five years as an SWL, and thinks that a novice should be allowed to operate a Club station under supervision, rather as is done in the Iron Curtain countries, before being permitted to set up his own rig. The budding amateur would be required, say, to confirm 100 countries by QSL card and to have operated satisfactorily in contests, under the supervision of a full-licence holder, for a three-year probationary period. Perhaps too, some sort of operating-lore questions

should be asked in RAE, covering such matters as prefixes, and knowledge of special frequencies not covered in the licence but which the good operator will steer clear of, such as the SS/TV and RTTY frequencies. Certainly such a test would help to remove from our ranks the inevitable "lid" types. But as much or more could be achieved simply by *telling* people when their operating is a bit shoddy, and by setting a good example—after all, there are very few of these "lids" who want to be so classified as such by the rest of the fraternity.

Certainly of late years there has been a very noticeable slide in operating standards on the HF bands, and it is not by any means due entirely to stations behind the Iron Curtain—some of the liddery is no doubt accidental or due to ignorance—after all, if one listened until one was *sure* a given frequency was clear before launching a CQ or other call, then no-one would ever put out a call! On the other hand there is no doubt that some of it is a combination of bloody-mindedness and plain spivvery.

### Sign-Off

And there it is again. Our thanks are due to all those reporters who wrote in with their news before they had received their copies of the January *Magazine*, and so helped your scribe to put something together for this month's offering. For next time, your deadline will be **immediate**, addressed as always to "CDXN," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18-1RQ. See you then!

### PLEASE NOTE!

We much regret that under the present difficulties of production we are unable to say when the next issue will appear. At the moment of writing, we are faced with office black-outs, short-time working at our printers and slowed-up mail deliveries. We continue to do our best to keep the wheels turning and the fire in! *Editor*.

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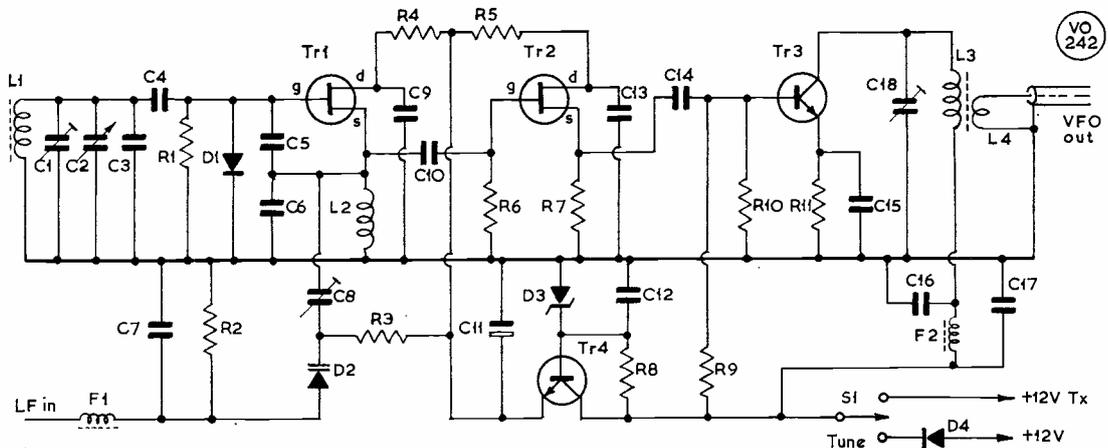


Fig. 1

**Table of Values**

Fig. 1. Circuit of the 24 MHz VFO

C1, C8 = 25 $\mu$ F, trimmer	R11 = 180 ohms
C2 = 10 $\mu$ F, tuning	F1, F2 = Ferroxcube (RF) chokes
C3 = 100 $\mu$ F, mica	D1 = BAX13
C4 = 180 $\mu$ F, mica	D2, D3 = BA102
C5, C6 = 150 $\mu$ F, mica	D4 = Germanium diode
C7, C9, C12, C13, C15, C16 = .01 $\mu$ F, ceramic	Tr1, Tr2 = BFW10, or TIS34
C10 = 18 $\mu$ F, mica	Tr3 = BF194, or 2N3563
C11, C17 = 10 $\mu$ F, elect.	Tr4 = BC107, BC108 or BC109
C14 = .001 $\mu$ F, ceramic	L1 = 5 turns 18g., 10 mm. dia.
C18 = 60 $\mu$ F	L2 = 10 mH RF choke (see text)
R1 = 100,000 ohms	L3 = 18 turns 18g., 10 mm. dia.
R2 = 3,200 ohms	L4 = 3 turns on L3.
R3, R6 = 120,000 ohms	
R4, R5 = 100 ohms	
R7 = 1000 ohms	
R8 = 680 ohms	
R9 = 12,000 ohms	
R10 = 4,700 ohms	

THIS article discusses a complete two-metre transmitter with BLY transistors in the final. Circuitry and all essential values are given.

Fig. 1 shows the circuit of the 24 MHz VFO. Transistor Tr1 oscillates on 24 MHz and Tr2 serves as a source follower. Tr3 is a straight amplifier on 24 MHz. Tr4 functions as a voltage stabiliser with D3 in the base circuit. Coil L1 must be varnished and L2 must not be a ferroxcube device but an HF choke of about 100 mH. (over)

**Table of Values**

Fig. 2. The Two-Metre Transmitter

C1 = 0.60 $\mu$ F, trimmer	R1 = 1000 ohms w/wound potentiometer
C2 = 47 $\mu$ F, ceramic	R2, R3 = 27 ohms, $\frac{1}{2}$ w.
C3, C7, C8, C9, C11, C12, C14, C15 = 0.25 $\mu$ F, trimmer	F1-F9 = Ferroxcube choke
C4, C6 = .01 $\mu$ F, ceramic	Tr1, Tr2 = 2N3563, or BF194
C10, C13 = 680 $\mu$ F, ceramic	Tr3 = 2N2219, or 2N4427
C5 = 680 $\mu$ F, ceramic	Tr4 = 2N4427, or 2N3866
C16 = 10 $\mu$ F, elect.	

**TWO-METRE Tx WITH VFO DRIVE**

**GENERAL DESIGN CONSIDERATIONS**

B. ZWERVER, PA0ZHH

(Translated by A. H. Dormer, G3DAH)

**TABLE OF COIL DATA**

L1 = Three turns at cold end	L2 = 18 turns 18g., 10mm. diameter, tapped 10 turns from cold end.
L3, L4 = 5 turns 18g., 10mm. diameter, centre tapped.	L5, L6 = 5 turns 18g., 5mm. diameter.
L7 = Three turns, 8mm. diameter.	L8 = Four turns, 8mm. diameter.

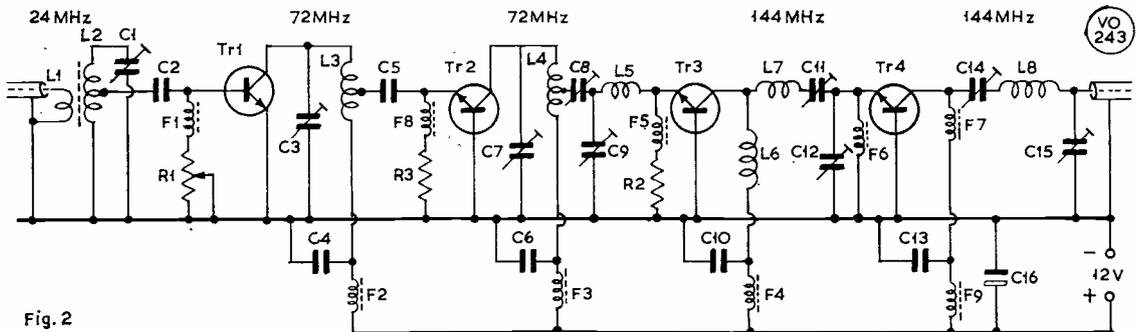


Fig. 2

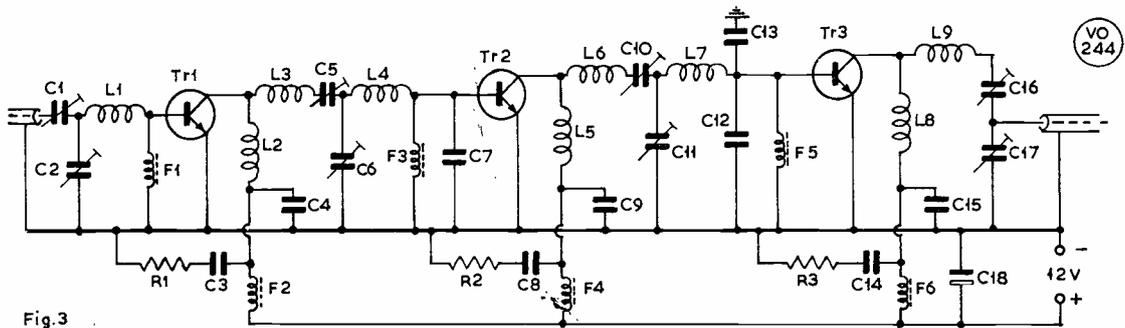


Fig. 3

In the "tune" position, a Ge diode is placed in series with the supply. This results in the application of the same voltage as when the complete transmitter is on, so enabling the VFO to be netted exactly. Transistors Tr1 and Tr2 may be almost any FET type. The oscillator frequency is determined mainly by the value of C4. On "receive," the whole VFO is switched off, but if an external VFO is used only Tr3 need be disconnected. For this transistor (Tr3) practically any of the BF types will be suitable.

The two-metre transmitter proper is shown in Fig. 2. Tr1 triples the 24 MHz signal to 72 MHz, and this is amplified by Tr2. The resultant frequency is doubled to 144 MHz by Tr3 and then amplified in Tr4. The output amounts to between 100 and 200 mW. (Note that the linear amplifier requires an RF input of about 75 mW). Here also, any HF type transistor will serve for Tr1 and Tr2, and for Tr3 and Tr4 also, provided that the TO5 outline is used. Tr4 must be fitted with a heat sink. Coil L2 is close-wound and coils L3 and L8 are wound with 1mm. spacing between turns. The trimmers are Philips beehive types.

At Fig. 3 is the circuit of the linear amplifier. The 144 MHz signal of between 100 and 200 mW is raised to about 15 watts with a supply voltage of 12v. If the supply is increased to 13.5V., the output rises to about 20 watts. Tr1 must be fitted with a large heat sink and Tr2 and Tr3 bolted to a sink of at least 100 cm<sup>2</sup> of copper or aluminium 2mm. thick. If possible, this sink should be secured to the chassis or case. The emitters of Tr2 and

### Table of Values

Fig. 3. Transistor Linear Amplifier for Two Metres

C1, C2,	R1, R2,
C5, C10 = 0.25 $\mu$ F, trimmer	R3 = 10 ohms, $\frac{1}{2}$ w.
C3, C8,	F1-F6 = Ferroxcube
C14 = 0.1 $\mu$ F, elect.	chokes
C4, C9 = 100 $\mu$ F, ceramic	Tr1 = 2N3866, or
C6, C11,	2N4427
C16, C17 = 0.40 $\mu$ F, trimmer	Tr2 = BLY87, or
C7, C12,	BLY88
C13 = 47 $\mu$ F, ceramic	Tr3 = BLY89, or
C15 = 150 $\mu$ F, ceramic	BLY90
C18 = 100 $\mu$ F, elect.	

### TABLE OF COIL DATA

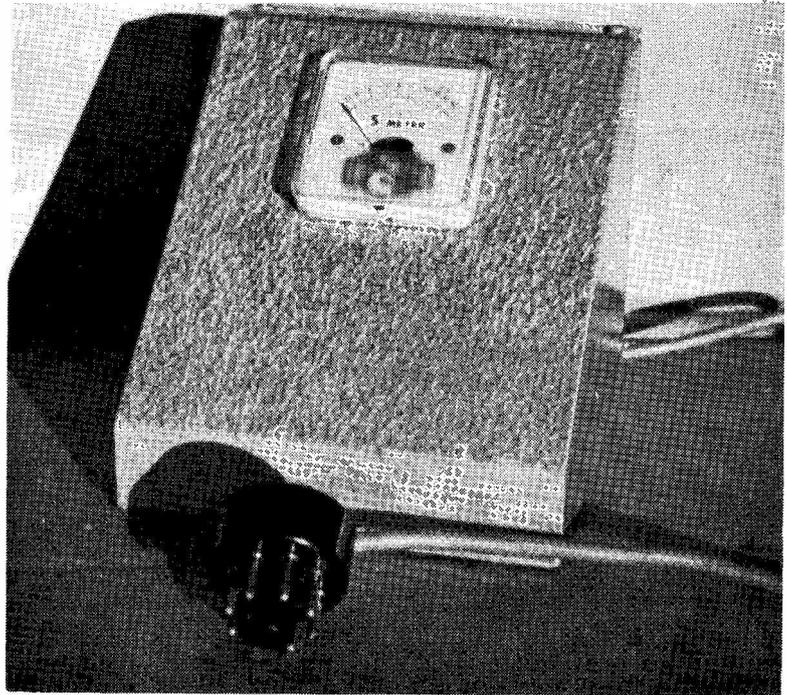
L1	= 2 turns 18g., 8 mm. diameter, spaced 1 mm.
L2, L5, L6	= 2½ turns 18g., 10 mm. diameter, spaced 1 mm.
L3, L4, L7	= 2 turns 18g., 10 mm. diameter, spaced 1 mm.
L8, L9	= 3 turns 14g. silver-plated, spaced 2 mm.

Note: Coils will probably require slight trimming and spacing adjustment to achieve resonance.

Tr3 must be soldered as close to the board as possible. This board should not be too small—say, 7 x 14 cm. epoxy 2mm. thick. Some unmarked BLY87's will not work in this circuit. In this case L5 must be changed to 13 turns, 5mm. diameter of 0.5mm. copper wire. Here again, Philips beehive trimmers are used, but it is recommended that C16 and C17 should be of good quality with a better-than-usual temperature characteristic. The supply voltage does not need to be switched off during reception.

**Though for this issue we have had to suspend, for space considerations, our usual Book Advertising, details and up-to-date post-free prices for all titles we handle will be found on the cover and several inside pages of the January issue of "Short Wave Magazine"**

Finished appearance of  
the S-Meter

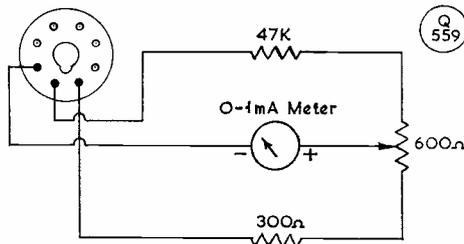


### PLUG-IN S-METER

SUITABLE FOR MOST  
EDDYSTONE RECEIVERS

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

OF the large number of Eddystone receivers in use, most types are fitted with a rear socket for the connection of a signal strength meter. Receivers with which this accessory may be used include the 640, 740, 750 and 888A, and all employ the same connections. As the intended S-meter can be by no means easy to obtain, one may be constructed using the circuit below.



Circuit of the Plug-In S-Meter

The H. L. Smith Type "U" sloping front case, 4 x 4 x 4 ins. (see picture) is ideal for this project. The actual size of the S-meter purchased to fit depends primarily on how much is to be spent. Also needed will be an octal plug or octal base from an old valve, a length of 3-core flexible cord, a pre-set or ordinary style potentiometer, two resistors as diagram and an 0-1 mA m/c meter.

As the resistors and potentiometer form part of a bridge circuit, some modification to their values will not affect results, provided the meter can be set to zero, as described later. So a 500-ohm potentiometer is suitable, the lower value resistor then being 330 ohms.

Wire the instrument as in the circuit herewith, making the potentiometer accessible from the back. Anchor the 3-core cord on a multi-way tag strip.

About 18in. of cord will be convenient. In the diagram, pin connections are either when looking at the pin end of the plug, or when looking at the underside of an octal valveholder, in the usual way. The leads pass down the pins and are soldered.

#### Meter Type

The instrument actually shown is the SR-38P type, which is 1 1/16 in. square, and has a full-scale deflection of 1 mA. This is ready scaled for use as a signal-strength meter. Instruments which are electrically the same, but of larger dimensions, are also easily obtained, and may be used in the same way.

If a 1 mA meter is to hand, it can of course be used, and can be fitted with an arbitrary scale. Instruments

which require a larger current will prove rather insensitive, and should not be tried. A more sensitive meter, such as one of 500  $\mu\text{A}$  (0.5 mA) or 250  $\mu\text{A}$  (0.25 mA) deflection may be used, and will give a greater swing. This can be reduced by placing a resistor of a few hundred ohms in series with the meter itself. The actual deflection obtained depends on both the sensitivity of the meter and its DC resistance, but quite a wide range of instruments can be used successfully.

