APRIL 1973

RADIO COMMUNICATION

17 May 1973

World Telecommunication Day

International co-operation in telecommunications

International Telecommunication Union

RSGB Diamond Jubilee Year

1913 – 1973

Journal of the Radio Society of Great Britain

APRIL 1973

RADIO COMMUNICATION

Volume 49 No 4 Price 30p

CONTENTS

Radio Communication **is published by The Radio Society of Great Britain as its official journal on the first Tuesday of each month and is sent free and post paid to all members of the Society**

ABC
MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

17,313 copies per issue average circulation in 1972

Contributions and all correspondence concerning the **content** of *Radio Communication* should be addressed to: The Editor, *Radio Communication*, 35 Doughty Street London WC1N 2AE. Tel 01-837 8688.

Closing date for contributions unless otherwise notified: 4th of month preceding month of publication.

Advertising, other than Members' Ads, should be sent to the above address marked for the attention of Mr C. C. Lindsay. Tel 01-837 8688 or 01-686 5839 (advertising only).

A * *

OUR WESTERN

YAESU MUSEN MAIN DISTRIBUTOR

"ALL RECEIVERS 'FALL OFF' AT 30MHz!"

THIS HAS BEEN THE GENERAL OPINION OF RECEIVER SENSITIVITY PERFORMANCE FOR YEARS AND STILL APPLIES TO SOME MODERN EQUIPMENT! HOWEVER, **IT DOES NOT APPLY TO YAESU EQUIPMENT!** **"YOU DON'T BELIEVE US? THEN HERE ARE THE FACTS!"**

TAKE YOUR PICK! EITHER REFER TO THE R.S.G.B. REVIEW OR OUR TEST ON AN OFF-THE-SHELF

YAESU FT-401

YD-844 **SP-400** **FT-401** **FV-401**

RECEIVER MEASURED PERFORMANCE

SENSITIVITY

Input Freq. MHz	S + N:N for 0·5μv emf dB	S + S:N for 1·0μv emf dB
3·6	16	22
7·1	19	25
14·2	19	25
21·2	19	25
28·7	20	26
29·7	20	26

AGC CHARACTERISTIC

Input emf 14·2MHz	AF output dB	Comparative figures with £1,2000 receiver! dB
1 microvolt	0	0
3·2 microvolt	+6·5	+6·5
10 microvolt	+8·1	+8·1
32 microvolt	+8·6	+8·6
100 microvolt	+8·8	+8·8
320 microvolt	+8·8	+8·8
1 millivolt	+8·8	+8·8
3·2 villivolt	+8·9	+8·9
10 millivolt	+8·9	+8·9
32 millivolt	+9·0	+9·0
100 millivolt	+9·0	+9·0
320 millivolt	+9·0	+9·0
1 volt	+9·0	+9·0

INTERMODULATION. In-band 3·7MHz.
Measurements made with two Marconi Signal generators TF2002SA, two Digital Synchronisers, Marconi TF2170, Hewlett Packard 302A Wave analyser and resistive combining pad.

Input emf of each generator	2nd order 600MHz dB	3rd order 800MHz dB	3rd order 2600Hz dB
100 microvolts	—37	—24	—38
1 millivolt	—30	—20	—33
10 millivolt	—28	—17	—31
100 millivolt	—26	—16	—30

INTERMODULATION. Out of Band. Second Order.
Inputs at 6·7MHz and 7·5MHz Tuned to 14·2MHz

Input emf of each generator millivolts	Equivalent emf of IM products	dB relative to one input
3·2	Inaudible	Inaudible
10	Inaudible	Inaudible
32	Inaudible	Inaudible
100	0·25 V	—112 dB

In order to compare receiver performance figures one must determine the following:

1. 'Voltage': is it emf or pd across, say 50 ohm input? There is a 6dB difference!
2. The signal + noise to noise ratio (S + N:N) in dB's.
3. The frequency at which the measurements have been made.
4. The bandwidth used.

Just in the same way as one can't compare apples with oranges, nor can one compare sensitivity figures unless the same standards are used. To use a narrower bandwidth would seem to give a receiver a better noise performance. Equipment used for tests; Marconi signal generator TF2002AS, Digital Synchroniser (Marconi) TF2170AF, Power Meter TF2500.

DESENSITISATION

Wanted signal at 14·210MHz at 1·0μV

QRM level emf	QRM Freq.	Freq. spacing	QRM Freq.	QRM level emf
mV	MHz	kHz	MHz	mV
4·5	14·20	10	14·22	4·5
6·3	14·19	20	14·23	6·3
12	14·16	50	14·26	12
14	14·11	100	14·31	14
14	13·71	500	14·71	14

Measurements. Receiver tuned to 14·21MHz.RF Gain at max. Mode USB. 1·0V input. Interfering signal at given spacing from wanted signal. Level of QRM signal raised until S + N:N ratio is reduced by 3dB.

INTERMODULATION: Out of Band. Second Order.
Inputs at 21MHz and 6·8MHz Tuned to 14·2MHz

Input emf of each generator millivolts	Equivalent emf of IM product	dB relative to one input
3.2	Inaudible	Inaudible
10	Inaudible	Inaudible
32	0·18 V	—105 dB
100	0·5 V	—106 dB

INTERMODULATION: Out of Band. Third Order.
Inputs at 14.0 and 14·1MHz. Tuned to 14·2MHz

Input emf of each generator millivolts	Equivalent emf of IM product	dB relative to one input dB
3.2	0·1V	—90
10	0·4V	—88
32	9·0V	—71
100	320·0V	—50

ELECTRONICS (UK) LTD

So when you hear people say that receivers 'fall-off' at 30MHz. or that you sacrifice receiver performance if you buy a transceiver, don't forget to reply, "Not with Yaesu Musen you don't."
As regards transmitter performance we respectfully draw your attention to the power output figures at 30MHz. and 3.5MHz. You'll notice they're the same! Now try your own equipment and see how it compares; on second thoughts don't bother as we don't want you to have any sleepless nights! Yes we have a very large stock of OSKER POWER METERS at the old pre-yen re-valuation price of **£18.5** + VAT so get yours now.

YAESU PRICES
By the time you read this VAT will apply and due to the re-valuation of the yen prices may be up 25%. However, due to our holding large stocks at the time of going to press we have some models still available at old prices + VAT only. This includes the FT-101 Mk 1 at **£229** + VAT. We have a few of the latest models too complete with 160m but no doubt these will all be gone by the time this appears? FT-501. Production has been delayed at the factory and this unit is not expected until June. However, we should have one mid-April for callers to inspect and test. With VAT and the yen having gone up it will now be around **£375.**

NEW/USED EQUIPMENT: 3 months guarantee. Add £1 Securicor delivery.

Collins, 75SI, v. good	£175.00	Heath SB303 Mint	£150.00	KW Atlanta, New	£199.00	Sommerkamp, FT-250, v. good	£135.00
Codar pre-selector	£5.00	Heath SB101 + HP23E	£150.00	KW Atlanta, used, good	£150.00	Sommerkamp, FT-500	£135.00
Eddystone 750	£45.00	Heath SB101 + HP23 + CW + SB600 110 CAV	£155.00	KW Vespa 2 v. good	£90.00	Tristao 105' Teles, Tower.	£225.00
Eddystone EC10 Mk2.	£60.00	Heath HW32A + HP23E	£60.00	Lafayette HA350, excellent	£55.00	Trio 9R59DS, new	£49.50
Eddystone 888A + Spkr. + S. Meter + plinth	£60.00	KW2000 + AC + DC PSU, v. good	£150.00	Lafayette HA500	£30.00	Trio JR500SE excellent	£45.00
Hallicrafters HT32B, Good	£80.00	KW2000A + AC PSU, v. good	£149.00	Lafayette HA600, v. good	£39.00	Trio JR310 excellent	£60.00
Hammarlund HX50	£79.00	KW2000B + AC PSU, exc.	£170.00	National NCX-5 superb	£175.00	Trio TS510 mint.	£140.00
Hamgear pre-selector	£8.00	KW DC PSU for 2000A	£20.00	National NCX500 excellent	£175.00	Yaesu FT-101 mint.	£199.00
Heath RA1	£25.00	KW VFO4B	£20.00	Pyramid linear amp. good	£37.00	Yaesu FT-101 + 160m. mint	£205.00
Heath SB200 as new	£99.00	KW PEP meter	£10.00	Racal HA796	£485.00	Yaesu FT-200 mint.	£140.00
Heath SB303 + CW. New assembled	£238.00	KW Viceroy 4, v. good	£80.00	Sommerkamp FT100-160m., good	£150.00	Yaesu FT-560 excellent	£155.00
						Yaesu FL-2000	£70.00

Installing a Rotator Antenna Tower?

Then you'll be glad you dealt with the

LEADING DISTRIBUTOR IN EUROPE

We have THE STOCK . . . for quick delivery
THE SPARES . . . for after sales service
THE EXPERIENCE . . . to give you the advice you require

There's more to even a simple job like fitting AR22R than just buying it and attaching a 4-way cable! Naturally, we don't wish to give away all our "trade-secrets" by publishing all the pitfalls! We just recommend you to avail yourself of our services! Our aim is to see you with a safe efficient installation.

A GREAT NEW RANGE OF ANTENNAS!
WILSON ELECTRONICS (U.S.A.)

have appointed us as their European Distributor, for their vast range of MONO-BAND BEAMS for 10, 15, 20 & 40m and DUO-BANDERS for 10/15, 15/20 and 20/40m.

Supplies of these antennas are due to arrive in April but let's make it clear now; they won't be cheap! But then you don't expect to get a 7 ele. 20m. beam for £7 if it's going to stay up in the air! The range includes 2 and 3 ele. 40m. beams plus big duo-banders like 6 ele. on 20m and 2 ele. on 40m! Prices will be announced after the stock has arrived so send us an SAE and we'll send you details as soon as possible.

ANTENNA ROTATORS.

AR20 (P &P 40p)	£20.00	AR22R (p & p 65p)	£25.00	TR44 (p & p 75p)	£45.00	HY-GAIN, 400 (p & p £1)	£115.00
				HAM-M (p & p 80p)	£70.00		

BANTEX FIBREGLASS MOBILE ANTENNAS (Carr. 50p) including Base

70½, 70MHz, ¼ wave	£3.00	BGA, 144MHz, ¼ wave	£6.15	Magnetic mount	£6.15	Note. Deduct 50p from price of aerial if base is not required.
144½, 144MHz, ¼ wave	£2.85	B5, 144MHz, ¼ wave	£4.35	All aerials complete with base.		

HY-GAIN—see separate sheet

G WHIPS (Carriage 50p, coils 20p)

Tribander 10, 15, 20m.	£9.45	LF160 160m. coil	£4.00	160 Ranger	£7.50	MM 80m. coil	£4.00
LF40 40m. coil	£4.00	Whip for LF coils	£1.00	Multimobile '71' 10, 15, 20m.	£12.50	MM 160m. coil	£4.00
LF80 80m. coil	£4.00	160/180m. Duobander	£9.00	40m. coil	£4.00	Basemounts	£1.45

NOTE. PLEASE ADD VAT TO ALL ADVERTISED PRICES

NEW ENLARGED CATALOGUE. You ought not to be without your copy listing towers, masts, antennas, rotators, Yaesu equipment and a host of other items. Send 20p only (no s.a.e.)

Hours of business: Monday-Friday, 9-5.30 p.m. Saturday, 9-12.30 p.m.
★ **Money saving "package deals" on purchase of mast, rotator and antenna.**

AGENTS—G3PRR CHESHAM (BUCKS) (02405) 4143 and G3UDR SHIPSTON-ON-STOUR (GLOS) 61839

WESTERN ELECTRONICS (U.K.) LTD.
OSBORNE RD . TOTTON , SOUTHAMPTON SO4 4DN

TEL: TOTTON (04216) 4930 or 2785
Cable: 'AERIAL' SOUTHAMPTON

ANNOUNCE *A NEW SERVICE*

JUST PHONE YOUR ORDER IN!

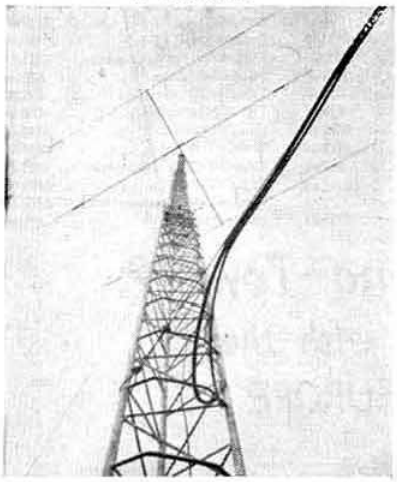
NO LETTER WRITING — NO MONEY REQUIRED
MERELY QUOTE YOUR ACCESS CARD NUMBER AND WE DESPATCH THE GOODS

1. This service will be available to callers, mail and telephone customers; just another part of the finest service available to the U.K. Amateurs. We hope you'll give it a try! We'll despatch your order the same day if humanly possible by whatever means you wish.

You may order anything which we sell by this high speed service, including used equipment, up to the limit of your Access card.

TOWERS AND MASTS

79' TELETOWER



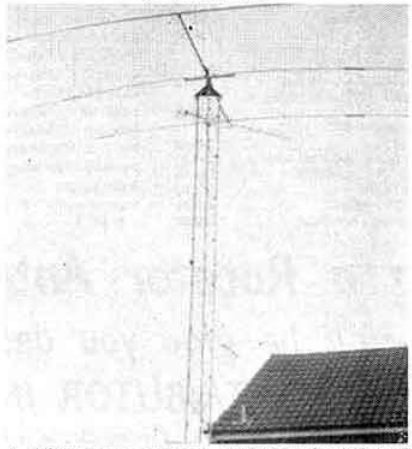
TELETOWERS

The finest value in guyed, galvanised steel towers which telescope down to 25'. Price (carriage paid):

42' **£84.00** 57' **£117.00** 79' **£145.00** 101' **£185.00**

TOWERS (in stock!)

30' HAMTOWER



A self-supporting galvanised steel tower for IHF band beams. Each 10' side weighs only 22 lbs., so the tower can be erected single-handed.

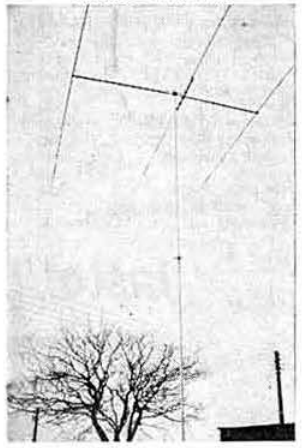
Price: **£55.00** carriage paid.

VERSATOWERS

Immediate delivery from our stock! Self-supporting tilt-over towers for 40', 60' and 85'.

P40, **£121.75**, P60', **£146.50**, T85', **£275.00.**

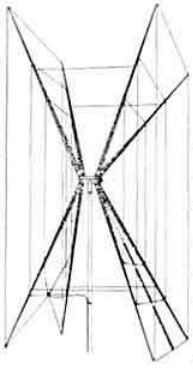
TELEMOST with TA33



The best telescopic rotatable masts. Can be erected single-handed in minutes and extends vertically upwards. Prices (carriage paid):

	Mast only	*Mast and Rigging kit*
30'	**£16.50**	**£22.30**
40'	**£18.70**	**£29.70**
50'	**£22.00**	**£36.85**

ANTENNAS



THE FINEST FROM CANADA

GEM-QUAD £74.50

for 10, 15 & 20m.

- ★ Weighs only 21 lbs.
- ★ Withstands 100 mph winds.
- ★ Forward gain up to 8dB.
- ★ Balun included.
- ★ Converts to 3 or 4 element quad.
- ★ Fibreglass tri-dectic spreaders.
- ★ Front/back ratio 25dB.
- ★ Low angle radiation.

THE FINEST FROM U.S.A.

HY-GAIN 18AVT

HY-GAIN 18AVT/WB THE GREAT NEW WIDE BAND VERTICAL SELF SUPPORTING FOR, 10-80m. (ex-stock) **£33.00.** Take the wide band, omnidirectional performance of Hy-Gains famous 14AVQ/WB add 80m. plus extra heavy duty construction and you have the new 18AVT/WB ★ True ¼-wave resonance on all bands ★ 52Ω/P ★ SWR of 2 : 1 or less at band edges ★ 1 kW (AM) ★ Radiation pattern has an outstandingly low angle ★ Roof or ground mounting.

Hy-Tower 10–80m Self supporting tower	**£110.00**	TH2 Mk.3 10–20m. 2 element	**£51.50**
18V 10–80m. Vertical self supporting	**£12.85**	Hy-Quad. 10–20m. 2 element quad	**£74.50**
12AVQ 10–20m. Vertical self supporting	**£16.50**	DB10–15A 10 & 15m. 3 element beam	**£57.00**
14AVQ 10–40m. Vertical self supporting	**£24.50**	204BA 20m. 4 element beam	**£80.00**
LC-80-Q. Loading coil for AVQ. 80m.	**£7.75**	203BA 20m. 3 element beam	**£72.00**
18AVT/WB 10–80m, Vertical, self supporting	**£35.50**	153BA 15m. 3 element beam.	**£36.50**
TH6DXX 10–20m. 6 element beam	**£97.00**	103BA 10m. 3 element beam.	**£28.50**
TH3 Mk.3 10–20m. 3 element 2kW. beam	**£75.00**	Lightning arrestor, LA-1	**£14.50**
TH3 Jnr. 10–20m. 3 element 600W beam	**£51.50**	Lightning arrestor, LA-2	**£2.50**
		12RMQ roof mounting kit.	**£9.15**
		14RMQ roof mounting kit	**£10.60**
		18RMQ roof mounting kit	
		18TD Reeltape portable dipole	**£ 41.00**
		C1 centre insulator,	**£2.50**
		E1 end insulator, per pr	**£1.50**
		400 Rotor	**£115.00**

MOSLEY (Carriage paid) (Ex-stock from us for fast service)

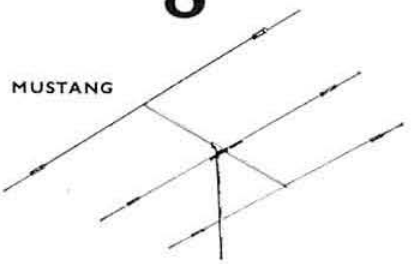
Mustang, 10–20m. 3 ele. 2kW	**£45.50**	TA33 Jnr. 'E' for 2" mast	**£37.00**	TA32 Jnr., 1–20m. 2 ele.	**£26.00**	TA31 Jnr., Rotary dipole	**£16.40**
		TA33 Jnr., 10–20m. 3 ele	**£36.50**	TA32 Jnr. 'E' for 2" mast	**£26.50**	SWL Listeners dipole	**£11.90**

WESTERN ELECTRONICS (U.K.) LTD.
OSBORNE RD . TOTTON . SOUTHAMPTON SO4 4DN

TEL: TOTTON (04216) 4930 or 2785
Cables: 'AERIAL' SOUTHAMPTON

We've improved on the Yagi !

Impossible - not really, we've added British know how and Mosley reliability.



MOSLEY of England Antennae

Mustang. 3 band 3 elements
Elan. 2 band 3 elements
TA-33 Jr. 3 band 3 elements
TA-32 Jr. 3 band 2 elements
TA-31 Jr. 3 band dipole
V-3 Jr. 3 band vertical
A-310. 10 metre 3 elements
A-315. 15 metre 3 elements
Atlas. 4 band vertical
TD-3 Jr. 3 band trap dipole
RD-5. SWL amateur bands
SWL-7. SWL broadcast bands
D-4BCa. Base loading coil for ATLAS for 80 metres
TW-3X Jr. 20, 40 and 80 metre vertical
VTD-3 Jr. 3 band vertical for difficult locations
IMPACT Mono Banders

MOSLEY U.S.A. types in stock :

MCQ-3B. 10, 15 and 20 metre Quad
MCQ-20. 20 metre Quad
Classic-33. 10, 15 and 20 metre 3 elements
Classic-203. 20 metre 3 elements
A-92-S. 2 metre 9 elements
DI-2. 2 metre. Ground plane
Other U.S.A. types to special order.

Give Your Signal the Mosley Impact

MOSLEY Electronics Ltd

TOWERS ROTATORS
CABLES INSULATORS etc

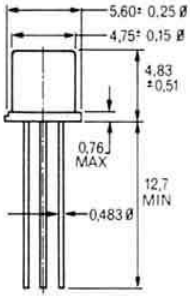
Administrative Address only
40 Valley Road, New Costessey, Norwich, Norfolk, NOR 26K

FOR ALL ANTENNA DETAILS :
Send for complete Handbook, containing full details and prices of Antennas and other technical information. 25 pages, **15p**
Refundable upon purchase of an Antenna.

TERMS Retail mail order subject to £1·00 minimum order.
Cash with order only. Trade and educational establishments M/AC on application (minimum £5·00).
Postage 10p inland, 25p, Europe.
GUARANTEE: All goods carry full manufacturer's warranty. Get in touch today for a complete run-down of devices available from SCS (include SAE).

SCS COMPONENTS, P.O. Box 26, Wembley, Middlesex HA0 1YY
The 'Professional' Amateur Supplier

device of the month ZN414



The Ferranti ZN414 is a complete a.m. radio circuit which operates from 1.1 to 1.8 volts and requires only battery, earphones and antenna plus a tuning capacitor and two decoupling capacitors. The ZN414 features: medium and long waveband, good stability on assembly, no setting up of IF coils, plus much more.

a complete a.m radio circuit for just £1.20

compatible device MFC4000

The Motorola ¼-Watt Audio Amplifier is designed for the output stage of battery powered portable radios.

* 250 mW of Audio Output Power
* Low Standby Current— 3·5 mA typical
* Low Harmonic Distortion
* Reduces Component Count in Portable Radios by Two Transformers and Two Transistors
* Eliminates Costly Component Matching Requirements

motorola 1/4 watt audio amplifier MFC4000 50p

LOWE ELECTRONICS

119 Cavendish Road, Matlock, Derbyshire, DE4 3HE

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

John: G3PCY Bill: G3UBO Alan: G3MME

MAIN DISTRIBUTOR FOR YAESU MUSEN EQUIPMENT

Hours: Tuesday to Saturday 9-5.30 (closed for lunch 1-2 and all day Monday)

SERVICE AND SALES (evenings and weekends only): John G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex. Tel: Ringmer 812071. Sim GM3SAN, 19 Ellismuir Road, Baillieston, Nr. Glasgow. Tel: 041-771 0364. Alan GW3YSA, 35 Pen y Waun, Efail Isaf, Nr. Pontypridd, Glam. Tel: Newton Llantwit 3809. Peter Ward, G3XWX, 47 Radstock Avenue, Ward End, Birmingham B36 8HD.

SERVICE ONLY (evenings and weekends): Dave Dryden, G3BKQ, 205 Main Street, Thornton, Leics.
Sim, John, Alan and Peter will be happy to demonstrate New Yaesu Gear by appointment. They also have a pretty good selection of second-hand trade-ins at the right price.

In view of the uncertainty of prices and VAT and as the pre-VAT mad rush to buy has died down, it might be a good time to advertise some of our lesser-known bits and pieces, and at the same time, as well as advertising them, see if we can't give you some helpful hints and tips.

Yaesu News

FT101 owners—we now have AM filters in stock—indispensable for the 2m man. Price £18 + VAT. Write for details of fitting or arrange a day when we can do it.

FTdx401 owners—we thoroughly recommend our tune-up device which requires 9 volts and plugs into the mike socket. This is a high output pulsed tone of 10 millisecs on and 50 millisecs off. This 20% duty cycle means you can load up your FTdx401 (or any other SSB rig) at full power to achieve optimum loading conditions without over-running the P.A. Using this device we have run an FTdx401 at FULL POWER for an hour without the slightest sign of distress. We are very pleased with this little idea and anyone running high power (particularly applicable to linears) will find it invaluable. For blind or handicapped operators—this is the answer. We like it, and at the price of **£1.50** + VAT for a kit, or **£3.00** + VAT assembled on a P.C. board, it represents a worthwhile addition. However, please note two very important points—one—it does not absolve you from treating your rig to a 50 ohm (or about) antenna and—two—please don't load up right on top of a QSO. The poor chap struggling to a copy a weak signal will swear at *us*, not you!

Mobile News

We still have a few FT75's at pre-revaluation prices, so if you are thinking of a mobile rig, the FT75 fits into the smallest of cars and gives a very good account of itself both for local and DX working. There is a great deal to be said for a compact, trouble free, push button rig for mobile—it looks good and it PERFORMS.

Station Accessories

The uncertainty of import prices gives us a chance to advertise the station accessories which we have in stock and which we rarely get a chance to describe in any detail.

Aerials

We always have a wide selection in stock ranging from 4 element wide spaced single band beams, through quads and verticals to 2m Yagis and 2m whips. For the man who wants a big beam—give us a yell, because we generally find that, price for price, our Japanese beams out-perform all others in quality and performance. In the medium price range we find the American Polygon quad a good buy and in the lower price range our verticals take some beating.

Asahi Echo 8G—here is a trap vertical requiring no guys and no radials (although radials can give greater performance) covering 4m to 10m with a low SWR at a very low price of **£20** (+VAT) including carriage. It stands about 21' high and is an excellent performer.

Diamond DP 104

A compact trap vertical for 20, 15 and 10m. Low SWR on all bands and only stands some 11' high. Excellent for portable or where neighbours are a nuisance. **£19** + VAT carriage paid.

Diamond DP 103

80 and 40m trap vertical about 25' high. Light guying advisable (ropes provided). My own feeling is that an 80m dipole will outperform an 80m vertical, but if you haven't room for a dipole, then the DP103 will work well for you. Radials not essential, but they always help. Tune for the bit of the band you use most, but remember that, as with *ALL* loaded verticals, tuning is fairly sharp. Price **£25** + VAT, carriage paid.

Diamond DP 105

Covering all bands 80 to 10, standing about 25' high and again benefiting from light guying (provided). A popular antenna for the man who hasn't room for an 80m dipole. Price **£35** + VAT carriage paid.

In connection with the above aerials, the questions we are mostly asked are:

1. Do I need an ATU? No, definitely not.
2. Do I need radials? No, provided the vertical is post mounted at ground level, but radials do improve performance and if you can lay them out it isn't a bad idea.
3. Can I mount it on a chimney? Yes you can, but here radials are essential.
4. What coax does it need? Coax straight from the Transmitter into the aerial—ideally 50 ohm but 75 ohm won't harm anything.

All in all, the vertical is probably the easiest to erect, easiest to tune for lowest SWR and least neighbour attracting of all Amateur aerials, and the performance, while not up to a good beam or quad, is surprisingly good.

Mobile Aerials

We stock the very popular G-Whip range amongst which are the Tri-lander multi-mobile and, a new product, the Flexiwhip which has a coil spring built in. These are all-band mobile whips featuring helical loading on the H.F. bands with centre loading for the L.F. bands. The Multi-mobile has the advantage of up to 4-band operation without coil changing—requires patience in tuning, but once tuned for the desired bands, requires no coil changing or switching—simply switch the transmitter to the desired band. For portable operation, the "extendarod" can be used to increase the whip length for better performance without appreciably altering the point of resonance. . . . If you can't work him on the move, pull over to the side, add the "extendarod" and try again!

For the L.F. Mobileer—the 160/80m or Ranger 160 is a good buy.

G-Whip Prices

Carriage (50p) + VAT extra.

Trib and er (20, 15 and 10) **£10.50.**
Multimobile (20, 15 and 10) **£12.50.**
L.F. Coils (40, 80 and 160m) **£4.00,** top whip sections **£1.00.**
Duoband er (160/80m) **£9.00.** Ranger 160m **£8.00.**
Flexiwhip **£15.00.** Coils **£4.00** each.
Base section for all G-Whips **£1.50.** Extendarod **£4.80.**
Please note that carriage and VAT are EXTRA.

V.H.F. antennas

We stock a good range of 2m 'J' Beams from the simple 4 element up to the Parabeam and 8 over 8. We have them in stock and can ship either British Rail Express (50p extra) or by Securior 24 hour service £2.00 extra). We have both 50 and 75 ohm versions, so please advise us which you want.

'J' Beam Prices + VAT + Carriage

2/4 element	**£2.90**	2/6Y 6 element	**£3.50**
2/8Y 8 element	**£4.20**	2/10 10 element	**£9.00**
2/14P 14 element Parabeam	**£14.30**	2/12 Double 6 slot feed	**£6.80**
2/16 Double 8 slot fed	**£8.40**	2/10XY Crossed 10 element	**£12.20**

Please add VAT and carriage.

2m Mobile Whips

We consider the Diamond ¾ vertical gutter mounting whip to be a best buy. A beautifully finished antenna, mounted in seconds, which requires no holes or other mods to the vehicle. Complete with 4m coax. Very flexible—drive straight into your garage. Considering the performance, quality and finish of this antenna, the price is very reasonable at **£10** + VAT. Carriage 50p.

Antenna Accessories

SWR Meters

Probably the most import accessory in the shack—we stock two models—the well known and very popular Hansen SWR 3 and the twin meter, Asahi. The Hansen has a single meter which is switched to read forward or reflected power, and has a sensitivity pot which enables it to be used with a wide variety of rigs of different power outputs. It gives a useful reading on as low as 160m and as high as 2m. Price **£5** + VAT, post paid.

The Asahi has the advantage of twin meters so that both forward and re-

flected power may be monitored simultaneously. It also has a sensitivity pot and is useful from 160 to 2m. Price **£8** + VAT, post paid.

Both the above are of 50 ohm nominal impedance, but may be altered to the 150 ohm resistors fitted.

Coax sockets in both cases are SO 239 as fitted to all Yaesu gear and require PL 259 plugs which we can supply at 30p (plus VAT) each post paid. If you use ¼" coax (UR43 or similar) we can also supply PL259 reduced at 10p each (+ VAT), post paid.

One or two points which you may find interesting. When your SWR meter reads 1 : 1 you may have a perfect match, but try and bear in mind the following:

1. The diodes used in any Amateur type SWR meter require a certain voltage across them before they conduct, so that your apparent 1:1 SWR may be due to the diode nearly, but not quite, conducting. Hence you should always momentarily check your SWR at a higher power. (No need to wreck the PA—just sufficient to check SWR).
2. The coax cable you are using has losses. Take a look at the table of losses below and consider that with 150 feet of nice new UR 70 on 10m, the forward power drops off 3 9dB by the time it reaches the antenna. By the time the reflected power gets back to the SWR meter, it has dropped another 3 9dB. Hence there is a built in 7 8dB differential between forward and reflected power. This means, of course, that even if your 10m aerial has blown away, your SWR meter will still read arousing 2·5:1 which could thoroughly bamboozle you! It is instructive to stick a 2m Yagi at the end of a long length of coax—check the SWR. Remove the Yagi and check again. You may get quite a surprise!

The moral to this tale is—use the SWR meter as a guide but he aware of its limitations.

When you first put up an antenna, it makes sense to plot the SWR on graph paper, starting at one end of the band and taking readings every 25kHz on 80 to 40, every 50kHz on 20 to 15 and every 100kHz on 10. This way you can see, where your lowest SWR occurs and, if that point isn't where you want it, you can bring it where you want it by lengthening or shortening the elements. On multi band antennas—adjustment on one band can affect the others so keep on checking all bands until you get an acceptable compromise.

Baluns

Popular H 2 P balun 1:1 ratio is **£4.80** + VAT post paid.
H 2 P balun 4:1 ratoi is **£4.80** + VAT post paid.
Rugged Kirk 5075 B 1:1 2kW broad band **£7.50** + VAT post paid.
Kirk 5075 D LF 1:1 2kW specially optimised for 160, 80 or 40m dipoles **£6.50** + VAT post paid.

Cable

We stock:
UR43 8p/m. plus VAT
UR70 10p/m. + VAT
UR67 22p/m. + VAT
75 ohm twin feeder 3p'./m.
300 ohm twin feeder 5p'./m.

Rotators

We stock the well known CDR range which for years have been used by Amateurs all over the world.
AR 22–R **£25** + VAT; TR 44 **£45** + VAT and HAM–M at **£70** + VAT. All complete with remote indicator/control box and carriage paid by Securicor.

Choice of Rotators

The number of chaps who are an AR 32 to turn a hefty H.F. beam is legion. It is a tribute to the ruggedness of the AR 22–R that they get away with it for so long—but sooner or later the gears strip. The fact is that the AR 22–R is designed for 2m beams. For something bigger, up to light 3 element trap beams (TA 33 jnr. for example) the TR 44 is the shot. For the heaviest of beams the extra ruggedness of the Ham–M ensures a long trouble-free life. At Matlock we use a Ham–M—it has been on top of the tower for many years and will remain there for many years to come!!

Rotator Cable

4 core for the AR 22–R at 15p/metre and 12 core for the TR 44 and Ham–M at 30p/m. Actually the latter two require a rather odd cable—8 core, two cores of which are 18ga. and the remaining 6 are 22ga. This cable will allow operation up to about 50 yards away. A special cable like this costs rather a lot, so we sell standard 12 core and parallel 2 lots of 3 wires to give the required extra thickness. The cable we sell is well on top of the requirement—can be used be used for remote operation well in excess of the claimed 50 yards.

Wattmeters

This is the final item I'd like to mention in connection with antennas. This is a properly terminated dummy load/wattmeter, aimed at the serious VHF man—it is a direct reading wattmeter with a constant 50 ohm impedance right up to 50MHz making it ideal for power measurements at 2m and 70cms. Switched scale 20 or 120W f.s.d. and the large log scale makes low power readings possible to less than 500mW. If you are H.F. only, forget it—you can get a dummy load much cheaper, but a 2m or 70cm dummy load is a very different matter. Add to this the fact that it is a direct reading wattmeter, then you must agree that it is very well worth **£25** plus V.A.T.

Headsets

In common with everybody else, the headsets we sell are the universal low impedance padded stereo Hi Fi sets. The reason we don't sell proper communication headsets is that they cost rather a lot of money and the stereo sets, due to mass production and mass marketing, represent much better value for money. However, all the stereo sets on the market suffer from two snags for Amateur use:

1. They are stereo
2. They are very sensitive

They can be converted to monaural by simply chipping off the lead going to the chassis on the stereo plug, and substituting the lead which gets to the ring. The fact that they are very sensitive means that unless the A.F. gain control is turned right down, it will take the top of your head off. The snag is that with the AF gain right down, residual hum tends to over-ride the signal and this hum becomes objectionable. The cure is simple—an attenuator, consisting of just two small resistors—a 10 ohm across the plug of the headsets and a 100 ohm in series with the signal lead. Having done these simple mods the headsets become really good for Amateur use. Good quality sound and very comfortable to wear. Full instructions in detail with sketches, on the above modifications with every set. Price **£3.00** post paid + VAT.

Valves

For common valves like 6BA6's, 6BE6's, 6AU6, etc. etc., we recommend you go to one of the large London dealers in valves—we simply cannot compete with their prices. Quite honestly if we want a common valve, we get it from RST or Z & I rather than go to our Wholesaler—it's cheaper. We recommend you do the same.

Where we can be of service to the Amateur is to stock some of the valves he *can't* get easily, particularly those used in Yaesu equipment as under:

6AH6, 6BZ6, 6CB6A, 6CL6, 6U8A, 6EW6, 6EH7, 6BM8, 12BY7A. All at **60p** each + VAT post paid.
6GK6 **£1.20** + VAT post paid.
PA Valves 6JM6A **£1.50** each + VAT post paid.
6JS6C, 6KD6, **£2.00** each + VAT post paid.
These are supplied in matched pairs at no extra cost.

Finally we must mention that we still have some 4CX250 valve bases in stock complete with chimneys. Brand new **£3.00** plus VAT post paid.

Service

Ask anyone who has dealt with us—he is our best advertisement.

Second Hand Equipment

We always have the best selection in the best condition, fully checked, serviced and guaranteed. If it is not to your liking, you simply pick up the 'phone and tell us. We collect and you get your money back less the cost of carriage. This takes all the risk out of buying second hand. A SAE will get you our latest second hand list and a large envelope with a 6p stamp on will get you our complete catalogue which runs to over 50 pages, and includes circuit diagrams of all new gear.

Trade-Ins

We are always happy to trade in used equipment if it is something we can recommend to another customer. We don't mind if it's faulty because we service all the second hand gear before resale aynway.

Hire Purchase

We can arrange Hire Purchase terms on both new and second hand gear. The deposit is a mere 10% and repayment may be spread over 12, 18, 24 or 36 months. Your trade-in gear is perfectly acceptable as a deposit.

Agents

Don't forget that our Agents, Sim, in Glasgow, John in Sussex, Alan in S. Wales, and Peter in Birmingham can demonstrate and supply Yaesu gear, have second hand gear for sale, have a wide range of accessories and are available evenings and weekends to help you, advise you or just chat to you. Why not 'phone them if you have any problems?

In the case of Peter in Birmingham, he is operating full time from his home and although not yet on the 'phone is available pretty well any time. Five minutes from the Gravelly Hill interchange (Spaghetti Junction) puts him pretty close to you.

LOWE ELECTRONICS

119 Cavendish Road, Matlock, Derbyshire, DE4 3HE

Tel. Matlock 2817 or 2430 9 a.m. - 9 p.m.

MAIN DISTRIBUTORS FOR YAESU MUSEN EQUIPMENT

MEMBERS OF THE AMATEUR RADIO RETAILERS ASSOCIATION

Radio Shack Ltd

U.K. Distributors of

BARLOW WADLEY'S

unique

CRYSTAL CONTROLLED

RECEIVER

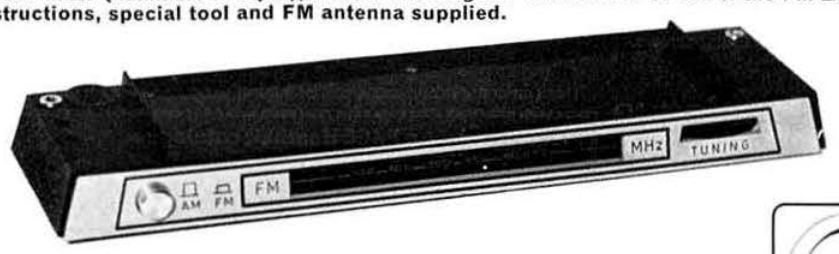
XCR-30 Mark 2

The XCR-30 is a specialized, high sensitivity, portable short wave receiver designed to provide precision frequency tuning over the full short wave spectrum up to 30 MHz, with exceptional frequency stability for both amplitude modulated (A.M.) and single sideband (S.S.B.) transmissions.

A multiple heterodyne circuit is incorporated wherein the harmonics of a 1 MHz quartz crystal control the frequency shown on the dials to an accuracy sufficient to locate and identify a station whose frequency is known. The crystal stabilizes the received frequency to eliminate tuning drift over long periods of time and to provide stable single sideband pitch. Frequency selection is a composite function of two dials. The whole number of the frequency (in MHz) is displayed on one dial whilst the second dial displays the remaining decimal portion of the frequency.

A separately tuned whip antenna is provided which enables an excellent level of sensitivity for a portable receiver to be obtained, especially at the higher frequencies where signals are usually weak. Logging facilities are provided by log cards in a flip-up holder on the set, on which can be logged identities, frequencies, time of day and time of year for instance, of stations which are of particular interest. On account of the high setting accuracy of the set, it will enable the listener to return to a previously heard transmission with the certainty of hearing it if the conditions are suitable.

These units (available in April), extend the range of the XCR-30 to cover the FM Band 87·5-108 MHz. Fitting instructions, special tool and FM antenna supplied.



TR 801 FM
TUNER

RADIO SHACK LTD.

188 BROADHURST GARDENS, LONDON, NW6 3AY

Just around the corner from West Hampstead Underground Station

Telephone: 01-624 7174. Cables: Radio Shack, London N.W.6.

Giro Account No.: 588 7151

Open 6 days 9 a.m. until 5 p.m. Closed for lunch 1 p.m. until 2 p.m.

& ACCESS

NEW—HEATHKIT 2-METRE TRANSCEIVER HW-202

OPTIONAL EXTRAS:

Tone Burst Encoder.

Regulated A.C. Power Supplies.

Coming in May

Features—

All solid state design

Can be completely aligned without instruments

Multi-channel capability—independent pushbutton selection of 6 transmit and 6 receive crystals

10-Watts Minimum Output—designed to operate into even an infinite VSWR without failure

Optional Tone Burst Encoder—mounts inside, gives front-panel selection of four presettable tones

Available with a full-line of accessories—for both mobile and fixed operation

Includes push-to-talk mike—ceramic tailored-response microphone provides outstanding audio transmission

We think you'll agree it's worth waiting for. The Heathkit HW-202 compares with the best wired amateur 2M/FM rigs you can buy. Plus it has: multi-channel capability via independent selection of 6 transmit and 6 receive crystals. Solid-state circuitry with complete built-in alignment procedures using only the manual and the front-panel meter allow operation over a 1MHz segment from 143·9 to 148·3MHz. Removable front-panel bezel permits installation of the new Heathkit HWA-202-2 Tone Burst Encoder. Operational stability over a wide −30° to +50°C range.

10-15 watts transmission into an infinite VSWR—indefinitely, with no failure. The HW-202 needs no automatic shutdown—it continues to generate a signal regardless of antenna condition.

Transmitter deviation is fully adjustable from 0 to 7·5kHz, with instantaneous deviation limiting. Harmonic output is greater than −45dB from carrier.

The Heathkit HW-202 comes with two crystals that are used in initial set-up and alignment, and give you simplex operation, quick-connecting cable for 12-volt hook-up, heavy duty alligator clips for use with a temporary battery, antenna coax jack, gimbal bracket, and a unique mobile mount that lets you remove the radio from the car by simply unscrewing two thumbscrews.

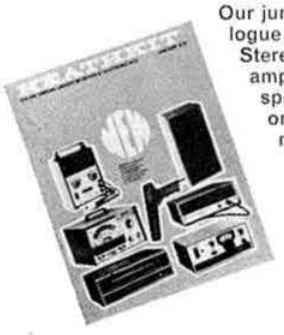
The repeaters are waiting—there are probably several open repeaters in your area now. So here's an economical Heathkit rig to get you in on the activity—with all the mobile portability, fixed-station versatility and all-round high performance you want.

Kit K/HW-202 9 lbs £89.10 + 66p. p & p (Incl. £8.16 VAT)

HW-202 SPECIFICATIONS—RECEIVER—Sensitivity: 12dB SINAD* (or 15dB of quieting) at .5μV or less. **Squelch threshold.:** 3μV or less. **Audio output:** 2W at less than 10% total harmonic distortion (THD). **Operating frequency stability:** Better than ±·0015%. **Image rejection:** Greater than 55dB. **Spurious rejection:** Greater than 60dB. **IF rejection:** Greater than 75dB. **First IF frequency:** 10·7MHz ±2kHz. **Second IF frequency:** 455kHz (adjustable-**Receiver bandwidth:** 22kHz nominal. **De-emphasis:**—6dB per octave from 300 3000Hz nominal. **Modulation acceptance:** 7·5kHz minimum. **TRANSMITTER —Power output:** 10 watts minimum. **Spurious output:** Below −45dB from carrier. **Stability:** Better than ±·0015%. **Oscillator frequency:** 6MHz, approximately. **Multiplier factor:** × 24. **Modulation:** Phase, adjustable 0-7·5kHz, with instantaneous limiting. **Duty cycle:** 100% with ∞ VSWR. **High VSWR shutdown:** None. **GENERAL—Speaker impedance:** 4 ohms. **Operating frequency range:** 143·9 to 148·3MHz. **Current consumption:** Receiver (squelched): Less than 200mA. Transmitter: Less than 2·2 amperes. **Operating temperature range:** −10° to 122°F (−30° to + 50°C). **Operating voltage range:** 12·6 to 16·0V DC (13·8V DC nominal). **Dimensions:** 2¼" H × 8¼" W × 9¼" D.

