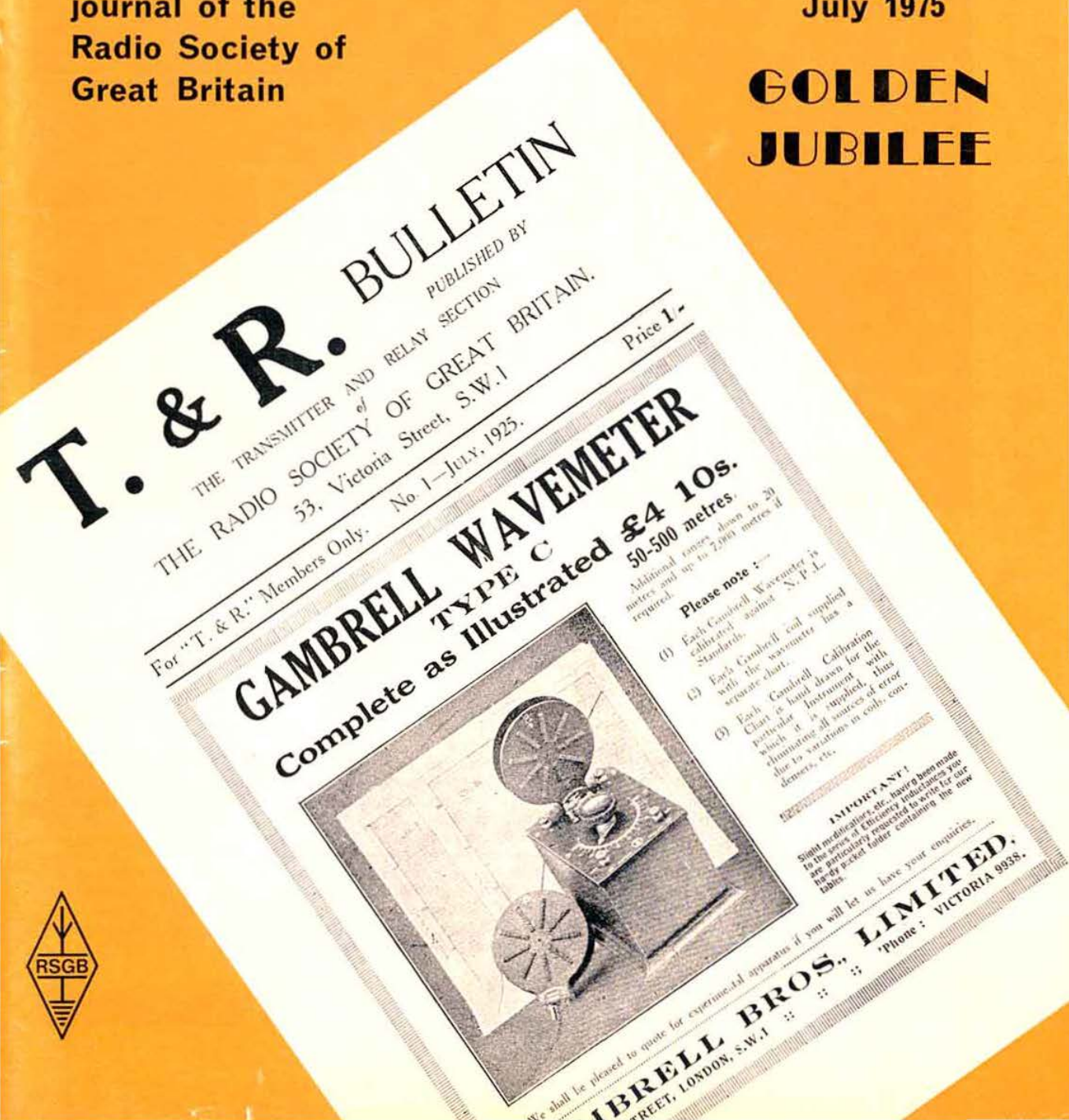
radio communication

journal of the Radio Society of Great Britain

July 1975

GOLDEN JUBILEE



radio communication

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ABC
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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).

NATTER NET

Following the announcement of yet another "new" band plan, we can all clearly see the need for flexibility in operating on the VHF bands. The ultimate flexibility will be guaranteed by following the all new Matlock Elastic Band Plan and we list here some of the basic requirements for SSB operation under this plan.

All SSB transceivers must be used with the R.I.T. control switched on and offset by 2·5kHz. This will ensure that operators will chase each other up and down the band thus giving the impression that activity is high. This system will also remove the need for a calling channel since all one has to do is wait on any convenient frequency and before long a QSO will hop by and can be latched on to.

The existing calling channel will thus be freed for use as a contest frequency. The contest will take the form of seeing how many simultaneous QSO's can be carried out on the same frequency. G3PCY and G3ZYC are currently leading the table with their totals of 57 stations all talking at the same time!

This achievement will be printed in the 1976 Guinness book of records and will take some beating.

As well as the legal requirement to give one's callsign at regular intervals, a new regulation calls for each net to change frequency by 20kHz every two minutes. This will mean that the meandering monologuist will find that after his twenty minute non stop chat, he will have been talking to himself for eighteen and the rest of the party will be on some other frequency.

All CQ calls must be continued for 15-20 minutes non stop and will contain no reference to either location or beam heading. This will lend a touch of excitement to the listener's life and add to his DF experience. It will also guarantee a rapid turnover in rotator spares due to premature wearing out of bearings, etc.

Use of a disguised voice, either by using an incorrect regional accent or, better still, a combination of speech processing and a touch of over driving will make the QRA hunt even more difficult.

More details will follow in due course unless:

a) I'm arrested or
b) I'm set upon by rabid band planners.

'73 G3PCY.

LOWE ELECTRONICS

TOP SELLERS FOR VHF

VFO-30G
£55 + VAT

TR7200G
£110 + VAT

PS-5
£43 + VAT

The TR7200G is the best selling 2 metre FM mobile transceiver in Europe. Some of the reasons why this is so may not be obvious from the basic specification. It's not just the high sensitivity (0·3μV/15dB quieting) or the superb finish, it's the full range of accessories and the finest service backup in the country. It's the little details like the LED under the channel number indicator that is RF powered and only lights when you have a receive crystal fitted. The "transmit" lamp gives the same function for the transmit crystals. This means that you no longer have to wonder which channels are operational when you are mobile. Did you know that by removing the rear panel accessory plug you can drop the receiver gain by 10dB to prevent the fellow next to you in the car park at the rally from blowing your head off!

Did you know that the TR7200G has a public address facility—useful if you're campaigning for the position of VHF manager!

Did you know that the swr protection system is not the "sudden death" variety but gradually reduces the Tx power with increasing SWR so that you are not put completely off the air when your mobile whip antenna gets wet. The same system protects the PA and driver from over voltage damage when the rig is used in a vehicle having a high charge voltage from the alternator.

Only Trio equipment has the unique tuning fork controlled repeater access tone generator to ensure access first time, every time.

All these features and more, can only be provided in equipment made to professional standards by a professional company. The Trio Corporation is the largest electronics manufacturer in Japan offering a range of amateur equipment and you, the customer, benefit every time.

The TR7200G comes to you complete with mobile mounting bracket, stand off feet for fixed station use, microphone, microphone bracket, cable, spare fuse, manual, fitted five channels as follows:

145·50	Simplex	145·15/75	Duplex
145·525	Simplex	145·175/775	Duplex
145·55	Simplex		

with most other IARU channels available ex stock.

HEAD OFFICE **119 Cavendish Road, Matlock, Derbyshire. Tel. 2817 or 2430 9 a.m to 9 p.m.**
BRANCH OFFICES Goring Road, Steyning, Sussex. Tel. Steyning 814466
Soho House, 362-4 Soho Road, Handsworth, Birmingham Tel. 021-554 0708
AGENTS Alan GW3YSA. 35 Pen-Y-Waun, Efail Isaf, Nr. Pontypridd. Tel. Newton Llantwit 3809
John G3JYG. 16 Harvard Road, Ringmer, Lewes, Sussex. Tel. Ringmer 812071
Sim GM3SAN. 19 Ellismuir Road, Baillieston, Nr. Glasgow. Tel. 041-771 0364

OPENING HOURS: 9-5.30 TUESDAY TO SATURDAY INCLUSIVE

73 from BILL G3UBO/VE8DP, ALAN G3MME, JOHN G3PCY/5N2AAC, IAN G3ZYC

LOWE ELECTRONICS

BELCOM AMR-104H

The AMR-104H is an all new FM receiver from Nihon Dengyo, makers of the Liner 2 SSB transceiver. It offers 8 channel scanning facilities in either the 2 metre amateur band or the 150-170MHz marine band. Small enough to fit anywhere in a car, boat or at home, it incorporates an AC power supply as well as operating from 12V dc (negative earth). Fully automatic or manual scanning with individual channel lockout facilities. Exceptional selectivity due to use of triple filters. Dual gate FET RF amplifier and mixer for excellent sensitivity and front end selectivity.

AMR-104H SPECIFICATION

Frequency Range	144–146MHz (Amateur)
No. of Channels	8
Selectivity	15kHz
1st I.F.	10·7MHz
2nd I.F.	455kHz
Sensitivity	0·5μV 15dB quieting
AF Output	1W into 8 ohm (built in loudspeaker)
ANT Impedance	50 ohm
Semiconductors	2 Dual gate FET, 2 I.C., 27 transistors, 31 diodes.
Size	$6\frac{1}{4}'' \times 2\frac{1}{4}'' \times 8\frac{1}{2}''$
Weight	$3\frac{1}{2}$lbs
Accessories Supplied	AC Power Cord, DC Power Cord, Mobile Mounting, Bracket.

FEATURES

- ★ AUTOMATIC OR MANUAL SCANNING
- ★ 8 CHANNEL OPERATION
- ★ 240V AC/12V DC NEGATIVE EARTH
- ★ DOUBLE CONVERSION
- ★ TRIPLE FILTERING FOR OUTSTANDING SELECTIVITY
- ★ BUILT IN LOUDSPEAKER
- ★ SMALL SIZE
- ★ LIGHT WEIGHT
- ★ CHANNEL SKIP FACILITY
- ★ REVERSE POLARITY PROTECTION
- ★ ADJUSTABLE CHANNEL HOLD TIME

PRICES (Ex-VAT) AMR-104 AMATEUR, FITTED 3 CHANS, £65; AMR-104 MARINE, FITTED 8 CHANS, £86.

LOWE ELECTRONICS

BELCOM FS1007P

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

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

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

PRICE (Ex VAT) FS1007P £220.00.

FEATURES

- ★ BUILT IN LOUDSPEAKER
- ★ 16 CHANNEL SCANNING
- ★ INDIVIDUAL CHANNEL SKIP FACILITY
- ★ PRIORITY CHANNEL OPERATION WITH FRONT PANEL CRYSTAL SOCKET
- ★ MANUAL OR AUTO SCAN
- ★ SWITCHABLE HI LOW POWER
- ★ SWITCHABLE DEVIATION
- ★ S METER/RF OUTPUT METER
- ★ CENTRE ZERO TUNING METER
- ★ RX FINE TUNING CONTROL
- ★ BUILT IN SWR BRIDGE
- ★ BUILT IN DIGITAL CLOCK WITH ALARM AND AUTO SWITCH ON
- ★ BUILT IN AC/DC POWER SUPPLIES
- ★ 10 WATT TRANSMITTER
- ★ 0·3μV SENSITIVITY
- ★ FITTED 8 CHANNELS

FINAL WORDS

With all the claims and counter claims made these days, it's difficult for the average amateur to judge from whom he should buy his equipment. Our advice is to go and see the dealer in person, inspect his premises and more seriously, his workshop facilities, then make up your own mind. Now that you are spending £300-£400 on a typical HF transceiver, you must be certain that you can have it repaired quickly and *correctly* by your dealer. Why not ask other Hams about Lowe Electronics reputation for service. It's our best advertisement. **'73.**

GAREX (G3ZVI)

PRICES INCLUDE POST, PACKING & VAT AT 25%

PYE CAMBRIDGE AM10DV/6, dash mount, hiband, (ideal for 2m) 6 channel, excellent condition, tested, **£33** inc post & VAT.

THE GAREX Mk II TWOMOBILE FM/AM Tx-Rx

Brief technical details:

Tx, Rx and PSU for 12V DC input contained in one unit 12 × 4½ × 8" deep.

Tx Transistorised crystal oscillator (8MHz), multipliers and modulator, quick-heat tetrodes YLI080 driver and PA. No standby current. 6 switched crystal positions. Fist mic. with press-to-talk. Switched AM or FM. Tone-burst generator—2 tones + off switch.

Rx Fully transistorised. Continuous tuning from 144 to 146MHz directly calibrated dial. VFO supplied from i.c. voltage regulator for improved stability under mobile conditions. 2 RF amplifiers, FET 1st mixer, 1st IF 10·7MHz, crystal controlled 2nd FET mixer, 2nd IF 455kHz, squelch, audio output to drive external 3Ω speaker. FM/AM reception selected by switch independent of Tx mode, utilising i.c. quadrature detector on FM.

35 transistors, 3 i.c's, 15 diodes. Floating supply for pos. or neg. earth.

Price complete with one Tx crystal and detailed handbook **£150.00** inc. VAT. Securicor delivery £3.50 extra.

Garex Loudspeaker Unit. Matching style to Twomobile, dual-purpose table-top or mobile mounting 5 × 3" 3/5Ω drive unit. Ideal for popular R/T equipment **£5.00.**

Printed circuit boards from Pye R/T equipment, with circuits. All transistor, all in good used condition, unless otherwise stated.

FM AF board provides audio for FMTx also Rx audio preamp, suitable valve or transistor Tx **£1.45**
Rx Rf board 148–174MHz for Cambridge and AM 25T **£6.25**
10·7MHz I.F. board **£2.15**
2nd mixer 10·7MHz to 455kHz with 11·155MHz xtal **£2.40**
455kHz block filters 25kHz chann. spacing, low impedance **£2.05**
25kHz chann. spacing, high impedance **85p**
12½kHz chann. spacing—details & prices on application
455kHz A.M. I.F. board (ex AM25B) **£1.25**
455kHz A.M. I.F. board ex AM10, AM25T **£1.80**
Squelch boards (ex Cambridge) AM **40p** (ex AM25T) **50p**
(ex AM25B) Type A or B, **17p.** 2 for **30p**
Mic. amplifier board ex AM25B **95p** ex AM25T **95p**
Mod. output board ex AM25B or T **50p**
Rx Audio board ex AM25B **50p**; ex AM10 **£1.70**; ex AM25T **50p**
6kHz Audio block filter ex AM25B **30p**
AGC Assembly ex AM25B **30p**
Mic. preamp board, 2 transistor, emitter follower output **60p**

NOTE—Apart from providing spares for the specific equipment, all the above boards are an ideal basis for home-brew equipment.

6 channel xtal plate & switch assembly, hiband, for dash Cambridge, complete **£3.75**
Modulation transformers with connection data
p.p. NKT404/OC28/OC35 to QQV03–10 **£1.45** Driver to suit **45p**
Single EL84 to QQV03–10 **£1.50**
p.p. EL91 to QQV03–10, + 3Ω LS & 15Ω pub. address **£1.50**
p.p. EL84 to QQV03–20a ex-Murphy **£2.60**
Mod. and Driver Transformers pp NKT404 to QQV03–20A **£1.45 the two.**
Audio Transformers 6AQ5 to 3Ω & 10Ω, pp NKT404 to 3Ω, small or large. Drivers to suit, small or large. **40p** ea, any **2** for **70p, 3** for **£1.00.**
Lt Choke 3A 0·1Ω, for psu or hash filter, **40p** each, **3** for **£1.00.**
Camera video board (Lynx) new **£4.40**
Rectifier plug in valve replacement stack of silicon diodes, full wave 2·6kV p.i.v. at 400mA. Int. oct. base, wired as 5U4, easily moded. **90p**
Circuit breakers, panel mounted, 0·3, 0·5 and 2 amp (new) **60p**
Reed switch S.P.C.O. 33mm × 5mm dia. (75mm over leads) 10VA rating **40p**
Reed realy coils to match above, 24V (2·5k res.) **25p**
Low loss SP reed and 24V coil glass encap. **60p**
Painton (min. Jones) connectors, chassis mtg. 18 way female **35p**
ditto, 6 way (2 pins at rt. angles) male or female **17p**
Toggle switches, SP biased off **17p**
Crystals HC6U: 12·700MHz, 11·155MHz **60p**
HC6U for 2m Tx 9·0656, 9·0688, 9·0719MHz **£1.70**
Valves (New or tested ex. equip.) EB91, EC91, ECC91, ECF80, ECH83, ECH84, 6AT6, 6BH6, 6BJ6, 6CB6, EZ81, EY81 **17p** each, any 4 for **60p**
Transistors (tested, with mtg. kits) NKT404 **17p** each, 4 for **60p**
Integrated circuits (new, full spec.)
723 voltage reg. TO5 metal case, 2/37V out at 150mA for 5/40V in **90p**
SN76660 FM quadrature detector **£1.45**
CD4001 AE quad. 2-input NOR gate for tone-burst gen. **60p**
NE555 Timer for tone-burst gen. or time-out indicator **95p**

Relays 12V 2 pole co 6A contacts, ex-Cambridge **30p**
Miniature 12V plastic cover SPCO **40p**; 4PCO **45p**
25 AMP 6V single make 6V double make 12V d/make 12V s/make **45p**
Type 2400 ex AM25, please specify coil/contacts required **30p**

Mains transformers multitap prim. unless stated otherwise
HT Transf. 5 windings: 35V 0·2A, 75/115V 0·15A, 50V 0·5A, 150V 0·3A, 170/220V 0·3A (13lb) **£6.55**
(For quick heat QQZO6–40 Tx) 7 windings 232V, 276V (300mA); 60V, 50V (50mA) 2·1V 8A 17·5V 1A 12·6V 4A (11·5lb) **£5.70**
170–0–170V 90mA, 50V 50mA, 6·3V 3·3A, 5V 2A (5.5lb) **£2.25**
0–146–232V 160mA, 26·5V 1A, 13·9V 5A, 50V 50mA (10·5lb) **£4.00**
Small 110V Pri. 30V 100mA sec. **40p** each, 2 for **75p** (series pri. for 240V) **£5.45**
230/240V Pri. 72V 40mA, 6·8V 10A, 6·3V 4·6A C core (7lb) **£3.40**
200/250V Pri. 31·5–0–31·5 ½A tapped 22, 24, 25·5, 28·5V **£3.40**
Auto 0–100–110–150–200–230–240–250V 200VA **£5.45**
345–0–245V 150mA, 5V 2A (POF) **£5.45**
6·5–0–6·5V 2.3A, 6·5–0–6·5V 2·9A, 6·5–0–6·5V 4·25A, 6·5V 2·7A, 37V 30mA (POF) **£6.30**
515–450–0–450–515V 240mA, 50V 50mA, 5V 2A, 6·3V 4A (12lb) **£1.10**
Charger transf. 240V in, 17·5V 1A out **25p**
Selenium bridge rectifier for above
HT chokes 5H 80mA, 4H 240mA, 1H 240mA, 1·25H 350mA, 1·8H 125mA **£1.10**
Top grade types: 9H 250mA 107Ω **£2.60** 10H 20mA 100Ω **£1.55**
8H 240mA (POF) **£2.60**, 35H 25mA (POF) **£1.55**
N.B. POF = Potted, oil-filled.

Toroidal inverter transformers (with circuits)
Input 6/12V DC, output 265V 150mA (Cambridge) **£2.05**
Input 12V DC, output 170/375V 180mA (Vanguard) **£2.05**
Input 12V DC, output 80/130V 150mA (Ranger) **£1.95**
Pye Continental type **£2.80**
HT choke suitable for 2–3kHz Inverters **60p**

Rectilinear pots multiturn, preset, p.c. mtg. (new)
10, 20, 25, 100, 250, 500, 1·5k, 2k, 2·5k, **35p** each, any 4 for **£1.**
Neons, min. wire ended, **6p** ea., 10 for **50p**, 100 for **£4.50**
Diodes CS34–A **40p**
Air spaced Trimmers (ex) small: 2–20pf, 2·4–30pf, large: 10pf, 25pf **17p**
small 2–20pf with spindle ¼" × ½" **30p**
Butterfly trimmers large 2 × 17·5pf, 2 × 10pf **80p**
Beehive trimmers 2–8pf **5p**
Tetfer trimmers 2–10pF, multiturn, OK for UHF. **70p**
Tx Multiplier Transformer for AM10, AM25B or T, High or Low Band **35p**

Other Pye coils and transformers also available

10·7 IFT (valve type) 2½" × ½" square double tuned **25p**; 2 for **40p**; 6 for **£1.00**
Coil formers, ceramic, single hole fix 1½ × ½", (with slug) 10 for **70p**
Modulator kit for QQV03–20a. Includes **all** necessary components; ready assembled pc boards, driver and output transformers, power transistors (with mtg. kits) circuit and connection details; also suitable for QQV03–10, for 12V working, bargain price **£2.95**
Type 2, similar to above, but output transformer has additional 15Ω output winding for pub. address **£3.20**
Rx audio kit similar to above, but 3Ω output **£1.40**
Mobile PSU 12V DC input (floating for + or − E) transistor inverter 170, 220 or 380V DC at 180mA output, fully smoothed, chassis section, self-contained, fully wired and tested, with circuit **£5.55**
As above, but partly assembled (as cut out), complete with all components, circuit, finish-it-yourself **£3.40**
Ventilated steel cabinets 12 × 12 × 18" high, with wall-fixing lugs, internal chassis frame 11½" × 11" × 13". New condition **£2.30.** Buyer inspect and collect by appointment.
Pye Ranger spares IFT's 10·7MHz, 2MHz, Noise lim. assy., Rx osc. mult. transformer: all at 35p
Tubular split stator pa capacitor **45p**
BNC 50ohm free sockets (new) **15p** ea; 12 for **£1.30**, 50 for **£4.50**
Paper block capacitors (Mfd/voltage) 0·5/400, 1/500, 1·5/500, 2/350 at **60p** 8/600, 8/800, 8/1,000 at **£1.25**
Walkie-talkie canvas satchel, main compartment approx. 8½ × 7 × 2", plus mic/batt compartment approx. 7 × 5 × 1½" for Murphy Rover, (Bantam will fit) **£2.05**
Rotary Converters 12V DC to 320V 160mA DC **£1.70**
Fist mike, PTT db carbon insert, curly lead, octal plug, for Murphy, also BCC69 Reporter **90p**
Input transformer for above mike **40p**
FM Deviation Meter TF 934 good working order, with handbook. Prefer buyer collect (VAT 8%) **£54.00**

Unless stated otherwise, components are ex-equipment, in good condition, your satisfaction guaranteed. Wherever possible, full supporting data is given. Prices quoted are inclusive of UK post & packing & VAT at 25%

Mail order only. Sole address for orders and enquiries
GAREX ELECTRONICS
7 NORVIC ROAD, MARSWORTH, TRING, HERTS HP23 4LS
S.a.e. with all enquiries please. Phone Cheddington (STD **0296**) **668584**
6.30pm-9pm and weekends only.

SOUTH MIDLANDS COMMUNICATIONS

The newest of the Yaesu transceiver on offer the FT201. The FT201 features 80–10m operation and the ability to run from the mains or a 12V supply. It is constructed using plug-in modules as made famous in the FT-101. Of special interest to those contemplating using the 201 as a prime mover for VHF use, is the use of 9MHz as the IF frequency and that full AM operation is possible (the optional AM filter being available). For the CW enthusiasts a 600Hz filter is available with AGC characteristics to suit the mode. Write for full specifications.

BASIC 201, £290 (+25% VAT)

NEW FROM SMC THE FT620B

The FT620B features full 1kHz resolution VFO coverage across 50–54MHz in 8 ranges, SSB (selectable), AM or CW (build your own FM modulator) 4 crystal controlled channels in each band segment, receiver offset clarifier, noise blanker, built-in AC and 12V DC power supplies, mic supplied. The exceedingly low level of spurious emissions and the 50MHz output makes this unit highly suitable for use as a drive source transverting to 4, 2 or 70cms, and/or parametrically up converting to 70 or 23. For use on 70cms. We are pleased to announce the Microwave Modules transverter is now available for use with a 50MHz I.F., **£62.00.**

FT620B £205 (+ 25% VAT)

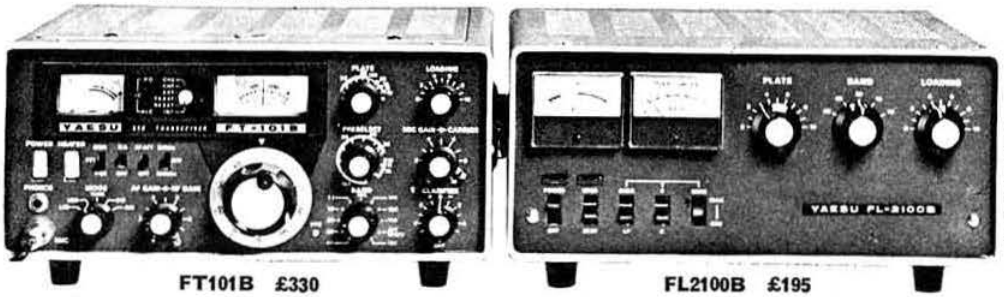
FL101 £265
RFP101 £22

FR101S £245
FR101SD £330

FR101D £330
FR101DD £430

The FR101 is an advanced receiver offering in the deluxe version, coverage from 1·5MHz including all SW broadcast and HF amateur bands (23 in all) to 144MHz. AM, FM, SSB CW are catered for, each with a separate crystal filter. Transceive operation with the FL or FT101. Now with 70MHz coverage.

The FL101 is the ideal companion to the FR101 thus forming a superb base station. Operation on 160 through 10m using SSB, AM, CW or FSK is offered, with the added bonus of an option inbuilt RF speech processor being available at moderate cost.



FT101B £330

The FT101B is except for driver and PA, fully solid state using reliable and serviceable "computer type" plug-in modules. All that is needed for instant "on the air" operation from 160 through 10m is either 12V DC or 234V AC and, of course, an antenna.

FL2100B £195

The FL2100B features operation 80 through to 10m using two rugged 572B carbon plate tubes in class "B" grounded grid circuits with individually tuned input coils for each band, and Bifilar wound ferrite filament chokes.

FT101B £330
FL2100B £195
FV101B £48
SP101B £13

SEE OVERLEAF FOR A SELECTION OF MASTS, ANTENNAS AND ACCESSORIES

SOUTH MIDLANDS COMMUNICATIONS LTD

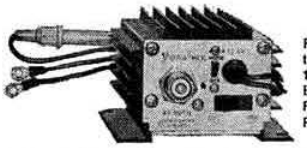
OSBORNE ROAD, TOTTON
SOUTHAMPTON SO4 4DN
Osborne Road is off Rumbridge Street

SMC
A MEMBER OF THE ARRA
Hours of business:
9-5.30 9-12.30 Saturday

Cable: Aerial Southampton
Telex: Chamcom 47388
Tel: (04216) 4930 & 2785

Agents (evenings) (ALL QTHR)
Brian Kennedy G3ZUL Droitwich (09057) 4510
Peter Avill G3TPX, Darton (022 678) 2517
Ian McKechnie GM8DOX, Bridge of Allan (078683) 3223
Howarth Jones GW3TMP, Pontybodkin (035 287) 846

SMC South Midlands



144MHz LINEARS RFL

RF sensing, switchable drop out time SSB, AM, FM, CW, 12VDC. 10W drive. 801 100W, 901 150W. Ex-stock in Totton

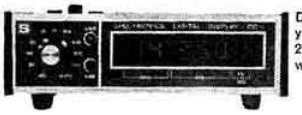
RFA-10-100-HBX (801) .. **£75**
RFA-10-150-HBX (901) .. **£95**

RF SPEECH PROCESSOR KP12A

Audio to audio, via 10·7MHz, mains powered, illuminated meter, FT-101, FT2 plugs suitable all phone modes superb on FM.

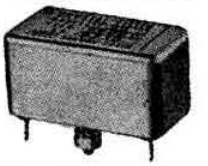
EX STOCK IN TOTTON.
£44 p & p 40p (+ 25% VAT)

READOUT UNIT FOR FT-101 ETC. DD1 Ex stock in Totton



Digital readout to ± 100Hz for your FT-101 (B), FT-401 (B), etc. 21 IC's 76 diodes provide a most worthwhile accessory.

£110 (+ VAT) Carriage paid



9MHz SSB FILTERS YF90/F/S EX STOCK IN TOTTON.

2·4kHz, 6 pole, each individually supplied with ± 6dB, 25dB, 60dB bandwidths, ripple factor and insertion loss.

Filter only **£11.00**
Filter, USB Crystal, **£12.50**
Filter, USB and LSB, **£14.00**
p & p 37p (+ 25% VAT)

CRYSTALS—LOW PRICES FROM STOCK (INSURED P & P 37p) (all plus VAT 25%)

FT2F (52MHz Rx, 6MHz Tx) £3.50 pair £2.00 single
144 (·15, ·25, ·36, ·40, ·48)
145 (·08, ·09, ·68)
Specials 144·60 RTTY, 144·70 FAX, 144·80 DX, 145·90 SPACE
Repeater R0, R2, R3, R4, R5, R6, (R7), R8
Simplex S0, S16, S20, S21, S22, S23, S24
Inverse Repeater
IR6T, IR8T, IR0R, IR2R, IR4R, IR5R

FT2FB (14MHz Rx, 18MHz Tx) £3.50 pair, £2.00 single
144 (·15, ·20, ·36, ·40)
145 (·32, ·44, ·51, ·09, ·84)
Specials 144·50 SSTV, 144·60 RTTY, 145·90 SPACE
Repeater R0, R2, R3, R4, R5, R6, (R7)
Simplex S0, S16, S20, S21, S22, S23, S24
Inverse Repeater
IR0R, IR2R, IR5R, IR6R, IR7R, IR8R

C826MB/C146A (All £3.50 pair or £2.00 each)
144 (·2R, ·48) 145·05, S20 to S24

FT220 channel crystals. £2.20 each
8 (·00, ·125, ·15, ·175, ·225, ·25, ·275, ·50, ·575)

Multi 7/8, Trio 2200 (£3.50 pair, £2.00 each)
R5, R6

C430 ONLY £3.50 pair (save £1.25)
433 (·10, ·15, ·20)

12MHz HC6/U (£2.20) and HC25/U (£2.00)
144·48, S0, S18, S20, S21, S22, S23, 145·700

8MHz HC25/U (£2.00 each)
·48, S20, S21, S22, S23, S24

PYE POCKETPHONE £4.50 pair
433 20

PYE CAMBRIDGE etc (52MHz HC6/U)
R6 & R7 Receive £2.20 each

SPECIAL OFFER (for MORSE-MEN!)
144 125T 12MHz HC25/U only £1.00

SUB STANDARDS
100kHz HC13/U £2.50
1MHz HC6/U £4.50

VHF CONVERTOR CRYSTALS All £2.20 each
4m 42MHz, 2m 38·666MHz, 70cm 50·5MHz

CRYSTALS TO ORDER 6-8 weeks

Phone 04216-4930 for best price

◀ THE HANDHELD—THE KP202

Supplied with six of the most useful channels (S0, S20 and S21, S22, R5, R6 and R7), (save £25). Two watts of RF, and ½ watt of audio make this, with its immunity to image problems, and I.F. breakthrough, undoubtedly the best buy today — **£75.00.**

THE KP202 is supplied complete with telescopic whip, leather handle/whip case, and 'F' type coax connector.

Accessories include internal tone burst unit **(£5.50),** flexible stubby helical antenna **(£4.25),** leather case **(£3.75),** spare F connectors **(25p),** spare telescopic whips **(£1.70),** F to UHF adaptors **(95p),** set of 10 ni cads **(£8.50),** battery charger (base master) **(£8.80),** spare battery hods etc, etc.

"NO FM GROUP MEMBER SHOULD BE SEEN AT A MEETING WITHOUT ONE."

MAGNUM TWO TRANSVERTER (Electronic Developments). Uses H.F. Transceivers P.S.U. and ½ watt on 28MHz for up to 100w output. Supplied completed with relays and 11-pin plug for instant operation. Microwave Modules receiver converter. **£88.00**

BELCOM LINER TWO. 12v DC for 10w P.E.P. on Two. Coverage of 240kHz in 24, 10kHz. VXO channels. Preamp for Liner II, £3.75. (+25%) **£145.00**

NEW from U.S.A.

SOMMER GENERATORS—EX STOCK IN TOTTON (8% VAT)

GA123M5 1000w 230v AC **£135.00**
GA203M5 1600w 230v AC **£155.00**
GA303M5 2400w 230v AC **£215.00**
GA403M5 3200w 230v AC **£320.00**

NEW from SMC

SWR 50

SWR 10

NEW LOW PRICE SWR/POWER METERS (p & p 37p)
Freq. 3·5–144MHz (SWR only to 432) Up to 1kW.

SWR10 Reflectometer, single meter, accuracy quoted ±10% **£6.30**
SWR50 Calibrated for 50 and 75 ohm line, power meter (±20%) and SWR (±5%) **£11.20**

MICROWAVE MODULES (all 28-30MHz i.f., others to order) p & p 30p (+ 25% VAT)

70MHz Convertor .. **£15.20**
70MHz Convertor +LO .. **£16 30**
144MHz Convertor .. **£15.20**
144MHz Convertor +LO **£16.30**
144MHz Pre amp 2 outs **£9.00**
432MHz Convertor **£18.10**
432MHz Transvertor **£62.00**
1,296MHz Convertor **£24.00**

SECONDHAND PRICE LIST—PHONE 04216 4930 FOR LATEST (+ 25% VAT)

Buy it with Access

PLEASE NOTE—THESE PRICES *DO NOT* INCLUDE VAT (25% or 8%)

Terms: Cash with order, or credit card holders just 'phone in! or, if possible, same day despatch. Immediate H.P. available for card owners for amounts up to £150.00. Holders of current U.K. callsigns (where references have been provided) can be speedily cleared, or normal H.P. at competitive rates is available.