#### Setting Up S-Meter

The receivers mentioned have a diode in series with the meter, to prevent a reverse current, and this makes necessary a very small re-adjustment of the zero setting screw on the meter itself. This should be set so that with the equipment off, the meter pointer is very slightly below its normal zero position.

With the receiver on, and with RF and IF gains at maximum, but no aerial connected and the aerial-earth terminals shorted, the potentiometer is then adjusted so that the meter reads zero.

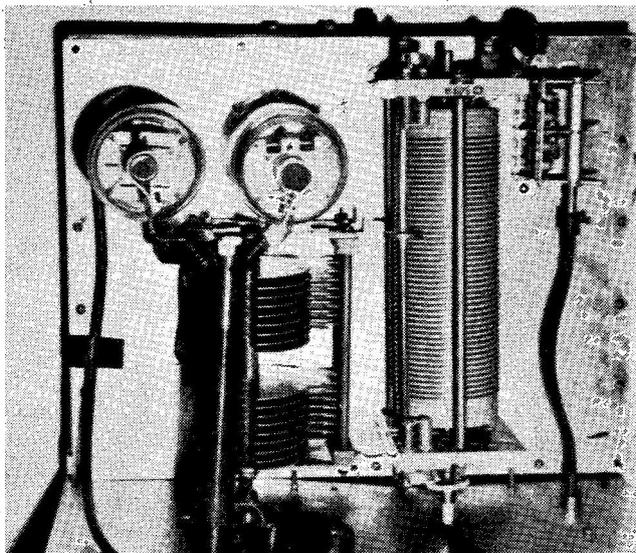
It will be remembered that any S-meter, as normally used by an amateur station, does not give an absolute signal strength reading, but only a *comparative* indication. Strong signals will of course result in a higher reading than weak signals. However, anything done at the receiving station which increases signal strength from the receiver will also give an increased reading. This includes improvements to the aerial or earth, or comparisons with one aerial and another; adjustments to any aerial tuner or other matching device, or any change which increases signal strength at the receiver aerial terminal. Any change within the receiver itself which improves output will also raise the meter reading, and included here are

changes such as replacing aged valves, or realignment of RF or IF circuits.

In this direction, it is of course perfectly easy to try any external modification, such as the use of a tuner or different aerial, to find if this improves signal strength. But trimming or other adjustments *inside* the receiver are not recommended, unless the user has the necessary equipment and information to carry these out correctly.



“ . . . . . Could you let me have a pair of long-nosed pliers . . . . . ”



Layout of the double-813 Linear Amplifier described by GW4BCD in the last issue—it can run a cool 600 watts.

## APPROACH TO THE 23-CENTIMETRE BAND

FIVE WATTS OUT USING  
2C39 VALVES

Based on an article by H. Van Amerfoort, PAØHVA, in the Dutch "Electron," freely translated by A. H. Dormer, G3DAH

**D**ETAILED instructions for the construction of this apparatus have not been given; the general outline only is described. It is recommended, therefore, that those unfamiliar with resonant cavities should not attempt to build this transmitter without reading up the subject in the handbooks and *very* careful study of the component parts.

The 23cm. transmitter described here consists of a tripler and amplifier, or of a locked oscillator with amplifier, each using a 2C39 valve. Equivalents of this valve may also be used. This article deals mainly with the mechanical construction. The transmitter with oscillator and amplifier is intended for SSB and FM. The outputs of the tripler, oscillator and amplifier are entirely conventional.

The 23 cm. band is increasing in importance, and more and more amateurs are beginning to experiment on it. To achieve satisfactory results, one needs, in addition to a good antenna, to have reasonable power available. If you already have a tripler you can, by using the amplifier described here, increase your signal strength by 10 dB (nearly two S-points).

### Electrical Construction

From the cathode circuits onwards the oscillator, tripler and amplifier are identical. The tripler cathode circuit is tuned to 432 MHz and that of the oscillator and amplifier to 1296 MHz. All stages are driven in grounded grid. Poor results have been obtained with strip lines on 1296 MHz, and for this reason a tuned cavity is used in the anode circuits.

In the diagrams the circuit is shown with lumped constants. All input circuits make use of the valve self-capacity and inductance of the cathode lead supplemented by a trimmer. In this way, a shortened half-wave circuit is formed. In the case of the tripler, resonance at 432 MHz is obtained by building out the input circuit with a coil of one turn of 12g. wire having a diameter of 8 mm. (0.3 inch). In the oscillator, the input coupling capacitor is omitted. The heater circuit, which is connected to the cathode, is fed through two chokes made with 18g. enamelled wire of which 4 turns, 3mm. long, are close wound and subsequently opened out slightly. One choke is returned to earth while the other goes *via* a feed-through capacitor to the 5.7 volt supply. The grids must be earthed for RF. This is achieved with a capacitor consisting of a brass plate into which the grid finger stock is soldered and insulated from earth by a small sheet of Teflon or PTFE. In this way, the grid bias voltage can be applied. The description of the anode

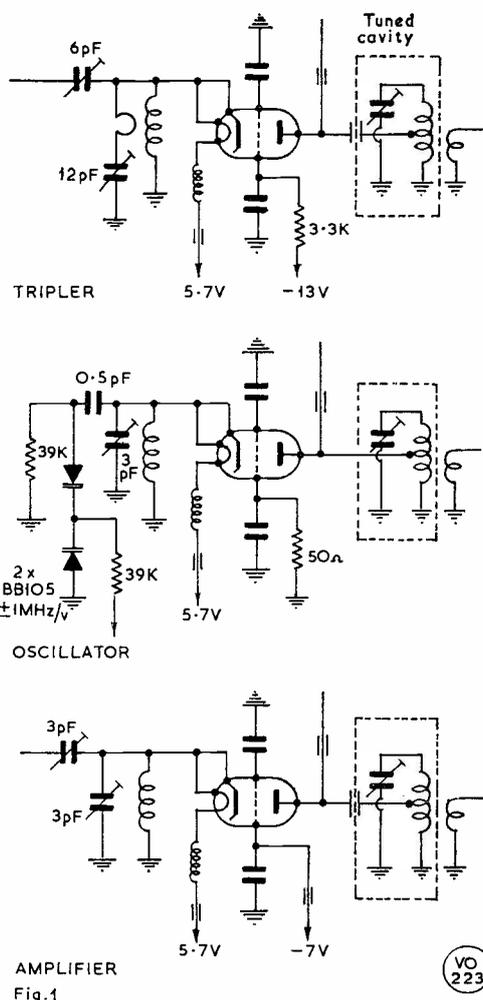


Fig.1

cavity will be brief since the drawings really speak for themselves. The high voltage for the anode is connected to the capacitor plate on the outside of the cavity, which is DC insulated from the rest. As the exterior of the cavity carries no RF, this is no problem. The cavity is tuned by means of a screw, and it is important to use the greatest care in construction here in order to keep the output high. The contact between screw and thread must be very good. An assembly from a silvered waveguide would do very well here.

### Setting Up

For setting up, a good load resistor, preferably with power measurement facilities, is required, together with an SWR meter. Adjust the cathode circuit for minimum reflected and maximum forward power by means of the series and coupling capacitors. This applies to the amplifier and tripler. In the case of the oscillator, the

cathode circuit must be tuned to 1296 MHz. Then adjust the anode circuit tuning and coupling capacitor for maximum output. The power may be set by varying the HT. The position of the coupling loop is determined by experiment. The loop and plug are rotatable, good contact between plug and earth being ensured by the use of a spring-loaded washer. Altering the coupling changes the tuning of the cavity. Typical operating conditions are shown in the Table.

**Operating Conditions**

	TRIPLER	AMPLIFIER	OSCILLATOR
Va	500	500	200 Volts
Ia	35	200	50 mA
Vg (standing)	-13	-7	— Volts
Vg (driven)	-60	-7	— Volts
Win.	5	5	— Watts
W out.	5	50	5 Watts
Eff. %	28%	50%	50%
Gain	0	10	— dB

**Mechanical Construction**

The drawings give details of all the important units and the complete assembly. (The small metal strips on

which the trimmers are fastened to the case enclosing the anode are not shown since these are not of great importance. They are, in fact, 1mm. thick and 10mm. wide brass). The chassis is 115mm. long, 80mm. wide and 55mm. high and is provided with a wire-mesh covered opening for the airflow exit in the smaller side. The description of, and type of material used for, the various units is specified as follows:

(A) Cavity sides: Tinsplate 0.5mm. thick. First drill the holes, bend along the dotted lines with the help of a square, and then solder the edges *firmly* together.

(B) Cathode compartment: Tinsplate 0.5mm. thick. First drill the holes and then bend at right angles and solder *firmly*.

(C) Mounting plate: Brass 1.5mm. thick.

(D) Cavity top plate: Where indicated solder two 6BA nuts and the brass tube of the dimensions given.

(E) Decoupling capacitor plate: Brass 1.5mm. thick, and brass tube. With a fretsaw, cut slots in the tube as shown and bend the resulting fingers slightly inwards.

(F) Grid decoupling capacitor plate: Brass 1mm. thick.

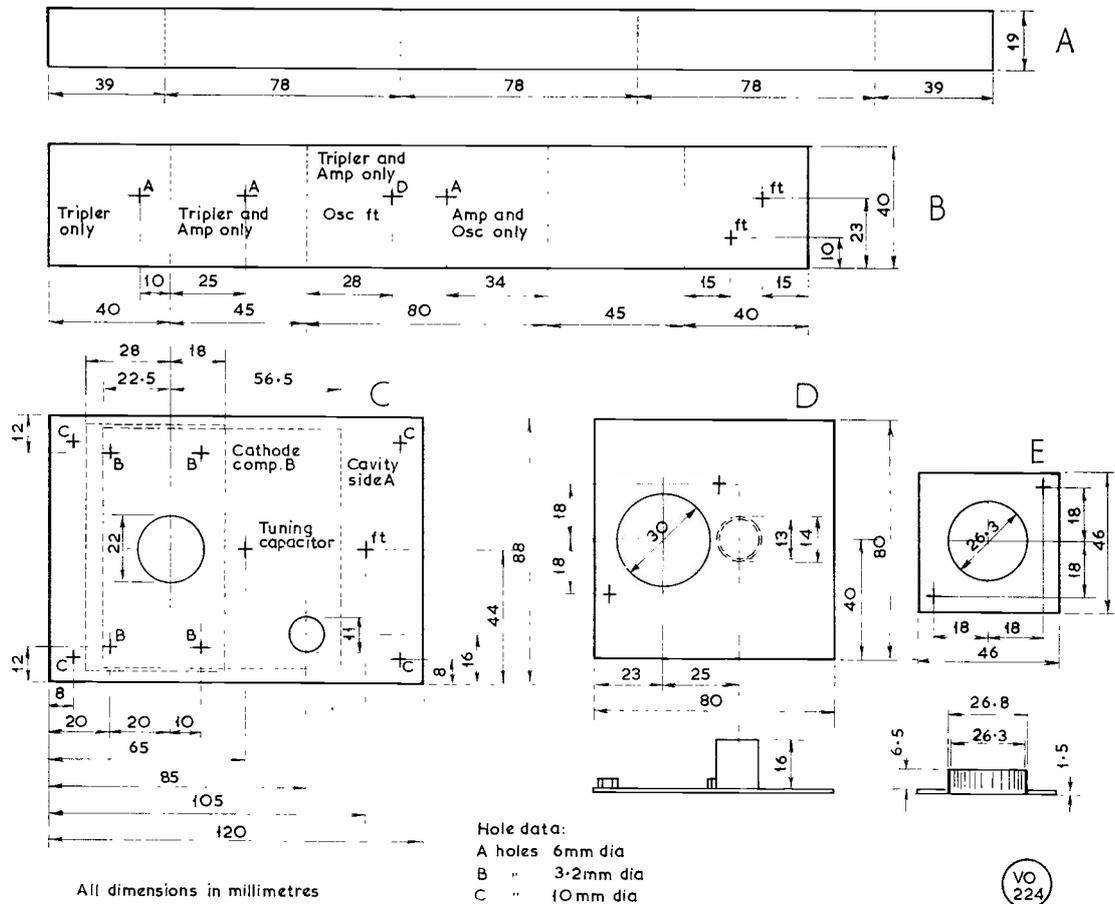


Fig. 2

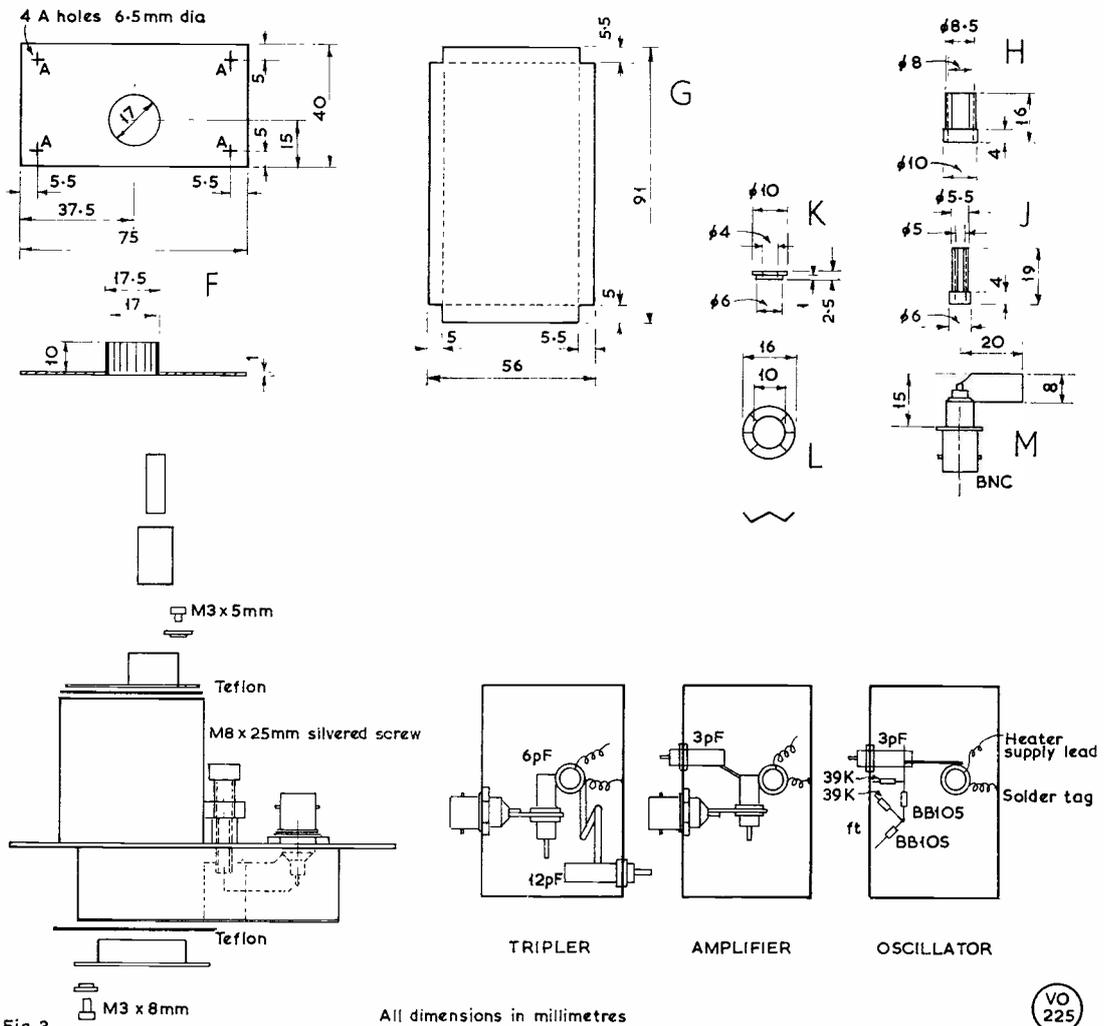


Fig. 3

All dimensions in millimetres



Other details as for (E) already given.

(G) Cover of cathode compartment: Tinplate 0.5mm., bent along the dotted lines.

(H) Cathode connection: Brass tube—saw cuts as before and bend the fingers slightly inwards.

(J) Heater connection: Brass tube. Saw cuts as before and bend fingers slightly outwards.

(K) Insulated bushes. Reflon or Nylon. The small insulating washers supplied with the 2N3055 transistor will serve.

(L) Spring washer. Phosphor bronze 0.5mm. thick.

(M) Output coupling loop. Tin plate 0.5mm. thick and 6mm. wide. Solder to the BNC socket after the washer "L" and the fixing nut are in position.

To assemble, first solder "D" on to "A", followed by

"C" and then "B". In the drawings of the final assembly, a  $\frac{5}{16}$  in. bolt is shown for tuning, and this should preferably be silvered as heavy RF current flows here. Take great care with the construction here.