*SINAD = $\frac{\text{Signal + noise + distortion}}{\text{Noise + distortion}}$

Free Catalogue



Our jumbo sized Heathkit catalogue is full of good things. Stereo amplifiers, tuner amplifiers, tuners, loudspeakers and audio accessories, electronic calculator, metal detectors, short-wave receivers, intercoms . . . even a powerful battery charger kit.

Heath (Gloucester) Ltd., Gloucester GL2 6EE

(Mail order prices and specifications subject to change without notice)

Please send me a FREE Heathkit catalogue

Name

Address

HEATH Schlumberger

Heath (Gloucester) Limited, Dept: RC/4/73
Gloucester GL2 6EE. Telephone 0452 29451

RADIO SOCIETY OF GREAT BRITAIN

35 DOUGHTY STREET, LONDON WC1N 2AE

FOUNDED 1913 — MEMBER SOCIETY

INCORPORATED 1926 — INTERNATIONAL AMATEUR RADIO UNION

PATRON: HRH THE PRINCE PHILIP, DUKE OF EDINBURGH, KG

COUNCIL 1973

PRESIDENT	J. A. Saxton, DSc, PhD, CEng, FIEE, FInstP
EXECUTIVE VICE-PRESIDENT	G. R. Jessop, CEng, MIERE, G6JP
IMMEDIATE PAST-PRESIDENT	R. J. Hughes, TD, DLC, G3GVV
HONORARY TREASURER	J. O. Brown, LLB, FCA, G3DVV

MEMBERS

E. J. Allaway MB, ChB, MRCS, LRCP, G3FKM
B. D. A. Armstrong, G3EDD
R. W. Fisher, G3PWJ
W. J. Green, G3FBA
E. G. Ingram, GM6IZ
W. F. McGonigle, GI3GXP
L. E. Newnham, BSc, G6NZ
C. H. Parsons, GW8NP
J. R. Petty, G4JW
W. A. Scarr, MA, FBIS, G2WS
A. W. Smith, GM3AEL
R. F. Stevens, G2BVN
G. M. C. Stone, CEng, MIEE, MIERE, G3FZL
F. C. Ward, G2CVV

GENERAL MANAGER AND SECRETARY
D. A. Findlay, FCA, G3BZG

EDITOR
A. W. Hutchinson

REGIONAL REPRESENTATIVES

Region 1.—North Western	B. O'Brien, G2AMV, "Tanglewood", Anthony's Way, Heswall, Wirral, Cheshire.
Region 2.—North Eastern	J. E. Agar, G8AZA, 88 Rothbury Street, Scarborough, Yorks.
Region 3.—West Midlands	B. Kennedy, G3ZUL, 10 Pilgrim Road, Droitwich, Worcs.
Region 4.—East Midlands	T. Darn, G3FGY, "Sandham Lodge", Sandham Lane, Ripley, Derbyshire.
Region 5.—Eastern	P. J. Simpson, G3GGK, The Beagles, Caldecote Highfield, Near Cambridge.
Region 6.—South Central	L. W. Lewis, G8ML 34 Cleevelands Avenue, Cheltenham, Glos.
Region 7.—London	R. S. Hewes, G3TDR, 24 Brightside Avenue, Laleham-on-Thames, Middx.
Region 8.—South Eastern	D. N. T. Williams, G3MDO, "Seletar", New House Lane, Thanington, Canterbury, Kent.
Region 9.—South Western	H. W. Leonard, G4UZ, 4 Start Bay Park, Strete, Nr Dartmouth, S Devon.
Region 10.—South Wales	D. M. Thomas, GW3RWX, 88 Cefn Graig, Rhiwbina, Cardiff CF4 6JZ.
Region 11.—North Wales	P. H. Hudson, GW3IEQ, "Silhill", Dinas Dinlle, Llandwrog, Caernarvon.
Region 12.—North-East Scotland	A. J. Oliphant, GM3SFH, 17 Rockwell Crescent, Thurso, Caithness.
Region 13.—South-East Scotland	V. W. Stewart, GM3OWU, 9 Juniper Avenue, Juniper Green, Midlothian EH14 5EG.
Region 14.—West Scotland	M. A. Comrie, GM3YRK, 57 Dungoyne Drive, Bearsden, Glasgow.
Region 15.—Northern Ireland	J. Thompson, GI3ILV, "Albany", Newry Road, Armagh, N Ireland.
Region 16.—East Anglia	D. F. Beattie, G3OZF, "Mayerin", The Common, East Hanningfield, Essex.
Region 17.—Southern	L. N. G. Hawkyard, G5HD, 100 Shirley High Street, Southampton, Hants.

HONORARY OFFICERS

Awards Manager (hf)	C. R. Emary, G5GH, Westbury End, Finmere, Buckingham.
Awards Manager (vhf)	Jack Hum, G5UM, 27 Ingarsby Lane, Houghton-on-the-Hill, Leicester LE7 9JJ.
Intruder Watch Organizer	C. J. Thomas, G3PSM, 73 Mexborough Avenue, Leeds, LS7 3ED
QSL Bureau Manager	A. O. Milne, G2MI, 29 Kechill Gardens, Bromley, Kent, BR2 7NH.
Recorded Lecture Library Curator	G. Milne, G3UMI, 23 Linacre Road, Eccleshall, Stafford.
Slow Morse Practice Transmissions Organizer	M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.
Society Historian	L. E. Newnham, G6NZ, 17 Washington Road, Emsworth, Hants.
Trophies Manager	P. Carey, G3UXH, 99 Bell's Lane, Hoo St Werburgh, Rochester, Kent.
VHF Manager	G. M. C. Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23.

Current Comment

Top band and 80m

During the October 1972 meeting of the RSGB Council, consideration was given to the possibilities arising from the World Administrative Radio Conference for the Maritime Mobile Service due to open in Geneva on 22 April 1974. The maritime conference held in 1967 had passed additional regulations which are due to come into effect at various dates from 1 January 1973 and due note had to be taken of the effect of these upon stations of the amateur service operating in the 160 and 80m bands, both of which are also used by the maritime service. Further, it is vitally necessary to consider the future position of the amateur service and to ensure that existing frequencies shall be retained and, if possible, expanded.

The terminology of the maritime regulations refers to *medium frequency* bands between 1,605kHz and 4MHz and *high frequency* bands between 4 and 23MHz. It is the former portion with which there is immediate concern. After 1 January 1973 all new installations on ships must be ssb and all coast stations must change to ssb as soon as possible and stop using dsb after 31 December 1974. A system of channels will be adopted and this is one of the matters already submitted for the agenda of the 1974 conference. It will be seen, therefore, that the pattern of maritime telephony operation will change completely during the next eight years, by which time no dsb installations will be permitted.

How does this affect the amateur service? In so far as the 1974 conference is concerned, probably not at all, as the agenda does not provide for new regulations affecting other than the maritime service. However, it is prudent for the representatives of the amateur service, the national societies and the IARU, to consider what steps could be taken which would reflect favourably upon them. Following discussions with responsible persons at Geneva, the position was discussed by Council and the following proposal was adopted, "Amateur telephony stations in the UK shall be encouraged to use the ssb mode only after 1 January 1975 for transmissions in the bands 1,800-2,000kHz and 3,600-3,800kHz". Please note that the wording does not suggest that the use of ssb shall be compulsory. Also, no attempt has been made to evaluate the communications efficiency of the various telephony modes, a task best left to the professional engineer. The object behind the proposal is to show that the amateur service is responsible and is prepared to adapt to changed conditions.

Having taken part in the 1971 Space Conference as a member of the UK delegation, the writer had the unhappy experience of hearing of consecutive rejections of amateur service proposals by majorities in the proportion of 7 to 1. The amateur radio representatives then present at Geneva made a firm resolve that preparation for the next ITU conference must begin immediately, and before the dates were known, if the amateur service was to be spared further attacks and erosion of frequencies. It is considered that a statement by the amateur service representatives at the next maritime conference concerning the use of ssb on top band and 80m would have a very considerable value and would help to forestall any regulatory proposals. The matter is to be considered by the 41 societies of the Region 1 Division whose reaction, so far, has been favourable.

For those who have recently joined the ranks of amateur radio a few words on the 1·8MHz band may not be out of place. Prior to the 1947 Atlantic City conference, the UK allocation was 1,715 to 2,000kHz. This band was restricted to 200kHz at this conference and has remained so since that time despite violent attacks at the 1959 Geneva conference. The UK administration has consistently supported the retention of this band against considerable opposition from a number of European countries. Examination of the Radio Regulations will show that amateur occupancy of this band is by a footnote only. We do not have the respectability of "shared" status in the frequency tables.

The next World Administrative Radio Conference at which *all* frequencies will come under examination is not far away. Let us take the first steps to secure the amateur position for the future by adopting a responsible attitude towards operation on top band and 80m. The national societies and the IARU will do all in their power on behalf of amateur radio. For their work to be effective they must have the support of their members.

G2BVN

QTC AMATEUR RADIO NEWS

Subscriptions and VAT

The RSGB will have to pay VAT on all payments received for subscriptions which are due on or after 1 April 1973. It would be of great assistance if members could ensure that they mention their renewal month when sending in subscriptions, preferably by returning the subscription renewal card.

Subscriptions are due for renewal annually on the first of the month in which the membership certificate was first issued. The renewal month is also given by the code number on the *Radio Communication* wrapper below and to the right of the address. For associate members this number is followed by the letter "A". Thus "4" denotes a corporate membership subscription renewal due on 1 April and "6A" denotes an associate subscription renewal due on 1 June.

The G3TDZ portable 2m transmitter/receiver, Mk 4

The author of this article, published in the January issue of *Radio Communication*, has pointed out the following errors:

In the receiver parts list, TR7 should be AC176 and TR8 AC128.

In Fig 1 and Fig 7, two C33s are shown. The 6V line decoupling capacitor C33 lies between C18 and L8 in Fig 1 and is the one shown in the parts list. The other C33 is next to L2 and is its resonating capacitor with a value of 10pF.

In Fig 6, RFC1 should read RFC5; RFC1 is omitted from the practical design.

RFC4 is not shown but, as explained in the text, fits between b and e of TR4.

C5 and C11 are not shown but connect between the ht entry spigots and earth foil.

As a result of correspondence with other constructors, two other points have been made. It is suggested that in the transmitter RFC2 and RFC4 have only two turns on the ferrite beads instead of three as shown. One constructor had to reduce the number of turns on L4, L6 and L7, to achieve satisfactory resonance, by two turns—this probably depends on the coil formers and slugs used but indicates some experiment may be needed in certain cases.

WB5CBC great circle bearings charts

Mr W. D. Johnston, WB5CBC, author of the article "A handy chart for great circle bearings" in the November 1972 issue of *Radio Communication*, advises us of an error in the entry for Yugoslavia (Belgrade).

All charts postmarked 13 January 1973 or later have the correct figures inserted. Correct figures for charts posted prior to that date can be estimated by referring to a map and the figures for the countries adjacent to Yugoslavia. For example, the correct figures from the centre of London to Belgrade are: BNG = 108, MI = 1,052, KM = 1,694, RBNH = 303.

RSGB Dinner Club

The next meeting of the RSGB Dinner Club will be held on Friday 4 May at 7.15 for 7.45pm.

A new venue has been arranged for this meeting, the Royal Westminster Hotel, Buckingham Palace Road, Victoria, London. A separate room and bar have been reserved and members should meet in the Westminster Suite.

This is an informal occasion and all members, ladies and guests are welcome.

The cost, including VAT, will be £2, and reservations should be addressed to Mrs R. Talbot at RSGB HQ.

Stolen equipment

A KW2000A transceiver serial number A715 and psu serial number PA630 were stolen from the premises of the British European Airways ARS at Northolt in February. Anyone who can supply information about this equipment is asked to contact Mr D. Wales, General Secretary, BEA Silver Wing Club, BEA Line House, Ruislip, Middlesex.

Licence figures

The Ministry of Posts and Telecommunications advises that the following numbers of amateur licences were in force at 31 January 1973.

Class A	14,494	Class B/M	840
Class B	3,743	Television	235
Class A/M	2,873		

BBC Engineering Advisory Committee

Dr R. L. Smith-Rose, CBE, a past-president of the RSGB, is retiring from the chairmanship of this committee and has been succeeded by Sir Robert Cockburn, KBE, CB. The Engineering Advisory Committee was set up in 1948 to advise on the scientific research and engineering policies of the BBC and includes a number of eminent scientists and BBC senior engineers.

Mullard booklets

A booklet recently published by Mullard is entitled *Transistors for single-sideband operation*. The first section considers linear operation and amplifier design, while practical circuits are given in the second section. Accompanying the circuits is full design and component information.

Requests for copies, quoting reference TP 1337, should be made to Communications Electronics Division, Mullard Ltd, Mullard House, Torrington Place, London, WC1E 7HD.

The fifth in the series of Mullard booklets, *Power Electronics Technical Notes*, deals with rectifier circuits. Full information is given for the design of most types of single- and three-phase rectifier circuits. The booklet will be of interest to engineers and also to students and teachers of electronics.

Requests for copies, quoting reference TP 1310, should be made to Instrumentation and Control Electronics Division, Mullard Ltd, Mullard House, Torrington Place, London, WC1E 7HD.

Can you help?

Members of the University of Lancaster Amateur Radio Society and other local radio amateurs have been invited by the Cheshire Home at Oaklands, Garstang, Lancashire, to start an amateur radio group. They appeal for the help of anyone who is willing and able to donate any unwanted equipment, especially receivers and literature, to this very worthwhile cause. It is hoped that at least one other Cheshire Home in the area will become interested.

Offers will be gratefully accepted and transport arranged by A. L. Thwaites, G3HHR, University of Lancaster ARS, Dept of Environmental Sciences, The University, Bailrigg, Lancaster.

Samson Voron, VK2BVS, of 60B Dutruc Street, Randwick, NSW, Australia 2031, who is 19 years old, would like to correspond with anyone interested in amateur radio or Indonesian.

Anyone knowing the present whereabouts of Peter Coombes, who was licensed pre-1939 and active in Arundel, is asked to advise RSGB HQ.

IARU Region 1

The national society of Iceland, Islenzkir Radioamatorar, has recently joined the Region 1 division of the IARU, which now comprises 41 societies, nearly half the number of IARU worldwide. The chairman of Islenzkir Radioamatorar is Olafur Axelsson, TF3AW, and the society address is PO Box 1058, Reykjavik.

A "thank you"

Mrs J. Hodgkins, G3JZP, wishes to thank all those amateurs who kindly phoned, wrote, and offered assistance over the air, when her husband, G3EJF, was admitted to Catterick Military Hospital following a heart attack.

The G2DAF ssb transmitter Mark 2

We are advised by the author, Mr G. R. B. Thornley, of the following error in Fig 2(b) on page 160 of the March issue: a 27pF capacitor should be inserted between pin 2 of V6 and the 100kΩ resistor. He apologises for having overlooked this when preparing and checking the drawings.

Audio frequency interference (afi)

by P. W. WATERS, G3OJV*

The problem

The current boom in hi-fi sales has led to an increase in the number of cases of interference caused by radio transmitters operating in close proximity to audio equipment. Almost all audio equipment now being produced for the domestic market is entirely solid state and this changeover from valves to transistors has coincided with a hi-fi boom, making it difficult to assess to what extent transistors are responsible for the increase in the number of cases of interference. Certainly transistorized equipment appears to be far more susceptible than the older valve equipment. Also of significance is the now widespread usage of magnetic cartridges which require amplifier sensitivities of the order of 3 or 4mV. This usually necessitates one or two additional stages of amplification, whereas the older type of crystal and ceramic cartridges having far higher outputs require far less gain from the amplifier.

Unlike television interference, there is usually very little that can be done at the transmitter end to prevent the trouble. Apart from reducing power, moving aerials or switching off altogether, the cure must be at the complainant's end. Like all kinds of interference this poses a social problem. The average cost of a stereo radiogram is around £80 to £100, and for a hi-fi installation comprising separate amplifier, speakers, turntable and possibly vhf tuner the price rises to the region of £150 to £200. Any person having spent this amount of money is not going to take kindly to hearing a burst of cw or "distorted" ssb coming through in the middle of his or her favourite record. Unfortunately, telling your neighbour that the interference is not the fault of the transmitter, but his own equipment, is not going to ease the matter even though it is probably true.

Of course, each case has to be dealt with on its merits and no hard and fast rules can be laid down. It is of prime importance to use tact, patience and common sense. A special mention should be made here of the case of interference from an a.m. transmitter. A sensitive hi-fi system may well be picking up such a signal and relaying it in "full frequency stereo sound"— a situation which calls for special tact.

The cause

Before discussing the various ways in which this kind of interference can be prevented, it is necessary to understand how the rf signal reaches the amplifier, is rectified, and emerges at the speaker as an unwanted signal. Fig 1 shows typical audio amplifier low signal stages. In the case of the transistor version notice the base/emitter junction. This forms a fairly effective junction diode and any rf signal that reaches this stage will be rectified and passed on as an audio signal to the following stages. Similar comments apply to the valve stage. RF energy reaching the grid of the valve is likely to be rectified by non-linear action and the resultant demodulated signal passed on through the following stages as an audio signal. With the modern hi-fi amplifier, having a high overall gain and an output rating of 10 to 15W/channel or even more, rf breakthrough can be dramatic.

There are a number of paths the radio signal can take to reach the circuitry of an audio amplifier. In high rf fields even direct pickup by the circuit board is possible. Normally, however, the signal is fed to the amplifier via the various connecting cables, which make very good "aerials". Two of the most common sources of trouble seem to be the mains cable and the speaker leads. The mains connection, because of modern ring mains circuits, results in the entire house power wiring being connected to the amplifier and acting as a long-wire "aerial".

As for the speaker leads, stereo reproduction requires a pair of speakers to be separated from the amplifier and turntable unit in order to obtain the stereo effect. In practice this means that the speakers are very often positioned several yards away from the amplifier, the length of twin flex usually used for this purpose making a good "aerial", possibly resonant on or near one of the hf amateur bands. This, of course, ignores the other connecting cables from record turntable, tape unit, vhf tuner etc. It is not surprising, therefore, that a substantial rf signal can find its way into an amplifier several hundred feet distant from the transmitter.

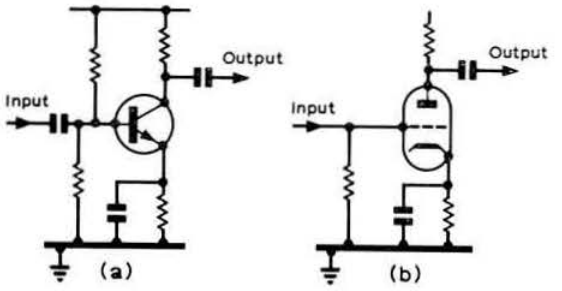


Fig 1. Typical first stages in audio amplifiers which are open to rf interference, (a) transistor, and (b) valve

The treatment

There are two basic ways of tackling interference in audio equipment. Either the circuit can be modified to prevent the rectification occurring, or the rf signals can be prevented from reaching the amplifier circuitry by fitting filters to the various connecting leads.

Dealing firstly with the rectification problem, it has already been shown how, in a transistor amplifier, trouble usually arises when rf reaches the base/emitter junction of a transistor. Similarly, in a valve amplifier, too much rf energy on the grid can also result in rectification. Clearly, if the rf signal can be

*8 Gay Bowers, Hockley, Essex.

bypassed to earth without degrading the wanted audio signal then the problem will be solved. The most obvious solution that comes to mind is to fit a capacitor between input and earth of the amplifier of such a value that while it looks like a near short circuit at rf it offers a high impedance to audio frequencies. Unfortunately, between the input and the transistor base or valve grid may be several inches of wire or circuit board, switch contacts with their associated connecting leads and other components. Bypassing at the remote input socket of the amplifier may therefore not be sufficient. A far more effective method of preventing rectification is to solder a capacitor directly across the base/emitter junction or between control grid and cathode to prevent an rf potential difference between the electrodes.

Fig 2 illustrates the required circuit modification. The capacitance value, C, can be around 1,000pF, although it is by no means critical. The British Radio Corporation recently recommended values of 2,000pF for one of their transistorized radiograms. This effected a complete cure without affecting the fidelity of the amplifier. Because of the generally higher impedance of valve amplifiers it would be desirable to keep the capacitance value as low as possible and to include an rf choke or 10kΩ resistor in series with the grid to prevent too much loss of high frequencies.

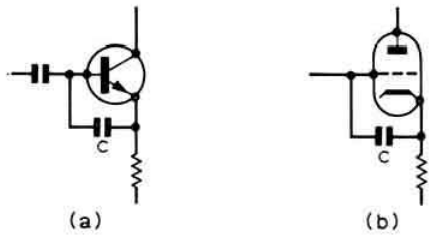


Fig 2. (a) A suitably chosen capacitor connected between the base and emitter of an early transistor stage will bypass the offending rf to earth without affecting the audio signal. Suitable values are discussed in the text. (b) The analogous modification to a valve stage

In some cases it will be found necessary to fit bypass capacitors to more than one stage. An indication as to exactly where in the amplifier the rectification is taking place can be obtained by noting whether the level of the interference changes when the amplifier volume control is rotated. Similarly a test should be made to ascertain whether or not rotating the tone controls has any affect on the response of the interfering signal. If the signal is affected by adjustment of any one or all of the controls then the rectification is probably taking place in an earlier stage. The word "probably" is used deliberately. In a recent case investigated, the rf signal was getting past the first stage and being fed to the following stage via the volume control which was acting as a variable attenuator. Although the control affected the level of interference, the rectification was taking place after the volume control. In practice the fitting of bypass capacitors as shown in Fig 2 usually results in a complete cure.

Once again there are exceptions to every rule. For reasons which are not clear to the author, there has been a case where the fitting of a capacitor across the base/emitter junction has considerably *increased* the amount of breakthrough. So as an alternative, one or two ferrite beads can be slipped over the base lead of the transistor. However, this can present practical problems if the transistor happens to be soldered very close to the circuit board. In such cases, therefore, an attempt must be made to keep the rf signal out of the amplifier circuitry.

Up until now various ways of preventing rf rectification by modifying the circuitry have been considered, without making any attempt to keep the rf energy out of the amplifier. Very few domestic amplifiers are housed in a sealed metal box, but in a majority of cases the rf signal is introduced into the amplifier by means of the external connecting cables, so this need not be a drawback. For reasons mentioned later it may not be desirable to attempt to effect a cure by working on the internal circuitry. If, as an alternative, a filter can be fitted that will either block the path or short circuit the rf signal to earth, then the interference should cease.

The first step is to find out which lead or leads are acting as aerials. Very often this is likely to be a matter of trial and error, but there are two ways in which identification of the offending lead can be revealed. Firstly, with the af gain advanced, the various signal-carrying leads into the amplifier should be disconnected. If the interference stops or reduces, then the lead concerned is to some extent acting as an aerial and will require attention as detailed later. Obviously the speaker leads and mains lead cannot be disconnected. The second method adopted by the author, very often revealing which of the leads is causing the trouble, is to couple a grid dip oscillator tightly up against each lead and sweep the tuning dial back and forth. The af gain control on the amplifier should be advanced so that the background noise of the amplifier can be heard from the speakers. If the lead being tested is conveying rf into the amplifier then an increase in background noise in the form of hum or hiss will very often result when the oscillator is brought into close proximity to the lead. For best results the grid dip oscillator should be modulated by a tone. As amplifiers are very often sensitive to certain bands of frequencies only, it is essential that tests be carried out with the grid dip oscillator tuned across the same frequency range as that from which the interference is being experienced.

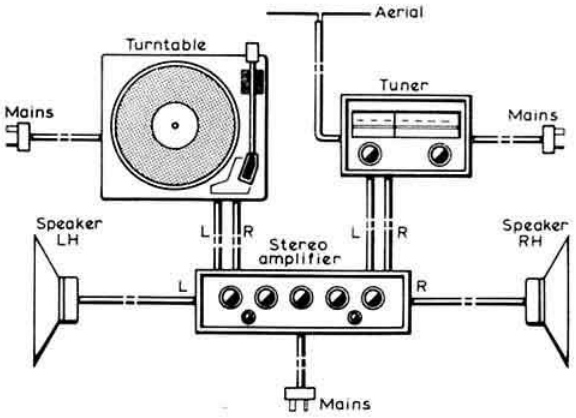


Fig 3. Any of the connecting leads to and from audio equipment can act as an "aerial" to rf signals, and, as can be seen, in a typical hi-fi system the number of such leads can be considerable

Before dealing with the individual leads going to and from the amplifier, a few words regarding the earthing of amplifiers may be in order. Often an amplifier will have a separate earth terminal at the back of the casing. It is sometimes recommended that earthing the amplifier to an earth separate from the mains earth by means of this terminal will help reduce rf breakthrough. Unfortunately the hi-fi installation is very often so situated that a fairly long earth lead is necessary to reach the amplifier. Instead of acting as an earth for rf signals it acts as an extra aerial and will sometimes actually increase the amount of breakthrough by increasing rf energy on the chassis. By all means try the effect of earthing the amplifier but similarly also try *disconnecting* the earth lead if one is already fitted.

The number of separate cables going to an amplifier in a hi-fi installation can be considerable, the actual number varying with the amount of ancillary equipment in use. Fig 3 illustrates a typical layout.

It has already been mentioned that each cable can be regarded as being an aerial capable of picking up rf signals and feeding them into the amplifier. Clearly a device is needed that will present a high impedance to rf signals while appearing as a low impedance to audio signals. Inductors and capacitors either separately or together in the form of LC networks readily fulfill just this function. The problem with inductors or capacitors is that the former can be bulky items and both often necessitate cables having to be cut and connectors modified during installation.

In recent years ferrite has become a very popular material for use in combating tvi. In particular, it has been found most useful in preventing rf on the outer braiding of coaxial cable finding its way into the tv receiver. In addition to their efficiency, ferrite cores have the major advantage that the existing cable can be used to form the winding, preventing the need to break the cable. One of the most popular ferrite devices is the ferrite ring, on which a very compact winding can be wound. Because of its shape, the cable is self-securing and the complete filter takes only minutes to construct. As a rule of thumb, as many turns as possible should be wound on to the core, with a minimum of 8 or 10 turns.

For combating rf pickup by connecting cables in hi-fi systems the ferrite ring filter is a very effective device. It can be used on speaker cables, leads from the ancillary equipment and main leads. Usually speaker leads and signal leads from record playing units are small diameter cables, and it is quite possible for a common ring to be used for each pair of leads in the case of stereo installations. The actual grade of material does not seem critical and either rod or ring cores can be used. In the author's case great use has been made of Mullard FX1588 rings. It is most important that the filter be installed at the amplifier end of the cable run and as near to the amplifier as possible.

Ferrite inductors are not the only devices for blocking out rf signals although they are probably the neatest and most compact, if not the cheapest. Coaxial cable substituted for the usual twin flex speaker leads will often help considerably where rf is being picked up on the "positive" speaker lead and conveyed back to the early stages of the amplifier via the negative feedback line. See Fig 4.

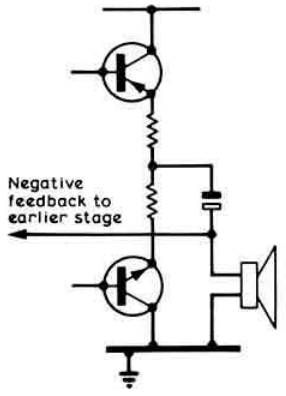
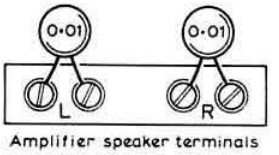


Fig 4. The normal output configuration of a transistor amplifier incorporates a feedback loop to the earlier stages. Thus any rf picked up by the speaker leads can be fed back to the input stages, where rectification and amplification may take place

Fig 5. To combat mild cases of rf pickup by the speaker leads, 0·01μF disc ceramic capacitors, connected across the amplifier output terminals, can be tried



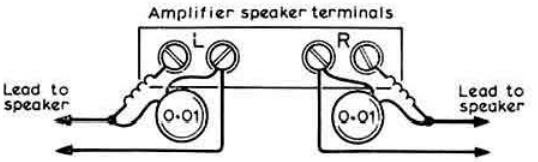


Fig 6. In cases of excessive rf pickup by the speaker leads a combination of capacitor and inductor can be tried

The use of coaxial cable will also prevent the possibility of rf energy being rectified in the transistor power output stage. This can occur even with the amplifier switched off. The author has had one such case and there have been similar cases of interference to transistorized tv receivers reported. Even the nocturnal operator is not clear of this problem! In cases where the rf pickup on the speaker leads is not too severe the use of 0·01μF disc ceramic capacitors connected across the output terminals of the amplifier can be tried (see Fig 5). More effective suppression will be obtained if an inductor is also added as shown in Fig 6.

However, the use of capacitors or coaxial cable cannot prevent rf currents from reaching the amplifier chassis by means of the "negative" speaker lead. In such cases some form of inductance is needed to choke the rf, and the use of a ferrite ring will be found effectively to filter both conductors if twin flex is used for speaker leads.

RF energy picked up on the mains lead can be a problem whether dealing with tvi, bci or afi. The solution is the same for all three types of domestic equipment, and a number of different mains filter circuits have been published. Two circuits are shown in Fig 7. It is most important that capacitors have an adequate ac rating. The inductors can comprise 18swg enamel wire on ¼in former (wood dowel) 2in long. Ferrite rod material (such as an old medium wave ferrite aerial with the winding removed) can also be used and will probably be found more satisfactory for the more severe cases. Where a mains filter is used as suggested above, ideally it should be installed inside the amplifier casing, but with the modern tendency to squeeze as much circuitry into as small a space as possible there is very often

no room for the inductors required. If this is so, then the filter will have to be installed externally to the amplifier casing and it is most important to make sure that the unit is completely and safely enclosed so that there is no risk of shock. The advantage of the ferrite ring filter mentioned earlier becomes obvious!

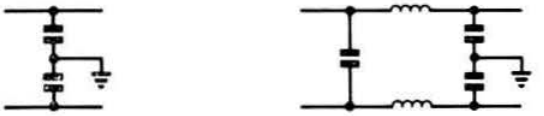


Fig 7. Two circuits for suppression of rf pickup on mains leads. It is important that the capacitors have an adequate ac rating, and if the components are mounted externally from the cabinet they should be well-insulated to avoid any risk of electric shock

Earlier, the popularity of the magnetic cartridge was mentioned. This in itself has brought about a new problem, although it is only likely to manifest itself in very high rf fields. Because a magnetic cartridge contains a small inductance, it is possible for rf signals to be induced in the coil and conveyed down the inner conductor of the screened cable to the amplifier. Unplugging the cartridge head from the arm will confirm whether or not this is the cause of the trouble. Ceramic or crystal cartridges will not suffer in this way. The solution is a small LC network installed either at the cartridge head or at the amplifier input, see Fig 8. Care should be taken to select as low a value of capacitor as practicable to avoid reducing the high frequency response. If the network is installed in the cartridge head, adjustment must be made to the arm counter-balance weight to maintain the correct tracking pressure (often less than 2gm).

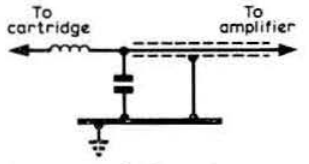


Fig 8. Cases of rf pickup via the coil of a magnetic cartridge can be solved by a simple LC network, installed either at the cartridge head or the input to the amplifier. The lowest possible value of capacitance should be chosen, to avoid any reduction in the hf response of the system

VHF tuners are susceptible to two different forms of interference. The rf energy can either get into the front end of the tuner causing interference to radio programmes only, or alternatively it can be picked up on the vhf coaxial down lead and conveyed back to the amplifier via the chassis of the tuner to cause audio breakthrough. RF energy picked up on the outer coaxial braiding can be prevented from reaching the amplifier either by inserting a ferrite ring filter or using a 1 : 1 transformer, see Fig 9. Both are familiar devices for tvi sufferers. If, however, the interference is found to be tunable on the vhf tuner, or only present when it is switched on, then there is a strong possibility that the rf signal is being picked up on the fm aerial and a simple high-pass filter as used for tvi should clear the trouble. The need for the receiver to be provided with an aerial adequate for the area applies just as much to fm reception as it does to tv reception. Normally this means an fm band dipole in the loft or on the roof but in some areas, particularly where

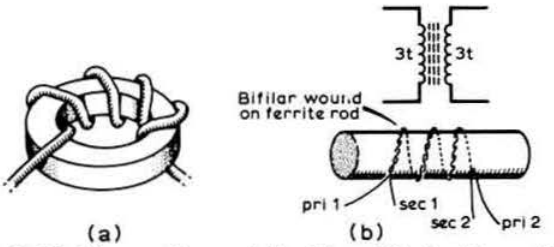


Fig 9. RF pickup on the coaxial braiding of the lead from vhf tuner to amplifier can be cured by either a ferrite ring filter or a 1 : 1 transformer

stereo reception is required, a three- or four-element beam is needed.

When dealing with cases of hi-fi interference it is essential to realize the importance of keeping all leads as short as possible and this applies in particular to speaker leads. A problem which has given the author some trouble in the past is the re-radiation of signals from one cable to another (tvi sufferers please note). If a lead has had to be filtered then keep it as far away as possible from other leads. Try moving the various connecting leads to the amplifier about in relation to one another and if a number of leads have been taped together try unwrapping the tape and separating them. Very often a speaker lead will be tacked along the skirting board with the mains cable and rf will be induced from one to the other. In the author's case laying the tv aerial coaxial lead next to the speaker leads results in severe audio breakthrough while separating them a few inches completely clears the trouble. Never allow any excess cable to trail over the floor. It should either be shortened or coiled up and taped. The importance of this point cannot be over-emphasized.

The social problem

There is virtually nothing that the amateur radio operator can do at the station end to prevent causing audio breakthrough, apart from reducing power, unless he is prepared to change his mode of transmission. The latter option has been taken up by a number of vhf operators by switching from a.m. to fm. The A1 cw operator has the option to change to F1 but this is hardly likely to find much favour on the hf bands and is likely to confuse some operators who may tune to the space instead of the mark. The great difficulty in handling cases of interference is explaining to the sufferer that the fault is with his equipment and not the amateur's. No hard and fast rules can be given as each case is different and personalities and attitudes vary widely. Basically a combination of diplomacy and firmness is required.

The question of whether or not the job of curing the interference is to be undertaken by the amateur concerned is a matter of personal discretion. The author does not favour the idea of carrying out work involving the opening up of amplifiers. This is fine if the amplifier is one's own, but be very careful before deciding to carry out any work on a neighbour's equipment. Really it is a job to be carried out by a paid service engineer, not necessarily because the amateur involved is not capable of doing the work but because anything that goes wrong subsequently is likely to be blamed upon the amateur. If a neighbour does ask an amateur if he would be prepared to carry out the work he should think very carefully before deciding, and if in doubt—refuse.

The question then arises as to who carries out the work. The listener is not likely to have the knowledge to carry out the work himself. He may also be unwilling to pay to have the work done for him if he considers the amateur at fault. Even if he does decide to employ the services of a paid engineer or dealer the time taken up in tracing the trouble is likely to be considerable and many dealers will just have no idea where to start. A major portion of responsibility must be with the manufacturer who designed and made the equipment. In this respect the British Radio Corporation has been found to be particularly helpful. Unfortunately, many manufacturers seem surprisingly disinterested in the short-comings of their equipment although some do provide a certain amount of help and advice in the way of technical correspondence, circuits and perhaps a few components. We therefore find ourselves caught in a vicious circle with an embarrassed amateur and an unfortunate and possibly irate sufferer.

It is hoped that this article will encourage rather than deter amateurs trying to solve their audio breakthrough problems. During the 'fifties and 'sixties tvi has been a big problem, but through the persistent work of the RSGB local groups and individuals the problem has been overcome by many. Audio breakthrough looks like being an even bigger problem to be faced in the 'seventies. The solution is mainly with the manufacturers but it is up to the amateur movement as a whole to make them aware of the problem with a view to persuading them to raise their standards.

Why the sun?

by R. A. HAM, FRAS, BRS15744*

A question frequently put to the author is: "Why pay so much attention to solar radio waves, why not other stars in the universe? After all they are nuclear furnaces like our sun, and they too emit radio waves."

A simple answer to these questions cannot be given without first considering what connection there is between radio and astronomy. The science of astronomy is a vast and complex subject which, for hundreds of years, has been the domain of the optical telescope used by thousands of amateur observers throughout the world, complementing the precise work of the professional observatories.

Briefly, in addition to light and heat, most celestial bodies "shine" at a variety of wavelengths within the electromagnetic spectrum. Direct observations by human beings are limited to those waves which the eye can see, and those which are sensed by feeling. To detect other radiations it is necessary to use suitable instruments, and the detection of celestial radio waves necessitates some form of radio receiving equipment.

So far this century the science of radio and electronics has developed so fast that in the 1970s it is difficult to keep pace with it. Almost every week new solid-state devices are introduced which can change existing techniques and thinking and make new projects possible. Chronicles of this century have already shown that the amateur radio movement has met the challenge and explored each new path which the advancing technology of radio has presented. It was logical, therefore, that many radio amateurs would turn their attention towards the stars with a view to investigating the radio waves which reach our planet from our natural neighbours in space.

Radio astronomy is a relatively new branch of science which has already made a great contribution towards man's better understanding of his celestial surroundings. Literature on the famous radio observatories indicates the impact which the radiotelescope has made in the field of astronomy.

For the amateur to make a meaningful study of the heavens by radio, he would require a very large aerial system which must have accurate settings, followed by an expensive low-noise, high-gain, radio receiving system. Once this has been set up, a computer would be required to analyse the stellar radio waves which have travelled through space for millions of years before reaching earth. In addition to this exotic equipment there is the problem of which radio frequency to use before undertaking a serious observational programme. Apart from the initial installation costs, the expensive running cost of the system would prohibit the majority of amateurs from undertaking such a project.

The sun, however, is a different proposition, because its radio waves only take 8·3min to cross the 93-million-mile gap between it and the earth. In addition it is possible to carry out useful work at metre wavelengths. Solar radio noise at metre wavelengths usually indicates that there is activity during which time the sun may well be ejecting streams of complex particles towards the earth. The solar radio noise is detected on earth very quickly, but the particles which leave the sun at the same time may take between 20 and 40 hours to arrive at the earth's orbital path. If the timing is right, these solar particles may collide with, and penetrate the earth's gaseous atmosphere and disturb its natural state.

It is already well known that these solar particles can cause an aurora to manifest within the earth's polar atmosphere, and can also cause a radio blackout by disturbing the "F" region of the ionosphere.

Consistent radio observations of the sun at metre wavelengths can see the commencement of a solar storm and enable its progress and life cycle to be recorded. Many solar storms have lasted for 7–10 days, during which time the radio observer can check for aurora, radio blackout and sporadic-E, by using normal communications receivers to watch the behaviour of the signals from known terrestrial transmitters.

A solar radio telescope operating at 136MHz can cost between £80 and £150 to build and install, subject to the availability of a pen recorder on the surplus market. The main running cost is the daily consumption of chart, which depends upon the chart speed, period of observation and amount of solar activity.

From solar radio astronomy a great deal can be learnt about the sun's behaviour, and from associated observations one can also make a meaningful contribution towards knowledge of the sun and its indirect effect on radio communication.

Remember. . . . A solar storm on Monday could mean an aurora on Wednesday, a report on the GB2RS news on Sunday, and another notable week recorded for posterity to read.

* Faraday, Greyfriars, Storrington, Sussex.

An inexpensive vhf aerial

by R. P. NEAVE. G8FLC*

THE widespread and ever-increasing use of the vhf radio spectrum by amateurs for local net purposes in all parts of the globe has led to a profusion of aerials, the vast majority of which are professionally manufactured and inclined to be expensive.

The aerial featured here was made entirely of ready-to-hand materials and has proved in use to be every bit as good as the manufactured brands. The main requirements were assessed to be simplicity, cheapness and portability, in that order, and these are adequately met in the ground-plane design to be described.

The aerial is assembled from the following components:

(1) A pyro-gland assembly as used by electricians for terminating copper-clad power circuits in industrial and domestic installations.
(2) Seven ⅛in bronze welding rods, each 20in long.
(3) Two connectors of the chocolate-block variety, two grommets, and a piece of sleeving.

Construction and assembly

A 6BA tapping size hole is first drilled radially in the centre of each of the faces of the hexagon section of the pyro-gland Each of these holes is tapped 6BA. Next, six lengths of the ⅛in welding rod are threaded 6BA for approximately ¼in at one end only. It will be necessary to reduce slightly the diameter of the welding rod in order to apply a 6BA die; an alternative would be to use 5BA taps and dies in place of 6BA throughout. The remaining length of rod is fitted with a chocolate-block connector held by one screw only, leaving about half the connector extending clear of the rod. The remaining connector is soldered inside the large end of the pyro-gland.

The aerial is assembled by slipping a short length of sleeving over the ⅛in rod with the connector already fitted. The sleeving butts up to the end of the connector, and a suitably-sized grommet is slipped over the sleeving so that it touches the connector. The whole rod assembly is then inserted into the hexagon gland and positioned to give the greatest clearance between the two connectors.

Another grommet is slipped over the sleeving protruding from the end of the hexagon gland and the gland nut is fitted and screwed home; this will hold the vertical element securely. A coaxial feeder is connected to the chocolate-block connectors, the inner wire to the vertical element and the braiding to the connector soldered inside the hexagon gland. The six radials can now be screwed into the ready-tapped holes in the hexagon faces of the gland, and the aerial is almost ready for use. It only remains to attend to mounting, which can be in a socket on the end of a length of conduit or on any suitable bracket, as desired.

The tuning is accomplished by pruning the vertical element with successive cuts of ⅛in until no further improvement is obtained on the reflectometer. The radials may also be pruned in the same way.