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Communications Ltd

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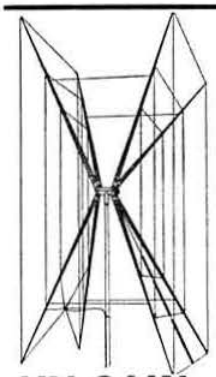

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GEM-QUAD
for 10, 15 & 20m.

- ★ Weighs only 21lb
- ★ 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

VERSATOWERS
Carriage paid, England & Wales

Illustrated right. Tiltover Telescopic post mounted ex-stock. The tilting action allows ease of maintenance and changes of antennas. The relatively low weight eases installation problems. From: **£172.25** (+ 8% VAT)

ALIMASTS
Carriage paid, England & Wales

A/Alloy Telescopic 1·5, 2, 3 metre sections, 6-21 metres from **£11.60** for 6m to **£38.00** for 21m. (+ 8% VAT)

TELOMASTS
(England & Wales, carriage £1.50) (+ 8% VAT)

Galvanized steel Telescopic 10ft. section with or without rigging.

30ft.—**£15.00** 40ft.—**£20.00** 50ft.—**£25.00**

With rigging kits:

30ft.—**£29.00** 40ft.—**£39.00** 50ft.—**£49.00**

HAMTOWERS
(Carriage extra)

Galvanized lattice 10ft. sections 30ft. height with climbing steps on one face. From: **£105.50** (+ 8% VAT)

HY GAIN, THE BEST RANGE, FROM THE USA (Carriage paid) (25% VAT)

HY TOWER	10-80m Vertical Radiator	£132.00	TH2 Mk III	10-20m. 3 element	£69.00	DB1015A	10-15m. 3 ele	£76.00
18V	10-80m. Loaded Vertical	£18.00	TH3 Jnr.	10-20m. 3 element	£74.00	DB24B	20m 3 ele. 40m. 2 ele.	£142.00
12AVQ	10-20m. Trapped Vertical	£25.50	TH3 Mk III	10-20m. 3 element	£99.90	402BA	40m 2 element	£121.00
14AVQ	10-40m. Trapped Vertical	£36.00	TH6DXX	10-20m. 6 element total	£119.00	204BA	20m 4 element	£96.00
18AVT	10-80m. Trapped Vertical	£52.00	HY QUAD	10-20m. 3 element	£99.00	203BA	20m 3 element	£80.00
BN86	1 : 1 Balun	£9.50	LA1	Lightning arrestor (gas)	£17.50	153BA	15m 3 element	£44.00
562	Rotary bearing	£3.50	LA2	Lightning arrestor (spark)	£3.00	103BA	10m 3 element	£35.00

S.M.C. TRAP DIPOLES (Carriage paid) (25% VAT)

Trap dipole 10-80m .. .. .. **£16.85** Type HP (1kW pep) .. .. .. **£18.75** Type P Portable **£19.50**

JAYBEAM COMPLETE RANGE OF (AND MORE!) (Carriage extra) FOR 70, 144 or 432MHz (25% VAT)

FOUR METRES		TWO METRES		TWO METRES		70 CENTIMETRES	
4Y/4M 4 element	£6.80	5XY/2M 5 ele crossed	£8.20	5Y/2M 5 element Yagi	£4.30	D8/70 8 over 8 slot	£9.00
PMH2/4 2 way harness	£5.30	8XY/2M 8 ele crossed	£10.20	8Y/2M 8 element Yagi	£5.60	PBM18/70 18 ele Parabeam	£10.50
BEARINGS		10XY/2M 10 ele crossed	£14.10	10Y/2M 10 ele Long yagi	£11.00	MBM46/70 46 ele Multibeam	£12.10
RZ100 Alignment bearing	£7.60	D5/2M 5 over 5 slot	£7.92	14Y/2M 14 ele Long yagi	£14.20	MBM68/70 68 ele Multibeam	£16.10
COUPLERS		D8/2M 8 over 8 slot	£10.50	PMM2/2M 2 way harness	£3.95	PMM2/70 2 way Harness	£3.30
JBL15/592" Jointing sleeve	£1.85	PBM14/2M 14 ele Parabeam	£16.90	PMM/2C Circular phasing	£2.85	PMH4/70 4 way Harness	£3.85

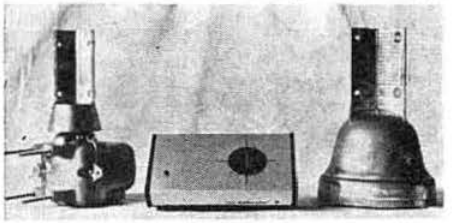
CDE ROTATORS EX STOCK (IN TOTTON) FOR FAST DELIVERY (25% VAT)

THE NEW CONTROL UNIT FOR THE CD44 AND HAM 2

Carriage (B.R.S.) Free. Securicor delivery 60p extra

ALL ROTATORS SUPPLIED COMPLETE WITH APPROPRIATE CONTROL BOX AND INSTRUCTIONS

AR30 for Stereo and small VHF beams	£25.00
AR40 for Medium VHF Small HF beams	£30.00
AR33 de luxe version of AR40	£36.75
CD44 Arrays up to 2½ sq. ft. of wind area	£60.00
Ham II Arrays up to 7½ sq. ft. of wind area	£90.00
Con Cable 5 way for AR30/AR40 (8% VAT) at 18p/m	
Con Cable 8 way for CD44/HAM II (8% VAT) at 26p/m	



THE NEW SILENT CONTROL UNIT WITH AN AR30 and 40

K.W. EQUIPMENT (carriage extra)

KW103 SWR/PWR meter	£16.00	Dummy Load 75/50 ohm	£12.00	KW160 Topband ATU..	N.A.	KW108 Monitorscope	£85.00
KW107 SUPERMATCH	£63.00	Antenna switch, 3 way	£6.00	KW EZ match 10/80m ATU	£22.00	KW109 QRO ATU	£78.00

MOSLEY TRI BAND (10-15-20m) BEAMS (carriage £1.75) (+ 25% VAT)

TA33 Jnr E 3 ele 200W RMS	£53.00	TA32 Jnr E 2 ele 300W AM	£37.00	Mustang 3 ele 2kW PIP	£70.00	Mustang 2 ele 1kW AM	£56.00

BANTEX FIBREGLASS, STAINLESS STEEL VHF/UHF MOBILE ANTENNAS (Carriage 75p) (+ 25% VAT)

B5 ⅝Wave 144MHz,	£5.00	**B5U** ⅝Wave 432MHz	£5.00	Magnetic Base Mount,	£7.50	Note: deduct 50p from price of
BGA ⅝Wave 144MHz	£6.60	**70**½ ½Wave 70MHz	£3.00	Trunk Lip Mount	£5.10	aerial if standard base not required

GWHIPS, The British Mobile HF Antenna Range (Carriage 75p) (+ 25% VAT)

Tribander 10, 15, 20	£13.53	LF40, 80 or 160m	£4.51	Flexiwhip, 10m with base	£10.45	F15, 20, 40, or 160	£4.67
Multimobile 10, 15, 20	£15.73	MM40, 80 or 160m	£4.10	Basemounts	£1.81	Telescopic whips for coils	£1.22

R.F. CABLES (Carriage up to 20m, 40p; over, 50p; less for lighter cables) (NB VAT 8% ONLY)

50 ohm RG8U/UR67 ..	33p/m	75 ohm UR39	25p/m	75 ohm Flat twin ..	6p/m	75 ohm BICC 2378 ..	22p/m
75 ohm UR57	33p/m	75 ohm Economy ..	10p/m	300 ohm Ribbon	6p/m	50 ohm UR43/UR76 ..	15p/m

COAX PLUGS (p and p extra) (plus VAT)

PL259 48p; PL259A 56p; UHF Angle 90p; S0239 35p; UHF back to back 75p; BNC plugs 44p; N plugs 83p

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OSBORNE ROAD, TOTTON
SOUTHAMPTON SO4 4DN
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A MEMBER OF THE ARRA
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Peter Avill G3TPX, Darton (022 678) 2517
Ian McKechnie GM8DOX Bridge of Allan (078683) 3223
Howarth Jones GW3TMP, Pontybodkin (035 287) 846

PAUL
G3VJF

THANET

INOUE FOR

IC-22A

5 CHANNEL . . £115 + VAT

8 CHANNEL . . £125 + VAT

Both with automatic tone burst. No buttons to press while driving.

IC-22A BRIEF SPECIFICATION

Frequency coverage 144–146MHz. 22 channel capability.
Power requirements 13·8V DC ± 15% neg ground
Consumption Transmit 2·1 Amps, receive 180mA
Size 2⅜" × 6¼" × 8¼" (58 × 156 × 216mm)
Weight 4lb
Accessories supplied: Mic. Versatile mobile mounting bracket. DC Power cord. Spare Fuse, etc.

AN OLD FRIEND IN A NEW BOX—BUT WITH EXTRA CHANNELS FITTED!

The very popular IC-22 has been given a face lift. The dial Knob has been moved to the left and re-designed to give clearer channel indication, and the knobs, switches and S-meter have been moved about a bit and re-shaped to give a more modern (and we think more attractive) appearance. Inside there is not much change other than a change in front-end transistor and modification of the squelch circuit. The 22-A thus is in every way as good as the old faithful IC-22 with its excellent speech clipping for optimum readability, either direct or via repeaters. Similarly the receiver is good and sensitive but with an improved squelch circuit. We supply free of charge an automatic tone burst which operates only on repeater channels. Channels fitted are SO (145·00), S20, S21, 222 and S23 for £115 + VAT. Alternatively for £125 + VAT you can have the above channels plus either 3 repeater channels or S24 and 2 repeater channels. Note that this is cheaper than it would have cost for a similar number of channels in a 22—that's our contribution towards helping to heal the chancellor's wounds! By the way, have you realised that if you allow for inflation over the past year it is now cheaper, in terms of pieces of steak or bread and butter puddings, to treat yourself to a black-box than it was a year ago. If you want even more channels for your 22A the cost is £4.00 plus VAT per pair of crystals.

RECEIVER
Sensitivity 0·4μV for 20dB quieting
I.F.s 10·7MHz, 455kHz
Bandwidth ±8kHz (−6dB), ±15kHz (−50dB)
Spurious response −60dB or less
Crystal Frequency 14MHz

TRANSMITTER
Power O/P 0·5W or 10W switchable
Mod System Variable reactance phase mod with clipping
Deviation Adjustable 3–16kHz (we set to 4·5kHz)
Spurious O/P −60dB or less
Crystal frequency 18MHz

OTHER LINES FROM THANET:

IC-3PA DC PSU and speaker. Has automatic overload protection and harness to hold IC-22, IC-22A, IC-225, IC-320 or IC-20. **£35.00** + VAT.

PL-V1 External VFO for the IC-210 or IC-225 with centre zero meter for easy netting Extremely stable. **£42.00** + VAT.

21-VFO External receiver VFO for the IC-21, IC-21A, IC-22 or IC-22A. **£42** + VAT. Crystals for IC-20, IC-21, IC-22, IC-2F, IC-320 or IC-31. **£4.00** per pair + VAT. Crystals for IC-225 and IC-210—reverse repeater or special channels **£3.00** + VAT.

SECONDHAND TRIO Tx 599 in virtually new condition—private sale on behalf of a customer **£140** (NO VAT).

FREE SECURICOR DELIVERY ON ALL TRANSCEIVERS

BARCLAYCARD welcome here

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NOTE OUR NEW ADDRESS DURING EXTENSIONS TO OUR WHITSTABLE PREMISES

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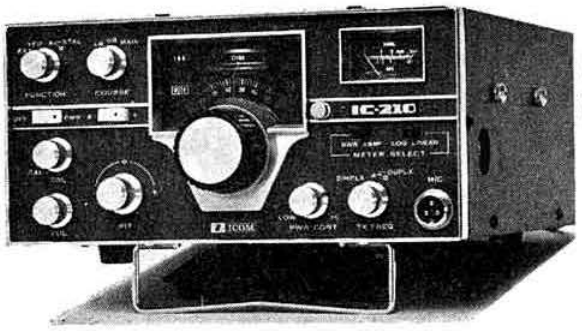
34 Cliff Avenue, Herne Bay, Kent CT6 6LZ **Tel. (02273) 63846**

ELECTRONICS

DAVE
G8ELP

VHF AND UHF

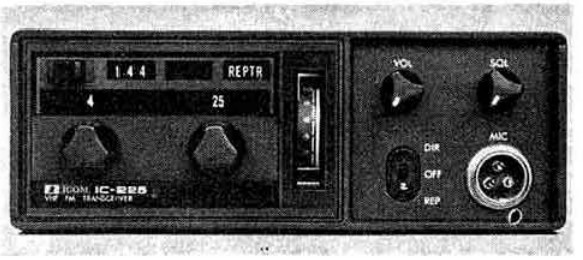


IC-201

We are pleased to say that we have two sample models which can be seen at Barnsley and Herne Bay and will be shown at several rallies. Full details will be sent to those who have asked very shortly. It looks like the IC-210, has 1kHz dial read-out, a two speed tuning drive, FM, SSB and CW, VOX, a centre zero meter for easy netting on FM, side tone on CW, RIT and Duplex facilities. It really is an excellent machine for £300 + VAT. We are hoping to have supplies for sale in about 4 weeks.

IC-210

A fully VFO controlled FM transceiver operating from mains or 12V battery. Full 600kHz repeater shift facility and automatic tone burst gives full repeater coverage. Still one of the best buys on the FM market. NOTE: IF YOU BUY FROM US OR ONE OF OUR AGENTS YOU GET A TONE BURST FITTED FREE AND AN *ENGLISH* MANUAL. Still £200.00 + VAT.



IC-225

The ultimate in mobile rigs with 80 channel operation as it stands plus the availability of extra channels if required, or full VFO coverage on transmit and receive when used with the PL-V1 (or a home brew 12MHz VFO). Automatic 600kHz Tx frequency drop and introduction of a tone burst when switched to REP give full UK repeater coverage without needing extra crystals. Tx power 10W, Rx sensitivity 0·4μV for 20dB quieting. Spurious response and radiation better than −60dB. Superb audio tailoring and clipping. £195.00 + VAT.

IC-21A

The updated version of the IC-21 using crystals or the DV-21 VFO £178.00 + VAT.

DV-21

Digital frequency synthesiser VFO for the IC-21A, IC-21, IC-22 or IC-22A (the last three rigs require modifications). Output 18MHz on transmit and 44MHz on Rx. Transmit or receive frequency displayed on LED display. Can be programmed for separate Tx and Rx frequencies, or for simplex operation, in 5kHz steps. Alternatively it will scan the band in 10kHz steps looking for stations on which it will lock for a pre-set period adjustable from 4 to 30 secs. There are also two built in memory frequencies which are easily programmed by the user. These memories are not erased when the device is switched off. £172.00 + VAT.

IC-320 **INOUE HAVE GONE UHF** 70cm 10watt mobile FM transceiver similar in appearance to the IC-22A. 12 channel capability, fitted with 4 channels including 433·2MHz. Extra channels available at £4.00 + VAT. Ideal for the new 70cm repeaters. £169.00 + VAT.

IC-31 Base station version of the IC-320, similar in appearance to the IC-21 and IC-210. Built in mains PSU, or 12V operation. Coming shortly £220.00 + VAT.

LONDON AGENT We are pleased to introduce Terry Barnett, G8BAM, as our London agent. Terry will hold a representative range of our stock and will be available for demonstrations and sales evenings and weekends by telephoned appointment only. We will be also opening agencies in South Scotland and South Wales shortly.

AGENTS

(by telephoned appointment, evenings and weekends only)

NORTH
Peter Avill, G3TPX,
7 Moorland Crescent,
MAPPLEWELL, Barnsley, Yorks
Tel: DARTON (022678) 2517

LONDON
Terry Barnett, G8BAM,
7 Cochrane Court,
Leyton Grange,
LONDON E10 Tel: 01-556 9366

APPOINTED STOCKISTS

Crayford Electronics
32 Iron Mill Lane,
CRAYFORD, Kent.

Lee Electronics
400 Edgware Road,
LONDON W2

D. P. Hobbs Ltd.,
11 King Street,
LUTON, Beds.

The Heathkit 5-band HW-101 transceiver. It'll make you very pleased with yourself.

Like most Heathkit amateur radio equipment, our HW-101 SSB transceiver comes in kit form.

So, besides the enjoyment of using it you'll also have all the satisfaction of knowing you built it.

It should make you very pleased with yourself.

Especially as it's about the best transceiver in its class. And represents exceptionally good value for money.

Take a look at the technical specifications now and then send for your free Heathkit catalogue.

In it you'll find the whole of our amateur radio range together with full details about the easy payments available with the Heathkit Monthly Budget Plan.

Which should please you even more.

HW-101 transceiver specifications

Receiver section:

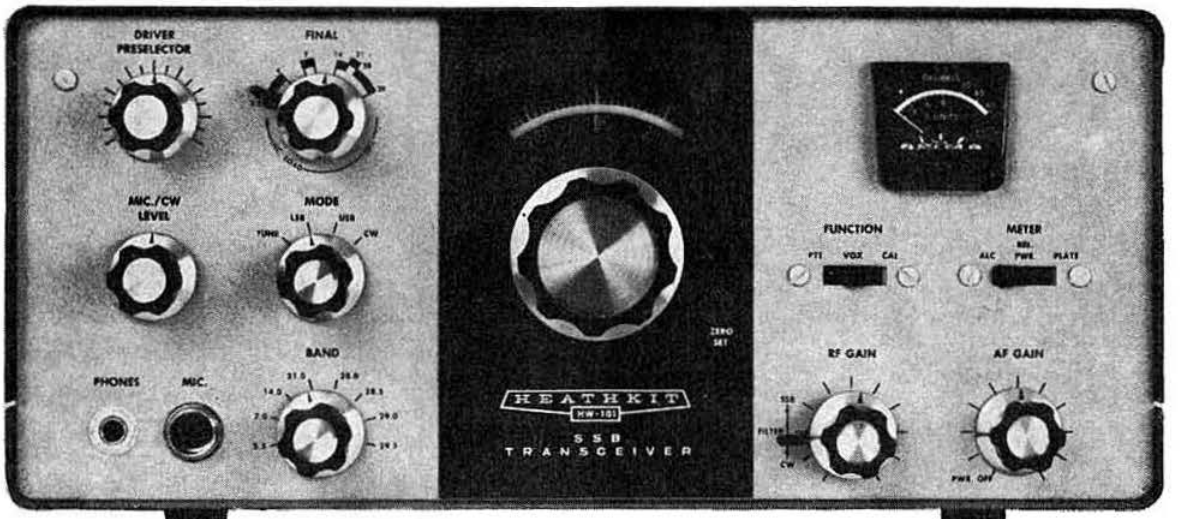
Sensitivity: Less than 0.35 microvolt for 10 db signal-plus-noise ratio for SSB operation.
SSB selectivity: 2.1 kHz min. at 6 dB down; 7 kHz max. at 60 dB down (3.395 MHz filter).
CW selectivity: (with optional CW filter installed) 400 Hz min. at 6 dB down; 2.0 kHz max. at 60 dB down.
Input: Low impedance for unbalanced coaxial input.
Output impedance: 8 ohm speaker and high impedance headphone.
Power output: 2 watts with less than 10% distortion.
Spurious response: Image and IF rejection better than 50 dB.

Transmitter section:

DC power input: SSB—180 watts PEP; CW—170 watts.
RF power output: 100 watts on 80-15 M; 80 watts on 10 M.
Output impedance: 50 ohm to 75 ohm with less than 2:1 SWR.
Oscillator feed-through or mixer products: 55 dB below rated output.
Harmonic radiation: 45 dB below rated output.
Transmit/receive operation: SSB, PTT or VOX. CW provided by operating VOX from keyed tone using grid-block keying.
CW sidetone: Internally switched to speaker or headphone in CW mode. Approx. 1000 Hz tone.
Microphone input: High impedance with a rating of −45 to −55 dB.
Carrier suppression: 45 dB down from single-tone output.
Unwanted sideband suppression: 45 dB down from single-tone output at 1000 Hz reference.
Third order distortion: 30 dB down from two-tone output.
RF compression: 10 dB or greater at .1 mA final grid current.

General:

Frequency coverage: 3.5 to 4.0; 7.0 to 7.3; 14.0 to 14.5; 21.0 to 21.5; 28.0 to 28.5; 28.5 to 29.0; 29.5 to 30.0 MHz.
Frequency stability: Less than 100 Hz per hour after 45 minutes warm-up. Less than 100 Hz for ±10% line voltage variations.
Modes of operation: Selectable upper or lower sideband and CW.
Dial calibration: 5 kHz.
Calibration: 100 kHz crystal.
Audio frequency response: 350 to 2450 Hz.
Power requirements: 700 to 850 V at 250 mA with 1% max. ripple; 300 V at 150 mA with .05% max. ripple; −115 V at 10 mA with .5% max. ripple; 12 VAC/DC at 4.76 amps.
Cabinet dimensions: 6 5/16" H., 14 13/16" W., 13 3/8" D.



HEATH
Schlumberger

Heath (Gloucester) Limited, Radio Section, Bristol Road, Gloucester, GL2 6EE. Tel: (0452) 29451.

RADIO SOCIETY OF GREAT BRITAIN

35 Doughty Street, London WC1N 2AE

Telephone 01-837 8688

Founded 1913
Incorporated 1926

Member society, International Amateur Radio Union

PATRON: HRH The Prince Philip, Duke of Edinburgh, KG

The national society representing all UK radio amateurs

Membership is open to all those with an active interest in radio experimentation and communication as a hobby

Annual membership rates: UK—£5.50 (including VAT); (Unlicensed members under 18 years of age, £2). Overseas—£5 (USA, $12).

Applications for membership should be made to the general manager, from whom full details of Society services may also be obtained.

GENERAL MANAGER AND SECRETARY
G. R. Jessop, CEng, MIERE, G6JP

EDITOR
A. W. Hutchinson

CQ de RSGB

Page re-arrangement

This page has been re-arranged to make more economical use of the space and provide a regular feature spot for important Society announcements, news items and comment.

As all regional representatives and honorary officers are licensed amateurs, their addresses appear in the *RSGB Amateur Radio Call Book* and these will no longer be published on this page.

Regional representation

The result of the ballot in Region 6 was as follows:

D. C. Andrews, G4CWB	52 votes
M. I. Connell, G8HDL	11 votes

Mr D. C Andrews was therefore elected regional representative for Region 6.

Council has also approved the appointments of those representatives for Regions 3, 12, 16, 18 and 19 shown in the list published on page 398, May issue.

In the case of Region 7, Mr A. H. Othen, G8FSZ, has been unable to accept this appointment for health reasons, and Mr R. S. Hewes, G3TDR, representative of the former Region 7, has offered his services as representative of the new Region 7. Council has accepted Mr Hewes' offer with thanks and has appointed him to that position.

MEMBERS' ADS—rate increase

Since the current flat-rate charge for Members' Ads was fixed at 40p a year ago, printing costs have continued to escalate and have recently suffered a steep rise as a result of printing industry wage increases back-dated to May 1975.

It has therefore become necessary to review the charge for Members' Ads, and Council has decided that the flat rate charged for 40 words or less shall be increased to 50p. This will cover most of the typesetting costs while the Society will continue to subsidize this service to members by providing the pages and paying for their printing.

All Members' Ads *received* up to and including 1 August 1975 will be accepted at the old rate and published in the September issue. Thereafter *only* advertisements **at the new rate of 50p** will be accepted.

QTC AMATEUR RADIO NEWS

PAGE CHANGE

SEE PREVIOUS PAGE FOR IMPORTANT ANNOUNCEMENTS

Hand-held equipment

The Radio Regulatory Department of the Home Office has communicated its view to the RSGB that use of this type of equipment *while walking* from one place to another ("pedestrian mobile") is not covered by either the amateur (sound) licence nor the amateur (sound mobile) licence. Use of such equipment at a particular site is covered by clause 1(1) (a) (ii) of the main amateur licence and the callsign plus details of the location should be transmitted. On the basis that the majority of the operators who wish to use hand-held equipment while walking would already be in possession of an amateur (sound mobile) licence, the Home Office will sanction this use by the issue of a letter of authority to be attached to the licence.

The Society has requested that the pedestrian use of hand-held equipment be incorporated in the main amateur (sound) licence. This will lessen administrative work and avoid any misunderstanding.

Some members have reported temporary difficulties when using mobile or hand-held equipment. It is strongly recommended that a copy of the sound mobile licence should be carried at all times. It is suggested that the original licence can be photo-reduced (eg by a Xerox copier) and a photograph of passport size and a signature be added at the foot of the second page. If the document is laminated, this should them provide firm evidence of the status of the user.

A long-standing request by the Society to the Home Office is that the present form of licence be replaced by a small card showing the holder's particulars with the licence conditions appearing in a separate document.

Taking your rig abroad?

Following a recent incident involving the French customs, the attention of members is drawn to the information appearing under the above heading on p185 of the March 1968 issue of *Radio Communication*.

For those who do not have ready access to this issue the suggested procedure when taking equipment abroad is outlined below.

An arrangement has been made with the Automobile Association whereby members of the RSGB and ARMS will be able to obtain a customs document to include the car and the radio equipment mounted in it. This carnet is recognized by virtually all customs authorities. The carnet is only issued in conjunction with the AA 5-star service, and requests should be sent to: Automobile Association, Fanum House, Station Road, Cheadle Hulme, Cheadle, Cheshire SK8 7BS.

The AA will require a bankers indemnity or a cash deposit of £100. Failing this, Royal Insurance of 48 St James's St, London SW1, will usually be prepared to issue a suitable indemnity for a fee of £5.

The AA will not make any additional charge for the issue of the carnet as it will be included in their 5-star service. Particularly note that the issue of the carnet *cannot* be dealt with by local offices of the AA.

RSGB Interference Survey

Licensed members who have not already completed and returned the Interference Survey form included in the May issue of *Radio Communication* are asked to do so as soon as possible.

Some members may feel that because they have not yet had any interference problems they cannot contribute any useful information. In fact, for the purpose of this survey, a properly-completed form reporting no problems at all is just as important as a form describing many problems.

Publications information

Current estimates for the new RSGB *VHF-UHF Manual* indicate that it should be available before the end of this year. The new RSGB *Radio Communication Handbook* on the other hand has been subject to further delay, but it is hoped that this publication will be available early in 1976. Members are requested not to place advance orders for either of these publications at this stage as the cover price has not yet been established.

Radio Amateur Old Timers' Association

The seventeenth reunion of RAOTA was held on 16 May at the Bonnington Hotel, London WC1, when there was an attendance of 58.

At the AGM held prior to the buffet, Mr Kenneth Alford, G2DX, was re-elected president; Mr "Dud" Charman, G6CJ, was re-elected vice-chairman; Miss May Gadsden was re-elected hon secretary and hon treasurer, and Mr Bill Corsham, G2UV, was elected a member of the committee.

It was decided that the reunion in 1976 will take place on a Saturday, commencing with a luncheon followed by the AGM. Date and venue have yet to be fixed.

Mr Ohlsson, W7DZL, and his wife were welcomed as guests of the association.

It has been suggested that a reunion of the Radio Amateur Old Timers' Association should be organized to coincide with the ARRA Exhibition next autumn. The proposed date is Friday 31 October (the middle day of the show), and the venue the Grand Hotel in Leicester. There would be a four-course dinner at an anticipated cost of £3.25 per head.

All old timers within travelling distance of Leicester who would be interested in supporting such an event are asked to write without delay to Miss A. M. Gadsden, 79 New River Crescent, London N13 5RQ, but *not* to send any money until the level of interest can be established. Each member should state if he will be bringing his wife to the dinner and whether overnight accommodation will be required at the Grand Hotel.

Amateurs eligible for membership of RAOTA are those licensed in 1949 or earlier.

QSL Bureau

Scottish members should note that the address of their sub-manager, Mr David Macadie, GM6MD, is now 11 Marchmont Road, Ayr KA7 2SB.

RSGB NATIONAL MOBILE RALLY

Woburn Abbey, Bedfordshire

(Coach Park Site)

Sunday 3 August 1975

From 11am

Attractions will include a large trade exhibition, RSGB bookstall and enquiries stand, grand raffle, Raynet stand, BARTG stand, and a bring-and-buy stand. All will be under cover.

Bring-and-buy rules: (*i*) All items to be marked with vendor's name, callsign, and price expected. (*ii*) All items to be coded "1 of 1", "2 of 4" etc. (*iii*) No item accepted for sale after 2.45pm. (*iv*) All unsold items to be collected by 5pm. (*v*) The RSGB accepts no responsibility for unclaimed items. (*vi*) 10 per cent commission will be charged on each item sold.

The RSGB makes no charge for entrance to the rally but all visitors must pay for entrance to Woburn Park, in which the rally takes place, at 25p per car irrespective of the number of passengers.

All the normal Woburn attractions will be available at small extra charges. Various bars and cafes are available nearby.

How to get there:

From the south via the M1—Leave the M1 at intersection 13, **not 12 as signposted**. Turn left off motorway and follow signposts through Husborne Crawley to Woburn Abbey.

From the south via the A5—Turn right at Hockliffe and follow the A50 to Woburn.

From the north via the M1—Leave the M1 at intersection 14 and follow the A50 to Woburn.

From the north via the A5—Turn left at A418, five miles south of Fenny Stratford, and follow to Woburn.

From other directions make for the points indicated above and proceed as indicated.

Avoid routes signposted to "The Wild Animal Kingdom" or "Game Reserve". The rally takes place in Woburn Park and correct routes are signposted to "Woburn Park" or "The Abbey". Also watch for RSGB signs.

Holders of callsigns in the series G3EAA to G3HZZ are asked to note that for family reasons their sub-manager, Mr Bill Green, G3FBA, is giving up the post. Mr Green has covered this series since it was first issued and sincere thanks are extended to him for a job extremely well done. The new sub-manager is Mr S. L. Newport, G4DEV, 101 Elibank Road, Eltham, London SE9 1QJ.

Radio Amateur Invalid & Bedfast Club

Will all members, representatives and supporters of RAIBC and those requiring information or help please note that the HQ address is now 59 Pantain Road, Loughborough, Leics LE11 3LZ, and all communications, subscriptions and donations should be addressed to the new hon sec: Mrs Rita Shepherd, G3NOB.

The Torbay ARS will assist any RAIBC member in the TARS area who is unable to get equipment going or who has other radio problems. Contact should first be made with G3NOB who will pass the request to TARS.

Cyprus 2m beacon

This beacon has been resited, and equipped with a better aerial, on Mount Olympus, the peak of the Troodos range and 2,000m above sea level. It now operates continuously on 144·139MHz. The aerial is a stacked 6-over-6 slot-fed Yagi beamed on 295° true, ie towards Greece and Europe. The power output is 15W, the keying is frequency shift, and the callsign is 5B4CY. Reports on its reception would be very welcome and should be sent to the Cyprus Amateur Radio Society's VHF Manager, PO Box 4574, Nicosia, Republic of Cyprus.

Can you help?

Mr J. Melvin, G3LIV, 5 Lancashire Drive, Belmont, Durham (tel Durham 63111) would like to trace the owner of FT277B, serial number 310463. He will accept any transfer charge call concerning this equipment.

An Aberdeen member, who obviously wishes to remain anonymous, has been embarrassed by a cheque, which he used to purchase large die-cast boxes from an unidentified dealer's stall at the White Rose Rally on 30 March, being returned by his bank to the dealer. Will the dealer concerned please contact the member, who wishes to clear his name and conscience (not to mention any myths about Aberdonians!), via the editor.

GB3LO 2m repeater experiments

The UK FM Group is to conduct two experiments in conjunction with the GB3LO Channel R7 2m repeater. The experiments, which are due to start on 1 August for three months, concern the transmission of sstv and rtty through the repeater using F2. There will be three specific half-hour periods per week for these experiments. The periods will be from 0001 to 0030 local time, sstv on Wednesdays and rtty on Thursdays and Saturdays. During these test periods sstv/rtty will have priority over other "normal" traffic.

Operators intending to take part in these experiments are advised to either consult their specialist newsletters or contact the UK FM Group. For both sstv and rtty the latest IARU standards should preferably be used compatible with F2 transmissions. All sstv and rtty transmissions must be preceded and followed by voice identification.

"Bulletin" reflections

by PAT HAWKER, G3VA

Volume 1 Number 1 of the *T & R Bulletin* was published in July 1925. Now 50 years and 600 issues later we trace just a little of its long continuous story, covering a period which has seen the hobby grow from around 1,000 experimental transmitters in 1925 to the over-20,000 British amateurs of today. For some it is hoped this account may bring back memories; for others it may serve as a reminder that even in these days of solid-state and satellite repeaters many of the ideals, the requirements, the problems and the practices of the amateur transmitter remain remarkably the same. Inevitably this is a personal story that omits much, but it is written as a grateful and frank tribute to a journal that has seemed part of the author's life for just on 40 years.

BIRTH OF THE "BULL"

By 1925 the first heady excitement of short-wave dx was over, transmitters (mostly single-stage power oscillators) and Schnell and Reinartz "straight" receivers had been made to work down to 23m; spark had been superseded; broadcasting was pushing British amateurs off 440m; aircraft communications had taken over 1,000m. Daylight dx had come with the opening of the short waves; the Radio Transmitters Society had fused with the Transmitter & Relay Section (the active transmitting group within the still prestigious, but not always effective, Radio Society of Great Britain, then concerned with many aspects of "wireless"). Radio amateurs were divided into two rival groups—the "giants" of the recent dawn of international dx and those who had helped pioneer broadcasting in Britain by phone and music transmissions on medium waves.