Use a large soldering iron for the assembly in order to get good electrical joints.

**Some Further Observations**

From this foregoing it will be gathered that tinplate is an excellent material for RF tuned cavities. For all the parts specified (except for the flexible parts) other materials, such as copper and copper strip are also suitable. To avoid bad contacts, the tuning of the anode circuits can be accomplished also by using an insulated screw (nylon) to move a flexible strip within the cavity.

To extend the life of the 2C39, a lower current than

that specified by PA0HVA is important. A higher anode voltage (one can go to 1 200 volts) results in a somewhat higher output for the same input. It may then be necessary to slacken off the antenna coupling.

To assist in the adjustment for maximum output power, a relative power indicator can be used.

The amplifier is not set up in Class—C. The output is not much lower, but the amplification is a little higher.

Not described are the two Varicaps in the oscillator cathode circuit. These are used for the electrical tuning of the oscillator. Via the converter, the oscillator signal (or rather a small portion of it), is transverted to 28-30 MHz. The signal is then passed to a phase discriminator where it is compared with an SSB or FM signal on 28-30 MHz, and the resultant DC output used to control the oscillator frequency. The sensible thing is to begin with the tripler, and when that is working satisfactorily, to go over to the controlled oscillator. For optimum cooling, it is advisable to fit chimneys round the anodes.

The trimmers used are the professional *Philips* type with fixing nut and soldering tag at the top. Other

types seem to give poorer results. Glass trimmers are also suitable.

This article is intended to interest experienced VHF experimenters in the construction of a practical design for one of our highest-frequency communication bands. It will be seen from the discussion that the work is mainly mechanical (or, in the vernacular, "tin bashing") and in fact success depends upon the care and accuracy with which this is done. The aid of a competent amateur model maker, with his tools and metal-working equipment, would be of great assistance in this connection.—*Editor.*

## DESIGNING A CONSTANT-K FILTER

MATHEMATICS AND CIRCUITRY INVOLVED

G. R. THOMAS (G4AWJ)

AFTER construction of an audio compressor it was desired to shape the audio frequency output not to exceed 2700 Hz. Perusal of filter circuits led to the choice of a constant-k low-pass filter.

A "filter" will pass certain frequencies without loss—that is, a band of frequencies in its "pass band" will get through with minimum (ideally, zero) attenuation, while above or below the "pass band" attenuation is finite.

All filters have a common characteristic: They are constructed from purely reactive components, for otherwise the attenuation could never be zero.

By definition, a T or *pi* section "constant-k" is one in which the shunt and series impedances  $Z_1$  and  $Z_2$  are connected by a relationship  $Z_1.Z_2 = R^2$ , where R is a resistance completely independent of frequency. This R is known as the design impedance of the section.

The equation  $Z_{oT} = \frac{Z_1.Z_2}{Z_{o\pi}}$  connects the characteristic impedances of the T and *pi* section composed of the same shunt and series impedances (see Fig. 1).

For a constant-k section  $Z_{o\pi} = \frac{R^2}{Z_{oT}}$ , the two impedances  $Z_{o\pi}$  and  $Z_{oT}$  will be imaginary or real at the same time, so that when  $Z_{oT}$  changes from imaginary to real so will  $Z_{o\pi}$ .

In consequence the two sections will exhibit the same cut-off and pass band frequencies. The two sections T or *pi* are referred to as prototypes.

The prototype T and *pi* low-pass filter sections are shown in Fig. 2, where  $Z_1 = j\omega L$  and  $Z_2 = \frac{I}{j\omega C}$

from which  $Z_1.Z_2 = \frac{j\omega L}{j\omega C}$  and this results in the equation  $Z_1.Z_2 = L/C$ , consequently the sections are



At the Leicester Amateur Radio Exhibition back in October, G3HXN of Heath (Gloucester), Ltd., was demonstrating much of their well-known kit-built equipment, including this small TV/Rx, which can be put together in about eight hours.

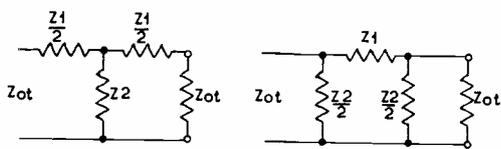


Fig. 1

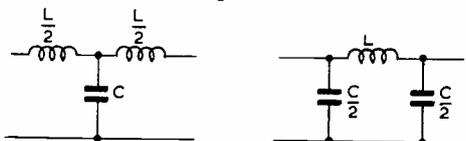


Fig. 2

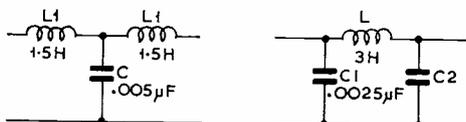


Fig. 3

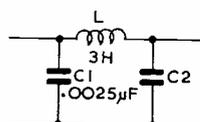


Fig. 4

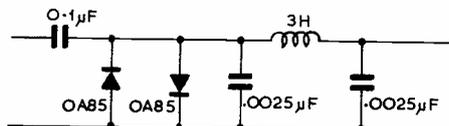


Fig. 5

Q  
551

constant-k and as  $Z1.Z2 = R^2$ , therefore  $R = \sqrt{L/C}$ . And without proof the cut-off frequency  $fc$  is given by  $fc = I/\pi\sqrt{LC}$ .

Given the design impedance  $R$  and the cut off frequency  $fc$ , the two equations giving these factors in terms of  $L$  and  $C$  are:  $R = \sqrt{L/C}$  and  $fc = I/\pi\sqrt{LC}$  from which we derive  $L = R/\pi fc$  and  $C = I/\pi Rfc$ .

It is these latter two equations that give us the value of the components required for the sections.

In this case, the design impedance is 25,000 ohms the cut-off frequency 2,700 Hz.

Therefore,  $L = R/\pi fc = 25,000/3.14 \times 2,700 = 3$  Henry.

$C = I/\pi Rfc = 10^6/3.14 \times 2500 \times 2700 = 0.005 \mu F$ .

Thus, the values of the T section are given in Fig. 3 and those for the pi section in Fig. 4.

Each section has a cut off frequency of 2700 Hz with a design impedance of 25K, the difference between the two sections being the way the characteristic impedance varies with frequency.

The finalised circuit is shown in Fig. 5. The back-to-back diodes eliminate any unwanted audio spikes from passing through to the transmitter stages.

Should greater fall-off at cut-off frequency be desired then the prototype may be followed in tandem by an M-derived filter.

**CORRECTION — CORRECTION**

As pointed out by several readers (and noticed at this end when it was too late!), in the article "Linear RF Amplifier for the HF Bands" in the January issue, the reference to the meter should have been to the effect that the multiplying resistor network (p.667 and p.669) is in series with the instrument—as someone said of the original error "poor milliammeter."

Also, in the MCC Report in the same issue, the co-operator with G3ZSS on G3CXX, the winning Club, should have been given as G3YRU, and not as stated on p.682.

**MOBILE RALLY DATES—SEASON 1974**

The following fixtures are notified in reference to Mobile Rallies to be held this year:

**May 5:** Spalding Tulip-Time Rally, Surfleet, as in previous years. Trade stand bookings as early as possible, to R. Harrison, G3VPR, QTHR.

**May 12:** South Leicestershire Mobile Rally, Hinckley, with trade applications to M. B. Farr, G4CAJ, 23 Waterfall Way, Barwell, Leics.

**May 19:** Amateur Radio Mobile Society (A.R.M.S.) Rally at R.A.F. Station, Cosford, on the A.41 about eight miles from Wolverhampton. Details from Norman Fitch, G3FPK, QTHR.

**May 19:** Northern Mobile Rally, at a new venue—details later. D. G. Mott, G8BZY, QTHR.

**May 26:** Hull & District A.R.S. event at the East Riding College of Agriculture, near Beverley, Yorkshire, as in previous years. Organiser: L. D. Colley, G3AGX, QTHR.

**June 30:** Upton Mobile Rally, Worcester. Information from B. A. Jones, G8ASO, QTHR.

**July 7:** West of England Mobile Rally at Longleat, Wilts., as in previous years. Details: Brian Croker, G3ULJ, QTHR.

**July 21:** Cornish Club Rally, at venue yet to be arranged. Information from M. C. Locke, G3NKE, QTHR.

**RTTY CONVENTION**

We are asked to say that the third British Amateur Radio Teleprinter Group (BARTG) convention will take place on Saturday, May 18 at the Village Hall, Meopham, Kent, with facilities, attractions and arrangements as last year. Information from the hon. secretary, D. F. Beattie, G3OZF, Mayerin, Churchway, Stone, Aylesbury, Bucks.

**SITTING THE R.A.E.?**

If you propose taking the next R.A.E., in May, your application should be in before the end of this month. Your course-instructor will have details, or apply at the office of your local Education Authority, quoting "Subject No. 765, City & Guilds."

# VHF BANDS

A. H. DORMER—G3DAH

## Meteor Scatter

RECENT periodic meteor showers seem to have produced some very good results for the devotees of this particular activity.

G8DNK (Bradford) was rightly pleased with his contact with OH5NW in QRA NU13e via the *Geminids* on December 13. Maximum signal strength was S8 and average S4. There is no omission in the report as quoted—it was done on SSB! As far as is known, this is the first phone contact GW/OH using the scatter mode. Doug also had a partial contact with DC7CW in Berlin; he got RS52 from the latter but could not determine if his report to DC7CW had been received. He had another incomplete contact the following evening. Gear at the Finnish end—and if you don't recognise the callsign it belongs to the president of the Finnish Radio League (SRAL)—was a pair of 4CX250B's to  $4 \times 11$  elements at 75ft. and in Bradford the Tx ran similar power into a 14 ele. at 65ft. DC7CW has 4CX250B's to a 16-ele. beam.

GW3NJW in Cardiff was also active during the *Germinids* and made it successfully with SM5LE in 55 minutes. The Swede's signals were peaking in excess of 40 dB over noise in 500 Hz on 144.690 MHz. Although no burst longer

than two seconds was received, the fact that there were 26 of them during the time (plus 29 "pings") solved the problem. SM5LE was receiving about the same amount of information at his end as Clive was getting in Cardiff, which was gratifying since 'NJW runs only 50 watts to a 6-ele. at 25ft. He just missed it with DL7QY as, although reports were exchanged both ways, he could not copy the essential "R". This particular sked has been going for a total of 20 hours yielding 231 "pings" and 82 bursts, and two very near misses, but, undaunted, they are pressing on until they *do* make it. Information was exchanged at this time with EA4AO, DM2BYE and OK1BMW, but not enough to qualify for even a near miss, despite a 25-second burst from the DM which included callsigns only. Infuriating for them both! However, '3NJW did make it with EA4AO on January 3. Six hours of test with UT5DL produced only a few "pings."

One thing which has come out of all this is that it is possible to get a form of M/S back-scatter and side-scatter, so if the radiant is unsuitable for the direct path, a QSO may still be possible by juggling with antenna headings. GW3NJW was active during the *Quadrantids* on January 3 and here the results were spectacular in that, at long last, the contact with DL7QY was completed—and that in so short a time as 38 minutes. He also made it with EA4AO although this took rather longer—three hours and 22 minutes to be precise—but it still looks like a first GW/EA via M/S, although not, perhaps, the first GW/EA QSO by extended tropo. or Oscar VI! It appears that the *Quadrantids* peaked on January 3 but were dead by the 5th.

GW3ZTH (Bridgend, Glam.) has been involved in M/S working for some time now. His contact on October 21, 1973 with I4BER in Bologna must still be the first GW/I of this type, and was effected via the *Orionids*. Attempts to make it with OK3CDI during the *Leonids* in mid-November were abortive, although HG5AIR was copied at 539 while he was working Johnny Stace, G3CCH. Incidentally, this shower produced one of the longest

bursts ever—three minutes! The *Geminids* in mid-December gave contacts with SM5LE and SM5AII. Joe also made good use of the *Quadrantids* on January 4 when the first GW/USSR QSO was made with UT5DL in QRA LI22f in the West Ukraine (QRB about 1,900 km) after eleven previous attempts. Signals were peaking to S7 at times and up to S9 during a QSO with DL7QY in Berlin.

In the hope that this report may have stimulated latent interest in this type of operation, the periodic showers for the next few months which should be productive of results are: April 20/22, *Lyrids*; May 2/6, *Aquarids*; and August 10/13, *Perseids*.

## Oscar News

*Oscar VI* has exceeded its one year planned life, and although it is anticipated that it will continue to function for some months to come, the signals are getting steadily weaker and the restricted times of operation, spasmodic failures and not least the familiarity are making it a less attractive target. There is no doubt, though, that it has been an outstanding achievement in the field of amateur endeavour, and all concerned with its planning, design and operation are much to be congratulated.

The time has now come to make preparations for operations through *Oscar VII* and to that end the information tabulated here should help. Be it noted that there is still no firm date for launch, but it should take place early in the year.

**Repeaters:** Two linear repeaters are to be carried with specification as follows:—

- No. 1** Input passband,  
432.125–432.175 MHz  
Output band,  
145.975–145.925 MHz  
Power output,  
14 watts p.e.p. (or 3.75 watts)  
Antennae,  
circular polarisation  
Downlink passband  
Inverted  
Telemetry Beacon  
On 145.980 MHz—200 mW  
output  
Uplink power req'd.  
300–400 watts e.r.p.

No. 2 Input passband,  
145.85-145.95 MHz

Output passband,  
29.40-29.50 MHz

Power output,  
2 watts p.e.p.

Uplink antenna  
Circular polarisation

Downlink passband  
Not inverted

Telemetry beacon  
On 29.50 MHz

Uplink power req'd.  
80-100 watts e.r.p.

No repeaters will be working on the day of launch although the 70 cm. beacon will operate to carry telemetry information. Only after thermal and electrical stability have been confirmed will normal operation become possible.

#### Beacons:

No. 1 Frequency,  
435.1 MHz

Power output,  
0.4 watts

Modulation,  
FSK with 850 Hz shift

Does not operate during periods when the 70cm/2m. repeater is in use. Doppler shift will be of the order of  $\pm 10$  kHz.

No. 2 Frequency,  
2,304.1 MHz

Power output,  
0.1 watts

Control,  
By command

Identification,  
CW "HI" followed by 30 second dash

Teletype and CW encoders are carried together with "Codestore" as per *Oscar VI*. Doppler shift  $\pm 55$  kHz. (It should be quite an exercise tracking this beacon with a 4ft. dish having a 5° aperture!)

**Power supplies:** The primary power source consists of eight solar-cell arrays yielding 2.2 amps at 6.4 volts subsequently transformed into a +14 volt supply. Nickel-cadmium batteries supply back-up power when the cells are not illuminated.

**Operating Modes:** Four modes of operation are envisaged:—(A) 2m.-10m. repeater; (B) 70 cm.-2m. repeater, high power; (C) 70 cm.-2m. repeater, low power; (D) Recharge.

Normal operation will alternate between modes (A) and (B), an

### THREE BAND ANNUAL VHF TABLE

Final Placings at December 31, 1973

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G3NHE	46	6	76	15	45	9	197
G3ZMD	59	6	69	13	42	7	196
GD2HDZ	41	5	78	10	34	7	175
G3DAH	49	5	58	15	33	8	168
G4BMM	39	3	58	13	35	7	155
G3OHH	59	6	57	10	9	2	143
G3FUJ	43	4	52	9	27	7	142
G4BEL	23	2	60	11	30	6	132
G2AXI	48	5	46	8	20	3	130
G8FUI	—	—	78	11	28	4	121
G8EOP	—	—	64	10	31	6	111
G8GNE	—	—	65	12	18	7	102
G4ASR	28	2	58	10	—	—	98
G8BXX	—	—	62	12	19	2	95
GW8FOL	—	—	83	12	—	—	95
G8FMK	—	—	45	9	34	5	93
GW8FKB	—	—	82	11	—	—	93
G8DNK	—	—	76	13	—	—	89
G8ECK	—	—	67	13	6	1	87
G3XJS	9	1	35	8	23	6	82
GW3ZTH	—	—	66	14	—	—	80
G3BW	—	—	71	9	—	—	80
G3XDY	—	—	68	11	—	—	79
G8FQE	—	—	61	13	—	—	74
G8CKZ	—	—	60	14	—	—	74
G8CKY	—	—	53	10	7	2	72
G8BKR	—	—	42	5	20	2	69
GW8DUP	—	—	59	9	—	—	68
G8GPR	—	—	60	7	—	—	67
GM3ZVB	9	1	46	8	—	—	64
G8FWB	—	—	53	11	—	—	64
G8HET	—	—	50	12	—	—	62
G4AEQ	—	—	36	4	17	3	60
G18EWM	—	—	49	7	—	—	56
G8ATY	—	—	43	7	2	1	53
GW8BXQ	—	—	45	8	—	—	53
G3SMU	18	3	10	2	16	3	52
GW8EHK	—	—	44	8	—	—	52
G8FPK	—	—	44	6	—	—	50
G4AJE	—	—	38	8	1	1	48
G4BKG	—	—	40	7	—	—	47
G8CBU	—	—	36	3	7	1	47
GW3CBY	7	2	21	5	5	2	42
G8DGR	—	—	32	2	6	1	41
GW4BXE	—	—	35	6	—	—	41
G8COG	—	—	28	3	5	1	37
G8EMS	—	—	27	7	2	1	37
G8DOT	—	—	27	8	—	—	35
G8HRJ	—	—	32	3	—	—	35
G8GXE	—	—	30	5	—	—	35
G8GNC	—	—	28	2	—	—	30
G8GBV	—	—	19	3	5	1	28
G4AEZ	—	—	23	5	—	—	28
G4BOW	—	—	24	3	—	—	27
G8GJB	—	—	23	3	—	—	26
GD4BJL	4	3	13	5	—	—	25
G4CMV	—	—	19	3	2	1	25
G8FUL	—	—	23	2	—	—	25
G8ECU	—	—	19	2	—	—	21
G3EKP	8	3	4	2	2	2	21
G3WHK	—	—	17	3	—	—	20
GW8CMA	—	—	14	3	—	—	17
GW8CGH	—	—	12	3	—	—	15

internal timer in the spacecraft generating a pulse every 24 hours which operates switching between modes so that each repeater will be operational on alternate days.