* 24 Mayfield Road, Writtle, Chelmsford, Essex, CM1 3EL

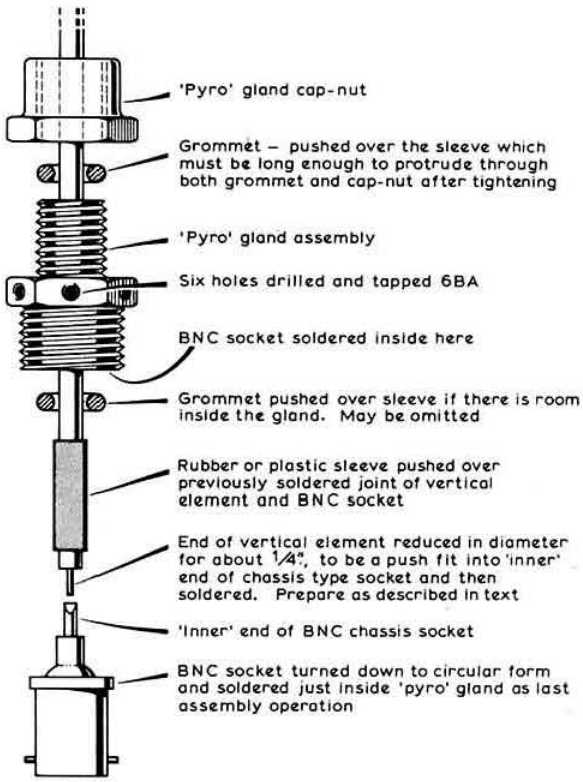


Fig 1. An improved method of connecting the coaxial lead to the aerial is to use a BNC chassis-mounting socket in place of the chocolate-block connectors

The best match will probably be with 50Ω coaxial cable, and the quarter-wave dimensions for the elements will be 19¼in for 2m.

A further slight modification to the assembly which does result in additional expense, but which is certainly recommended, is to replace the two chocolate-block connectors with a modified BNC (chassis-mounting type) socket, (see Fig 1). The flange must be turned down to a circular form just small enough to push fit into the large end of the gland assembly. The lower end of the vertical element is reduced in diameter for about ¼in to enable it to be fitted and soldered into the cable connection pin of the BNC socket. A short piece of sleeving is fitted as in the first method of assembly and the BNC flange is then pushed just into the pyro gland and the joint lightly soldered. The gland cap nut is fitted as before, after a close-fitting grommet is positioned on the sleeve before the final tightening.

A coat of polyurethane varnish may be applied before raising the aerial to its operational position.

by P. J. HORWOOD, G3FRB*

The Yaesu FTDX401 transceiver

THE task of a reviewer is lightened if few derogatory comments have to be made; after having carried out a series of measurements on the FTDX401 the reviewer was pleased to find that this was the case; and furthermore, not being the owner of a commercial transceiver, he was able to be objective without prejudice in favour of one make or another.

At the present time there is almost as great a multiplicity of transceivers on the market as there is hi-fi gear. How the laymen selects the latter by any means other than price is not obvious, but as technicians or engineers, radio amateurs should be able to study a performance specification and make an objective decision. The measured performance tabled at the end of this review confirms that the FTDX401 very adequately meets the needs of the amateur, whether he wishes to work dx or rag-chew.

Notwithstanding what has been said, one must make comparisons at some level, and the reviewer chose to make the straight one between the amateur transceiver and professional communications equipment. Even at this level it is surprising what value and performance the FTDX401 provides for the money. This is the result of designing the equipment around relatively cheap receiving components, for example the pa uses the familiar colour television deflection valves, producing respectable powers on a short duty cycle with medium ht at high peak cathode currents. As loaded rf voltages are relatively low, tank circuits are surprisingly small and do not incorporate the wide-spaced transmitting capacitors beloved of the home constructor. Although it was anticipated that the tank circuit efficiency would fall off at 28MHz, this was not borne out by the measured results.

Published specification

DC input: 560W p.e.p., 430W cw.

Frequency stability: <100Hz in 30min after warm-up.

Carrier suppression: —40dB.

Unwanted sideband: —50dB at 1,000Hz.

Intermodulation products: —25dB.

Receiver sensitivity: 0·5μV pd, 10dB $\frac{s+n}{n}$ at 14MHz.

Selectivity: **ssb** 2·4kHz @ —6dB
4·2kHz @ —60dB
cw 600Hz @ —6dB
1·2kHz @ —60dB

(Note: unwanted products were not specified if relative to p.e.p. or one tone of a two-tone signal)

* 14 Main Road, Hextable, Swanley, Kent.

Construction and appearance

The FTDX401 is well constructed, no faults developed, and close inspection revealed no dubious or dry joints, or burnt sleeving.

A number of infrequently adjusted controls and sockets are carried on the rear apron, leaving a clear and accessible front panel layout. Being used to a multiplicity of meters the reviewer was disconcerted to find only one meter, of less than 2in effective diameter, with four switched functions. While it performed adequately, it could usefully have been larger, or more than one meter could have been used. Setting levels such as quiescent anode current would have been more accurate, but costs must be considered.

The panel layout is attractive and the markings durable, and once the simple transmitter tuning procedure had been memorized, band changing was very speedy.

Operation and use

Little need be added about tuning, although the reviewer still considers tuning deflector-valve PAs in 10s bursts, with periods for cooling, a hazardous operation. He would be surprised if a busy operator obtained more than a year's use from a set of pa valves. The addition of clippers or compressors would reduce it further.

But in the ultimate it is on-the-air effectiveness that matters most. The FTDX401 was used alongside a home-built transmitter designed to professional standards, with a fully-transistorized exciter, and capable of putting 400W continuously into a dummy load. It was also at least four times the size of the FTDX401. Arrangements were made to switch aerials between rigs; it was therefore not surprising that with only about 1dB difference in output power signal reports were virtually identical.

Speech-quality reports were consistently good, even when the FTDX401 was driven well into alc. The home-built transmitter scored when the inbuilt speech clipper was used, this conferring as much as 10dB of equivalent speech-power gain, but this was not a fair comparison.

As a result of these on-the-air tests the reviewer awards the Yaesu his highest personal compliment; that is, he would be happy to own one if only he had not spent two years designing and building his own rig!

General comments

The accompanying handbook was well produced, with full re-alignment instructions and specifications. The latter are reproduced here, before the measured performance. One curious omission was any reference to microphone requirements and audio sensitivity figures. However, several of the popular dynamic types were tried and found to be satisfactory.

There is, of course, no such thing as a tvi-proof transmitter, but the FTDX401 goes some way in helping to solve the problem, the third harmonic of 14MHz and the second harmonic of 21MHz both being a respectable —60dB, (see the recorded results for more details). The harmonics were measured relative to maximum cw power on all bands; a Hewlett-Packard spectrum analyser with storage tube was used on single-shot frequency scan so as not to overheat the pa valves. The process was repeated with cw power limited to 200W, showing very little improvement in harmonic reduction.

All necessary plugs and connectors for microphone, key, aerial, external vfo, etc are supplied.

Calibration

The vfo tuning knob carries a metal scale calibrated 0-100kHz, the accuracy being very fair when zeroed against the inbuilt calibrator at one end.

Receiver measured performance

Input signal 1μV emf, output 100mW af

Band (Freq)	$\frac{s+n}{n}$ (ssb)	Image rejection at highest freq
3·6MHz	18dB	
7·1MHz	17dB	
14·2MHz	23dB	
21·1MHz	21dB	
28·25MHz	26dB	
28·75MHz	26dB	
29·25MHz	26dB	
29·75MHz	29dB	70dB

SSB bandwidth
2·5kHz at — 6dB
4·2kHz at —60dB

S meter
Acceptable arbitrary readings from off-air signals

Noise silencer
Very effective on impulse noise

Transmitter measured performance

Load 50Ω at threshold of alc, relative to one tone in two-tone signal

Band	Output two-tone p.e.p.	Inter-modulation products	Carrier suppression
3·5MHz	280W	—12dB	—38dB
7MHz	280W	—23dB	—45dB
14MHz	300W	—28dB	—38dB
21MHz	320W	—26dB	—40dB
28MHz	280W	—20dB	—40dB

Harmonics (–dB) at maximum cw output

Band	Power	2nd	3rd	4th	5th	6th	7th	8th
3·5MHz	260W	−45	−49	−70	−70	−65	−70	−52
7MHz	260W	−41	−58	−61	−68	−68	−50	—
14MHz	300W	−43	−60	−72	−73	−68	—	—
21MHz	280W	−50	−50	−60	—	—	—	—
28MHz	300W	−40	−45	—	—	—	—	—
Power limited to 200W cw								
14MHz	200W	−46	−63	—	—	—	—	—
21MHz	200W	−50	−53	−62	—	—	—	—
28MHz	200W	−43	−50	—	—	—	—	—

VFO calibration after warm up, zeroed at 14MHz relative to internal calibrator.

Frequency (MHz)	Error (Hz)	Frequency (MHz)	Error (Hz)
14·00	0	14.2	+150
14·05	−470	14·25	+870
14·1	−10	14·3	+230
14·15	+250	14·35	+510

Note: Calibrator was later found to have +715Hz error at 14MHz but errors would be substantially similar if zeroed to accurate 14MHz signal.

Drift from cold, zeroed at 3·5MHz

Elapsed time (Min)	Frequency (Hz)	Elapsed time (Min)	Frequency (Hz)
0	0	5	+80
1	+10	6	+90
2	+20	7	+95
3	+40	8	+100
4	+60	9	+95
		10	+95

Short term drift substantially zero thereafter.

When changing sidebands the carrier is shifted from one side of the ssb filter response to the other, rather than incur the expense of two filters. This method requires separate calibrations for upper and lower sidebands; or, as employed in the FTDX401, the ability to rotate the kilohertz scale in relation to the main dial. Thus, with the calibrator switched on and the sideband selected, the tuning knob is rotated for zero-beat, and without moving the knob further the scale is turned so that its zero coincides with it. It is a simple process which does not suffer from the possible ambiguity of two scales. While not so speedy as the two-filter method, one rarely operates against the norm, so once set up for a particular band no further attention is required.

Conclusions

The FTDX401, then, is a very potent package for its dimensions, no extras are required, certainly not a linear, and given suitable aerials one is in business in a big way. An external vfo is available (not tested) which allows split frequency working, or the more commonly required ability to chase a station that drifts or for perverse reasons refuses to come accurately into net! The review equipment was kindly loaned by Western Electronics (UK) Ltd, Osborne Road, Totton, Southampton, SO4 4DN.

Break-in and listening through

by R. Baldwin, BSc, G3WZ*

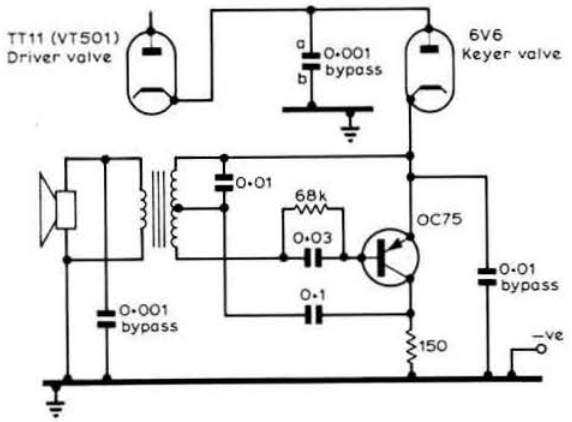
THIS article describes a method, possibly new, for the amateur to listen to his own cw signal.

In the seagoing equipment of the Marconi Company, years ago, this was quite brutally done. The 70m or so of aerial wire came into the radio room to be energized with a tuned coil, and it earthed itself through two ponderous additional contacts on the morse key. The receiver aerial was connected to the aerial side of these two contacts, so that depressing the key earthed the receiver aerial, while two additional contacts shorted the phones. The RAF was considerably more advanced and anybody who has seen an old T1154 transmitter will have stared in wonder at the large battery-operated relay. This keyed the aerial and about half a dozen other circuits, moving ½cm from side to side.

One very satisfactory solution is the incorporation in the receiver of an extra variable potentiometer to back-up the normal rf gain at its earthy end. This can be set so that enough of one's own transmission breaks through on "send", while switching to "receive" shorts-out this extra muting resistance.

Another old approach is the "bleeper". This is no more than 30cm of wire which, surmounting a small box with a self-contained transistor audio oscillator and speaker, collects and rectifies enough rf to operate the oscillator. This is undoubtedly a good system when the shack is crawling with rf, but on some bands it may remain mute.

A solution which has worked with the author is to use a few hundredths of 1W in the cathode end of the driver keyer. This keyer valve is itself in series with the driver as shown in Fig 1. The lf oscillator works well irrespective of which band the transmitter is on, and there are very few snags once the development work to suit one's own circumstances has been covered. In the author's case the 6V6G keyer valve takes just 10mA with key down, and the oscillator shown in its cathode abstracts about 2V.



It was decided to use one simple transistor, consuming as little power as possible. A typical receiver transistor lf transformer with tapped secondary was pressed into service and the circuit is approximately a Hartley oscillator. The value of the base leak influences the note pitch, while the capacitor across half the secondary stopped a tendency not to oscillate in the low power situation, and may also serve as a bypass for stray rf. The component choice is not critical. The 0·03μF blocking capacitor was also chosen for the note pitch, an additional 0·01μF here lowered the pitch by about 100Hz. The 150Ω resistor at the emitter is necessary to secure bias feedback. The transistor works satisfactorily with any normal value of bypass capacitor, such as 0·1μF or 0·01μF.

Some rigs may not have a convenient keyer valve, in which case there should be no difficulty in using the bypassed cathode circuit of a keyed driver itself. Two possible connecting points are marked *a* and *b* in Fig 1. In no case should the device be put where it is live to earth—the transformer used was not designed to resist ht.

The oscillator should be kept well away from the rf part of the transmitter, using a screened double-core lead to bring the output to a suitable transistor speaker or earphone near the operator. With the line earthed on one side and decoupled on the other, there is little chance of rf leakage. At the cathode it is difficult for any dangerous voltage to be at large with adequate earthing to the chassis at all points shown. However, if all earths end at one point and this becomes disconnected, then danger could ensue.

The audio oscillator *could* go in the cathode of the pa. In this case the only solution is to parallel it with a carefully-decoupled resistor. First, the oscillator should be constructed on Veroboard and worked off a 3V supply (or other suitable value). Then its current consumption should be measured—say 0·01A. If 100mA is going to the pa there is enough data to work out component values. The 100mA will develop 3V across 3/0·1 or 30Ω, by Ohm's Law. Oscillator resistance, from Ohm's Law, is 3/0·01 or 300Ω.

For parallel conditions such as this.

$$\frac{1}{30} = \frac{1}{300} + \frac{1}{\text{Bypass resistance } (\Omega)}$$

From this the bypass resistor is 33Ω, should be rated at 2W or more, and the rf bypass must be short and sound. Lead-off wiring to the lf oscillator should be metal braided.

If the drive or input is reduced there will be a lowering in the volume of the bleep. The device as used has proved absolutely trouble-free over four years.

There is nothing to stop completely conventional biasing and circuitry being used in the oscillator. This circuit was chosen to consume as little current as possible, consistent with oscillation and quiet audibility. There seems no particular obstacle to putting other sorts of transistor circuits in the biasing of valves, as Mr R. C. Marshall has pointed out [1]. A transistor crystal oscillator might then use the valve, of whose circuit it is a part, for further amplification. Or the first stage of an audio amplifier might be transistor, with a valve fed from its own transistor bias. Any interaction could be arranged to provide negative feedback or even clipping. Someone must have tried it all.

Reference

[1] R. C. Marshall, *Radio Communication* Vol 46, pp 299, 382, 448.

* 11 Meadow Court, Whiteparish, Wilts.

A note on kites

by J. B. ROSCOE, MA (Oxon), GM4QK*

SEVERAL types of airborne devices for supporting aerials are available, in amateur circles they may be known as "skyhooks", though in NASA's vocabulary this term is restricted to high-altitude balloons. Whether they are heavier or lighter than air, they have one factor in common: lack of staying power, although for portable and other temporary applications they have their uses.

Nearly 25 years ago "Stratovision" tv transmissions were tried out over New York City, using a B29 aircraft at 25,000ft [1], but in general such techniques are of little interest to the amateur, for whom the practical alternatives are the balloon and the kite.

The balloon

To a large extent the balloon and the kite are complementary, in that there is generally too much wind for one and not enough for the other. Local meteorological officers are a most helpful source of information here: not only can they give detailed predictions of wind force, but they themselves frequently have practical experience of using balloons. An early enquiry to their Glasgow office, for example, about the possibility of elevating an aerial in NGR NW elicited the reply that there would be few days in the year when a balloon could be employed.

As far as balloons are concerned, the choice is between gas or hot air; and a 4½ft hot-air balloon is now available commercially, though not continuously fired. One point emerges clearly: the lifting power of an ordinary balloon is feeble. Ex-barrage balloons may well be used for moving timber, but the working load of a balloon of acceptable size and price is a few ounces. Hydrogen is not really cheap or convenient when delivered on site, is not usually recoverable, and constitutes a considerable safety hazard.

The kite

Information on kites is available, even if from rather obscure sources. There has been some recent British work on load-lifting kites, but much of the earlier work is in German and dates from the mid-'twenties. Local public libraries will have one or two books on the subject, but these are intended for people who regard kite-flying as an end in itself, and are not helpful, for example, on the load-carrying potential. More esoteric information will be available from the British Library Reference Unit.

The German work led to the design of man-lifting autogiro kites, notably for towing behind surfaced submarines as observation posts, but it is not clear that there is any inherent advantage in the design. The box kite is the obvious choice for most applications. It is robust, stable and easily flown, it can be dismantled almost completely, and it carries a good load for its size.

Aerial types

In the first flush of enthusiasm it is tempting to launch enormous lengths of wire into the sky. It should be remembered, though, that the longer an aerial becomes, the nearer will the main lobe move to the line of the wire, and amateur operators are not usually interested in ionosphere sounding. Except when using suspended feeders, or certain types of collinear verticals, a height of 100ft will be adequate for most operations.

With suitable ingenuity most types of aerial—quad, delta, yagi—could probably be lofted, but the most usual approach is to run up a single wire. In most temporary locations the worst way of feeding this wire is to load it against earth. A short length of metal driven into dry ground cannot provide an efficient earth—though anchor chains and steel hulls are a different proposition. Almost invariably, far better results will be obtained by loading the airborne wire against one or more terrestial ones. It matters little whether the configuration looks like an L, an inverted-T, a drooping dipole, or even a full-scale ground-plane: it will radiate.

If the kite is tethered simply by the aerial, without a string, an inclination of something like 45° may result. With a separate string, provided that the kite will take the extra weight, inclinations nearer the vertical can be achieved. How near the vertical should the aerial be? This depends on the type of aerial and on the directivity required. A sloping wire will provide more radiation in one direction at the expense of others, which can be entirely advantageous.

Aerial construction

Aluminium wire is obviously more suitable than copper when weight is restricted: the specific resistances are roughly in the ratio 24:16, whereas the densities are about 27:90. There should be no difficulty in obtaining supplies in the required gauge, length, and temper.

Kites may be stable over a period of hours, but rarely over a period of seconds. The aerial will be in a constant state of oscillation, perhaps with large superimposed swoops up and down. Electrically this does not seem to matter. There will obviously be changes in capacitance as the aerial moves relative to the ground, but at hf these are not likely to cause loss of signal strength through mistuning. Mechanically, though, the problem is more serious. The constant oscillation, and consequent work-hardening of the wire, is a sure way to fracture copper and aluminium.

The simplest way of combatting this problem is to use short lengths of stranded wire—ordinary flex—at the points where the bending occurs. Experts in oil-immersion soldering will join the flex to aluminium wire with enthusiasm: others can use a (nude) barrel connector, which will also prove handy for watching the wire from a distance.

Kite suppliers

A wide range of types and sizes of kite is available from Brookite Ltd, Francis Terrace, Junction Road, London N19. These are made of good-quality cotton with wooden spars, and are supplied without string. A double-winged aero kite, for example, costs £1.78 for the 70 by 60cm size, and £3.45 for the 102 by 95cm size.

What appears to be a selection from the same range is available from Yachtmail Co Ltd, 7 Cornwall Crescent, London W11 1PH. These kites are supplied with 200ft of string. A 28in by 24in aero kite costs £2.10, and the 40in by 33in size £3.77. This firm also supplies a hot-air balloon kit at £3.92, as well as extra string, reels, etc.

Reference

[1] *Journal of Brit Inst of Radio Engineers*, 9, 1949, pp 264–266.

* 39 Letham Road, Strathaven, Lanarkshire, ML10 6DU

TECHNICAL TOPICS

by PAT HAWKER, G3VA

A CONSIDERABLE amount of material to pack in this month—so straight down to business with some notes on transistorized transmitters.

Solid-state transmitters

While we remain unconvinced that the high-power all-solid-state transmitter is yet "cost-effective" for amateur fixed-station operation, there is no doubt that transistor amplifiers of quite respectable power ratings are beginning to appear on the market. For both professional and amateur equipment, especially with broadband output stages, it remains important to look carefully at the harmonic and ip characteristics of any transistorized amplifier to be used for ssb operation. The bipolar transistor does not take too kindly to linear operation, and it seems a pity that more effort has not been put into the development of field effect devices for power amplification.

But undoubtedly the solid-state transmitter offers many advantages for portable and mobile operation. R. A. Bastow, G3BAC, comments on our remarks in the February *TT*, and wonders if the rapid failure rate experienced by G3SL may in part be attributable to the use of 50V which he feels is rather high for a BD121.

G3BAC recommends the use of series tuning as a means of providing good matching and protection against the high power dissipation in off-tune conditions which occurs when using parallel tuning. He has used series tuning for some years in an a.m. mobile rig, with no disasters resulting from running off-tune or without a load.

Fig 1 outlines the pa stage of his solid-state, 3·5MHz, ssb transmitter which delivers 14W p.e.p. output. The standing current is set to 50mA by forward bias on the base, and this can be readily talked up to an indicated 500mA using a 2N706 running 10mA at 12V. The silicon diodes across the base of the BD123 prevent destruction of the base-emitter junction by overbiasing or overdriving. With series tuning the power amplifier current rises on resonance and the load pulls it down (G3BAC notes that he has never seen anything in print describing the correct tuning procedure for series tuned amplifiers). Good regulation and decoupling are necessary with the peak currents of around 1A and ordinary paper tubular capacitors are useless for the collector decoupling capacitor.

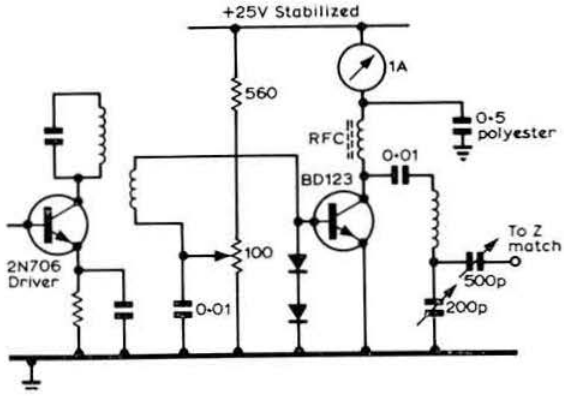


Fig 1. Linear transistor amplifier used by G3BAC in 3·5MHz mobile ssb transmitter, providing 14W p.e.p. output. RFC is 50 turns 22swg enam, wound on ferrite rod

With a bit of shopping around, it is becoming possible to pick up useful power transistors at relatively low prices, and Bill Poel, G8CYK, draws attention to Pattrick and Kinnie of 191 London Road, Romford, who, he says, have been offering PT4176 devices at "incredible" prices, (for example PT4176C at £1, PT4176D at £1.50). These are capable, if used correctly, of providing powers of the order of 7 and 24W at 144MHz, though we have not been able to check these figures from any available data sheets. Bill Poel and Peter Burton are endeavouring to form "Ambit" or Amateur Radio Bulk Buying Group to obtain for amateurs some of the favourable prices which can be achieved by buying semiconductor devices in bulk—it sounds a good idea although one can imagine it involving a lot of work and not a little financial risk. For audio applications he draws attention to the LM380 integrated circuit, which he believes to be just about the best audio ic available (at about £1.30) providing up to about 2W of audio from a 12V line and, to quote G8CYK, "is virtually indestructible provided it is used in a proper heat sink".

Multiband loops

Some follow-up notes on the G6XN multiband loop/quad techniques outlined in the February *TT*—and assuming you will have already noted last month's correction pointing out that there should be *no* insulator at the half-way point (unless of course one is needed for support).

One point I did not make clear: the total amount of wire in the loop plus stub is approximately 140ft, but the distribution between stub and loop can be varied (though clearly there will be advantages in having, say, 68-70ft in the loop); G6XN did describe a quad based on this technique having only 12ft sides, so making the construction a good deal less massive.

A. H. Mason, GM6MS, has successfully used a 140ft loop (ie all the wire in the loop and no stub). He fed this with 72Ω coaxial cable, though it should be noted that this is possibly not the ideal match. He found this system performed fairly well from 7 to 28MHz, and could be used also on 3·5MHz by open circuiting the loop at the half-way point, so turning it into an inverted Levy-quad element (Fig 2).

Another variation, which I have been trying, is a G6XN-type loop plus resonant feeders, twisted around through 90° to provide vertically-polarized signals. Initial results seem promising though I suspect that the closeness of one side of the square-loop to ground (maximum height is only

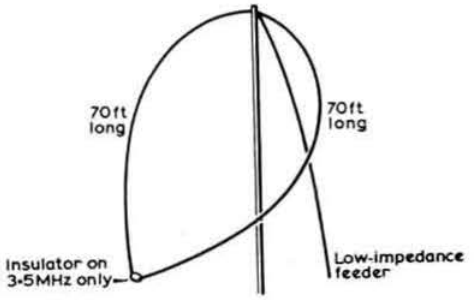


Fig 2. The 140ft multiband loop aerial used by GM6MS for 7 to 28MHz—for 3·5MHz operation the loop is open-circuited at its mid-point, 70ft from the feeder connection

24ft so that the lower wire is only 7ft above the ground) is causing some unbalance; still it has brought VK and W contacts on 7MHz. With points of maximum current halfway up each vertical leg, the astute may notice an affinity with the G8ON aerial (*TT*, January 1972 and *ART4*) which can be likened to a three-sided loop (if such a term is acceptable).

In his classic book *Antennas*, John D. Kraus, W8JK, shows another way in which vertical polarization can be achieved with square loops, though we have never heard of any amateur using this system. Fig 3(a) shows the conventional horizontally-polarized system, and (b) shows the system being tried at G3VA. In (c), the W8JK system, the loop is continuous and is fed by unbalanced line: the aerial currents flowing to the feed point are equal and in phase so that the current distribution changes to that indicated.

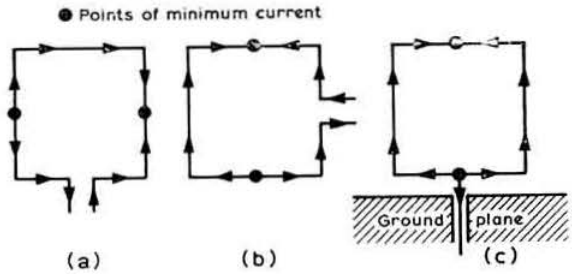


Fig 3. Current distribution in 1λ square-loop elements. (a) conventional horizontally-polarized element; (b) vertically-polarized system being tried at G3VA (but note unbalance to earth); (c) vertically-polarized voltage-fed element described by W8JK in *Antennas*

Although quad/loop aerials are most certainly better when hoisted well clear of the ground, it has often been observed that their performance at low heights is not at all bad. We were interested to note the following comment in *IEEE Trans on Ant & Prop* (January 1973): "it is known that the radiation characteristics of electric dipoles placed at or near ground level and operated at lf are strongly affected by the electrical properties of the soil and that magnetic dipoles or loop aerials are much less affected by comparison." It would be interesting to know if vertically-polarized loop aerials could help to overcome on hf the well-known hostile soil and surroundings of urban sites. Probably not—but one lives in hope! After all, the Beverage receiving aerial on lf and hf can pull in low-angle signals although very near the ground.

Delta-birdcage aerials

Over the years there have been a number of techniques developed with the aim of simplifying the construction of quad-type aerials. Apart from the delta approach, one of the better known is the G4ZU birdcage, as described in *Radio Communication Handbook*.

An interesting combination of both these techniques is described in *QTC* No 1, 1973, by Kenneth Johansson, SM4EMO, though the idea stemmed from Yasuo Murai, JA5AO/7. This uses a triangular loop but distorted in the manner usually associated with the birdcage configuration at the top. Although the aerial requires quite long supports (4·5m for a 21MHz aerial) the arrangement is still probably a good deal simpler to build than a conventional quad. Each loop comprises approximately 2 by 0·15λ horizontal members and 2 by 0·3λ sloping members to make up the 1λ loop. The stub is adjusted to provide maximum front-to-back ratio; most of the mechanical details can be gathered from the 21MHz array shown in Fig 4.

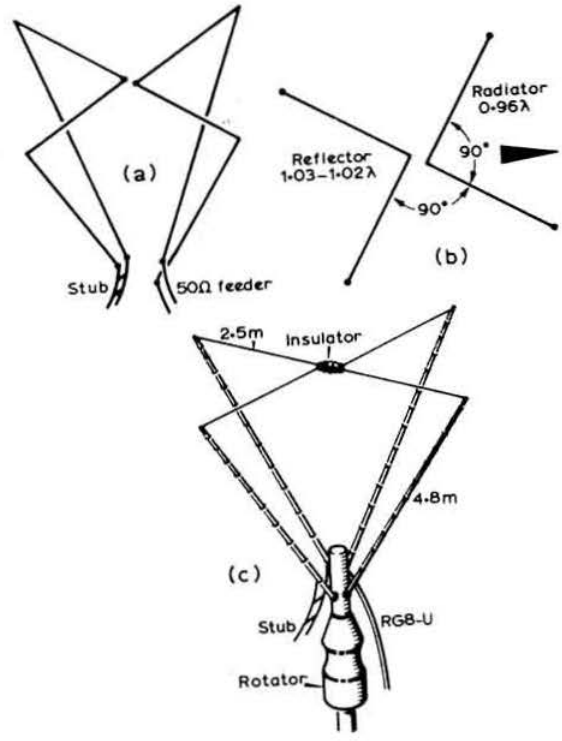


Fig 4. The delta-birdcage type of aerial described by SM4EMO based on a design by JA5AO. The dimensions shown are for a 21MHz array

Vertical dipoles

Every now and again somebody rediscovers the fact that a $\frac{1}{2}\lambda$ vertical dipole can be a very attractive alternative to the much better-known $\frac{1}{4}\lambda$ grounded vertical or the $\frac{1}{4}\lambda$ fed against an artificial wire ground plane. Latest to do so is B. H. Brunemeier, VO9N, who writes in *Ham Radio*, December 1972: "from personal observation the half-wave vertical is unknown around the world . . . I have never yet contacted another station using one . . . I can't help wondering why DXers around the world aren't using it."

Well, certainly we have long included some notes on the value of the vertical half-wave dipole in *ART* and can recall several amateurs writing over the years to point out (often with some evident surprise) that these aerials can and do work very well. The reason that they are largely ignored is probably the variability of results which depend markedly on ground conductivity. The position was well summed up many years ago in the original edition of *Amateur Radio Handbook* as follows: "the vertical half-wave may be used where the site is fairly open, and if the soil is a good reflector, as for example in damp country, it will be found very good for long distance work, but it has frequently been found disappointing."

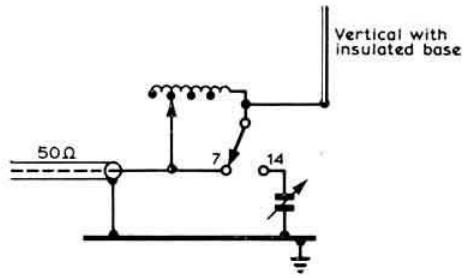


Fig 5. Method of feeding a 34ft vertical as a half-wave dipole on 14MHz and as a quarter-wave monopole on 7MHz, as described by VO9N

VO9N shows a useful suggestion for feeding a 31-34ft vertical element as $\frac{1}{2}\lambda$ on 14MHz and $\frac{1}{4}\lambda$ on 7MHz, (see Fig 5). As K2QBW has pointed out (*TT*, December 1970 or *ART4*) it is possible to use a multi-band trap vertical in the half-wave dipole mode by attaching a length of rotor cable cut to provide $\frac{1}{4}\lambda$ monopoles on the various bands; the system then in effect becomes a series of half-wave verticals, although some of those using the arrangement may not recognise that this is what they are using and continue to refer to the aerial simply as a "vertical".

The short backfire again

On several occasions we have referred in *TT* (and subsequently in *ART*) to the work of H. W. Ehrenspeck in developing high-gain "backfire" yagi aerials, including the so-called "short backfire" system in which a dipole is mounted between a reflector in front and a larger specially shaped reflector at the rear. Ehrenspeck has claimed that such an array can provide the equivalent gain of a conventional 20-element yagi, although it is fair to say that backfire systems have always been controversial—though I know of engineers who have been in touch with him and who are convinced that the system has merit, if not always suitable for the job they have in mind. There is, in fact, some evidence that properly designed short backfire aerials *do* work!

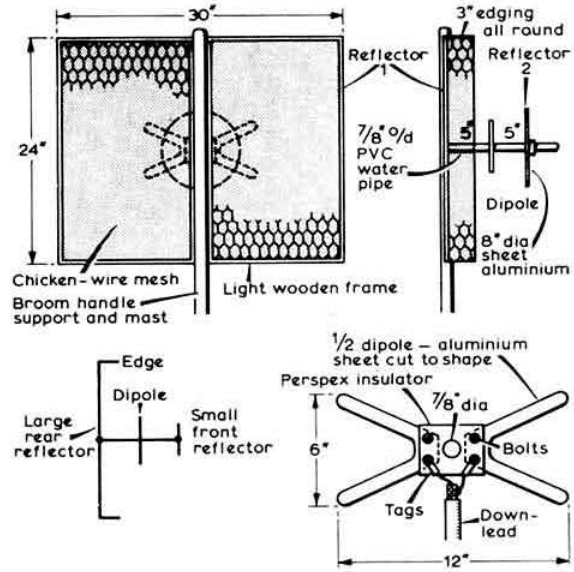


Fig 6. The *Television* design of a "short back-fire" aerial for uhf television reception. The dipole "arms" are about $\frac{3}{4}$in wide. The pvc boom is mounted on the light wooden frame which is bolted to the broom handle mast using the type of metal bracket used to mount loft aerials, but other types could be used

A practical design intended for uhf television reception appears in the February 1973 issue of the British magazine *Television*, though I am puzzled that the author has achieved good wideband performance (the design is claimed to work over channels 21 to 41, representing some 160MHz between 470 and 638MHz, and to provide a gain roughly equivalent to a 22-element wideband television yagi). This uses wire mesh for the specially shaped "saucepan lid" reflector: details of this design are shown in Fig 6.

Before leaving the subject of aerials we would like to draw attention to what appears to be a very attractive technique for constructing traps for multiband aerials, described by W. J. Lattin, W4JRW, in *QST*, November 1972. These resonant traps are made in the form of a spiral delay line and do not require any high-voltage capacitors; in effect they comprise a form of coaxial line with a helical inner conductor. He provides full constructional details and the resulting traps should prove of very high Q.

Aluminium earthing systems

The value of good and extensive earthing systems or earthing mats for use with vertically-polarized aerials is now widely recognized. But in these days when copper is becoming an increasingly costly commodity this can involve sinking, literally, a lot of capital into the earth. For many applications —including radio earth systems—people have been looking into the possibility of replacing copper with aluminium even though an aluminium conductor has to be 1·6 times larger in

diameter to have the same conductivity as copper; the use of aluminium is already becoming established practice for some forms of telecommunications cables, aerials, open-wire transmission lines and the like. But the use of aluminium for earths raises the question of will it remain effective over a long period when buried in various types of soil, or will various unwanted chemical reactions occur? An account has appeared recently in *ABU Technical Review* of an experiment being carried out by All-India Radio to find out whether or not aluminium earth conductors are likely to remain effective over a long period. It is too early to say with certainty that they will—but the results so far (two years' work) seem very promising. Using aluminium wire, earth resistances of 2·0 to 2·7Ω, have been achieved (copper 1·9 to 2·4Ω), and in one location significantly lower resistance was achieved with aluminium (3·6Ω) than copper (5Ω). An earth for a broadcasting station, 120 radial wires each 50m long connected to an aluminium plate 60 by 60cm and 3mm thick, using Alcapi solder, showed earth resistances of 0·3Ω in one location and 0·6Ω in another, although it is recognized that measurements made with an earth megger have to be treated with some caution.

Mains-connected-chassis supply

In January *TT* a mains-connected-chassis type of power supply was included (Fig 1 of January *TT*) stemming from Swiss and German publications. The supply used what I felt was an ingenious relay protection system that ensured that the "line" (or "live") mains lead could never be connected to chassis; however, it did show the "neutral" wire connected to "chassis" and also to supply "earth" (the German term on the diagram for this third lead was "Schutzkontakt", or screen contact, which I assume is similar to supply earth in British practice). It has been suggested to me that "neutral" and "earth" leads should never be deliberately connected together since there may be odd potentials between them. So far I have not been able to locate a clear ruling on this in *IEE Wiring Regulations*, but include this as a warning that this point needs looking into: however, it would seem quite possible to use the protection system without connecting the supply "earth" to chassis, just using this lead to supply one end of the relay winding (possibly through a capacitor).

Also as a result of this item several enquiries have come in about the linear itself, based on two PL509 European line output valves: see Fig 7 for circuit details.

Speech processing for ssb

Speech processing has clearly become a subject of continuing interest—not to mention some misconceptions. We select this month from among the comments received and recent articles.

First, it is worth stressing that the evidence accrued from the operational use of the professional "Lincompex" shows beyond any reasonable question that very real and practical advantages can be gleaned from well-designed speech processing systems—though these advantages will tend to be evident only when the going is tough. In "The operational and economic advantages of using Lincompex" the late P. R. Hutton-Penman and W. M. Davies (*IEE Conference Publication No 64* "Signal processing methods for radio telephony") wrote: "in use the Lincompex system gives an operational improvement equivalent to an increase of transmitter power of 12 to 15dB. This gain may be used to reduce transmitter power or aerial gain or to improve circuit quality and reliability as required." Admittedly the Lincompex technique is more sophisticated than rf clipping, and is in effect an infinitely-clipped system, but the principles are basically the same. It cannot be too often emphasized that for a full understanding of speech processing principles one should really go back and study some of the original work in this field in France, Britain, Germany and Holland.

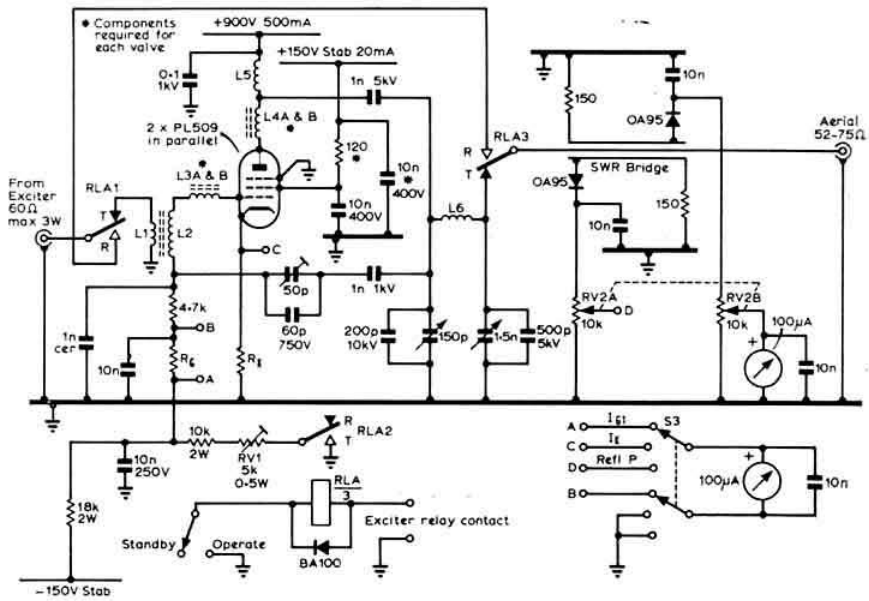


Fig 7. The 3·5MHz linear intended for use with transistor exciter and the power supply described in January *TT* (DL8TO in *Old Man*). L1 3 turns, L2 25 turns (Siemens 14 × 8mm former, 550M25); L3A, L3B ferrite bead rf choke; L4A, L4B 4 turns on 15Ω 1W resistor; L5 rfc suitable for pi-network output; L6 6 µH (about 15 turns, 2mm silvered-copper, 4cm)

Dr D. A. Tong, G8ENN, is in substantial agreement with the comments of B. G. Tew, G3WFF, in the January *TT*. The odd thing to him is that amateurs should *still* doubt the necessity of speech clipping in radio communications. He recalls that key references to professional work were quoted by G. M. Ward, G3BOB, in his highly interesting "New Techniques for Amateurs" (*Radio Communication*, September 1969, pp 594–600), particularly the three references 1, 2 and 5.

"FRENA, a system of speech transmission at high noise level" by F. de Jager and J. A. Greefkes (*Philips Technical Review*, 19, No 3, 1957–8, pp 73–103) includes a very readable account (in English) of the merits of infinitely-clipped ssb and the Frenac system. "Optimum compression of the dynamics of speech by means of amplitude limiting" by H. Rupp (*Nachrichtenstechnischen Zeitschrift*, 15, October 1962, pp 488–494) compares (unfortunately, in German) the relative effectiveness of rf clipping, audio clipping and compression. "Constant-level speech in ssb transmitters" by J. Daguet and K. Gilabert (*L'Onde Electrique*, XLI, No 410, May 1961, pp 498–509) gives (in French) much experimental data derived from experimental work on an infinitely-clipped ssb system.

G8ENN points out that this third paper contains some very relevant remarks: (free translation) "in the absence of noise, the reproduction of the operator's voice is slightly altered but the timbre of the voice, slightly modified, remains identifiable" and also "during telephone conversation the mean power emitted in infinitely-clipped ssb is 8dB greater than in normal ssb, but the real gain attributable to the clipping exceeds 11dB. The voice quality is practically unaltered in clipped ssb. In the presence of noise, infinitely-clipped ssb gives better intelligibility than normal ssb. The difference becomes more and more important as the noise level rises."

This means that a 10W fully-clipped transmission is approximately equal, in terms of received loudness, to an ordinary ssb transmission of 120W p.e.p., suggests G8ENN (but note that this assumes that no clipping is being introduced in the 120W transmitter by "flat-topping"—G3VA).

Some experiments with speech clipping

As a result of reading G3BOB's article and the above references, G8ENN recently determined to investigate further, with a lash-up "closed-circuit" ssb generator/demodulator at 455kHz, using Plessey SL600 devices, and a pair of ceramic ladder filters. The input signal came from a broadcast vhf/fm tuner and the clipping level could be varied while the clipped signal was being monitored on an oscilloscope. Even with infinite clipping the distortion of the announcer's voice remained acceptably low, certainly no worse than ordinary speech clipping using, say, 10dB of clipping. At lower levels the distortion was hard to detect though still very effective in raising average-to-peak voltage ratio of the ssb waveform, whereas the "loudness" of the demodulated signal varied dramatically from no clipping to full clipping. This experiment was enough to convince G8ENN that "ssb without rf clipping is an obsolete mode for serious communications."