Until 1925 *Wireless World* had been the official journal of the Society, providing generous coverage of meetings and activities; occasionally with papers reprinted as *Proceedings of the RSGB*. There had been no regular Society publications. As interest increased in broadcasting reception, the commercial publications gradually devoted less space to transmitting topics. Several of the early British amateurs looked wistfully across the Atlantic and felt the lack of an exclusively amateur radio periodical, but (as in many other matters) it was left to Gerry Marcuse, 2NM, to make the first move.

In 1924 he wrote a letter to the editor of *Wireless World*: "Considerable dissatisfaction seems to exist in the minds of various members, the causes of which appear to vary, but the feeling is, I believe, that we require a periodical of our own, similar to *QST*."

Even then, no immediate action resulted and the idea might have lapsed had there not been a change of ownership of *Wireless World* in February 1925 (a change that arose out of the journal's support for international working by British amateurs when, in 1924, the Government attempted to close this down—but that is another story).

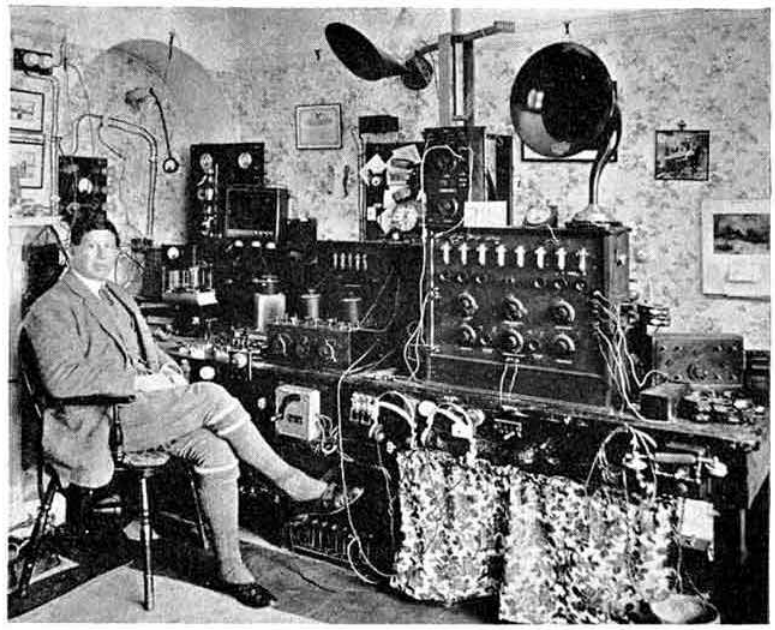
The new owners were reluctant to continue the official association with the RSGB and it was arranged that instead *Experimental Wireless* would become the Society's journal. This was a magazine edited by Paul Tyers, 5GX, which had supported amateur radio since the first issue in 1923, particularly the "more serious experimenters". But it had never minded chastising in print those "who never perform any experimental work, who buy their sets ready made, who usually know no morse whatever, and who are best known for the great number of gramophone records which they send." Although many amateurs wrote for *Experimental Wireless*, it is doubtful whether it enjoyed the same support as *Wireless World*, so the proposed change brought to the fore the dilemma facing the T & R Section. Out-of-London members were already complaining that they received little in return for their subscriptions.

So by 1925 Gerry Marcuse and H. Bevan Swift, 2TI, then chairman of the T & R Section, felt something must be done urgently if the British amateur movement was not to split up again, as it had done several times in the early 'twenties. Bevan Swift has described what happened: "With this thought in mind, we (2NM and himself) resorted to a Lyons teashop and over a cup of coffee discussed what could be done. If we could only issue a bulletin, say once a month, detailing the activities of the section, it would give the provincial membership some satisfaction. The original idea was a simple four-page leaflet without advertisements.

"A rough draft was prepared and taken to a committee meeting of the section who immediately approved the idea and suggested that instead of a leaflet an actual magazine should be issued. As the committee was unable to embark on this expenditure itself, the matter had to go before the main RSGB Council for sanction. Here the proposal received only lukewarm support, because of the alternative arrangements with *Wireless World* and *Experimental Wireless*. The T & R Section committee decided to go ahead with the *Bulletin* and to shoulder the expense as best they could. To lighten the burden it was resolved to include a few advertisements; Arthur Hambling, 2MK, was able to approach the radio trade for advertising. J. A. J. Cooper, ex-5TR, was the first editor and with Bevan Swift, Gerry Marcuse and Ralph Royle, 2WJ, made up the first editorial committee.

"Vol 1 No 1 was hailed with general approval . . . some wanted a *Bulletin* every week and twice the size."

The first 12-page issue, of which nearly five pages were filled with advertisements, included a description of a single-stage 23m transmitter by Ralph Royle, 2WJ. The components were mounted on a wooden baseboard; there was a



The equipment used by Gerald Marcuse, G2NM, at Caterham, Surrey, during January 1924. From this station he made the first two-way contact on short waves with the west coast of the USA and maintained contact for some weeks with the Rice-Hamilton Expedition to South America

home-made blocking capacitor made of zinc sheets separated by photographic plates; the large single valve was mounted in a wooden supporting frame; the power supply used "chemical rectification" from the mains. Another article described a new "tetrodyne" superhet mixer using a four-electrode valve; there were many humorous asides which depended on the close-knit nature of the early amateurs. The *T & R Bulletin* was off to a promising start.

One result was a large increase in membership of the T & R Section which soon outgrew in size the main body of the RSGB; since members of the section were not automatically members of the main Society the anomaly led to a drastic re-organization of the whole Society: the T & R Section as such ceased to exist and in fact became the controlling factor in the Society, but the name was retained for the journal until 1942.

As many have found, it is easier to start a magazine than to keep one going, but fortunately there was plenty of enthusiasm and an obvious willingness to lend a hand. G. W. Thomas, 5YK, took over the editorship when J. A. J. Cooper had to step down. Arthur Milne, 2MI, drew many hundreds of the early illustrations. Horace Freeman of Parr's Advertising took on the problem of obtaining advertisements. Members of the editorial committee seem to have been ready to take their jackets off and tackle every aspect of production. One of these was Jimmy Mathews, 6LL, the pioneer of transatlantic working on 28MHz in 1928, who has set up a remarkable record in having, as a member of successive editorial and technical committees, been actively concerned with the production of the *T & R Bulletin*, the *RSGB Bulletin* and *Radio Communication* until finally this year he took on the only slightly less active role of a "corresponding member".

Gradually in the early 'thirties the size of the *Bulletin* increased, more rapidly after John Clarricoats, G6CL, became the Society's full-time secretary in 1932, later secretary-editor and finally editor. If this is to be a factual account, then one must admit that "Clarry" could make enemies as well as friends. In his belief in the freemasonry of amateur radio, sometimes it seemed he was influenced as much by freemasonry as by amateur radio. But that having been said, it must equally be stressed that it was his remarkable energy and dedicated vision that in those early days converted what was still in many respects an amateur newsletter into a substantial publication of high repute. Perhaps only those with experience of publishing can appreciate just how much effort he must have put into those pre-war *Bulletins*, with the full-time help of Miss May Gadsden and the voluntary efforts of an enthusiastic group of members.

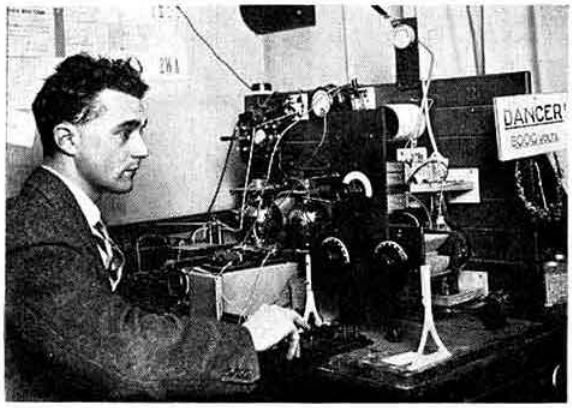
Later, in the stringent days of the second world war, he had the frustration of seeing the size fall back almost to its earliest levels with thin 16-page issues, but nevertheless an issue did appear each month, and the journal was for a time published from his home in Southgate.

GERRY MARCUSE AND EMPIRE BROADCASTING

We have noted how credit for the launching of the "*Bull*" belongs to Gerry Marcuse, Bevan Swift and the first small editorial committee. Marcuse, having conceived the idea, seems to have been willing to leave the implementation largely to others—hardly surprising in view of the enormous enthusiasm with which he pursued almost every branch of amateur activity and organization during the 'twenties.

One story, even though it is not directly connected with the *Bulletin*, is worth telling, if only to illustrate the spirit and resourcefulness of the early pioneers: the launching of Empire broadcasting by Marcuse in 1927.

This was on 32m which was at that time one of the favourite dx bands. For this was a period when amateurs picked for themselves 23, 33, 37, 43, 80, 110 and 160m for most of their operation. This was part of their inheritance based on the



The transmitting equipment of J. H. D. Ridley, G5NN, in South Norwood, London, about 1925 when he was one of the first amateurs to hear Mexican signals on 91m. But the 6,000V and large transmitting valves show that not all stations were low power. (Photo by courtesy of *Wireless World*)

original American licences of 1912 that gave amateurs unlimited access to "200 metres and down".

Marcuse was among the most successful of the small number of British amateurs who were in at the dawn of international dx. 2NM found that his telephony operation brought him correspondence from listeners who were overjoyed to hear a voice from the "mother country". This was in 1925-26 when there were no British broadcasting stations on short waves.

And so he began, with Post Office permission, a daily series of broadcasts directed to listeners in the British Empire. And these really were *programmes*. With his friends he organized concerts and song recitals, inviting many well-known musicians and singers to his home "Coombe Dingle" in Queens Park, Caterham, and to that of a friend, Percy Valentine, in whose home a studio and control room were set up; they even had a special Post Office distribution link between the two houses in the form of two telephone lines. Valentine's uncle was a conductor and occasionally there was a full orchestra packed into the studio. Once they organized an "All-Australian" concert with internationally-known talent. There were regular outside broadcasts and the song of thrushes and blackbirds was relayed from the garden. Marcuse was not supposed to re-broadcast the medium-wave BBC programmes but he often did this, and the high-spot was his regular re-transmission of Big Ben, the first time these familiar sounds had ever been heard thousands of miles away via radio.

The Marconi Company let him have a Reisz microphone; Captain Mullard had his generator rewound when this blew up, and supplied enormous, football-sized power valves free of charge.

Marcuse had a fabulous site 700ft above sea level with a 100ft mast and Zepp aerial; he ran about 1·5kW on 32·5m and was regularly heard all over the world.

One of his first fan letters came from a lady in the West Indies. It was his lifelong claim that she wrote: "I am enchanted with your voice which I hear every Sunday morning. I have three lovely daughters and a flourishing business. If you would like to come over you can have the pick of the daughters and the business." Despite such alluring payola he remained in England.

His special Post Office licence permitted him to broadcast so many hours each week. Soon, many overseas stations (including those in Sydney, Ceylon, Singapore, India, New Zealand) were re-broadcasting his programmes on medium waves to local audiences.

These amateur broadcasts continued for about two years until in 1929, soon after the BBC had begun some experiments on G5SW at Chelmsford (it was not until 1932 that they launched the Empire Service), the Post Office told him to close down; his frequency was wanted. It had cost him some thousands of pounds out of his own pocket, but he had proved what he set out to show—that there was a demand for short-wave broadcasting from Britain. Marcuse remained an active amateur until his death at the age of 74 in 1961—a truly remarkable man who deserves to be remembered for many things, not least the foresight that British amateurs needed their own journal.

THE 'THIRTIES

It was in the years that ended with the cessation of amateur activities on 1 September 1939 that the "*Bull*" probably achieved its optimum balance and range, largely free of the economic and industrial problems that have beset post-war publishing. There were constructional articles; a constant flood of new information on aerials (some, including the "VS1AA", described first in its columns); vhf and microwaves; design trends; workshop notes by "Shack" (G6SN); book and "contemporary literature" reviews; Contact Bureau notes (later "Research and Experimental Section"); articles for newcomers by Austin Forsyth, G6FO, and later Jerry Walker, G5JU; social happenings and the annual convention (an annual highspot from 1926 to 1938); district notes; new members and new addresses; a monthly editorial by "Clarry"; the often pungent humour of "Uncle Tom" (L. H. Thomas, G6QB). There was a neat combination of fact and fantasy in such odes as:

> "Little Tommy put a shunt
> On his meter at the front,
> If he'd hidden it away,
> He'd still have had his call today."

This was in the days when although most British amateurs were officially limited to 10 or 25W input, some had permits up to 500W or so, and fooling the PO inspector became something of a legend. Was it really true that G2 -- had a low-power transmitter in his shack with a feeder passing (apparently) straight up through the attic wherein sat an enormous amplifier? Or that the trams in Cairo used to travel in fits and starts when SU1 -- keyed his rig?

It was, however, not all fun, frivolities and "baby broadcasters" (to use a then-common term of abuse). Dud Charman, G6CJ, was showing us how to get dx to order; the careful observations on 28MHz of Dennis Heightman, G6DH, have probably never been excelled (his identification of the nature of the "hiss phenomenon" remains one of the important amateur contributions to radio astronomy); H. A. M. Clark, G6OT, was giving advice on how to avoid tvi soon after the opening of "Ally Pally" in 1936.

Print and postage were cheap and quick. The lifting of

restrictions on American imports brought in a flood of Hallicrafters, National, Tobe-Deutschmann and RME receivers and the ubiquitous 6L6, T20 and T55 valves. Components such as variable capacitors, slow-motion dials, plug-in coils were readily available from Eddystone, Raymart, JB, Hamrad, Formo and others.

A note appeared under the heading "The Month on the Air" in September 1936: "The editor is considering introducing a new monthly feature which will contain interesting news items mainly concerning dx operation. Such a feature can only be prepared by a member who is regularly on the air . . ." To this invitation John Hunter, G2ZQ, (one of those who became a "Silent Key" in the war) responded, his first column suggesting that "the stumbling block for WAZ seems to be the zone including Tibet and the Lansu province of China and we would like to hear of any *authenticated*

During the 'thirties the equipment became a lot less crude than when the "Bulletin" began, but it was still very large as this photograph shows. In the foreground, Dud Charman, G6CJ, enters up the log

contacts . . ." The column was later taken over by H. A. M. Whyte, G6WY (VE3BWY) and then Arthur Milne, G2MI, who spanned the war years.

Amateurs were on 56MHz before the end of the 'twenties (16-mile contacts were being reported in 1925) but much of the early work used simple self-excited oscillators; a big step forward was a crystal-controlled transmitter described in the "*Bull*" in November 1935. An excellent account of uhf communication, including an experimental transmitter for 50cm, was written by Eric Megaw, of GX6MU fame, in July *1931*! Regular columns on 28 and 56MHz by Nell Corry, G2YL, Constance Hall, G8LY, and others were a feature of the middle and late 'thirties. All this with a membership gradually rising to almost 4,000 by 1939. The high level of *activity* of the period is shown by the 1938 "band occupancy" checks which revealed (over a few weekends) 1,698 different British calls out of a possible 2,500. In 1938 well over a thousand were regularly active on 7MHz alone. During the period 1933 to 1938 the number of licences doubled from 1,300 to 2,600. Of 2,705 licences in October 1938, 1,812 were for 10W, 503 for 25W. There were also 2,198 "artificial aerial" licences.

Many articles appeared in the "*Bull*" on the early history of the Society—a special 21st birthday number in June 1934 ran to some 80 pages including messages of congratulation from The Prince of Wales, Sir Oliver Lodge, Guglielmo Marconi, Dr W. H. Eccles, Sir Ian Fraser (Lord Fraser), Sir John Reith (Lord Reith) and many others. Both E. J. Simmonds, G2OD, and Gerry Marcuse, G2NM, contributed their own accounts of the pioneering of short waves. Or again, one remembers in other issues the very detailed account of "the dawn of international dx" by W. E. F. Corsham, G2UV, who took part in the original transatlantic tests, and accounts of early components by Stan Lewer, G6LJ.

ALL OUR YESTERDAYS

Throughout the 'thirties, licence conditions in the UK remained virtually unchanged (except for the reduction of the unpopular "guard bands" at the edges of each band from 25kHz to 5kHz). To obtain a "radiating" permit (full licence, minimum age 16 years) it was necessary to pass a 12wpm morse test which could usually be taken in any town (plenty of operators then to be found in the Post Offices) and also to show intention "to conduct experiments of scientific value or public utility", licences being issued "only if the nature of the proposed experiments and other circumstances warrant that course". Many and strange were the applications composed to fulfil that requirement. Perhaps it was fortunate for many of us that once the experimental licence (there were no *amateur* licences at that time in the UK) was issued, the authorities seemed to lose interest in those "experiments"; though no British station was allowed to send "CQ" (we used "TEST" instead). "Artificial aerial" licences required no examinations but a full quota of birth certificates, references and the like.

Sometimes it seemed the Post Office engaged the applicant in a form of chess. The would-be amateur would submit a list of proposed experiments to improve transmitter design . . . the GPO would counter by declaring such experiments could be equally well carried out with an artificial aerial permit (which gave no right to radiate signals, merely to install or build transmitters). The frustrated applicant would consult one of the fortunate who had already obtained a licence, and together they would concoct a new thesis, this time bringing in some mention of aerials or propagation; with luck, the authority would relent and ask for "crystal certificates". If you sent only a certificate for 7MHz (doubling to 14MHz) you would get a 10W licence only for 7 and 14MHz; if you were astute enough to send also a 1·7MHz certificate, that band would be included (all other bands had to be applied for later); if you sent only a 1·7MHz certificate you got only 1·7MHz. To add 28 and 56MHz was fairly easy but 3·5MHz was difficult and the applicant had to have held a licence for at least one year. After six months, you could apply through the RSGB for a 25W permit. Higher-power permits meant that you had to dream up some more "experiments" that would justify them. The few old-timers with 500W permits were the subject of much envy. There is a classic story, again concerning 2NM, of how when his signals were picked up in Japan the Post Office (who wanted to establish a commercial circuit to that country) wrote asking him for details of the power and wavelength he was using, saying "if the limitations of your licence have been exceedeed steps will be taken, if possible, to amend the licence to regularize such tests". But that was in the 'twenties, not the more formal 'thirties!

During the 'thirties many of the more important technical developments were first applied to amateur work in the USA: this is hardly surprising since by the mid-'thirties there were already more than 50,000 *amateur* transmitters in the USA compared with under 2,000 *experimental* permits in the UK. James Lamb, W1CEI, introduced the concept of single-signal reception in 1932, putting a crystal filter in the i.f. amplifier: although his filter used a circuit developed in the UK by Dr Robinson for "stenode" reception. But the *Bulletin*, in 1939, was able to present an excellent and far-seeing series of articles by E. L. Gardiner, G6GR, (who had collaborated with Dr Robinson) on *band-pass* crystal filters. Valves were the speciality of D. N. Corfield, G5CD; book reviews were usually by Professor T. P. Allen, GI6YW. Associated publications began with *What Is Amateur Radio?* in 1932; followed by the first edition of *A Guide to Amateur Radio* in 1933, with annual editions until the appearance of the first edition of *The Amateur Radio Handbook* in 1938—240 pages and priced at 2s 6d (12½p). It was felt this was rather expensive for some prospective amateurs, so *The Helping Hand to Amateur Radio*, based on articles by Austin Forsyth, G6FO, was offered for the princely sum of 3d!

The capabilities of those pre-war amateurs should not be underestimated. After the introduction of Class B modulators in the early 'thirties, dx telephony became more consistent and led to such exploits as an all-continent round-table contact on 4 January 1938. Consider too the nine-element 28MHz rotary beam at GM6RG: six directors, driven element and two reflectors 48ft up, so sturdily constructed that the elements could be adjusted *in situ* from a gangway under the main boom: Brian Groom had this monster in use in 1938 at Galashiels.

Most of the present-day amateur contests were conceived in the 'thirties: NFD in 1933; BERU (initially a British Empire Radio Week) in 1931; top band, vhf and QRP contests were all popular, and fully reported in the "*Bull*".

Although the 0-V-1 "straight" receiver remained popular throughout the 'thirties for cw (I made my first VK contact with one in 1939) the period witnessed the great changeover to the superhet communications receiver. The HRO Senior was first marketed in 1936; National, Hammarlund, RME and the stream of low-priced Hallicrafters receivers were advertised in the "*Bull*" from about 1937. You could buy a Sky Buddy for £9 9s or a Sky Champion (with rf stage) for £15 15s, or a Super Skyrider for £32. These sets were imported by Webbs Radio, Eves Radio, Raymart, Premier and ACS. Tobe Deutschmann offered a good receiver kit, with excellent bandspread and triple-tuned i.f. transformers. Shortly before the war several British firms took up the challenge. Eddystone put their popular "All-world Two" to one side to bring out the ECR and later the 358 superhet receivers; there was a model by Evrizone (probably the first British receiver of this type, offered at £20) and the Peto Scott Trophy series.

In the early 'thirties, transmitting valves were a major problem and very costly for British amateurs. Large audio power triodes such as the PX25 were used, but they had high internal capacitances and it was not uncommon to find the old LS5 bright emitters still in use. Around 1936 the American "tubes" began to arrive: the "210" and 6L6 at about 8s 6d, the T20 at 17s 6d, the T40 at £1 4s and the 35T at £2 10s. Wonders indeed. The 807 (developed from the 6L6 about 1936) was seldom mentioned before the war. British companies brought out the ESW20 (direct equivalent to the T20 triode), and the RFP15 by the old "362" company became popular for suppressor grid modulation in 25W stations.

With coaxial cable virtually unknown, the Zepp and centre-fed dipole with open-wire lines or end-fed aerials were the most popular; the 84ft "W3EDP" enjoyed a vogue. The aerial wizards such as Dud Charman, G6CJ, talked of rhombics and W8JK driven arrays, delta matching and the importance of great circle maps. QSL cards could be bought at 1,000 for 10s from the "small ads".

WARTIME "BULLETINS"

So the 'thirties drew towards their climax. As one international crisis followed another the "*Bull*" increasingly included items about ARP, the newly-launched Civilian Wireless Reserve and its longer-established Royal Navy counterpart. Amateurs began turning up in unexpected places in unexpected roles. One read of the award of an MBE to "Tich" Emary, G5GH, for his work as a Foreign Office man in the Spanish Civil War—a foretaste perhaps of the many hundreds of amateurs who were sucked into the strange world of ULTRA and Y, double transposition and double-cross (XX), RSS and its VIs, the "Golf Club and Chess Society" at Bletchley, SCU with its farmyard and sense of discrimination, Special Forces, ISLD and Force 136, SOE and SIS. An odyssey that led one British amateur into the heart of the Netherlands' Bureau Inlichingen's secret communications network in a Dutch museum and waterworks. Although the Society was often the vital link that directly or indirectly put members in touch with such organizations, little of these activities appeared in the security-conscious columns of the wartime "*Bull*".

The blow had come suddenly but not unexpectedly. A notice in the *London Gazette* of Thursday 31 August 1939 proclaimed:

> "I, Major The Right Honourable George Clement Tyron His Majesty's Postmaster General hereby give notice that . . . all licences for the establishment of wireless telegraph sending and receiving stations for experimental purposes are hereby withdrawn."

Spot the "73" and the HRO receiver in this wartime greetings card

"Belgian meteo service for the RAF"—one of the courageous "underground" organizations that sent regular weather reports into England from occupied Belgium by secret hf radio links during the second world war, so helping to reduce RAF losses due to unexpected bad weather

"*Bull*" cartoons showed the desolate amateurs watching as their equipment was trundled off into storage by Post Office officials.

"The Month on the Air" became "The Month off the Air". Members of CWR became the "Early Birds" (Wireless Intelligence Screen) etc. Amateurs were soon to be found in every nook and cranny of the world's first electronic war. Industry adapted quickly; it is said that Ernie Dedman, G2NH, of QCC, more used to supplying crystals to amateurs, found himself one day with an order for millions!

At first, paper remained plentiful and issues substantial. "Khaki and Blue", "Ham Hospitality", active-service lists and similar columns reflected the change from civvies to uniform. For all too many, a "Silent Key" notice or years in the "Kriegies" (POW camps) where more than one amateur participated in the building and operation of secret radios, and for whom C. H. L. Edwards, G8TL, organized an efficient service of gift parcels (not all of which, I suspect, were as innocent as they seemed).

For many, in the tedium that accompanies war, the monthly arrival of the "*Bull*", no matter how thin it became, was a welcome link with the hobby they had left behind—or, increasingly as new members came flooding in after *The Amateur Radio Handbook* became virtually an official Services textbook, a hobby to which they looked forward. Even from thin issues one could learn of the growing importance of frequency modulation and microwaves.

Towards the end of the war, with hostilities ceasing in Europe, one began to hear G7 callsigns on the amateur bands, operated by a small group of well-known British amateurs who spent their time working a strange assortment of stations that often concealed the identities of other amateurs overanxious to re-engage in a hobby that had been almost silent for so long (never in fact completely silent, since the Germans as part of *their* signals intelligence maintained some D3 and D4 stations on the bands, including a series of beacon stations).

The authorities, however, played fair. Licences with the unrestricted right to call CQ began to be re-issued at the beginning of 1946. My first post-war entry in the log reveals a 28MHz contact with SV1EC in Athens (the operator was Major-General Eric Cole, better known as SU1EC and G2EC, which was the only British two-letter callsign containing an E). It was not long before the first of the new G3-plus-three calls was heard; pre-war holders of figure-two-three-letter "artificial aerial" licences, on passing the morse test, were awarded their G prefix. Now for the first time there was a Radio Amateurs' Examination, though at first many could claim exemption on the grounds of Service qualifications. The terms of the new *amateur* licence had been agreed with the Society during the war.

The shortage of paper and the small 6pt typeface used for many of the pages made the early post-war "*Bulls*" a mere shadow of the fat issues of 1939: yet they included such important reports as those from Atlantic City, where RSGB representatives Stan Lewer, G6LJ, and John Clarricoats, G6CL, succeeded, among other things, in adding the vital footnote to the Radio Regulations that left us with 200kHz of "top band".

Many, better left untold, stratagems were used to obtain extra paper, and for a period an occasional *Proceedings of the RSGB* helped relieve the acute technical starvation of the period. It was the 'fifties before there seemed sufficient space really to reflect the many changes that were fast galloping into amateur radio. But one gem of a series in the late 'forties was "In Your Workshop" by "Donex" (Ken Alford, G2DX, who first held a licence pre-1914 and who must be one of the very few people whose amateur activity already spans more than 60 years).

My own professional connection with the *Bulletin* lasted from 1947 to 1951, though some readers seem to think I am still on the staff! David McIlwain and then John Rouse followed me as assistant editors.

THE SECOND 25 YEARS

To this writer at least, it seems incredible that there have been as many issues since 1950 as there were before; the years appear to have speeded up and one can never hope to do justice to the hundreds of members who have contributed to its columns. Though it is invidious to name names, one remembers Louis Varney's (G5RV) efforts to show us how to build transmitters that radiated fewer harmonics. For undoubtedly the reduction of tvi (and nowadays afi) has remained throughout this period the single most-worrying aspect of amateur radio, and one that affects directly almost all transmitting amateurs: some excellent articles have helped us all.

Then again there has been the consistent encouragement given to vhf and microwave operation—among those who have sat in the seat of vhf reporter was, for a ten-year stint, Fred Lambeth, G2AIW, and, not far short of that number, Jack Hum, G5UM, (who in the early 'thirties had contributed regular notes on 2MHz operation!). It is already some five

years since Dain Evans, G3RPE, began the first monthly microwave column in any amateur journal.

There have been regular columns on ssb, on mobile operation, on amateur television, and currently on Raynet and swl activities. "Month on the air" has proved the longest-running of all regular features. One remembers with gratitude the re-awakening by Dick Thornley, G2DAF, of interest in the home-building of high-performance receivers and ssb transmitters, an early (1951) introduction to switched wide-band exciters by Reg Hammans, G2IG, and some notable contributions by Peter Martin, G3PDM. In a world increasingly dominated by speech there was a memorable account of the morse code and morse keys by J. Piggott, G2PT, in 1956. Then there have been innumerable reports from readers and from overseas technical journals in "Technical topics", which I began with more than a few doubts in 1958, but which has somehow survived 17 years under the same management—from 6ft racks to "table-top" transmitters, transistors, FETS and integrated circuits.

John Rouse, G2AHL, succeeded "Clarry" as editor in 1963 and worked diligently and skilfully to improve the journal until his untimely death in 1967. Trevor Preece, G3TRP, and John Adey valiantly kept the issues coming until the appointment, late in 1969, of our present editor: A. W. Hutchinson. Under his guidance *Radio Communication* has reached a certified ABC figure of 17,816 copies per issue; has topped 100 pages in a single issue; and has maintained consistently high standards of accuracy and detail. Advertising, with the aid of C. C. Lindsay, has for the first time since the earliest days been taken back in-house with outstanding success. Over many years Derek Cole has provided thousands of complex drawings from rough sketches with an expertise and promptness that few other journals could hope to equal.

Behind the scenes for many years has been Roy Stevens, G2BVN, chairman of the Technical & Publications Committee, who has shown how firmly he believes that committees are for *doing*, not just for discussing. It is not always realized that all technical contributions go to referees for evaluation; usually members of the T & P Committee, but often outside specialists. The role of these members in maintaining the high reputation for technical accuracy and judgement should not go unacknowledged. George Jessop, G6JP, has long been associated with the journal and many other RSGB publications.

The *RSGB Bulletin* became *Radio Communication* in January 1968—a change that at first seemed not to appeal to the majority of members. Nowadays, however, and particularly since one began to hear the diminutive "*Rad Comm*", the present title is so well accepted that, at a recent AGM, members were overwhelmingly in favour of its retention.

A society journal is not, of course, just a technical magazine. It must reflect all interests and activities of members. The more amateur radio polarizes or coalesces into factions of specific interest with mode or band rivalries, the more difficult becomes the task of the editor. The man who wants to build a top band rig is not going to seek help from articles on microwave plumbing; a channelized nbfm 144MHz mobile rig has something, but not all that much, in common with an hf ssb transceiver. Again some activities now seem to engender a desire for exclusiveness and the channelling of information into specialized newsletters.

Constructors want constructional articles; buyers want equipment reviews; some want controversy—some wish to avoid it; a local group or society expects to see its activities reported, even though these may be of local interest only; some would like pages of "Your opinion"; almost all readers want pages of ads and small ads. Some want more space given to this or that; others resent any space being given to activities in which they personally are not interested.

The greater diversification of amateur interests, and the growing gaps between them are, I believe, the main reasons why one can look nostalgically at those *Bulletins* of the middle and late 'thirties and feel that they had perhaps more central unity and balance than has generally been achieved in the second 25 years. Compared with 40 years ago, there is these days much less humour, a noticeable absence of sermonizing or policy-stating editorials (and sermons are good for all of us sometimes), less looking towards the future but also less looking back at the lessons of the past. It seems sad that a Society five or six times as large has not been able to keep an annual convention going, as it did so successfully in the 'thirties. Even an annual exhibition is no longer directly linked to the RSGB. The many specialized factions and newsletters are symptoms, not the cause, of this difficult problem. There is a critical size to an amateur radio society above which it becomes increasingly difficult to maintain personal contacts and enthusiasms.

Of course, today it is more streamlined, efficient, cost-effective and professional and few of us would have it otherwise, whether or not we question the idea that "bigger necessarily means better". But I must confess that personally when, for any reason, my belief in the future of the hobby occasionally falters, I find it soonest restored by picking up some old *Bulletins* (thanks to Reg Cole, G6RC, my shelves go back to 1928, some eight years before a 14-year-old schoolboy became hooked on his own copies). That perhaps is the nature of the ageing process. I hope and imagine that in the year 2000 the new members of today will be looking back with similar warmth to Volume 51.

Happy birthday, O journal, and I hope that in your veins of printer's ink you feel 50 years *young*! □

HF BEACON STATIONS

Callsign	Frequency (MHz)	Location	Reports to
DL0IGI	28·195	Mt Predigtstuhl near Salzburg	DJ5DT, Kollowitzweg 1, D 6100 Darmstadt, FR of Germany
GB3SX	28·185	Crowborough, Sussex	G3DME
PY1CK	28·165	Rio de Janeiro	PO Box 1044, Rio de Janeiro, Brazil
VE3TEN	28·175	Ottawa	VE3QB, 782 Dunloe Avenue, Ottawa, Ontario, Canada
VP9BA	28·165	Southampton, Bermuda	VP9BY, PO Box 73, Devonshire, Bermuda
ZL2MHF	28·170	Mt Climie, Wellington	PO Box 40212, Upper Hutt, New Zealand
5B4CY	28·180	Limassol	5B4AP, Box 1267, Limassol, Cyprus
3B8MS	28·190	Signal Mount, Mauritius	MARS, PO Box 13, Curepipe, Mauritius

Reports for any of the above may be sent to RSGB HQ (Attn IBP). At present only DL0IGI switches to 28·200 at 00-05 and 30-35min past each hour.

Switched polarization cubical quad

by C. J. McCLOUD. G8IBQ*

A high-gain aerial which could be vertically or horizontally polarized by operating a simple control in the shack was required by the author, and this led to the development of the following design.

Aerial details (Fig 1)

The aerial consists of eight closed loops, mounted on an alloy boom. Each loop is made of ⅜in aluminium tubing and held in position by ½in doweling which is bolted to the main boom.