Power supplies are monitored, and if the battery charge drops below a predetermined value, the device will switch to mode (C). Any further reduction in the charging rate will initiate operation in mode (D) with both repeaters off and the beacons switchable by ground command to allow telemetry to be received. Ground control have an override on any of these operations.

#### Orbit and Tracking Data

The sun-synchronous orbit will be almost identical to that of *Oscar VI*, so the same tracking procedures will be suitable. Orbit times are being arranged so that they interpolate with those of *Oscar VI*, thus giving some five or six passes every two hours or so during the life of the earlier satellite.

\* \* \*

These preliminary data will be amplified and orbital predictions published once the satellite is fully operational.

And let's hope that such an apparently complicated package is going to perform as advertised—good luck to all who try with *Oscar VII*!

#### Beacons

Service from several of the U.K. beacons has been interrupted for various reasons recently. GB3VHF is due to move to 144.15 MHz on February 1 when the new Band Plan comes into official being and is being prepared for that event. GB3DM has been off but is now up again on 2m. but not, as far as can be learned, is it in regular operation on 70 cm. In any case, although the keyer has been modified to control on both frequencies, they have to be modified for the low end of both bands.

On Four we have no beacon at present—GB3SX has been off for months and no firm date can be given for its return to regular functioning. GB3SU went off around the start of the present fuel crisis and is still silent. This must be the first time it has not been there since it was inaugurated.

Although under the new Band Plan many beacons will have to change frequency (at least the high power ones will), a list of beacons on the VHF bands is published herewith and amendments to it will be promulgated as the occasion arises. The list is correct to December 31, 1973 and is likely to remain so for some time since the changeover to new frequencies throughout Region I is likely to be a lengthy process.

#### VHFCC Awards

Award No. 203 goes to John Quarmby, G3XDY of Grimsby, in respect of contacts made on 2m. from his old QTH in Cleethorpes, which he left in August last year. Judging by the strength of his signal in Herne Bay these days, the new location must be pretty good. For most of the contacts, the Tx was based on the "DJ9ZR driver board" followed by a pair of 4CX250Bs. The converter fed a home-built, solid-state, fully tunable IF strip. The antenna was a 10-ele. beam at 28ft. and the QTH at 10 (*ten!*) feet a.s.l. In spite of this height restriction, take-off was good in all directions except to the South West, where the Lincolnshire Wolds obstructed the view somewhat. Operating hours have been restricted during term (at Manchester University), but John has managed to get a bit of time in on 2m. and expects to have SSB on 70 cm. going shortly.

G8FVI, Chris Reeves (London) gains Award No. 204 for two metres. He was first licensed in February, 1972 and runs a Pye base station Tx with 15 watts input to an 8-ele. Yagi at 19ft. The Rx is a Mosfet converter to an HRO. The 80ft. a.s.l. site has a good take-off in all directions except to the North.

In Ludgershall, near Andover, Dennis Russell operates on 2m. and gains Award No. 205. He was first licensed as G8FKZ in October, 1971 but did not get on the air until February of the following year when he acquired a Heathkit HW-30. The original antenna was a 6-ele. Yagi which has been replaced recently by a 9-ele. job at 32ft. a.g.l. Receivers have changed a bit over the period but the present set-up is a Mosfet converter into a B.34 tuning 14-16 MHz. A new Tx is also nearly

#### List of Two-Metre Beacons

Call sign	MHz	QRA/QTH
OE5THL	144-000	HI52 Linz
DL0DE	144-002	GI15 Deggendorf
F3THF	144-007	YI13d Lannion
SP6VHF	144-010	KK10a Kielcke
DL0RG	144-100	DK04 Niederhausen
ZB2VHF	144-130	Gibraltar
GB3CTC	144-130	XX55 Redruth
OE7IB/7	144-150	FH57 Innsbruck
GB3GW	144-250	YL21 Swansea
JX3NM	144-297	Jan Meyen Island
GB3VHF	144-500	AL52 Wrotham
OK1KCU/1	144-675	GK29j Bournack
OH8VHF	144-800	MZ78 Oulu
OK3VHF	144-900	?
OH6VHF	144-900	KW59f
OH3VHF	144-929	LV38c Ylojaru
SM4UKV	145-004	Gryhyttar
DM2AKD	145-068	GM58 Königswüsterhausen
LA1VHF	145-150	ET13c Gaustatoppen
LA2VHF	145-200	FX42e Trondheim
LA3VHF	145-250	IC48d Harstad
OY3VHF	145-260	WV16 Torhaven
LA4VHF	145-300	CU47c Bergen
ON5JP	145-500	Dinant
DL0SG	145-900	GI13 Straubing
GB3ANG	145-950	YQ36 Dundee
OE3XXA	145-950	II51 Vienna
PA0PKN	145-950	CM63h
PA0DSW	145-955	Wormer
SK1VHF	145-955	Gotland
OK1VR/1	145-960	Zaly
SK4MPI	145-960	HU29 Falun
F7THF	145-960	DL15g Nr. Belfort
DL0PR	145-971	EO38 Garding
DL0SGA	145-973	GJ76b
GB3DM	145-975	Durham
OZ7IGY	145-979	GP23e Copenhagen
DL0ER	145-980	DL45d Essen
DL0IC	145-985	?
HB9HB	145-985	DH66f Chasseral
YU1VHF	145-990	JD29g
OY7VHF	145-990	Faroes
GB3GI	145-990	WO13 Strabane
GB3LER	145-995	ZU64 Shetlands
GB3GM	145-995	YS33 Thurso
SK2VHF	145-995	Umeo
OE5ITL	145-998	HI52 Linz
YU2VHF	146-000	HF28j

#### List of 70-Centimetre Beacons

Call sign	MHz	QRA/QTH
DL0SZ	432-008	FI68 Straubing
OZ7IGY	432-018	GP23e
DJ2LF	432-020	DL35h Dortmund
SP7UHF	432-030	KK10a
OK1KCU/1	432-034	GK29j Bournack
PA0VD	432-125	? Not in operation
DL1XV	433-000	GH25 Bad Reichenhall
DL0NFA	433-450	FJ47a Moritzberg
GB3GEC	433-450	Not in operation
DL7HGA	433-485	GM47g Berlin
GB3SC	433-500	Sutton Coldfield
PA0DSW	433-800	Wormer

**List of Four-Metre Beacons**

Callsign	MHz	QRA/QTH
9H1MB	70-26	Malta
ZB2VHF	70-264	Gibraltar
TF3VHF	70-275	Iceland
GB3GM	70-305	Thurso
EI4RF	70-325	Mullaghmore, Cork
GB3SU	70-695	Sheffield
GB3SX	70-699	Crowborough, Sussex

complete and this will give about 20 watts of phase mod. out on Two and will also serve to drive a varactor tripler to 70 cm. Dennis is equipped for A/TV reception and is planning for SSB. Although the postal address of the QTH is Hants., the station is, in fact, in Wiltshire.

**VHF Three-Band Annual Results**

Congratulations to Martin Dann, G3NHE of Sheffield, who scored nearly a double century to lead in the Three-Band Annual Tables. His score of 197, pipping by one point only that of G3ZMD, is the best we have had in the Tables since they were re-started, and it is gratifying that the total number of entries should also be a record.

Thanks to all those who have supported this feature during the year and helped to make it a success. We hope you will continue to do so. The new Tables start immediately and run from January 1 to December 31, 1974 and will include this year a separate Table for 23 centimetres. Claims should be sent as usual each month to "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

**Contests**

**Results:** The October UHF/SHF contest produced a goodly number of entries. Winner of both the 432 MHz and 1296 MHz (Fixed) sections was G4BEL. Then G3LTF/A carried off the 432 MHz and the 1296 MHz (Portable) events while G4ARD led the 13 cm. section and G3WDG the 3 cm. entry. It looks as if this is going to be a popular annual contest.

**Reports:** The Four-Metre Cumulative on January 6 was the last in the series which has suffered much from poor propagation conditions. Even though the amount of DX worked

must have been miniscule, these contests do ensure some increase in activity on this very underpopulated band, and are more than welcome for that reason alone.

**Forthcoming Events:** February 3, 144 MHz Fixed station CW. March 2/3, 144 MHz Open and SWL; March 30/31, 432 MHz Open.

**Scottish News**

There appears to be a growing interest in 23 cm. operation in Scotland, perhaps surprisingly, as the terrain must be a bit difficult in many cases in view of the more basic line-of-sight requirement. However, GM3VBB (Balerno) and GM4BHA on Corstorphine Hill are in regular contact on the band.

GM8BKE of Bearsden is now up on 70 cm. with SSB and ploughing a bit of a lonely furrow, one understands. Still in the Glasgow area, one wonders what happened to the expedition organised by GM8HBU for the West of Scotland Club which should have taken place in November last. Nothing has been heard of anyone contacting them, so perhaps it never did get off the ground?

On the 2m. front, GM8IAP (Cellardyke, Fife) is radiating a fine signal and seems to have a pretty good QTH, as he is working down into England fairly regularly in spite of the poorish propagation conditions of late. GM4CLH seems to have overcome his modulation problems and is back on the air although GM8HXM of Prestonpans is, unfortunately, off it due to TVI problems of an unusual and most unwelcome kind. GM8EKF of Edinburgh has completed the mods. to his Vanguard (T) which is now fully tunable and gives some 17 watts output. Several of his close neighbours are agog to hear his new FM Tx Mk. III.

**Welsh News**

GW8FOL (Anglesey) found conditions good for the 144 MHz fixed station contest in December and mentions particularly that G13WTG, G13KXV, G18EWM and G18HXX were all active—callsigns for some of us to note! He also points out that the number of stations using a /A callsign during fixed station contests is increasing. This practice is per-

**VHF Century Club Members****70 Centimetres**

Cert. No.	Station	Date Issued
1	G3DAH Herne Bay, Kent	15/4/68
2	G8AAZ London, S.W.19	16/8/68
3	G8AEJ London, S.E.20	8/11/68
4	G8AWO Welwyn Garden City	14/1/69
5	G8AUE Ambergate, Derby	14/1/69
6	G8ARM London, S.E.3.	13/4/69
7	G8AYN Dartford, Kent	1/10/69
8	G3MCS Aylesbury, Bucks.	13/10/69
9	G8ART Leamington Spa, Warks	20/3/70
10	G8BYV Dereham, Norfolk	19/10/70
11	G8APZ Hounslow, Middx.	7/7/71
12	G3UBX Wolverhampton, Staffs.	10/11/71
13	G8ABP Paignton, Devon	31/12/71
14	G8CKX Ambergate, Derby	31/12/71
15	G8CIT Hampton, Middx.	6/11/72
16	G8EOP Dewsbury, Yorks.	1/2/73

**Four Metres**

Cert. No.	Station	Date Issued
1	G3IMV Bletchley, Bucks.	6/11/68
2	G3EKP Blackburn, Lancs.	6/11/68
3	G3UUT Acomb, Yorks.	7/2/69
4	G3FDW Retford, Notts.	30/12/69
5	G3VSA Manchester, Lancs.	9/11/70
6	GC3OBM Guernsey, C.I.	7/10/71
7	G3HBG Godstone, Surrey	30/10/71

NOTE: There are more than 200 VHFCC's in issue for the Two-Metre band.

mitted under the general rules for VHF Contests if the equipment is permanently installed at the /A location. Where it is moved there specifically for a contest, the correct procedure is to make an entry for the /P section of the event, where there is one. While admitting the accuracy of GW8FOL's comment, one assumes that contestants are aware of this limitation, and hope that the rule is not being "bent" to give an unfair advantage. (There are always those who will read any Contest rules to find the loopholes—we have had it for years in connection with MCC!—Editor).

GW8FKB, also in Anglesey, has had antenna trouble which has kept him off the air since September until recently, when he managed to get a 9-ele. up at 15ft. and knock off a few *Oscar VI* contacts.

From Pembrokeshire, GW8BXQ says there are now no fewer than eight stations equipped for 2m. SSB in that county. He runs a "Liner 2" himself, and his plans for

1974 include a 4CX250B linear to go with it and some 70 cm. SSB. He, with others, regrets that the repeaters planned for 2m. do not include any linear models. 'Tis a pity!

Down in Swansea, GW8DUP has fixed up crossed, 10-ele. Yagis and would like to hear from anyone interested in doing some circular polarisation tests. He is *QTHR*.

### Special Activities

GW4BLE advises that the QSL cards for the Blackwood Society's expedition to GW in August last year(!) have now arrived from the printers and are being distributed through bureaux. If you are missing confirmation of a QSO with GW6GW, hang about a bit as it is probably on the way—they apologise for the delay. Oh, well, for some it mightn't matter. The Blackwood boys have a tape/slide lecture of the expedition which is available on loan for Club use.

Grafton Radio Society run their usual 144 MHz contest on February 16. Full details from G3ZKE, *QTHR*. An interesting aspect of this particular event is that a special prize is being offered for the highest score from any station first licensed within the previous six months. Certainly an idea to attract the newcomer who often hesitates to enter contests.

The next meeting of the South East UHF/VHF Group is scheduled for March 1 and will be held as usual in the Electronics Building, University of Kent.

Tom Douglas, G3BA, is trying to organise a couple of "chain gangs" on 70 cm. SSB. The first one is nearly complete and comprises G8AGU, GW3ZTH, G4BBR, G3BA, G3ZYC, G3EHM, G3KMS and G8EPG. QRG is 432.15 MHz as the *working* channel with 10 kHz increment/decrement as required to suit the traffic. As a quick check with a map will reveal, the chain runs from Devon to Sheffield, that is from SW to NE. It is proposed that the second chain should run from Herne Bay/Margate up through London, the Midlands and Cumberland to finish in the Isle of Man. Activation is 2200-2300 clock each evening since most people can get on at that sort of time on some occasion during the

week. The first half-hour would be devoted to contacts from SW to NE and the second from SE to NW. Listened to, a regularly active net such as this can be a useful pointer to propagation and what's on—in fact it could stimulate activity. If you are interested in joining in, get in touch with G3BA, *QTHR*.

And with the goggle-box shutting off at 10.30 p.m., why not put in an hour on the air before bed-time?

### General News

George Sassoon, G3JZK (Warminster) is still plugging away at *Oscar VI* and to date has made 154 QSO's in 26 countries, but is finding things a bit more difficult now use is restricted to Southbound passes only. He managed to make it with W8DX in Detroit at 3,192 miles, resulting in the receipt of an airmail QSL card, two IRC's and a peppermint-flavoured s.a.e. to boot! He would be interested in hearing from anyone who would like to have a go at M/S work.

G3NHE is one of the many who lost their antennae during the recent gales. He is now there again on all the VHF bands but is reduced to using smaller beams at reduced heights.

Several readers have commented upon, and your scribe also logged, a high level of "white noise" over the band for much of the day during the 144 MHz contest of December 9. G3OHH (Mow Cop) found that it peaked up to the Southeast. Any clues? 'OHH also reports an encouraging increase in 4m. activity after 10.30 p.m. and the TV close-down. G4CAZ, 14 km. East of Leicester, is getting out very well on that Band with his 6 watts to a two-element indoor beam.