He points out that clipping of a dsbsc waveform was clearly seen, as predictable, to have all the snags of both af and rf clipping in that audio harmonics are produced in the speech band, requiring the use of a high grade rf filter: the result, like af clipping but unlike ssb rf clipping, is the same as when the audio is clipped prior to modulation. On the other hand, ordinary af clipping in a.m. and fm systems can give an enormous increase in subjective loudness, and although audio distortion is higher than with rf clipping, the intelligibility remains high. This can be readily shown by connecting a simple "back-to-back diode" clipper between an fm tuner and a hi-fi system and gradually increasing the gain prior to the clipper.

G8ENN and his wife normally carry single-channel 144MHz transceivers in pocket and handbag respectively, on continuous stand-by. They emit 100mW of highly-clipped and filtered a.m. and provide impressive talk-power. Reports of R4 S2 have been received from reliable operators and the best dx has been 150 miles using a 6in long spring aerial. Despite the fact that the demodulated speech waveform looks like a square-wave, audio quality is perfectly acceptable for the purpose of keeping in touch—and as with any other clipping system one can always provide good quality speech by speaking farther from the microphone. Apart from questions of talk-power, a clipper and filter system, G8ENN is convinced, is essential in any a.m. or fm system to avoid overmodulation and over-deviation.

Richard Fusniak, G3TFX, writes "to add coal to the fire" by stressing the difference between speech compressors and speech clippers; he is constantly coming across evidence that many amateurs do not appreciate the difference. A clipped signal, he points out, has lost part of the waveform, and this can never be accurately restored, whereas "a compressor does not lose any of the basic information. He believes that providing a compressor "sounds good" and the attack and decay times as well as the frequency response have been optimized "the compressed signal will be more intelligible than a heavily-clipped signal in a noisy environment". It seems to me that the key point here is the attack and decay times which can be difficult to optimize, and I suspect that some readers would not agree too readily with this line of argument—however, we hope to return to some of G3TFX's suggestions on another occasion.

A valuable summary

But we cannot leave this subject without drawing attention to the article by Les Moxon, G6XN, "Performance of rf speech clippers" (*Ham Radio*, November 1972, pp 26–33) which goes into the whole subject from the amateur viewpoint very thoroughly, and is based on much practical experience. He draws attention, like G8ENN, to the French paper by Daguet and Gilabert, noting their reference to the value of rf clipping in increasing the signal-to-noise ratio of speech sounds such as "th" which are important for intelligibility but low in energy content and which may otherwise easily get submerged in the noise. He also notes that it has been clearly demonstrated that, in ordinary speech, intelligence is conveyed entirely by frequency and not by amplitude.

G6XN also draws attention to the fact that the use of two high-grade ssb filters is not ideal since these have a 3dB bandwidth of between 2 and 2·2kHz, and any signal passing through two such filters during transmission and possibly one or more similar filters in reception will inevitably lose some intelligibility. He believes that filters of a slightly relaxed "nose" specification should be used: in his own case,

Continued at foot of facing page.

MICROWAVES—1,000MHz and up

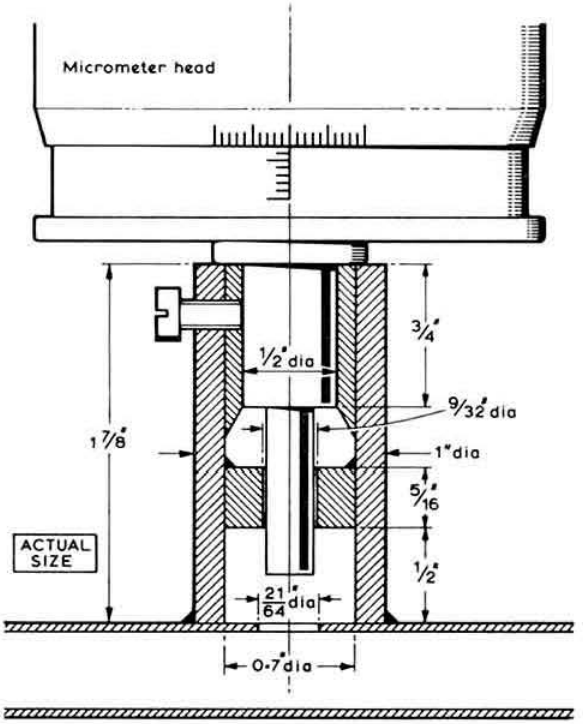
by DAIN EVANS, G3RPE*

A high-Q wavemeter for 3cm

The 3cm wavemeter described in the February column is particularly suitable for initial equipment as it is self-calibrating. It also has a relatively low Q, about 500, which makes it convenient to use when oscillators may have to be retuned perhaps several hundred megahertz to bring them into the amateur band. However, with advanced equipment, a more precise wavemeter is of advantage. The one described below has a Q in the region of 5,000, which corresponds to a resolution of about 1MHz, and can be calibrated to measure frequencies in the range 8 to 12GHz.

As is illustrated by the figure, the wavemeter consists of a resonant cavity 0·7in diameter and 0·5in long end-coupled to waveguide. It is tuned by the spindle of a standard micrometer head, the electrical position of the "cold" end of which is defined by a $\lambda/4$ choke. Fortunately the calibration is linear with frequency in the range 10–10·5GHz within about 1 per cent, the tuning rate measured being almost exactly 10MHz/0·01mm. If one accurate calibration point can be determined within this range, then a calibration for the remainder can be calculated without undue error. To take full advantage of the resolution of this wavemeter, a drum-type micrometer (such as Moore and Wright type 480M) can be used. Alternatively, a smaller micrometer such as type 952M may be employed, perhaps with a reduction drive and a directly calibrated scale.

The original wavemeters were made from 1in diameter brass bar which was drilled and reamed to produce a tube. The choke was made as a separate part. To assemble, a 0·7in drill was clamped vertically in a vise, and the wavemeter body was positioned on this to locate the choke correctly and held in place by the micrometer clamping screws. The choke was soldered into place, the joint checked visually, and then the waveguide was soldered. An accurately turned sleeve served to locate the micrometer head. Other methods of fabrication may be used, for example machining the body, choke and sleeve from a solid bar, provided that the internal dimensions quoted are adhered to. Alternatively, a flange



may be fabricated on the body of the wavemeter so that it can be bolted rather than soldered to the waveguide. In the original versions, only the micrometer spindle was plated (0·0002in copper or gold), although even this is not really necessary.

* 4 Upper Sales, Chaulden, Hemel Hempstead, Herts.

Technical Topics

Continued from facing page.

Yakumo Tusin Company of Tokyo provided filters modified to a 6dB bandwidth of 2·5kHz rather than 2·2kHz; such filters would in fact be cheaper than the conventional ones if there was sufficient demand.

I will not attempt to try and précis a long and detailed article, but I cannot refrain from quoting his final conclusions.

"Formal rf clipping provides the basic engineering advantage of establishing a much more definite peak signal level and is capable of providing a total increase in talk power of about two S-units with no adverse consequences. This requires about 20dB of clipping and observance of the following conditions:

(1) Use of filters designed for the job, filters correctly designed for conventional systems being unsuitable.

(2) Hard limiting with a dynamic range in excess of 20dB.

(3) Adequate precautions to ensure that *all* limiting takes place between the filters.

(4) Adequate carrier rejection *prior to the clipper*, as well as overall.

(5) The transmitter must have adequate *mean* power-handling capability.

(6) Operation of the final must be highly linear, and, in general, must have a higher peak power capability."

FOUR METRES AND DOWN

by JACK HUM, G5UM*

Keyboard currencies

We have it from G3YKB of Ealing that there are now 30-plus stations in the London area currently active on rtty, all within reliable communication range of each other on the southern calling channel of 144·6MHz. About 10 of them use autostart, ie unattended monitoring of the frequency. So it would help if telephony operators would be good enough to keep clear of "Point Six".

On this subject there is evidence, adds G3YKB, that some purchasers of ready-made senders do not check what frequencies are supplied with them (which is contrary to the terms of the licence anyway), and find themselves stuck with a 144·6MHz crystal, which is bad for them, clobbered by teleprinter, and bad for the rtty users, clobbered by speech.

There has been some comment that the GB2RS Sunday morning bulletin goes out on 145·3, the northern rtty calling channel, which indeed it does. Fortunately the elapsed time of the GB2RS bulletin is quite short (barely half an hour for both readings), which means that the inconvenience to rtty men is only minimal.

Important date for all keyboard men: Sunday 13 May, when from 1000-1600bst the annual 144MHz contest of the Mid Severn Valley Teleprinter Group will be on. RSGB general rules apply (see *Radio Communication* January 1973) except that Rule 9 says "Radioteleprinter only (the use of 50 baud speed is recommended)". In addition, the time of commencement of each contact must be stated. Enquiries to G3NUE should be accompanied by an sae. Entries to G3PWJ, Bob Fisher, 47 Elmhurst Drive, Kingswinford, Brierley Hill, Staffs.

Oscar 6 currencies

Some hard facts turned in by G3IOR of Norwich about how much (or little) erp is needed to access Oscar 6 may help slow down the rat-race which many observers feel is tending to gallop on to the satellite scene. Pat Gowen offers the reminder that AMSAT have established from flight experiments and pure mathematical logic that the maximum power needed is an erp of 100W, which can be 10W of rf fed to an aerial of 10dB gain. Only −130dBW at the Oscar receiver drives its 10m transmitter to full output (say 800mW) under single signal conditions. And 50W to a dipole at the ground station will do this, assuming average maximum slant range of 2,000 miles, 3dB polarization mismatch and the customary power and swr losses on 100ft of coaxial cable.

Efficient 2m transmitters but poor 10m receivers, it seems to G3IOR, cause operators to use more power than they need in order to hear their signals coming back. The result, he adds, is that ". . .the power sharing system of Oscar 6 ups the alc and chops down the gain drastically of those who are playing the game", thus goading them into increasing their power needlessly. Oscar's battery power is reduced as a consequence, and long inoperative periods result until the 6Ah NiCad cells recharge from the solar panels.

A low-angle aerial for horizon orbits plus a good 10m outboard rf stage such as a mosfet peaked at 29·5MHz, would enable people to work more stations because they could hear more, would permit longer periods of Oscar operation because of less battery clobbering, and would let "the other chap" work the dx as well.

From low angle to high angle, essential for those overhead passes. For these G3WPO of Burgess Hill recommends a 2m turnstile for sending and a 10m turnstile for reception, which give excellent coverage when the satellite is 40° up, or higher. And the circular polarization reduces Faraday QSB considerably. Height: as little as 25in for 146MHz and a bare 10ft for 29·5MHz. Tony Bailey, noting comments about the wider-than-expected bandwidth of Oscar, suggests this may simply be because the satellite receiver is flat for 100kHz, only −3dB down at 120kHz, −6dB at 150kHz and −10dB at 240kHz, which is a lot wider than the 100kHz translation spectrum. Input sensitivity is 2μV/m for full output in the 100kHz flat portion of the receiver bandwidth.

Extended range for GB3PI?

The RSGB has applied to the Ministry of Posts and Telecommunications to resite the GB3PI repeater station at an elevated location at Barkway in north Hertfordshire, about a dozen miles south of the present site down in the flatlands of central Cambridge.

If permission is granted for this move to be made, the range of GB3PI should be considerably extended, especially to the south, where radiation has been inhibited by this same Barkway ridge.

The GB3PI experiment is due to finish in August, when it will be possible to evaluate the results obtained both from the Pye Telecoms works and from the new site farther south. (If you are new to repeaters remember you access GB3PI on 145·15 and listen on 145·75MHz.)

Further to repeaters here is some news of Continental developments . . .

Euro-repeaters

In Germany about 70 repeaters are now operational on 2m, all to the national standard of 1·6MHz input-to-output spacing, and causing some controversy that this spacing is too wide. The newest repeater is DB0VR and conforms with IARU 600kHz separation, 145·325 in and 145·925 out, at Nordhalle-Sauerland, near Dortmund. Three others to the same standards are in the planning stage.

The potentiality of 70cm mobile-via-repeater is evident to the Swiss: they now have the following repeaters in service:

R70 431·05 to 438·65 at Vetliberg, HB9Z; Pilatus, HB9AA; Chaumont, HB9FG; and Basle, HB9B.

R74 431·15 to 438·75 also at several sites.

* Houghton-on-the-Hill, Leicester LE7 9JJ.

The 19th, at Whitton

Convention is next Saturday (and Sunday)

If dinner tickets required, apply *now!*

Diamond Jubilee VHF Convention '73, the nineteenth in the series, is this coming weekend, main proceedings on Saturday 7 April and a new discussion session on the Sunday morning 1000 till 1230.

Few dinner places are left for the evening (Dr John Westhead, of Pye, will be guest of honour), so if you intend to go to convention-and-dinner get your £2.25 in the post (with a 3p stamp) tonight. Better still, if you are within range of 35 Doughty Street, pay there. For dinner only the charge is £2. For convention only, 50p, and pay at the door if you wish.

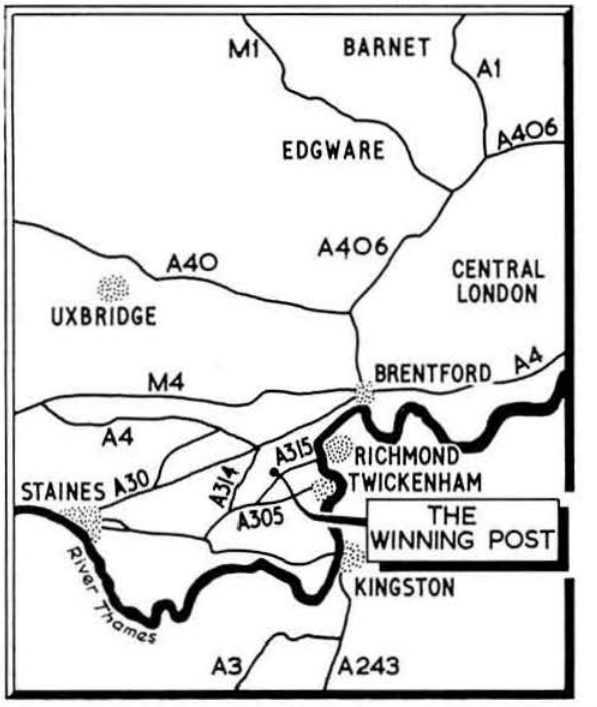
Afternoon lecture session features:
Barry Doel, G3SXK, on "The GB3PI story".
Dain Evans, G3RPE, on "Microwaves today".
Don Hayter, G3JHM, on "Some aspects of tv broadcast propagation".

VHF Manager Geoff Stone, G3FZL, will preside.

Constructors' Contest: bring your latest made-it-myself item. It might win you "The 1962 VHF Committee Trophy".

Bring and Buy: have a clear-out of unwanteds, bring them along to G8AXA, and see him after the show to collect your sale-money (or take home the unwanted unwanteds).

Raffle: you will need plenty of loose change for the G3BPT raffle at 1735 hours (but you might get a 70cm Yagi for free if your dinner ticket has the lucky number on it).



R76 431·20 to 438·80 at Santis, HB9CC; and Weissenstein, HB9BA.

These accord with the IARU separation of 7MHz (*Radio Communication* for July 1972 p 449 is useful re-reading in this context). Tone access is by 1,160, 1,435 or 1,595Hz according to station.

And on 2m the first Swiss repeater is now operational on 145·15 up channel and 145·75 down channel at Monte Generoso (EG06g), call HB9H.

Farther east the Czechs are testing OK0A, believed first linear repeater in Europe, on 145·1 to 145·7, bandwidth ±8kHz. They also have a conventional repeater on 145·225 re-radiating on 145·825MHz.

Further to Euro-metre-wave movements here is some bandplan news.

—and Euro-bandplans

France has adopted *in toto* the IARU Region 1 vhf bandplan agreed in Scheveningen last year. The F-men also propose to adopt forthwith the suggestion that ssb should be zoned 144·15 to 144·250MHz. How this will work out in practice remains to be seen, in the light of the fact that the IARU recommended centre frequency for A3J is still 145·41. Even so, it would be no bad thing to ensure that your ssb equipment is viable for the low end of 2m (you ought also to be able to push it down to 144 if you want to use it on A1).

The Italians, too, propose to use 144·15 to 144·25 for sideband, observing a dx spot channel on 145·4MHz. They will adopt the IARU bandplan on 1 July 1973, extending it by nominating channels (0–80) every 25kHz of the 144–146MHz band. The segment 144·25 to 144·99 is scheduled for a.m. phone, and the segment 145 to 145·9 for fm.

In Holland the Region 1 plan has been adopted, but fm channelling continues on a town-by-town basis, eg Amsterdam 144·48, Rotterdam 145·6, The Hague 144·8 and Utrecht 144·7; worth knowing if you intend to motor in the Netherlands this summer and want to know which crystals to take.

Contest commentary

Do the standard RSGB metre-wave contest rules stack the cards too heavily against the average 70cm operator? Harold Turner, G8VN, of Derby, as he compiled his entry for the recent 432MHz Cumulatives, began to think they do. And perhaps in the light of the fact that 70cm is a shorter range band than 2m or 4m there might be a case for varying them in this instance. He says: "I suggest it would give more encouragement to people if the points awarded went up in 5km steps up to 50km, that is, one point for every 5km up to 50km. Above 50km one point for every 10km."

His neighbour G8CYW offers the ingenious suggestion that points scored by distance could be divided by a figure proportional to aerial height asl times aerial gain in decibels times input in watts, or something along similar lines. We can see adjudication problems here for the already hardworked VHF Contests Committee, and anyway if you make the scoring system too difficult fewer people will bother to enter . . . even so, what do other 70 centimentalists think?

The heavy occupancy of 2m during the double event of

KEEP MOBILE CALLING CHANNELS CLEAR

National mobile calling channel (all modes) is 145·00; and for fm is 144·48. Please move off them when communication is established, to leave them clear for others. Fixed stations in particular: be good enough to keep off both channels.

3-4 March (at least one Welsh portable was said to have worked over 500 stations) belied an undercurrent of dissatisfaction that two bands were involved. It was necessary to decide whether to go in for the Sunday fixed station event and no 70cm or the 24-hour event *with* 70cm. Even the bonus multiplier of six for 432MHz contacts failed to draw many on to "the next band up" when comparable points could easily be collected on 2m from the hordes of stations available. "Was there ever a dafter arrangement?" chides G3NHE. And from the south west G2WS declares "I shall not submit entries for any more combined 144/432MHz events, and I find many vhf men in this part of the country share my views". Bill Scarr adds that he is much in favour of a cw-only event for 432MHz, and believes it might ". . .shake some of the B-licensees out of their apathy and show them what they are missing by not facing up to the morse test".

On contest procedure generally, another word from G3NHE of Sheffield: Martin Dann respects the spirited defence of the practice of working more than one station at a time in contests (see *Your opinion*, March 1973, letter by G4AHN and G8CKZ). Although agreeing that highly-organized contest groups must use every means within the rules to garner as many QSOs as possible as quickly as possible, he, like many other contestants who participate primarily for enjoyment, wonders if slick operating can be carried too far. If the rules are not modified to forbid multi-contacts, he feels that at least QRA and QTH should be spelt out *separately* to the "multis" instead of polishing off the lot with one message, addressed to all.

The 23cm dish used for e-m-e work by G3LTF at Chelmsford. Built about two years ago, it uses ¼in diameter mesh and weighs about 2cwt. The circularly-polarized circular guide feed shown gives good beam concentration: the drop off at the dish edge is —10dB

Beyond the horizon (or the dx clip)

Monitor the telegraphy end of 2m and catch fleeting auroras when they manifest themselves. That there was tone-A about on 21 February became evident to G3IPV of Norwich when OZ1OF was logged at 2215gmt, quickly followed by DK5QK and LA7QI, both beaming north to the aurora source, as their "A" notes testified. So was GM2DRD, who seemed to be working plenty.

For G3LTF, at Chelmsford, the aurora started at 2325gmt and lasted for about 75min. Among several Scottish and Scandinavian stations heard or worked on 144MHz was SM4EBI at almost 800 miles (Peter Blair was his first G ever). Next day, 22 February, a hint that Tone A might again occur came when Meldrum TV sound went auroral just before 1900gmt. Then 2m went auroral (quick QSO with GM3UAG) and simultaneously a sharp increase in the auroral characteristic of Meldrum was noted.

In South Wales a curiosity was that GW3WRE in "the world's worst vhf location" among the Welsh mountains had GM3UAG at RST56A when GW3ZTH only five miles away could not hear the signal from Aberdeenshire. Resisting the temptation to throw away his converter, GW3ZTH pressed on and was rewarded with contacts with both 'UAG and GM3ZVB in Edinburgh. With Joe Ludlow the auroral starting and finishing times coincided exactly with those reported by Peter Blair. He describes the sound of the February manifestation as not quite the usual buzz-saw but rather ". . . as though the bfo had been switched off. The auroral effect came and went several times before finally disappearing".

As for LA-men, we remarked last month that when 2m is wide open and everybody can work Norway the news value is minimal. But here is an exception to the general rule:

Last summer LA9T worked so many East Anglian stations that it seemed likely he would rate for the "Norfolk and Suffolk Award", offered by the Lowestoft club. A copy of his log was obtained and it was indeed true. Now, Ken Dawson, G3XSK, tells us, the certificate is on the wall at LA9T, and the usual small charge for it made to claimants was paid by the Lowestoft club in this instance.

There is a moral in the story, and it is an obvious one: much more vhf activity exists in East Anglia than the generality of operators on the London-Birmingham-Manchester axis may believe. "Turn your beams this way more often!" urges G3XSK.

Can the UK-to-Cyprus path be broken down on 70MHz this year? Patient vigil kept last year by G2DN of Purley in Surrey failed to produce any signs of G3FET/ZC4, although at both ends much dx broadcast was in evidence on the band. The tests continue, and 'FET monitors 4m most Sunday mornings for weak cw from these islands.

The 6m beacon on Cyprus was heard in Capetown last November. G2DN would like to see (and hear) it beamed on the UK. It might be an indicator of potential 4m openings.

The NRL 50th Anniversary moonbounce tests were crowned with success. In all, 12 stations were heard in six different countries, 11 on the key and one voice. Further listening watches were scheduled for 31 March and 1 April on 23cm, 70cm and 2m. From Melbourne comes news from Bob Arnold, VK3ZBB, that in mid-February VK3AKC worked into North America by e-m-e, this on 1,296MHz.

Adding to his already formidable stock of metre-wave propagation info, BRS15744 of Sussex has started a project, to run for a year, involving the comparison of beacons GB3GW and GB3DM with the current barometric pressure and other meteorological parameters, three times every day. Already in the first two months of observations the chart traces clearly show that the weak dx signals increase in strength just before a change in pressure is due.

The regular observations which Ron Ham makes in other areas of vhf propagation go out over GB2RS most Sundays. These are well worth watching, as clues to impending auroral or other dx possibilities are often given.

Beacon news

Most RSGB beacons radiate from electronically-orientated sites such as professional transmitting stations or technical colleges. Not so GB3GI, which is installed in the egg-packing compartment of a hen battery house. There are good reasons for this unique site: it happens to be 610ft up, the farmer-occupant is a brother-in-law of GI3TLT (he and GI3SUM are beacon keepers), and in particular the take-off to the NE and SE to which the 4-el beams are directed is excellent. To each beam 6W of rf is fed at 145·990MHz, interrupted by a mechanical keyer built by GI3KYP.

Later it is hoped the present valve transmitter will be replaced with an all-transistor one complete with G8AZU non-mechanical keyer.

Hugh Irvine, GI3TLT, tells us that many RSGB groups and clubs have donated cash to the Bangor ARS to help pay for the beacon's running costs. There is much enthusiasm east of the Irish sea that GI shall continue to be GO.

Tech corner

From BRS33404 (K. H. Smith, 37 Lonsdale Drive, Enfield, Middlesex)

I see from *FMD* (December and January) that interest is being shown in the Mullard ELC1043 uhf television tuner adapted for reception of 70cm amateur television. I was involved to some extent in the design of this tuner, and it occurs to me that there are a few points relating to this conversion which if attended to could lead to better results being obtained when a Channel 1 television receiver is used as the i.f. strip.

The tuner was designed to cover 468-850MHz for a mid-band i.f. of 35MHz. Because the i.f. coil is tunable from 32-37MHz it cannot be correctly tuned to the Channel 1 frequency (42-45MHz). Furthermore, to obtain an i.f. output of 45MHz the oscillator frequency, operating higher than the signal circuit frequency, needs to be increased with respect to the latter.

The i.f. coil will tune correctly to Channel 1 if four turns are removed from the winding. If the tuner is connected to the tv set with 12in of coaxial cable (capacitance, say, 20pF), and assuming an input impedance of approximately 75Ω, the i.f. bandwidth of the coupling circuit becomes 10MHz at 2dB and 5·5MHz at 1dB, which is reasonably adequate for 405-line video.

It is possible to change the oscillator frequency, and thus peak the output at 45MHz, by careful adjustment to the right loop within the ELC1043 tuner box, an involved operation of which I will give details if required. Correctly tuning the i.f. to 45MHz and adjusting the oscillator frequency will result in a gain increase of nearly 6dB.

VHF BEACON STATIONS

Callsign	Location	Nominal frequency	Emission	Aerial direction
GB3ANG	Angus	145·95MHz	A1	SSE
GB3CTC	Redruth, Cornwall	144·13MHz	A1	ENE
GB3DM	Burnhope, Co Durham	145·975MHz	F1	N/S
GB3GI	Bangor	145·99MHz	A1	NE/SE
GB3GW	Swansea	144·25MHz	A1	ENE
GB3GM	Thurso	145·995MHz	A1	S
GB3LDN	S. London	1,297·950MHz	F1	E/NW
GB3SC	Sutton Coldfield	433·50MHz	F1	N/S
GB3SU	Sheffield (temporary location)	70·695MHz	A1/F1*	Omni
GB3SX	Crowborough	70·699MHz	A1	N
GB3VHF	Wrotham, Kent	144·500MHz	F1	NW

* Callsign on F1 continuously, on A1 once a minute. When on A1, F1 is suppressed.

Two further points worth mentioning are:

(1) With the varicap voltage near zero, in order to tune as low as 435MHz the slope of the oscillator frequency with respect to applied tuning voltage is almost at a maximum. Typically, if the dc voltage is varied by 15mV the oscillator frequency changes by 0·5MHz. Hence the dc tuning voltage to the varicap diodes must be very well stabilized.

(2) No permanent external connection should be made to the test point at pin 9 otherwise the oscillator radiation will exceed the permitted limit.

Here and there

Still the complaints come in of fixed-station hogging of the mobile calling channel of 145MHz, especially in the London area. There is only one word for it: *antisocial.*

A suggestion to the VHF Committee from G8CUT of Chelmsford: institute a new special award on 4m, 2m and 70cm "... to help to activate the once-in-a-blue-moon counties". Other opinions, please!

Further to specialist groups, the London FM-ers' first convention at Weybridge on 24 February drew 150-plus enthusiasts, and much practical tech-lore was exchanged and imparted. At the agm the same day G8AAI and G5AGX were re-appointed chairman and sec respectively, with G3UFU treasurer (sub is £2 pa).

If you have a young friend "who likes listening to the police, fire or ambulance signals on vhf", remind him it is illegal. If need be, invite his attention to the case last month when a motorist was fined £10 on two charges of doing just this, and what is more, had his appeal dismissed (*The Times* Law Report, 6 March).

The first meeting of the new Midlands Branch of the BATC was held on 26 February. Video men in the region who wish further information will find the branch chairman Arthur Bevington, G6AFV/T, also known as G5KS, a very helpful and enthusiastic person to contact.

25 YEARS BACK

"There exists already a considerable amount of interest in the soon-to-be-released two metre band . . . without exception all correspondents agree with the undesirability of the super-regenerative receiver plus modulated oscillator technique being employed . . ." G2UJ in an article "The Two Metre Band", *RSGB Bulletin*, April 1948.

THE MONTH ON THE AIR

by JOHN ALLAWAY, G3FKM*

READERS will note from remarks made later in *MOTA* that the separate phone DXCC certificate is to be eliminated. A few minutes tuning around on the 14MHz band when the recent Spratly Is dxpedition was being received in Europe provided ample justification for such a decision by ARRL. Wide areas of the band were completely blocked by ssb callers, many of whom appeared to have little idea of what was happening—some to the extent of calling "CQ Spratly Is" on the expedition's frequency. The same number of stations using cw would have occupied far less space and created less splatter, and the now apparently inevitable group of stations insulting each other on the dx station's frequency would not have been *quite* so evident!

No one has so far admitted ownership of a ZB2RE award. Your scribe would appreciate any information which would help several correspondents to obtain their copies.

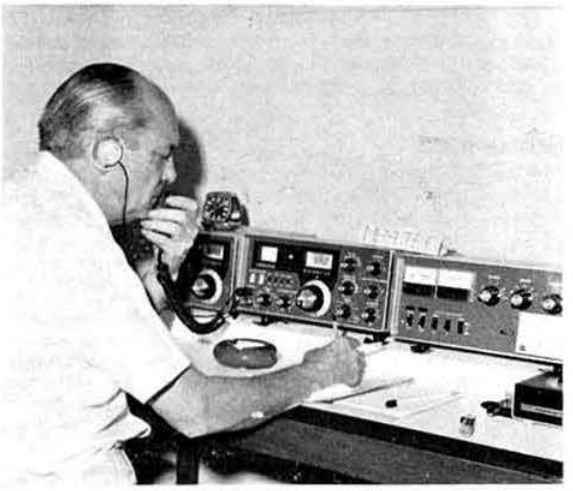
News from overseas

G8GRH is in St Kitts and on the air as VP2KH. He is particularly interested in rtty and claims to be the first station in the Caribbean to use that mode. Hours of operation are usually 2130 to 2300 on 14MHz, 2300 to 0200 on 7MHz, and 0200 to 0400 on 3·5MHz. At weekends he is to be found most of the day on 21MHz ssb. Requests for skeds are invited and should be sent to the address in *QTH Corner*. QSLs are sent direct airmail on receipt of three IRCs. VP2KH may also be found on 14,190kHz around 1100.

DX-pedition of the Month Bulletin 2/72 lists the following as currently active stations for whom DOTM acts as QSL manager: CN8HD, CR5SP, CX2CO, C21DC, C21DR, DJ0VB, FM7WF, HK0AI, HM1AJ, HP1IE, HS2AGP, IP1MOL, IP1RB, IP1RBJ, KV4FZ, LA1H, LU1AZO, OY7ML, PY2PA, PY2PE, VE1ASJ, VE8RCS, VK3BM, VK3CIF, VK9JK, VK9XI, VK9XK, VK9XW, VK9XX, VP7NY, VP8JV, VP9GR, VS6DO, VS6DR, W4EXI/P, W9OIJ/P, XE1IIJ, ZS6IW and 9Y4VT. All these may be applied for via PO Box 7388, Newark, NJ, 07107, USA.

In a letter to your scribe, WB2OZW points out the great benefit that has resulted from the opening of 3,775 to 3,800kHz to Extra Class licensees. Paul praises the Canadians for their tolerance and help, and also gives great credit to G2YX, G3PCG, G3TJW, G3ZAY, G3ZPW, G3ZYY, G4AKC and others whom he says do a great deal to help those with weaker signals. Deliberate interference seems to be a problem on the other side of the Atlantic too.

BRS17567 has kindly passed on a letter from VK3FF, who is acting as QSL manager for VK0WW on Macquarie Is. VK3FF has moved, and although letters sent to the address given in March *QTH Corner* will reach him, his new address is given this month. All cards (including those from listeners) will be answered within 48 hours of receipt. Airmail postage from VK to most of western Europe is 35c—the equivalent of four IRCs, and Phil will also accept mint postage stamps to the value of 35c (USA) or 17p from any of the following countries: CT, Germany, EA, EI, F, the UK, HB, I, LA, OE, ON, OX, OY, OZ, PA, SM, SV, the USSR, ZB2, 5B4 and 9H. All times must be in gmt and listeners must report the station being worked. VK3FF was formerly VK0PF and still has his logs and QSL cards.



Tom Cheesley, MP4TEE

Tom Cheesley, MP4TEE (see photo), is having difficulties caused by deliberate interference, particularly when he is attempting to work into the UK. Tom reports that the Arabian Knights Net meets twice on Fridays—at 0600 and 1300 on 14,280kHz, the latter session being intended for VK/ZL check-ins. The number of Arab stations supporting the net seems to be dwindling and it may cease if the present interference from Europe and the USSR does not lessen. MP4TEE has now worked nearly 200 countries in five months, and has another 18 months to go in Abu Dhabi.

DX news

O Y-arin mentions that OY3KT and OY9CM are currently the most active pirate OY calls and have been so for a couple of years—please save QSLs by not sending cards for "contacts" with these two.

ARRL have decided to cease issuing a separate telephony DXCC as from 1 September 1973. From that date there will only be one certificate regardless of mode.

XG1G was the callsign used by XE1J to celebrate the 450th anniversary of Colima. Stations in Panama were heard using 3E prefixes during February, this was to mark the occasion of the 7th Bolivarian Games being held in Panama City. IV5VEC and IV5PLR were two of the special stations on the air during the Viareggio and Versalia carnivals.

Stations on Ascension Is will use callsigns in the ZD80A–ZD80Q during the period 27 May to 2 June to celebrate Ascension day. A special QSL will be available to those who contact two of the special stations.

* 10 Knightlow Road, Birmingham B17 8QB.

VP8MH is on the air now from S Orkney. According to the *West Coast DX Bulletin*, VP8ME has said that a licence has been issued for use in the S Sandwich Is but no details are known. The same news-sheet says that VQ9HCS is leaving Aldabra in mid-March and may visit Astove Atoll or Farquhar Is.

A special certificate—the Diplome du Carnaval—is available to those who contacted five Martinique stations during the period 3–7 March. Send log copy and six IRCs to FM7AN, L. Larrieu, BP 662, 97200 Fort-de-France, Martinique.

The Camel Drivers RC meets on Saturdays and Sundays at 1230 on 14,285kHz. The club station is YA0CDRC, and YA1AH acts as net control station. A special award is available to those who contact members (see *Awards*).

Two stations claiming to be in Turkey have been reported. TA1KT has been worked on ssb, and TA1UA on cw. The former asks for QSLs via K4IEX, but the latter gives a direct address and it might be recalled that it may be unwise to mention amateur radio on any correspondence sent there.

VR6TC is now back on Pitcairn Is and has found a very large number of QSLs waiting for his attention. He estimates that the backlog may take him several months to clear.

According to the *West Coast DX Bulletin*, W6KNH keeps a regular schedule with 5W1AU and ZK1MA on 14,240kHz at 1700 on Tuesdays. Callers are welcome *after* the business in hand has been dealt with.

The USSR Antarctic bases have now been allocated callsigns with 4K1 prefixes and are as follows: 4K1A = Molodezhnaya, 4K1B = Mirny, 4K1C = Vostok, 4K1D = Novolazareskaya, 4K1F = Bellinghausen, 4K1G = Leningradskaya and 4K1H = Russkaya.

Top band news

No news of holders of 160m WACs other than those listed in January issue have been received to date. EP2BQ received the first WAC for Asia in December last (he also obtained the first 5BDXCC for Asia—in 1971). PZ1AH has had his callsign pirated on the band but was without a transmitter at the time of writing. W2EQS reports that more than 50 countries were active during the CQ 160m contest, and KV4FZ's DXCC score now stands at 96 countries worked—at this rate he could become the first station outside the USA to acquire a 160m DXCC (W1BB holds the only one so far).

VK6HD reports a most successful season during which he has worked GW3YGH, GM3YCB, G3ZEM, GM3IGW/A, G4AKY, 4W1AE, OKs, W4, 5, 6, 7, 8, 9 and 0, and several JAs. He has heard 5Z4KL and VK3ABR. Mick says that conditions have now deteriorated towards Europe and that he will try again in the May to July period.

Peter Malon, G4BLF, one of Britain's youngest licensed amateurs, became interested in amateur radio two years ago and thanks to help from Hull ARC received his licence in September 1972

Dxpeditions

Unconfirmed reports have been received of further activity from Mt Athos due to take place from 21 April to 1 May This time all bands will be used and both cw and ssb.

5Z4KL is said to be still trying to visit Juan de Nova before returning home from Kenya in June, and may be able to do so around Easter time.

FL8OM (who has recently operated as FL8OM/4W1) says that his home is located very near to the border with Somalia and that he has applied for a 6O1 licence.

Contests

In the **1972 ARRL International DX Competition** UK scores were as follows:

PHONE SECTION

C/Sign	Points	C/Sign	Points	C/Sign	Points
G3TJW	**1,334,160**	**GC3ZIP**	**76,272**	**G4ANT**	**3,079,092**
G2QT	1,214,400	GC3YIZ	28,560	(Multi-op)	
G3ZBA	908,010	G3YWI	13,020	G4ALE	1,105,344
GW3NWV	**899,406**	G5AWX	8,436	G3FVA	82,134
G3YHB	291,042	**GM5AXO**	**1,740**		

CW SECTION

C/Sign	Points	C/Sign	Points	C/Sign	Points
GW3JI	**808,974**	G3APN	170,847	**G4ALE**	**1,247,256**
G2QT	**785,400**	GW3SYL	125,820	(Multi-op)	
G3KMA	658,368	G2AJB	49,350	G3YCT	508,458
G2DC	521,136	**GM5AXO**	**35,532**	**GW3UCB**	**45**
G3TXF	177,708	G3CWL	3,465		

The PACC Contest

1200 28 April to 1800 29 April.

All bands 1·8 to 28MHz. CW and phone but not cross-mode, each station may only be worked once per band. Exchange RS/T plus serial number (from 001). PA/PI/PE stations will also indicate their province. Each contact counts three points and the final score is the total QSO points multiplied by the number of provinces contacted on each band added together (maximum being 72). Logs should show date, time, station worked, province, if multiplier, number sent and received, points, and should be sent (before 30 June) to Mr L. v. d. Nadort, PA0LOU, Bospolderstraat 15, Nieuwerkerk a/d IJssel, Netherlands. Listeners may take part—each PA/PI/PE station logged counts one point and logs should indicate date, time, station, code group given by him, band, station being worked, points claimed.

In the 1972 event UK scores were as follows: **GM3KLA (5,112 points)**, **GC2LU** (2,431), GM3ZRT (2,016), GM3YOR (1,302), **G4ACQ** (1,284), G3XSK (459), and **GC3YIZ** (390).

The Second County Hunters SSB Contest

2200 13 April to 0500 16 April.

This is a phone only contest, the object of which is to contact as many USA counties as possible. Stations may only be worked once (mobiles from each county) and RS, QSO number, and county/country should be exchanged. Contacts with fixed stations count one point, with mobiles five points.

Summary and log sheets are available from WA0ZCQ, 6004 NW 68th Terr, Kansas City, Mo, 64151, USA. Logs go to the same address and must arrive by 1 June.

The Helvetia 22 Contest

1500 5 May to 1700 6 May.

Phone and cw, all bands 1·8 to 28MHz. Same station may be worked on each band/mode for points. Exchange RS(T) and serial QSO number (from 001). Each contact counts three points and the multiplier is the total number of cantons worked on each band added together. Indicate the usual data in logs and show each canton worked for the first time on each band. Include a summary sheet and submit to USKA Traffic Mgr, HB9AHA, im Moos, 5707 Seengen, Switzerland, within 30 days. This contest is an excellent way to obtain credits for the beautiful Helvetia XXII Award.

USSR callsigns

Considerable confusion still exists over the identification of stations in the second and eighth call areas in the Soviet Union. Individual stations licensed before 1970 still use the UA2, UC, UP, UQ, UR, UH, UI, UJ, UM series of prefixes, but club stations and post-1969 individual stations have suffixes UK2 or UK8 respectively for the two call areas. The first letter of the *suffix* now indicates which republic the station is located in, and this may be identified from the following list:

Kaliningrad	—UK2F.	Turkoman	—UK8H.
White Russia	—UK2s A, C, I, L, O, S and W.	Uzbek	—UK8A, C, D, F, G, I, L, O, T, U and Z.
Lithuania	—UK2B and P.		
Latvia	—UK2G and Q.	Tadzhik	—UK8J and R.
Estonia	—UK2R and T.	Kirghiz	—UK8M and N.

VHF (28MHz and above) individual stations use prefixes in the RA, RB etc series.

Awards

The Marconi—Kemp Award

To the end of January the Barry College of Further Education Radio Society had received 40 applications for this attractive award. Available in three classes, with a special star award for cw operators, this award is presented to stations working 10 Italian stations, 10 British stations and a maximum of five special commemorative stations, operating periodically throughout the world. The award is printed in English and Italian.

The qualifying period for this award is from May 1972 to 31 May 1973. Full details and list of commemorative stations available from the secretary, Barry CoFE Radio Society, Colcot Road, Barry, Glamorgan, CF6 8YJ.

The Camel Drivers RC Award

For contacts with (or confirmed listener reports from) 10 club members since 1 May 1969. At least half must have been outside the applicant's own continent. Send certified list of QSLs with 10 IRCs to DK5AR, W. Renner, D-3400 Goettingen, Friedensstr 25, Germany. (Lists of members may be obtained by sending one IRC).

Odds and ends

Latest news from G3LP concerning his daily 3·5MHz cw schedules with ZL4IE is that on 11 February the wonderful score of 500 days worked since 29 August 1971 was reached! Missed days have been due to holidays and only four are thought to have been due to conditions (G3LP feels that contact may have been possible even on these in view of more recent knowledge).

G3ZZR is being pirated by GM3ZZR/A, who says he is in Dundee and is called Archie. G4BBA is also having his callsign used by an unauthorized person on 1·8MHz a.m.—this one says that he is Will in Slough, and in fact is loud in west London.

DA2XU reports that suitable rubber stamps for confirming contacts by stamping incoming cards and returning them to sender are available from John Meerloo & Sons Ltd, Three Colts Lane, London, E2.

GM4AZC is studying in Southampton and is therefore only active during his vacations. So far he has only been on 1·8 and 3·5MHz using A1 and A3. However, his call is being pirated. He hopes to be on all bands soon.

G3LIV is on sstv with a home-built monitor and would like to hear from anyone who has built the monitor described in the BATC booklet. He contacted OX3SL on 20 January 1973 and wonders whether this is the first G/OX sstv contact.

G3EPU is being greatly troubled by a pirate using his callsign. This individual calls himself Ken and has been active on all modes and most bands since 1966. G3EPU has been off the air for two years and before that only used a.m. on 1·8, 28 and 144MHz. A further note will appear in *MOTA* when the real G3EPU becomes active again.

G3RFG recently contacted W5BSR who said that he is 83 years old. Stan would be interested to know who is the oldest licensed amateur in the world.

A new net—the "Zulu-Zulu Net"—has been formed for holders of G3ZZ callsigns. It meets on the first day of each month at 2000 on 3,725kHz.

G3ZZZ's callsign is being used by a pirate on 160m cw—the real G3ZZZ has no equipment for this band.