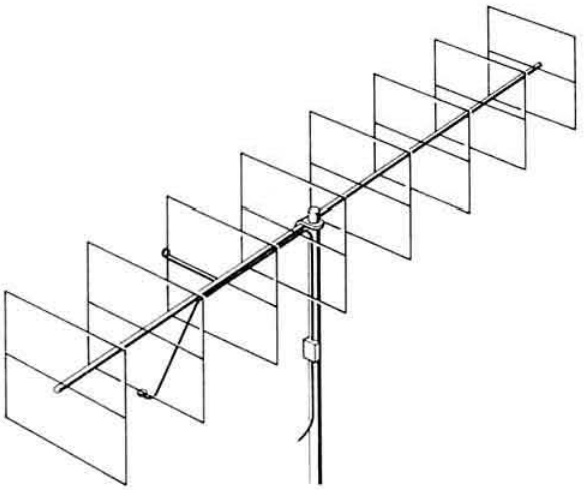


Fig 1. Aerial construction

The reflector is 21in on all sides and is spaced 20in behind the horizontally-polarized driven element. This driven element is 20in on all sides and is fed half way along the bottom leg. The vertically-polarized driven element is placed 14¼in in front of the first driven element and is of the same size. It is fed half way along one of the vertical legs. The sizes of the two driven elements can be arranged so that the horizontal element is tuned to 144-145MHz and the vertical element tuned for 145-146MHz. This will improve the swr, as with the band plan fm simplex is largely in the top half of the band and vertically polarized. At the frequency to which the driven element is tuned the swr is 1:1·1 and rises to 1:1·4 at the band edge. The directors are placed 14¼in apart in front of the driven elements. The first director is 19¼in on all sides, the second 19in and the rest are 18½in on all sides. The dimensions of the completed aerial are 107in long and 21in wide. The element spacings given above may be varied between 0·15λ and 0·25λ to improve gain.

* 17 Culvers, South Harting, Petersfield, Hants GU31 5LG.

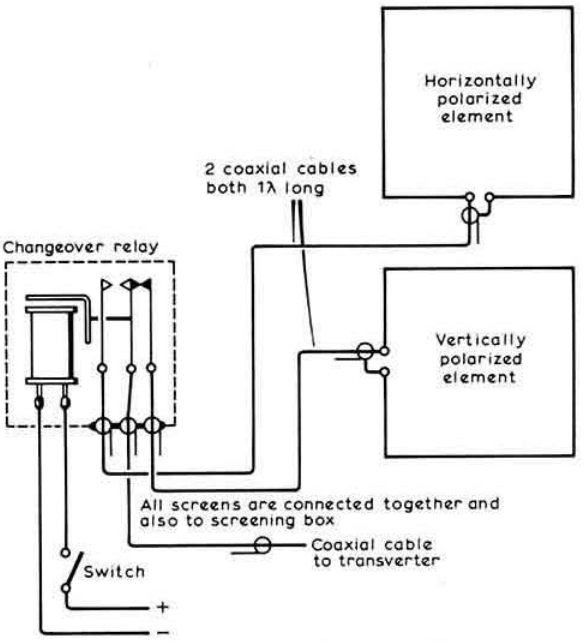


Fig 2. Element switching details

Element switching (Fig 2)

A coaxial cable 1λ long is connected to each of the two driven elements. These two cables are taken to a change-over relay mounted in a metal box on the mast. A coaxial feeder from the transceiver is also brought to this relay. The screens of the three cables are joined together and connected to the relay box. The centre conductors of the cables are connected to the relay so that in one position the vertically-polarized element is connected to the feeder and in the other position the horizontally-polarized element is connected to the feeder. The relay can be of any type available, but a coaxial relay is to be preferred.

Conclusion

The author has had very good results from this aerial and it out-performs the eight-element Yagi which it has now replaced. He will be pleased to hear from readers who make use of the design. □

Catalogue received

The new 64-page Heathkit catalogue gives full details of the extensive range of equipment now available. New items of interest to the radio amateur are a solid-state dip meter, a solid-state electronic keyer and a code practice oscillator. Copies of the catalogue are available without charge from: Heath (Gloucester) Ltd, Bristol Road, Gloucester GL2 6EE.

A simple pre-scaler for 145MHz

by C. H. EDLIN, BSc, FInstP, G3QC*

HAVING built a 6-digit digital frequency meter which was acceptably stable, sensitive and accurate up to 31MHz, the author, being interested in 2m operation as well as in the hf bands, naturally wished to extend the instrument's operation to vhf. This article describes how this was carried out in as simple and cheap a manner as possible. It is not suggested that the full potentialities of the ic available have been explored, but merely that the instrument as here presented does the job required of it most satisfactorily.

For the benefit of readers who are not too familiar with digital techniques it may be said briefly that a digital frequency meter (dfm) is an instrument into which one may feed a stream of pulses, and which displays directly the number of these pulses occurring per second. A pre-scaler is the name given to an accessory instrument used before the input of the dfm to effectively increase the latter's upper frequency limit.

This is done by dividing the frequency being measured by some factor such as 2 or 5 or 10. If it can be arranged to make this factor 10, then the numerical display simply suffers a displacement of the decimal point. Thus a dfm capable of displaying 15MHz and switched to read this as "015000kHz", when fed through a divide-by-10 pre-scaler will display 150MHz as "015000kHz". More digits following the 15 may be displayed by switching the dfm to read hertz, when, of course, the 15 will overflow to the left of the display. It will thus be apparent that with a dfm having a minimum upper limit of 15MHz, a pre-scaler for the 2m band will be basically a divide-by-10 counter which will operate satisfactorily with an input of 144 to 146MHz.

Divide-by-10 ic counters having upper frequency limits of 200MHz, 400MHz and 600MHz are produced by several manufacturers, but they are very costly. Some rejects find their way on to the surplus market as "untested", and are advertised frequently in this journal. This was the source of the divide-by-10 ic in the instrument described here, and was bought as "Three untested uhf divide-by-10 counters, price £2". The author was unable to make two of the three operate, although they drew a current very close to that drawn by the remaining one, which it was found would successfully divide by 10 up to a frequency in excess of 170MHz. This ic is of 14-pin dil construction, which fits sockets suitable for the standard 7400 series of ICs. Fig 1 shows the pin connections.

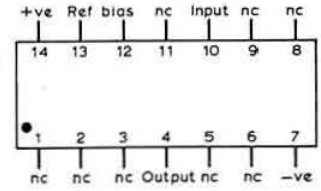


Fig 1. Divide-by-10 uhf ic (top view)

After some experimentation the circuit finally used is shown in Fig 2. An etched circuit board is made from a piece of glass fibre copper laminate 3in by 1⅞in to the pattern shown in Fig 3, so as to make all component returns to the positive earth as short as possible. The only exacting requirement in making this is the drilling of the 14 holes for the dil socket pins, the spacing of which is 0·1in; the distance between the two rows of pins is 0·3in. This is done quite simply by clamping a small piece of Veroboard to the appropriate place on the copper laminate, and using this as a template. Holes are drilled as shown, and the ic socket and other components are inserted from the non-etched side and soldered in position. Apart from the ic all components are easily obtainable, and none are critical in value. The ecb is fitted behind the 6in by 3in aluminium front panel, spaced about ⅜in by ¼in 6BA bolts. Two of the latter also secure one end of each of the coaxial sockets for input and output. The same two bolts serve to make electrical connection between the earth-plane of the ecb and the earthed side of the coaxial sockets and the front panel.

The panel is fitted to a standard 6 by 3 by 2¼in aluminium box, which is large enough to house either a small power supply or batteries. Front-panel lettering is by Letraset, protected by matt Letracote aerosol.

As regards power supply, it is important that the applied voltage should not exceed 5·2V, when the consumption is about 70mA. The author has operated the instrument mostly from a bench power supply adjusted to 5V. However, as it was found that performance at 170MHz was quite satisfactory at 4·5V and 60mA, it was decided to make the unit self-contained with a 4·5V dry battery. One of the flat variety, or three 1·5V U2 cells are quite easily accommodated within the case. A ⅛in LED with 300Ω series resistance acts as pilot lamp and adds 10mA to the current consumption. Fig 4 shows an alternative mains power supply.

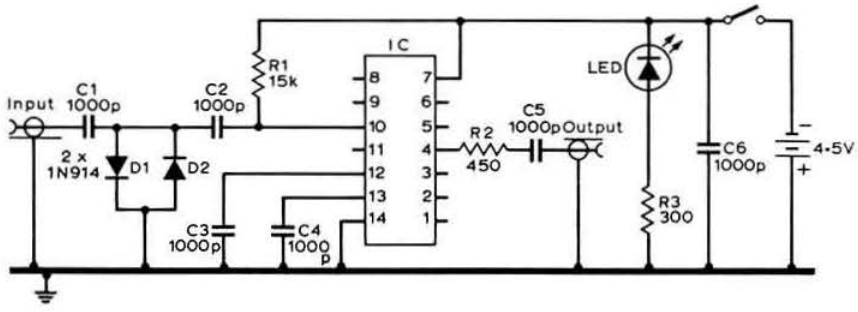


Fig 2. Complete circuit of pre-scaler

* Mr Edlin died in November 1974, and we are grateful to Mr R. B. Tunney, G8DD, for his assistance in processing this article for publication—*Ed*

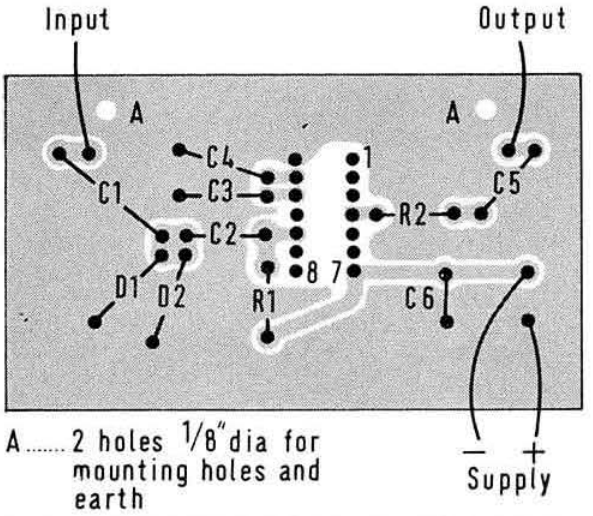


Fig 3. Etched circuit board, viewed from copper side (actual size)

As this unit is always used along with a dfm, a further simplification could be the replacement of the output coaxial socket by a rubber grommet through which could pass a short length of light coaxial cable soldered to the ecb and terminated externally by a coaxial plug. The most generally useful input arrangement is a ½in diameter single turn of pvc-covered 16swg wire soldered to the end of an 18in length of coaxial cable.

This gives adequate pick-up if held near the tuned coils of crystal oscillators or doublers of a converter, or in the vicinity of a transmitter crystal oscillator or pa. Alternatively, a 1in probe from the centre conductor of the input coaxial cable may be more convenient in certain cases. It should be remembered that by placing a loop close to a tuned circuit, especially oscillators, the frequency of the circuit may be altered. However, the sensitivity is such that tight coupling is seldom necessary.

A valuable ic of the type in use here is worth safeguarding. In this design a useful amount of protection is afforded at the input by the capacitor, the two high-speed silicon diodes, and the 15kΩ pulldown resistor—at the output by the use of a positive earth-plane.

As regards applications to amateur equipment, these speak for themselves. One may cite as typical examples the calibration of a grid-dip meter in a matter of minutes and the instant determination of one's transmission frequency. The measurement of frequency of received signals is not quite so simple.

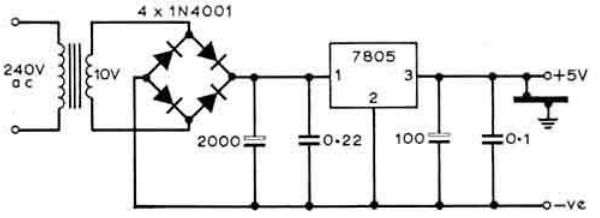


Fig 4. Alternative mains power supply, using an ic voltage regulator

The maximum operating frequency can be substantially increased by maintaining the applied voltage as near to 5·2V as possible and by keeping the input and output stray capacitances low by the use of short lengths of low-capacitance coaxial cable. By these means it has been found possible to operate the pre-scaler with input frequencies well in excess of 300MHz. The unit has been operated at 5·2V for considerable periods over several months without trouble, but it is suggested that the voltage is kept as low as possible consistent with the upper frequency limit required.

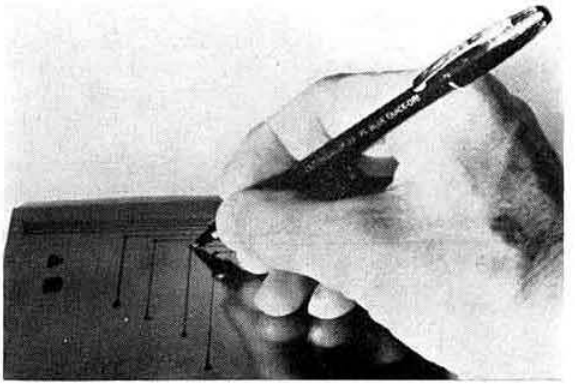
A further marginal improvement in the upper frequency limit can be made by building the pre-scaler into the dfm and switching the input either into the pre-scaler or direct to the dfm by means of a suitable Yaxley switch. Screened connections have not been found necessary, thus further reducing the stray capacitances across the input and output.

Although the dfm is arguably the most complex piece of circuitry to enter the amateur shack, involving for a 6-digit display well over 2,000 transistors, about 1,000 diodes, and nearly 2,000 resistors, most amateurs would agree with the author that once having acquired one, it becomes almost as indispensable as the voltmeter or the soldering iron! □

NEW PRODUCT

Marking pen

The original Decon-Dalo etch-resist marking pen for preparing printed circuit boards has been extensively used by both professionals and home constructors since it was introduced some three years ago. A new improved version, the 33PC Quick-Dri, is now available. The major improvement is a new etch-resist ink with rapid drying characteristics. A new hardened-nylon tip is now incorporated which ensures finer marking throughout the life of the pen. The Decon-Dalo 33PC Quick-Dri is priced at £1.08 each (postage and VAT included) either direct from Decon or from radio supplies retailers. The manufacturer's address is Decon Laboratories Ltd, Ellen Street, Portslade, Brighton, Sussex BN4 1EQ.



New Decon-Dalo 33PC etch-resist marking pen makes finer lines for freehand pcb work than its predecessor, and uses quick-drying ink

TECHNICAL TOPICS

by PAT HAWKER, G3VA

"THE power must not exceed 10 watts and messages may be sent only on waves of 150 to 200 metres (tonic train, cw and telephony) and a further fixed wave of 440 metres (cw and telephony only) . . . permission is granted where justified for the use of short wavelengths (eg 23 metres, 45 metres) . . . time occupied in transmission must not exceed two hours during any consecutive period of 24 hours . . . the use of 440 metre wave is not allowed between 5pm and 11pm weekdays or during the Sunday programmes of the BBC . . . except with the prior sanction of the Postmaster General messages may be transmitted only to stations in Great Britain or Northern Ireland which are actually co-operating in the licensee's experiments . . . no single transmission may last for more than 10 minutes and must be followed by a period of 3 minutes listening-in on the wavelength used for transmission . . . the station must not cause interference with other stations." (The combined height and length of aerials was limited to 100 feet—later 150 feet).

These are extracts from the standard form of experimental transmitting licence in force in the UK in July 1925 when the *Bulletin* (now *Radio Communication*) was born. Yet from the same source (*The Wireless Annual for Amateurs and Experimenters 1925*) one learns: "The outstanding feature of 1925 has been the extraordinary success attending short-wave transmission and reception." All credit, then, to those British amateurs who 50 years ago so successfully overcame the repressive restrictions imposed on them and still made time to found and support our journal. And if it might be thought that the British pioneers were hard done by, consider the position elsewhere in 1925: *Belgium* "Transmitting licences are not yet authorized by the Belgian Government"; *Holland* "The Government, as a general rule, will issue transmitting licences only to amateur associations and not to individuals"; and *Germany* "Transmitting licences, except in special cases, are only granted to wireless societies recognized by the German Post Office". Of course, many amateurs operated in such countries as "pirates".

So we must be grateful that the Society, during the second world war, persuaded the British Post Office to introduce the vastly more liberal licences under which we in the UK operate today!

Graphic symbols

In these days of modules and integrated circuits we seem to be steadily moving away from the time when one could just look at a circuit diagram and immediately decide what it was all about: more and more the tendency is to think in terms of block schematics, sub-systems and modules. This has led over the years to increasing use of graphic symbols that tell us the function of that particular part of the equipment, but not the individual components. Although this family of block symbols has been used in some journals for many years and can be found quite frequently in *Radio Communication*, they are seldom explained in the amateur handbooks or similar reference sources, even though many of them are now in the various "standards".

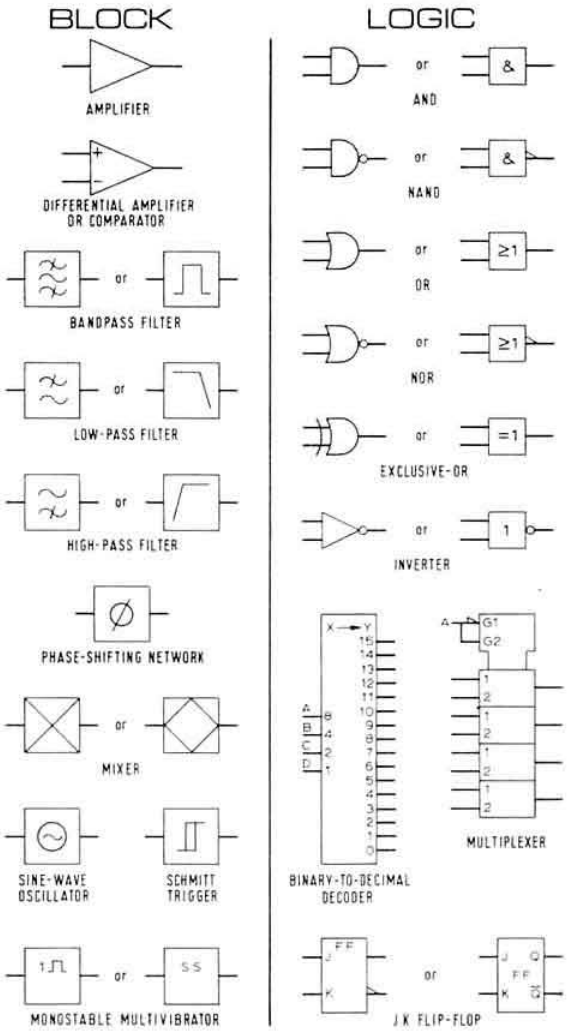


Fig 1. Block function type graphical symbols including the new "square box" logic diagrams

Fig 1 is therefore a first attempt at bringing a number of them together, although in usage there are some variations. It also includes the new "square" style of logic symbols that are now being widely used in the American journals and which have been adopted by the International Electrotechnical Commission (see *QST*, August 1974). A useful fold-out chart of American graphic symbols of all types appears in *Electronics*, 3 April 1975.

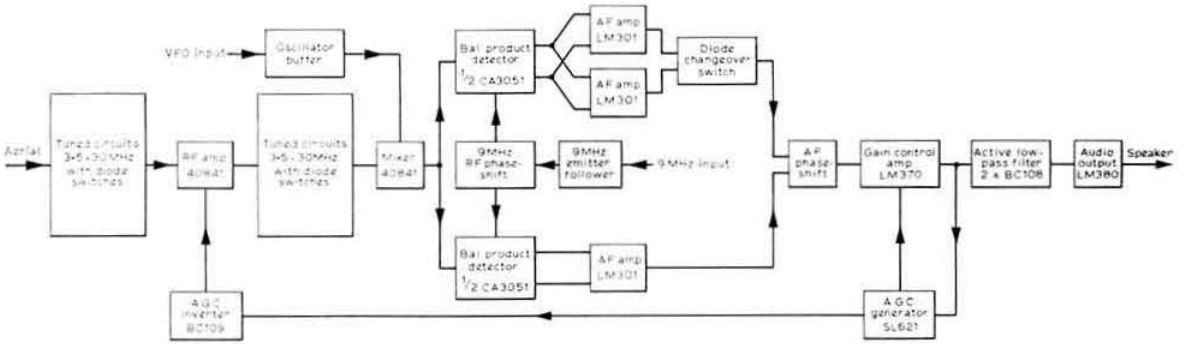


Fig 2. Receiver section of the Otago Branch (NZART) transceiver project which includes full use of diode switching and ssb demodulation using phasing techniques. The mixer feeds into the product detectors via a 9MHz LC filter having four tuned circuits, but there are no i.f. amplifier stages, thus drawing on direct conversion techniques

Wavechange switching with diodes

Recently a good deal of emphasis has been placed on the attractions of the various phasing-type ssb generators as a means of combating the high cost of good ssb crystal filters and their associated oscillator crystals. We should not, however, forget that phasing and third-method techniques are also applicable to ssb demodulation and can similarly give results comparable to an expensive crystal filter.

It is interesting to find in *Break-in* (March 1975) a description by P. W. Johnson, ZL4LV, of the solid-state receiver section (Fig 2) of an Otago Branch transceiver project. This makes use of phasing-type demodulators to provide switchable sideband selection, uses active low-pass filters and also makes extensive use of diode switching. The front-end uses three 40841 dual-gate FETs (rf amplifier, mixer and current sink for diode waveband switching) plus seven integrated circuits and eight bipolar transistors (plus the hf and 9MHz oscillators which are apparently in the transmitter section). The aim is to provide a good-performance receiver at attractive cost. (Complete kits, including printed circuit boards drilled with component locations etc, are being made available through The Secretary, Otago Branch NZART, Box 6050, Dunedin North, New Zealand.)

This month, however, we would like to look in some detail at the diode switching techniques used for band changing. Although this approach tends to produce a complicated-looking circuit diagram, it offers a very useful simplification in mechanical construction of receivers, since it eliminates the need for multi-bank waveband switches located close up to the coil pack, which probably represents the single most difficult part of a receiver for the average constructor. At the same time there is clearly a need to be careful in putting large numbers of non-linear diodes into the signal paths of receivers.

In practical diode switching of rf circuits one must take into account that it is rf and not dc we are switching and that a diode is not a perfect switch in either of its two states. The problem of ac switching is solved by adding dc so that we are now dealing with dc current varying above and below its mean value; provided the dc bias is greater than the peak of the superimposed ac the diode will treat this as dc and remain in its forward conductive state. In general the bulk resistance of the diode in its conductive state does not greatly affect circuit performance.

In the reverse-biased "off" condition it is necessary to ensure that the diode is sufficiently biased to prevent the maximum amplitude of any signal from overriding it, causing the diode to conduct. Second, the diode junction capacitance must be sufficiently low to avoid capacitive coupling through the diode. Since capacitance is reduced with increased reverse bias, both requirements are met by using the highest practical reverse voltage in the "off" state.

If signal current in the forward direction or signal voltage in the reverse direction exceeds the dc conditions, clipping and distortion of the signal will result, causing cross modulation and reducing the dynamic range of the receiver. Thus it is important to select values of current and voltage for the two states so that they exceed the greatest expected signal levels.

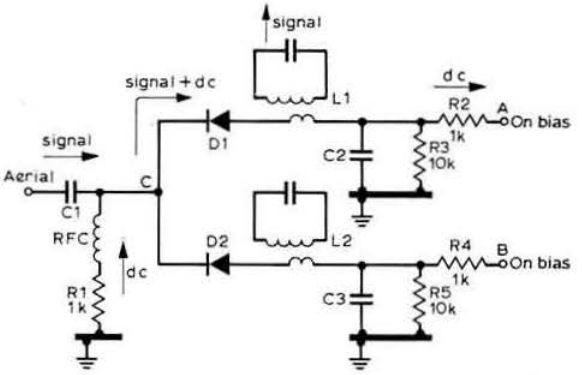


Fig 3. Simplified diagram showing how diode waveband switching is incorporated in the input circuits

ZL4LV provides a simplified circuit of the input switching (Fig 3). Point A has 12V applied, point B is open. A current of 6mA flows through R1, D1 and R2. D1 has negligible resistance. The aerial currents will be superimposed on the dc at the junction of C1/RFC and will pass through D1. The signal and dc will be separated again by the transformer action of L1, the signal being coupled to the tuned circuit in the usual manner. The dc voltage at point C will be 6V. Negligible current passes through R3.

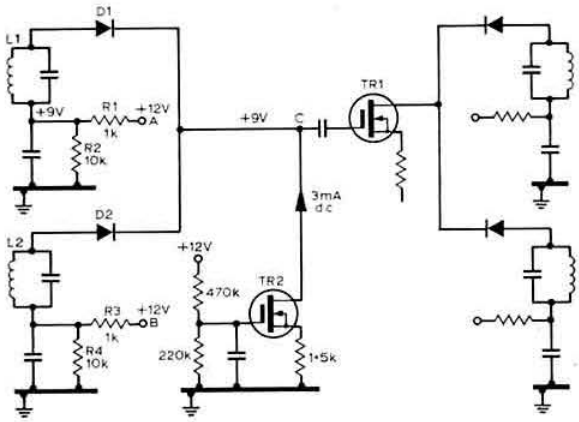


Fig 4. Simplified diagram showing diode switching applied to the mixer grid circuit by means of fet current sink (in practice this is a 40841 dual-gate device with the two gates strapped together). Signal output in receiver is taken from taps on tuned circuits

Since point B is left open, there is no current flow through R4 or R5 so that their junction is effectively at earth potential, whereas point C is at 6V, thus reverse biasing D2 and blocking signal currents to L2.

On the tuned side of the input transformer a basically similar arrangement is used (Fig 4) but there is an additional complication. The gate of TR2 is of very high impedance and draws virtually no current; this means that to allow the diode switch to operate it is necessary to add a device which will pass dc and yet act as a very high impedance to signal currents. While an rf choke might be used, it would be difficult to find one which would have sufficiently high impedance to match the gate impedance over a wide band of frequencies. It is thus necessary to use an electronic circuit that simulates the required conditions, and this can be achieved by using the drain current of a fet or the collector current of a transistor. These can be biased to pass a current but with an impedance which, when looking back into the device, is very high.

The practical arrangement shown in simplified form in Fig 4 uses a fet. Then with 12V connected to point A, a current flows through R1, L1, D1 and TR2. The bias network on the gate of TR2 is selected to allow a current of 3mA to flow in the drain circuit, causing a voltage drop of 3V across R1, which puts the junction of R1/R2 at +9V. Point C is similarly at +9V; then with no connection to point B, D2 is reverse biased. The signal current is superimposed on the dc in L1, passes through D1 and is coupled to the gate of TR1 via the coupling capacitor. Although a current passes into the drain of TR2 no significant damping is placed across the tuned circuit, since the effective ac dynamic impedance looking into the drain is very high. The source resistor of TR2 is left unbypassed; the gate is bypassed, thus operating the stage in the grounded-gate mode which ensures the highest output impedance.

The drain circuit is relatively easy to operate with a diode switch since the necessary dc plus superimposed rf already exists. The tuned circuit is merely connected via a diode to the drain of the fet, and then 12V connected to the "cold" end of the tuned circuit activates the circuit required, with all other circuits remaining disconnected. In practice the tuned circuits are tapped to reduce gain and to reduce the chance of overload. There will of course be a dc voltage drop of 0·6V across each diode but this has no effect on most aspects of circuit performance, although it will be noted during voltage measurements.

Variable power supply

The idea of using a spare QQE-06/40 (QQV06-40A etc) at 50Hz may seem an odd one, but we notice from *Electron* (May 1975) that R. A. van Dijk, PA0DXR, does this in order to obtain the very useful facility of a variable voltage power supply providing an output from about 40 to 290V at up to 60mA: Fig 5. It would of course be possible to use two separate valves (eg 807) by strapping the grids and screen grids together. Diodes can be almost any silicon power types of about 1,000V piv rating.

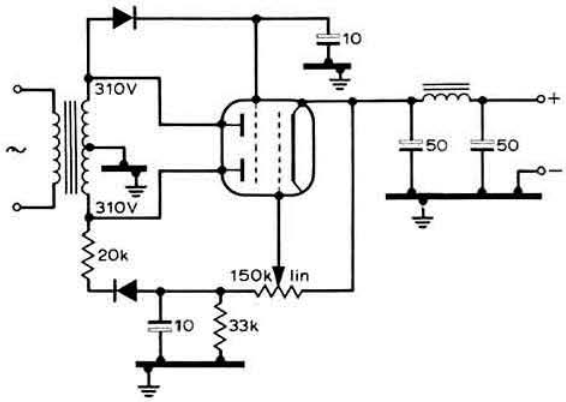


Fig 5. Variable voltage power supply providing 60mA at 40 to 290V described by PA0DXR

More on cathode impedance and Class C

George Jessop, G6JP, adds some further illuminating remarks to the question raised in the March *TT* by Chris Foulkes, G3UFZ, on whether Class C operation shortens valve life due to cathode interface impedance. He points out that this question was tackled energetically by the valve makers some years ago and was largely overcome by the development of new cathode materials, although he feels it may be unwise to generalize on all types of valves. He writes:

"In the days when practically all equipment used the CV138 (Z77, 6AM6, EF80 etc) for one purpose or another, a lot of research time was spent in discovering the cause of the loss of mutual conductance that occurred in standby conditions, especially in telephone equipment where reliable 10,000h lives were being demanded.

"The use of appropriate cathode material led—at least in the UK—to the general use of material which was substantially free from this trouble. The Americans also used a similar cathode material and I imagine the East Europeans have followed suit.

"In such valves as the 6146, made without zirconium-coated anodes, a much greater trouble arose due to cathode poisoning by gassing without the clean-up effects of electron current. In this respect the 6146 cannot be considered a well-processed valve, and not, for example, in the same street as

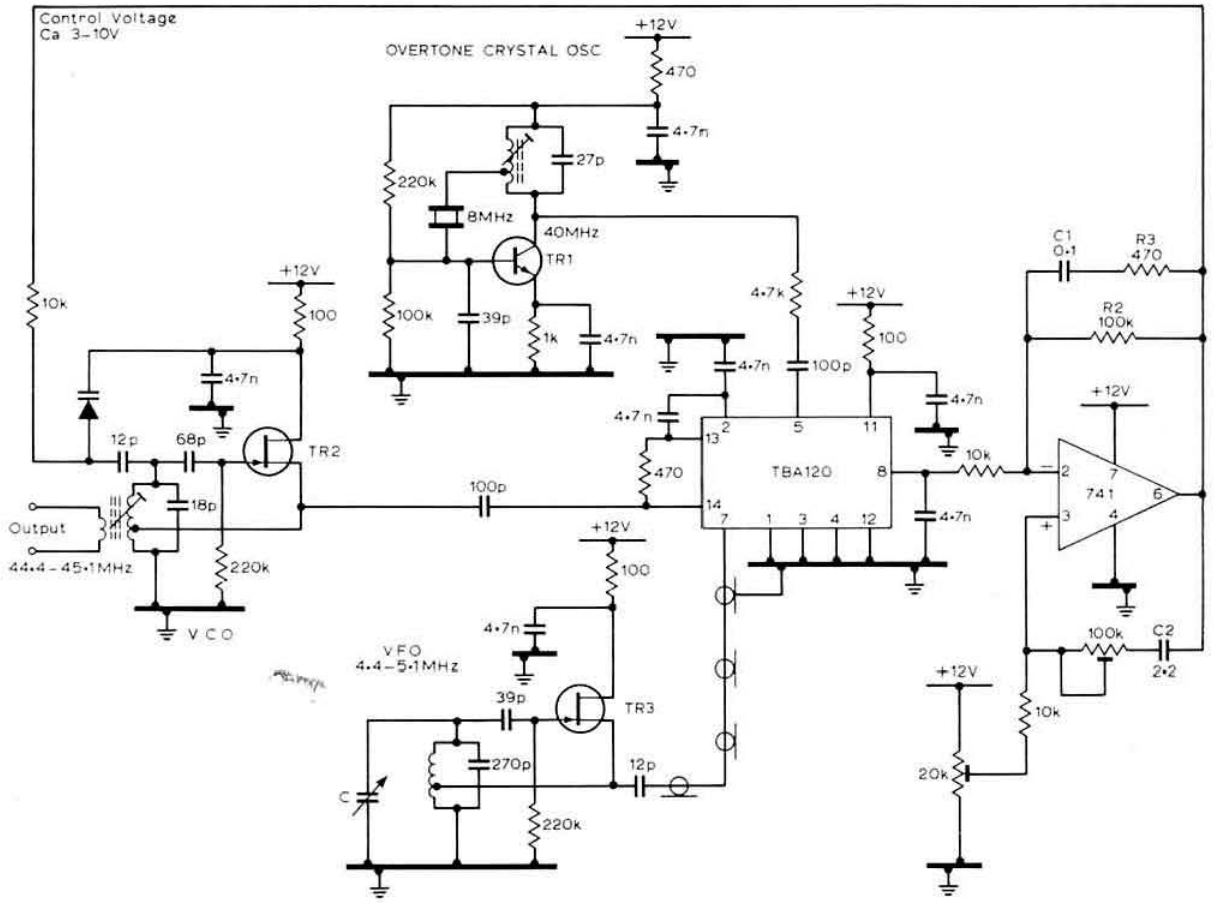


Fig 6. PA0KSB's phase-lock loop vfo providing output between 44·4 and 45·1MHz and suitable for converting channelized 144MHz equipment to continuously-tunable

the QQV03-20A. The 6146 is processed virtually as an ordinary receiving valve, not even of the long-life type, whereas the QQV03-20A twin tetrode with higher-grade anode and hot-contact getter (zirconium) was processed as a transmitting valve."

This suggests that while it is probably quite safe to run genuine high-grade transmitting valves in Class C without worrying too much about inactive periods, there may be some danger of shortening the life of some of the popular power amplifier valves. As G6JP says, however, it may be unwise to generalize.