G3XDY now has all his VHF antennae up at the new QTH near Grimsby and expects to be operational on 70 cm. SSB shortly. G8GXE has completed the rebuild of his "Cambridge" Rx (it is now fitted with BFY90 RF stages and 40600 mixer) and has finished the construction of a 70 cm. varactor and converter, thus stepping up the level of activity around the Stoke Poges area. G3FPK (Purley) is also back on 2m. after a protracted break which included the daunting task of decorating the shack anew.

### TWO-METRE ANNUAL TABLE

Final Placings at December 31, 1973

Station	Counties	Countries	Total
GW8FOL	83	12	95
GW8FKB	82	11	93
G3NHE	76	15	91
G8DNK	76	13	89
G8FUJ	78	11	89
GD2HDZ	78	10	88
G3ZMD	69	13	82
G8ECK	67	13	80
GW3ZTH	66	14	80
G3BW	71	9	80
G3XDY	68	11	79
G8GNE	65	12	77
G8EOP	64	10	74
G8BXX	62	12	74
G8FOE	61	13	74
G8CKZ	60	14	74
G3DAH	58	15	73
G4BEL	60	11	71
G4BMM	58	13	71
GW8DUP	59	9	68
G4ASR	58	10	68
G3OHH	57	10	67
G8GPR	60	7	67
G8FWB	53	11	64
G8CKY	53	10	63
G8HET	50	12	62
G3FIJ	52	9	61
G18EWM	49	7	56
G2AXI	46	8	54
G8FMK	45	9	54
GM3ZVB	46	8	54
GW8BXQ	45	8	53
GW8EHK	44	8	52
G8ATY	43	7	50
G3FPK	44	6	50
G4BKJ	40	7	47
G8BKR	42	5	47
G4AJE	38	8	46
G3XJS	35	8	43
GW4BXE	35	6	41
G4AEQ	36	4	40
G8CBU	36	3	39
G8DOT	27	8	35
G8HRJ	32	3	35
G8GXE	30	5	35
G8DGR	32	2	34
G8EMS	27	7	34
G8COG	28	3	31
G8GNC	28	2	30
G4AEZ	23	5	28
G4BOW	24	3	27
GW3CBY	21	5	26
G8GJB	23	3	26
G8FUL	23	2	25
G8GBV	19	3	22
G4CMV	19	3	22
G8ECU	19	2	21
G3WHK	17	3	20
GD4BJL	13	5	18
GW8CMA	14	3	17
GW8CGH	12	3	15
G3SMU	10	2	12
G3KEP	4	2	6

### FOUR-METRE ANNUAL TABLE

Final placings at December 31, 1973

Station	Counties	Countries	Total
G3ZMD	59	6	65
G3OHH	59	6	65
G3DAH	49	5	54
G2AXI	48	5	53
G3NHE	46	6	52
G3FIJ	43	4	47
GD2HDZ	41	5	46
G4BMM	39	3	42
G4ASR	28	2	30
G4BEL	23	2	25
G3SMU	18	3	21
G3KEP	8	3	11
GM3ZVB	9	1	10
G3XJS	9	1	10
GW3CBY	7	2	9
GD4BJL	4	3	7

70-CENTIMETRE ANNUAL TABLE

Final Placings at December 31, 1973

Station	Counties	Countries	Total
G3NHE	45	9	54
G3ZMD	42	7	49
G4BMM	35	7	42
G3DAH	33	8	41
GD2HDZ	34	7	41
G8FMK	34	5	39
G8EOP	31	6	37
G4BEL	30	6	36
G3FIJ	27	7	34
G8FUI	28	4	32
G3XJS	23	6	29
G8GNE	18	7	25
G2AXI	20	3	23
G8BKR	20	2	22
G8BXX	19	2	21
G4AEQ	17	3	20
G3SMU	16	3	19
G8CKY	7	2	9
G8CBU	7	1	8
G8ECK	6	1	7
GW3CBY	5	2	7
G8DGR	6	1	7
G8COG	5	1	6
G8GBV	5	1	6
G8EKP	2	2	4
G8ATY	2	1	3
G8EMS	2	1	3
G4CMV	2	1	3
G4AJE	1	1	2

He is contemplating 2m. SSB using the Hallicrafters HT-46 as the prime mover. (Couldn't do better—one of the nicest bits of gear of its type that there is.—*Editor*).

**Low Electronics:** They propose to handle the realignment of "Liner 2" equipments to make them compatible with the new VHF Band Plan and an area and time basis as follows: North-West and Midlands, during *March or July*; South Midlands and Home Counties, *April or August*; West Country, *May or September*; Rest of the Country, *June or October*. If these periods are inconvenient, you can bring, or send, your "Liner 2" at any time after October, notifying the firm first. There is a while-you-wait service for those with the time to spare. The charge for the modifications, which include realignment and new xtal and dial, is £4.40—and well worth it, one would have thought, to have had all the spurs reduced to minimum and the set brought up-to-date.

A number of letters have been received with comments on the new Band Plan, as published here in December-January. So far, we have heard only from anti's. If you are for it (or against) let us know what *you* think. Thanks for opinions already expressed. They are being held till we get many more, to permit a more

accurate assessment of the situation to be made.

Finally, a slight correction: The discoverer of the *Kohoutek Comet* is in fact a Czech working at a German observatory at Hamburg—so that puts that right! But how can all those experts who predicted that this Comet would be the sight of the century have been so wrong? And how is it that they have not come forward to give us a credible explanation of the discrepancy between fact and prediction?

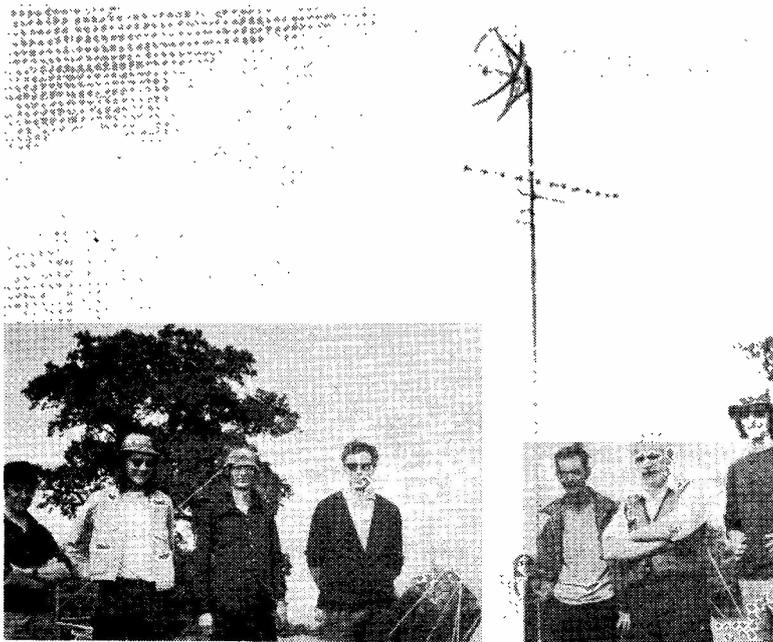
73 de G3DAH

PLEASE NOTE!

It is not possible to give forward deadlines for any of the regular features—except to say that they are **immediate** for whatever "next issue" we may be able to produce.

As this is being written, it is impracticable to set finite dates either for deadlines or for publication. This is because of the general disruption of work—office darkness, mail delays, short-time operation on the production side and the general business difficulties prevailing towards the end of January.—*Editor*.

This is the crew, funny hats and all, said to be going to activate GB3RUT in Rutland for the couple of days at March-end before that little county becomes extinct on April 1 by absorption into the new Local Govt. area. In this picture are G4ALN, G4CAF, G8FJG, G8GGU, G8DPB and G8HGN. They plan to work all bands and all modes, details as given p.680, January "VHF Bands."



# THE MONTH WITH THE CLUBS

By "*Club Secretary*"

(Deadline for March issue: Immediate!)

Address all reports for this feature to "*Club Secretary*", Short Wave Magazine, Buckingham, MK18 1RQ

IT seems opportune, with the first "Clubs" piece for 1974, to set out for the benefit of those interested, and particularly Club scribes, the way we go about putting the piece together.

Basically, there is far more material to embody than we have space fully to take in. Thus, a proportion of all the reports must form the basis of the "Short Notices" panel, care being taken to ensure that normally a Club has not figured in "Short Notices" during the previous three months. Thus a regularly reporting group can expect to be cut out of the narrative to appear in the Panel at intervals of not more than four months or less than four months. However, some months see a heavier clip than others, and when we get a low intake of Club reports, then fewer, or even none at all, are put into the Short Notices. In addition, where a particular Club has a change of venue, or a special item which needs stressing, then it is taken into the main body rather than relegated to a short notice which would not be enough to alert members to the special item, change of Hq. address, or whatever. In other words, we do our best to give all concerned coverage within the space limits. In addition, since we always seem to receive a few letters after the deadline, any such are added to the following month's mail clip—so if you write a letter with details of your Club, which misses the deadline and so does not appear in the piece expected, it will be certainly found in the following month's piece, or in Short Notices.

So now you know!

## Westerners

**Cornish** come first here, and we note that they have Hq. at the SWEB Clubroom, Pool, Camborne, where they may be found on February 7; part of the entertainment for the members will be a talk by G4BHC on Speech Compression, and the second half is down to G8HTE, to talk about DX Reception.

At **Plymouth** they have a newly-decorated clubroom in which to foregather, at Virginia House, Bretonside, Plymouth. We understand the February 5 date to be a visit to the Texas Instruments factory; but anyway, we can say that they regularly get together on the first and third Tuesday of each month, starting at 7.30 p.m.

Every Thursday sees the radio-minded population of the **Yeovil** area heading for the group Hq. at 31 The Park, Yeovil. More details can be obtained from G3NOF, as in the Panel opposite.

**Blackwood** have a room at the Community College, Oakdale, Mon., where they can be found on Friday evenings. This crowd are quite contest-minded, and have put in an entry for the *CQ WW Contest*, among others.

At **Torbay**, the gang enjoyed their Christmas party, shared with Plymouth and Exeter. They are next to be found on February 23, for a lecture on Printed Circuits, at Bath Lane, rear of 94 Belgrave Road, Torquay, where they have their Hq.

## Southern

There are not many groups who would think of "Members Problems" as the subject for an evening's entertainment, but this is being done—not, if memory serves, for the first time—at **Acton, Brentford & Chiswick** on February 19. The venue, as usual is at the Chiswick Trades and Social Club, 66 High Road.

The latest issue of the **Chiltern** club newsletter carries the dates of meetings on to January 23, which is the AGM; thus for the February dates and programme we must refer you to the secretary, G2DRT—see Panel. The Hq. is at the Ernest Turner works in Totteridge Avenue, High Wycombe, the factory car-park, entered from Gordon Road, being available for use by those attending; there is a footpath connecting to Totteridge Avenue.

**Echelford** meet on the second Monday and the last Thursday of each month, at St. Martins Court, Kingston Crescent, Ashford, Middx.; the February 11 date is a surplus equipment sale. This group have no less than three licensed YL members, the latest being G4CQO.

Weekly meetings are the thing at **Dunstable Downs** where Chews House, 77 High Street South, Dunstable, is the Hq. February 8 and 22 are "Between Weeks," while on 15th there is the Annual General Meeting, and on March 1 a Garex Sale.

February 19 sees a Constructional Contest at **Sutton & Cheam**, at the Library, Cheam—please bring along a bit of gear to enter the contest, and a bit of blanket or

similar material to ensure table tops are not scratched by your latest masterpiece.

A change of name falls to be recorded next. The group which is usually known as "North Bucks." has now decided to call itself **Milton Keynes**. You can meet them on February 11, at Wolverton Youth Club.

We have two month's issues of *Mid-Sussex Matters* to hand, but neither tells us what is happening at **Mid-Sussex** in February, at Marle Place, Leylands Road, Burgess Hill, the club Hq. We must, therefore, refer you to G3RXJ, as Panel below.

Now to **Colchester** where the lads are currently getting together each week at the Army Amenities Centre, Reed Hall Avenue, but it is understood they are actively on the lookout for a more suitable place.

There are two meetings of the **Cray Valley** crowd each month, the dates in question being February 7 and Thursday, February 21; at the first G3BZG will talk on

"Amateur Topics" and there is a Surplus Sale down for the latter one.

A special speaker is lined up at **Mid-Herts.** on February 14, in the person of G3GGK, who will be talking about "The History of VHF Mobile Radio." This should be an interesting one; go to Welwyn Civic Centre, Prospect Place, Old Welwyn, for this one—note it is Old Welwyn and *not* the Garden City.

**Grafton** next, with Hq. at Holloway Institute, Archway Annexe, Highgate Hill, on Fridays. Open nights are down for February 1 and 15, the latter also being a committee session; on February 8, T. H. Mallett will be talking about Air Traffic Control, and on 22nd G8EEI takes Industrial RF Heating as his subject.

There is an element of doubt about the dates for the meetings, at Westgate Hall, Canterbury, of the **East Kent** group, although we know that G3VJF will be doing his stint, talking about "FM Gimmickry." If

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

- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W3-8LB.  
 A.R.M.S.: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey, CR2-1EZ.  
 BARKING: R. E. Clark, G8BXC, 62 Waltham Road, Woodford Bridge, Essex, IG8-8DN.  
 B.A.R.T.G.: D. Beattie, G3OZF, Mayerin, Churchway, Stone, Aylesbury, Bucks.  
 BEDFORD: G. E. Parker, 12 Dawlish Drive, Bedford, MK40-3BB.  
 BLACKWOOD: R. B. Davies, GW3KYA, 16 Vancouver Drive, Penmain, Blackwood, Mon., NP2-0UQ.  
 BRISTOL: P. Gaskell, G4BZZ, 50 Champion Road, Kingswood, Bristol, BS15-4SX.  
 BRITISH RAIL: L. C. Carter, G3ILC, 35 Barnfield Road, Kingston-on-Thames, KT2-5RH.  
 CARLISLE: C. A. Goddard, G8DVD, 21 Green Croft, Brampton, Cumberland, CA8-1AX.  
 CHILTERN: F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks. (*Penn 4240*).  
 COLCHESTER: E. Jacobs, 26 Pondfield Road, Colchester.  
 CORNISH: H. Webster, G3XTF, Crandale, Gillyfields, Redruth (*6905*), Cornwall.  
 COVENTRY: G. A. Whenham, G3TFA, Lavernock, 33 Chapel Street, Bishops Itchington, Warwickshire.  
 CRAY VALLEY: P. F. Vella, G3WVP, 78 Hurst Road, Sidcup, Kent.  
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London, SE23-3BN. (*01-699 6940*).  
 DARTFORD HEATH D/F: Mrs. M. Worbey, G3XVC, 13 Havelock Road, Dartford (*22889*), Kent.  
 DERBY: F. C. Ward, G2CVF, 5 Uplands Avenue, Littleover, Derby (*21931*), DE3-7VE.  
 DUNSTABLE DOWNS: C. G. Powell, G8BPK, 1 Wenwell Close, Buckland Wharf, Aston Clinton, Aylesbury (*630600*), Bucks.  
 EAST KENT: M. Dennison, G3XDV, 36 St. Andrews Road, Deal, Kent, CT14-6AT.  
 ECHELDFORD: V. W. Higgs, G3VWJ, 205 Commercial Road, Staines (*57021*), Middx., TW18-2QT.  
 EDGWARE: A. J. Masson, G3PSP, 62 Coldharbour Lane, Bushey, Herts., WD2-3NY. (*01-950 6827*).  
 GLENROTHES: A. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife, KY1-2LH.  
 GRAFTON: H. du V. Ashcroft, G8AYU, 86 Avondale Avenue, Finchley, London, N.12.  
 HARROW: L. Light, G3KDL, 22 Chippenham Avenue, Wembley, Middx. (*01-902 2570*).  
 HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford.  
 HINCKLEY: M. Farr, G4CAJ, 23 Waterfall Way, Barwell, Leics., LE9-8EH.  
 KINGSTON: R. S. Babbs, G3GVU, 28 Grove Lane, Kingston-on-Thames. (*01-546 2801*).  
 MAIDSTONE YMCA: C. L. Turner, G3VTT, 40 Egremont Road, Bearsted, Nr. Maidstone, Kent.  
 MELTON MOWBRAY: R. Winters, G3NVK, 32 Redwood Avenue, Melton Mowbray (*3369*), Leics., LE13-ITZ.  
 MEXBOROUGH: N. Jenkinson, G8FUV, 6 Makin Street, Mexborough, Yorks.  
 MID-HERTS: A. Marshall, G8BUR, 33 Brookbridge Lane, Datchworth, Herts. (*Knebworth 2229*).  
 MID-LANARK: D. H. Plumridge, GM3KMG, 7 Waterside Gardens, Hamilton (*28759*), Lanarks., ML3-7PY.  
 MID-SUSSEX: E. J. Letts, G3RXJ, 87 Meadow Lane, Burgess Hill (*3552*), Sussex.  
 MILTON KEYNES: R. S. King, G8CHK, 7 Brackley Road, Towcester, Northants.  
 NORTH KENT: R. Wells, G4ARQ, 12 Bullbank Road, Belvedere, Kent.  
 NOTTINGHAM: S. F. Claringburn, 49 Fernleigh Avenue, Westdale Lane, Nottingham, NG3-6FN.  
 PLYMOUTH: C. Mitchell, G3UVS, Kechil Rumah, Green Lane, Yelverton (*2986*), Devon, PL20-6BW.  
 R.A.I.B.C.: Mrs. F. Woolley, G3LWY, Woodclose, Penselwood, Wincanton, Somerset, BA9-8LT.  
 READING: R. Sterry, G4BLT, Watergate House, Bethesda Street, Upper Basildon, Reading, Berks., RG8-8NT.  
 R.A.F.: F/Lt. V. J. Ludlow, G3JLZ, Amateur Radio Society, Hq., R.A.F. Locking, Weston-super-Mare.  
 SCUNTHORPE: H. Garner, G4CFD, 4 Kealholme Road, Messingham, Scunthorpe, Lincs.  
 SHEFFIELD: P. Day, G3PHO, 39 St. Albans Road, Sheffield, S10-4DN.  
 SOLIHULL: L. G. Boswell, G4AEJ, 170 Kestrel Avenue, Yardley, Birmingham, B25-8QX.  
 SOUTH BIRMINGHAM: R. J. Thompson, G8GDZ, 23 Fox Hill, Selly Oak, Birmingham, B29-4AG. (*021-472 0533*).  
 SOUTHGATE: J. Batchelor, G3XMV, 22 Faversham Avenue, Bush Hill Park, Enfield, Middx. (*01-360 6537*).  
 SOUTH MANCHESTER: D. Holland, G3WFT, 7 Alcester Road, Sale, Cheshire, M33-3GW.  
 SPALDING: R. Harrison, G3VPR, 38 Park Avenue, Spalding, Lincs., PE11-1QX.  
 SUTTON & CHEAM: A. Keech, G4BOX, 26 St. Albans Road, Cheam, Sutton, Surrey.  
 TORBAY: M. Yates, G3UIQ, Top Flat, 23 Waverley Road, Newton Abbott (*3025*), Devon.  
 VERULAM: H. Young, G3JHY, 93 Leaford Crescent, Watford (*25633*), Herts., WD2-5JQ.  
 WEST KENT: S. Emlyn-Jones, G4BKG, 36A London Road, Southborough, Kent.  
 WIRRAL: F. Smith, G3YGL, 72 Church Road, Bebington.  
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset.  
 YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