G6YL has received news from VU2JA (Joe Faithful, 20 Cubbon Rd, Bangalore 5600001) that Indian amateurs are now allowed to operate between 3,650 and 3,700kHz. Joe has heard UK stations and is on 3,650kHz at 0030 most days calling CQ and hoping for European replies.

Band reports

Very poor conditions on the hf bands have been reported by all who wrote to your scribe in the past few weeks. The *West Coast DX Bulletin's* sunspot report said that the month began with no spots visible, but that three appeared in the middle of the month, two of these disappearing on the 21st.

Many thanks to the following for sending in logs from which this section has been compiled: G2HKU, G3HB, G5JL, G6GH, G3s GVV, NKQ, YOB, BRSs 2098, 17567, 31301, As 7511, 7785 and 8113.

Stations listed in italics were using cw, the others ssb.

3·5MHz. 0000 *UJ8JBR*, VP2MY (QSL to W1IXL), 6W8AL, 9Y4T. **0100** ZF1GC. **0600** FL8FT, KP4ARW/HI8, TU2DO, YS1RFS. **0700** LG5LG, *VR1AA*, YN9MQ, *ZL3KK/C*. **0800** *CT3AS*, ZLs, 3E1MN (Panama). **1700** ZL2BT, 4X4OC. **2000** 1S1A, 5X5NK. **2100** A2CCY, DU1EJ, EP2FB, JY9GR, ZS2MI, 5Z4KL. **2200** FL8OM/4W1, HS5AFJ, VP2s LI, SAF, VQ9R. **2300** M1I, PJ7ARI.

7MHz. 0000 HR8BD. **0500** *EL2DO*. **0700** *KL7HBT*, *VK5CX*, WA7NIN (Nevada), ZL4HJ. **2000** A4FE. **2200** CO8RCB, *CR4BS*, *VK6SA*, *VP9HH*, *5T5FP*, *9G1HE*. **2300** *OX3WQ*, ZS2MI, *5R8BD*.

QTH Corner

CR8AG	via CT1SH, Dr J. M. Costa Reis, Rua Prof Sousa da Camara 151-R/C-E, Lisbon, Portugal.
CN8BO	via K7VAT, G. N. Gompf, 616 Utah Av, Libby, Mont, 59923, USA.
FG0GE	R. W. Little, BP 63, Marigot, Guadeloupe, French West Indies.
FL8OM/4W	via DJ1TC, O. Blankenhorn, Sophienstr 178, 7500 Karlsruhe, Germany.
IT9GCO	PO Box 11, 93100 Caltanisetta, Sicily.
JD1AHC	via JA8AWH, Y. Shiya, 1682 Kawazoe, Sapporo, Japan.
JY9GR	via DK4PP, K. Pinger, Neue Wilhelmstr 1, 5450 Neuwied 21, Germany.
K4VMA/VP7	D. Baird, AUTEC, Box 47, FPO New York, 09559, USA.
M1I	via I0BNZ, R. Carignano, V Silvestr 221, 00164, Rome, Italy.
OH0MA	K. E. Eriksson, SF-22430, Saltvik, Finland
OK5KBB	via OK3CIB, C. Malis, Obrancov Mieru 7/7, Ziar N/Hronom, Czechoslovakia.
TA1KT	via K4IEX, R. Beatty, 11 Heritage Cove Ct, Casselberry, Fla, 32707, USA.
TA1UA	Box 699, Karakoy, Istanbul, Turkey.
TL8LI	Elein Duchenchoy, 10 Rue Meridinne, Rouen 76, France.
TY3ABF	via DL8OA, A. Stabusch, Holbeinstr 5, 2000 Hamburg 52, Germany.
ex-VK0PF	(see VK0WW).
VK0WW	**(correction)** VK3FF, 34 Lilian Parade, Eltham, Vic. 3095, Australia.
VP2KH	S. T. May, Box 184, Basseterre, St Kitts, West Indies.
ex-VP8LZ	G. Kennedy (as below).
ex-VP8MF	Mrs B. A. Kennedy, The Bungalow, Radio & Space Field Station, Chilbolton, Stockbridge, Hants.
YB9ABH	30-P River Valley Close. Singapore 9.
ZF1FOC	PO Box 845, Miami, Fla, USA 32754.
ZF1JA	c/o C & W (WI) Ltd, PO Box 293, Georgetown, Grand Cayman, BWI.
5Z4NM	DJ3YU, K. Fritsch, Langenhainerstr 26, 6000 Frankfurt Main, Germany.
6Y5DB	via VE3EDC, J. W. Roberts, 162 Ruttan St, Thunder Bay, Ont, Canada.
9G1HE	via VE3FCL, N. R. Whitton, RR2, Copetown, Ont, Canada.
9X5NA	via W7LFA, N. G. Ray, 14005 132nd Av NE, Kirkind, Wash, 98033, USA.
9X5QC	Box 396, Kigali, Rwanda.

RSGB QSL Bureau, Bromley, Kent, BR7 2NH

14MHz. **0600** MP4TEE. **0700** A4FB. **0800** KC4USA, 9M8WUW. **0900** KL7GCK, YK1AA. **1000** *EA8URE*. **1200** VK2, VK3, VK4. **1500** VK6, WA1RDH/VQ9, 9N1MM. **1600** HV3SJ, VUs. **1700** G3VBK/MM (off 9L1), TU2DB, VP2AA, ZS2MI, 4S7AS. **1800** EA9AI, EA9EJ (Sp Sahara), JX1AK, KH6BB, 4W1BC, 5Y4XNT. **2000** CR3BS, CT3AR, ZD9GC (QSL via ZS6XO). **2100** FG7TD, JY9VO, VP8s FL, JV, XT2AK, ZF1NR. **2200** CE, LU, PY, VP2AA, 9Y4VV. **2300** EL2CP, ZP5ML.

21MHz. **0700** EP2SP. **0800** XT2AB. **0900** JAs, JT1MAC, JY6UMM, *KG6s AAY*, *JBS*, VQ9HCS, 3B8CV, 4W1BC. **1000** A4FE, *UA0YT* (zone 13), VQ9R, *XW8BP*, ZD3M, 9G1BS, *9L1JT*. **1100** M1C, ZD8MH, ZS2MI, 5B4AK, 9M2DQ. **1200** A2CCY, EA9EA, HS4AFD, TY3ABF, VK6s, ZB2CO, 8R1J, 9N1MM. **1300** VP8FL, YB1OR, 5R8BF, *5Z4NM*. **1400** HC2HM, *4W1BC*, 6J9WA (?), 7P8s AC, AD (QSL to VE2JH). **1500** FL8AG, SU1MA, VQ9NEW, WA1RDH/VQ9, *5T5CJ*. **1600** *ZF1FOC*, 3B8CI, *5R8AG*, **1700** CR5SP, W6/W7s, XT2AE, **1800** CR3KD, VP1BH, VQ9HCS. **1900** HRs, YVs. **2000** OAs, PYs.

28MHz. **0900** *ZM1HV*. **1100** CR4BS, ST2SA. **1200** *CR6OZ*, *EA8URE*, ZC4HC, *9J2XZ*, 9E3USA. **1300** CP1FG/6, CR6s, CXs, LUs, 9J2s, VP2LI, ZD7JV. **1600** TU2DD.

Many thanks to all correspondents, and especially to the authors of the following for information obtained from them: **Long Skip** (*Nick Sawchuk*), the **West Coast DX Bulletin** (*WA6AUD*), the **Ex-G Radio Club Bulletin** (*W3HQO*), **DX'press** (*PA0INA/PA0TO*), **DX News Sheet** (*Geoff Watts*), the **29 DX Club Newsletter** (*VK6JR*), **QUAX** (*G3DME*), the **DX'ers Magazine** (*W4BPD*), and **NARS Newsletter** (*5N2ABG*).

Please send all items for **May** issue **to reach G3FKM** no later than **2 April,** and for **June** issue by **7 May.** Please remember that these are *positively the last dates* on which information can be used for the issues specified—that which arrives earlier is doubly welcome!

Propagation Predictions

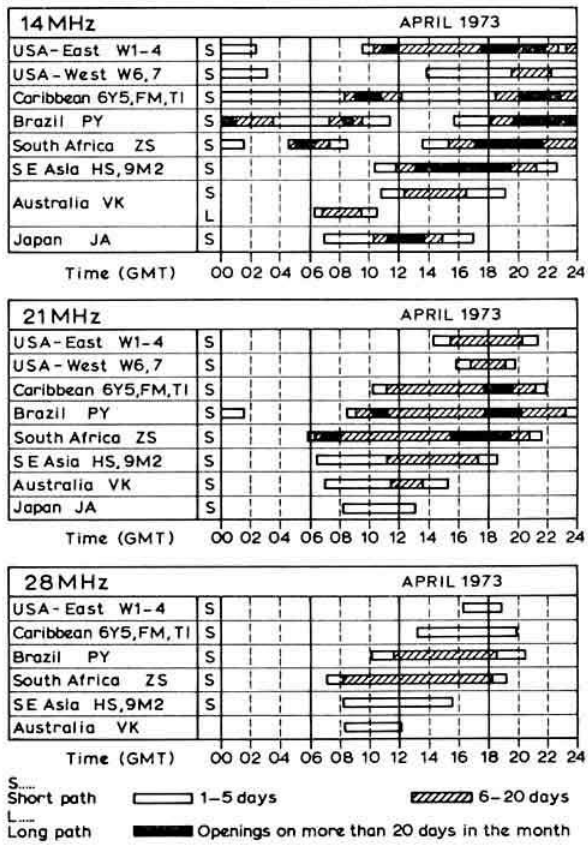
The change from winter to summer conditions occurs during April and existing poor conditions on 28MHz and 21MHz will worsen even more. Only on favourable days (days with above average MUFs) will communication with Africa and South America be possible on **28MHz.** Short skip with Europe will liven up this band in May. The adverse conditions will also affect **21MHz,** limiting contacts with North America, East Asia and Australia. More favourable conditions on this band will be to Africa, South and Central America.

In contrast to 28 and 21MHz, **14MHz** will improve still further, as shorter nights mean the band will remain open longer. Communication with Central and North Africa should be possible right through the night, but there will be a break in traffic with South Africa. Contacts with Hawaii should be possible on 14MHz between 0730 and 0900 and 1830 to 1900gmt, but as the path lies over the North Pole, traffic will be interrupted by the aurora. The possibility of contacts with Australia via the indirect path might occur in April, but there will be much more chance in the summer.

There will be suitable conditions on **7MHz** for dx when the longest part of the path lies in darkness, but as the season advances, dx on this band will often be interrupted by static. During daytime local traffic will be affected by the dead zone. The distances covered will shorten on this band and on **3·5MHz** as summer advances. Local traffic will seldom be interrupted by the dead zone.

The mean provisional sunspot number for February 1973 from the Swiss Federal Observatory was 42·1 with the greatest solar activity occurring during the first half of the month. The predicted smoothed sunspot numbers for June, July and August are 34, 32 and 30 respectively.

The current sunspot cycle is declining from a maximum, with a sunspot number of about 110, in 1968-9. The next minimum is expected in 1974-5. A tentative forecast is that the next cycle will exhibit similar characteristics to the present cycle.



COUNCIL PROCEEDINGS

A brief report of the Council meeting held on

4 January 1973

Present: *Dr J. A. Saxton (President, chairman), Dr E. J. Allaway, Messrs B. D. A. Armstrong, J. O. Brown, W. J. Green, R. J. Hughes, E. G. Ingram, G. R. Jessop, L. E. Newham, C. H. Parsons, J. R. Petty, W. A. Scarr, A. W. Smith, R. F. Stevens, G. M. C. Stone, F. C. Ward (Council members), D. A. Findlay (general manager), A. W. Hutchinson (editor).*

An apology for absence had been received from Mr W. F. McGonigle.

Election of Executive Vice-President
A ballot was taken and the President declared Mr G. R. Jessop elected as Executive Vice-President for 1973.

Statement by President
The President welcomed the members of Council to this, the first meeting of 1973. Dr Saxton said that he expected the Council to discuss matters of major policy import, not matters of detail which were more appropriate for consideration by the Council's various committees. To this end he expected Council members to submit items of important policy.

Dr Saxton then explained that he proposed to set up a President's Committee whose terms of reference would be to review the organization and administration of the Society and report thereon to Council. In selecting members of Council to be invited to serve on this committee, the President had endeavoured to include both London and provincial members who would provide a wide range of views. The following members had agreed to serve on the committee, of which the President would be chairman: Messrs J. O. Brown, G. R. Jessop, W. A. Scarr, R. F. Stevens and F. C. Ward.

Zone B Council member—casual vacancy
It was agreed to invite Mr R. W. Fisher, G3PWJ, to act as Council member for Zone B.

Financial matters
The Honorary Treasurer reported that draft accounts for the six months to 31 December were being prepared and from preliminary figures it seemed that the net surplus to 31 December would be in line with the budget.

Mr Brown reported on subscriptions and VAT and emphasized that it was necessary for Council to reach a decision at this meeting as to the action to be taken on subscriptions.

It seemed that there were two ways of dealing with VAT: as the tax was only payable on the amount of the subscription, the effect could be reduced by making separate charges for *Radio Communication* and subscriptions: an alternative was to leave the amount of the subscription at £4 as at present and for the Society to pay the VAT applicable or for the member to be required to add VAT to his subscription payment.

It was agreed that it would not be to the advantage of the Society to have separate charges for subscriptions and *Radio Communication*, and that members should be warned immediately that the Society would pay VAT on subscriptions from 1 April 1973 but that it would be necessary to increase subscriptions as soon as the rate of VAT is known.

Membership and affiliation
It was resolved:

(i) to elect 123 new members;
(ii) to accept reduced subscriptions from four members;
(iii) to waive the subscriptions of 10 members;
(iv) to grant affiliation to the Thornbury and District Amateur Radio Club and the Cosford Amateur Club, Wolverhampton.

Annual General Meeting
Mr Stone said that he felt that the changed arrangements for the AGM in December had not been satisfactory. He suggested that the Society should revert to the previous arrangement whereby after the AGM a meeting was held at which members could discuss informally both the report of Council which had previously been published and any Society matters which they wished to raise.

It was agreed that this arrangement should be followed in future.

It was suggested that it might be advantageous to change the date and venue of the AGM.

A letter from the City and County of Bristol RSGB Group asked that the AGM of the RSGB should be held on such day and at such time to enable members at a distance from the place of the meeting to attend more easily.

Diamond Jubilee—Constructors Awards
Mr Stevens suggested that as part of the Diamond Jubilee year it would be appropriate for the Society to sponsor three awards for home-constructed equipment. The intention would be for the equipment to be reasonably simple but reflecting the 1973 state of the art and to form the basis of articles to be published in *Radio Communication*. Categories suggested were: HF receivers; VHF converters/receivers; Test equipment.

Council agreed to this suggestion and asked Mr Stevens to submit the matter to the Technical and Publications Committee so that terms of reference and publicity could be arranged.

Committee minutes and recommendations
Council received the minutes of the MPT Liaison Committee (7.9.72), Raynet Committee (9.9.72), Finance & Staff Committee (30.10.72), Interference Committee (10.11.72), VHF Committee (29.11.72) (Council accepted the recommendation that the Fraser Shepherd Prize should be awarded jointly to Mr L.W. G. Sharrock, G3BNL, and Mr A.Wakeman, G3EEZ, the presentation to be made at the VHF Convention in April. Council also accepted the recommendation that Mr B. R. Coleman, G8AZU, and Mr G. W. Tibbetts, G3NUE, should be invited to serve on the VHF Committee), Education Committee (25.11.72), Membership & Representation Committee (28.11.72) (Council accepted the recommendation that the terms of sale of publications should be the same for both RSGB Groups and Affiliated Societies), VHF Contests Committee (4.12.72).

Council was advised of a recommendation in the Technical & Publications Committee meeting minutes of 5.12.72, which would be tabled at the next meeting, This was that a new system of compiling and printing the *RSGB Call Book* be adopted. The system was known as the "Cardlist System" operated by Eyre & Spottiswoode Ltd. It was agreed that this recommendation be accepted now so that the new system be put in hand without delay.

Correspondence
Mrs Gladys Walker, the widow of G2WO, had sent a cheque for £30 asking that the Society should purchase some item of furniture as a memorial to the late G2WO and G5JU. Council accepted the gift, and the general manager would make arrangements for the purchase of a suitable item of furniture.

Mr J. W. Mathews, G6LL, had written to ask Council to give early consideration to the appointment of Honorary Vice-Presidents of the Society. It was agreed that this matter should be placed on the agenda for future Council meetings.

Zone G Conference
It was agreed that Mr A. W. Smith, GM3AEL, as Council member for Zone G be authorized to organise a conference in the zone during 1973.

VHF Conference and Region 13 ORM
Council accepted a proposal that there should be a VHF Conference and Region 13 ORM in Edinburgh during 1973.

Region 14 ORM publicity
Mr Smith requested publicity in *Radio Communication* for the minutes of the Region 14 ORM held in Glasgow on 1 October 1972. The editor said that he had already written to Mr Smith on the matter, pointing out that he had not received any report on the ORM for inclusion in *Radio Communication*.

Mr Smith asked whether it was permissible for news of RSGB events to appear in other publications. Council agreed that there was no objection to this form of publicity.

Preliminary notice

Region 10

Diamond Jubilee ORM and Dinner

Saturday 22 September 1973

University College, Park Place, Cardiff.

Full details available shortly

OBITUARIES

Lt Col W. D. Horniman, G2WH
Bill Horniman died during February after a lifetime's interest in amateur radio. He was a professional soldier with the Royal Signals, and latterly maintained his on-the-air activities despite declining health.

Mr B. Jobson, G3IEN
Benjamin Jobson died in January at the age of 52. Well known on 20m ssb, he was a keen supporter of Hartlepool ARC.

Mr H. Marshall, OBE, G5IP
Harry Marshall died on 23 February, aged 85. He was a keen 80m cw man and active member of the Torbay ARS, his interest in amateur radio dating back to 1925.

Mr. C. F. Thomas, G3EKU
Frank Thomas died recently, aged 79. A founder member of the Verulam ARC he was the first chairman and held the office for seven years.

Mr D. Wash, G4BAJ
Denis Wash died on 9 February at the age of 43. Although newly-licensed, he had been a keen listener for several years.

We have also been advised of the deaths of:
Mr G. F. Beresford, G8CS.
Mr A. S. Fountain, BRS27762, of Sheffield, on 6 September 1972.
Mr J. Turney, G3ALH, of Collingham, near Wetherby, on 18 December 1972.

YOUR OPINION

The Editor
Radio Communication
Sir—As the new season of mobile rallies approaches, may I suggest to top band talk-in station operators that instead of random tuning, a specific frequency be announced in advance. Three advantages are apparent.

The first, and by far the most important, is improved road safety; knob twiddling is very dangerous while driving. The second would be that mobiles not requiring talk-in facilities could arrange nets with friends in advance without fear of causing interference to the talk-in station. Finally, there would be a far better chance of the talk-in station hearing "distress" calls from distant and not so distant mobiles.

Yours faithfully,
D. Matthews, G3ZZP/M

The Editor
Radio Communication
Sir—I feel that some reply is justified to my good friend John Allaway's opening remarks in "Month on the Air" published in January's issue.

After criticizing amateurs who "know their rights", G3FKM goes on to state his! I believe it is wrong to criticize amateurs in other parts of the world without first obtaining some facts. If his reasoning is to be followed to its illogical conclusion, I must presume that he would, with one stroke of the pen, deny our JA, KA, JD, HL and HM friends the use of ssb on 80m (their band is 3,500-3,560kHz). What must be realized is that for different parts of the world, different frequency allocations are in force together with differing interference problems.

On 15m the Japanese novice or lower class licensee is allowed to operate on phone, consequently during the weekend the phone band is occupied by thousands of these amateurs pursuing their hobby. To escape the QRM a number of VKs move towards the lower part of their phone band (by gentleman's agreement 21,000-21,100kHz cw and 21,100-21,450kHz phone).

Obviously what is needed is an internationally agreed bandplan which makes allowances for, where possible, local conditions and frequency allocations and *not* the "colonial gun-boat policy" advocated by G3FKM.

Yours faithfully,
Michael E. Bazley, VK6HD

John Allaway replies
My comments in January *MOTA* referred quite specifically to the situation on 21MHz, and in particular to contacts between stations in Australia and those in parts of the world where 21,000-21,150kHz is a "cw area". No suggestion was put forward that VKs should be denied the use of this part of the band when working within their own Region. The Japanese "Telephone" and "Telegraph" Class licensees are restricted to 10W input.

The Editor
Radio Communication
Sir—Last October, having completed 40 years' service with my firm, I became entitled to a cash/kind award, and as I have had to make do with second-hand receivers for the 20 years I have been licensed I decided this was the opportunity to at last have a brand-new set. Being primarily a cw man I decided on a well-known British set with an audio filter and this was duly ordered by my firm last October with a promise of a six-week delivery in good time for the usual presentation of awards in early January.

The receiver never arrived and the latest promise of delivery is the middle of March.

With this kind of service is it any wonder our magazine is filled with advertisements for foreign equipment?

Wake up you British firms and get back in the market! Apart from helping yourselves you could also help our balance of payments.

Yours faithfully,
A. Renwick, G3JIC

NRSA Annual Convention

Forum Halls, Wythenshawe
Manchester

Sunday 6 May, 11am—6pm

This new venue for the Northern Radio Societies Association Convention, on the south side of Manchester, is a few minutes from the M56 Motorway and with good access from the centre of Manchester.

The convention will take the same form as in previous years, with member societies competing for the G3AYD trophy awarded to the stand giving the best presentation of some aspect of amateur radio.

Major manufacturers and distributors of amateur radio equipment will also be exhibiting their wares.

Talk-in stations will be operating on 2, 4 and 160m and the main station will operate on all hf bands using the callsign GB2NRS.

The usual raffle will be organized with tickets on sale during the day.

Further information is obtainable from Peter Taylor G8BCG, 2 Columbia Avenue, Gorton, Manchester M18 7LG.

CONTEST NEWS

RSGB Diamond Jubilee VHF/UHF Contest rules

To mark the Diamond Jubilee of the RSGB, a contest will be held which combines the traditional "open" event with the multiband feature of VHF NFD. Operation will be on any of the bands between 70MHz and 1,296MHz using one callsign only, and much of the operating skill will lie in deciding which bands to use, and when to move on. Another novel departure is that a station will only be competing with other entrants in the same geographical area, and appropriately the areas chosen are the RSGB electoral zones. Separate results tables will be published for each zone, and separate awards will be made.

As usual, the adjudicators ask all entrants to read the rules. Since we are hoping for a record entry it will be necessary to divide the work between several adjudicators, and in order to put everyone's score back together after checking, we must request an additional piece of paper: a summary sheet. These will be available, together with log sheets and cover sheets for each band, from any vhf contest adjudicator on receipt of a large sae.

The VHF Contests Committee hopes that members will enjoy this new contest; if so, it may not be necessary to wait 60 years for the next!

The following General Rules, as published in the January issue of *Radio Communication*, will apply, except as superseded below:

1. **Date:** 7-8 July 1973. **Times:** 1600-1600gmt.
2. All entries and check logs should be sent to the adjudicators at: VHF Contests Committee, c/o 100 Shirley High Street, Southampton.
3. (Unchanged).
4. Operation will be on the 70MHz, 144MHz, 432MHz and 1,296MHz bands, using one callsign only.
   Awards will be made to the winners and runners-up in each RSGB zone (see footnote).
5. (a) On the 70MHz, 144MHz and 432MHz bands contacts will be scored according to General Rule 5a.
   (b) On the 1,296MHz band contacts will be scored at one point per kilometre.
   (c) Separate logs and cover sheets should be made out for each band. Claimed scores should be multiplied by the following factors: 70MHz – 2, 144MHz – 1, 432MHz – 5, 1,296MHz – 1.
   (d) After multiplication, the scores should be tabulated, *with the callsign*, and name of group if applicable, on a multiband contest summary sheet (available from any contest adjudicator on receipt of an sae).

6a, 7a, 8b, 9a, 10a, 11-24 (Unchanged).

25. A station may not engage in more than one contact concurrently.

Footnote

RSGB ZONES

Regions in each zone

Zone	Regions	Zone	Regions
A	1 and 2	E	10 and 11
B	3 and 4	F	15
C	5, 7, 8 and 16	G	12, 13 and 14
D	6, 9 and 17		

Counties in each region

Region 1 (North Western)	Cheshire, Cumberland, Lancashire, Westmorland, the Isle of Man.
Region 2 (North Eastern)	Durham, Northumberland, Yorkshire.
Region 3 (West Midlands)	Birmingham (postal area), Hereford, Shropshire, Staffordshire, Warwickshire, Worcestershire.
Region 4 (East Midlands)	Derbyshire, Leicestershire, Lincolnshire, Northamptonshire, Nottinghamshire, Rutland.
Region 5 (Eastern)	Bedfordshire, Cambridgeshire, Hertfordshire (outside Region 7), Huntingdonshire.
Region 6 (South Central)	Buckinghamshire (outside Region 7), Gloucestershire (excluding Bristol), Oxfordshire.
Region 7 (London)	London postal districts, Middlesex, Surrey and all other territory within 25 miles of Charing Cross.
Region 8 (South Eastern)	Kent (outside Region 7), Sussex.
Region 9 (South Western)	Bristol, Cornwall, Devonshire, Dorset, Somerset.
Region 10 (South Wales)	Brecknockshire, Cardiganshire, Carmarthenshire, Glamorgan, Monmouthshire, Pembrokeshire, Radnorshire.
Region 11 (North Wales)	Anglesey, Caernarvonshire, Denbighshire, Flintshire, Merionethshire, Montgomeryshire.
Region 12 (North Scotland)	Aberdeen, Angus, Banff, Caithness, Inverness, Kincardine, Moray, Nairn, Orkney, Perth, Ross and Cromarty, Shetland, Sutherland.
Region 13 (East Scotland)	Berwick, East Lothian, Fife, Kinross, Mid-Lothian, Peebles, Roxburgh, Selkirk, West Lothian.
Region 14 (West Scotland)	Argyll, Ayr, Bute, Clackmannan, Dumbarton, Dumfries, Glasgow (postal area), Kirkudbright, Lanark, Renfrew, Stirling, Wigtown.
Region 15 (Northern Ireland)	Antrim, Armagh, Down, Fermanagh, Londonderry, Tyrone.
Region 16 (East Anglia)	Essex (outside Region 7), Norfolk, Suffolk.
Region 17 (Southern)	Berkshire (outside Region 7), Hampshire, Wiltshire, the Channel Islands, Isle of Wight.

Diamond Jubilee Listeners' VHF/UHF Contest rules

1. The contest is open to all non-licensed fully paid-up members of the RSGB. Only the entrant may operate his receiving station.
2. The station must remain on the same site for the duration of the contest; portable operation is permitted.
3. The contest will take place concurrently with the Diamond Jubilee VHF/UHF Contest.
4. Operation will be on the 70MHz, 144MHz, 432MHz and 1,296MHz bands.
   Awards will be made to the winners in each RSGB zone, and at the discretion of Council the Hanson Trophy will be presented to the overall winner.
5. Contacts will be scored in the same manner as in the transmitting contest (Rule 5). Stations may be logged once on each band.*
6. Logs must show in columns: (a) Date/time (gmt), (b) Callsign of station heard, (c) My report on his signals, (d) Report and serial number sent by station heard, (e) Callsign of station being worked, (f) Location given by station heard, (g) Points claimed. CQ and test calls do not count for points and should not be logged.†
7. Entries should be sent to the adjudicators at: VHF Contests Committee, c/o 100 Shirley High Street, Southampton, and should be postmarked not later than 23 July 1973.

* Entries must be prepared in the same manner as those for the transmitting contest (Rules 5c, 5d)

† On 144MHz, the callsign in column (b) may occur only once in every 20 QSOs logged.

144MHz Portable Contest rules

Date: 27 May 1973. **Time:** 0900-1700gmt

All entries and checklogs should be sent to: VHF Contests Committee, c/o 17 Holmbush Road, London SW15.

The following General Rules, published in the January issue of *Radio Communication*, will apply: 1, 2, 3, 4b, 5a, 6a, 7a, 8d, 9a, 10a, 11-24.

The Mitchell-Milling trophy will be awarded to the winners of this contest.

DF Qualifying Round—South Manchester

Date: 20 May 1973.
Map: OS Sheet 101 (Manchester).
Assembly: 1300bst for start at 1320bst.
Location: NGR 808848. Disused road, formerly a part of the A538, near the "Romper" public house. The start is only a few hundred yards from the new M56 motorway. Frequencies and callsigns will be announced at the start.

This event is being organized by the South Manchester Radio Club, and intending competitors are asked to notify Mr D. C. Holland, G3WFT, 7 Alcester Road, Sale, Cheshire M33 3GW, of the numbers in their parties requiring tea, as soon as possible, and in any case not later than 14 May.

A large-scale map of the start location is available from G3WFT on receipt of a sae.

National Field Day

A reminder that duly completed application forms must be returned to the HF Contests Committee, c/o G3NKS, by 30 April 1973. Application forms were sent to all 1972 entrants during February—if you missed out write to RSGB HQ requesting form HFC10/73.

It should be made clear that NFD Rule 9(a) refers, of course, to the equipment at each station.

Diamond Jubilee HF Contests

A reminder—if you should need one—that these two exciting contests take place next month. We hope that by now you will have at least studied the rules (February's *Radio Communication*), and have sent off for supplies of HF Contest Log Sheets (Form HFC 1) and HF Contest Cover Sheets (Form HFC 2). Note that although each contest runs for 36 hours, you cannot operate for more than 24 hours each weekend. Each rest period must last for at least two hours and you cannot claim more than three periods which would include a so called "rest period" at the start of the contest brought about by a late start.

As a further incentive to participate—although with the exciting BOAC "Earthshrinker" prizes it is probably not necessary!—affiliated societies (in the British Isles) are being invited to offer some form of prize or award to the highest placed member (or members) of their society. It is believed that the addition of local competition to the national contest will benefit all taking part.

Mid-Severn Valley Teleprinter Group

1973 144MHz Contest rules

The RSGB General Rules for VHF Contests, published in January issue of *Radio Communication*, will apply, together with the additional rules and ammendments detailed below.

1. 1000-1600bst, Sunday 13 May 1973.
2. Entries to be sent to: R. W. Fisher, G3PWJ, 47 Elmhurst Drive, Kingswinford, Brierley Hill, Staffordshire.
3. The contest is open to radio amateurs holding a British licence.
4a. A certificate will be awarded to the entrant having the highest score.
5a. In the event of a tie, the entrant having the better average points per contact will take precedence.
6a, 7a, 8b.
9. Radioteleprinter only. (The use of 50 baud speed is recommended.)
10a.
12. With the addition of the time of commencement of contact.
13, 14, 15, 17, 18, 20, 21, 22, 23.

Stamped self-addressed envelope with any enquiry, please, to G3NUE, QTHR.

70MHz Cumulative 72/73 Contest results

A good number of stations were active during all periods although only 24 entries were received. Conditions did not do a great deal to help the participants. Some felt that the period was not long enough: others felt that it was just right; most agreed with the timing and the day on which the contest was held. G3OHH decided to have a "handicap" by using cw only. A lot of cw was used and a few stations used ssb. A certificate of merit will go to G4AGE, although his score was low he did attempt to work the band with 10W and a dipole.

L.V.G.T.

Posn	Station	Points	Cnty	QSOs	Input pwr	Best dx	Km
1	G3OHH	321	SD	41	50	G3DAH	295
2	G3KSU/P	265	HE	85	10	G3OHH	280
3	G3VCV	204	HN	48	50	G3KSU/P	205
4	G3NPI	202	BE	86	40	G3VPF/P	130
5	G3VPF/P	201	DT	81	25	G3VPK	260
6	G3ZMD	196	BD	56	12	G3RLE	—
7	G6HD	181	KT	67	34	G3OHH	248
8	G3LVP	161	EX	55	50	G3OHH	—
9	G3ZRF	156	SY	86	35	G3OHH	270
10	G3ZYS/P	145	SY	75	10	G3VPF/P	180
11	G3MXH	140	EX	48	18	G3OHH	290
12	G3ZLQ/P	132	BS	54	3	G3VPF/P	160
13	G3PGN	124	EX	42	40	—	—
14	G5UM	118	LR	33	18	G3JYP	224
15	G3WMR/M	114	LD	68	25	G3VPF/P	210
16	G4BEG	102	SY	50	5	G3OHH	230
17	G3YQW	84	SX	83	19	G3OHH	270
18	G3ZKR/P, G5HD/P*	74	WE	57	12	GW3MHW/P	215
19	G3HBG	73	SY	23	30	G3OHH	265
20	G3BMM	69	BD	25	12	G3VPS/P	123
21	G4BEZ	65	GL	18	18	G3RLE	207
22	G3FIJ	46	EX	16	25	G3KMI	—
23	G3TAL	35	HE	17	5	G6HD	128
24	G4AGE	28	DY	20	10	—	—

*Change of callsign only.

RSGB 7MHz Contest results

Conditions during the cw weekend were very bad and probably accounted for the fall in entries. We sincerely hope that conditions will be a little more favourable in 1973 with a larger entry for all sections. Generally the standard of log keeping was very much higher than last year's, particularly in the receiving sections.

Our congratulations go to all the section winners who in due course will be receiving their certificates. The HF Contests Committee again wishes to thank stations for their assistance in verifying QSOs and particularly for the check logs.

CW SECTION

Psn	C/sign	Pts	Psn	C/sign	Pts	Psn	C/sign	Pts
1	G3LNS*	3,725	41	OZ4H, UK2GBY	540	81	W4HOS	330
2	G3KDB*	3,645	43	SP2AVE	535	82	OK1AOU	325
3	G2QT*	2,900	44	G3KZR	530	83	HA1ZD, SP8EDQ	320
4	G3PDL	2,395	45	EP2BQ*, UO5OAL	525	85	PA0VB	315
5	G3MGL/A	2,290	47	UK5IAZ	520	86	OK1TW	305
6	G3MZV	2,275	48	PA0LCE	515	87	I1CRW/P	300
7	G2DC	2,055	49	OZ8HC	510	88	UP2NX	285
8	G3TBK	1,930	50	SV0WTT	505	89	HA4XX, OK1DAV, SP9EEE	255
9	GW3JI	1,860	51	OZ4HW, SV0WH	500	92	SP9KRT, UA4PU	240
10	G3ESF	1,640	53	YO2BBB	490	94	W4ZSH	235
11	G3YCT/A	1,610	54	SM4CJY	475	95	OK2TB	230
12	W1ARR*	1,395	55	DL1PB, OK1DIM	470	96	SP6UK, SP8FNB	225
13	GI3GTR/A	1,280	57	G2AJB, G3WP, YO5ALH	455	98	OK1AOV, OK1AWH	205
14	G3ZDD	1,230	60	OK1ASG, SP9DWT, UR2QD	440	100	UF6QAC	200
15	G8HX	1,200	63	UY5CW	435	101	UP2AW, UQ2PN	185
16	G3KSH	1,190	64	DL1YA	430	103	LA5KO, OK1DWA	175
17	G3MXJ	1,080	65	OH7NW	425	105	VE3CDK	170
18	G3VDL	1,075	66	EA2HR, HA0LO	415	106	SP6DMJ	165
19	G3MWP	1,170	68	SP5DDJ	400	107	W7QK, YO2AVA, YO2QQ	160
20	G8KU	1,060	69	PA0KW	395	109	UB5QBC	155
21	G3RZI, YU2CDS*	930	70	OH2LU	390	110	SP6DNZ	140
23	EL0N*	925	71	UA3GM	365	111	OH2XM, SP7KKA	135
24	GD4AM	910	72	DL1JC	355	113	HA2MV	130
25	G2GM	890	73	OK1FJS	350	114	SP2KFQ	125
26	YU1OCV	855	74	SP1ETC, YO8AZQ	345	115	LA3LC	115
27	SP5EXA	795	76	EA2IA, SM6DJI	340	116	EA2JJ, OK1KZ, OZ4DX	110
28	DK5LY	720	78	DJ5QK, SP6CZ, UB5UAR	335	119	OK3ZBU	100
29	SM0TW	710				120	OK1AEH	55
30	YU1SF	675						
31	OK3TCA, SM7EAN, UB5IF	645						
34	OK2PDL, UW9WL*	625						
36	OZ2UA	620						
37	UB5LL	615						
38	DJ7ST	585						
39	OK3EE	560						
40	EA5BS	555						

PHONE SECTION

Psn	C/sign	Pts	Psn	C/sign	Pts	Psn	C/sign	Pts
1	G3SSO*	1,825	19	GC3YIZ	495	36	EP2BQ, UC2BF	325
2	G3TR*	1,680	20	I8KBT	465	38	OZ3KE	310
3	G2QT*	1,670	21	OZ4HW	440	39	G3MWZ, SM0CGO	305
4	G3WJN	1,665	22	OZ9HO, SM7AIL	425	41	OK1KZ	295
5	GW3ZQH	1,565	24	OH5PL, UK3YAB	395	42	OZ8KU	280
6	G3WFT/A	1,542	26	DL1IP, I2PHN	385	43	SP9PT, UK5MAG	270
7	G4ACQ	1,485	28	OZ2UA, OZ3JR	380	45	SM4AZD	260
8	G3SWX	1,450	30	HB9DX	375	46	SP5XM	255
9	G3VLX	1,435	31	F3IJ, LA8NC	365	47	DL1YA, UD6CC*	250
10	EP2TW*	1,075	33	OH7NW	360	49	OH2LU	245
11	DL2NO*	890	34	UR2QD	340	50	OH7OQ	185
12	G3VIR	850	35	I3BBZ	330	51	UK2GBY	180
13	DK1PW	645				52	HB9QA	110
14	LA5QK	550						
15	DK5GX	540						
16	DJ4RL	515						
17	G3MWP, LA5KO	505						

PHONE RECEIVING SECTION

Posn	Number	Pts	Posn	Number	Pts
1	BRS26431*	1,520	11	A6117	745
2	BRS33823*	1,425	12	BRS30628	615
3	BRS18461*	1,325	13	SWL I1-12387	560
4	BRS25429	1,305	14	SM5-2735	545
5	A7082	1,195	15	NL 455	535
6	A7460	1,140	16	A6098	415
	BRS20249	1,140	17	LA-M-5605	315
8	BRS33442	915	18	UQ2-037-27	310
9	BRS28201	870	19	OK1-15835	240
10	A8131	845			

* Certificate winners

CW RECEIVING SECTION

Posn	Number	Pts	Posn	Number	Pts
1	BRS32457*	1,425	7	OK1-18556	315
2	BRS18461*	1,240	8	OK3-26180	305
3	A7082	920	9	BERS195*	250
4	BRS33442	750	10	UB5077-483	240
5	A7460	710	11	OK1-13188	115
6	BRS30628	595			

1972 21-28MHz Telephony Contest results

Enjoyable was the general theme though VK/ZL were annoyed about the clash with their own contest. Band conditions on both days seemed to be similar with clearly defined skip distances. Unlike 1971, Africa and South America did not open up but the west coast of the USA and VE made up for this. The overseas entries were well up on last year, while the UK entry was about the same.

The committee expresses its appreciation for check logs from EL0N(G3UOF), W3MDJ, WA0YED, UA3DAO, GM3SYD, GW3DQU, G3WP, G4AVC.

R.J.P.

OVERSEAS TRANSMITTING

Psn	C/sign	Pts	Psn	C/sign	Pts	Psn	C/sign	Pts
1	UK5MAF	3,038	34	VE6AYU	1,045	67	JA2XLR	635
2	9H1CH	2,521	35	UV3DN	1,075	68	UA9CBO	625
3	EP2TW	2,347	36	OE1FF / W4DQD	1,045	69	UC2BX	615
4	ZS6ZE	2,335				70	OH7RF	590
5	W7RM	2,105	38	HA5KF	1,035	71	UA9FBM / UK5QAV	585
6	UK6LDZ	1,950	39	UG6GAF	1,030			
7	YU1ODS	1,755	40	W5SBX	1,010	73	UT5VU	545
8	OD5BA	1,680	41	WB4UKA	985	74	OH2LU	542
9	UA9BB	1,645	42	UI8CD	975	75	OH3XJ	530
10	UK2GAA	1,640	43	JA1ELY	965	76	JA6RCH	525
11	9M2DQ	1,610	44	JA8WY	930	77	UA6HYL	505
12	LZ1CW	1,570	45	LA8NC	915	78	RA3MOG	460
13	UK2BBB	1,540	46	UK3SAG	910	79	W6DQX	440
14	RA3NAM	1,500	47	UB5LU	905	80	UA3EQ	430
15	OH2BAD	1,480	48	OK3AS / UC2WP / VE1ANZ	900	81	ZL1AGO	425
16	UA6LO	1,435				82	OH6ZH	410
17	UR2QD	1,405				83	UW3DZ	395
18	G3MUL/CE3	1,395	51	HA6NN / OH4SO	887	84	UO5OAB	390
19	ZE1BL	1,365				85	VE3SLC	375
20	RA0ABE	1,340	53	JA2JW	837	86	OK2KR	330
21	WB2MQI	1,260	54	OH2BJY	825	87	JH1ZEG	320
22	RB5VAC	1,245	55	JA8DFD	820	88	JA4BNT	297
23	RB5VBD	1,240	56	OH6YP	805	89	JA3PLR	280
24	UA3DDF	1,235	57	HA4XG	765	90	CE8AO	272
25	UK3AAO	1,230	58	UA1AW	757	91	LU3HAK / OH7NW	250
26	RB5QAO	1,190	59	VE6MP	750			
27	W9LKI	1,187	60	JA8GO	740	93	JR1VAY	230
28	LA9OI	1,175	61	UA4SR	737	94	W4HOS	220
29	RA3MAH	1,170	62	UA1LL	705	95	SP9KRT	165
30	UY5YB	1,120	63	JA6FBQ	672	96	UO5OAA / XE2LLX	115
31	HA4XX	1,100	64	HA3PG / UA9FAJ	665			
32	OH5PL	1,085				98	JA4ILU	70
33	MP4TEE	1,060	66	UK5QAU	645	99	OK1KZ	55

UK TRANSMITTING

Psn	C/sign	Pts	Psn	C/sign	Pts	Psn	C/sign	Pts
1	G3WJN	12,332	16	G3JVJ	3,040	30	G3SMM	2,250
2	G3UML	11,135	17	G3TBK	3,035	31	G3DME / G3GXO	2,240
3	G3SSO	10,265	18	G3ZZJ	3,030			
4	G2QT	8,149	19	GW4BLE	2,925	33	G3ZDF	2,220
5	G4ANH/A	7,530	20	G3UFY	2,905	34	G3ZFE	2,145
6	G3TR	6,849	21	G4BJT	2,805	35	G3YNO	1,920
7	G3YJI	6,370	22	G3KWH	2,780	36	GM5AXO	1,885
8	G2DC	6,030	23	G3WFT	2,755	38	G3KEN	1,870
9	G4APL	5,720	24	G3YBH	2,675	39	GM3LYI	1,775
10	G3MGW	5,350	25	G2AJB	2,610	40	G4ALG	1,495
11	GC3YIZ	5,265	26	GM3VEY	2,580	41	G3WDI	1,245
12	G3ZRS	4,565	27	G8KU	2,505	42	G3HZM	805
13	GW3ZQH	3,850	28	G3XRM	2,500	43	G3TGR	730
14	G3KSH	3,685	29	G3JKY	2,315			
15	G4AMT	3,260						

OVERSEAS RECEIVING

Posn	SWL No	Pts	Posn	SWL No	Pts
1	UB5-070-9	1,770	8	UA3-170-347	805
2	UA3-151-18	1,390	9	JA1-1176	365
3	JA1-11166	1,105	10	SM5-2735	350
4	UA0-103-16	1,100	11	WDX4CESH-W4-122	320
5	UA3-142-198	1,020	12	OK1-15835	315
6	UA9-099-8	945	13	JA1-11614	120
7	UA9-165-55	885			

UK RECEIVING

Posn	Number	Pts	Posn	Number	Pts
1	BRS32525	6,270	7	BRS26003	3,420
2	BRS26431	5,292	8	BRS30628	3,170
3	A7460	4,409	9	BRS20249	3,115
4	BRS28005	4,063	10	BRS26870	2,775
5	BRS26407	3,990	11	BRS28201	2,620
6	BRS32457	3,950	12	A6098	710

Disqualifications, Rule 11

G3SEM and G4BKY-Mixed frequency logs, Rule 8b.
BRS19682-Mixed frequency logs, Rule 5; G station logged 559 times, Rule 6.