PA0KSB phase-locked vhf vfo

Regular readers of *TT* (always assuming they exist!) will need no introduction to the ingenuity of Klaas Spaargaren, PA0KSB, with a string of useful ideas and circuits to his credit. Dick Rollema in *Reflecties door PA0SE* (*Electron*, March 1974) introduced another one: a voltage-controlled 45MHz oscillator that can be phase-locked to a 4·4 to 5·1MHz vfo *without* the usual mixer etc between the vco and crystal reference oscillator by cunning use of the Siemens TBA120 consumer-type ic.

The vfo is designed to convert a Japanese 144MHz channelized equipment into continuously-tunable, but could fulfil other applications. PA0SE has kindly provided an English translation of his notes. This particular arrangement has resulted from some years of experimentation by PA0KSB into a range of exotic circuits; it works well and has proved reproducible, as indicated by a number of PA0 amateurs now using the system.

The circuit diagram is shown in Fig 6. TR2 is the vco, controlled by the 3 to 10V control line to tune between 44·4 and 45·1MHz. The vco signal is mixed in the TBA120 with a 40MHz signal from the co (TR1) which uses an 8MHz crystal on its fifth overtone (an alternative overtone circuit, due to PA0WSP, is shown in Fig 7). The TBA120 provides the phase detector; this compares the difference frequency of the co and vco with the vfo on 4·4 to 5·1MHz. A 741 op-amp amplifies the control voltage by 10 times before delivering this to the varicap in the vco.

Until the loop is locked, positive feedback around the 741 results in low-frequency oscillation, but when synchronized the negative feedback stops the lf oscillator. R3 and C1 stabilize the loop. PA0KSB avoids the use of a separate mixer by using connection 5 on the TBA120 (note the TBA120S cannot be used in this manner); pin 5 is normally intended for amplitude control of af output when the device is used as an fm detector.

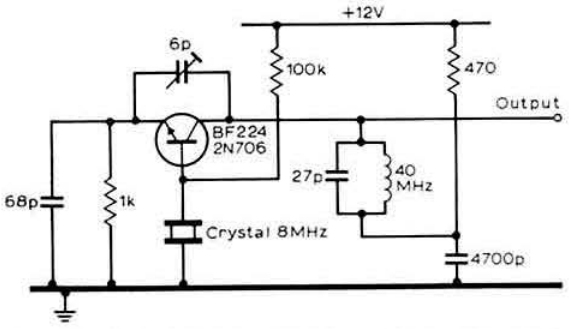


Fig 7. Alternative overtone crystal oscillator by PA0WSP providing 40MHz output from 8MHz crystals

The mixing process produces many frequencies but the phase detector acts only on the difference component (4·4 to 5·1MHz); this works only if the difference frequency is some 10 times lower than the original frequencies: if this is not the case a separate mixer followed by a bandpass filter to select the required signal will be needed.

The following hints simplify adjustment: the oscillators are pre-tuned using a gdo. With a supply voltage of 12V, the 20kΩ preset is adjusted so that slider voltage corresponds to the voltage on pin 8 of the TBA120 when the loop is not locked; about 6V should then appear at the output of the 741. Voltage on pin 8 should be about half the supply voltage but this is affected by the rf drive. As soon as it is set, the 100kΩ preset is adjusted until oscillation just starts: both should then require no further adjustment.

When the system is in lock, tuning the vfo from high to low frequency should produce a control voltage at the output of the 741, building up from 3 to 10V. If the variation is larger or smaller it can be corrected by modifying the value of the 12pF coupling capacitor between the varicap and the vfo tank.

Some additional general comments have been made by PA0KSB.

(1) Coil data and the value of the tuning capacitor in the vfo are not given as these are best determined experimentally, but this should not prove a handicap to constructors likely to obtain good results from this circuit.

(2) The TBA120 functions excellently up to about 80MHz, although at this frequency the amplifier/limiter stages provide very little amplification. It will *not* function on 144MHz. Useful input voltages for the rf signals up to about 45MHz are of the order of 100 to 200mV but the value is not critical.

(3) Frequency variation of the vfo should be less than 1:2 otherwise locking on half-frequency can occur.

(4) The oscillators should be well screened to prevent the appearance of spurious signals of the type so familiar with mixer-type vfos; it is the charm of the pll vfo that one *can* avoid such spurii!

(5) If used in a receiver, care should be taken that no harmonics of the vfo, vco or reference co fall on the signal frequency, the image frequency or in the i.f. passband.

(6) Citizen's band 27MHz crystals have a fundamental frequency of about 9MHz and work well on their fifth overtone: it is thus possible easily and cheaply to experiment between 45 and 46MHz using this type of crystal.

(7) Phase-lock loop oscillators of this type allow a vfo to be on frequencies much lower than is practical in a mixer-type vfo. A range of 1 to 1·5MHz, for example, is entirely practical, producing a very stable signal; such a refinement is not really needed for 144MHz fm operation although it would permit reproducible fixed channel selection without the cost of crystals.

(8) In a well-screened pll vfo virtually the only possible spurii are those located alongside the wanted signal and caused by any form of ripple on the control voltage; in a receiver such a condition can be observed as phase modulation on incoming signals (any vco is inherently susceptible to any ripple on power supplies etc).

(9) When used in a transmitter the pa or aerial should only be energized after the loop is locked; otherwise the signal swings through the band and this must be avoided even if the rate of frequency swing is so high that the signal flashes through the passband of receivers.

(10) Frequency modulation is possible by modulating either the crystal oscillator or the vfo; the control system is fast enough to transfer such fm to the vco.

(11) Output can be taken from the coupling link on the vco tank via a buffer-amplifier (Fig 8). The signal can then be fed directly into a Japanese equipment or the tripler of a home-made receiver.

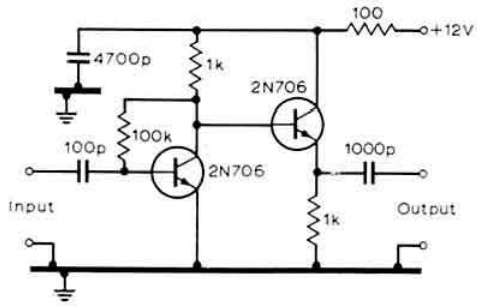


Fig 8. Broadband buffer amplifier used by PA0KSB to feed output from vfo into the Japanese 144MHz equipment or to the tripler of a home-made receiver

VFO stabilized by PAL delay line

In *TT* (August 1972) attention was drawn to work being carried out by M. J. Underhill at the Mullard Research Laboratories near Redhill, Surrey, on oscillators stabilized by inexpensive delay lines (type DL50) of the type used in PAL colour television receivers. The delay line, like a quartz crystal, provides a frequency determining element which has a rapid change of phase with frequency. This provides an oscillator insensitive to any amplifier "noise" or phase shifts and consequently gives it a low noise output and good short-term stability. Although the concept of oscillator noise and jitter still seems to be an unfamiliar one to many amateurs, its importance in high-performance equipment (eg reciprocal mixing) is now increasingly recognized (see *ART*).

The 1972 item concerned a system which can provide a series of outputs spaced at intervals of 15·625kHz (ie the television line frequency for which the delay lines are designed) and significantly more stable than is possible with a conventional unstabilized L-C oscillator and with less noise than with many current forms of stabilization.

In the latest *Annual Review* covering work at Mullard Research Laboratories during 1974, a further report on this project shows how a goniometer can be used as a fine tuning

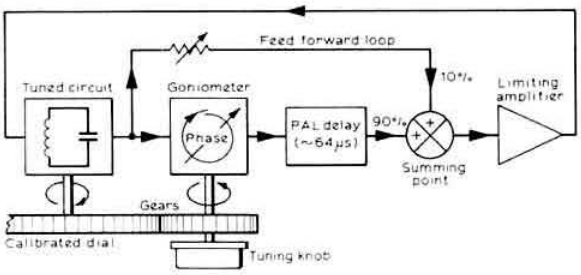


Fig 9. Directly-stabilized tunable delay line oscillator in which each complete turn of the tuning knob changes frequency by 15·625kHz

control to provide continuous rather than step tuning of the output. In one form of the oscillator, 192 complete revolutions of the goniometer tuning shaft are required to tune across a bandwidth of 3MHz (governed by the 3 to 6MHz passband of the delay line). The system has been tested at frequencies up to 400MHz.

It would thus seem to have all the elements of an excellent vfo for hf or vhf applications, with a fine tuning knob having a tuning rate of exactly 15·625kHz/revolution of the shaft of the ganged differential tuning capacitor (Jackson Brothers type C758–5348). In one directly-stabilized form this knob is connected by mechanical gearing to the tank tuned circuit: Fig 9. In another form the oscillator is indirectly stabilized by using vco/phase lock loop techniques.

While the Mullard report does not give any detailed performance figures (or circuit diagrams) it is stated: "In practice both the oscillators give low noise and have the good long-term stability of the PAL glass delay line. It is amusing to find that putting a finger on the goniometer tuning capacitor connections only gives a frequency shift of a few hundred hertz. This gives some indication of the inherent stability of these delay line oscillators."

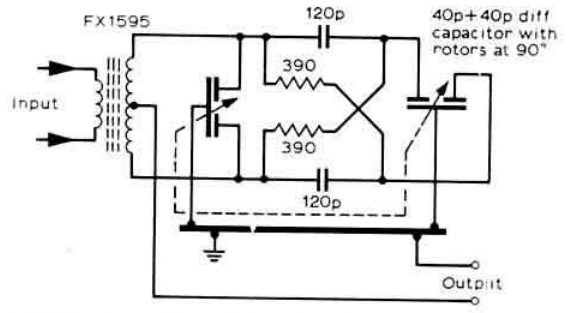


Fig 10. One form of practical goniometer used to provide continuous tuning on a delay-line stabilized oscillator

It is also indicated that it is easy to apply nbfm directly with a deviation of about ±2kHz.

It would thus seem that this approach provides the delay line equivalent of a variable crystal oscillator (vxo) but with the possibility of providing continuous coverage of up to a 3MHz bandwidth, and with less "oscillator noise" than produced by most conventional forms of frequency synthesis. As it is an industrial research project, it is rather unlikely that detailed circuit information will be published at this stage; but the information given in 1972 and in this latest report would seem to provide most of the essentials.

Single-sideband cw

J. W. Bluff, G3SJE, (*Your Opinion*, May 1975, p397) and R. Skelton, 6Y5SR, ("Some thoughts on cw communication", February 1975, pp116–17) raise some interesting questions on how much bandwidth is needed for cw reception (or theoretically would be needed if we could neglect the question of receiver/transmitter frequency drift). G3SJE speculated on whether it would be an advantage to try to develop ssb transmission of cw (first, you have to grasp the fact that cw *has* sidebands which are a function of the signalling rate). Here it might seem in the one move of adopting ssbcw we could halve the spectrum utilization of the already very economical system of cw, and also increase signal-to-noise ratio at the receiver and so allow us to dig even deeper for weak cw signals. And with such tempting bait why has nobody ever caught at this line before, particularly at vlf where the bandwidth of cw is of considerable practical significance?

The answer, very simply, is they have—some 45 years ago. The whole idea was discussed with supporting mathematics in a paper "Asymmetric telegraphic spectra" by C. R. Burch, then a member of Metropolitan-Vickers but for many years subsequently at the H. H. Wills Physics Laboratory of Bristol University (the paper can be found in the *Journal of the American Institute of Electrical Engineers*, December 1931, pp2197–2218).

Put very briefly, the author showed that true ssbcw is a practical impossibility if the messages to be sent are long. This is because the "tails" of the morse symbols do *not* die away exponentially like ordinary signals but die away so that the amplitude of their envelope is inversely proportional to the time. It can be shown that a sufficiently long message could in certain circumstances, if ssbcw were being used, cause the peak aerial voltage gradually to build up to an impossibly high figure, until something would have to give and cause a spark-over. Infinite voltages in a world of finite insulation!

There is, however, as C. R. Burch showed in 1931, an answer to this: it is only necessary to leave a small vestigial sideband instead of suppressing it completely (it need only be a very small departure indeed from perfect ssbcw) and infinitely high voltages can no longer build up. Almost half the bandwidth is still saved and it is perhaps surprising that no practical use seems to have been made of this technique at vlf, although obviously ssbcw by filter techniques would be difficult to implement.

There is another possibility, as was pointed out in the same paper: two different cw messages could be sent on the same carrier by using quadrature techniques (just as the stereo record has two channels of audio modulated on the same groove). This would represent, in effect, a form of independent sideband transmission (isbcw).

Personally, I do not think that the day of asymmetric (or dual-channel) cw is about to dawn for amateurs, though there clearly is a place for extremely narrow-band filters, whether these are provided electronically in the receiver or naturally in the ears of the operator. But it is good that people are thinking about ways of extending our present limits in weak-signal reception: one of the first steps is to ensure an extremely high degree of stability at both ends of the link. □

Building blocks for the novice

by SVEN WEBER, G8ACC*

Diodes, diodes and diodes — and some experiments with them (Part 16)

Designing a simple power unit

In this, the last article of the present series, it is proposed to draw upon some of the things that were mentioned earlier. It is not the intention to describe the construction of a "stabilized" or any other type of power unit, but some pointers will be given that may help with the design of a simple supply.

The first thing to do is to find out the characteristics of the transformer which is at the heart of the supply. Many of these are not quite so good as they seem but, assuming that a transformer has been obtained that appears suitable, check the open-circuit ht voltage when feeding mains (or any other primary power) in at the correct tap (nb: anything over 50V can be *lethal*, take care!). Next, estimate the total power load that the transformer will be required to give and connect appropriate resistances to every winding so that the full load is more or less reached. This would normally involve a fairly substantial resistor on the ht side. Then measure the ht voltage in this condition.

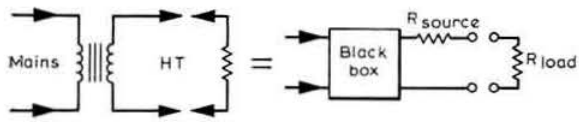


Fig 107. The mains transformer can be considered as a black box supplying the output voltage and with a certain internal resistance (R_{source})

Doing this gives an idea of the source resistance that the rectifier(s) is/are going to see (Fig 107). Just measuring the dc resistance gives a very inaccurate result. By proportion,

$$R_S = \frac{R_L (V_U - V_L)}{V_L}$$

where R_S is the source resistance, R_L is the load resistance, V_U the open-circuit voltage and V_L the loaded voltage. Incidentally, on the mains side of the transformer, the fuse should always be the *first* component after the mains plug, and then the switch between fuse and transformer, *both* on the live side (Fig 108). Sometimes these components are doubled on the neutral side.

If in operation the transformer is to be run unloaded for some time after it is switched on (for valves etc to warm up), the peak voltage across its terminals will be 1·414 times the rms voltage. For example, with a 500V transformer it will be 707V. It is worth keeping this in mind and designing

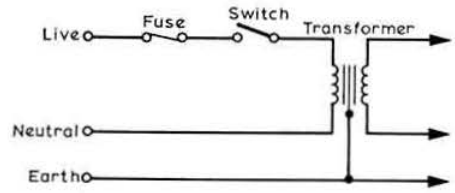


Fig 108. Fuse comes first after the mains plug, then the switch —both being on the live side

around it. If it is proposed to use a half-wave rectifier and a capacitor input filter, the rectifier *must* be rated to at least $2 \times \sqrt{2}$ (2·83) times the rms voltage (here, 1,400V+), otherwise at some future date a new transformer, rectifier, reservoir capacitors and even output transistors (if they are used) may have to be bought. To be safe, the piv rating of the diode should be at least four times the rms input to cope with surges and other fluctuations. The current rating must also be reduced by 20 per cent at least if a half-wave circuit is used. It is also worth remembering that the load resistance that the transformer sees in such a circuit is approximately half the actual load (see Part 8, November 1974).

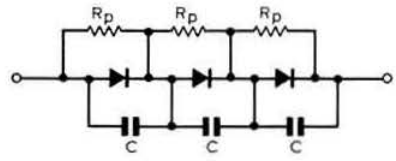


Fig 109. Voltage-sharing resistors across series rectifiers

If a bridge rectifier is used, the piv rating need only be $\sqrt{2}$ times the rms voltage or, to be on the safe side, twice the rms voltage, and the current rating of the individual diodes can be exceeded by 60 per cent. If diodes are used in series to increase the piv, opinions vary as to whether it is necessary to have voltage-sharing resistors (R_P in Fig 109) in parallel with them. If it is decided to use such resistors, they should not bleed to much current and should be of sufficient power rating to stand the piv across them. Again from Part 8, the load resistance that the transformer would see is

$$\frac{1}{(2/R_L) + (3/R_P)}$$

The value of any paralleled capacitors should not be too large: the time constant of C and R_P should be far smaller than the time for half a cycle. The voltage rating must also be at least up to the piv.

Preventing voltage surges from damaging components is the next problem. There are some surges that the equipment cannot be protected against except by taking the mains plug out, but these are one-in-a-million chances. Most surges come from switching the equipment on or off and also normal mains impulses. In Part 4 (July 1974), a method was given of overcoming these by having a damped capacitor

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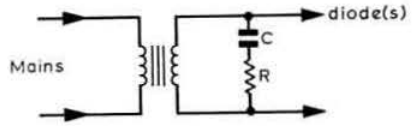


Fig 110. Damped capacitor across secondary of transformer to reduce voltage spikes

across the ht secondary winding (Fig 110). For 50Hz mains, the capacitance of C in microfarads is often calculated from the formula:

$$C = \frac{K \times \text{total transformer VA rating}}{(\text{diode piv})^2}$$

K is taken as 400 with all Stalloy cores and C-cores above 200VA, and 700 with C-cores below 200VA. R is given by $38\sqrt{R_L/C}$ where again C is in microfarads. This is a very useful way of avoiding damaging voltage spikes.

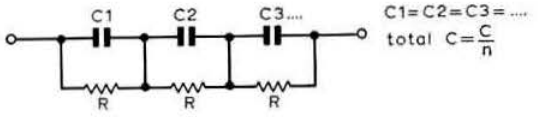


Fig 111. Voltage-sharing resistors across series reservoir capacitors

The value of the input capacitor has next to be determined. In Part 8 a set of curves was given (Fig 58) for a half-wave rectifier, and it would be erring on the safe side to use these curves for any non-multiplying rectifier. It is necessary to decide what order of voltage stability is required. Over a certain value of capacitance this is primarily determined by the ratio of the source to load resistances. For instance, if the voltage had to stay steady to within 10 per cent, the ratio between source and load resistances would not have to exceed 1:100. If, however, the voltage were allowed to go down to 80 per cent of the unloaded voltage, the ratio could be reduced to 1:25 if $2\pi f R_L C$ was over 50 (C in farads). The capacitor must, however, be rated at least to the unloaded voltage (preferably 25 per cent above it) and, on a purely practical point, if series capacitors are used it is best to have them all of the same value and rating and use voltage-sharing resistors in parallel (Fig 111). Unfortunately, the value of the source resistance cannot normally be too low, otherwise the charging current into the reservoir capacitors through the diodes when switching on could destroy them. A good guide to use is that diodes can pass five to eight times their rated maximum current for 0·01s but for no longer. So if, say, the source resistance (transformer effective) were 50Ω and the peak output were 1,000V (700V rms), this would mean having rectifiers that could cope with a surge current of 20A, meaning a nominal maximum of 3 to 4A. Alternatively, the series resistance could be increased by either having a resistor before the diodes or, perhaps better, a resistor or thermistor in the primary circuit which could be shorted out after a while.

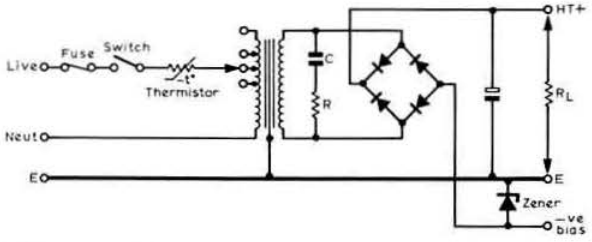
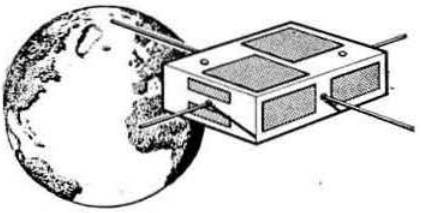


Fig 112. Zener diode in negative line to provide a bias supply

For further smoothing by using inductors, resistors or other filters, reference should be made to the RSGB *Radio Data Reference Book* pp 69–71. Such topics are rather outside the scope of these articles. One final point: if a negative supply is needed, a heavy-duty zener diode in the negative supply rail can be very useful, although the available current is fixed by the current drawn by the ht circuit and the ht voltage would be that much less (Fig 112). □

OSCAR NEWS



Orbit predictions

An Oscar satellite predictor is now available from Trisagion Ltd at a cost (including VAT and postage) of 65p. Once set to a reference orbit, crossing times and longitudes for succeeding orbits are shown. The address of the supplier is Dall, By Rannoch Station, Perthshire PH17 2QH.

To assist in the assembly of an Oscalator, IARU Region 1 has produced a northern hemisphere map on a polar stereographic projection to a size of about 12in square. The addition of a cursor in the manner described by G2AOX in his series of articles will enable the user to see the satellite track for each equatorial crossing. The information shown is accurate for both Oscars 6 and 7. Copies of the map are available to *callers only* at RSGB HQ for 10p.

Reference orbits

Date	Orbit No	UT	W	Mode
Oscar 6				
12 July	12,523	1746	317	
19 July	12,610	1631	298	
26 July	12,698	1710	308	
Oscar 7				
12 July	2,994	1606	291	A
19 July	3,082	1641	300	B
26 July	3,170	1716	309	A

HG5BME

The station located at the Budapest Technical University, HG5BME, is looking for rtty contacts with UK stations using 850Hz shift on the Oscar 7 432–145MHz translator. A steerable aerial system and adequate power is available.

Telemetry required

Readout of the telemetry from both Oscar 6 and 7 is urgently required. This applies particularly to Channel 6A of Oscar 7 when the satellite is south of the UK. Also of particular interest are readouts of the teletype telemetry. All information should be sent to G3UEA (QTHR) where it will be collated for onward transmission to AMSAT in Washington.

FOUR-TWO-SEVENTY

by MARTIN DANN, G3NHE*

1975 VHF Convention

WELL over 600 people signed in at the "Winning Post" at Whitton on Saturday 10 May, the first day of the 21st National VHF Convention. This may not have been quite as many people as were at the nearby Twickenham rugby ground for the cup final, but they were none-the-less sufficient to cause RSGB VHF Manager Geoff Stone, G3FZL, in his opening address, to talk in terms of a possible new venue for next year's event. It was in front of a packed audience that G3FZL officially opened the proceedings, and he spoke of the obvious success of the convention, inviting members to let the VHF Committee have their views on the suggestion to hold the 1976 convention in more spacious surroundings.

IARU Region 1 Conference

G3FZL was joined by Roy Stevens, G2BVN, and Richard Baker, G3USB, to report on the outcome of the IARU Region 1 Conference in Warsaw last April. Geoff Stone explained that many of the decisions arrived at in Warsaw were made with the 1979 World Administrative Radio Conference in mind, for at that time the fight to retain our frequency allocations would be on, and the outcome would depend very much on our own efforts. It was important to show that full use was being made of the amateur bands, especially for experimental work, and to this end more written reports were essential, particularly in the microwave region where the RSGB was now responsible for promoting the 10GHz band.

Revised band plans

The vhf manager went on to discuss the alterations to the vhf/uhf band plans. Full details of these appeared on p468 of last month's *Radio Communication* and it is hoped that the accompanying article will be carefully studied by all vhf/uhf users.

Geoff Stone ended by telling the assembly of the tribute paid at Warsaw to the work of Ron Ham, BRS15744. His achievements have shown the importance of the role that a dedicated receiving member has to play in the field of amateur radio research.

"Our bands are not sacred"

The floor was then taken by G2BVN, organizer of the IARU Region 1 Conference, who, after an explanatory introduction covering the work and history of the IARU, went on to outline the efforts being made to formulate a world plan for amateur radio acceptable to all administrations. It was very necessary, he said, to present a united front at the 1979 World Administrative Radio Conference, for our frequency allocations were not sacred: the conference could result in the loss of all or any of our bands, and the outcome was entirely dependent on our own efforts. G2BVN reminded the gathering that the RSGB was the only organization able to negotiate on behalf of British amateurs, and it was therefore important that every possible support be given to the Society, as it was for all amateurs in the world to support their national societies.

Tribute

After G3USB had explained the new repeater channels and arrangements for fm simplex on 70cm, Geoff Stone wound up the opening addresses by paying special tribute to G2BVN for the tremendous amount of work he puts into amateur radio, not only for the RSGB, but also as secretary of IARU Region 1, in which role he organized the recent conference. From their reaction, it was clear that the audience wholeheartedly endorsed these remarks.

The lectures

At this stage the convention split into two streams, and those with interests in microwaves as well as vhf/uhf had to decide whether to join stream "A", chaired by Geoff Stone, or stream "B" (microwaves), chaired by Dain Evans, G3RPE. The latter stream heard a lecture on 23cm ssb by Charles Suckling, G3WDG, and Ken Hutchinson, G4ALN, the aim of which was to encourage wider use of this mode on 1,296MHz.

After the interval for refreshments, an assessment by Heath Rees, G3HWR, of equipment performance using simple techniques was followed by GW3PPF's exposition on super-refraction on 10GHz, sub-titled "Beyond the horizon on microwaves". The stream "B" lectures were concluded by G8DEK discussing the use of the most modern components in mixers and preamplifiers.

Lively discussion

Meanwhile, stream "A" were being introduced to the members of the VHF Contests Committee by its chairman Cliff Sharpe, G2HIF, who went on to describe the functions of the committee and its terms of reference. The lecture was then thrown open for a question-and-answer session, which quickly developed into a very lively discussion. After critical remarks by 4m men (who appeared to be present in force) Cliff Sharpe gave an assurance that the committee was not biased against this band, agreeing that there had been a dramatic upsurge of activity over the past 12–18 months. Some interesting suggestions were raised for the committee's consideration, and these will be outlined later under "Contest comment".

Tropoprop and aurorae

Time ran out all too quickly on the contest debate, but after a short break there was consolation in the shape of two speakers who were obviously experts on their respective

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subjects. Ray Flavell, G3LTP, gave an interesting and informative talk on the mechanisms of vhf tropospheric propagation, ending by making a plea for more help to be given to the RSGB Scientific Studies Committee, specifically by providing long-term vhf signal records over long paths which have a centre near one of the UK radiosonde stations, preferably Crawley.

Charlie Newton, G2FKZ, enlivened his lecture on vhf auroral propagation with his customary humour and enthusiasm, and he too stressed the need for feedback of information. He asked that during openings accurate records of times and beam headings be made and sent to the Scientific Studies Committee, and to obtain the other station's beam heading G2FKZ suggested the use of "QTF/A" ("What is your auroral beam heading?"). He also asked for support for the auroral warning scheme (see May's *Four-Two-Seventy*), making the point that auroral propagation was a field of research in basic physics that could only be covered by radio amateurs.

The lecture programme was concluded on the Sunday morning, when, in addition to the time for informal discussion, Pat Gowen, G3IOR, presented an information-packed session on amateur space communication.

Dining and dancing

After the success of the first day of the convention, the convivialities of the Saturday evening dinner and dance were deemed equally successful by the many who attended. In proposing the toast "The RSGB", Harold Haines, G2ALH, Market Technical Manager Telecommunications, Mullard Ltd, spoke of the importance of the higher frequencies, particularly microwaves, which he felt represented the real future of telecommunications.

The President of the Society, GW8NP, made no apology when replying to the toast for turning once more to the theme of the future of our frequency allocations. Although he felt optimistic about the outcome of the 1979 World Administrative Radio Conference, he urged that we make sure that the maximum percentage of licensed radio amateurs belonged to their national society.

The awards

The formalities culminated in the presentation of the awards by Geoff Stone, who said that it was intended in future to present all vhf awards at the convention.

The 1962 VHF Committee Cup for home-constructed equipment went to Gordon Lean, G3WJG, for his crystal-controlled solid-state source for 10GHz, which gives 3mW for use as a receiver local oscillator, and 20mW output from a Gunn diode "amplifier".

The RSGB President, Cyril Parsons, GW8NP, accepting on behalf of the Barry Radio Society their part of the Fraser Shepherd Prize from RSGB VHF Manager Geoff Stone, G3FZL. Photo: *G3OUF.*

G3FZL was pleased to announce the re-introduction of the John Rouse Memorial Trophy, and this was awarded to Andrew Betterton, G8FNF, for his 2m synthesizer.

The Fraser Shepherd Prize for microwave activity was awarded jointly to GM3OXX and GW4BRS (the Barry Radio Society) for their record-breaking work on 3cm.

Recalled at the last minute to the dinner via the London repeater, GB3LO, G3WMR was able to collect in person the VHF Manager's Trophy for winning the 1974 70MHz Open Contest.

Finally, before dancing commenced, the lucky dinner ticket draw took place. Quad-loop aerials for 23cm were won by G3BA and G3OHH, a Burns kit by G8ACJ, and the ladies prize, a large box of chocolates, was carried off by the xyl of G3NHE!

The bring and buy sale at the convention was very successfully organized by the Echelford Amateur Radio Society, and through its chairman, Richard Baker, G3USB, the VHF Committee extends its appreciation of their efforts which contributed substantially to the financial success of the event.

1979 and all that

The mood of the 1975 VHF Convention was clear—it is up to us what happens to our frequency allocations at the 1979 World Administrative Radio Conference. Several speakers at Whitton made specific suggestions as to how we could help ourselves, and these were mainly concerned with giving maximum publicity when the amateur bands were being used for research or experimental work by amateurs; more technical reports and papers were called for, together with details of auroral contacts, propagational studies etc. Unfortunately, many of us do not have the time or opportunity to involve ourselves in such work, and might feel that our contributions are of little significance. However, things which on their own have no apparent value are very often useful collectively, and *any* worthwhile activity or achievement should be given publicity. Let us not only be heard to be active, but seen to be active by letting (in the case of serious experimental work) the Scientific Studies Committee have our results, or in the more usual case of less esoteric activity, making use of these columns.

We are always pleased to receive news of any useful achievements, outstanding successes or unusual activity, but would also like to know the means by which the results were achieved: for example, the power and the aerial that were

used, the problems that were experienced and how they were overcome. Even a very brief background description vastly increases the value of a report.

At present one gets the impression that only a few minority groups are interested in giving regular publicity to their progress and results, but there *must* be other activity worthy of mention; interesting skeds, for example, or good dx via tropo, meteor-scatter results, etc. Let us remember that excessive modesty in our achievements could spell disaster in 1979.

Falling standards

Joost Berden, G3RND, of Cowes, IoW, has been a 2m and 70cm operator for a good number of years, so his feelings that operating standards on these bands are rapidly deteriorating are based on experience. His views echo the growing rumblings of discontent among many vhf men who often blame some particular feature of vhf operating (repeaters, "black-boxes" etc) for the falling standards. It is perhaps worth considering that it is not the equipment used that conducts itself badly, but the operator using it; these things are quite capable of being used, and are used, in a manner which gives offence to no-one, although it is possible that certain trends in vhf amateur radio do make it easier for the sloppy, thoughtless or anti-social operator to be heard further afield than would once have been the case. Perhaps there is a need for more control over some of these trends, but equally, it could be that the control needs to be applied to the ease with which an amateur licence is obtained.

On another tack, Joost Berden is annoyed when he hears crystal-controlled stations laying claim to "their" frequency whether or not it is already occupied. G3RND does not think that the rockbound operator has an inalienable right to any channel, or any "sail before steam" rights over stations who are vfo controlled. In any case, Joost would not have thought that it should be beyond the capabilities of any radio amateur to "pull" a crystal, or build a vxo or vfo of the required stability.

Another aspect of 2m operating that displeases G3RND is the habit of some stations of ragchewing on beacon frequencies. He wonders whether they are incapable of reading frequencies, or whether they are just plain anti-social.

DX news

Waking up to a covering of snow at the beginning of June (as did the writer and many others in the north) does not make one think of super-dx on vhf/uhf; but super-dx there had been, via sporadic-E and tropo, during the previous week. The tropo opening on the night of 28/29 May seemed to be one of those inverted affairs where the higher frequencies open up first and the lower frequencies later. Claus Neie, DL7QY, in West Berlin (GM47b) noticed this effect when poor results on 2m caused him to check 70cm, just in case, and there was G3LQR peaking S9. Not only did a 70cm contact follow, but a switch to 23cm also proved successful—and this over a QRB of 810km. At the same time, 2340gmt, not one single G station was to be heard by DL7QY on 2m. Later, however, from about 0100 gmt onwards, 144MHz opened up, and Claus had ssb contacts with G8FQE (ZM35j) 55/58, G8GQV (ZN11d) 52/54, and his best dx was GW4BJE (YL35f) 53/53 at a QRB of 1,200km. DX signals faded out in Berlin around 0500gmt. DL7QY rates this as one of the best lifts into the UK that he can remember on uhf.

The G3WDG/G5HD trip had reached the old county of Roxburghshire, the new Borders region, on the night of the opening and they found themselves in a position not only to make their usual skeds but also to work a string of Continentals on 70 and 23cm, including a 432MHz contact with a DL near Hanover, close to the East German border.

Within an hour of the end of the 144MHz portable contest on Sunday 1 June, when most stations were packing up their contest gear, there was a short sporadic-E opening which gave G4BPY of Walsall (YM30d) a contact with LZ1AB in LC27d. Gordon Pheasant wonders whether this might be a 2m record, (sorry—the G3NHE QTH locator map does not extend to LZ; can anyone help?). Vassil was on 144·09MHz cw, and reports of 569 were exchanged. G4BPY neither heard nor worked any other dx at that time.