you intend paying a visit, we suggest you get in contact with the Secretary—see Panel p.735.

The new location of the **Southgate** Hq. is off Wilson Street, Winchmore Hill, and we believe the date to be February 14; however, we have not got any up-to-date news, so try G3XMV, the secretary—see Panel.

**Kingston** have their place at the Berrylands Scout Hq., Stirling Walk, Raeburn Avenue, Surbiton, which is at the rear of the Surbiton Lagoon. They get together on February 13, there, to hear a talk on Switching and Steady-State Regulators in DC-DC Converters. In addition, on February 26 there is the Sausage and Mash Supper, at St. Mark's Parish Church Hall, Surbiton, for which tickets can be obtained from G3GVU.

**Dartford Heath D/F Club** are possibly hit more than most groups by the petrol situation which has meant they have not organised any D/F Hunts yet this season. However they still can carry on with their normal gatherings at the Scout House, Broomhill Road, Dartford, on February 1, and 15, the latter being set aside for a Film Show.

On to **Verulam**, who for the moment are at the Market Hall, St. Albans on February 20, when G2FKZ will be answering the question "What is Magnetism?"

#### Midlands

**South Manchester** are near our arbitrary northerly Midlands boundary. They have a place at Sale Moor Community Centre, Norris Road, and also a VHF shack at Greeba, Shady Lane, Manchester 23. To take the Community Centre gatherings first, there is February 1, when G4AUR will be doing experiments with Gunn Diodes at SHF. The G8DNF tape-and-slide lecture will be given on February 8, covering the DX-pedition to Andorra, and on the 15th there are Parts 5 and 6 of their basic Radio Theory talks, for the newcomer to the radio. Finally, on February 22 comes a Surplus Equipment Sale. Morse is given for a short period at the start of each of these meetings. This leaves the VHF activities at Shady Lane, which occur every Monday evening—visitors welcome at either venue.

At **Solihull** the scribe says he has nothing laid on at the time of writing for the February 19 date, although something no doubt will be cooked up in time. The Hq. address is not stated but is understood to be the Manor House, Solihull, in the High Street.

One does not ever recall having heard from the **Hinkley** group before, but they obviously have been in thriving existence for some considerable time at the local College of Further Education, Hinkley, with a programme of talks, visits and so on. (Incidentally, we believe this group to be, in fact *Hinckley*, despite the spelling adopted by the Secretary!).

**Bristol** seem to have moved their Hq. since last we heard from them; they are now at 24 Bright Street, Barton Hill, where they foregather every Tuesday evening, and wish it to be known they would very much like to see potential new members, not to mention some visitors!

One of the best of the Club magazines comes from **Spalding**, who can boast of no less than 110 members on their books. They can be located on February 8 at the Teachers Centre, Knight Street, Pinchbeck, where they

will be hearing George Broughton talking and showing slides about Aircraft.

February 6 is down for a talk by G8PG, and February 20 is still to be finalised, says the *Newsletter* of the **Wirral** group, who meet at the Sports Centre, Grange Road West, Birkenhead on the first and third Wednesdays of every month.

At the time of writing we had no February details from **Coventry**, but we know they get together weekly, on Friday evenings, with Nights-on-the-Air alternating with more formal activities. For the details, contact G3TFA at the address in the Panel on p.735.

The same situation pertains at **Hereford** where they assemble in the County Control, Civil Defence Hq., Gaol Street, on alternate Fridays; informal activities seem to alternate with more "set-piece" lectures and film shows.

February at **Melton Mowbray** means February 15, at the St. John Ambulance Hall, Asfordby Hill, Melton, to watch and hear the G8DNF "DX-pedition to Andorra" tape-and-slide lecture.

#### Round The U.K.

It would be nice to have enough reports from GM once in a while to enable us to have a separate section for them. Meantime, we will compromise by dealing with the two we have so far received at the top of this clip.

**Glenrothes** have a clubroom in Library Buildings, Douglas Road, Leslie, Fire, open on Sunday evenings, for a programme yet to be finalised. In addition, the group meets at the same place on most Wednesday evenings, quite informally.

Notes in this column have "proved beneficial", says the Secretary up there at **Mid-Lanark**. This group get together on February 1, for an A/TV demonstration by GM6ADR/T, and for an amusement yet to be settled on February 15; both are at Wrangholm Hall Community Centre, Jerviston Road, Motherwell.

A very good newsletter comes from **Derby** at regular intervals, and it says much for their resources that this time, although the printing has had to revert to the good old-fashioned duplicator, they have managed to keep up the standard. From it, we learn that meetings are at 119 Green Lane, Derby on Wednesday evenings. February 6 is a Surplus Sale, and the 13th a "Night-on-the-Air," followed on February 16 by the annual dinner at the Derbyshire Yeoman; this one is a Saturday evening. February 20, back at the clubroom, sees G3OCA talking about and showing some of the 250 *trophies* he has picked up in contests, and explaining how to go about it! To round off, February 27 is a Technical Film Show. Looking forward a bit, we see March 20 as the evening for the AGM, for which all paid-up members (all 190 of them) are requested to make the effort to attend.

Every Thursday the Sherwood Community Centre, Mansfield Road, Nottingham, resounds with Amateur Radio chat and noises, from the **Nottingham** chaps. Their monthly routine is that on the first Thursday there is an Activity Night, the two middle weeks are devoted to talks of some kind, and the last one is a Forum. The club station is equipped with an FT-250, a Europa transverter for Two and a TA-33 beam—so they are well off.

SHORT CLUB NOTICES

CLUB NAME	HEADQUARTERS LOCATION	MEETING MONTHLY
Barking	Westbury Recreation Centre, Ripple Road, Barking	—
Bedford	"Dolphin," The Broadway	February 7, 14, 21, 28
Crystal Palace	Emmanuel Church Hall, Barry Road, S.E.22	February 16
Edgware	Watling Community Association, Orange Hill Road	February 14, 28
Harrow	Harrow Sea Cadets, Woodlands Road	February 1, 8, 15, 22
Maidstone	Sportscentre, Melrose Close	February 1, 8, 15, 22
North Kent	Congregational Church Hall, Bexleyheath Clock Tower	February 14, 28
Reading	White Horse, Emmer Green	February 12, 26
Scunthorpe	<i>Not given</i>	<i>Not given</i>
South Birmingham	Hampstead House, Fairfax Road, West Heath	February 6
West Kent	Adult Education Centre, Monson Road, Tunbridge Wells	February 1, 15

N.B.—In each case, the Secretary's name and address appears in the Panel on p.735.

We don't often hear from **Sheffield** but when we do, they throw the book at us! They assemble on the third Monday in each month, at the Sheaf House Hotel, Bramall Lane. February 18 is down for a Quiz—not the usual stuff but a light-hearted affair with a pint at stake. To make their activities well known they have sent a programme to everyone who has ever left an address in the book, plus all the call signs given in the *Call Book* as being within their catchment area—a good idea, this.

**York** are also in session every week, their favoured evening being Thursdays, at the British Legion Club, 61 Micklegate, where they will be pleased to receive visitors or prospective members.

Every Monday evening at the Community Centre, Currock House, Lediard Avenue, Curruck, **Carlisle** the local group gets together; they have a novel solution to the problem of the RAE candidate having to drop out of club life, in that they give him individual coaching; he is then able, they say, to turn up at all the many activities that they plan and carry out.

A change of venue is notified by **Mexborough**. They now meet at the Free Christian Church Hall, College Road, Mexborough for the activities they are at the moment planning. Details of all these may be obtained by contacting G8FUV—see Panel.

Other Groups

**R.A.I.B.C.** are top of this pile, catering as they do for those who are interested in Amateur Radio activity and who are in any way disabled. Also, they always need

supporters for all sorts of odd tasks, like for instance reading *Radial* on to tape for blind members, or putting someone's receiver to rights, or whatever. And, of course they could always do with donations to help their objectives—many Clubs make one at their Annual General Meeting.

**A.R.M.S.** take care of the interests of the /M operator, whether he is on Top Band, the DX bands, or at VHF—one feels a subscription would be well worth while for any mobile operator.

The name alone of **British Rail** is enough to explain who they cater for; they in their turn are part of the international FIRAC group covering railwaymen in all parts of the world, even behind the Iron Curtain.

The **Royal Air Force** also has its own Society, with a very good newsletter, and various useful services offered to the members, whatever part of the globe they may be in.

Then of course there are the clubs concerned with special operating interests, one of which is **B.A.R.T.G.** catering for all the chaps who either transmit or listen with a radio-teleprinter (RTTY) set-up.

Conclusion

That about brings us to the bottom of the bucket for another round. Due to the general dislocation now prevailing, the deadline must be as soon as possible after you see this, *please*, with your notices for the March goings-on, addressed as always to "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18-1RQ.

PLEASE NOTE!

As this is being written, it is not possible to set finite dates either for deadlines or publication. This is because of mail delays and the general disruption of work at our printers consequent upon the short-time operation imposed by the power restrictions. We can only continue doing our best, in co-operation with our printers, to keep things going! *Editor.*



" . . . . . You'll find the feeder length can be a bit critical . . . . . "

# NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. call signs, as issued or changes of address of transmitters already licensed. All addresses published here will be reprinted in the U.K. section of the "RADIO AMATEUR CALL BOOK" in preparation. QTH's are inserted as they are received, up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.

- G3AHS**, D. G. Thompson, 17 Fair-oak Way, Baughurst, Basingstoke, Hants., RG26 5NT (*re-issue*).
- EI0CN**, B. Coughlan, 254 Glenwood Estate, Dublin Road, Dundalk, Co. Louth.
- G4CPJ**, S. Seymour, Shangri-La, Besthorpe, Newark, Notts.
- G4CQD**, G. Strangward (*ex-G8H1B*), Wilton House, Wilton Terrace, Hornsea, Yorkshire.
- G4CQH**, J. F. Sperry, 70 Uffington Drive, Harmanwater, Bracknell, Berks. (*Tel. Bracknell 22330.*)
- G4CQK**, A. Allnut, 18 Crofton Avenue, Walton-on-Thames, Surrey, KT12 3DB.
- G4CQX**, L. E. Palfrey, 53 Kings Avenue, Greenford, Middlesex.
- G14CRL**, A. E. Henry, Inglewood, 15 Carolhill Park, Ballymena, Co. Antrim. (*Tel. Ballymena 41068.*)
- G14CRQ**, R. K. Quigg, 101 Belvoir Drive, Belfast, BT8 4DN.
- G4CSE**, M. E. Lewis (*ex-G8GIM*), 10 Kenmore Drive, Filton Park, Bristol, BS7 OTT.
- G4CSZ**, M. R. Riley, 150 Bedworth Road, Bulkington, Nuneaton, Warwickshire, CV12 9LQ. (*Tel. 0203 314946.*)
- G4CTG**, R. H. J. P. Harvey, B.A., Elm Tree Cottage, Highstreet Green, Chiddingfold, Godalming, Surrey. (*Tel. Dunsfold 315.*)
- G4CTW**, F. Radwell, 20 Little Holbury Park, Lime Kiln Lane, Holbury, Hants.
- G4CTZ**, I. M. Cage (*ex-G8GBV*), 25 Petersham Drive, Alvaston, Derby, DE2 OJU. (*Tel. Derby 71875.*)
- G5BFP**, R. Bo, 11 The Grove, Sunderland, Co. Durham, SR2 7HF.
- GW6AJR/T**, D. A. Toombs (*GW8FXM*), 5 Lewis Avenue, Blackwood, Mon., NP2 1JG.
- G8HFH**, J. H. R. Towey, Yew Tree Farm, Gospel Ash, Bobbington, Stourbridge, Worcs. (*Tel. Bobbington 271.*)
- G8HIO**, T. P. Ellis, 13-A Lower Edgeborough Road, Guildford, Surrey, GU1 2DX.
- G8HPI**, E. H. Cousins, Holmfirth, Hallfield Gate, Shirland, Derbyshire, DE5 6AG.
- G8HUX**, H. Igglesden, 24 School Road, Beeding, Steyning, Sussex. (*Tel. Steyning 812598.*)
- G8IEA**, S. C. Parham, 14 Fairview, Fawkham, Dartford, Kent, OA3 8NR. (*Tel. Ash Green 872604.*)
- G8IGP**, G. Mills, 18 Delf Street, Sheffield, S2 3GX.
- G8IHY**, R. W. Sharp, 77 Cloche Way, Upper Stratton, Swindon, Wilts., SN2 6JN. (*Tel. Stratton St. Margaret 4367.*)
- CHANGE OF ADDRESS**
- DA2WA**, A. S. Coombes (*G13OLV*), c/o White Horse Mess, Munster, B.F.P.O. 17.
- G3AFT**, Grafton Radio Society, Holloway Institute, Archway Annexe, Highgate Hill, London, N.19.
- G3EPU**, K. M. Bailey, 32 Strathearn Road, Wimbledon Park, London, SW19 7LH. (*Tel. 01-946 1390.*)
- G3GUV**, T. Griffin, 164 Eggleston View, Branksome, Darlington, Co. Durham, DL3 9SJ.
- G13HNM**, C. E. Davies, 52 Salisbury Terrace, Portrush, Co. Antrim.
- G3HVU**, J. L. Roberts, South Riding, Main Street, Ashby Parva, Lutterworth, Leics., LE17 5HS. (*Tel. Leicester 209626.*)
- G3IUZ**, Rev. H. R. Davis, The Vicarage, Eaton Bray, Dunstable, Beds., LU6 2DN. (*Tel. Eaton Bray 220261.*)
- G3JYB**, C. Teale, 43 Trelawney Road, Plymouth. (*Tel. Plymouth 68106.*)
- G3MQX**, P. Lane (*ex-GW3MQX*), 3 Lakes Close, Brixham, Devon.
- G3NOX**, W. H. Brown, 3 Honister Drive, Heron Hill, Kendal, Westmorland.
- G13OLV**, A. S. Coombes (*DA2WA*), c/o White Horse Mess, Munster, B.F.P.O. 17.
- G3OXP**, M. H. M. Chamberlain, Cleve House, St. Johns Road, Mortimer, Reading, Berks., RG7 3TR. (*Tel. 0734 332174.*)
- G3PPF**, S. A. Greenfield, 47 Nort Road, Brightlingsea, Essex.
- G3RYM**, T. J. Money, 38 Eythrope Road, Stone, Aylesbury, Bucks.
- G3UKE**, P. W. Adams, 23 Lynwood Close, South Woodford, London, E.18. (*Tel. 01-505 5434.*)
- G3XDS**, P. J. Wilde, 35 Charles Street, Mansfield-Woodhouse, Mansfield, Notts.
- G3YXZ**, P. J. Marcham, 39 Holwell Place, Pinner, Middlesex, HA5 1DX.
- G3ZOL**, J. R. Powell, The Liberal Club, Sir Issac's Walk, Colchester, Essex.
- G13ZSC**, K. McGonigal, Tielsa, 3 Glendale Gardens, Randalstown, Antrim, BT41 3EJ. (*Tel. Randalstown 378.*)
- G4AJB**, J. A. Bradley, Cleveland, 2-A Ormes Lane, Tettenhall, Wolverhampton, Staffs., WV6 8LL. (*Tel. 0902 756660.*)
- G4ASW/W2**, M. Yorke, 221 Parkview Apts., 130 Jerusalem Avenue, Hempstead, Long Island, New York, 11550, U.S.A.
- G4AVB**, D. G. Simmons, 17 Berry Road, Stafford, Staffs.
- G4BBH**, R. C. Feiryman, Tara, 11-A Beddingfield Way, Lyminge, Folkestone, Kent, CT18 8JH. (*Tel. Lyminge (0303) 862711.*)
- G5VS**, V. A. Sims, 3 Brunel Close, Maidenhead, Berks., SL6 2RW. (*Tel. Maidenhead 25637.*)
- G6AEK/T**, M. I. Edwards (*G8CPF*), Tecalmic U.K., Andil House, Court Street, Trowbridge, Wilts.
- G8BJN**, S. J. Taplin, 37 North Park, Fakenham, Norfolk.
- GW8CGH**, D. C. Pickering, 107 Ystrad Fawr, Bridgend, Glam., CF31 4HW. (*Tel. Bridgend (0656) 58474.*)
- G8CPE**, M. I. Edwards (*G6AEK/T*), Tecalmic U.K., Andil House, Court Street, Trowbridge, Wilts.
- G8GKV**, E. H. Downer, 1 Twitten Way, Tarring, Worthing, Sussex. (*Tel. Worthing 35260.*)
- G8HDR**, C. A. Lancaster, 41 Green Lane, Harrogate, Yorkshire, HG2 9LP. (*Tel. Harrogate 89091.*)
- G8HQN**, R. J. Haysom, 19 Braydon Avenue, Little Stoke, Bristol BS12 6EH.