February 144MHz CW Contest results

There was a very good response to this contest which was added at short notice to the Contests Calendar following a request to the VHF Contests Committee. It was the original intention to have this as a fixed contest but due to the last minute rush to meet publication closing date an error was made. Hence all entries fixed and portable were accepted, although portables and multi-operator stations have been indicated.

The timing proved to be just right, no adverse comments were received and a number of entrants recorded their satisfaction. Conditions were variable, with the welcome appearance of several DL and PA0 stations.

Certificates go to the winning station G3SRT/P, and to the runner up who was also the leading fixed station G3NNG. Those sending in check logs, especially PA0JR and PA0HOP, are thanked for their assistance.

G.M.C.S.

Posn	Callsign	Cnty	Points	QSOs	Best dx	Km
1†	G3SRT/P	SE	478	72	DJ5BV	675
2	G3NNG	BE	445	70	DJ5BV	585
3	G3NHE	YS	432	62	DJ5BV	617
4	G3POI	LD	376	62	DC6EQ	500
5	G3WSN	EX	368	62	DC6EQ	478
6	G3UKV	SE	344	50	DJ9DL	663
7	G3WZT	SX	309	55	DJ5CV	485
8	G3MOT	OX	296	60	DJ9DL	585
9	G3TIR	SX	287	57	DJ9DL	500
10	G8GP	LD	268	54	DC6EQ	485
11	G3FZL	LD	260	50	DC6EQ	485
12*	G3FEC/A	WE	257	49	G6PG	250
13	G3DAO	SX	235	43	DC6EQ	550
14	G6PG	NK	233	25	DJ5BV	274
15	G3NJF	LN	223	32	DJ9DL	560
16	G4AEQ	LE	211	34	G3WZT	305
17	G5UM	LR	202	38	DJ9DL	608
18	G3FIJ	EX	179	27	DJ9DL	445
19	G3TBK	NM	173	31	DC6EQ	530
20	G3XBY	W	168	36	PA0HOP	455
21	G3FYX	GR	160	30	G3HCW	240
22	G3XWZ	NM	157	33	DJ9DL	600
23*	G4BCO	SX	154	30	G3WKF	375
24	G3JYP	WD	144	20	G3WZT	426
25*	G3YXR	HE	140	36	G3BHW	195
26	G3COJ	BS	133	27	DJ9DL	520
27*	G3BRK	KT	131	34	DJ9DL	480
28	G3WUX	LE	106	22	G3WZT	351
29	G4AWA	WR	97	24	G4ATX	250
30	G3SHY	NM	91	22	G4ATX	225
31	G3ZJG	LR	88	20	G3DAO	210
32	G4ASR	LD	35	15	G3FEC/A	115

* Multi-operator.
† Multi-operator portable. Check logs from PA0JR, PA0HOP and G3LCH.

Grafton G2CJN VHF 1972 Contest results

Open Section

Posn	Callsign	Points	Posn	Callsign	Points
1	G8GHA/P	254	9	GW3JFY/P	69
2	G8GCS/P	179	10	G8BWW	67
3	GD8EXI	157	11	G8CTT	65
4	G4AJW	151	12	G8FUR	46
5	GW8FNT/P	111	13	G3LCH	41
6	G4BEE/P	97	14	G8FBL	32
7	GM8EYW/P	80	Late entry		
8	G8DKG	73		G4ANS	86

Award for highest placed newly-licensed station: G8GHA/P.

IARU Region 1 VHF/UHF/SHF Contests, 1972

A total of 826 stations from 21 countries, and 196 stations from 14 countries, submitted entries in the IARU Region 1 Contests which were held respectively on 2-3 September and 7-8 October 1972. The overall number of stations taking part was marginally less than in previous years, although there was a noticeable increase in the popularity of the microwave frequencies.

Entries from the UK accounted for most of the portable activity on 1,296MHz in the September VHF/UHF contest, and for the first time logs were entered in the 21GHz section of the October UHF/SHF event. Support from British stations, however, was very disappointing on 144MHz, and the few entries which were received failed completely to reflect the exceptional level of national activity during VHF NFD.

As the principal objections to UK participation in IARU events were removed by the revised procedure for adjudication agreed at the IARU Region 1 Conference held in May 1972, it must be presumed that the effort of translating radial scores into points per kilometre is sufficient to deter British enthusiasm.

The RSGB has already prepared a 30-page booklet containing the detailed results of both IARU contests, and individual copies were sent to all participants during February. The VHF Contests Committee congratulate the winners in the different sections of both events, and also thank contestants, vhf managers and all others concerned for their part in the 1972 IARU Region 1 VHF/UHF/SHF Contests.

C.S.

SUMMARY OF RESULTS—SEPTEMBER

Section 1. 144MHz fixed stations. 364 entries (UK 5).
1. F9FT/A
2. OZ5TE
45. G3OHH

Section 2. 144MHz portable stations. 303 entries (UK 9).
1. OZ9OT/A
2. PA0ZAZ/P
13. GW3BA/P
27. G3ODY/P

Section 3. 432MHz fixed stations. 56 entries (UK 1).
1. DK0FB
2. PA0EZ
13. G8BKR

Section 4. 432MHz portable stations. 50 entries (UK 10).
1. GW3LTF/P
2. G3UBX/P
3. DL0RR/P

Section 5. 1,296MHz fixed stations. 4 entries (UK nil).
1. PA0HVA
2. DL6MHA

Section 6. 1,296MHz portable stations. 49 entries (UK 38).
1. GW3LTF/P
2. GW3KPT/P
3. G3SXK/P
16. F2TU/P

SUMMARY of RESULTS—OCTOBER

Section 1. 432MHz fixed stations. 80 entries (UK 13).
1. DK0FB
2. PA0EZ
9. G3LTF/A

Section 2. 432MHz portable stations. 53 entries (UK 4).
1. PA0MS/P
2. PA0ZAZ/P
21. G4ARD/P

Section 3. 1,296MHz fixed stations. 24 entries (UK 8).
1. PA0HVA
2. G3LTF/A

Section 4. 1,296MHz portable stations. 23 entries (UK 2).
1. PA0MJK/P
2. F2TU/P
10. G4ARD/P

Section 5. 2·3GHz fixed stations. 5 entries (UK 2).
1. G3LTF/A
2. DK3YF

Section 6. 2·3GHz portable stations. 2 entries (UK 1).
1. G4ARD/P
2. DL2AS/P

Section 7. 3·4GHz fixed stations.
None

Section 8. 3·4GHz portable stations. 3 entries (UK nil)
1. DL8IK/P
2. DJ1WP/P

Section 9. 10GHz fixed stations. 2 entries (UK 2).
1. G3THQ/A
2. G3NHZ

Section 10. 10GHz portable stations. 2 entries (UK 2).
1. G3ZGO/P
2. G3ZKR/P

Section 11. 21GHz fixed stations.
None

Section 12. 21GHz portable stations. 1 entry.
1. G3WDG/P and G8ADP/P

Contests calendar

7-8 April	— SP DX CW
8 April	— Grafton Top Band (Rules in March issue)
8 April	— WAB LF CW
8 April	— 80m Low Power (Rules in March issue)
15 April	— 70MHz Portable (Rules in March issue)
21-22 April	— Bermuda Phone
28-29 April	— PACC CW/Phone
29 April	— DF Qualifying, Rugby (Rules in March issue)
5-6 May	— 144/432MHz Open (Rules in March issue)
5-6 May	— Bermuda CW
5-6 May	— Helvetia 22 CW/Phone
6 May	— 432MHz Fixed (Rules in March issue)
12-13 May	— Jubilee Phone (Rules in February issue)
12-13 May	— CQ-M (USSR) CW
13 May	— Mid-Severn Valley Teleprinter Group 144MHz (Rules in this issue)
19-20 May	— Jubilee CW (Rules in February issue)
20 May	— DF Qualifying, S Manchester (Rules in this issue)
27 May	— 144MHz Portable (Rules in this issue)
2-3 June	— NFD (Rules in February issue)
9-10 June	— 70MHz Open
10 June	— DF Qualifying, High Wycombe
16-17 June	— Microwave FD
17 June	— WAB VHF Phone
23-24 June	— Summer 1·8MHz
24 June	— DF Qualifying, Chelmsford
7-8 July	— Jubilee VHF/UHF (Rules in this issue)
14-15 July	— SSB FD (Rules in March issue)
15 July	— DF Qualifying, Coventry
22 July	— 432MHz Portable
4-5 August	— YO DX CW/Phone
5 August	— DF Qualifying, Slade
11-12 August	— WAE DX CW
12 August	— 70MHz Fixed and Portable
18 August	— 144MHz QRP
19 August	— 144MHz SSB Open
1-2 September	— LZ DX CW/Phone
1-2 September	— VHF NFD (Rules in March issue)
1-2 September	— IARU 144MHz
9 September	— 80m FD
9 September	— DF Qualifying, Dartford Heath
8-9 September	— WAE DX Phone
15-16 September	— SAC CW
22-23 September	— SAC Phone
23 September	— DF Final, to be organized by Stratford Group
6-7 October	— VK-ZL-Oceania Phone
6-7 October	— UHF NFD
6-7 October	— IARU 432/1,296MHz
13-14 October	— VK-ZL-Oceania CW
13-14 October	— 21/28MHz
20-21 October	— WADM CW
20-21 October	— 7MHz CW
3-4 November	— 7MHz Phone
3-4 November	— 144/432MHz CW
10-11 November	— OK DX CW/Phone
10-11 November	— 2nd 1·8MHz
11 November	— 70MHz Cumulative
9 December	— 144MHz Fixed

MOBILE RALLY NEWS

South Leics Mobile Rally, 13 May
Talk-in stations as follows: G3ZOP/A on 160m, G8CGW/A on 2m a.m./fm, G3WPB/A on 2m ssb. Bring and buy stall open to everyone. (See also March issue, p203.)

Southdown Mobile Rally, 22 July
The Southdown Rally will be held at Polegate, on the A27 (Lewes-Eastbourne), opposite the "Long Man" at Wilmington. There will be trade stands, refreshments and talk-in from Firl Hill with an rtty link from the hill to the rally site. It is hoped that the callsign GB2SS will be obtained. An additional attraction will be the Polegate Steam Engine Rally being held the same day, offering various entertainments including a fairground. For further details contact G4BCO, QTHR.

SPECIAL EVENT STATIONS

Cromwell Community College Open Day, 31 March
G3NVM/A and G3SPK/A will be on the air from the college, operating a demonstration station as part of the open day activities.

Morpeth Spring Festival, 17 April-6 May
Northumbria Radio Club is putting GB3MSF on the air during the Spring Festival, dates as above. The station will be operated from the clubroom, 3 Wheatsheaf Yard, Morpeth; further details from G4AVO, QTHR.

Banks Steam Party, 21-23 April
GB3BSP is being operated by members of Ainsdale Radio Club over the Easter holiday from the site of the Banks Steam Party. (This is a gala of restored steam engines and fairground organs, the proceeds from which will be donated this year to the National Society for Mentally Handicapped Children). The location of the event is Hoole Lane, Banks, near Southport, Lancs, and activity will be on 160-2m, with talk-in facilities available on 160m, 70·26MHz, and 145MHz. For further details contact G3LWK or G3VNQ, QTHR.

Hereford Cider Festival, 25 May-3 June
Hereford Amateur Radio Society is mounting GB3HCF during the Cider Festival, and operation is expected to be on hf bands, with emphasis on 80 and 20m. There will also be two teleprinters available. All enquiries concerning the station should be sent to the hon sec, 181 Kings Acre Road, Hereford, HR4 OSP. Further information concerning the festival itself can be obtained from John Meredith, Cider Festival organizer, HP Bulmer Ltd, Ryeland Street, Hereford.

Bristol 600 Exhibition, 21 July-12 August
This event, which will be visited by HM The Queen, plus an estimated half million visitors including many from overseas, is being marked by a special station GB2BEX. Operation will be on 80-10m, mainly ssb between 10am and 9pm each day of the exhibition. A special aim of the station will be to contact other cities called Bristol, round the world.

Mobile Rallies Calendar

15 April	North Midlands, Drayton Manor Park.
6 May	Spalding Tulip-Time.
13 May	South Leicestershire, at Westfield Activity Centre, Rosemary Way, Hinckley, Leics.
20 May	RAIBC Picnic, with Southampton RSGB Group, at the Fairground, Broadlands Estate, Romsey, Hants.
27 May	Hull & DARS, at Bishop Burton, near Beverley, Yorks.
27 May	Maidstone, "Y" Sportscentre, Melrose Close, Maidstone.
27 May	Northern, at Moorgrange Secondary School, West Park, Leeds.
10 June	Elvaston Castle, Elvaston Castle Countryside Park, Nr Derby.
17 June	ARMS, Staffordshire, venue to be fixed.
24 June	Bristol City and County RSGB Group, at Longleat, Warminster, Wilts.
1 July	South Shields and DARC, at Redwell School, Prince Edward Road, South Shields.
7 July	Hanworth Carnival, Hanworth Air Park, Hanworth, Middlesex.
8 July	Cornish, Treviglass County Secondary School, Newquay, Cornwall.
8 July	Upton, Worcester & DARC.
22 July	Anglian, Suffolk Showground, Bucklesham Road, Ipswich.
22 July	Southdown, Polegate, Wilmington.
5 August	RSGB Woburn Abbey Rally.
12 August	Torbay ARS, Newton Abbot Rugby Ground, Newton Abbot, Devon.
19 August	Bristol Mobile Picnic. Ashton Court, Bristol.
19 August	Preston ARS, Kimberley Barracks, Deepdale Road, Preston, Lancs. (New date).
23 Sept	Harlow & District, Netteswell Comprehensive School, Harlow.

RAYNET

by S. W. LAW, G3PAZ*

In our final remarks last month we lamented the lack of news from GM, but let us hasten to amend this with respect to the very active group centred on Glasgow. Rather were the words directed to those who appear to have faded into limbo; or could it be that our little reminders about the validity of the old registration cards have somehow been overlooked? We trust that the next Raynet Committee meeting will be able to report a spate of re-registrations from our Scottish members. Maybe it will not be out of place to once again repeat the story of the disgruntled person who approached us at one of the exhibitions complaining that they had been completely ignored and produced a registration card which proved to be no less than five years out of date! The moral is all too obvious.

Strangely enough we have been approached by a prospective member who evinced great interest in getting something moving around his new area now that he has settled in, but explained that in an intensive period of listening he has heard no Raynet activity at all. Perhaps some members in the area would care to contact GM3SYF (QTHR) and put Dave's mind at rest.

While on the subject of gathering members, G8CDP, the controller of the 12-strong Teesside group, would welcome applications from any Class A licence holders in the area in order to extend the scope of activities beyond the present 2m limit of the six mobiles and six static stations. The primary frequency at the moment is 145·8MHz and all can also use 145 if necessary. This area is large for such a small group and includes the North Yorkshire moors, hence both the Teesside and North Riding Constabulary have expressed great interest in the potentialities of the group and would welcome its expansion. The police concerned have full details of equipment and availability and keep an interested eye on the various exercises. G8CDP is QTHR and will welcome all applications.

Diary date
The redoubtable G3HRK, controller of the widespread and complex group in Norfolk, is once again showing the flag and relaxing the membership at one of their popular rallies on 1 July. West of the city of Norwich is Barford, a mere seven miles, and there at the village hall you will find stalls for surplus equipment, local produce, light refreshment and an auction (knowing Doug, this could be fun). In addition there will be the inevitable raffle and even organized games for the juniors; in fact something for everybody. Add this to the dates we gave you last month; this is a good year.

Controllers meetings
The idea of a liaison meeting for controllers of adjacent areas is by no means new and there are several well-established gatherings in various parts of the country at fairly regular intervals. However, the idea does not appear to have caught on everywhere and we would like to hear more of this type of activity. The exchange of ideas and the amicable settling of controversial issues can do nothing but good. We had the privilege of attending a southern meeting recently and were very impressed both by the numbers present from a widespread area and the freshness inculcated by the freedom of expression of varying viewpoints and methods. Why not get in touch with your own neighbours and get together for the mutual benefit of all? There may well come a time when something really big comes along and a united effort might be required on a larger scale than you envisage at the moment.

Essex Raynet General Meeting
Essex Raynet will hold a General Meeting at Police Headquarters, Chelmsford, on Tuesday 12 April at 8pm. G3PHQ will operate on 70·375 and 144·75.

Honorary registrations secretary: **Mrs Jane Balestrini, "Merrivale", Willow Walk, Culverstone, Gravesend, Kent.**

* 130 Alexandra Road, Croydon, Surrey, CR0 6EW

MEMBERS' ADS

These low-cost flat-rate advertisements are accepted as a service to members of RSGB. They must be submitted on the Members' Ads order form printed on the last page of each issue of *Radio Communication*, or on a postcard similarly laid out. Each **must** be accompanied by a **recent** *Radio Communication* wrapper addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque for 25p (stamps not accepted). They will not be acknowledged. Those not clearly worded or punctuated will be returned. No other correspondence concerning this service can be entered into.

The closing date for each issue is the 4th of the preceding month but no guarantee of inclusion in a specific issue can be given. Valid advertisements not published in the issue following receipt will be held over until the next issue.

Trade or business advertisements, even from members, will not be accepted for Members' Ads but should be submitted as classified or display advertisements in the usual way. The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions or for the quality of goods offered for sale.

Members are advised to enclose a stamped addressed envelope when replying to advertisements.

See the current order form on the last page for further details.

FOR SALE

KW swr mtr type 101, mint, £7.50; *RC* Aug-Dec '69, 50p; *Radio Constructor*, May '72-Jan '73, £1.25. Higgins, 15 Ejirton Dr, Cregagh, Belfast 6. Tel Belfast 644 688.

KW2000B with ac psu, mint cond, only few hrs use as exciter for 2m, £170. G8DYB, QTHR.

Kokusai MF455-15K fltr, data sheet, as specified for G2DAF tx Mk III, £5. G3SJF, QTHR. Tel Highcliffe 2612.

Oscar 8MHz FT243 xtals, £1.50; AR88D main tuning dials, £1.50 ea; cavity wvmtr 850 to 1,320MHz, brand new in orig sealed container with clbrtn chart, £10; your xtals etched, sae enquiries. G3IUD, QTHR

BC312-F rx 1·5-18MHz, wkg but bfo messy, with psu, £13 ono, buyer coll by arrangement. R. Parker, 30 Cambridge Road, Langland, Swansea, SA3 4PQ.

Heathkit DX40U tx with vfo handbks, spare valves etc, gd cond, £20 ono. G8DK, QTHR. Tel Locksheath 2362.

PR30X preselctr £5; 19 set variomtr £1; 2m halo £1; Joystick aerial with Lo-Z atu £5; buyer coll. E. F. King, 12 Towers Ave, Maghull, Liverpool, L31 0AJ.

Lafayette HA800 amateur bands, solid state rx, 160m to 10m plus 2m mosfet cnvrtr, spkr, xtal filtr and Q-mult unit, only one year old, exc cond, £50 the lot ono. R. G. Barrett, 23 Carshalton Rd, Beddall, Pontypridd, Glam. Tel Newtown Llantwitt 3345.

KW Atlanta Mk II + psu, £150; vfo £24; vox £6; Shure 444 mic £10; dummy load £4; Hanson swr £3; aerial switch £2.50; all as new, little used, comp stn, 3-tier trolley, leads, £185. White, 83 Meeting Lane, Penketh, Warrington, Lancs.

70cm gear, pre-amp 50p; cnvrtr (12-16MHz) £5; tripler amp £2.50; power amp £2.50; 2m exciter £5; freq metr TS-127U £5; UM3 £4; various mains trnsfmrs, mtrs, relays. **Wanted** transistor gen cov rx, eg Mohican. G8BIJ, QTHR. Tel Chertsey 63544.

Panda cub 160m to 10m a.m./cw with cct diags and instrctns, gd cond, £22 ono, buyer coll. G8VN, QTHR. Tel Derby 54464.

Codar CR70A, PR30, Joymatch atu spkr, housed in modern mahogany cab; Joystick vfa, all perf wkg order, immac cond, ideal for keen swl, £40 ono (cost over £60). D. S. Marshall, "Shelwyn", Nut Orchard, Twyning, Glos. Tel Tewkesbury 294082.

Low band W15AMB, boot mount, £50; W15AMD dash mount with mains psu, £60 ono. no mods. G3XHF, QTHR. Tel Reading 23995.

SWR bridge and power mtr switches, 50/75Ω line, PL259 skts, £8; 14AVQ vertical with LC80Q coil, £15, carr extra. Lee, 18 Kilmington Way, Highcliffe Christchurch, Hants. Tel 0425-2 5974.

BC221 with calbn charts and orig tech manual, spare valves, no psu, £15. Smith, The Old Forge, Brinkley, Newmarket. Tel 063-876 230.

Vertical 30ft + 14ft, ex-gov kit in bag, £3; No 19 set tx/rx + variomtr, £2.50; buyer coll, or del 20 miles; "101 ways to use your scope" and "101 more ways", mint, £1.20 the two; PR30X preselector, vgc, £4. G3UIJ, QTHR. Tel 01-898 5608.

SSB gnrtr, 455kHz, Collins mech fltr in G2DAF-type chassis, 898 dial drive, band change switch, carrier xtal, ideal basis for tx/rx, £18 ono; Mullard 5-10 amp, £10 ono; pr KT66s, £2.50. Reynolds, 224 Station Rd, Rolleston Burton-on-Trent. Tel Tutbury 3395.

2m tx/rx, exch for Airmec 853, ideal ssb rx, APT 5155, reg psu, both mint cond. G3ZAV, QTHR.

Marconi CR150 rx, 2-60MHz, with built-in power pack, rewired in pvc-covered wire, £15; Panadaptor, 24MHz i.f. ± 5MHz, ideal for vhf feed from cnvrtr i.f. o/p, £10. G3MPS, 31 Woodlands Ave, Weybourne, Farnham, Surrey. Tel Aldershot 26170.

Motorola ICs, MC787P, 50 off, £5, buyer coll, 80m vfo, 5W i/p, multipliers and 50W pa thrown in, £3 inc psu. G3MEJ, QTHR. Tel 01-648 5895.

Pye Ranger, low-band, nr 4m, less xtals, £7; Fantavox communication rx, HE50, 10-600m, £12: Minimitter cnvtr 10-80m 1·6MHz i.f., £4, all items ono. G3VSJ, QTHR. Tel Walham Cross 36512.

Mullard students constructional scope, i.f. time base, only £5 ono; R1155 mains psu, ldspkr o/p, dipole aerial, i/p df cct removed, £5 ono, both with full ccts etc. R. Johnson, 206 Orphanage Rd, Erdington, Birmingham 24. Tel 021-373 4288.

HW17A wkng W1D, dc psu, new, any offers. **Wanted** in gd wkg order model RCX panoramic radio adaptor i/p, freq 450 to 475kHz. Write to EI8BZ, Blackrock, Co Dublin, Ireland.

Collectors item, 1930 approx, Osram Music Maker IV, wkg, offers; 60W cw tx, three band, built-in psu, £8; 150W amplifier £4; 19 set rx only, £5; several PSUs, Minolta 24 rapid camera, £25, sae. 4 Hill St, Tillicoultry, Clacks.

Exchange Hy-gain vertical 18AVT/WB, only few weeks old for tri- or two-band beam, all letters answered. G4ADF, QTHR.

Star ST700 tx, immac cond, 6146Bs final, all bands, £70, buyer coll. G3BIC, QTHR. Tel 021-353 4119.

Nixie tubes, miniature 2cm high with decimal points, side viewing, wire-ended, 60p ea. G3WXZ QTHR. Tel Needham Market (Suffolk) 720422.

Crystals, 2m, 12063, B7G, 8079·1, HC6U, 8054·6, HC18U, 4m, HC6U, 8795 (70·36), 8795·87 (70·375), 75p ea. G3RDQ, QTHR. Tel Radnage 2461.

Eddystone EC10 Mk II, mains psu, whip aerial, orig box, £56, plus del; 70cm Parabeam £2, buyer coll. G8AYY, QTHR.

KW2000 ac & dc psu, vgc, £120; Pye base tx, 640 p.a. modified, wkg on 2m, £25; 2m transistor cnvrtr, i.f. 4-6MHz, £5, can del rsnble distance. G4AED, QTHR.

HW17A 2m tx/rx, no mods, with hndbk, exc cond, Daystrom checked, £45. HW17-1 12V /M psu to match, with hndbk, £9. D. Lomax, 72 Avenue Road, Torquay. Tel 27898.

Collins KWT6-type rx exciter, 1·7 to 31·7MHz synthesized, 1kHz steps, continuous tuning, usb, lsb, isb, a.m., exc cond, £220; 14-el a.m., Parabeam with cdr, heavy duty rotor and 30ft galvanized scaffolding tower £25. Tel Bracknell 20358.

Joystick and tuner, 300W p.e.p., £8. tx/rx, 2m TR1986, new cond, bargain at £4, Japanese bug key, £3. G4ADF, White Cottage, Codmore Hill, Pulborough, Sussex, RH20 1BQ.

HROM, 9 coils, gd cond, £19. UR-1A fet solid state rx, exc cond, £19; High gain 12AQ, as new, boxed, £12. E. W. Taylor, "Merryfield", Brook Lane, Wood Green, Fordingbridge, Hants. Tel Breamore 436.

1 new Eimac 4X150A and 2 new bases; store soiled 4X150A(2), 4X250B(2) and 1 base, no chimneys, believed unused, £10 the lot. HW30 "Twoer" £22. **Wanted** FT401 or FT101. G3FYW, QTHR. Tel Yorkshire Sleights 280.

HRO valves, 12 way plugs, sockets, mains trnsfmrs, chokes, relays, mtrs, capacitors var, fixed, mics, valves, coils, megger gnrtr table-top cabs, xtals, metal rectifiers, stab supply, sig gnrtr, other equipment, going cheap. G3DFS, QTHR. Tel 021-354 7769.

Codar AT5, 250 psu, /M psu, T28, 12/RC xtal mic, £35; 2m 5W a.m./cw tx, £5; "Electronic Valves", vols 1, 4 & 7, £1·50, all vgc, carr pd. **Wanted** Heathkit SB640 vfo and 2m transverter. G3JMD, 8 Heythrop Drive, Middlesbrough.

Murphy TR902 high band base stn, single channel, rx side untested, £20. G3WEX, QTHR. Tel 021-354 4265.

Crystals, HC6U, 1MHz and 5MHz, HC18U, 8·950MHz. all 75p ea, any three for £1.85, send 3p sae with remittance and order. Richard Bowell, 16 Margarite Way, Wickford, Essex.

Scope CT52 2¾in TB 10Hz, 40kHz, 1MHz bandwidth, as new cond, c/w test leads probes metal transit case, ideal bench instrument, £20 carr. pd. G3MLP, 10 Roberts St, Rushden, Northants. Tel 09334 2469.

RC, 1965, 1972, 50p per year, postage extra; *SWM* 1956, 1957, 1962, 1964, 1966, 1967, 1969, 1970, 1971, 1972, 1963 less June and July, 50p per yr, postage extra, offers lot. G4FN, 31 Highfield Gdns, Grays, Essex.

1155N rx covers 160, 80, 40, 20m, external psu, £5; 62 set tx/rx 1·6-10MHz, int mods, xtal mic, preamp, power supply fltr, external ht, psu, mic, phones, £16. G4AHI, QTHR. Tel Rayleigh 4195.

Top band /m tx complete, 10W i/p, mic, 12V invrtr, £12; 38·6666 HC6U xtal, £1. **Wanted** xtal 67·333 or very close. G3ZUL, QTHR. Tel Droitwich 4510.

Trio 9R59DE rx, Windsor Trident tape recorder, 7in reels, Labgear type 10, sig gen, Multitone 60W tx, 27MHz, 10in spkr, 12in spkr, both in cases, *PW*, *PE*, *RC* 1967-1972, £70 lot, all gd cond. E. E. Cox, 279 London Rd, Reading, Berks. Tel Reading 61950.

Cheap, Londex coaxial changeover relay, wvmtr, W1646 (ac powered), 3in scope tube, VCR138. **Wanted** bfo coil from old Sky Champion rx, rf ammeter, 2A, fullscale. Parker, 133 Station Rd, Cropston, Leicester, LE7 7HH.

Pye Vanguard AM25B + control box, 2m, £12 carr extra. **Wanted** beam rotator/gdo. G3JGC, 64 Verity Cres, Canford Heath, Poole, Dorset.

American Thordarson trnsfmr 700-0-700, 200mA, 12H and 20H mtchng chokes, rectifier trnsfmr with rectifiers, £2.25; UM3 mod trnsfmr and driver, £1.25; Gardner HV 5V 6A twice, or 10V 6A, 75p, carr extra. D. E. Herbert, Farm Cottage, Callestick, Truro, Cornwall. Tel Perranporth 2047.

American valve tester, wkg order, with details, all mods, £4; Lissen spkr circa 1920, gd cond, £5, both carr extra. G3YAO, QTHR. Tel 01-654 6642.

CR100 £15; mains trnsfmrs, Woden, 250mA, 650/650, 750/750, £2 ea; ex Gov, 800/800, 100mA, £1.50. G3WGL, QTHR. Tel Glossop 4981.

VFO HW HG10B, on 2m £20; Taylor sig gen, 62A £10; Avo mtr impedance bridge £5; EMI impedance bridge, mains or battery, caller coll. Exch for Mini tri-band beam full size quad (poly quad) kit. G8DXN, QTHR. (Now G4BNH), 26 Dene Hill, Baildon, Shipley, Yorks.

KW Victor tx, 120W am/cw, £25; AR88D rx, pvc wired, £25; BC221 freq mtr, psu & charts, £15; B2 spy rx/tx with psu and all coils etc, £12. G3PGW, QTHR. Tel Tewkesbury 293112.

Hammarlund HQ170 plus trnsfmr for mains operation, in gd cond, £70 ono; Pye base stn converted for 2m + 8MHz xtals, £25, will del up to 50 mile radius. G8FJL, QTHR, Tel 0246 72431.

CCTV Monitor 21in 625-line, metal case, standard i/p, tested, £10; valve SPG £8; **Wanted** Ex broadcast camera equpmnt or spares, lenses, tripod, pan & tilt head Mk III cable. Summers, 7 Orchard Close, Morton, Gainsborough, Lincs. Tel 3940.

TA33 Jnr, almost new, £20; J-beam, 4-el, 4m, £2.50; Cossor scope 1039A, Mk II, £10; Pye Ranger, low band unmod ccts, mic, £8; Taylor 47A valvetester, adaptors for glass valves, £2, rough, buyer coll. G3XFM, QTHR. Tel York 78409 after 6pm.

Hudson 2m fm tx/rx, 2m xtals, QV310 pa, 12V pos, neg earth, £25 ono with ccts; 80-10m a.m. cw tx, 150W, snip, £10. T. Mills, 75 Lymington Ave, Clacton, Essex. Tel Clacton (0255) 21664.

Johnson vacuum var capacitor, 110pF, £2.50; trnsfmr 3·4kV, ct, 150mA, 6·4V 8A ct, £2.50; turn-counting dial £1.50. G3PJT, QTHR. Tel Comberton 3137.

70cm GEC base tx, fm, 3–20 pa, £20; 70cm Pye base rx transistor, £15; 2m Pye base tx, fm, with case and a.m. rx, £20; J-beam 10el £4; 70cm parabeam £4 ono. G8BRF, QTHR. Tel 061-485 6745.

For G2DAF Mk II tx, comp set 22 Electronique coils in screened cans £5; vfo, 5-5·5MHz, with valves, rigidly-constructed, £2.50, or both £7; several 2·5A 260V ac variacs, £3.50 ea, carr extra. GM3JHL, 128 Sheephouse Hill, Fauldhouse, West Lothian, Scotland. Tel Fauldhouse 433 (evngs).

Valiant a.m. /M tx/rx £25; Hudson fm ditto £25; both 12V. 145·0 Pye base and Bantam a.m./hb, both £220. **Wanted** Cambridge control boxes and mics. GC3HKV, QTHR. Tel Guernsey (0481) 47278.

Heath RF1U £12; Delta relay unit £3; Phillips tape recorder EL3541, £10. **Wanted** Mohican. G3OCS, QTHR. Tel Brightlingsea 3879.

HRO psu, bndsprd, gen cov coils, perf, £25 ono; Ranger on 2, needs xtals and slight attn, £8; VV beam 10-15-20 Delta match, offers. **Wanted** TA33 or 32; small top band /M rx. G3WHQ, QTHR. Tel Grimsby 823824.

AR88D, handbk, spare valves, tuning mtr, gd cond, £25; 52 set Canadian mains psu, £9, carr extra on both. Peacey, 4 Wellwood Close, Cyncoed, Cardiff, CF3 7HD.

KW1000 lin amp, mint cond, £100 ono; Western Electronics 3 band quad, new, £20; buyer coll. G3XTU, QTHR.

Sommerkamp FR100B with 160m and Codar Q-mult; Codar AT5 with mtchng psu, unused, atu mics and phones, £95 no offers. J. R. Baker, 9 Manor Gardens, Effingham, Surrey. Tel Bookham 56435.

Complete swl stn, BC348, psu, spkr, Codar PR30, £10. Mason, 8 Colborne Ave, The Vineries, Wimborne, Dorset. Tel Wimborne 3618.

Reflectometer for 2m, £1.75; few 832A valves, 65p ea. D. Pickering, 26 Hedl Ganol, Sarn, Nr Bridgend, Glam.

KW201 rx with clbrtr and KW Viceroy IIIA tx, both mint cond, used as comp stn with aerial, c/o relay, £150 or would sep at £75 ea; wld del rsnble distance London. G3CLK, QTHR. Tel 01-777 5229.

144MHz Solid State Modules cnvrtr as new, £10; *RC* Handbk type 70MHz nuvistor cnvrtr, needs alignment, exc mech and elec constrctn, £8; Lafayette HA63A comm rx, Joymatch, Joystick, £12. J. Owen, 76 The Glade, Shirley, Croydon, Surrey. Tel 01-654 5741.

Complete ssb/cw stn comprising KW Vespa Mk I tx with psu and mic; Trio JR500S rx with spkr and all connecting cables, immac cond, £95. G3ZZD, QTHR. Tel TunbridgeWells 34117.

Vox unit for KW204, £8; Heathkit DX100 + SB10 adaptor £50, del latter within 50 miles. G4AVO, QTHR.

Eddystone EC10 mains pack, mint, perf order, £44; Partridge trnsfmr, 550V, 250mA, Gardeners 550V, 350V, 300mA, Woden 450V, 200mA, 400V, 100mA, all with LTs, £1.75 eac, all items carr extra or coll; sae for details. G2BAT, Firdowne, Gomeldon Hill, Salisbury Wilts.

Swan Corp 10-40 trap vert, as new, best offer secures. J. A. Tiernen, 429 Oxford St, W1. Tel 01-286 4505 (evngs).

KW Vanguard 10–160, exc, £25 or exch gd 18 AVT, 9R59D rx, or sim gen cov rx. G4BJB, Holme Cottage, Church Lane, Ruscombe, Twyford, Berks. Tel Bracknell 20242 ex 2227.

Marconi CR100/8 £20; Heathkit 10–12U scope £35; RF-1U sig gnrtr £12; AO-1U sine/sq gnrtr £11; Class D wvmtr £5; all as new; *SWM* 1966-1969 and RSGB *Bull*, 1964-1972. Tel Beaconsfield 4343 (Bucks) w'ends only.

Heathkit HW17 2m tx/rx with dc psu, all Heath mods to "A" standard, gd wkg order and cond, £45 or offers; Sentinel 2m fet preamp, barely used, £4, or £47 together. G3PRR, QTHR. Tel Chesham (024-05) 4143.

HRO pp, ls 6 coils 100/1,000kHz, xtal, B7G valves, ssb GEC miniscope, spare CRTs, gd cond, Nombrex sig gen new cond, Nombrex audio osc, sine/sq wave, new cond, £36, buyer coll or why? G4GU, 59 Belgrave Ave, Watford, WD1 8NF. Tel 20132.

Radioactivity pocket dosimeters, as new, in case, with instrctns for use and for charging from any 240V dc supply, calibrated in milli-rontgens, fully tested, only 70p inc postage. G3ZSE, QTHR.

Heath GR78 £55; KW Valiant with 160m £15. Blakeley, 338 Thong Lane, Gravesend, Kent.

70cm pa and psu £25; KT88 modltr and spares £10; Philips tape recrdr EL3548 £20; wvmtr type R502 (100kHz-48MHz) £7·50; CDR AR10 £13.50; trnsfmrs—620-0-620V at 200mA £5; 1,500V at 125mA £3; 300-0-300V at 150mA £2.50; 3/10 to EL84 £1; 3/10 to 2 × 6AQ6 75p; Garex 70cm cnvrtr (28-30) £7.50; RSW 2m Hi-Q break £2.50; RSW 70cm pre-amp £2.50; R209 £13.50; uhf tuner £5; Germanium power transistors: 2N1078, 2N158, 2N158A, 2N1330, 50p ea; 1mA fsd mtr £1. G8CXJ, QTHR. Tel Crayford 51171.

Solartron CD1014—2 scope, 5MHz, as new, £40; Airmec power o/p mtr (af), 20mW-20W, £10; stab psu 0-800V at 200mA, £10 ea; TF142E af distortion mtr, £10; Philips GM1324 lab square wave gnrtr, £35; Advance H, af sig gen £20; lots of lab type mtrs 50p ea; Ray Dennis, 5 Holly Lodge, Wisteria Rd, Lewisham, SE13. Tel 852 2363 (evngs), 693-8692 (days).

KW Vanguard tx £15; Eddystone S640 with Q-mult, pre-selector, S-mtr, £15; 2 Hi-band Pye base stns £8 (£6 without mtr); Colormaster rotator £10; Admiralty pattern wvmtr £5; Class D wvmtr, int psu, £2; £1 paid towards carr on all items. J. Clements, 24 Valley Road, Tasburgh, Norwich NOR 66W, Norfolk.

Single paddle valve keyer by G2BB based on Ultimatic, well-made, little used, offers over £11. GM3IAA, QTHR. Tel Inverness 30459.

HRO rx with bndsprd coils, 160-10m, psu, spkr, £20; KW Vanguard tx, 160-10m, £25; matching Geloso mic £2.50; KW Geloso amateur band cnvrtr 160-10m £7, buyer coll, all vgc. G3TJR, QTHR. Tel Cooden 3851.

Yaesu FT2F, a.m. mod, fitted sep rx, vfo, £49; h/brew G2DAF lin, pr 813s, less psu, £17; ht trnsfmrs, 2,500V 500mA, £3; KW Ezeematch, mint, £8; SCR522 tx/rx, unmodded, £6. T. C. Sargent, 19 Manor Close, Aveley, Stockendon, Essex.

Heathkit vfo, model HG10-B covering 80, 40, 20, 15, 10, 6m and 2m, brand new, never used, £25; Heathkit HW17, as new cond, £60 ono. G8CZY QTHR. Tel Meadowfield 780465.

TW communicator 2m /M tx/rx, first class cond, exc performance, spkr, power supply for mains operation also; offers to R. J. Burrows, 8 Castle Court, Hurst Lane, Birmingham B34 7HS. Tel 021-706 8629 (daytime).

Custom-built mahogany formica cab, 47 by 18 by 27in, with 4 built-in 13A skts, shelves and separators, will house complete stn, £30 ono; Class D wvmtr, ac psu, £6 ono. C. J. Adams, 12 Cromwell Rd, London E17 9JN. Tel 01-521 3008.

New Atlanta, sep vfo, perf cond through illness, 5 hrs use, sell, £165; Heathkit, new 80m tx/rx, HW12A, mic, spkr, dc psu, 4 hrs /M swl use, factory-aligned and tested, buyr test and coll Greater London area, £65. G. H. Sissons, 25 Smithlands Grove, Bickley, Bromley, Kent. Tel 01-464 3646 anytime.

DX40U with VF1U and aerial c/over relay £15. Phone 01-527 4492.

Complete stn, HW100 lin, atu, tower, TA33 Jnr, heavy-duty PPs, LM14 freq mtr aerial control gear, /M psu, £175 ono. C. Stacey, 62 Prospect Place, Grays, Essex.

Drake TR3 ac psu RV3, remote vfo, exc cond, £175; Heath SB220 2kW lin, almost brand new, prof built, £150. Weatherley, Radiation Inc, RAF, Oakhanger, Bordon, Hants. Tel Bordon 3441, ext 254.

Pye 2207, boot mount, tx/rx, 25W, with control unit and all connecting leads, unmodified, easily converted to 4m, £12 plus £1 p & p. P. Webster. 7 Berkley Close, Hellesdon, Norwich 44602.

KW Viceroy Mk 3 £70; 25 ft steel lattice tower, 2 sctns, £20; 3-el 21-MHz beam, h/brew, £3; JXK 2m cnvrtr 28-30MHz, £8; 2m tx/rx with psu (h/brew), £7; 750V psu, all Woden £7; Racal 100kHz unit £5. G5DF, QTHR. Tel Reading 27876.

H/brew hf lin, 813, £10; hv psu £3; 2 cowlgills £1 ea; psu and pr Selsyns £3; Thunderbird 3/4-el beam, dismantled, £10; TW 2m convrtr 24-26 £4, buyer coll, all untested, ex late G5HZ. G5DF, QTHR. Tel Reading 27876.

Marconi TF937 (CT218), prof sig gen, 85kHz-30Mz a.m./cw/fm, new, in transit case, £85; TF885, video osc, 25Hz-5MHz sine/square, £25; 13A scope, new crt, completely overhauled, £20; eht psu, 2·5kV at 15mA, stab, £5. A. Jackson, 38 Haslemere Rd, Thornton Heath, Surrey. Tel 01-689 2727.