With G3DAO (Selsey) the same opening lasted from 1715 to 1750gmt producing contacts with LZ1BW (LC27e) and LZ1AB. Peter Cutler noted that signals were way down on those heard during the big sporadic-E openings last year, and fading made several repeats of the relevant information necessary on both sides. Peter reports that F9LT also worked LZ1BW, and LZ2MY in QTH locator square MC, but neither F9LT or G3DAO heard any other dx. Back on 21 May, Albert Latham, GI3JLA, of Omagh in Co Tyrone, heard an Italian station in QSO on 144·2MHz at 1818gmt. A "CQ" call off his frequency resulted in contacts with I4EAT, I4PWL in FE60f and I2CZE, all 59 plus ssb. The opening lasted just 15min, and Albert wonders whether these are GI/I "firsts" on 144MHz. The GI3JLA station runs 200W p.e.p. to a 4X150A, and the aerial is a 10-el slant-crossed Yagi at 32ft.

Meteor-scatter

Ron Harris, GW8DUP, of Swansea, proves that meteor-scatter contacts using ssb are quite possible by sending details of his achievements over the past year. Five new countries have been worked, all of which may be GW "firsts" for 2m ssb meteor-scatter. These are: DC7CW (GM47j) on 7 June 1974; HB9QQ (EH45e) on 12 August 1974; SM7AED (GQ56b) on 13 December 1974; I4BER (FE54e) on 5 May 1975 and OE3XUA (HH10b) on 6 May 1975. GW8DUP is to be congratulated for the patience and perseverance he must have applied to achieve these excellent results.

Slow-scan

Ron Johnson, G3GRJ, of Waltham Cross in Hertfordshire, had been operating sstv on the hf bands for a couple of years when it occurred to him that with Class A numbers swelled by the Class B licensees, 2m presented an excellent potential source of inter-G working on this mode. He has consequently been promoting the use of 144·28MHz for sstv, and is pleased to report that at least six eager converts in the south-east are busy building their sstv monitors. Already fully operational and active most evenings between 2000 and 2200 are G3VXZ, G3WW, G3OXZ, G8HET and G3GRJ himself, and any newcomers to the mode are more than welcome to call in for information and help.

Also having some success with sstv is Grant Dixon, G8CGK, of Ross-on-Wye, and he also notes the use of

144·28MHz as an ssb sstv calling and working channel. (With the move of the ssb calling channel from 144·2 to 144·3MHz it might be advisable for slow-scan users to move up to 144·5MHz: it is a regrettable fact of life that many sideband operators, after establishing a contact on the calling channel, have the habit of saying "ten up" or "twenty down", and QSYing without first checking the channel to which they are moving.) Grant Dixon has recently exchanged two-way sstv pictures with three stations for the first time—G3VKV, G8HET and G3YQC.

Dusty problem

Gear that is in regular use in the shack, or portable, and constantly being tinkered with, moved around and modified etc is one thing; gear in constant use and rarely touched is another, as GB3SU beacon-keeper G3RKL has found to his cost. Twice within one week the ht fuse on GB3SU blew, the reason being tracked down to an accumulation of dust, in a different place on each occasion, providing a break-down path to earth for the ht. Fortunately G3RKL has the help of G3HVI in Stoke-on-Trent, who monitors the beacon regularly, and who was able to prove the efficacy of the early-warning system with a quick telephone call to '3RKL.

The new Harpur Hill site of the Sheffield University beacon has been found in general to give better coverage and stronger signals than the old central Sheffield location, but there are odd exceptions. In the south-east, G3LVP and other Essex stations have noted poorer reception of 'SU, much affected by QSB, and one assumes that this is some peculiar effect of the hilly terrain around the beacon. The excellent coverage from the central Sheffield site must have been due to aerial height above ground (it was on top of a 100ft building) rather than height asl.

Tony Whitaker has ideas for the eventual modernization of the beacon transmitter, as well as an increase in power, but, with the exception of the easily-overcome dust problem mentioned above, the device is working so well that it seems a shame to disturb it!

Expeditions

An ambitious trip has been planned by the Southend Group this summer. Starting on 2 August, they will tour Europe for a fortnight, taking in Belgium (1 day), France (2 days), Luxembourg (2 days), Switzerland (3 days), Liechtenstein (5 days), Austria (1 day) and Italy (2 days). With the exception of 4m, operation is intended on all bands from 160m–70cm, ssb, cw and fm, and they also hope to be operating through Oscars 6 and 7. High power will be used on 2m from 4CX250s, and other gear will be: FT101, transverters for 2m and 70cm, Liner 2, FT2, 14-el 2m beam, 46-el 70cm Multibeam and dipoles for the hf bands. The self-styled "nuts" who are attempting this hectic tour are G4DML, G4CDN, G8FUF and G8GUO, who regret that no skeds can be made. If the Southend men get through *that* itinerary they are going to need a month to recover when they get back—the best of luck to them!

A little nearer home, Peter Wallis, G3YJI, will be signing GC3YJI from Guernsey on 4m and 2m ssb, the period being 5–17 July inclusive. He will be active from the island during the RSGB Jubilee Contest on 5/6 July.

Short but very sweet; that was the G3WDG/G5HD six-day trip which happily coincided with the tropo opening on 28 May. The 4m, 70cm and 23cm bands were covered, from Salop, Powys, Cumbria, Wigtown (Dumfries and Galloway region), Roxburgh (Borders region), Durham and Clwyd, and the success of this trip can have done no harm at all to activity on these bands.

Sincere apologies are offered by G3VPS for the disruption of his schedule caused by a series of disasters to both car and rig. First of all Peter's aerial change-over system failed, and being unable to find anywhere in a tent to plug in a soldering iron he had to resort to "b and b" to effect the repairs. Then a fault developed on the inverter and an intense search of electrical emporia on his route failed to produce the necessary spares. Fortunately G3VPS managed to get the inverter going again, although only on an intermittent basis. Five hours were spent on a Chepstow car park trying to cure carburettor trouble, during which time a fair quantity of petrol was ingested, resulting in a pair of very sore lips. Other minor problems, such as tappet trouble, a non-operative petrol gauge, a broken mobile whip and a parted throttle cable all added to Peter's problems, but at least he enjoyed the cycling event he was following!

Contest comment

Arising out of the discussion session with the VHF Contests Committee at Whitton came two interesting suggestions which the committee promised to consider carefully. The first, from G3FDW, was that VHF NFD entrants should nominate their three best bands to score for the overall result, although where four bands were worked they would all appear in the individual band result tables. The idea appeared to meet with a good deal of approval, the feeling being that this would help to offset the advantage gained by stations in areas of relatively high 23cm activity. The counter argument was that the stations with prospects of a high 23cm score might well not even bother operating on 4m.

The second idea, which seemed to meet with unanimous approval, was to have a 144MHz contest in which only contacts over 200km counted for points. The VHF Contests Committee would very much appreciate views on both these suggestions.

Another point on which the committee would like comments is the proposed moving of VHF NFD from September to July, doing an exchange with the HF Contest Committee's SSB Field Day.

There is a strong possibility that a 432MHz cumulative contest will be re-introduced next year. The fall-off in the number of entries during 1974 when three such events were held was very noticeable, although those who participated will be aware that many stations regularly appear for cumulatives, but never send in a contest entry. Unfortunately, the committee has to rate the success of a contest by the number of entries received, so it may be that the future of this contest rests with those who enjoy taking part, but who never appear in the results table: perhaps they will next time?

Contest news

For those who fancy something a little different, how about a vhf contest sponsored by the Itchycoo Park VHF Amateur Radio Society? Originating in the USA but aiming to promote worldwide vhf activity, the contest starts at 6pm on 26 July and ends at 10pm on 27 July, all times local. The

only band of interest to UK amateurs is 144MHz, and each station may be worked once only, any mode. A contest exchange consists of callsign, county or political sub-division and state/province/judicial district. Logs should show exchange information, band, time and scoring, which is QSOs × counties × states (countries?). Entries by 31 August to WA3NUL, Box 1062, Hagerstown, Maryland 21740, USA.

Less exotic and nearer home is the vhf section of the WAB Contest to be held on 20 July, 0900–2100gmt. Full details may be obtained from WAB contest manager G4BFY, QTHR, but briefly the contest exchange consists of report, serial number, WAB book number (if any) and, for UK entrants, WAB area and county. Score five points per contact, and multiply by number of WAB areas plus dx countries (all G call areas count as one). Entries by 8 September to G4BFY.

The hopefuls who took to the hills for the 31 May/1 June 144MHz portable contest were not rewarded by the best of conditions, although there was no shortage of activity. Leading stations were passing serial numbers over 400 towards the end, with GW3UCB/P and GW3WAS/P featuring prominently. The G3XDY/P team seemed to be giving the GWs a run for their money until early on the Sunday morning when their generator broke down and they were forced to continue with battery-powered QRP.

It may have been imagination, but your scribe gained the impression that there was an improvement in the general quality level of signals during this event. There were a few over-exuberant types spreading their signals generously around the band, but these did seem rather fewer than usual, so perhaps the pleas for more attention to be paid to the quality of signals has had some effect.

A few harsh words being exchanged were heard occasionally—rather needlessly one felt—when stations inaudible to each other and sharing the same frequency eventually moved beams, became aware of each other and started the old "who got here first?" argument. Under conditions of high activity, and while stations still insist on congregating together within a narrow portion of the band, a certain amount of mutual QRM is bound to occur, and a sensible "give and take" attitude is necessary. After all, a high QRM level is one of the penalties one has to pay for a good vhf site.

Despite the modest conditions, the GW3UCB team managed some 30-40 Continental contacts, including PA0, DL and ON, although no spectacular dx was worked.

Repeater news

The Kent Repeater Group continue to make progress, and work on the GB3KR transmitter is well advanced. They hope to incorporate various refinements after studying the problems experienced by other repeaters, one of which will be a system to prevent accidental or deliberate jamming of the repeater stopping a stronger signal accessing the device.

The North Surrey Repeater Group have submitted details o the RSGB of the proposed GB3NS 70cm repeater.

Awards

Apologies to G3OZT, who wondered what he had done to offend when he was not credited with 144MHz Transmitting Certificate No 425 back in April.

The following FMD certificates have been issued during the last month by the vhf awards manager:

70MHz Transmitting: Certificate No 115 to Les Hawkyard, G5HD.

144MHz Senior Transmitting: Some of the cards in the claim from G3OSS dated back to 1961, but Angus McKenzie now has Certificate No 75; No 76 was earned by Arthur Williams, GW8FKB of Anglesey.

144MHz Transmitting: No 445 to GW8HVP and No 446 to G2BLA.

Quality control

Jim Edgar, GI8JWG, recently purchased a well-known piece of commercial vhf transmitting equipment and was appalled to discover the poor quality of the signal radiated, with spurii appearing over a wide spectrum. This led him to wonder whether the RSGB could institute some kind of "seal of approval" scheme covering such features as spurious emission, frequency stability and electrical safety. Jim Edgar appreciates that the onus for ensuring that his signal is correct rests with the individual amateur, but he is not happy with the lack of control over the quality of commercial equipment, particularly imported gear.

Miscellany

It was nice to learn that the 70cm beacon, GB3GEC, is back on the air from Borehamwood, frequency 432·1MHz. It is understood that at present it runs 5W output. When finalized, the aerial will consist of two 8-el crossed Yagis, one beaming ESE, the other NNW, although at the time of writing careful searching has produced no sign of the beacon at G3NHE and it is suspected that the beams are not in their final positions.

There have already been reports of ZB2VHF being heard on 144·145MHz in this country; an opening on 23 April gave several stations here first sound of this beacon.

Claus Neie, DL7QY, of Berlin, also took advantage of the April opening, and in the small hours of 24 April worked G4CXL, G8GDK/P and G3JHM, all on ssb. Signals were too weak to try 70cm, and the lift faded out in Berlin around 0200gmt. Claus is well known in this country for his excellent dx work, Oscar chasing, meteor-scatter tests, and for his association with the *Dubus* magazine; he is a welcome new member of the RSGB.

Many newer Class A arrivals on 2m have been surprised to be told that Monday night is cw activity night; customary silence at the bottom end of the band had dissuaded them from exploring further. Now, however, many do, and are often rewarded by dx contacts on A1 under conditions where even high-power A3j fails to get through. Although peak time is 2000-2200 any Monday, it is worth trying a call on the key on other evenings of the week; there is frequently someone waiting to reply.

Albert Latham, GI3JLA, (Co Tyrone) is active on 4m, 2m and 70cm ssb/cw/a.m. and would be more than pleased to QSY from 2m to 70cm should any station like to try tests on that band.

Finally, the deadline for the August issue is immediate, and items for inclusion in the September issue should reach G3NHE no later than 4 August.

MICROWAVES

by DAIN EVANS, G3RPE*

A record-breaking time on 10GHz

In the May column, it was suggested that this season promised to be a most interesting one for 10GHz, but little did the writer guess that it would all start to happen quite so early.

Late in March an attempt was made at moonbounce by GM3OLK in Glenrothes, with a power output of 1·5W to a 10ft steerable dish. GM3BKE in Glasgow (90km away) heard one ping only, despite calculations which suggested that with the 2·4kHz bandwidth of the system there should have been about 7dB in hand. With GM8HEY's 10mW fed to the dish, signals could be copied 31km away in Edinburgh over a patently non-optical path.

On 4 May, GM3OXX/P on Ben Ime (3,318ft) worked GM3BKE and GM3DXJ on Cocklaw (1,047ft), near Dunbar, over a 151km path which passed nearly directly over Stirling. Signal strengths were estimated to be at least 30dB in hand: signals were still copied with one aerial removed. A feature of this path is that it is mainly over land.

Meanwhile, the GW4BRS group had been making several super-refraction contacts along the south coast, as those who attended GW3PPF's lecture at the recent VHF Convention will know. The longest one was from Start Point to G3KSU on the Isle of Wight, a distance of about 170km.

On 11 May, GMs 3BKE, 3DXJ, 8HEY and 3OXX on Bennane Head in Ayrshire attempted to work GI8AYZ over the 70km optical path to Torr Head in County Antrim. All four GM stations received strong Irish signals, but GI8AYZ's receiver developed a fault and the contact was not completed. A second attempt a week later failed in the same way.

Later on the same day, GMs 3DXJ, 8HEY and 3OXX travelled to Auchenmalg Bay in Wigtownshire for tests over a long super-refraction path with the GW4BRS group sited on St David's Head in Pembrokeshire, 322km away. S9 signals were received in both directions virtually immediately—in the excitement, nobody remembered to take more precise measurements. This contact, of course, well and truly broke their own UK record of 243km established almost exactly a year previously, and for GM8HEY it meant a Microwave Award. The next day an attempt was made on the world record using a 600km path from Port Fada on the Mull of Kintyre to Portreath in Cornwall. However, nothing was heard either way. Those concerned are still trying to work out why.

There are several features worth pointing out about these long super-refraction contacts. First, they were all made with small equipment, usually Gunn oscillators generating 5-10mW with dishes 24-30in in diameter, with i.f. bandwidths of about 200kHz. Second, over a path of 322km the sea represents an obstruction 7,000ft in height. In the absence of super-refraction, this would result in a path loss of several hundred decibels, an insuperable barrier. Third, and for this writer a mind-boggling feature, all the contacts were made directly on 10GHz without the assistance of any talk-back.

The last weekend in May brought further interesting contacts. GM3OXX and GM8HEY again hiked all their equipment to the top of Snaefell (the railway was not running) to act as the focus of activity. Their reward was seven contacts, one with GI8AYZ to make the first GI—GD contact on this band. This brings the total number of countries worked to nine. G4ALN and G8FJG both made two 150km+ contacts to doubly qualify for their Microwave Awards. G4ALN also set up what surely must be a world record—the best dx using a standard dustbin lid as an aerial (see this column October 1974).

A second Irish station (GI8DMX) was also heard, and G8ENR was active. A welcome partner for GM3DXJ was G5MBF, who is PA0KKZ in disguise.

Low-power varactor multipliers to 10GHz

Several people have been using redundant Gunn diode oscillator cavities as the basis of varactor multipliers to 10GHz. A typical version is that due to G8DEK. A BXY41B varactor (which is available on the surplus market) replaces the Gunn diode in the cavity shown in Fig 3 on p289 of the May 1974 *Radio Communication*. The simple matching circuit between driver and varactor is shown in Fig 1, and this should be contained within a trough or screening box. Other forms of cavity should work as well provided that the inductance L is optimized.

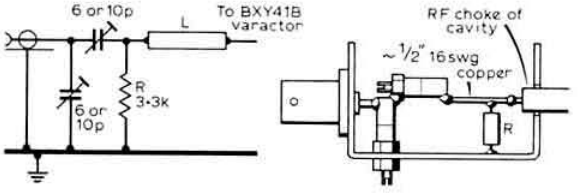


Fig 1. Circuit and layout of driver/varactor matching network

From 400mW of drive at 1·006GHz, an output of about 6mW at 10·060GHz is obtained, which is more than enough to form the local oscillator of a receiver. It would also act as quite a potent transmitter: assuming the use of a narrow-band receiver and operation in an a.m. mode (thus avoiding the 10dB fm penalty), this power is equivalent to at least several hundred milliwatts of a wide-band transmission. It is of course essential that the output of the multiplier be adequately filtered and that the purity of the output be checked, preferably with a spectrum analyser. A practical filter was described in this column in August 1973.

G8APP uses a similar approach, and obtains about one milliwatt from 400mW drive at 400MHz. He recommends that the driver be mounted directly on to the multiplier, as his experience is that movement of any flexible coaxial cable connecting the two can upset the tuning. □

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

THE MONTH ON THE AIR

by JOHN ALLAWAY, G3FKM*

News from overseas

Keith Younger, G3OIB, is in Lesotho and has the callsign 7P8AC. He will be there for two years and is active on all bands 3·5 to 28MHz using a Trio 515 transceiver and TL911 linear amplifier. He is located 5,000ft asl and his aerials consist of a vertical and a trap dipole. So far, he has met 7P8AT who is from Japan and 7P8AR who works for the BBC. Keith suggests that QSLs are sent to him at G3OIB, but those needing a quick card are advised to write to him at PO Box 829, Maseru, Lesotho.

Allan Papworth, G3WUW, is in Malaysia and has the callsign 9M2RL. He will be there for two months and finds 1400–1600 the best time for UK signals.

G4DWV will be in Israel for 10 weeks from 29 June. He hopes to be on the air regularly between 14,200 and 14,350 kHz.

The XIV Boy Scouts World Jamboree

This will be held at Lillehammer, Norway, from 29 July to 7 August. A special callsign, LC1J, has been issued to the Jamboree station, which will be on the air on ssb, cw, rtty and sstv throughout the event. VHFfm will also be used. Frequencies will be near the usual Scout frequencies—3,590, 7,030, 14,070, 21,140 and 28,190kHz on cw, and 3,740, 7,090, 14,290, 21,360 and 28,990kHz on ssb. LC1J will probably also be able to communicate via Oscar. Special QSL cards will be used to confirm contacts. There will be daily sstv programmes and it is hoped to exchange pictures with other Scout groups. Questions regarding operation from LC1J should be addressed to QSL manager LA4LN (see *QTH Corner*).

DX news

Activity from Asia has recently decreased due to the disappearance from the air of stations in Vietnam and Cambodia. The Spratly group of islands has allegedly been occupied by Vietnam, thus precluding any dxpeditionary activity from there in the foreseeable future. Sikkim has become part of India and AC3PT's equipment is reported to have been seized. Signals from Thailand have been noticeably fewer, and the one active amateur in Bangladesh has had difficulties with the authorities.

Several unusual prefixes have been in use by Canadian stations. Stations in Truro, Nova Scotia, have been using CH1 to mark their city's centenary. XK3 has been in use by amateurs in Peterborough, Ontario, to mark that town's 150th anniversary, and XO by those in North Bay for their centenary. A special certificate is available to those who contact two XK3 stations—applicants should send their QSL cards for the Canadian stations, plus four IRCs, to VE3ALQ, J. Fisher, 645 Weller St, Peterborough, Ont, K9J 4X1, Canada.

KM6EA is active at 0200 on 14,220kHz, 0500 on 7,250kHz, and at 0830 on 3,802kHz. He also joins the YLSSB Net on 14,333kHz around 2100. KM6EB is also active and has been running amateur radio courses with considerable success—10 out of 14 pupils have passed their examination and are awaiting their WM6 calls, four of these being lady operators. Those still needing QSLs for contacts with KM6BI during the period 1964-1967 are advised to apply to W7PHO who has the logs for that period. The northern Line Islands have become separated administratively from the Gilbert and Ellis group and may soon use a different prefix. However, it is believed that there will be no change in their DXCC status.

QSLs for contacts with FW8DY, KH6GLU, KX6BK and VR3DY may be obtained from VK4ABA, Ed De Young, 52 Aerodrome Rd, Maroochydore, Queensland, 4558, Australia.

ZL3NR/C was formerly ZK2BD and should be on Chatham Is for about 18 months.

There is some controversy concerning the recent TI9FAG expedition. TI2WD alleges that there is no reciprocal licensing between Costa Rica and Switzerland and that the operation was illegal. HB9AQM says that the licence was correctly issued and that specific permission to transmit from Cocos Is was given.

Readers looking for a contact with Tristan da Cunha might like to know that ZD9BT keeps a schedule with his QSL manager, GB2SM, each Tuesday at 1500 on about 21,370kHz. When this contact is completed other callers are welcome. VP8OB in South Georgia is often around 14,200kHz at 2100.

3B8DO is reported to be active on 7MHz cw at weekends between 0200 and 0300 when he keeps a schedule.

1976 USA bicentennial callsign prefixes

During 1976 stations in the USA will be allowed to use prefixes in the AA to AL series. The prefixes they may use are as follows (current prefixes are given first):

WA = AA	KG6 (Guam) = AG6	KS4 = AH4	WJ6 = AJ1
WB = AB	KW6 = AG7	KS6 = AH3	WP4 = AJ8
W = AC	WB6 = AG3	WH6 = AH1	WV4 = AJ2
K = AD	WG6 = AG5	WM6 = AH2	KC4 = AL4
WD = AE	WW6 = AG1	WS6 = AH5	KL7 = AL7
WR = AF	KH6 = AH6	KJ6 = AJ7	WL7 = AL1
WN = AK	KM6 = AH7	KP4 = AJ4	
KB6 = AG2		KV4 = AJ3	

Dxpeditions

VK4ABA, Ed De Young (KH6GLU), John, VK3JW, and VK4WS will be setting sail in a 56ft trawler in late August en route for three locations which they hope will each count for new DXCC countries. This will be followed by a seven-day operation from Mellish Reef in early September, then from another (as yet undisclosed) destination and a final operation from Willis Is before returning to Australia.

3B8DL was scheduled to depart from Mauritius on 13 June for a three-week visit to Rodriguez Is, where he will be on the air as 3B9DL. INDXA has supplied him with some ssb equipment.

* 10 Knightlow Road, Birmingham B17 8QB.

The Warsaw Shortwave Club station, SP5PWK, operated here by SP5AUY (left) and SP5DZJ

Activity from Mt Athos by SV1GA and a group of other Greek amateurs is expected to take place during July, possibly around the 20th.

Contests

The European DX Contest

0000 9 August to 2400 10 August (cw).
0000 13 September to 2400 14 September (phone).
0000 8 November to 2400 9 November (rtty).
All bands 3·5 to 28MHz. Single-operator all-band and multi-operator single-transmitter categories. Single-operator entrants may only operate for 36 hours and rest may be taken in up to three periods. Europeans work non-Europeans and exchange RS/T and serial QSO number (from 001). Each contact counts one point, and a station may be worked on each band for credit. The multiplier is the number of ARRL DXCC countries worked on each band added together—each call area in JA, PY, VE, VO, W/K, ZL, ZS and UA9/0 counts as a country. The multiplier on 3·5MHz may be multiplied by four, on 7MHz by three and on 14/21/28MHz by two. Additional points may be claimed by using QTCs. These are reports of confirmed QSOs that have taken place earlier in the contest and which have been later sent back to a European station. One point for each QTC may be claimed. It contains the time, call and QSO number of a station previously worked and only 10 may be passed to any one station. Each QTC may be passed once only. Use separate log for each band; send a large self-addressed cover and IRCs to WAEDC-Committee, D-895 Kaufbeuren, Postbox 262, Germany, for DARC log sheets. Deadline for receipt of logs is 15 September, 15 October and 1 December respectively. (Note that in the rtty section one's own continent may be worked). In the 1974 contests cw section UK entrants were **G3FXB** (334,152), G3KDB (232,271), G3SXW (100,101), G3ESF (54,372), G4BUE (38,535), G3GRL (32,900) and **GM3CFS** (25,935). G4BTJ (134,310) was the only multi-operator entry. In the phone section **G3GNC** (4,074) was the only single-operator entry from the UK, but **G4DAA** (684,204), G3RCV (186,432) and GM3ZRC (5,724) entered the multi-operator section.

Results of the **1974 SP-DX Contest** included the following UK entries: **G3ESF** (35,076), G2WQ (21,012), **GW3INW** (13,035)—all multi-band. **G3RTE** (15,118), **GW4BCA** (768), G2AJB (60)—all on 14MHz. **G3GRL** (1,470) and G3OCA (297)—both on 7MHz. **G3XWZ** (6,552), **GM3KHH** (728) and G4BXN (3).

Results of the **1974 CQ WW DX Contest** (phone) have been received from W1WY and are as follows:

Single operator

Callsign	Band	Points	Callsign	Band	Points
G3FXB	**All**	**1,055,868**	**G2BOZ**	**28MHz**	**28,674**
G3SEM	All	287,876	**GW3GHC**	**28MHz**	**14,248**
G4BVH	All	150,332	GW4CYD	28MHz	595
G3ZQW	All	139,810	**GW4DHS**	**21MHz**	**26,122**
GM3BCL	**All**	**82,016**	**GM3BCV**	**21MHz**	**10,440**
G3YBH	All	69,788	GM3YOR	21MHz	2,528
G4CLA	All	67,056	**G3XYP**	**14MHz**	**390,456**
GW3SLA	**All**	**53,063**	**GM5AIW**	**14MHz**	**36,714**
G3SXW	All	47,034	GM5AXY	14MHz	7,920
G3TXF	All	27,552	**G4BUE**	**7MHz**	**54,614**
G8VF	All	18,542	G3JVJ	7MHz	10,370
GM3SSB	All	16,642	**GW4BLE**	**3·5MHz**	**31,746**
G2AJB	All	15,548	**GM4ASY**	**1·8MHz**	**2,244**
G3MWZ	All	9,800	**GW3XNS**	**1·8MHz**	
G3MSB	All	7,626			

Multi-operator, single-transmitter

Callsign	Points	Callsign	Points
G3WYX	**2,288,551**	**GI3FFF**	**236,995**
G3UBR	1,215,500	**GM3ZRC**	**63,618**
G3RCV	871,168	G3EED	44,608
G8JC	543,768	GM3PXK	17,860
G3KMI	299,761	**GW3UCB**	**3,534**

GB3MCG scored 1,136,832 points as a multi-operator multi-transmitter entry.

The Colombian Contest

0001 19 July to 2359 20 July.
3·5 to 28MHz. Phone and cw. Exchange RS/T and serial QSO number (from 001). QSOs with HK count five points, with others outside own continent three points, with own continent two points and with own country one point. Total score is sum of points on each band multiplied by the sum of different DXCC countries worked on each band. Use separate log for each band, indicate each new country claimed and include the usual summary sheet. Post before 30 September to LCRA, Concurso Independencia, Apartado Postal 584, Bogota, Colombia.

The SSA 50 Contest

0600-2400 30 August (phone).
0600-2400 31 August (cw)
All bands 3·5 to 28MHz. Single- and multi-operator and listener classes. Club stations count as multi-operator even if operated by one operator. Exchanges consist of RS/T and serial QSO number (from 001). One point per QSO. Multiplier is the number of different Swedish prefixes (maximum 25) per band. Final score is total QSO points times sum of multipliers from all bands. The two leading stations in each country on each mode will receive awards. All entrants will receive a special participation award as this contest celebrates the 50th anniversary of the formation of SSA. Logs should show date, time, station worked, No sent, No received and band. Note new multipliers and points. Use separate log for each band. Summary sheet should contain operator's name, callsign, address and operating class together with final score claimed. Post before 1 October to SSA Contest Manager, SM0DJZ, Jan Hallenberg, Sleipnergatan 64.7TR, S-195 00 Maersta, Sweden.

In the **5th Worldwide SSTV Contest G3IAD** was top scorer outside the USA with 5,229 points. Other UK participants were G8PY (3,800) in second place and G3OXE (1,056) in seventh. G3MGF sent in a listener entry and came second with 1,960.

Awards

The Julianehaab (Greenland) Award

Julianehaab was founded 200 years ago, and to celebrate this fact the local branch of the EDR are issuing this certificate (the first ever from Greenland). Two hundred points are required and there are phone, cw, and mixed categories. All bands, hf, vhf, uhf and Oscar may be used but crossband/repeater contacts are otherwise excluded. The first contact with each Julianehaab station counts 20 points (30 if via Oscar Mode A, 40 via Mode B), and stations may be contacted three times on each band at intervals of at least one month. Subsequent contacts count only 10 points. Send log details and five IRCs to OX3AB, Arne Pedersen, PO Box A5, DK-3920 Julianehaab, Greenland. Valid contacts may be made between 7 April 1975 and 6 April 1976, and the current amateur population of valid stations includes OX3s AB, AC, BY, CS, EL, FG, HA, KS, LA, MD, PN, RA, RF, WX and ZM.

The WAC Awards

IARU now issues five and six-band versions of the WAC, for confirmed contact with all six contintental areas of the world on each of five or six bands. All contacts must have taken place since 31 December 1974. Applications, accompanied by the relevant QSL cards, should be sent to the headquarters of the society which represents the country in which the applicant lives (British applicants should send theirs to G5GH). Details will then be forwarded to IARU HQ and certificates will be sent out from there. Note that contacts must be made from one station operated at one location—this means one metropolitan area or an area not exceeding 25 miles in diameter. There are no mode endorsements available.

The CW Award of the 50th Anniversary of REF

This is being issued to celebrate the 50th anniversary of the foundation of Reseau des Emetteurs Français, and is available to those who contact at least one member of the National Award CW DTC between 1 May and 31 August. Each member of the latter organization will send a special number during all his cw contacts over the period. Logs should be sent to F8GA, M Rene Roy, Le Moulin, Muides sur Loire, 41500, France, "from 15 September". They should indicate the date, time, frequency, callsign and received group relating to each contact. A list of DTC certificate holders may be obtained from F8GA in exchange for an irc.

The Worked All Malaysian Award

A WAMA certificate will be issued to any amateur who has proof of two-way contact with the following: 10 different 9M2 stations, 10 different 9V1 stations, plus one contact with each of VS5, 9M6 and 9M8. Any special endorsement for band or mode may be applied for. Applicants should send a list of claimed contacts showing callsign, date, time, mode and band. QSLs need not be sent if this list is certified by the local amateur radio society or two licensed amateurs. Please include five IRCs to cover return postage and address to MARTS, PO Box 777, Kuala Lumpur, Malaysia.

QTH Corner

A4XVB	G4DLG, 2 Pendrel Close, Buntingdale Park, Tern Hill, Market Drayton, Salop.
GB2IARU	via G3GVV.
GB3IARU	via G2BVN.
HC1WW	via K1ALP, 25 White Oak Rd, Trumbull, Ct, 06611, USA.
HK0AA	LCRA, Box 584, Bogota, Colombia.
KM6EB	PO Box 43, USNS, FPO, San Francisco, Cal, 96614, USA.
KX6BB	K3NEZ, 207 W. 38th St, Wilmington, Del, 19802, USA.
LC1J	T. V. Segalstad, LA4LN, PO Box 31, Smestad, Oslo 3, Norway.
VE3HEY/SU	via VE3PET, Box 4, Petawara, Ont, Canada.
TI9FAG	via HB9AQM, Zuercherstr 69, CH-8406 Winterthur, ZH, Switzerland.
VP5AH	via WA4DRU, 2318 S. Country Club Rd, Melbourne, Fla, 32901, USA.
VP5B	via W4ORT (see below)
VP5CW	via W4ORT, 1045 Le Brun Dr, Jacksonville, Fla, 32205, USA.
VP5M	via WB4QKE, 111 Algonquin Terrace, Indian Harbour Beach, Fla, 32935, USA.
VP5WW	via WB4EYX, 62 Coquina Av, St Augustine, Fla, 32084, USA.
VR3AJ	via KH6CIY, 23b6 Aha Maka Way, Honolulu, Hawaii, 96821, USA.
XJ3ITU	via VE3ODX, Canadian DX Assn, PO Box 717, Postal Stn "Q", Toronto, M4T 2N5, Canada.
YK1UN	PO Box 35, Damascus, Syria.
ZD8LN	Box 4608, A.I., c/o Patrick AFB, Fla, 32925, USA.
ZL3NR/C	B. J. Donaldson, c/o Radio Station, Chatham Is, New Zealand.
3B9DL	via WA5ZWC, 5027 Braesheather, Houston, Tex, 77035, USA.
5B4CA	G4AWJ, "Crofters Cot", Highcroft Crescent, Heathfield, Sussex, TN21 8HE.
7P8AC	via G3OIB (see text).
9M8HG	via GW3OJB, 15 Church St, Pembroke Dock, Dyfed.
9N1MM	via W2KV, E. Blaszczyk, 2308 Branch Pike, Cinnaminson, NJ, 03077, USA.

RSGB QSL Bureau, G2MI, Bromley, Kent, BR2 7NH

The DXCC CW Award

A new award, for two-way cw contacts only, has been authorized by the ARRL Board of Directors. All confirmations must show a contact date on or after 1 January 1975, and applications may be submitted after 1 June 1975. Charges have now been introduced for all DXCC awards and new applications for the DXCC award must include $10; the fee for the 5BDXCC award is now $20. Further endorsements now cost $2.