## R.A.E. QUESTION AND ANSWER

### THE MAY 1973 EXAMINATION

*The next City & Guilds Examination for Radio Amateurs—now subject No. 765 in the C. & G. syllabus—comes up in May. As in previous years, we give here a set of “model answers” to the 1973 Paper—noting that for completeness we deal with all ten questions, though in the Exam. itself only eight need be answered, the two in Part I being compulsory. What the Examiner expects is that candidates should show by their answers that they understand the questions and could expand on them in detail if necessary. In other words, long and detailed explanations are not usually required. Formulae must of course be correctly stated and worked. To pass the R.A.E. involves getting at least 50% of the marks in both Parts, and there are grades of “distinction” and “credit”, though for the issue of an AT-station licence all that is needed*

THESE answers to the questions posed in the May 1973 R.A.E. are in the nature of “ideal” and what a candidate may expect to be able to write down in the allowable time could be less, depending on his facility with pen and ink. However, it must be said that the writer did the first draft of these answers, to all the questions, in under the magic three hours—so they are not by any means impracticable.

When attending for the examination, points to be borne in mind are as follows:

(1) Arrive early—there is nothing more flustering to an examination candidate than rushing around trying to find the exam-room at the last minute—all the energy that could be used profitably in thinking how to tackle the exam. paper.

(2) Come fully equipped. A slide rule is permissible and logs are provided. You must bring pen—and ink, lest the fountain run dry!—pencil, ruler, drawing instruments, and a watch (or clock even) with which to time your progress against the required progress to complete the answers in the time allotted. Allow 20 minutes per question, with ten minutes at the start to read and understand the questions and ten minutes at the end to “dot the i’s and cross the t’s.” Remember that if you answer one question perfectly and take three hours to do it, you cannot possibly gain a pass slip!

(3) Questions may be answered in any order. This being so, it is common sense to sort out, first, the question which you can most easily answer, and tackle it. Everyone who takes the exam. suffers to a greater or lesser extent from butterflies in the tummy, and if you tackle the easiest question first, it will serve to get you out of the starting-gate.

(4) Before you actually start the examination, make quite sure that the answer paper is properly completed

*is a pass. A certificate is awarded to all successful candidates, showing the grade achieved. Possession of this certificate is essential for the granting of a U.K. amateur transmitting licence—it is also accepted in the same way in many other countries in which an examination pass is required for an AT-station licence. Note that applications to sit the May Exam. must be in before the end of February; your Course Instructor will have details—Editor.*

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with your name, address and other details as requested. This is vital as it is this which makes sure that when your paper has been marked the results of your efforts can be communicated to you—it’s not a lot of use doing a perfect paper and then not receiving the result of your efforts because the examiners can’t read your name and address!

#### RADIO AMATEUR’S EXAMINATION, MAY 1973

This examination is divided into two parts; failure in either part will carry failure in the examination as a whole.

The maximum mark for each question is shown. Answer eight of the following ten questions as follows: Both questions in Part I (which are compulsory) and six questions in Part II.

#### Part I—Answer both questions in this part

- Q. 1. (a) What are the restrictions on the type of book to be used as a logbook for recording the operation of an amateur radio station?  
 (b) (i) State the entries to be made in the log.  
 (ii) State the method of making and timing entries.  
 (c) Under what conditions may persons other than the licensee operate the station?  
 (15 marks)

#### Answer 1.

(a) The log shall comprise of one book, and shall not be of loose-leaf format.

(b) (i) The entries in the log shall show the date, time of commencement of every call from the station (including test transmissions to determine freedom from interference), callsigns of stations to which messages are sent or from which messages are received, times of establishing and ending communication with each such station, precise frequency of frequencies used and class or classes of emission and time of closing the station down. If operation has been from temporary premises or a temporary location, or alternative premises, the address or particulars of the location shall be given. Should any other person operate the station, that person is to sign the log and show his callsign or amateur radio certificate number in the log.

(ii) All entries are to be made at the time of making the contact, in indelible writing, with no gaps between entries. All entries as to time are to be in GMT.

(c) No unauthorised person to operate the station. Anyone allowed to operate the station is to observe the

licence conditions, and must hold either a GPO Amateur Radio Certificate, or an amateur radio licence, and shall sign the log as specified earlier in this answer. (Editor's Note: It is not clear whether the phrase "an amateur radio licence" in the last paragraph would in fact cover the case of an overseas amateur using the station other than one holding a reciprocal G licence and it should be noted that the licence itself is not specific on the point. Thus the wording given in the answer, as it follows the licence, accepts the ambiguity and no marks can be lost for an improper answer.)

- Q.2. (a) What factors should be taken into account in the construction of a variable frequency oscillator to ensure a satisfactory standard of frequency stability?  
 (b) With the aid of a circuit diagram describe a typical variable frequency oscillator and explain carefully how each of the factors mentioned in (a) has been dealt with. (15 marks)

Answer 2.

(a) Factors influencing the stability of a variable frequency oscillator (VFO) include (i) Choice of circuit, (ii) Choice of components, (iii) Heating of the VFO and its parts, from whatever cause, (iv) Mechanical stability of the VFO structure as such, (v) Mechanical stability of the components and wiring within the VFO structure, (vi) Excessive feedback within the VFO, and (vii) Any feedback whatever from other parts of the transmitter circuit, or the aerial.

(b) The chosen circuit is the Seiler type, used with an FET. Components for this circuit should be selected with great care. Resistors should be either metal-oxide or metal-film types, of more than adequate thermal rating, while the fixed capacitors in the tuned circuit should be of best quality mica, others being zero-temperature ceramic. The variable capacitor should not have aluminium vanes as these tend to show a severe temperature coefficient—brass should be chosen and the capacitor should be of such construction as to ensure that the vanes of the moving part of the capacitor cannot vibrate. The VFO should be protected from heat by either separating it from the transmitter proper or by careful design of the transmitter so that heat is carried away from the hot areas as easily as possible; some judicious lagging may help, and a little negative temperature-coefficient capacitance in the tuned circuit. Construction of the VFO should be in a die-cast box rather than a fabrication, to avoid any mechanical stresses as the transmitter warms up. All components must be anchored at both ends, and all wiring both direct and stiff. The coil used should be well spaced from the structure of the box and from any screening material, by at least one diameter, and the wire should be wound on the (preferably ceramic) former under tension. A stability figure to aim for is to have less than 100 Hz per hour drift after a 15-minute warm-up, and for a change of mains voltage of  $\pm 20\%$ . This implies stabilised power supplies, including the heater line if a valve is used. Finally, the VFO should be coupled to a good dial-and-drive mecha-

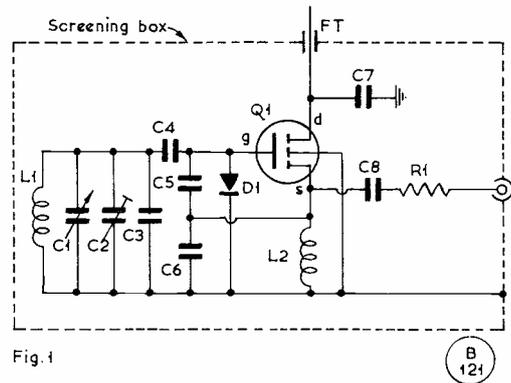


Fig. 1. To answer Q.2(B). Seiler Oscillator using 1GFET. It would be used with a buffer stage (see text) and values could be: C1, 100 pF; C2, 25 pF, trimmer; C3, 100 pF, silver mica; C4, 330 pF, silver mica; C5, C6, 680 pF, silver mica; C7, 0.1  $\mu$ F; C8, .0022  $\mu$ F; R1, adjust for optimum with buffer stage connected; L1, 17 turns 20g., 1-in. dia. by 1-in. long; L2, 2.5 mH RF choke; D1, 1N914; Transistor, 1GFET or 3N128; FT indicates feed-through capacitors.

nism, through a coupling which relieves the VFO of stresses. (See Fig. 1.)

Part II—Answer six questions in this Part

- Q.3. (a) With the aid of a sketch describe the construction of a tuning coil suitable for use in a variable-frequency oscillator operating from 1.8 MHz to 2.0 MHz.  
 (b) Why is a screening can normally placed around such a coil?  
 (c) Describe briefly how this screen performs its function. (10 marks)

Answer 3

(a) See Fig. 2. The coil is made of a single layer of wire, wound tightly on a former of lowest possible coefficient of thermal expansion and of the shape factor

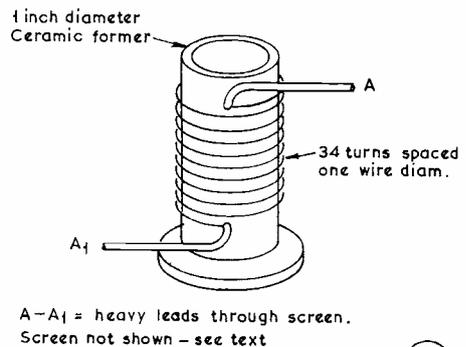


Fig. 2. To answer Q.3(A). Tuning coil for 1.8 MHz VFO.

to give highest Q. If possible the winding turns should be spaced one from another by a space equal to one wire diameter, and bare wire used. Screening material used should be at least one radius, and preferably one diameter away from the coil turns in all directions. No core of iron, dust, or ferrite is normally used.

(b) The screening can is normally placed around the coil to reduce to a minimum unwanted coupling between the coil and other parts of the VFO circuit, and to eliminate unwanted coupling between the coil and any other part of the transmitter circuit.

(c) Screening cans are of copper or aluminium material, and serve to confine most of the electro-magnetic field of the coil within the screen by generating eddy-currents opposing the penetration—Terman's *Radio Engineers Handbook* has a good explanation. Such a shield will also confine electrostatic fields in a similar manner; the effects described are accompanied by a loss of inductance and a fall in Q, which loss and fall can be kept tolerable by spacing at least one radius in all directions the coil from the screen.

(Editor's Note: The reference to Terman's work would not be expected in an R.A.E. answer, but should be noted for a good explanation of an effect often referred to but rarely explained.)

Q. 4. (a) State what is meant by "phase difference" between voltage and current in an AC circuit.

(b) What causes phase shift?

(c) State two conditions of an AC circuit which result in current and voltage being in phase.

(d) What is the impedance at 50 Hz of a series AC circuit consisting of a capacitor of 1.6 μF and an inductor of 3.2 H, having a resistance of 1000 ohms.

Note:  $3 \cdot 2 \pi$  can be taken at 10.

Answer 4

(a) Consider a signal following a law such as  $y = \sin \theta$ , and another following a law such as  $y = \cos \theta$ , plotting the values on a common graph from, say  $\theta = 0^\circ$  right through to  $\theta = 720^\circ$ . We will now have two sine-shaped curves, but they will reach their maximum and zero points at different places on the degrees axis. They are said to be "out of phase" with each other.

(b) Phase shift arises in any circuit having either capacitive or inductive reactance at the frequency in question.

(c) A purely resistive circuit, or a reactive circuit at a frequency where  $X_L = X_C$  the capacitive and inductive reactances being equal and opposite; this special condition is known as "Resonance" and can occur in either series or parallel networks.

$$(d) Z = \sqrt{R^2 + (X_L - X_C)^2} \dots \dots \dots (1)$$

$$\text{where } X_L = 2\pi fL, \text{ and } X_C = 1/2\pi fC \dots \dots \dots (2)$$

Thus, at 50 Hz,  $X_L = 2 \times \pi \times 50 \times 3 \cdot 2$ .

$$\text{i.e. } X_L = 1000 \text{ ohms.}$$

Similarly,  $X_C = 1/2 \times \pi \times 50 \times 1 \cdot 6 \times 10^{-6}$

$$\text{i.e. } X_C = 2000 \text{ ohms.}$$

Now we can put values into the equation for Z

$$Z = \sqrt{1000^2 + (2000 - 1000)^2}$$

$$Z = \sqrt{10^6 + 10^6}$$

$$\text{i.e. } Z = \sqrt{2 \times 10^6}$$

$$Z = 1 \cdot 41 \times 10^3, \text{ or } 1,410 \text{ ohms.}$$

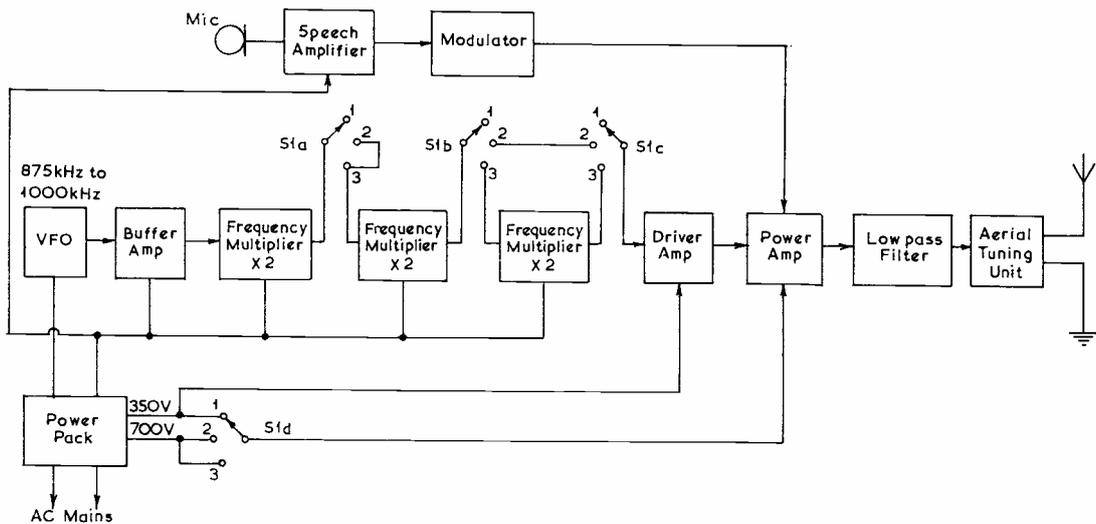


Fig. 3

Fig. 3. To answer Q.5 overleaf. This diagram is as given in the Question Paper, and is reproduced here for convenience in dealing with the questions.