Pye Vanguard, mint cond, rx, vfo tunes 2m, inc tx xtals for 14·5MHz and other channels, complete and wkg, £30 ono, inc fet preamp. GW3VPL, 48 Depot Road, Cwmavon, Port Talbot, Glam.

Heathkit DX60, unused, perf cond; DX40 with vfo 1U, used, wkg, going ssb, the lot, offers around £50. **Wanted** cct and info for Murphy Rover MR960, dash mount. G3ZON, QTHR. Tel 01-546 3447.

KW Viceroy £65; Eddystone 888A plus spkr, £70, buyer coll. G3MCA, QTHR. Tel Orpington 28790.

Complete swl station—Eddystone 888A (decoder and S-mtr), £60; Chapman tuner—vhf, fm, lw, mw, sw, trawler, £25; Codar preselector, 1·5kHz-30MHz, £2; operating console, teak finish, £25; all for £100. Dawbarn, "Mellor", 8 Daylesford Close, Parkstone, Poole, Dorset, BH14 8DY. Tel 0202-74 3735.

R1155A with psu incorporated and hndbk, £10 ono; Heathkit 10-12U scope, vgc, £18, buyer coll or local del. **Wanted** Aerial rotator, Avo 8. Tel Frinton (02556) 3843.

Electroniques Hamband transistorized tuning pack and 1·6MHz, i.f. unit with xtal fltr, 160/10m, assembled as rx with transistor af amp and 898 dial, £20; Codar PR30X preselector, £4. A. G. Gardner, 51 Rowan Road, Sutton Coldfield, B72 1NW, Warks. Tel 021-354 1232.

Pye base stn, low band, a.m. transistor rx, £50; Jap 2-stroke engine on frame for gnrtr, £5; Cossor 1035 scope, mains trnsfrmr u/s, £5; JXK fet 2m cvnrtr 28-30MHz i.f., £12. G3TON, QTHR. Tel 021-354 8914.

Scopes, Solartron CD7115·2, with trigger delay, £39; CD513·2 £25; TO3 portable £27; BC221B, with inbuilt psu, £18; Marconi TF144G £12; TF428B vtvm £5; s-x band Q-mtr, £12; Robuk RK4, 3-speed tape recorder, £19.50. R. C. Whitbread, 32 Ironmill Lane, Crayford, Kent, DA1 4RR. Tel Crayford 24625.

KW101 swr mtr 52Ω, SO259 £6.50; Bauer keying/paddle unit, unused, £2.75. G3ZZR, QTHR. Tel Witney 3792.

Nearly new Ten Tec PM3A, £30 ono; battered Creed 85R, good for spares, no rsnble offer refused, prefer buyer views and colls. M. R. Hall, 41 St Annes Road, Leeds LS6 3NY. Tel 876122 (w/ends).

2m rack-mounted tx, sep stab psu, £20, (no modulator); 3in scope-tube in case with psu, 100μA mtr, etc, (no timebase) £5. **Wanted** base stn complete, fm Ranger? pr 15in spkrs. G3OWB, QTHR. Tel Camb (0223) 59127.

Met balloons, 65p; 275ft reels aluminium wire, 55p, p & p inc, ideal for balloon-supported verticals. Stratton, 15 Avenue Rd, Brentford, Middlesex. Tel 01-560 8671 after 6pm.

Pye Vanguard tx/rx, modified for 2m with accessories; 10·245MHz xtal in HC6U; 18ft Pye remote-control cable with plugs (18-way); 19 set variometer; 50Ω 50W dummy load; trnsfmrs and many other goodies, full details on request. R. Phipps, 26 Spinney Hill Cres, Parklands, Northampton, NN3 1DL.

2m Pye base stn, 640 pa, a.m./cw xtals/vxo, £35; 2m Cambridge tx/rx, tunable, £25; mosfet cnvrtr, 28-30MHz i.f., £6; mosfet preamp £4, Class D wvmtr £4. **Wanted** AT5 T28 combination. G4BHM, QTHR. Tel Leeds 664833.

2m tx, 48W phase mod, exc, £22; 70cm cavity wvmtr, TS184A, £12; Heath 10-12U scope, exc, £32; Jason audio gnrtr, £8; DET 24 £1.50. Pawley 52 Sumatra Rd, West Hampstead, NW6. Tel 01-794 9934.

Sommerkamp FL200B tx, FR100B rx, gd cond, £130 the pr. G3VLX, QTHR. Tel 01-467 8093.

G2DAF lin using 4CX250Rs with psu, wkg 80 to 10m, £30; Heathkit GR64E gen cov rx, gd for swl, £13, buyer coll; XF9B xtal fltr, unused, £14. G3ZSS, QTHR. Tel 05432 2614.

Exch Solarscope CD513 for rx; have also 2m tx, complete, but fault in driver stage, will exch for complete but not necessarily wkg rx; pse call and examine gear. G3LYU, QTHR.

Creed 6S5 auto tx, 7½-unit code 230V ac/160V dc governed motor, £6.50; Creed 85R printing reperforator, type 13 governed motor, single or double current, £8, buyer coll. G3NUE, QTHR. Tel 06846 2766.

CR70A, spkr, bfo, needs attn, but wkg, £15; 2m cnvrtr, 4-6MHz, 9V, £5; PR30X preselector, internal psu, £5; small ac-dc cnvrtr, 3-12V nominal, £2; buyer coll or carr extra. L. Carr, White Lodge, Blackpond Lane, Farnham Royal, Bucks. Tel Farnham Common 3689.

BC221 freq mtr £18; Trio 9R59DE £30; Heathkit HW30 £18; Heathkit /M power unit for HW17A £15; Avo valve tester £8; Avo valve manual £2; Collaro studio tape deck £5, buyers coll. G8CJM, QTHR. Tel Medway 47280.

TCS tx/rx atu CU/spkr, mic, ccts; rx, spares, nr complete set (use case for psu?), £25; Pye Ranger (boot) case, frame, endplates, plugs & sockets exc cond, £1.50; control unit £2. G8AAG, QTHR. Tel Reading 883611.

Complete operational stn, Vespa Mkl tx, Eddystone 888A rx, KW E-zee match, 18AVQ Hi-gain aerial, manuals, £125, buyer coll. G3MIX, QTHR. Tel Teignmouth 4480.

144MHz 40W dc a.m. mains tx, QQVO3-20A, 4XOC28, £25; R4187 rx 2·8 to 18MHz, 28V dc, suit conversions etc, £3.50, sae all enquiries, further details, list of trnsfmrs, valves, transistors, FETs, etc. G8BUR, QTHR. Tel Knebworth (043881) 2229.

KW Vanguard tx, 160-10m, a.m./cw, £25, will del 50 miles. GW3WSU, QTHR.

QSB VK 50ft Telomast £15; TA33 Jnr £20; 2m Parabeam £9; ½G5RV £3; odds and ends, all coll. G3ZDC, QTHR. Tel Egham 4704.

HRO bndsprd coil packs, 80, 40 & 20m, £1 ea + post. G3SWP, QTHR.

Heath SB100 tx/rx with SB600 spkr, psu mic, hndbk, exc order, £125. Tel 01-648 5895.

G2DAF tx and psu, £35; G2DAF rx, Collins fltr, Eddystone dial, requires clbrtn, only £30; Pye Cambridge, fully modified, just install, £35; buyer coll. Tel Hinckley 36520 after 6pm.

Low z stereo hdphns £1.50; Philips 90RL194 vhf/mw transistor radio, £4; Mullard stereo 10 + 10W amp, Bribond PCBs, magnetic pu i/p etc, switched phones/LS, 240V i/p, bargain @ £10, carr extra. F. J. Crisp, Duver House, Duver Rd, St Helens, Ryde, IW PO33 1XY.

Heathkit DX-60B tx, HG-10B vfo, £25; HR-10 rx, £20. H. Rounds, 157 St Albans Rd, Sandridge, St Albans Herts. Tel St Albans 62830 after 5pm.

Scope, Solartron CD711S, high quality measuring scope, dc-9MHz, dual beam delay trig, etc, with hndbk £45, buyer coll; rtty adaptor fsk unit & psu, type CFS with hndbk, £10, callers only. G3WJG, QTHR. Tel 01-997 0901

Heathkit gdo IU, 530kHz to 230MHz, mint, £10; Eddystone 898 dial, unused, in orig packing, £6, coll or + postage. **Wanted** 14AVQ or 18AVQ Hy-gain vertical. Poole, 50 Woodberry Avenue, Winchmore Hill, N21. Tel 01-886 0564.

Sentinel 2m cnvrtr, 4-6 i.f., £10; 2m tx, rf section + psu 3-20A pa, £10; transistor Ranger, 6-chann tx on 2m, £5. S. Camm, 25 Sunnyhurst Lane, Darwen, Lancs. Tel Darwen 71690 after 6.30pm.

ICOM 1C21 with vfo & 7 crystal freqs, £120; delvd by Securicor in mnfctrs boxes, only 6 months old; BF180 preamp in diecast/box, £1. R. Payne, 18 Willian Road, Hitchin, Herts. Tel Hitchin 50519.

Cossor 1049 MkIII £25; Airmec 712 vtvm £5; Scalamp £10; Wheatstone bridges, other school lab equipment to clear, sae list, BD121, 55p ea, 1nF disc ceramic, 25 for 45p. **Wanted** AR88 or sim communications rx. B. S. Homer, 32 Iron Mill Lane, Crayford, Kent, DA1 4RR Tel Crayford 24625.

Solarscope CD643, gd cond, £40 ono, buyer coll. D. Pollington, 27 Stoke Ave, Hainault, Essex. Tel 01-500 6922.

Pye 6-chann Cambridge; Pye base stn, both wkg, with xtals for 70·26, offers. G3VPT, QTHR. Tel Norwich 898715.

Vintage rx, Sky Buddy S19R, gd cond, wkg order, £5, pref buyer coll; new 2N3866s by TRW, 50p ea, post 5p any number. G. Elliott, "Oatlands", Southend Rd, Howe Green, Chelmsford, CM2 7TD. Tel Chelmsford 71604.

HRO, gd cond, 11 coils incl bndsprd, 3·5, 7·0, 14·00, 28MHz, spare valves, xtal, i.f. unit, psu, £22.50. G3ADK. Tel Luton 27595.

Complete tv stn, less rf camera and control unit, solid state, broadcast standard, 625/405, own spg with Videcon 1in lens, monitor, etc, offers; will exch for ssb eqpmnt; colour i.f. strip with tuner, as new, £10. G3VOF, QTHR. Tel Swavesey 30588.

BC625 tx, unmodded, all valves, £6; Hi-band boot transistor Ranger £5; BCC69F tx on 2m, rx needs attn, with psu, £6; pr 807s £1.50; pr 5B/255M £1.00. Reynolds, 224 Station Rd, Rolleston, Burton-on-Trent. Tel Tutbury 3395.

HW100 and HP23 ac pu, both mint cond and hardly used, £120, enquiries w/ends only. Wickham, 9 Wensleydale Gdns, Hampton, Middx. Tel 01-979 8779.

KW Vanguard tx, 160-10m, £26; Trio JR500SE rx, 160-10m with SP5DS spkr, £48; can del rsnble distance. G4ABG, QTHR.

VHF Hi-band 10W base stns with hndbks, GR286 private unit, 7-chann, a.m. fm, £30; GR286 international unit 28-chann, fm, £25; SEA combi 6-chann fm with rcu £18. G3JMJ, QTHR. Tel 073-271 3467.

Eddystone EC10, Mkl with battery pack and mains psu, £35; buyer insp and coll. J. Nettleton, 129 Stainbeck Lane, Leeds 7. Tel Leeds 681753.

KW2000 ac psu £110; W1191A wvmtr, £3. G3SHQ, QTHR. Tel 04-446 5037.

CR100/8 £15, buyer coll; de luxe vfa, with tuner, £8; 455 Command rx £2; Raymart wvmtr £2. E. R. Crane, 1 Lea House, Salisbury St, London NW8. Tel 01-262 1461.

Pye Vanguard with mic, six-chann control unit, cables and xtals for 145 tx/rx, £20. G8FAL, QTHR. Tel Luton 31560.

Snelgrove of Canada F9001 9MHz xtal fltr, with matched xtals, £8; one MF455-10K, no xtals but with data, £4; 1 Eddystone 898, SM dial, unused. £4. GI3LEP, QTHR. Tel Dundonald 2134.

Hallicrafters S38C gen cov rx, £8; Veritone CR-150 gen cov rx with manual, £10; T1540 2m tx, gd cond, unmodded, £11; Newnes *Radio and Television Servicing* 1962/63, £2; buyer coll. G8COF, QTHR. Tel Nottingham 263275.

Henry's Radio 10W transistor amp with pre-amp, new Stentorian spkr and mic, battery mains, portable, £18, ono; Avo vtvm electronic testmtr TE25, £20; Pye mirror galvo, £1.50. **Wanted** Avo 8. H. H. Seymour, 6 Chichester Bldgs, Swan Mead, London SE1 4RY.

Pye Westminster a.m. 2 chann, wkg, xtals for 145.0, £45; Pye Vanguard a.m./fm, 2 chann 145·0 GB3PI, built-in tone burst gen etc, £45; Avo signal gnrtr, 50kHz-80MHz in 6 ranges, wkg, £15. G8AYB, QTHR. Tel Luton 55606.

Hammarlund HX50 tx, cw/a.m./ssb, 160-10, £80; Eddystone EA12, £120; 840C £35; Admiralty pattern 100335, exc modern rx, 60kHz to 30MHz, modular cnstrctn, geared drive, bargain, £45; 4m tx, 50W 4-el beam, £25. G3GTX, QTHR. Tel 01-938 4697.

High band fm Storno, CQM 13C 10m 12V units, just taken out of service, £12 ea. G3SLI, QTHR or phone via G3XGZ, Wantage 4004.

Vanguard AM25B on 70·26, exc cond cw control unit and connectors rx, needs slight attn; Pye base 703Z, 70·26 wkg, buyers test and coll. Offers. Tel Liss 3314 w/ends.

6-over-6 2m J-beam £4; Hansen SWR3 bridge, boxed, unused, £3; KW 3-way aerial switch £3; buyer coll. Shilvock, 14 Green Lane, Lye, Stourbridge, DY9 7EW. Tel 021-262 2789.

KW2000A + psu £160; KW E-zee match £10; KW lpf 75Ω, Ch 2, £3; KW dummy load £3; Eagle pwr & swr bridge £7, R216 + psu, £45; 4-el Yagi, 4m, £2. G3WQM, QTHR. Tel York 73672 (after 6pm).

Codar CR70A with spkr, cond as new, with long-wire aerial and insulators, to clear, offers considered, del to be arranged by buyer. N. A. May (jnr), 80 Green Lane, Great Barr, Birmingham B43 5LE. Tel 021-357 8692.

Rx R1116 £3; Mullard valve tester, 200 cards, £12; Cossor scope 1049 MKIV, with trolley, slightly faulty, £13; Leak amp and preamp, £10 or offers, buyers coll, sae for replies. G4AQV, QTHR.

Yaesu FRdx400 rx, 100-25kHz cal, mint, little used, £95; Hamgear 160m cnvrtr (cnvrts 7MHz), brand new, £7; Collins mech fltr, type F455Z1, 2·7kHz bandwidth, real beauty, £8. G3XTN, QTHR. Tel Kenilworth 56828.

Sig gnrtrs—EMI 30kHz–100MHz, 6 ranges, £30; Cossor 8-100MHz, 4 ranges, £25; both have carrier meters, accurate attenuators, exc calibration, pwr mtr, thermo 400W, 800W with 2-tone. Callers welcome. G3GYE, QTHR.

WANTED

Buy or borrow hndbk, cct for solar scope, type AD557. K. Beesley, Eliot College, The University, Canterbury, Kent.

Clean Labgear LG300 tx and matching Labgear psu, state cond, price inc carr. P. R. Cavanagh, 661 London Rd, Sheffield, S2 4HT. Tel 581139.

Morganite type 712, 200Ω, carbon resistor, state price, will pay all postage, etc. J. C. Eastaugh, DA2YU, RAF Gutersloh, BFPO 47.

Two metal octal valves, type 6SB7Y. G3AEX, QTHR. Tel 01-467 0381.

Back editions *RC*, Jan, Feb, April, Aug, Oct, 1966; Feb, April, 1967, Feb to Dec 1968, July 1969, Dec 1970, June 1971 to May 1972, why and price. G8BYL, QTHR.

Trio VFO5D, ext vfo for TS510, gd cond. G3SJH, QTHR. Tel 021-472 1301, ext 191, office hrs.

BC453 Command rx, SCR 274N, state price, cond. GW6PO, QTHR. Tel Cardiff 67194.

White stick operator EI9CA wants HW-12A with or without psu, gd wkg order and rsnble, all mail to EI8BZ, Blackrock, Co Dublin, Ireland.

Good gen cov rx for 0·5 to 30MHz with freq precision, around £70 to £100 mark. **For sale** G-whip, 1·8 to 29MHz, complete, offers? Pat Gowen, 17 Heath Cres, Hellesdon, Norwich, Norfolk, NOR 58N. Tel Norwich 56161, ext 2253.

G3HSC Morse records with instrctns. J. H. K. Redman, 22 Park Rd, Melton Mowbray. Tel 2209.

For new school club stn, rx and/or tx, also any old comps, test equpmnt, etc, all letters answered. M. Vann, G3RLV, The Grammar School, Doddington Rd, Wellingborough, Northants. Tel 09333 2793 (day) or G4BVF, 09333 2879 (evng & w/end).

Urgently, manual for SX28, buy or borrow. D. S. Booty, 139 Petersfield Ave, Staines, Mx, TW18 1DH. Tel Staines 51636.

R1475, must be in gd cond, coil arranged. GI3OZJ, QTHR.

Drake low-freq convrtr, 10-1,500kHz, model 4-LF. David Maurice Smith, 13 Perry St, Dartford, DA1 4RB. Tel Crayford 22892.

Urgently, two Electroniques i.f. trnsfmrs, type D1F1/35, series II + Q-mult coil, type QL2, your price paid. S. J. Dickey, 17 Maley Ave, W Norwood, SE27.

Manual or cct diag for Cossor 1035, buy or borrow. A. R. Hedge, 28 Westbury Cres, Oxford.

RC, January 1972, your price paid, will somebody oblige please. G8BDB, QTHR.

Upper pcb from scrap Period "Town and Country" rx for L7 and L8, Pye or h/brew 2m and 160m /M RXs; state wkg cond and price. O/C Swift M.C., No 270 Course, Cadet's Mess, RAF Henlow, Beds.

DST100 1930 vintage, urgently need manual, buy or loan, everything returned. H. Hina, 24 Parkway, Stevenage, SG2 8DJ.

Eddystone EP15 panoramic display unit, Universal bridge, Marconi TF2700, Wayne Kerr B221A, or sim; Telequipment A and J amps and TD42 timebase; *Ham Radio* magazine, March 1972. G2WRK, QTHR.

KW Valiant tx, 20,000Ω hdphns and S-mtr for AR88, Avo valve data manual. G6BJ, QTHR.

Mu-metal screen for 5UP1 crt. G3BYY QTHR. Tel Wraysbury 2007. Buy steal or borrow diagram and/or instrctn book for rx PCR1 2m conv to swop 14-16MHz for 6-8MHz. J. H. Rowsell, 33 Drake Ave, Foxhill, Bath, Som.

CQ PA0 de G3LIV visiting Groningen, 16-20 April, would like to meet locals; vhf rotator, trapped vert 18AVQ. G3LIV, 5 Lancashire Drive, Belmont, Durham. Tel Durham 63111.

Modern communication rx, rsnble price, must be first clas cond; BC221 with orig charts. Details to G3QC, QTHR. Tel Blidworth 3915.

Cct or manual for Triplett sig gnrtr with xtal, model 1632, very gd price offered; Electroniques 3·5-4MHz coils. C. Sutcliffe, 24 Medfield st, Roehampton, SW15. Tel 01-789 4979.

High class gen cov communication rx, top price paid: 4CX250B plus base-chimney. D. Lomax, 72 Avenue Rd, Torquay, TQ2 5LF. Tel 27898.

KW2000A + ac psu, or sim, with 160m, by small club, £100 offered. GW3RVF, QTHR. Tel 68166.

Looking ahead

7 April—RSGB VHF/UHF Convention, Winning Post Hotel, Whitton, Middlesex.

4 May—RSGB Dinner Club, Royal Westminster Hotel, Buckingham Palace Road, Victoria, London.

6 May—Northern Radio Societies Association Convention, Forum Halls, Wythenshawe, Manchester (Note change of venue).

26 May—Bristol '73 Mini-Convention; Royal Hotel, Bristol.

22 September—Region 10 ORM and dinner, University College, Park Place, Cardiff.

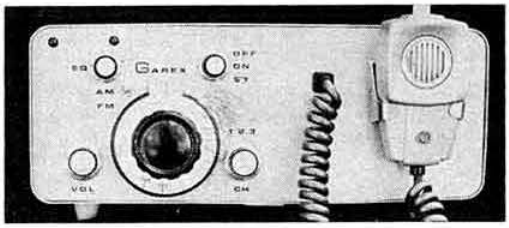
INTERFERENCE PROBLEMS

Members accused of causing interference or who suffer interference from external sources are invited to seek the assistance of the Interference Committee in solving their problems.

Enquiries should be addressed to: The Chairman, Interference Committee, RSGB, 35 Doughty Street, London WC1N 2AE.

GAREX

TW GAREX Transverters
We are now completing the final batch of TW units with transistor converters and improved drive.
Model 1 for use with low power input using transceiver P.S.U.
Model 2 for high power input 10-100 watts, less P.S.U.
Delivery 14 days. £85 each inc. Securicor despatch.
Sorry no power units are available at present.



TWOMOBILE AM/FM Tx-Rx
TX. Transistor crystal osc & multipliers. YL1080 driver 1080 P.A. output. No standby current. FM or AM at a flick of a switch. 3 position crystal selection. Spot check facility.
RX. Fully transistorized Tuneable covering 144 to 146MHz. Sensitivity 1.0 microvolt emf in. for 500mw audio out. S/noise ratio 10dB or greater for 1 microvolt input. Audio output stage to drive external speaker. Double super-het 2 RF amplifiers. FET first mixer. 1st IF 10.7 MHz. 2nd IF 455kHz. Crystal controlled second FET mixer stage. 6kHz bandwidth. 29 Transistors plus 6 diodes. Neg. or pos. earth. Directly calibrated dial. Squelch. Size 12 × 4½ × 8" deep. Delivery 7-10 days. Price **£105.45** complete, inc. 1 crystal, & PSU built in, for 12V DC input.

TWOMETRE TRANSMITTER RECEIVER AM
Complete with 12V DC mobile power supply unit built into one case 12"w × 4½" × 8" deep. *Rx* Fully transistorized covering the full 2 metre band. Built in noise limiter. Bandwidth 6kHz.

Tx 8MHz 6BH6-6BH6-QQVO3-10-QQVO3-10. Fully transistorized modulator with compression. Complete with P.T.T. mike, 28 Transistors, 10 diodes 4 valve. **£88.** Four metre Model **£88.**

Mains matching P.S.U. and speaker. **£18.50.** post 35p.

MARINE BAND. VHF radiotelephones, complete with battery and microphone/speaker. Crystals extra and subject to normal delivery periods. Size 4 × 13 × 21cm. Weight 1.4 kg. nom. Model GX1 type approved **£88** ex stock. Credit facilities now available on Transmitter receivers etc.

CHINNOR, OXON OX9 4BT
Telephone Kingston Blount 51476 (0844)

COMPONENTS
Mail Order only. Please send all component orders to
GAREX (W) LTD., 7 NORVIC RD., MARSWORTH, TRING, HERTS. HP23 4LS.

Where G3ZVI will be taking care of them. Lists—Large S.A.E. please.

FM (Phase Mod) RF P.C. board. Fully transistor, assembled. Suitable for 4-8 or 12MHz crystals. Osc. Multipliers and Mod. 24MHz output at 0.5W. 12-14V DC input. Circuit and mod. sheets supplied. Can easily be GDO'd for an 8MHz crystal. Ideal for the front end of a fully transistor transmitter. AM or AM/FM. **£4.85**
455kHz FM IF board. **£2.65**
455kHz AM IF board. **£2.65**
10.7MHz IF board. **£2.35**
Mic pre-amp boards. **52p**
FM squelch board **52p**
AM squelch board **27p**
All the above are assembled and include circuits and postage charges.
Plug-in Rectifier valve replacement stack. Octal(int) base. Full wave diodes 2·6kV peak at 200 ma plus. **68p** inc. postage.
Modulation Transformers
P.P. OC28/35 to QQV03-20a. Post 25p. **£1**
Single EL84 to QQV03-10. Post 20p **65p**
P.P. EL84 or similar to QQV03-20a. Post 28p. **£1.50**
CAMERA VIDEO BOARDS. Completely assembled. **£3.50** inc. post.
FM/AF Board (TX) to suit phase modified RF Board **£1.85**
Type 'O' variable capacitor 410pf, size 1.25" × 1.37" × 1" deep **22p**
Diodes 1AS029 **10p. 12 for £1**
Rectifier Boards 4 diodes for bridge cct, etc. Plus one bias diode RF choke and resistors **12p**
FM Transceiver RBM A41 38-45MHz. Further details later.

COMPONENTS

RETURN POST SERVICE

(WHERE POSSIBLE)

We stock so many state of the art components, it is impossible to list them all. A few examples are:

Resistors ★ ¼ watt & ½ watt, 10%, 10 ohms–1Meg.		1p ea
Capacitors ★ Polystyrene — Ceramic — Polyester— Electrolytic—Tantalum.		
Trimmers ★ Polypropolene — Ceramic.		
Semiconductors ★ 2N3819	Junction FET	29p
40673	MOSFET	65p
2N3553	VHF Tx	£1.40
BC108	Gen. Purpose	9p
Diodes ★ 1N4001	50v 1Amp	5p
Zeners	400mW 3·3–24v	11p
Hewlett Packard	LED (red) & clip	29p
Digital ★ IC's 7400 series		
Linear IC's ★ TAD110	IF system	£1.89
SN76013N	6W AF Amplifier	£1.90
Cables ★ RG174/U	50 ohm-0·1in dia coax	9p/metre

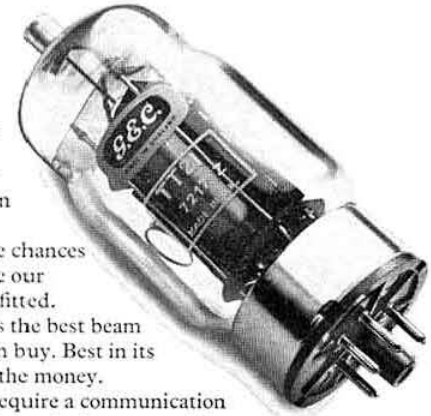
Catalogue also includes Semiconductor accessories, Heat Sinks, Wires, Solder, Coil Assemblies, Switches, Fuses, Knobs, Die Cast Boxes, etc. etc. etc. **Prices exclude VAT and 10% must be added to all orders.**

Terms of business: Minimum order £0.50 plus carriage 15p (free over £5.00).
Send 10p for Equipment and Component cats. to:

BURNS ELECTRONICS

THE COTTAGE, 35 BEULAH HILL, LONDON, SE19 3LR

The TT21. Cost per what?



Before you listen to us, listen to a few communication transmitters.

Because the chances are they'll have our TT21 already fitted.

Because it's the best beam tetrode you can buy. Best in its class. Best for the money.

So, if you require a communication transmitter tube at the lowest possible cost per what, sorry, watt, here's the address to find out more.

G.E.C. The M-O Valve Co. Ltd
Hammersmith, London W6 7PE Tel: 01-603 3431
Telex: 23435 Cables: Thermionic London
A member of The GEC Electronic Tube Co. Ltd., a management company which unites the activities of The M-O Valve Co. Ltd., and English Electric Valve Co. Ltd.

Radio Shack Ltd ★ London's Amateur Radio Stockist

Just around the corner from West Hampstead Underground Station

THE NEW DRAKE R-4C RECEIVER

FEATURES—

- Solid State Linear permeability-tuned VFO with 1kHz dial divisions. Gear driven dual circular dials. High mechanical, electrical and temperature stability.
- Covers amateur bands with crystals furnished. Covers all of 80, 40, 20 and 15 metres, and 28.5-29.0MHz of 10 metres.
- Covers 160 metres with accessory crystal. In addition to the amateur bands, tunes any fifteen 500kHz ranges between 1.5 and 30MHz. 5.0-6.0MHz not recommended. Can be used for MARS, WWV, CB Marine and Shortwave Broadcasts.
- Superior selectivity: 2.4kHz 8-pole filter provided in SSB positions. 8.0kHz, 6-pole selectivity for AM. Optional filters of .25, .5, 1.5 and 6.0kHz bandwidth available.
- Smooth and precise passband tuning.
- Tunable notch filter attenuates carriers within passband.

Matching Transmitter T-4XC also available

- Transceiver capability. May be used to transceive with the T-4X, T-4XB, or T-4XC Transmitters. Illuminated dial shows which PTO is in use.
- USB, LSB, AM and CW on all bands.
- AGC with fast attack and two release times for SSB and AM, or fast release for break-in CW. AGC also may be switched off.
- New high efficiency accessory noise blanker that operates in all modes.
- Crystal lattice filter in first IF prevents cross-modulation and desensitization due to strong adjacent channel signals.
- Excellent overload and intermodulation characteristics.
- 25kHz calibrator permits working closer to band edges and segments.
- Scratch resistant epoxy paint finish.

FULL RANGE OF MATCHING TRANSMITTERS, LINEARS AND ACCESSORIES IN STOCK.
SEND SAE FOR DETAILS.

DRAKE SPARES & SERVICE

RADIO SHACK LTD.

188 BROADHURST GARDENS, LONDON, NW6 3AY

Telephone: 01-624 7174. Cables: Radio Shack, London N.W.6.

Giro Account No.: 588 7151

Open 6 days 9 a.m. until 5 p.m. Closed for lunch 1 p.m. until 2 p.m.

Buy it with your BARCLAYCARD & ACCESS

B. BAMBER
Electronic Surplus

PYE CAMBRIDGE AMIOD dash mounting, good condition. High band 25kHz, OK for 145MHz. less xtals. **£15.**

PANEL METERS 500mA 190 ohm, size 2½" × 2½". Black bakelite case, Brand new **£1.50.**

PANEL METERS 1mA, 900 ohm size 3½" × 3½". Black bakelite case. Brand new **£1.50.**

PANEL METERS 100 microamp. Modern clear style with grey front. Size 4½" × 3½". Scale marked 0-20. Brand new **£2.50.**

PANEL BULBS wire ends 6·3 volt 0·3 amp. 10 for **25p.** PL 259 PLUGS **25p** each, reducers for std co-ax few only **10p** (only supplied with plugs).

SO 239 SOCKETS 15p each, ex-equipment few only.

BNC PLUGS 15p each. Amphenol type 31-304.

POWER TRANSISTORS 2 N3773 Silicon NPN 150W 140 volt. Two mounted on heat sink **£1.10.**

POWER TRANSISTORS CP 704 Silicon NPN 30W 80 volt. Mounted on heat sink **20p** each.

TRANSISTORS ASZ18 **50p.** OC22 **33p.** AFZ11 **50p.** AFZ12 **50p.** OC201 **10p.** OC24 **30p.** OC28 **40p.** BC177 **10p.** BC178A **10p.** AC128 **10p.**

RECTIFIERS BY122 10p, BY126 **10p,** (4 for **30p**).

VALVES ex-equipment QQVO6-40a **£2.00** each. QQVO3-10 **50p** each.

VALVE BASES to fit QQVO6-40a ex-equipment **40p** ea.

P. A. ASSY. ex-equipment suitable for 4 metres but can be changed to 2 metres. **50p** each.

VALVES Brand new and boxed QQVO2-6. **£2.00.**

VALVEHOLDERS B7G, B9A, and Octal **5p** each.

ASSORTED "GLASS" FUSES 1¼" length, **20p** per doz.

FERRITE ROD AERIAL, 5½" × ½" dia. with mw & lw coils. **15p** each.

TRIMMERS mica dielectric 550-1600pf **10p** each

TUNING CAPACITORS pre-set airspeed 100pf **15p** each.

TRANSISTOR INVERTER TRANSFORMER 12 volt input to give 375 volt at 150mA when used with bridge rectifier. 2½" × 2" × 2½". With circuit diagram **£1.80.**

TRANSISTOR INVERTER TRANSFORMER 6 or 12 volt input to give 260 volt at 150mA, also gives 12 volt output when used on 6 volt. Brand new with circuit diagram **£1.25.**

MAINS ISOLATING TRANSFORMER 375 volt.A. tapped primary, 240 volt output. Brand new **£5.00.**

MAINS TRANSFORMER 240 volt input, 250-0-250 at 25mA, 6.3 volt at 1 amp, 6.3 volt at 0.6 amp. Brand new **£1.00.**

MAINS TRANSFORMER 240 volt input, 2000 volt at 10mA output. Brand new **£1.00.**

Pye F.M. Cambridge spares ex-equipment

R.F. Boards High band **£3.30**
10.7MHz I.F. Boards **£2.80**
2nd Mixer Boards **£1.70**
455kHz F.M. Boards **£2.80**
Audio Boards **£2.80**
F. M. Squelch Boards **£1.70**
Tx Oscillator/Multiplier. **£1.70**
Bandpass filter 25kHz **£2.20**
YL1080 Valves **80p**
NKT404 Transistors **25p**
Relays 2 pole C/O 12 volt **25p**
Antenna C/O Relay 12 volt **£1.00**
Audio driver & O/P transformer **£0.55p**

MAINS TRANSFORMER 240 volt input, 500 volt tapped at 340 volt at 240mA, 315 volt at 135mA, 50 volt at 50mA 6.3 volt at 8.5 amp. Brand new **£3.30.**

MICROPHONE TRANSFORMER for use with low impedance microphones. 30-50 ohm input. Ratio 1:22. Lead mounting. Brand new **£1.15.**

AM2B Vanguards sets only no control equipment, high band & low band good condition, **£14.00.**

AIRMEC SIGNAL GENERATOR type 701, 30kHz-30MHz **£20.00.** Prefer buyer to collect.

TEKTRONIX CATHODE-RAY OSCILLOSCOPE D.C. to 10MHz good condition **£95.00.** Prefer buyer to collect.

AIRMEC DISPLAY OSCILLOSCOPE type T11410 needs some attention. **£25.00.** Prefer buyer to collect.

BARR & STROUD colour separation system. Type CT3. Offers invited.

Special 50p packs. Order 10 packs and will include an extra one free.

Jack plugs standard ¼" 4-**50p**
Multicore Solder 24 s.w.g. ¼lb-**50p**
Belling Lee TV sockets 12-**50p**
Resistors mixed values 50p a bag.
Valveholders assorted 20 for **50p**
"BNC" sockets round 5 for **50p**
Min. 4 core screened cable 10m **50p**
Valveholders B9D ceramic 6-**50p**
Screws, nuts & washers ass. 3 lbs **50p**
Care fuses 25 amp. 20-**50p**
Telephone handsets modern style black **50p**
Valves 6BH6 used 4-**50p**
6BJ6 used 4-**50p**
ECF80 used 4-**50p**
12AU7 used 4-**50p**
12AX7 used 4-**50p**
Transistors AC128 new 6 for **50p**
Capacitors 0.5mfd 3 volt 50 for **50p**
32-32mfd 450 volt 3 for **50p**
6400mfd 16 volt 3 for **50p**
DIN plugs 5 pole 240deg. 4 for **50p**
Relays 12 volt coil used 4 for **50p**
Potentiometers ass. values 12-**50p**
Control knobs ass. types 20-**50p**
Tape recorder amp. no details **50p**
Crystals HC6U 4 & 9MHz type 10-**50p**
Bolts 2 BA 2" long steel round hd. 200-**50p**
Diodes type OA79 25 for **50p**
Crystal switches 8 way 2 for **50p**
UHF/VHF TV tuners last few 2 for **50p**

SHIPTON CRYSTAL DRIVE UNIT type 555/B plus 3 slave clocks. Offers invited.

TERMS OF BUSINESS cash with order, mail order only, or callers by appointment.

PLEASE NOTE THAT ALL PRICES INCLUDE VAT

POSTAGE: 15p on all orders.

20 WELLINGTON STREET, LITTLEPORT, CAMBS. Telephone: Ely 860363

MINI-BEAMS

No garden is too small!

- 10—15—20 metres
- 6 ft turning radius
- No traps to burn out
- 50 ohm coax feed

B24 £35.75 (1.50) **HQ-1 £46.75** (1.50)

Send large SAE for details.

NEW! CURE TVI AT LAST

WATERS HIGH PASS FILTER—Just plugs into UHF TV receiver aerial socket. Offers high rejection of all HF band signals and also 4 and 2 metres. The only filter available for UHF 625 TV it also rejects outer braid currents. Aesthetically pleasing to the neighbours! Price £1.32 (6p).

Ferrite Rings—New supply available end of April. 20p. Note—Above prices effective 1st April.

WATERS ELECTRONICS (G3OJV)

8 Gay Bowers, Hockley, Essex

Callers by appointment *Tel 4930 (Evenings)*

G2CTV G3ZY

J. & A. TWEEDY (Electronic Supplies) Ltd.

MEMBER AMATEUR RADIO RETAILERS ASSOCIATION

Yaesu Musen:

FT101. 160 to 10	£255
FR200 with FP200 p.s.u.	£172
FT401 Transceiver	£230
FRSDX400 Receiver	£160
FLDX400 Transmitter	£146
FL2000B Linear	£148
FR50B plus Calib plus WWV Receiver	£63.00
FL50B plus VOX Transmitter	£72.00
FT2FB. 2 metre Transceiver	£89.00
FT2 Auto. 2 metre Transceiver	£146
FT501 & FT505 Available soon	

KW Electronics:

KW 107	£46.00
KW Ezee Match	£15.00
KW Trap Dipole 97ft. co-ax	£16.00
KW202 Receiver	£140
KW204 Transmitter	£160
KW 2000E Transceiver	£265
KW103 SWR and power meter	£12.50
KW Baluns	£1.95

Spacemark:

ETM2B Keyer	£23.80
ETM3B Keyer	£25.96

C.D. Rotators:

AR20	£20.00
AR22	£25.00
TR44	£45.00

Trio:

9R59DS G. C. Receiver	£49.50
JR310 Ham band Receiver	£75.00
JR599 Ham band Receiver	£185
TX599 Transmitter	£185
TS515 Transceiver with p.s.u.	£210
TL911 Linear	£140
TR2200 2 metre Transceiver	£62.50
SP5D Loudspeakers 8 ohm	£4.50
Tonilex 70cm Tripler amps	£06.50

Caslon Clocks:

Copal 601	£13.75
Copal 222	£6.65
Copal 101	£8.80
Copal 602	£11.50

Aerials:

Mosley, J Beam, Hy-Gain, Tavasu, "G" Whi0s, Telomasts.

Hamgear:

PM2A Preselectors	£9.20
PM2B Preselectors. Solid state	£8.25
PMV Calibrators	£7.75
PMVIII Calibrators	£11.75
PMIII Converter-1.8 MHz-7 MHz	£10.50

Used equipment: G line KW2000 **£110**; KW2000B **£170**; 9R59DS **£35**; FRDX-400 Choice of 3; DX40U + vfo **£22**; JR599 as new **£145**; JR500SE **£47.50.**

Open Tuesdays to Saturdays, 9 a.m. to 5.30 p.m.

HP terms available *Part exchanges*

79 CHATSWORTH ROAD, CHESTERFIELD S40 2AP

Tel. 4982 **Tel. 68005 evenings**

Pass the WORD! the BIRD is HERE

For 17 years, hams have been borrowing their friends' THRULINE® Wattmeter for accurate power and VSWR measurement. Now, at last, there is a Bird instrument designed for hams.

The NEW series 4350 HAM-MATE™ Directional RF Wattmeter is a direct descendant of the model 43 THRULINE® — the professional standard of the industry. It measures forward and reflected power in two ranges: 2000/200W or 1000/200W (1.8-30MHz) and 400/40W (50-150MHz).

One of the most important requirements of any insertion type RF wattmeter is its directivity, i.e. the ability to differentiate between power flowing in opposite directions in the transmission line. When adjusting an antenna to a 50-ohm line, a meter with insufficient directivity is likely to indicate a perfect match when none exists. The new HAM-MATE has a minimum of 20 dB directivity, an absolute must for meaningful reflected power (and VSWR) measurement.

The guaranteed SPECIFICATIONS:

Model	4350	4351	4352
Frequency Range	1.8-30MHz	1.8-30MHz	50-150MHz
Forward Power	2000/200W	1000/200W	400/40W
Reflected Power	2000/200W	1000/200W	400/40W
Accuracy	±8% OFS		
Insertion VSWR	less than 1.10 (50 ohms)		
Directivity	20 dB minimum		
Connectors	Female UHF (SO-239)		
Price	**£42**	**£42**	**£42**

BIRD ELECTRONIC LIMITED
NORTHWOOD MIDDLESEX

AVAILABLE FROM

HAM-MATE DEPT
32 NORTH VIEW EASTCOTE MIDDLESEX
Tel: 01-866 7564

G. W. M. RADIO LTD.

ALL PRICES include 10 per cent V.A.T.
RECEIVERS 62B. 150 kc/s to 300 kc/s, 0·56 Mc/s 1·5 Mc/s 3.9 Mc/s to 30·5 Mc/s in five bands. Controls and appearance similar to B40. Mains pack and monitor speaker built in. Clean condition and working. £21.80 carriage paid.
TRANSMITTER P.A. units STC T4188, tunes 2·8 to 18 Mc/s manual or 28v motor drive. 13" × 8" × 8". Pair CV2518 (4X150)28v blower cooled. Bases are NOT UHF type. Ideal basis for Linear Amplifier construction. £8.75 post paid.
PYE AM10D CAMBRIDGE Radio Telephones. Dash mounting, high band. Good clean condition, just out of service and complete with Conversion crystal only, £22.75 post paid. Pye Ranger dash mounting, high band. Clean and with Conversion crystal only, £6.55 post paid.
DOUBLE BEAM OSCILLOSCOPES CT436 (Military version of the Solatron CD1014) D.C. to 6 Mc/s, 10Mv per Cm sensitivity, clean and good order. £54.50 carriage paid.
PLESSEY PTR 161 24v 6 channel remote Transmitter/Receiver 116-132 Mc/s QVO4/7 output. 6" × 8" × 11" weight 16 lbs. Good clean condition and complete with circuit and details of suggested 2 metre conversion, including heater connections for 12v operation. £8.75 post paid.
RECEIVERS TCS 1·5 to 12 Mc/s. Power needed 12v AC or DC, 220v DC. Clean untested condition £10.35 carriage paid.
REED RELAY INSERTS. Overall length 1·85" (body 1·1") Diameter 0·14", single pole, normally off. To switch up to 550 ma at up to 250v DC, 69p per doz; £4.12 per 100; £30.25 per 1000; £275 per 10,000 all post paid.
NIXIETUBE bases 13 pin, 6 for 38p post paid. Moving coil microphones No. 13 with Plessey plug for B44, 65p post paid.
CALIBRATORS FREQUENCY CT432. 110/250 AC. 12" × 6" × 7½", 100 kc/s, 1 Mc/s and 10 Mc/s outputs from integral crystals. Provision for external crystals in the range 100 kc/s to 10 Mc/s. 4 front panel bases suit most types. RF sources may be fed in and calibrated by beating against desired crystal. Audio output to headphone socket. In Ministry packing and as new condition. £13.65. A few used but good. £9.80 both Carriage paid.
BC221 with AC pack, £18.60 or less pack £16.40 carriage paid.