Please note that the award manager for the PACC Award as given in April *MOTA* was not correct. Applications should now be sent to: Traffic Bureau, VERON, c/o PA0MOD, Dashorst 18, Leusden, Holland.

SSTV

G3WW reports that he now receives up to four enquiries weekly concerning the availability of sstv monitor equipment available for home construction and use. It would be most helpful to him if all sstv users could send him details of the equipment they are using. Up to autumn 1974 120 British amateurs had applied for permission to transmit on the mode but it seems that many of these are not yet active. A Sunday morning net is held at 0845 on 3,735kHz. G3IAD has now worked over 80 countries, the latest including VS6AI and FR7AB; W8YEX has 102 countries worked.

QRP

The DL AGCW Winter QRP Contest was won by DL7DO/P with the almost incredible score of 16,512 points, using 2W crystal controlled on all bands 3·5 to 28MHz. His lead can be judged by the fact that DL6ZG took second place with 6,860 points. UK entrants and placings were: G8PG (7th), G3DNF (11th), G3VDW (20th), G4AYS (22nd), G5B U (34th), G3FMW (50th), G3IQF (59th), and G3RJV (70th). Logs were received from 13 countries in four continents and included entrants from LU, PY, JA, and W. A record of 73 logs was received for the contest proper, and eight for the QRO section, won by DL1YA. All bands were used from

1·8 to 28MHz with maximum activity on 14, 7, and 3·5MHz. The next contest takes place on 5/6 July with unchanged rules. The winter contest will be held on 17/18 January from 1500 to 1500 with a compulsory nine-hour rest period. Rules etc may be obtained from G8PG, QTHR.

Mobile operation

G3FPK has supplied information on a decision taken by the Amateur Radio Mobile Society to try to draw up a list of frequencies to be used as rallying points for mobile stations. It is suggested that these should be: 3,755, 7,050, 14,110, 14,310, 21,210, 21,370, 28,550 and 29,550kHz. Norman also mentions the fact that the society's net now takes place at 1330 on Saturdays on 14,320kHz and is under the control of G4AMS (located at the home of G3BXI).

"QSL Managers Directory"

The 1975 edition of this most useful publication, which contains the full details (including addresses) of QSL managers of over 5,000 dx stations, is available through Geoff Watts, 62 Belmore Rd, Norwich, NR7 0PU, price (to European purchasers) £2.50. The directory is air-mailed direct from the USA to each buyer, as are the three supplements which appear during the year.

Band reports

A rather poorly-supported section this month, no doubt due to the early deadline for *MOTA*, and the rather poor conditions prevailing for most of the time. European signals have been coming through on 28MHz, and in fact this band has produced some good dx. The practice of putting out an occasional "CQ" call on what appears to be a dead band cannot be too strongly recommended.

The following are thanked for the information listed below: G2HKU, G4RZ, G5JL, G4BTI, BRSs 17567, 35413, 35608 and 35835, and A8312.

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

1·8MHz. 0000 *VE1MX, W1HGT.* **0300** W2HCW.

3·5MHz. 0500 8P6AH. **0600** *HK0BKX.* **2300** FP8DH, VP8NP.

7MHz. 0000 *CE3, 4, CE8AA, CO5CP, JY9FOC, PYs, VP9s.* **0100** *CX, HI, KZ5, OX3OO, VP2s SAI, SAH, TI9FAG,* XE, ZP. **0200** *CE, FM7WU, HC, HP, LU, OA, PJ2, VP2s ST, VL, ZL3GQ, ZP5VG,* 8P6. **0300** *3B8DO, 8R1J.* **0500** *TK8TT/FC,* ZL. **0600** *TI2WX* (W4MYA), TI9FA, VK2, 5, 7, W7UT, *ZC4ZC.* **0700** *VK.* **2100** *A9XU, VK3,* 5. **2200** *VP9, ZS1XR,* 5L7D, *6W8FP.* **2300** *CP, HK0BKX, LU, OA, TI, YB0ABV, ZP, 5Z4LW.*

14MHz. 0000 VP5GT, ZC4FT. **0400** *JY9CR,* VQ9L. **0600** FO8DO, *FO8EH,* KL7, VU2RES, *ZS1A.* **0700** FO8EG, KB6CU, KH6, *9G1JW.* **0800** KH6, KL7, KS6FF, W6/W7, VR3AJ. **1300** JA, 9M8VLC (QSL to WA7PEZ). **1500** TA1MB, *VU, XW8BP, YB0ABV, 9M8HG.* **1600** *DU,* HM1HJ, *VS5PM,* OE5CA/YK, *3B8DO,* 5N2NAS. **1700** VP8NK, *XW8HK.* **1800** 5T5ZR. **1900** C5AR, TT5AC. **2000** *A4XVB,* TJ1AF, ZL1AMO, *4J9A.* **2100** *H31AC* (=HP1AC), KL5ITU, TR8BJ, *ZF1VW* (TI2BEV/K4VW), *5L0P/MM* (HM5AP off Tangier). **2200** *FG7XJ,* VP1MT, VP5GT. **2300** *TI9FAG, VE7,* VU, W7, *ZL4FT.*

21MHz. 0800 ZE, ZS. **0900** VU, ZS, 9J2. **1100** ZD7FT. **1300** LU, ZS3AW. **1400** FG7AM, PY, VP8NK, 3A0FY. **1500** FC2CH. **1600** HV3SJ, ZD7SD, 9G1JD. **1700** G3BID/HB0/M, 9L1JM. **1900** VQ9HCS, ZP. **2000** CE3PY, LU.

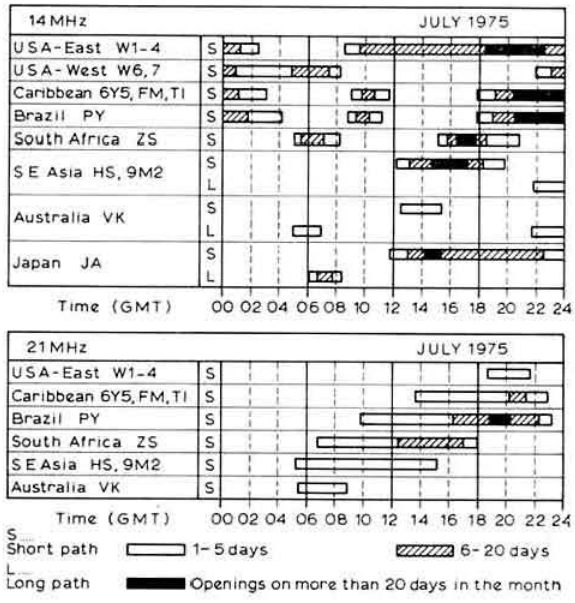
Propagation Predictions

These predictions are by and large the same as for last month. DX conditions on the hf bands are still not favourable.

14MHz will remain the main carrier of dx traffic, especially during night time. The possibility of dx traffic via the indirect path is once more pointed out. As it is now winter in the southern hemisphere, traffic with South Africa will cease early. Central African stations, such as those in Zambia and Rhodesia, will be heard longer than those in South Africa. The same applies to corresponding conditions on **21MHz.** There will be no noticeable change on **7** and **3.5MHz** compared with last month.

Readers will have noticed repeatedly that stations in the area indicated are not audible. This is especially the case when the time given does not correspond to the main working period of the dx countries. Contacts will be at their best if the time given in the predictions coincides with the main operating time of overseas stations. This particularly applies to countries with few amateurs.

The provisional sunspot number for May 1975 from the Swiss Federal Observatory was 8·7, with the first week of the month showing a moderate amount of solar activity. For the remainder of May the daily count was frequently zero. The forecast from the Telecommunications Services Centre at Boulder shows little hope of improved conditions on high latitude hf circuits. The predicted smoothed monthly sunspot numbers for September, October and November are 6, 5 and 4 respectively.



28MHz. 1000 CT, F, OE. **1100** C31IX, DL, HB, HG, I, LA, ON, OZ, SM, SP, UA, UB, *VO1AW,* ZD7FT, 4Z4MQ, 5B4AB. **1300** OJ0MA. **1500** LU8FT, PY, VU2GDG, 9H4K. **1600** G3BID/HB0/M, OY2BB, PY1ZBJ, UK9ABA, VQ9HCS, 4U1ITU. **1800** EA8DX, LU, PY. **1900** CE4BM, CX, LU, XQ3AR (Chile). **2000** CE3RC, LU, PY. **2100** LU.

Very many thanks to all correspondents, and also to the following for items obtained from their publications: the **Ex-G Radio Club Bulletin** (*W3HQO*), **DX News Sheet** (*Geoff Watts*), the **29 DX Club Newsletter** (*VK6WA*), the **DX'ers Magazine** (*W4BPD*), **Long Skip** (*VE1AL/3*), the **West Coast DX Bulletin** (*WA6AUD*), and **DXpress** (*PA0TO*).

Please send all items for **September** issue no later than **5 August.**

SWL NEWS

by BOB TREACHER, BRS32525*

10m activity day

The experimental activity day, arranged on 16 March, resulted in the receipt of 31 reports from five continents. The organizer, BRS25429, regrets that all the British activity was from the south, and that on the whole the response was poor. Most of the dx signals heard emanated from Africa—CR6s, ZE, ZS3, ZS1, ZS6, 6W8, and 7Q7. LU4ACJ was heard in Cornwall, and a W2 was worked from Plymouth at 1320. The only Europeans (OZ5FK and OZ5FS) were worked by G3NPB in Cornwall. ZL4IJ monitored the band from 0600 to 0817 but heard nothing, WA8ZCO (Mich) mentioned short-skip openings into neighbouring states and very weak South Americans. ZC4RH contacted ZE2JV and ZS6AAM. ON4FP had contacts with DF1KT and DK6KY, and heard 7Q7DW. G3ZGC/MM (off CR7) sent in a report of working 10R1Z, 4Z4MY and VQ9SS/C; two JAs were heard at 1130, and PY7AOR at 1410.

It seems that over 150 UK stations were known to have been active on 10m that day, and many good local contacts were possible. Your scribe endorses Dave Whitaker's suggestion that the band be used for this purpose during sun-spot minima, in the interests of band occupancy. Many thanks are extended to all who helped in this experiment, and it is hoped to repeat it in the autumn.

At the time of writing, short skip conditions are prevailing on 10m. A large number of correspondents mention much activity from Europe, often until 2300, with the occasional dx station being heard from around 1700 until 2000. Some of the dx stations heard in G were: CE4PM 1851, CR6TP 1913, CX7BF 1751, PY3BWK 2014, LU8FT 1801, 4W1AF 1512, 4Z4MQ 1708 and 6W8AAD 1723. The PY beacon was reported as being audible on a number of occasions but on some days no amateur signals from this part of South America were heard. There is no indication to suggest that these conditions will continue but let us hope that during the summer the band will be capable of some good dx traffic, and remember that 10m is never as dead as it appears.

Mobile rallies

Mobile rallies are ideal for listeners to meet and discuss any type of radio topic, and they are a good place to see all the latest receivers and aerials etc which are put on display by the many large commercial concerns. Many rallies have talk-in or exhibition stations and the operators there are only too pleased to have as many people looking on as possible, and of course QSL cards can be exchanged without spending 14p on postage!

As you know, rallies take place up and down the country, and there is almost bound to be one on your doorstep. Why not go along and give the group organizing the rally your support, meet a few new friends and possibly come away with a few bargain buys in the process ? Details of forthcoming rallies are given in *Mobile rallies calendar*, p557.

• 392 Rochester Way, Eltham, London SE9 6LH.

1975 HF Countries Table

Station	10	15	20	40	80	160	Total	Mode
BRS17567	49	119	195	51	159	6	579	ssb
A8482	34	118	189	85	133	0	559	ssb
A8312	12	81	151	79	108	28	459	ssb/cw
A8428	2	74	139	34	107	2	358	ssb
BRS25901	7	32	155	45	52	5	278	ssb
BRS34658	4	8	64	45	94	7	222	ssb
A8088	3	35	72	26	41	8	185	ssb
BRS35454	0	0	62	6	49	3	120	ssb
BRS35754	0	0	38	0	51	1	90	ssb

What the readers write . . .

Robert Maskill was A7827 last year but age has caught up with him and he is now BRS35454! Robert's main interests lie in listening on 20 and 80m but unfortunately his aerial installation is not all he would like, due to lack of space for large aerials at his QTH. However, a long wire tuned by an atu and fed into a 9R59DS has brought Robert some choice dx on both his favourite bands.

It was certainly pleasant to hear again from Neville Spry, BRS17567, who has been a regular correspondent in the past. Ill-health unfortunately forced Neville into an early retirement from the headmastership of a school in Yorkshire. He has now moved to Colwyn Bay in Clwyd and has been able to find enough time for amateur radio—sufficient time, indeed, to make him the leader in our 1975 Countries Table at present. Neville reports speedy confirmation by KM6EA in 13 days, and by 9M8VLC and VU7GC, both in under three weeks, and remarks that experience is certainly the best teacher when it comes to QSLing. Andrew Roberts also mentions this topic but he is slightly disgruntled that the cost of obtaining a QSL card direct from a dx station is now between 30 and 40p. He reflects, however, that this method is certainly the surest way of obtaining the desired card. Proof of this lies in the following list of cards all received direct during May: XU1DX, XV5DA, YJ8BL, 9V1SH (80m), 7P8AD, HH2WF, 3B8DN, 5H3JL and 8R1X.

David Sharred, A8312, continues to amaze with his ever-increasing 160m cw score. Although school exams have intervened, Dave still managed to hear HB0AZD, DJ6SI/I3 and GC4BUE/P for three new ones this year. His latest top band confirmations have been from PY1RO, OJ0MA and 9H1BX. An interesting QSL received in May was from WA4SGF/Mobile W4 for a 160m listener report. He uses a 13ft whip when /M and a 22ft extended whip when static mobile. He operates 1804-09kHz cw and asked Dave to tell everyone in G to listen for him. As Dave says, "I had doubts about him until the QSL came!" Our displaced Countries Table leader, Keith Kerr, A8483, had little to report, due to studies, but he did manage TI9DX (Cocos Island) on 20m ssb for a new one while on a fleeting visit back to his home QTH, although he missed out on hearing this expedition on 40 and 80m. Best QSLs received during May were considered by Keith to be FO8DY and 5W1AL.

All comments and table updates should reach the writer not later than 29 July for inclusion in the September issue. □

The new rtty standards from Warsaw

by D. A. EVANS, G3OUF

ONE of the many papers presented to the April 1975 Region 1 IARU Conference was "Radio teleprinting standards in the amateur service", submitted by the British Amateur Radio Teleprinter Group. This article is intended to summarize the main points for rtty operators, and sketch the final outcome from the Warsaw conference in terms of the standards now recommended by IARU Region 1. Those interested in reading the full BARTG paper, together with the complete rtty recommendations, should consult the June 1975 issue of the *BARTG Newsletter*.

The purpose of the BARTG paper (WA25) was threefold: (1) to update previous information on rtty activity; (2) to outline the main parameters affecting communications effectiveness for rtty operation; (3) to make recommendations for rtty standards. The paper discussed in some detail the various ways of generating rtty data and the most effective ways of reception, and concluded by making four recommendations to the conference as the basis of Region 1 rtty standards. The German Amateur Radio Teleprinter Group also presented a paper to the conference called "Technical standards for vhf rtty" (paper WA74), and it was obvious that some compromises would have to be made.

Papers for IARU conferences are circulated to all Region 1 societies many months before the actual conference. This gives time for the specialist groups in the various countries to read the papers and make their views known to the conference delegates. It is then up to the delegates to put forward the views of these specialist groups at the conference and vote accordingly.

The formal discussions on rtty at the Warsaw conference can be divided into four main areas. (1) **Speed**—BARTG recommended 50 bauds at the conference because a survey in 1974 among BARTG members showed a 2 to 1 majority in favour of this speed. Many delegates spoke in favour of 45·45 bauds and at the vote there was no support for the BARTG proposal. The speed of 45·45 bauds is thus recommended by IARU Region 1. Essentially, for those who operate on the hf bands there is no change. Some vhf/uhf operators are recommended to change to 45·45 bauds to fall into line with the IARU proposals for the benefit of standardization on the vhf/uhf bands. (2) **Shifts**—IARU Region 1 recommends a preferred shift of 170Hz on all bands below 30MHz. On the vhf/uhf bands shift is optional: 170 or 850Hz. On all bands fsk transmissions should be by fm generation techniques and mark is the higher radiated radio frequency. (3) **Reception of rtty** should be by means of a two-tone system for optimum communications effectiveness. (4) **AFSK tones for vhf/uhf use**—the BARTG paper recommended no change from the 2,125/2,975Hz tones. The German group on the other hand in their paper recommended new lower tones for narrow and wide afsk shifts as they considered afsk on fm transmitters was a most useful mode for vhf/uhf local and autostart communications.

At the conference various technical points were put forward, principally by the German and Luxembourg delegates, supporting the new lower frequency tones. BARTG told the conference that it did not favour switching to lower tones as it would involve much equipment change. BARTG also stated in its paper that as fsk was a far more effective mode than afsk it seemed hardly worth changing the afsk tone standards at this stage. A vote was taken as to whether the tones should be changed or not. Clearly the German technical arguments had been convincing because the result was full support for the German proposals. The new afsk standard adopted by the conference for vhf/uhf is therefore 1,275Hz (space) and 1,445Hz (mark). The 170Hz narrow shift is the new afsk standard; if 850Hz shift is used then the mark tone would be 2,125Hz. It was decided to form a sub-committee to agree the actual wording of this particular proposal. Included in the discussion was the fact that lower tone frequencies would be advantageous to afsk on fm transmitters. The final IARU Region 1 recommendation on afsk tones gives 1,275Hz (space) and 1,445Hz (mark) as the standard. In addition fm transmitters are recommended in preference to a.m. transmitters for afsk operation, the main reasons being: (i) there are tvi and audio-breakthrough advantages for fm, and (ii) there is far more fm equipment available for simple conversion to channelized afsk operation.

The following are the main technical advantages for the new tones. (a) The standard 1,275Hz space and 1,445Hz mark tones when fed to an upper-sideband ssb transmitter will produce correct 170Hz shift fsk keying, ie mark will be the higher radiated radio frequency. (b) When modulating an fm transmitter on afsk, compared with the old tone of 2,975Hz (space) the new tone of 1,445Hz reduces the power in the sidebands by some 33dB at 10kHz off channel when using 3kHz deviation, and thus offers considerable bandwidth reduction. Under certain conditions there is also about a 7dB improvement in signal-to-noise ratio. (c) All three tones (ie for 170Hz or 850Hz shift) will go through the ssb filters of ssb equipment without the problems previously associated with 2,975Hz.

The new standards do not affect fsk transmissions generated by feeding audio-tone keying to an ssb transmitter in any practical way at all. Stations generating fsk using the old and the new tones will be able to communicate normally and it will be impossible to tell who has switched to the new standard. When using ssb equipment in transceive mode on fsk, the main requirement is that the receive tones in the terminal unit correspond in frequency to the audio tones generated for transmit. In simple terms, if the receive terminal unit is changed to the new standards, the transmit afsk generator must also be changed to match it. □

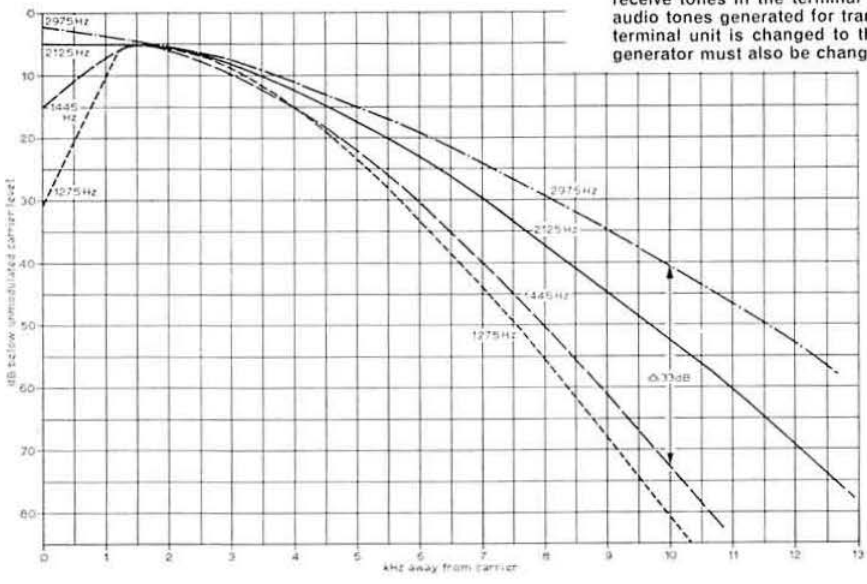


Fig 1. The power in the sidebands of an fm transmitter for various tones at 3kHz deviation, plotted by G3PLX from Bessel function tables

Updating the FMD Awards

Six months' notice of changes to take effect next January

by Jack Hum, G5UM, VHF awards manager

IT had become apparent over the last two years that the method of issuing Four Metres and Down operating awards was badly in need of updating, the old system having been in use since 1961. First, the widespread adoption of ssb at vhf and uhf has made the earning of an FMD certificate all too easy. Second, it was clearly necessary to make new arrangements in respect of Scotland, where topography and distance, which had always loaded the dice against GM operators in the collection of counties, were likely to be even more aggravating factors when the Scottish counties disappeared and the smaller number of large regions took their place.

Accordingly, the VHF Committee approved proposals made by the author to update the awards scheme as follows:

70MHz Standard Transmitting: Qualification to be three countries plus 30 counties (formerly three plus 20).

70MHz Senior Transmitting: To remain unchanged at six countries and 60 counties.

144MHz Standard Transmitting: The qualification has been lifted to nine countries plus 40 counties. The former "five plus 30" can be worked in a day given a reasonable lift.

144MHz Senior Transmitting: To remain unchanged at 15 countries and 60 counties.

432MHz Standard: To remain unchanged at three countries and 20 counties to encourage greater use of this valuable band.

432MHz Senior Transmitting: To remain unchanged for the same reasons, also because nine countries and 40 counties are by no means easy to work.

1,296MHz Standard: To remain at three plus 20 for the same reasons.

1,296MHz Senior: A new category introduced in case developing 23cm techniques and a few phenomenal lifts should make it viable; the requirement is six countries and 40 counties worked. It is unlikely to be met for some time to come, but while modifying the awards system it was felt that this new category could conveniently be introduced at this time.

Supreme Award: Granted automatically to any operator who secures two Seniors and one 1,296MHz Standard Award from fixed site only; or three Seniors (again from fixed site only).

Microwave: To remain unchanged. The requirement is for the submission of a QSL card to verify the first contact which an operator makes beyond the following distances: 500km on 13cm, 400km on 9cm, 300km on 6cm, 150km on 3cm, and 150km on 12mm.

Counting the counties

Since 1 January 1975 the new G/GW counties have been admissible for the FMD certificate (the old ones were usable until 31 December 1974). With effect from 1 January 1976 new arrangements will apply in respect of Scotland, where 33 counties disappear but only 12 Regions replace them. It is proposed that each of the new regions may be worked three times (three different stations of course, not the same one three times!), the new claim form to list the Scottish regions with three spaces against each one of them in which verification details may be inserted. On the old claim form there were 33 Scottish counties. There would be 12 Regions on the new one, which, multiplied by three, comes to 36.

These changes have been instituted only after taking much opinion over many months, and are regarded as being the fairest possible and at the same time the most practicable from the administrative point of view.

Although the foregoing arrangements come into effect on 1 January 1976, they will not invalidate claims under the old system. Example: if you worked G3NHE before 31 December 1974, you worked Yorkshire. If you worked him after that date, you worked South Yorks. Ask him for a card for each contact: they are two different counties, and can go towards your total score. Likewise Rutland and Huntingdonshire: both count, but only before 31 December 1974. But clearly there must be a "stop date" when five-plus-30 ends and nine-plus-40 begins (quoting the 144MHz requirement), and it is felt that 1 January 1976 is as good a date as any.

Listeners' awards

These too will be modified to correspond with the transmitting requirements, as they have done in the past.

Getting a claim form

Nearer the date of 1 January 1976, members wishing to obtain copies of the new FMD Award claim form can do so by sending an sae to the author at 27 Ingarsby Lane, Houghton on the Hill, Leicester LE7 9JJ.

YOUR OPINION

The Editor
Radio Communication

Sir—I have received a letter from the Radio Regulatory Department at the Home Office about my article "Radio communications at frequencies below 10kHz", published in your April issue.

They wish to point out that the issue of licences for operation at frequencies below 10kHz is *not* a mere formality and that at the present time there is little likelihood of any being issued. It is understood that cases of interference to Post Office line plant at these frequencies are at present being investigated, and while these are being cleared up no decisions will be made regarding the issue of ELF research licences.

Also they state that it is very unlikely that the 0–10kHz band will be allocated to the amateur service in the foreseeable future.

This comes as a blow to all the people about to engage in work at these frequencies, many of whom have written to me already, and I can only hope that the situation will improve in the very near future, enabling this most interesting subject to be pursued as actively as it deserves.

Roger Lapthorn, BEng, G3XBM

The Editor
Radio Communication

Sir—Heard on the 2m band recently from a young G8 + 3:

"I don't really want to run 400W but you must have it to best the other chap. That's what it's all about after all".

Ah, well—times change and I suppose we all have to change with them.

L. S. Chase, G8BHT

The Editor
Radio Communication

Sir—Having read with interest the article by G3XBM on vlf, I feel obliged to quote some experimental results obtained some years ago. On paper, modest powers will go a long distance by earth mode, and the formulas quoted in the article are in good agreement with those I derived at the time. However, underground metalwork, eg gas, water and electricity mains, form a very effective blanket to any transmission attempting to pass them. With a colossal 25W at 5kHz into 30Ω, signals were over 100mVm^{-1} at 70 yards, but undetectable (less than 1mVm^{-1}) at 250 yards. This could only be explained by the path between the transmitter and receiver being interrupted by three suburban roads. It would seem that earth mode is only suitable in country locations and absolutely useless in a heavily-built-up area. This information could save others a great deal of frustration and disappointment.

J. M. Howell, G4BXZ

The Editor
Radio Communication

Sir—With reference to GW8PG's (or is it G8PG's) comments in the February issue, I feel that while his views are fair comment, there are other considerations to take into account on the question of "G" prefixes.

My licence states clearly that my callsign is GI4CSO and while I would agree that GI4CSO/GM/M would be a considerable mouthful, it would at least give a true operating position of the station as well as providing correct QSL information.

Our QSL managers perform a splendid but largely taken-for-granted job and, while wishing to give them all possible assistance, I feel that the operator's callsign "as it is wrote" on the licence should be the callsign sent. Then there can be no mistake and the existing QSL system would need no modification whatsoever.

To centralize sub-managers in the way GW8PG (or is it G8PG?) suggests, would mean the end of our local bureaux, and with that

the sub-manager's wealth of local knowledge, without which many operators, for one reason or another, would never receive their cards.

The question of prefixes must be resolved now and the only way to do it is for each operator to use the callsign he was issued with, then qualify it with a suffix declaring the operational condition of the station.

J. McCormack, GI4CSO

The Editor
Radio Communication

Sir—In reply to 9M2DQ's query in the March issue regarding balance of the G3PTN balun, it is in the order of 5–10 per cent.

It may be of interest that the balun transformers wound on toroid cores and tested by myself exhibited about the same amount of unbalance. The toroid scores mainly in efficiency, especially at higher frequencies.

Z. T. Chowaniec, G3PTN

Special event stations

Cirencester 1,900th Year Celebrations, 5-12 July
Cirencester & DARC will operate GB3MCM in connection with these celebrations from approximately noon on 5 July to 12 July, on 160, 80 and 20m ssb, and on 2m fm and ssb. Operation will generally be between 7.30pm and 11pm on 7-11 July, and most of the day on 5, 6 and 12 July. Inter-G contacts on 160 and 80 with other towns of Roman origin specially welcome. Special QSL cards. Enquiries to G3UUO, tel Cirencester 3389.

Theale Green School Fete, 12 July
GB2TGS will operate on all hf bands and 2m. Special QSL cards. Visitors welcome: the school is five miles west of Reading off the A4. Organized by G4CWB.

Stowmarket Carnival, 17-19 July
Stowmarket & DARS, using GB2SCW, will be operational on hf bands in conjunction with this event.

Lee-on-Solent Air Day, 26 July
The RNARS will activate G3BZU/A on 1,875kHz, G3ZOE/A on 145·525 (Channel S21 fm) and G8HND/A on 145·5MHz (Channel S20 fm) as talk-in stations, the first two at Lee on Solent and the latter from Fort Widley (Portsdown Hill). Visitors should make first contact with Fort Widley for routeing instructions. Further details from G8HND.

Navy Days, Portsmouth, 23-25 August
The RNARS will be operating a station from the dockyard and GB3RN will be activated on 1,875kHz, 3,660kHz and 145·525MHz (S21 fm). A station on 70·25MHz may also be operated. All visitors welcome. Details from G3MTP.

Town & Country Festival, Kenilworth, 23-25 August
GB3TCF will be operated by the Coventry, Rugby, Solihull and Mid-Warks clubs from the Royal Show Ground, Stoneleigh, near Kenilworth during this event.

OBITUARIES

The Society records with regret the deaths of the following radio amateurs:

Mr P. F. Cundy, MIEE, G2MQ
Pat Cundy died on 6 May. He was very active on 28MHz pre-war, and 144MHz later on, and was hoping to return to activity in his retirement.

He was co-author of the Society publication *Valve Technique*.

Sqn Ldr C. J. Curtis, G3AGN
Jim Curtis died in December 1974. He was the holder of several certificates and for some time sent slow morse transmissions on 160m. His main interest was cw dx operation.

Mr J. Davis, AMIERE, 4X4CZ
Jack Davis, president of the Israel Amateur Radio Club for the past five years, died on 4 May in Tel Aviv at the age of 58.

Born in England, he went to Palestine during the time of the British Mandate and held the call ZC6AB. He later obtained one of the first Israel callsigns issued. In 1953 he worked in England as an electronic engineer with Ferguson, and later lived in the USA where he held the call K3KCS.

He was active on the hf bands and had many friends around the world.

Mr G. T. Green, G3JNX
George Green died on 13 May, aged 50. His main interest was rag-chewing and he was regularly to be heard on 80m and the dx bands, where he was quite a personality.

Mr H. K. Walton, G8ITA
Horace Kimberley Walton died on 5 May aged 75 years. Badly disabled in the first world war, he was an ardent short wave listener most of his life and had friends all over the country in this field. He obtained an amateur licence in 1974 and was about to apply for a morse test at the time of his death.

We have also been advised of the deaths of:

Mr S. Carabott, 9H1K, of Pawla, Malta, on 21 April;
Mr F. Hughes, G3ILA, of Luddesdown, in April; and
Mr R. McCreery, G3MWV, of Northfleet, on 15 May.

Mobile rallies calendar

6 July —Upton Radio Rally, Hill High School, Tunnel Hill, Upton-on-Severn, Worcs, one mile west of River Severn on A4104. Talk-in: G8JC on 3·750MHz ssb, and G3GJL on 144·22MHz ssb and 145·50MHz fm. Usual trade stands, displays, junk stall, sports and fancy dress for children. Details from G8ASO, QTHR, tel Worcester 351565.

20 July —Cornish RAC Rally, Cornwall Technical College, Pool, Camborne. Talk-in on 2m, 80m and 160m from 10am. All the usual attractions. Details from G3NKE, QTHR.

20 July —Polegate Steam Engine Rally (A27 Polegate to Lewes). Southdown ARS. Exhibition station GB2SS, talk-in on 2m and 4m on GB3SS. Details from G8CFZ, QTHR.

20 July —Anglian Mobile Rally, Stanway School, Stanway, Colchester, Essex. From 10am to 6pm. Talk-in on 80m and 2m. Bring and buy, trade stands, junk sale, and entertainment for all the family. Organized by Colchester Radio Amateurs; details from G3YAI, QTHR.

3 August —Woburn Rally, coach park, Woburn Estate. Details on page 525.

10 August—Bromsgrove Mobile Picnic, Avoncroft Building Museum. Free parking. Bring picnic meals. Talk-in on 160/80/2m. All the usual attractions. Details from J. K. Harvey, 22 Elm Grove, Bromsgrove B61 0EH. Tel 76941.

17 August—Derby & D ARS Rally, Rykneld School, Bedford Street, Derby. From 12 noon. Talk-in on 2m and top band. Admission and parking free. All the usual attractions, including a monster junk sale. Details from G3FGY, QTHR.

24A ugust—Torbay ARS Rally.

31 August—Preston ARS Mobile Rally, Walton-le-Dale County Secondary School, Brindle Road, Bamber Bridge (M6 Junction 29). From 11am to 5pm. Talk-in on 2m and top band. Trade stalls, bring and buy, refreshments, ample parking. Secretary G3ZXC, QTHR.

21 Sept —Peterborough R & ES Mobile Rally, Walton School, Peterborough. Talk-in on 160m and 2m. Details from G8GNV, QTHR.

21 Sept —North Ulster Group Rally, Castle Grounds, Antrim. Details from GI8AYZ, QTHR.

28 Sept —Harlow & D ARS Rally, Netteswell School, Harlow. Details from G8JXU, Mark Hall Barn, Harlow, Essex.

CONTEST NEWS

As an economy measure it has regretfully been decided not to include the results of non-RSGB contests in this section in future.