Q. 5. See Fig. 3 on p.741, showing diagram of a double-sideband telephony transmitter (which was part of the question paper).

(a) What is the function of the buffer amplifier stage?

(b) (i) What bands are covered by this transmitter?

(ii) Which position of S1 corresponds to each band?

(c) What is the function of S1D?

(d) What is the function of the low-pass filter, and what would be a suitable cut-off frequency?

(e) What class of operation would be suitable for the modulator?

(f) What class of operation would be most suitable for the PA?

Answer 5

(a) To isolate the Variable Frequency Oscillator from any loading changes caused by tuning up of multiplier driver, or PA stages.

(b) 1.8 MHz, 3.5 MHz, 7.0 MHz, at S 1-2-3 respectively.

(c) To enable the transmitter to be adjusted to ten watts DC input to the final stage on 1.8 MHz only.

(d) To keep transmitter harmonics from reaching the aerial and being radiated to cause interference to television. It could, in this case, be arranged to begin to cut off all frequencies above, say, 14 MHz.

(e) Class-AB<sub>1</sub>.

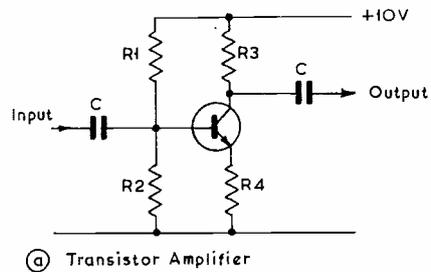
(f) Class-C.

Q.6. Describe with the aid of a diagram the action of *either* a transistor as an amplifier, *or* a thermionic valve as an amplifier.

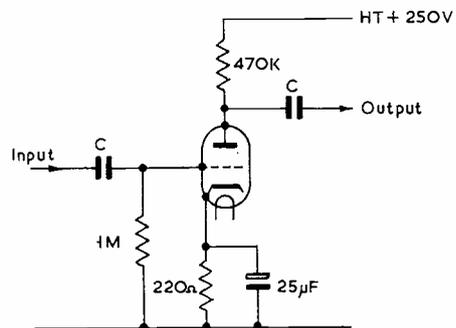
Answer 6

Consider Fig. 4A. Resistors R1 and R2 are set to give the desired standing base current; roughly, we may say R1 is about 4R2, and R4 adjusted to drop approximately one volt at the normal standing emitter current. R3 is the load resistor across which the output signal is developed. R1, R2, and R4 serve the purpose of stabilising the working point of the transistor on its characteristic curve. Imagine at the input terminal a sine-wave signal, which at the moment under consideration is going positive. This drives the base upwards, and increases base and collector current; thus more volts are dropped across R3, and a negative-going signal appears at the output. In a similar manner, when the base goes negative, the collector current falls, the collector volts rise and a positive signal appears at the output terminal. Thus, the transistor gives at its output terminal an amplified and phase-reversed replica of the input signal.

Consider Fig. 4B. The grid is connected to ground through R1 to give a DC return to cathode for the grid. R2 in the cathode circuit drops some voltage and hence biases the grid negative with respect to cathode, for Class-A operation. R3 is the anode load across which the output signal is developed. As before, a positive-



(a) Transistor Amplifier



(b) Valve Amplifier

Fig. 4

B  
124

Fig. 4. To answer Q.6. At (A) is a transistor amplifier, and at (B) a valve amplifier.

going signal at the grid is negative-going at the anode, and for the same reason, increases anode current. Negative-going signals reduce anode current and so reduce the drop across the anode load resistor. Thus, the valve gives an amplified, phase-reversed replica of the input at its output terminals.

NOTE. Only the valve *or* the transistor circuit would be attempted by a candidate; both are explained here for reference only.

Q.7. (a) With the aid of a block diagram explain the principles of operation of a super-heterodyne receiver.

(b) What are the advantages and disadvantages of

- (i) a relatively high intermediate frequency?
- (i) a relatively low intermediate frequency.

Answer 7

(a) Consider the block diagram at Fig. 5. Signals at radio frequency are selected and amplified to some extent in the RF amplifier, before being passed on to the mixer for application of the local oscillator signal; the degree of RF amplification is as low as possible consistent with overcoming the noise generated in the mixer. Depending on the tuning of mixer, local oscillator and RF stage, there will be a signal at the output of the mixer which is at the frequency of the IF amplifier,

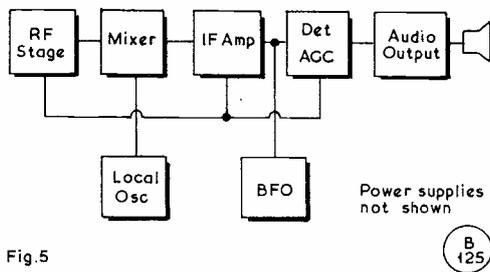


Fig. 5

Fig. 5. To answer Q.7. Block diagram of a superhet receiver of conventional design.

often around 465 kHz. The signal at the IF is given the main amplification here, and tuned circuits in the IF amplifier are arranged to reject signals near but not on the nominal IF amplifier design frequency. The signal at the output of the IF amplifier is passed to the detector-AGC stage, where there are two diodes. One is used for signal detection, the audio content being passed on to the AF amplifier; the other is exactly the same but has a longer time constant in its output, which results in a steady negative voltage relative to the earthy rail of the receiver, the amplitude of which increases with increase of signal. This negative voltage is fed back to the RF and IF valves to give a reduction of gain on big signals; the system is known as AGC. The AF amplifier brings the signal to a level suitable for headphone or loud-speaker outputs. The block labelled "BFO" contains an oscillator of frequency adjustable to either side of the intermediate frequency (IF). By its use it is possible to heterodyne a CW signal or re-insert the carrier of an SSB transmission and so resolve them. It is normally used without AGC, which is arranged to be switched off by earthing the AGC line.

(b) (i) A relatively high IF results in an improvement in image rejection, at the expense of greater difficulty in getting RF and local-oscillator stages to "track" and of some increase in complexity of the IF stages to obtain adequate gain and selectivity.

(ii) A relatively low IF makes for easier IF amplifier design, with the gain achieved over fewer stages and selectivity with simple tuned circuits. Tracking of RF and local oscillator is easier. However, against this must be set the much lower image rejection, and probably a tendency for the local oscillator to "pull" on big signals.

Modern practice tends to favour a relatively high IF.

Q.8. (a) What is meant by fading?

(b) Describe two causes of fading.

Answer 8

(a) Fading is the variation of mean signal strength

noted on a receiver located at a distant point, due to causes external to the transmitter or receiver systems.

(b) One cause of fading is the effect often seen on 1.8 MHz amateur band, where at night one receives both a ground-wave signal and a skywave refracted from the ionosphere. Because the two path lengths are different, and the sky-wave path length is constantly changing, the *phase* of the signals arriving at the receiver aerial will vary from additive to subtractive from moment to moment.

Another cause of fading is produced by the path length of a signal from transmitter to receiver through the ionosphere continually changing, this path length being different at different frequencies. Thus, maybe the upper sideband may be at a peak at an instant when the lower sideband is at a minimum, and the carrier frequency at some other level. This effect is very noticeable on double-sideband signals, and is called "selective fading." As the signal paths of such a signal are complex and continually changing, the fading will tend to distort the recovered audio in a quite characteristic manner.

Q.9. Describe carefully the method to be followed when measuring the radiated frequency of an amateur transmission with the aid of a heterodyne wavemeter.

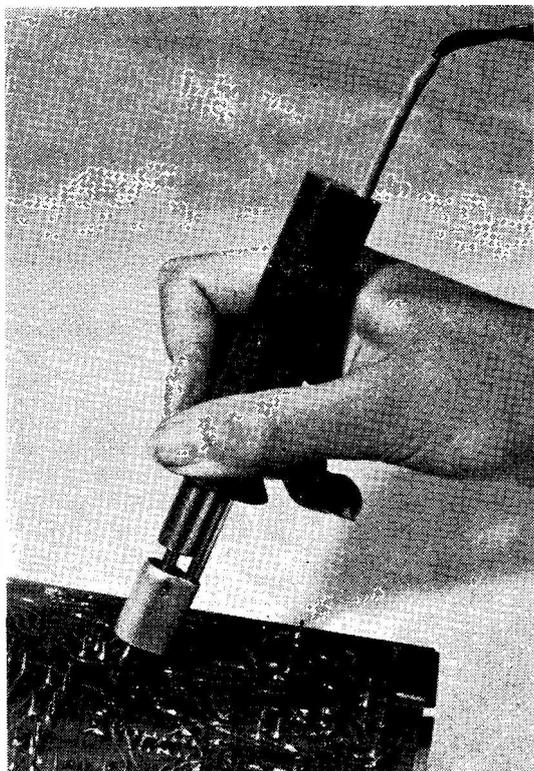
Answer 9

Consider the use of a BC-221 frequency wavemeter with mains supply. Switched on, set the function switch to "check" or "operate" and let the instrument warm up for at least 30 minutes.

The first step is to check that the crystal oscillator in the BC-221 is synchronised with a standard frequency transmission found in the station receiver, such as MSF or WWV. The oscillator should be adjusted to zero-beat to the standard signal heard; if not it must be removed from the case and the appropriate adjustment made. Switch to "check" and adjust the "corrector" knob to give a zero-beat in the headphones plugged into the instrument, at the nearest check point to the spot where the transmission is believed to be. Now connect a short piece of wire to the Ae. terminal of the BC-221, switch it to "operate" and set the tuning knob for zero-beat with the transmitted signal, checking that this is the right beat by switching the transmitter on and off. The *minimum* of coupling must be used between the two instruments to avoid spurious responses. In the example used for answering the question the transmitter was set to a point at the CW end of 1.8 MHz band, which the transmitter dial said was 1835 kHz; the BC-221 made it to be 1836 kHz after following the procedure explained. It must be stressed that with any heterodyne wavemeter all possible care and double-checking must be used to avoid spurious and incorrect results.

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We are not able to guarantee future publication until the present industrial difficulties have been resolved.



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Q.10. (a) Describe the construction of a transmission line suitable for use as an aerial feeder. State whether your example is meant to be used as a balanced or unbalanced line.

(b) What is meant by the "Characteristic Impedance" of a transmission line?

#### Answer 10

Consider Fig. 6, which shows an open-wire feeder, comprising two wires  $X - X^1$ , held a given distance apart by spacers  $S$ , which are inserted at intervals of, say, a foot or eighteen inches, the whole construction rather resembling the appearance of a rope ladder, with the ropes representing the conductors and the spacers the treads. The spacing may vary, to choice, between, say two to six inches. This line is called a "balanced" line, the impedance being given by the formula

$Z_0 = 276 \log B/A$ , where  $Z_0$  is the characteristic impedance,  $A$  the radius of the conductors, and  $B$  the spacing of the conductors, centre-to-centre.

As this formula makes clear, the characteristic

impedance is related to the physical parameters of the line. It may be regarded as the value of the resistance which, if placed across the end of a finite length of the line, would simulate to the RF generator the illusion of an infinite length of line connected into a pure load.

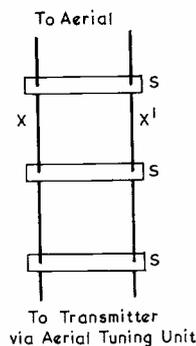


Fig. 6

B  
126

Fig. 6. To answer Q.10(A). Open-wire balanced feeder - see text.

#### Final Comments

The foregoing answers should be good enough to gain a pass. However, it must be realised that the examiners can only mark those questions, up to the total required, which you have answered. Thus a perfect answer taking three hours to one question will guarantee a failure.

It is felt that this Paper was one of the easier ones of recent years; this was doubtless reflected in slightly stiffer marking of the answers.

The writer has been asked about the question of a candidate using a pocket electronic calculator instead of a slide-rule or log tables. It is felt that this will be a matter for decision by the City & Guilds Institute in due course; till then, it is advised they not be used.

#### Notes for Candidates (Useful Reading List)

For those concerned, copies of the RAE Questions Papers for the years 1971-'72-'73 are available as one set, with the syllabus for Subject 765, at 25p post free, from the Sales Section, City & Guilds of London Institute, 76 Portland Place, London, W1N 4AA, quoting "Subject No. 765." Also obtainable, free of charge, is the Post Office pamphlet *How to Become a Radio Amateur*, covering the conditions for the issue of a U.K. amateur licence; you can get it from the Ministry of Posts & Telecommunications, Radio Regulatory Division, Amateur Licensing Dept., Waterloo Bridge House, Waterloo Road, London, SE1 8UA.

Following is a suggested list of books, obtainable from us, and suitable for RAE study and reading: *Amateur Radio* (£1.63); *Guide to Amateur* (90p); *Radio Amateur Examination Manual* (90p); *Amateur Radio Techniques* (£1.85); *ARRL Antenna Handbook* (£1.42) and for a standard text on the principles and practice of Amateur Radio generally, the *Radio Communication Handbook* (£4.13).

This list constitutes a library covering the immediate reading requirements of anyone aspiring to an amateur transmitting licence and also embraces the practical work involved in getting a modern AT-station on the air, with a lot of useful reference data to keep any licensed amateur interested and occupied for a long time to come. All titles are latest editions of books of proven worth. Prices quoted are post free, from stock for immediate delivery and orders with remittance should be sent to: Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, SW1H-0HF.



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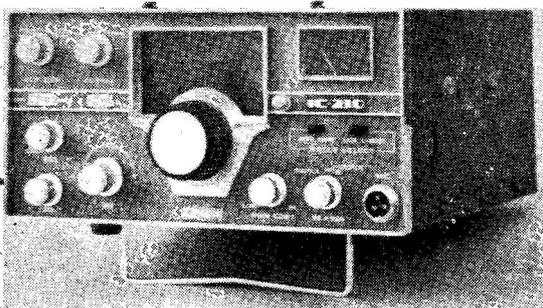
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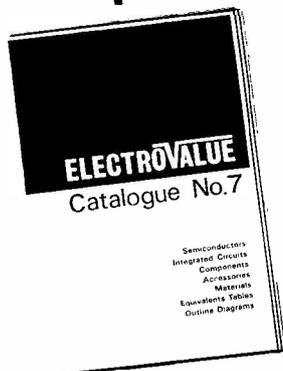
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**WANTED:** Ex-QRT restarting from scratch, everything required—no time to build, whole station or separate items. Must be New and in Excellent condition. Details and price please. (Sussex).—Box No. 5196, Short Wave Magazine Ltd., 55 Victoria Street, London, SW1H-0HF.

**EXCHANGE OR SELL:** Barlow-Wadley Mk. II in mint condition. Offers or exchanges?—Ring Sutcliffe, Bradford 676556 after 6 p.m.

**FOR SALE:** K.W. Viceroy Mk. III and Trio 9R-59DE, both in excellent condition, £80. Will consider selling separately.—Leyland, 72 Cliveden Road, Chester (22441), Cheshire.

**SELLING UP:** Eddystone 770R, just checked and re-aligned, complete with ground plane aerial and lead-in.—Ring Dixon, Stannington 386 (Northumberland).

**EXCHANGE:** Yaesu FRD-SX400, mint, covering 160-2m. FOR 940, SP-600, 730/4, BRT-400E (or W-H-Y coverage-wise?), cash adjustment required. (Kent).—Box No. 5197, Short Wave Magazine Ltd., 55 Victoria Street, London, SW1H-0HF.

**SELLING:** Trio TS-510 in mint condition, with mic. SWR meter and Z-Match unit, £145. Carriage extra.—Elsworthy, G4AYG, 2a Steele House, Dovercourt, Essex. (Tel: Harwich 6948, evenings).

**SALE:** Heathkit RA-1 communications receiver, amateur band coverage 160-10m, with built-in S-meter, noise limiter, crystal filter etc., an excellent receiver in good condition, £21.—Ring Jones, G4CMF, home 01-764 3881, office 01-920 8587.

**WANTED:** Receiver, preferably Eddystone type. Also Transmitter, such as K.W. Electronics, both for SSB operation, or a Complete Station. For SALE: Three portable masts, two boxed.—Underwood, G3ESO, 4 Earls Court Road, Amesbury, Wiltshire.

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**SALE:** R.C.A. AR88D receiver, with manual and speaker, £35. Also a BC-221 frequency meter, with charts and PSU, £15.—Minett, G3WPP, 50 Timberdine Avenue, Worcester, WR5 2BD.

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**WANTED:** A Trio 9R-59DS, must be in mint condition.—Ring Jepson, Nutley 2855 (Uckfield, Sussex).

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