All receivers and Test Equipment are in working order at time of despatch. Carriage charges are for England and Wales only.
Telephone 34897
Terms: Cash with order. Early closing Wednesday

G. W. M. RADIO LTD.
40-42 PORTLAND ROAD, WORTHING, SUSSEX

MI-19467-A MASTER OSCILLATORS

These R.C.A. units which are used in the ET 4336 transmitter and which were supplied as a separate item, each in its own slide-in metal case, are ideal as the heart of any high-power transmitter, unmodified as a low-power (approx. 20w.) transmitter, or as a basis for modification to suit individual requirements. They incorporate a 6-position oscillator switch (covering 1 to 5MHz); a 3-position Multiplier switch (covering 2 to 10MHz); a D.C. current meter, and oscillator and multiplier coils with "turns counting" mechanisms for precise tuning. Power requirements are H.T. and L.T. for the 807 valve used in the unit, and are brought in by an 8-pin Jones plug on the rear of the chassis. The basic frequency coverage of the oscillator is 1 to 10MHz, which can be extended to 20MHz when used as the oscillator section of a higher power transmitter or when used on its own. All these and many more details are covered in full in the extremely comprehensive instruction/service manual (supplied with each unit) containing wiring and circuit diagrams, adjustments, photographs etc. BRAND NEW. Price per unit is **£8.50** including two 807 valves. Carriage 75p.

COLOMOR ELECTRONICS LTD.
01-743 0899 **01-748 8006**
170 GOLDHAWK ROAD, LONDON, W.12.

AMATEUR ELECTRONICS G3FIK

BIRMINGHAM 021-327 1497 021-327 6313 MEMBER OF THE AMATEUR RADIO RETAILERS ASSOCIATION

To add to the problem of VAT, prices of all equipment originating in Japan including SOMMERKAMP gear will now be increased by approximately 10% due to the revaluation of the Yen, which will eventually of course also adversely affect second hand items. Thanks to the pre-VAT rush our stocks of used equipment are much lower than normal but at the time of going to press we still have several excellent items as shown below and if this appears in print before 1st April the opportunity still exists to buy without the imposition of VAT.

COLLINS KWM-2 TRANSCEIVER complete with Collins PSU Little used and mint condition £550.00
COLLINS KWM-2 TRANSCEIVER. Again with Collins PSU. Excellent £450.00
COLLINS 75A-4 RECEIVER. Fitted 3 filters plus 1 spare. This is, without doubt, one of the finest 75A4's to pass through our hands and is in truly immaculate condition £225.00
COLLINS KWS-1 TRANSMITTER. A rare transmitter indeed. Of matching appearance to the 75A-4 and with a kilowatt capability due to 4CX250's in the final. Less power supplies £200.00
EDDYSTONE EA12 RECEIVER. In excellent condition £145.00
EDDYSTONE EA12 RECEIVER. Absolutely immaculate, complete with speaker/plinth £150.00
KW2000 TRANSMITTER. Good clean condition £117.50
TRIO JR-310 RECEIVER. As new in all respects £66.50
TRIO JR-310 RECEIVER. Very good condition £61.50
TRIO JR-500 RECEIVERS. Several in stock from £45.00
LAFAYETTE HA-350 RECEIVER. Good condition £61.50
HEATH HW-101 TRANSCEIVER. Less PSU. Most excellent condition £81.50
HEATH HW-100 TRANSCEIVER. With both AC and DC PSU's .. £135.00

ALL ITEMS ARE PRICED TO INCLUDE CARRIAGE

PLEASE NOTE: Our used equipment stocks are continually changing. An S.A.E. will bring you our latest list.

HOME DEMONSTRATION SERVICE ON NEW GEAR AVAILABLE FROM OUR AGENTS!

Southern: J. H. Associates Ltd. (Jeff Harris G3LWM) Cricketfield Lane, Bishops Stortford, Herts. Tel: 0279-56347

Northern: J. Rowley, G3KAE, Castle Rise, West Ayton, Scarborough, Yorks. Tel: West Ayton 3039

Osker Block SWR200 Power Metres. The ultimate in SWR/Power Bridges. £19.25

TCC SWR Bridges
C3042 Single meter model £5.00
TCC SWR/Power Bridges
C3005 Twin meter model £7.85
Sansei Miniature SWR/Power Meter SE406 .. £3.80
Medco Filters. The best on the market
FL50A and FL75A 50ohm Belling connectors .. £6.00
FL50B and FL75B 75ohm PL259 connectors .. £6.50
FH40 High Pass £2.35

Copal Clocks
All types ex stock. Illustrated list by return ..
Amphenol PL259 Connectors .. .. .. 30p ea.
Belling coaxial connectors 10p ea.
50 ohm Heavy Duty Coax .. 22p yd. (carriage extra).

J. Beam Antennas. Illustrated catalogue on receipt of S.A.E. Full range in stock.

G-Whip Antennas. All ex stock. Catalogue by return.

Shure Microphones
Model 201 Hand £5.75
Model 444 Desk £13.25
Mosley Antennas
TA31 Jnr. £15.50
TA32 Jnr. E £25.00
TA33 Jnr. E £35.00
Hy-Gain Antennas
12-AVQ Vertical £16.50
14-AVQ Vertical £24.50
18-AVT/WB Vertical .. £35.50
LC-80Q Loading coil .. £7.50
TH3 Jnr. 3 ele beam .. £51.50
TH3 Mk III 3 ele beam .. £75.00
TH6 DXX 6 ele beam .. £97.00
BN-86 Balun £8.00
(Carriage extra on Mosley/Hy-Gain)
Rotators. All post paid.
Stolle Memomatic 3001 £22.40
Stolle Automatic 2010 .. £28.00
CDE AR20 .. .. £20.40
CDE AR22 .. .. £26.65
CDE TR44 .. .. £45.75
CDE Ham-M £70.80
Wightraps
Standard Pairs £2.90
High Power £3.90

ELECTRON HOUSE, 508-514 ALUM ROCK ROAD, BIRMINGHAM 8

BLANK CHASSIS

FOUR-SIDED 16 S.W.G. ALUMINIUM

Size	Price	Base	Size	Price	Base
6×4×2"	37p	19p	10×8×2½"	73p	33p
7×4×1½"	36p	20p	12×7×2½"	73p	36p
7×5×2"	44p	21p	12×9×2½"	84p	42p
8×4×2"	42p	21p	13×8×2½"	84p	42p
8×5½×2"	48p	23p	14×7×3"	88p	40p
9×7×2"	55p	29p	14×10×2½"	97p	52p
10×4×2½"	55p	23p	15×10×2½"	£1.01	55p
12×4×2½"	56p	24p	17×10×3"	£1.21	60p
12×5×3"	73p	29p			

Post and packing extra.

PANELS Any size up to 3ft. at 36 p sq. ft. 16 s.w.g. (18 s.w.g. 32p).

Post and packing extra.

H. L. SMITH & CO. LTD.

287-289 EDGWARE ROAD LONDON W2 1BE. Telephone: 01-723 5891

AMATEUR RADIO BULK BUYING GROUP

From G3ZPB: Components for G3TDZ 2m Transceiver, see Jan '73 Rad Com. P.C. Boards Rx 90p; Tx 60p; 3 gang × 17pF 90p; FX1115 Beads 1p ea or 35p/50; TAD100 ic £1.55; CFT455C Filter 55p; Ten NiCad Batteries £16.50.
Plessey SL600 ICs. 610, 1, 2, £1.72; 620, 1, £2.57; 630, £1.62; 640, 1, £3.03
Marker Pen for printed circuit boards—ideal for Amateur use, 80p.
From G8CYK; TOKO Filters. Ceramic types: CFT455B, 8kHz 55p; CFT455C, 6kHz 55p; CFU455C, 4.8kHz 60p; Mechanical type MFH51T, 5kHz £1.25.
Miniature IFT 455kHz 10p; **Audio I.C.** LM380, 2W on 12V with 7Ω, £1.37.
Transistors: 40673, 400MHz dual gate, MOSFET (protected) 55p; TIS88A sim. to 2N2545 FET 32p or £3.10. **Xtals:** 1MHz in HC6/U can £1.10.

(All post free. Full price lists on request (S.A.E. please):

W.S. POEL, G8CYK,
'LITTLE CROFT', MILL HILL,
BRENTWOOD, ESSEX.

P. L. A. BURTON, G3ZPB,
20, THORNTON CRESCENT
OLD COULSDON, SURREY

G3ZKS **G3ZKS**

YORK PHOTO AUDIO CENTRE

YAESU & TRIO Transceivers & Receivers
Hy-Gain Antennas & Accessories.
Latest lists by return

We are prepared to consider your Camera Equipment in Part Exchange and we will accept good quality gear in exchange for Cameras or Hi Fi.

H.P. Terms are 10% Deposit and up to 3 years to pay

SECONDHAND EQUIPMENT. Let us know what you are after, we may have it in at the right price.
S.A.E. with all enquiries please.

51, FOSSGATE, YORK YO1 2TF **Tel 56176 (After hours 25798)**

THE SENATOR CRYSTAL BANK

G3UGY **CRYSTALS FROM STOCK AT KEEN PRICES** **Phone 01-769 1639**

SENATOR CRYSTALS: the first place to contact when you need good crystals quickly.

Here are just a few of the popular frequencies actually in STOCK now:

kHz		MHz	
100 in HC13/U	£2.50	26·500 in HC18/U *	£1·60
454 in HC6/U	£1.75	28·045 in HC25/U	£1·60
455 in HC6/U	£1.75	28·500 in HC25/U	£1·60
456 in HC6/U	£1.75	30·000 in HC6/U	£1·60
500 in HC6/U	£1.75	32·500 in HC18/U	£1·60
		34·000 in HC18/U	£1·60
		34·500 in HC18/U	£1·60
		35·000 in HC18/U	£1·75
MHz		35·500 in HC18/U	£1·75
1·000 in HC6/U	£1·75	38·666 in HC18/U *	£1·35
2·000 in HC6/U	£1·60	40·000 in HC18/U	£1·60
3·500 in HC6/U	£1·75	42·000 in HC18/U	£1·60
5·000 in HC25/U *	£1·60	70·000 in HC18/U *	£2·00
7·000 in HC6/U	£1·50	71·000 in HC18/U	£2·00
9·000 in HC6/U	£1·50	72·425 in HC18/U	£1·75
10·000 in HC6/U	£1·50	72·500 in HC25/U	£1·75
10·245 in HC25/U	£1.60	72·525 in HC18/U	£1·75
11·000 in HC6/U	£1·50	96·000 in HC18/U	£2.00
24·500 in HC18/U	£1·60	116·000 in HC18/U	£2.80

*= Also in HC6/U

And here's our STOCK range of BRAND NEW HC6/U 8 MHz for 2M:
8·002 8·007 8·012 8·018 8·021 8·0266 8·032 8·041 8·043 8·047 8·048 8·0555 8·058 8·061 8·070 8·081 8·092 8·100 8·104 8·107

All at £1·25 each, post free.

The following frequencies may be suitable for your PYE Cambridge, Ranger, Vanguard, etc., etc. Check up with crystal multiplication data and crystal spec., in equipment manuals for suitability.

8·0555 MHz in HC6/U for TX × 18 = 145·000 MHz 2M Mobile **£1·25**
44·7666 MHz in HC6/U for RX × 3 + 10·7 MHz = 145·000 MHz 2M Mobile **£1·80**
8·100 MHz in HC6/U for TX × 18 = 145·800 MHz for RAEN **£1·25**
45·0333 MHz in HC6/U for RX × 3 + 10·7 MHz = 145·800 MHz for RAEN **£1·80**
12·975 MHz in HC6/U for RX × 12 — 10·7 MHz = 145·000 MHz 2M Mobile **£1·60**
11·1916 MHz in HC6/U for RX × 12 + 10·7 MHz = 145·000 MHz 2M Mobile **£1·60**
12·0833 MHz in HC6/U for TX × 12 = 145·000 MHz 2M Mobile **£1·60**
8·7825 MHz in HC6/U for TX × 8 = 70·260 MHz 4M Mobile **£1·60**
29·780 MHz in HC6/U for RX × 2 + 10·7 MHz = 70·260 MHz 4M Mobile **£1·65**
6·74666 MHz in HC6/U for RX × 12 — 10·7MHz = 70·260 MHz 4M Mobile **£1·60**
11·710 MHz in HC6/U or TX × 6 = 70·260 MHz 4M Mobile **£1·60**

NEW FREQUENCIES FOR POPULAR CHANNELS:

44·593333 MHz in HC6/U for RX × 3 + 10·7 MHz = 144·480 MHz F.M. Channel **£1·80**
45·016667 MHz in HC6/U for RX × 3 + 10·7 MHz = 145·750 MHz Repeater out **£1·80**
8·063888 MHz in HC6/U for TX × 18 = 145·150 MHz Repeater In **£1·65**
4·031944 MHz in HC6/U for TX × 36 = 145·150 MHz Repeater In **£1·65**
4·027777 MHz in HC6/U for TX × 36 = 145·000 MHz Mobile **£1·65**
4·013333 MHz in HC6/U for TX × 36 = 144·480 MHz F.M. Channel **£1·65**

NEW FREQUENCIES now available:

1·6202 MHz and 1·6184 MHz in HC6/U (spacing 1·8 kHz) at .. **£1·80** each.
33·6666 MHz in HC6/U .. **£1.60**
43·3333 MHz in HC18/U .. **£1.70**
46·6666 MHz in HC18/U .. **£1.70**
47·3333 MHz in HC18/U .. **£1.70**
48·3333 MHz in HC18/U .. **£1.70**
58·000 MHz in HC18/U .. **£1.70**
10·866667 MHz and 9·975 MHz in HC6/U (TX/RX crystals for glider channel 130·400 MHz at .. *each* **£1.70**

Prices for specially manufactured SENATOR Crystals are as follows (made to Ministry of Defence Standards):

50—149·9	kHz in HC13/U	£4·60
150—499	kHz in HC6/U	£3·85
450—500	kHz in HC6/U	£3·50
501—999	kHz in HC1/U	£4·50
1·000— 1·39	MHz in HC6/U	£3·20
1·40 — 20·00	MHz in HC6/U (18/U & 25/U over 5 MHz)	£2·00
20·00 — 59·99	MHz in HC6/U; HC18/U; HC25/U	£2·25
60.00 — 79·99	MHz in HC6/U; HC18/U; HC25/U	£2·50
80·00 —114·00	MHz in HC6/U; HC18/U HC25/U	£3·00
114·00 —140·99	MHz in HC6/U; HC18/U; HC25/U	£7·00
141·00 —175·99	MHz in HC6/U; HC18/U; HC25/U	£8·75
176·00 —200·00	MHz in HC6/U; HC18/U; HC25/U	£12·00

V.A.T. ADD 10% TO ALL PRICES. APRIL 1st ONWARDS —

Mail Order SENATOR CRYSTALS Dept. Q.C., 36 Valleyfield Road, SW16 2HR

SURPLUS EQUIPMENT

10X Crystals, thousands from 2-7MHz **15p** each, 8 for **£1.** Test Equipment: TF144G Sig. Gen. 85kHz-25MHz from **£12.** Solatron CD643S scopes, DC-12MHz in new condition **£45,** Cossor 1035 **£18.** Computer Panels sold by weight, lots of transistors inc. power types, diodes, R's, C's, pot cores, etc. Some boards are broken but good value at 3 lb **£1 (25p),** 7lb **£2 (40p)** Heat Sinks, Wt. 3 lb with 2 power transistors **£1 (25p)** BC107-8-9 **8p** ea. 14 for **£1,** 2N3055 **35p,** 741C **25p,** 709C **25p,** 723C **40p.** Crofon 1610 light guide 64 filament in sheath **£1** per metre, 5 + **80p,** 10 + **70p.** Surplus caps. μF/V: 8/12, 8/150, 75/6, 0.5/150, 4/200, 0.5/250, 0.25/350 all **4p;** 0.4/100, 550/6, 0.1/350 **3p;** 2/150 **2p;** 25/25, 40/100 **5p;** 8/350 PC, 500/25 PC, 0.47/350, 0.1/1000 **6p;** 8/350, 300/150, 20 + 20/300 + 50/50 **8p;** 8/450 **10p.** All post extra—send plenty, excess refunded. **60p** component packs: resistors, 350 carbon **60p (15p).** Capacitors: 75 electrolytic **60p (15p),** 150 mica, poly, ceramic **60p (8p).** 8 assorted panel meters **£2.60 (40p).** 7lb bargain parcels, contain R's, C's, diodes, transistors, pots, switches, xtals, P.C. boards, etc, etc. Amazing variety and value at **£2** (cp). Ferric Chloride 1lb **40p (15p)** 10lb **£3.50 (50p)** Loads of odd units, meters, components, etc, at shop for callers. Post in brackets. S.A.E. List.

GREENWELD ELECTRONICS (RC4)

24 Goodhart Way, West Wickham, Kent. Tel: 01-777 2001
Shop at 21 Deptford Broadway, SE8. Tel: 01-692 2009

MARK EQUIPMENT V.H.F. U.H.F. ELECTRONICS

0803 55488 ***G8ABP***

TRIO TS515 + PSU Transceiver. Cash only £199.
TRIO TL911 Linear. Cash only £133.
TRIO JR310 Receiver. Cash only £70.
Plessey SL600 I.C.s Brand New. SL610, 11, 12, £1.80. SL620, 21, £2.47. SL630, £1.70. SL640, 41, £3.30. All from stock. Post free. **KVG 9MHZ XF9A** Filters with both carrier crystals, and holders. £13.75. **Valves** Brand New QQVO2/6 £2. Boxed. **Coaxial Relays** Type 951, 450MHz. 50Ω. UR43. 12 or 24V coil £3.82.
M.E.23 23cms Plate line tripler for 2C39A etc. All Metalwork, housed in diecast box. Less valve. £9.25.
M.E.70 8 watt 70cms Tripler Amplifier, complete with 2 × QQVO2/6 £14.
2 METRE LINES Parallel line anode circuit for QQVO6/40 etc. 8" × ¾" dia. with disc tuning. Anode connectors and ceramic insulators. Silver plated **£4.50,** post 20p.
2 METRE HIGH Q BREAK All copper cylindrical type 12" × 1½" dia. Belling & Lee t.v. type input and output sockets suitable for high power **£5.25,** post 20p.
Transistors: 2N5245 (TIS88) 50p, 40600 75p, 2N708 30p, 2N3819 36p. 2N706 12p, TIS48 25p, 2N2369 30p. IN914 11p. BC109 30p.

35 Lidford Tor Avenue, Roseland Park, Paignton, Devon.

G3LRB **STEPHENS-JAMES LTD.** G3MCN

70 Priory Road, Anfield, Liverpool L4 2RZ. Tel 051-263 7829

At present due to the re-valuation of the Yen we are waiting for the new prices to be announced. We still have one or two items at the old price plus 10% VAT. Please write for up to date lists. SAE will bring these by return. We can offer one of the most comprehensive ranges in the country. Our range of secondhand equipment is always changing and if you require a specific item, let us know and we will inform you as soon as we have one available.

We require good equipment and will pay cash for these items. Please let us have full details and the price you require.

We can arrange HP terms on all orders over **£35** with a minimum of 10% deposit and the balance over 6 to 18 months on second hand equipment and 6 to 36 months on new equipment. Full guarantee is available on new equipment and 3 months on secondhand. We service and re-align equipment whether you bought it from us or not.

Yaesu/Sommerkamp/range
Send for latest price lists. Transceivers, Transmitters, Receivers, Speakers, etc.

Trio

9R59DS Receiver	£54.45
JR310 Receiver	£82.50
JR599 Receiver	£203.50
SP5D Speaker	£4.95

Lafayette

HA600A Receiver	£55.00

Barlow-Wadley

XCR-30 Receiver	£98.45

Eddystone

EC10 Mk. 2	£94.60
EB37	£86.00
924 AC Power Unit	£8.42

KW Electronics

KW2000E Transceiver	£291.50
KW202 Receiver	£154.00
KW204 Transmitter	£176.00
KW107 Matching Unit	£50.60
KW E-Z Match	£18.15
KW Balun	£2.53
KW Antenna Switch	£4.67
KW101 SWR Bridge	£9.35
KW103 SWR/Power meter	£13.75
KW Dummy Load	£8.80
KW Low Pass filter	£8.25
KW Trapped Dipoles from	£17.00

C.D.R. Rotators

AR22	£27.50
TR44	£49.50
HAM M	£77.00

Copal

24 Hour Clock	£6.00
24 Calendar Clock	£12.50

Hy-Gain Antenna Range

12AVQ Vertical	£18.15
14AVT Vertical	£26.95
18AVT Vertical	£39.05
TH3 Mk. 3 Tribander	£83.00

G-Whip Antenna Range
Complete range in stock.
SAE will bring full details.

J Beams
Complete range of rotators, antenna, masts, brackets, etc. SAE for catalogue.

R.S.G.B.
Full range in stock at current prices.

Sentinel 2 & 4 metre Convertors	£15.12
Sentinel 2 metre Pre-Amps	£7.15

Test equipment

TE16A Transistor Sig Gen	£8.74
TECH 15 Grid Dip Meter	£13.75
Hansen SWR Bridge	£4.95
Osker Power/SWR Meter	£20.00
Omega TE701 Noise Bridge	£14.85
Semi Automatic Bug Keys	£5.00
Sansei SWR Bridge	£4.00

PL259 Plugs **33p.** Sockets **33p.** Cable reducers **11p.** Dipole T pieces **14p.** Egg insulators **5p.** 7 ohm twin feeder **6p** yard. 300 ohm feeder **6p** yard. 50 ohm co-ax UR43 **13p.** UR67 **24p** yard.

Secondhand Equipment

KW2000B Transceiver	£192.00
National NCX5 Transceiver	£181.00
KW Atlanta VFO Unit	£24.00
KW77 Receiver	£66.00
Trio JR500 Receiver	£55.00
KW Vanguard TX	£24.00
Trio JR500 Receiver	£55.00

All above prices include VAT. Post/Carriage extra.

Members of the Amateur Radio Retailers Association.

PORTABLE PETROL ELECTRIC GENERATORS

HONDA

Keen Prices to R.C. Readers.

ALL MODELS, FROM THE INCREDIBLY QUIET HONDA E300E WHICH GENERATES 300 WATTS A C. PLUS 12v D.C. AND MEASURES ONLY 13" × 12" × 9" TO THE HONDA E4000E, 4 KW DIESEL SET.

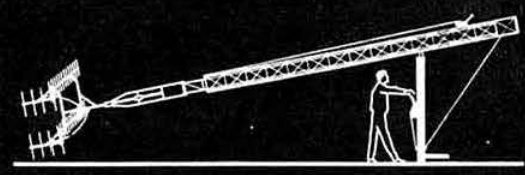
For brochure & full details, call, write or phone GODALMING 23279

ASHLEY DUKES

FARNCOMBE STREET, FARNCOMBE, GODALMING, SURREY.

INSIST ON VERSATOWER

Acclaimed as the World's leading telescopic tiltover tower in the field of radio communication.
Models from 25' to 120'
Enquiries to
Western Electronics (UK) Ltd
Osborne Road, Totton, Southampton



Look for the name

STRUMECH

Strumech Engineering Co Ltd
Coppice Side, Brownhills, Walsall, Staffs.

P. & P. DEVELOPMENTS

Shop hours Evenings/Weekends

Tel: Havant 72657 Tel: Cosham 74695

MURPHY 821. High band AM TX/RX QQVO3-10 final and drive rstages, easily converted to 2m. **£9** carr. 75p **MURPHY 820.** Mid-band dash version of the 821, good condition will convert to 2 or 4 with circuit. **£6** carr. 75p **MURPHY 807.** High power AM mobiles for 2 or 4 less QQVO3-20A but otherwise complete. **£6** carr. £1 **MURPHY BASE STATIONS.** High power AM complete units inc. PSU. **£25** carr. £2 **COSSOR CC15.** Low-band AM mobiles QQVO3-20A final, complete with all leads, spkr, mic etc. **£16.50** carr. £1 **GEC LOW BAND BASE** can be modified to 12½kHz. **£27.50** carr. £2 **PYE AM10B.** Highband 12½kHz. (New GPO spec.) complete with all accessories in good condition. **£60** carr. £1 **PYE R470.** UHF RX all solid solid state mint condition ideal for 70 cms receiver. **£45** carr. £1 **PYE** Highband AM monitor receiver 4 channels, ideal for converting to a 2m base RX, very clean condition. **£35** carr. 75p **HEATHKIT SB300.** Amateur bands receiver, mint condition, fitted noise limiter and speaker. **£80** carr. £1.50 **B44 MkIII.** Ideal for 4m. **£8.50** carr. 75p **PLESSEY PV215.** High quality SSB/DSB/AM/ISB driver units, output frequency 100kHz. Can be operated independently on USB and LSB at same time. Output level via 0-6dB atten. LC type filters, superb xtal ovens. The units are completely transistorized and in mint condition. **£30** carr. £1 **PLESSEY PVT223A.** This unit will accept the 100kHz above and mix giving output on 3·1MHz. **£20** carr. 50p **RADIO ALARMS.** New Murphy radio alarm units, contains 12v PSU audio board multi-program cam unit. Ideal for host of spares or as radio alarm. **£1.25** carr. 75p **PYE MARINE TX.** Runs 2x 5B254N's in final AM/CW/MCW xtal control on 8 channels or VFO in 1·5-16MHz continuous coverage. In good condition complete only **£10** carr. £1.50 **PSU's** for above TX less valves but with control unit. **£4** buyer collects **HF VFO/PA.** Contains 2x 4X150A's chimney and blower, good condition. **£12** carr. 75p **VHF FIBREGLASS WHIP AERIALS.** Ideal for cutting to ¼ wave on 2m. **£1** carr. paid **MULLARD.** Tubular ceramic trimmers 0-6pf **14p.** 0-12pf **19p** ea. **INVERTER PSU's.** 24v input 425 v at 125 watts output. New. **£4.25** carr. 50p **LOW VOLTAGE RELAYS.** 24v octal fitting **50p** each or 3 for **£1.25** carr. 10p. **MIC INSERTS.** Dynamic and carbon. **50p** each carr. 10p Lustraphone dynamic. **£1** each carr. 15p **STC 633.** High band AM 12½kHz mobiles good condition. **£65** carr. £1

PLEASE ADD 10% VAT TO ALL PRICES

P. & P. DEVELOPMENTS 19 LONE VALLEY, WIDLEY PORTSMOUTH, HANTS.

RADIO COMPONENT SUPPLIERS **J. BIRKETT** 25 THE STRAIT LINCOLN LN2 1JF

Tel: 29787

RCA 2N 3553 TRANSISTORS @ 80p each. 3 for £2.
VHF-UHF TUNING VARACTORS untested 50pf at 8 volt, 80pf at 4 volt, 6 for 25p.
50 PIV 1 Amp **SILICON BRIDGE RECTIFIERS** @ 25p.
Packet of 25 **PRINTED CIRCUIT SILICON DIODES** untested up to 1000 PIV 500mA @ 25p.
600MHz MADT unmarked **PNP TRANSISTORS** type **MSD 39.** 5p each, 40p doz.
Further supply of **300MHz DIVIDE BY 2 COUNTERS** @ 60p each.
DUAL 2 GHz NPN TRANSISTORS untested 2 for 50p.
100 PIV 10 Amp SILICON BRIDGES @ 75p.
MISCELLANEOUS TRANSISTORS 2N 1499A, 2N 1744, 2N 2788, 2N 3344, 2N 3392, 2N 3402, 2N 3721, 2N 3859, 2N 3877A, 2N 4386, 2N 4415, 2N 4412, 2N 4951, 2N 4953. All at 10p each.
HIGH VOLTAGE NPN POWER TRANSISTORS 250 volt TO 66 case @ 20p each.
FM I.C's similar to TAA 570 untested with data. 5 for 50p.
100 2 watt ZENERS untested @ 50p. 100, 400mW untested Zenners @ 50p.
Pack of **1000 GENERAL PURPOSE GERMANIUM DIODES** Cathode End Marked @ £2.
COMMUNICATION SERIES OF I.C's untested containing 1 × RF, 3 × I.F, 2 × VOGAD, 2 × AGC, 1 × Headphone Amplifier, 2 × Double Balanced Modulators, 1 × Mixer. The 12 I.C's for £2.75. Separate I.C's @ 25p.
SHORT LEADED ELECTROLYTICS 750uf 18v.w @ 8p, 1500uf 30v.w, @ 10p, 2500uf 30v.w @ 10p.
STC PRECISION CONDENSERS 1750pf 63v.w 1% @ 4p each. ·01uf 63v.w, 1% @ 6p each. ·05uf 63v.w, 1% @ 6p each.
400 PIV 5 Amp PUSH FIT TRIACS @ 32p each.
1000 PIV 1 Amp SILICON DIODES @ 10p each.
Unmarked 2N 706 Transistors @ 7½p each. 50p doz.
10 Watt unmarked Good **ZENERS** 7·5 volt, 8·2 volt, 9 volt, 11 volt, 12 volt, 13 volt, 15 volt, 16 volt, 18 volt, 20 volt, 24 volt, 27 volt, 33 volt. All at 20p each.
MULLARD 300mW ZENERS 4·7 volt, 5·6 volt, 8·2 volt, at 7p each.
LIMITING I.F. AMPLIFIER-FM DETECTOR like TBA 750. Five Stage Limiting Amplifier with a Balanced Product Detector, DC Volume Control and Audio Driver untested 4 for 60p with data.
S.C.R's Ex new Equipment 400 PIV 5 Amp 3 for 50p. 7 for £1.
BC 107 @ 10p, BC 108 @ 10p, BC 109 @ 10p. Any 3 for 25p.

PLEASE ADD 10% VAT ON ALL PRICES

G3LLL's CORNER
DON'T WORRY ABOUT THE VAT

The increases caused by VAT will be negligible when compared with the huge price increases anticipated due to the increase in value of the Yen against the £ of approximately 18%.

We can still supply FR50B, FL50, FR400 (DX) (and Super DX), JR.310 and TS.515 at the old prices (Plus VAT of course for any money arriving on or after All Fools' Day!) Whilst writing ask for details of our new Super de Luxe version of the Trio JR.310.

HOLDINGS

Carriage—Securicor £3.00. Rail or Postat cost, excess refunded.

PHOTO AUDIO CENTRE

39/41 MINCING LANE, DARWEN STREET, BLACKBURN, BB2 2AF.
Tel. Blackburn 59595 (2 lines) (7 miles from M6—closed on Thursdays)

GI AMATEUR SUPPLIES GI3Z1A
KW—TRIO—YAESU STOCKISTS

KW Electronics	TRIO	YAESU
2000E—£265	9R-59DS—£49.50	FT-101 + 160—£255
2000B—£240	JR-310—£75.00	FT-401—£230
107—£46	TS-515—£210	FT—200—£175
Most KW accessories from stock		FR-5DX 400—£160
		FR-50B—£59
		FL-50—£72

CDR Rotors—AR20—£20. AR22R—£25—TR44—£45
Eddystone—EC10 Mk II—£86—Model 1000—£210.
Solid State Module Converters—2m & 4m—£13.75.
HP terms available. Carriage Extra All Items.

J. P. MacMAHON
10 CHURCH ST., ENNISKILLEN, TEL 2955

FIRST for carpets
Dodson Bull

UP TO 30% DISCOUNT
BRANDED CARPETS

Wilton ● Axminster ● Oriental ● Tufted
● All makes available with full Manufacturers' Guarantees
● NO IMPERFECT GOODS SOLD ● Free delivery in U.K.
● Expert fitting service available

£200,000 carpets on display
In our extensive London and provincial showrooms
Free brochure on request to Dept. RC

DODSON BULL CARPET CO. LTD.

LONDON: 5 & 6 Old Bailey EC4M 7JD. Tel: 01-248 7971
BIRMINGHAM: 164 Edmund St B3 2HB. Tel: (021) 236 5862
BOURNEMOUTH: 268 Old Christchurch Rd BH1 1PH. Tel: 21248
BRIGHTON: 2-5 North Road BN1 1YA. Tel: 66402
BRISTOL: 2-3 Royal London House, Queen Charlotte St BS1 4EX. Tel: 28857
LEEDS: 12 Great George St LS1 3DW. Tel: 41451
MANCHESTER: 55-61 Lever St M1 1DE. Tel: (061) 236 3687/8/9
NEWCASTLE-upon-TYNE: 90-92 Pilgrim St NE1 6SG. Tel: 20321/21428
WESTCLIFF-on-SEA: 495 London Rd SSO 9LG. Tel: Southend 46569
Open: 9.00-5.30 Mon. to Fri. Sat. 9.00-12.00 (Manchester 9.00-4.00)

R.T.& I. offer the finest selection of first-class new and fully overhauled second-hand communications and electronics equipment in the U.K.

- *Constantly changing stocks of a vast range of equipment.*
- *Cash or Hire Purchase terms easily arranged.*
- *Part exchanges welcomed.*
- *We are 'spotcash' buyers for almost all electronic equipment*

Send S.A.E for our latest list of over 50 receivers and many other interesting items.

R.T. & I. ELECTRONICS LTD.
Ashville Old Hall, Ashville Road, London E.11 *Tel: 01-539 4986*

---

23 cms CONVERTER
Conversion Noise Figure: 9dB (Typ)
Conversion Gain: 9dB (Typ) I.F.: 144-146MHz
Price: £23.50 incl. p & p.

23 cms PRE AMPLIFIER
Typical Noise Figure: 5dB Typical Gain: 9dB
Price: £15.90 incl. p & p.

Belling Lee Connectors (BNC to order). 12v Supply. Size: Size 114 × 30 × 64mm.
Special introductory offer
23 cms pre-amp + 23 cms Converter £35.0 incl p & p.

LOW PASS FILTERS
As supplied to Government Depts & Industry
See earlier editions for INFO.
Price: £6.90 incl. p & p.

J.W.S. Products, 7 Chewells Close, Haddenham, Cambs.

CLASSIFIED ADVERTISEMENTS

RATES: Display: £4 single column inch.

Private advertisements: 5p per word, minimum charge £1.

Trade advertisements: 10p per word, minimum charge £1.

Box number fee 15p extra. Please write clearly. No responsibility can be accepted for errors.

Last date for acceptance - 10th of preceding month.

Post (With Remittance) to;

RADIO SOCIETY of GREAT BRITAIN,
35 DOUGHTY STREET, LONDON WC1N 2AE.

FOR SALE

QSL CARDS, GPO approved logbooks. 4p sae. Atkinson Bros, Looe, Cornwall. PL13 1JT.

QSL CARDS. 1,000 from £2.98. SAE samples. Ara Press, 46 Moat Avenue, Coventry.

QSL CARDS. Good selection TX and SWL. SAE samples. Bailey & Co., 35 Whitecross Road Rear, Weston-super-Mare.

THE INTERNATIONAL TRANSISTOR DATA MANUAL 1973 EDITION IS NOW READY. £5.25 plus 35p post and packing in the UK. Brochure available. Special 10% discount for personal copies to members of RSGB. Order direct from SEMICON INDEXES Ltd, Freepost, Wokingham, Berks. RG11 2AY.

FT101, MINT CONDITION, just over year old, £190. 34 Birch Avenue, Romiley, Cheshire.

INOUE IC700R solid state 80-10M. Rx, £50. Deliver 70 miles. G3YET. Tel: Bradford 46284.

HYGAIN BEAM. 3 element full size 20 meter. £21. G3BXI "Pennyfield", Gt. Easton, Dunmow, Essex. Phone: Gt. Easton 235.

RCA HF Sweep generators with 115V ac psu 5-70MHz in 3 bands. £10.00. USA (Bendix) Sig generators 1-130A 100-155MHz nice job £10.00. Small oscilloscopes TS 34/AP 110V ac in carrying case, £10.00, Valve testers very clean 110V ac £5.00, new 60 ft telescopic tubular masts (USA) crated £20.00, USA Rx R 361/GR 230V ac 255-400MHz xtal controlled £16.00, Freq meters BC906D £3.00, Diode test meters (IMA FSD) TS 268 in case £1.25, psu 24V ac 24V 36W ac out £1.00, psu 240V ac 12V 2A ac out £1.00, new 4CX250B's £5.00, plus carriage. GM3BQA, Woodlands, North Berwick. Tel NB 2519 after 7pm.

HEATHKIT TWO'ER AM/FM TRANSCEIVER, crystal for 144·8, £15.00. Part homebrew 2mtr tx, 3/20A final, working, £10.00. BC221 with psu, accuracy unknown, £10. Lafayette HA 600A almost new £35.00. Deliver locally G8DKJ, QTHR Tel 01-679 1378.

AM10D 6-CHANNEL PYE CAMBRIDGE dash mounting, for 2 metres £25 each. Also single channel version £24 each. Price includes carriage. G8BXJ, QTHR. Tel Bristol 695839.

RACAL RA17, perfect working order, offers over £150.00. Contact Mr. Jouhal, 150 Moore Road, Mapperley, Nottingham. Tel: 62917.

COPPER LAMINATE OFFCUTS useful mixed sizes—double and single sided S.R.B.P. and fibreglass. 3lb. pack (400 sq in) 80p. 6lb. pack £1.37. Ferric Chloride 2lb 40p. 4lb. 63p. R.S. Components available. Prices include postage. C.W.O. R. Edgecombe, 94 Larch Grove, Malpas, Newport, Mon.

SHACK CLEARANCE. Calibrator type 1, 14 valves with ac power pack, £2. American VHF/UHF Rx 75-1000MHz. £45. American Panoramic receiver, £25. American Rx 6-9MHz plus VHF. £15. CRO type 2, £6. 45MHz IF amplier, £2. 30MHz IF amplifier, £3. Gyroscope motor, £2. Carriage extra. Sae with enquiries. Hayward, "Sunnyfields", Lighthouse Road, St Margaret's Bay, Dover, Kent.

MISCELLANEOUS

PROTOTYPE or short run turning/milling etc., and sheet metal work capacity available.—C. G. James Electronics (G3VVB). Staines Road, Feltham, Middx. 01-570 3127.

PATENTS and TRADE MARKS.—Booklet on request. Kings Patent Agency Ltd (B. T. King, Mem RSGB, Reg Pat Agent).—146A Queen Victoria Street, London, EC4. Tel 01-248 6161. Telex: 883805. 60 years' refs.

CALL SIGN PLATE & BADGE ENGRAVING. Please add sufficient to cover VAT for orders from 1st April 1973—Workshops for the Disabled, Northern Road, Cosham, Portsmouth, PO6 3EP.

HOLIDAY ACCOMMODATION

U.S. VACATION? Would like to exchange lodgings and meals with one or more hams in London, Wales or Scotland for a two to four week stay. Exchange photos and info. or sked on 20-15 ssb. Charles Sellwood, W2RHQ, 902 First North Street, Syracuse, N.Y. USA.

AN INVITATION

Enjoy a holiday in beautiful Cornwall and operate G3XBR. Max. power to a 6 element beam at 70 feet. DXCC 250 plus. Self catering accommodation up to 3 double bedrooms. T.V. All linen provided. Just bring your pyjamas and Ham licence. Terms from £18 p.w. (for 4). Phone: 020-885 201 up to 10 p.m. for info. sheet by return post, or write to:—

Bernard Broughton, St. Tudy, Bodmin, Cornwall.

FOR SALE

Semiconductors 2N 3632 £4.20, 2N 3375 £3.10, 2N 3553 £0.75, 2N 4427 £0.40, FET 40673 £0.50, OC 35 £0.30, 2N 5016 £14, 2N 5102 £8.50.
Valves: QQVO6-40A £7.50.
Trimmers: Ceramic 40pF 5p, film 45pF 15p, air dielectric butterfly 40p.
Capacitors: Ceramic YD 2p.
Filters: 10·7MHz crystal 901B or 901C £12.
Mail order only with cash. Limited stock. All items new.

T. PARR
60 Culver Lane, Earley, Reading, Berks.

G8EHH **Pamela Webster**

STRATTON ELECTRONICS

ENAMELLED COPPER WIRE: Why buy a whole reel for that one coil? 18, 20, 22 SWG—2p/ft; 24, 26, 28 SWG—1p/ft; 30, 32 SWG—2p/yd; 34, 36 SWG 1p/yd.
DIODES: 1N4003 (200V, 1 A), 6p Transistors: BU105 (1500V, 10W), £1.85. See last month's ad. for BC108 & BCY71 equivalents at 7p & 8.5p.
Also available: Polyester capacitors at 1.5 & 2p/each. Lots of other bits & pieces. SAE. List.

Postage and packing 5p/order.
The Old School, Stratton, Circencester, GL7 2LS.
Tel: 0285-4207

MOSFET CONVERTERS
for 2 metres

* 28-30MHz I.F.
* Isolated, stabilised supply—operates from 9 to 15V.
* Anodised housing—4½ × 2½ × 1½ inches.
* Price? £9.95 inc. postage. SAE enquiries please.

G3OLB; 5 Derwent Court, Thornbury, Bristol.
Tel. Oldbury 4559.

INDEX TO ADVERTISERS

MEMBERS' 25p ADS ORDER FORM

Please type or print in block letters

Tick classification

For Sale ☐

Wanted ☐

Callsign | **QTHR**

or Name and address

Telephone number

I enclose a postal order/cheque for 25p as payment for this advertisement.

Date..... *Signed*..... *Callsign BRS or A No*.....

The number of words in each advertisement must not exceed 32 not including name and address or callsign and QTHR or telephone number. Four pages of each issue are allocated to Members' Ads at present, and in order to include as many advertisements as possible licensed members are requested to give their callsign and QTHR instead of their name and address. (QTHR means: "My address in the current call book is correct"). Also to conserve space, please keep advertisements as brief as possible. They will be edited to conform to a set style of abbreviations, so it is unnecessary to submit them in abbreviated form. Any which are not clear will be returned.

Conditions under which Members' 25p Ads are accepted are published on the first members' 25p Ads page of each issue. Do not forget to enclose a wrapper as proof of membership.

POST TO MEMBERS' ADS, "RADIO COMMUNICATION", 35 DOUGHTY STREET, LONDON WC1N 2AE

Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, 35 Doughty Street, London, WC1N 2AE
by The Garden City Press Limited, Letchworth, Hertfordshire SG6 1JS