80m Low Power Contest results

The contest attracted the largest number of entries for many years with 26 logs and one check log received. The winner was Philip Bagshaw, G3NEO, with a transistor vfo driving an EC91 pa coupled to his 40ft-high dipole. Runner-up was Stephen Rawlings, G4ALG/A, who operated an FT401 with a BFY51 outboard pa to an end-fed full-wave aerial. In third place was P. J. Ball, G3HQT, who also used an FT401 with an outboard pa to an end-fed λ/2 sloping wire.

Activity was high, with 57 other stations appearing in three or more logs, and dx worked included HB9, ON, PA0 and F. GMs and GIs were also worked and it is hoped that entries are received from outside G and GW next year.

Comments from the logs: "Drop WAB areas and substitute county code or nearest town" (G4ALG/A); "May we have transmitter and aerial details in the results table please?" (G3JKY); "Enjoyed contest in spite of 400W ssb 400yd away!" (G8PG); "Please keep going—publicity on the Continent?" (G4CXT); "More QRO support required" (G3KZR); "Half my QSOs made between 3·535 and 3·555MHz, the regular QRP channel" (G3DNF); "QRT at 1122 due to tv timebase noise" (G4AEO); "How about bonus points for crystal-controlled?" (G3VDW).

The 1930 Committee Cup will be awarded to G3NEO, and certificates have been sent to all entrants.

G3KKQ

Posn	Callsign	Points	Pwr (W)	QSOs	Tx	Aerial
1	G3NEO	5034	0·5	51	EC91	Dipole
2	G4ALG/A	4734	0·5	48	FT401/BFY51	1λ ef
3	G3HQT	4400	0·5, 1·0	46	FT401/obd pa	λ/2 ef
4	G3JKY	4200	0·45	40	2N706	Dipole
5	G3IGU	3417	0·5, 1·0	44	EF80	120ft ef
6	G8PG	2800	0·5	30	2N3053	90ft ef
7	G4CXT	2767	0·47	28	BFY50	Inv V
8	G3XWZ	2700	0·5	27	ttx	3/8λ gp
9	G3XJO	2167	0·5	22	ttx	40m Zepp
10	G3KZR	2000	0·48	21	BC148	G5RV
11	G3RQZ	1900	0·5	20	BFY51	90ft ef
12	G4AYS	1500	0·6	32	co/DL93	120ft ef cp
13	G3YMC	1142	2·0	47	ZT2476	1λ ef
14	G3YCC	1017	1·5	44	5763	Trap dipole
15	G3DNF	900	1·0	21	ttx	90ft ef
16	G4AEO	767	0·5	8	xtal/BFY51	G5RV
	G6ZG	767	0·8	16	6AQ5	Trap dipole
18	G3VDW	725	3·0	51	AT5	150ft ef
19	G3BRS/P	708	2·0	31	Ten-tec	G8KW, lw
20	G4DDX	540	2·6	38	5763	W3DZZ
21	G3KPT	365	2·4	25	BD131	66ft ef
22	GW4DOO	173	5·0	35	6BW6	66ft ef
23	G3AWR	170	3·0	14	Vespa	18AVT/WB
24	G4DPP	119	4·5	16	5763	100ft ef

G2BOF disallowed (late entry).
G3LMG/A, disallowed; no times shown in log (General Rule 8(c)).
Check log gratefully received from G3NYA.

70MHz Fixed Contest rules

0900-1500 26 October 1975

This contest has been added to the calendar in response to requests from the membership. All entries and checklogs to: VHF Contests Committee, c/o G4BWY, 27 Manor Road, Barnet, Herts EN5 2LE.

The following general rules, published in the January 1975 issue of *Radio Communication*, will apply: 1, 2, 3, 4c, 5a, 6a, 7a, 8b, 9a, 10a, 11-22.

144MHz QRP Contest rules—addition

Please add the following to the rules published in the May issue:

"The maximum dc input to the final stage must not exceed 1W, as defined by the terms of the licence: the maximum p.e.p. output on A3J is thus 2·67W."

Rugby DF Qualifying Round results

The weather on the morning of 27 April was not very promising, and by the time most of the 13 teams had assembled at the start it was raining heavily. Fortunately the conditions improved somewhat, and competitors were able to take their first bearings without getting too wet.

Good signals were heard from both stations, and some competitors were convinced that one of the transmitters was in Bucknell Woods itself; however, at 1330 all the teams had left the area.

Station B was in fact 5·75km to the north of the start on a disused railway track. This was soon located by Brian Bristow, followed some minutes later by a number of teams arriving almost simultaneously.

Station A was located 22km north of the start, on the bank of the Grand Union Canal, just south of Braunston tunnel. This proved a little more difficult to find for most competitors, but Trevor Gage arrived at 1512, followed by Paul Tyler at 1529 and Eric Mollart at 1529½. Eric had "run into" the aerial some time earlier.

Thanks are due to Brian Mahoney and Graham Taylor (Rugby), Gordon Reason (Banbury), George Walker and Derrick Newman (organizer).

			Time of arrival	
Posn	Name	Club	Station A	Station B
1	T. Gage	Oxford	1512	1420
2	P. Tyler	Oxford	1529	1420
3	E. L. Mollart	Oxford	1529½	1419
4	I. Butson	Chelmsford	1530	1419
5	A. W. Butcher	Chelmsford	1530½	1420
6	M. Hawkins	Chelmsford	1454	1533
7	W. North	Chiltern	1551	1419
8	J. R. Vickers	Stratford-on-Avon	1447	1559½
9	G. Whenham	Coventry	1607	1533½
10	C. McEwen	Chelmsford	1628	1453½
11	B. Bristow	Oxford	—	1407
12	D. Holland	South Manchester	—	1420
13	A. C. A. Newman	Salisbury	—	1421

Subject to confirmation, T. Gage and P. Tyler qualify for the final.

DF Qualifying Round—Dartford Heath

Date: 3 August 1975.
Map: OS Sheet 177 (East London) 1:50,000 series.
Assembly: 1300bst for start at 1320bst.
Location: Car park on south side of A2 at East Gravesend turn-off. NGR 661703.

Intending competitors requiring tea are asked to notify Mr P. G. Wells, 25 St Davids Road, Hextable, Swanley, Kent BR8 7RJ (tel Swanley 62726) not later than 28 July.

DF Qualifying Round—Salisbury

Note the date for this event is 13 July, not 13 June as shown in the rules last month.

1st Gray Valley Activity Contest results

Posn	Callsign	QSOs	Points	CVRS multiplier	Total
	160m TRANSMITTING				
1	G4BXT*	82	121	17	2,057
2	G4CVC*	65	106	17	1,802
3	G3WVP*	44	87	18	1,566
4	G3JJC*	26	67	17	1,139
5	G3SXE	30	67	15	1,025
6	G2MI	17	46	11	506
7	G4DEY	16	45	11	495
8	G4CNP	15	39	12	468
9	G3YDW	18	45	10	450
10	G4DNR	15	42	10	420
11	G3HS	69	84	4	336
12	G3YMC	38	55	5	275
13	G4DPT	18	18	0	18
14	GM3YOR	4	4	0	4
	160m RECEIVING				
1	BRS34032*	51	92	17	1,564
2	A8927*	68	97	11	1,067
3	BRS35411*	21	58	15	870
4	BRS33210	29	55	13	715
5	BRS28198	46	60	7	420
6	A8312	52	67	5	268
7	BRS35637	49	55	3	165
8	A8597	37	50	3	150
9	A8065	29	35	3	105
10	BRS34740	43	45	1	45

2m TRANSMITTING

1	G4BWG*	67	92	9	828
2	G8EZM*	70	93	8	744
3	G4DWZ*	77	98	7	686
4	G4CQR	74	93	6	558
5	G4DFI/P*	64	81	5	405
6	G8JHX	48	67	6	402
7	G2BLA	47	66	6	396
8	G4DNJ	39	56	5	280
9	G8FXF	27	46	6	276
10	G8JAY/P	44	57	3	171
11	G8HGP	24	39	4	156
12	G8JDN	12	23	2	46
13	G4DLB	11	22	2	44

2m RECEIVING

1	BRS34032*	41	62	7	434
2	BRS28198*	44	63	6	378
3	A8597	46	63	5	315
4	BRS35744*	22	27	3	81
5	BRS34740	18	18	0	18

* Certificate awarded.
Check logs from G3RCV, G3YWO, G8FCV/A, BRS32525.

CARC 160m Contest 1975 results

TRANSMITTING SECTION

Posn	Callsign	County	Score	Posn	Callsign	County	Score
1	G4CQZ	Herts	1,026	10	G3LCH	London	440
2	G3XZK	Glos	782	11	G3ZJK	Avon	352
3	G4BXT	Kent	752	12	G4BRA/A	Berks	348
4	G3ZVW	London	720	13	G4DJX	Herts	325
5	G4CTY	Herts	675	14	G4AWM	London	224
6	G4BWP	Beds	525	15	GM5BKC	Angus	210
7	G3TRF	Kent	510	16	G3OGY*	Hants	204
8	G4CWH	Surrey	504	17	G4DNI	Beds	126
9	G3OUV*	Bucks	496	18	G4BXY	Berks	102

* CARC member

RECEIVING SECTION

Posn	Callsign	County	Score	Posn	Callsign	County	Score
1	A8312	Staffs	1,404	5	BRS34032	London	507
2	A8597	Bucks	936	6	A8591	Dorset	330
3	BRS34740	Staffs	527	7	BRS35637	Wilts	280
4	A8890	Berks	512				

Certificates to G4CQZ, G3OUV and A8312.

Contests calendar

5-6 July	—Venezuelan Phone Contest
5-6 July	—DL QRP CW Contest
5-6 July	—RSGB VHF Open and SWL (Jubilee) (Rules in May issue)
12-13 July	—SSB Field Day (Rules in March issue)
13 July	—DF Qualifying—Salisbury (Rules in June issue)
19-20 July	—Colombian Contest
27 July	—144MHz QRP (Rules in May issue)
3 August	—DF Qualifying—Dartford Heath (Rules in July issue)
9-10 August	—European DX Contest (CW)
10 August	—70MHz Portable (Rules in June issue)
23-24 August	—All Asian CW Contest
30-31 August	—SSA 50 Contest
31 August	—DF Qualifying—Coventry
6-7 September	—VHF NFD and SWL (Rules in March issue)
6-7 September	—IARU Region 1 VHF (Rules in May issue)
13-14 September	—European DX Contest (Phone)
14 September	—80m Field Day
21 September	—DF Final—Slade
5-6 October	—RSGB UHF Open and SWL (Rules in May issue)
12 October	—21–28MHz Telephony (Rules in May issue)
18-19 October	—7MHz CW (Rules in June issue)
25-26 October	—CQ WW DX Contest (Phone)
26 October	—70MHz Fixed (Rules in July issue)
1-2 November	—144 MHz Open
1-2 November	—7MHz Phone (Rules in June issue)
8-9 November	—2nd 1·8MHz
16 November	—432MHz Open
29-30 November	—CQ WW DX Contest (CW)
7 December	—144MHz Fixed

RAYNET

by S. W. LAW, G3PAZ*

In our May column we published a proposed set of Raynet frequencies put forward by the Raynet Committee for comment. At the time of writing, no comments have been sent in by groups in any part of the UK. However, the VHF Committee considered the proposals at length and submitted a report which is of considerable interest in view of the IARU Region 1 Conference decisions on the 2m band plan.

Still on the subject of our May column, we inadvertently omitted to mention that the representative from Cumbria and our new committee member, Mr M. Barker, were present at the meeting of 1 March.

Sunday net
The 80m net on 18 May raised nearly a dozen stations. Had the net been on 25 May, we fear it might have been short of several members due to the Maidstone Rally! Raynet was well represented at this latter event and not least by four committee members: G3BPT and Jane Balestrini, our supplies officer, together with G3IIR and G3PAZ. A most opportune encounter was with Mr R. G. C. May, G4CEH, who also holds ON6UK. It would appear that the emergency system is very well organized in Belgium, with the full co-operation of the authorities. It consists of five stages to cope with various degrees of emergency, and when all levels become involved the amateur service is called out to back up communications.

Wider still?
We have reported overseas interest in Raynet at various times and the latest enquiry, we understand, is from Malta. So keep up the good work; the worldwide circulation of *Radio Communication* is greater than one might think.

News of group changes
West Glamorgan Group has lost Alan Glasford, GW3ACF, to whom a letter of thanks for past services has been sent. His place is taken by Mr J. Doyle, GW8JEN, 54 Bryn Catwg, Cadoxdon, Neath, West Glamorgan. The controller of the new Bedford Group is G8ENS, QTHR, and that for the Isle of Man Group is GD3YEO, QTHR. Enquiries in connection with the formation of groups have also been received from Durham University and Hertfordshire. The latter is particularly welcome as there was at one time a very active group in this area from which nothing has been heard for some time.

Registrations
At the last count re-registrations numbered 194 and the new registrations 79, of which seven were in the Isle of Man.

Supplies
Mrs Balestrini (xyl G3BPT, QTHR) reports that the new Raynet stickers are now available. These measure 5 by 2in, and show "Raynet" in black on yellow. The price is 20p post paid. *RAEN Manuals* are also available at the same price.

Hon Registrations Secretary; Mrs L. A. Crane, "Greta Woods", Bromley Road, Ardleigh, Colchester, Essex.

* 130 Alexandra Road, Croydon, Surrey CR0 6EW

Looking ahead

6 July—Third Microwave Round Table, IBA Headquarters, near Winchester.
21 September — Southampton RSGB Group Convention.
30 Oct-1 Nov — Amateur Radio Retailers Association Exhibition, Granby Halls, Leicester.

CLUB NEWS

RSGB affiliated societies and clubs, and RSGB groups, are invited to submit items for inclusion in "Club News" to their regional representatives (not direct to the editor). In the case of Region 11 clubs, they can send them direct to the editor until an RR is appointed.

Items of news and dates of forthcoming events should reach RRs by 28 July for the September issue.

REGION 1—RR B. O'Brien, G2AMV, "Tanglewood", Anthony's Way, Heswall, Wirral, Cheshire L60 0BP.

Ainsdale (AARC)—Thursdays fortnightly, 8.15pm. 17, 31 July, 14, 28 August. Ainsdale Scout Headquarters. Further details from G2CUZ.

Blackburn (East Lancs ARC)—First Thursday in each month, 7.30pm. YMCA, Shearbank Road, Blackburn. Visitors always welcome. Sec G8FDG.

Blackpool (B&DARS)—Mondays, 8pm. Pontins Holiday Camp, Squires Gate. Morse tuition 7.30pm.

Bolton (B&DARS)—Third Wednesday in each month, 8pm. Clarence Hotel, Bradshawgate. Sec G4AQB.

Bury (B&RRS)—Second Tuesday in each month but with informal meetings including morse and RAE classes every Tuesday. July meeting ("RTTY" by G8DVR and G3MUI). Mosses Community Centre, Cecil Street, Bury. Sec G8ECM, tel Heywood 65911.

Carlisle (C&DARS)—Mondays, 7.30pm. Currock House, Lediard Avenue, Currock, Carlisle. A very full programme of lectures and demonstrations has been arranged for the coming months. Full details from G8DVD.

Douglas IoM (Manx ARS)—Sec GD3YUM will be pleased to hear from any member who plans to visit the island.

Lancaster University (UoLARS)—Wednesdays, 7pm. Furness College. RAE and morse classes. The society is active on the hf bands and 2m using G3ZBY and G8DOU. Skeds and visits welcomed; enquiries please to Colin Pegrum, Department of Physics.

Leyland (LHARG)—Second Monday in each month, 7.30pm. "Rose & Crown", Ulnes Walton, Leyland. Net nights Saturdays 2000gmt on 145·8MHz. Details from G3XII.

Liverpool (L&DARS)—Tuesdays, 8pm. Conservative Association Rooms, Church Road, Watertree. Sec G3WCS.

Liverpool (North Liverpool RC)—Tuesdays, 8.30pm. Informal meetings. "Nags Head", Thornton, Crosby, Liverpool 23. Visitors welcome. Sec R. B. Porter, 11 Cranmore Avenue, Crosby, Liverpool L23 0QD.

Liverpool University (UoLARS)—Details of meetings from J. M. Pagett, G8IAV, c/o The Students Union.

Manchester (M&DARS)—Wednesdays, 7.30pm. All meetings include morse classes. 203 Droylesden Road, Newton Heath, Manchester 10. Sec G3IOA.

Manchester (South Manchester RC)—11 July ("Assorted df recordings" by C. Scholefield, G8GDM), 25 July (Talk by T. Winters, G4AOK, winner of the hb contest), 1 Aug (Club quiz), 8 Aug (Discussion on contest operation), 15 Aug ("PAL colour tv system" by T. Winters, G4AOK), 22 Aug (Night on the air), 29 Aug (Mystery lecture). 8pm. Sale Moor Community Centre, Norris Road, Sale, Cheshire. VHF and df meetings on Mondays, 8pm, at "Greeba", Shady Lane, Manchester 23: it is hoped to arrange df practice contests—anyone interested contact G3WFT or sec G8GDM.

Manchester University (MUARS)—Details of meetings from sec G. T. Phelan, G8EPS, c/o The University Union.

University of Manchester (UoM—IoS&TARS)—G3CXX is active on all hf bands and G8FOT on 2m and perhaps 23cm. Items for club magazine/newsletter, or letters from intending members gratefully received by G8GOS.

Preston (PARS)—17, 31 July, 14, 28 August. Morse practice 7.30pm, main meeting 8pm. "Windsor Castle" (private room), St Paul's Square, Preston.

Salford (Dial House RS)—Wednesdays, 5.30–9.30pm. Dial House, W45, 55 Portland Street, Manchester M60 1BA. Net channel 145·25MHz a.m.

Stockport (SRS)—Second and fourth Wednesdays in each month, 8pm. Blossoms Hotel, Buxton Road, Stockport. Sec G3FYE.

Thornton Cleveleys (TCARS)—First and third Wednesdays in each month, 8pm, morse practice from 7.30pm. St John Ambulance Hall, Fleetwood Road North (next to "Gardener's Arms"), Thornton. Details from sec G8OY.

Warrington (W&DARS)—Tuesdays, 7.45pm. Grappenhall Community Centre, Bellhouse Lane, Grappenhall. Sec J. Weaver, c/o Grappenhall Community Centre.

Wigan (W&DARS)—First and third Wednesdays, second and fourth Tuesdays in each month. Poolstock Cricket Club, Keats Avenue, Poolstock, Wigan. Sec G8FTF.

Winsford (Mid-Cheshire ARC)—Wednesdays. Technical Activities Centre, rear of Verdin Buildings, Verdin Comprehensive School, Grange Lane, Winsford, Ches. RAE and cw classes start 7.30pm, main feature 8pm. 160m net, 7.30pm Mondays; 2m net, 7.30pm around 145·5, Tuesdays. Club station G3ZTT on 160m Wednesday evenings, 7.30pm to 8pm. Further details from sec G3SIQ.

Wirral (WARS)—First and third Wednesdays in each month, 7.45pm. Sports and Recreation Centre, Grange Road West, Claughton, Birkenhead. Sec G3DLF.

Wirral (Wirral DXA)—Members or visitors, who will be welcome, should contact sec G3VZM for details of meetings.

Worsley (Eccles & DARC)—Tuesdays, 8pm. Bridgwater School, Worsley, Manchester. Club 2m net, 11a.m. Sundays on 145·66MHz. All visitors and prospective members welcome. Sec G4AEQ.

Merseyside members meet for lunch on the first Monday in every month. Please obtain details and book beforehand with G3VQT or G2AMV.

Will all club secretaries please advise the RR if letters of a "circular" nature are to be addressed to anyone **other than** the name shown in the list of Affiliated Societies in the latest issue of the *RSGB Call Book*.

REGION 2—RR R. C. Andreang, G4CMT, 6 Beech Avenue, Bilton, Hull, North Humberside.

Halifax (Northern Heights ARS)—9 July (Ragchew), 23 July (Open), 26 July (Visit to Skelton Pastures, Cumbria, BBC transmitting station), 30 July (Committee meeting), 6 Aug (Open), 20 Aug (Preparations for VHF NFD), 27 Aug (Ragchew). 7.45pm. Peat Pitts Inn, Ogden, Halifax. Sec G3MDW.

York (YARS)—Thursdays, 7.30pm. Various visits and talks lined up. 61 Micklegate, York. GB2TS at Tollerton Show on 16 Aug, and GB2NRM for one week commencing 27 Sept from the new National Railway Museum in York. Sec G3WVO.

REGION 3—RR H. S. Pinchin, G3VPE, 61 Cole Bank Road, Hall Green, Birmingham B28 8EZ.

Birmingham (Midland ARS)—15 July (Informal), 19 Aug. The Birmingham and Midland Institute, Margaret Street, Birmingham. G3ZKQ.

Birmingham (Slade R&SS)—11, 25 July, 8, 22 Aug, 8pm. The Committee Room, Church House, Erdington, Birmingham. G8GRC.

Birmingham (South Birmingham RS)—First Wednesday in each month. 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham 31. G8GDZ.

Bromsgrove (B&DARC)—5 July (GB2BRC at Sanders Park), 11 July (Natter-nite), 8 Aug, 10 Aug (Mobile picnic—Avoncroft Art Centre). 8pm. Avoncroft Art Centre, Bromsgrove. Sec J. Dufrane, 44 Hazelton Road, Marlbrook, Bromsgrove.

Coventry (CARS)—Fridays, 8pm. Baden Powell House, St Nicholas Street, Radford Road, Coventry. G3HDO.

Dudley (DARC)—Second and fourth Tuesday in each month, 7.45pm. Central Library, Dudley. G4BFT.

Hereford (HARS)—4, 18 July, 1, 15 Aug. Civil Defence HQ, Gaol Street, Hereford. G4CNY.

Lichfield (LARS)—7 July ("Some further thoughts on propagation"), 15 July, 4, 19 Aug. 8pm. Swan Hotel. New members and visitors welcome—Tuesday meetings are natter-nites. G3NLY.

Rugby (RDAR&EC)—Last Tuesday in each month, 8pm. Lawrence Sherriff Arms in the town centre. G3YQC.

Solihull (SARS)—15 July, 19 Aug, 7.30pm. The Manor House, High Street, Solihull. G4AEJ.

Stourbridge (S&DARS)—5 Aug (Informals at "Shrubbery Cottage" Public House, Heath Lane, Stourbridge), 21 July ("Digital frequency meter project" by G8DJM). 7.45pm. Oldswinford Hospital School, Heath Lane, Stourbridge. G4CLX.

Stratford-upon-Avon (S&DRC)—4 July (AGM), 1 Aug. 8pm. South Warwickshire College of Further Education, The Willows, Alcester Road, Stratford-upon-Avon. G3OOQ.
Telford (T&DARS)—Wednesdays, 7.30pm. Phoenix Centre, Manor Road, Dawley. RAE classes now for December examination. G4AXZ.
Wolverhampton (WARS)—7 July ("Raynet"), 14 July (Natternite), 21 July ("HF bands operation"), 4 Aug ("Maps and QRA Locators" by G3UBX), 10 Aug (DF Hunt 1·8MHz), 1 Sept ("Technical and other aspects of BRMB Commercial Radio"). Neachells Cottage, Danescourt Road, Stockwell End, Wolverhampton. G8GCV.
Worcester (W&DARC)—6 July (Upton Rally), 7, 19 July, 4, 16 Aug, 8pm. The Old Pheasant, New Street, Worcester. G8ASO, tel Worcester 351565.

The Coventry, Rugby, Solihull and Mid-Warwickshire clubs will arrange several demonstration stations using the special call GB3TCF at the Town and Country Festival to be held at the Royal Show Ground, Stoneleigh, Nr Kenilworth, on 23, 24 and 25 Aug.

REGION 4—RR T. Darn, G3FGY, 1 Sandham Lane, Ripley, Derbys.

Derby (D&DARS)—Wednesdays, 7.30pm. Room 4, 119 Green Lane, Derby. Visitors and prospective members are always welcome. G2CVV.
Derby (Nunsfield House CAARC)—Fridays, 7.30pm. Nunsfield House, Boulton Lane, Alvaston, Derby. Contact G4CTZ.
Leicester (LARS)—Mondays, 7.30pm. Gilcross Estate Cottage, Groby Road, Leicester. G3TQF.
Lincoln (LSWC)—Wednesdays, 7.30pm. Lincoln Astronomical Society, Westcliffe Street, off Burton Road, Lincoln.
Mansfield (MARS)—First Friday in each month. The New Inn, Westgate, Mansfield.
Melton Mowbray (MMARS)—Top band net 1115am Sundays 1,960kHz. VHF nets 1145am Sundays and 8pm Tuesdays and Thursdays. G3NVK.
Nottingham (ARCoN)—Thursdays, 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham.
Scunthorpe (SARC)—Tuesdays and Thursdays. The Shack, Grange Farm Centre, Scunthorpe.

REGION 5—RR P. F. Chilcott, G4BBA, 258 Coneygree Road, Peterborough PE2 8LR.

Bedford (B&DARC)—Thursdays, 8pm. United Services Club, The Broadway, Bedford. Details from Steve Felts, G8FMG, 6 White Lodge Close, Kempston, Bedford.
Cambridge (C&DARC)—Thursdays, 7.30pm. Details from G3YRZ.
Dunstable (DDRC)—4 July (Discussion on Jubilee VHF Contest), 11 July (HF contests—the best gear ?), 18 July (Best dx worked on 2m during Jan, Feb and April 1975), 25 July (Contest organizer G3ZFP gives report on achievements so far), 1 Aug (Mystery mobile night), 8 Aug (Chatter night), 15 Aug (Club quiz), 22 Aug (Informal), 29 Aug (Under-21 talks). Chews House, 77 High Street South, Dunstable. Details from G3XWS.
Shefford (S&DRS)—Thursdays, 8pm. Church Hall, Shefford. Details from G4DJH.

I am sure all members in Region 5 will join me in thanking G3GGK for the marvellous job he has done over the last three years. I hope I can do as well. *G4BBA.*

REGION 6—RR D. C. Andrews, G4CWB, 63 Bulmershe Road, Reading, Berks RG1 5RH.

Banbury (BARS)—Fridays, 7.30pm. 43 North Bar, Banbury. New members and visitors very welcome. Details from sec G3LTN, tel Banbury 710623.
Bracknell (BARC)—Mondays, 7.30pm. Cooper's Hill Community Centre. G3YMC.
Burnham Beeches (BBARC)—First Monday in each month. Hedgerley Scout Hut, Hedgerley, near Slough, Bucks. Sec E. Brown, 20 Balmoral Close, Chippenham, Slough.
Harwell (Atomic Energy Research Establishment RC)—Third Tuesday in each month, 7.30pm. Also informal meetings every Friday lunchtime. Social Club, AERE, Harwell. G3NNG.
Maidenhead (M&DARC)—3, 15 July, 7, 19 Aug. 7.40pm. British Red Cross Hall, The Crescent, Maidenhead. Sec G3FVC.
Milton Keynes (MK&DRS)—Second Monday of each month. Lovat Hall, Silver Street, Newport Pagnell, Bucks. Details from G8HUH.
Reading (RARC)—First and third Tuesdays in each month, 8pm. "White Horse", Emmer Green. G4BLT.

REGION 7—RR R. S Hewes, G3TDR, 24 Brightside Avenue, Laleham, Staines, Middx.

Addiscombe (AARC)—Tuesdays, 9pm. "Spread Eagle", Portland Road, South Norwood. Sec G4CZB.
Bexley Heath (North Kent RS)—Second and fourth Thursdays in each month. St Mary's Institute, 2 North Cray Road, Bexley. 8pm. Sec G4ARQ.
Cray Valley (CVRS)— 1 May, 6 June (To be announced), 15 May, 19 June (Natter nites). 8pm. Eltham United Reformed Church Hall, 1 Court Road, SE9. Sec G3WVP.
Croydon (Surrey Radio Contact Club)—15 July (IARU Warsaw Conference—how it affects amateur radio), 19 Aug (To be announced). 8pm. "The Ship", 47 High Street, Croydon. Further details from sec G3FWR, tel 01-657 3258.
Crystal Palace (CP&DRC)—19 July, 16 Aug (To be announced). 8pm. Emmanuel Church Hall, Barry Road, SE22. Sec G3FZL, tel 01-699 6940.
Esher (Thames Valley ARTS)—First Wednesday in each month. 8pm. King George's Hall, Esher, (next door to fire station). Sec G3ZNW.
Guildford (G&DRS)—Second and fourth Fridays in each month, 8pm. Model Engineering HQ, Stoke Park, Guildford, Surrey. Sec G3SYM.
Kingston (K&DARS)—9 July ("Getting started on rtty" by Douglas Davis, G3PAQ), 13 Aug (To be announced). 8.15pm. Tolworth Scout Hut, Stirling Walk, Raeburn Avenue, Surbiton, Surrey. PRO G8HUW.
Purley (P&DRS)—Last Friday in each month. 8pm. Lansdowne Hall, Lansdowne Road, Purley. Sec G8JAZ.
Reigate (RATS)—5 Aug (Natter nite). 8.30pm. "Marquis of Granby", Hooley Lane, Redhill. 15 July (Quiz v Cray Valley RS), 19 Aug (Members' evening). 8pm. St Mark's Church Hall, Alma Road, Reigate. Sec G3RIN, tel Reigate 47659.
Sutton & Cheam (SCRS)—15 July (General meeting—subject pending), 19 Aug (VHF NFD special). 7.30pm. The Library, Cheam, Surrey. Sec G4BOX.
Wimbledon (W&DRS)—Second and last Fridays in each month, 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon SW19. Sec G3XTC, tel 01-644 3698.

REGION 8—RR D. N. T. Williams, G3MDO, "Seletar", New House Lane, Thanington, Canterbury, Kent.

Three RSGB VIPs at the annual dinner and dance of Crawley ARC on 8 May. From left: John Allaway, G3FKM, Executive Vice-President; John Brown, G3DVV, Honorary Treasurer; Cyril Parsons, GW8NP, President. (Photo by courtesy of G3FRV and G8IBE)

Brighton (BTCARC)—Room B7, Richmond Terrace Building. Details of meetings from J. McKernan, 37 Balsdean Road, Woodingdean, Brighton.
Burgess Hill (Mid-Sussex ARS)—Marle Place, Leylands Road, Burgess Hill. Details from G3RXJ.
Canterbury (East Kent RS)—7 August ("RSGB" by G3MDO). Second Thursday in each month devoted to the practical side. Further details from G3XDV.
Chichester (CDARC)—Information from sec G8EPJ.
Crawley (CARC)—23 July (Informal, details to be arranged), 27 Aug (Informal at the "Gardeners Arms", Ardingley). It is hoped to arrange a coach outing to Woburn Rally on 3 Aug. Please contact G3MGL for further details of this and other club activities.
Dartford (DHDFC)—Scout House, Broomhill Road, Dartford. Sec G4BWV.
Dover (SE Kent YMCAARC)—First and third Wednesdays in each month. All meetings in three parts: (1) Morse tuition; (2) Talk/demo; (3) Practical. 7.30pm. YMCA Centre. The shack is open to all members any evening, 7-10pm. Further details from sec G8DRS.
Farnborough, Kent (Bromley RC)—Third Monday in each month. Rear of Farnborough Village Hall (opposite "The Woodman" public house). Details from Derek Morgan, 59 Bassetts Way, Farnborough, Kent.
Gravesend (GRSGBG)—Mondays, 7.30pm. "Windmill Tavern", Shrubbery Road, Gravesend, Kent. Area representative G3HLF.
Horsham (HARC)—First Wednesday in each month. Civil Defence HQ, Moons Lane, Brighton. Further details from G3NPF.
Maidstone (MYMCAARS)—"Y" Sports Centre, Maidstone. First and third Fridays devoted to beginners.
Medway (MARTS)—Fridays, 7.30pm. "Aurora Hotel", Gillingham. Details of meetings from G8FHN.
Tunbridge Wells (West Kent ARS)—11 July (VHF NFD arrangements). On Tuesdays following the Friday meetings at 7.30pm in the Drill Hall, Victoria Road, Tunbridge Wells, meetings for general ideas and construction. Further details from sec G4CCQ, tel Lamberhurst 393.

REGION 9—RR H. W. Leonard, G4UZ, 4 Start Bay Park, Strete, Dartmouth TQ6 0RY.

Camborne (Cornish RAC)—First Thursday in each month. 20 July (Cornish Mobile Rally, Cornwall Technical College, Pool, Redruth), 7 Aug ("Aerials" by G3NPB). 7.30pm. SWEB Clubroom, Pool, Camborne. Details from G3NKE, tel Camborne 2419.
Exeter (EARS)—Second Monday in each month, 7.45pm. Now at Coombe House, Coombe Street, South Street, Exeter. Full details from sec Jack Bawden, 232 Exwick Road, Exeter EX4 2BA.
Newquay (N&DARS)—Alternate Wednesdays, 7.45pm. Treviglas School. Full details from G8GOR.
North Devon (NDRC)—Second Wednesday in each month at QTH of G4CG, Barnstaple; fourth Wednesday in each month at QTH of G2FKO, Bideford.
Penzance (Cornish RAC)—Third Thursday in each month. 7.30pm. The Guildhall, Penzance. Details from G3NKE, tel Camborne 2419.
Plymouth (PRC)—First and third Tuesdays in each month 7.30pm. Virginia House, Bretonside, Plymouth. Visitors always welcome. Sec G8JES, 36 Higher Mowles, Higher Compton, Plymouth PL3 6NE.
Saltash (S&DARC)—First and third Fridays in each month. 7.30pm. Burraton Toc H Hall, Saltash. G4DHA.

My thanks to all in Bristol, Somerset and Dorset for your help and friendship over the past three years. 73, Len, G4UZ.

REGION 10—RR R. G. Barrett, GW8HEZ, 23 Carshalton Road, Beddau, Pontypridd, Glam.

Barry (BCoFERS)—Thursdays, 8pm. Barry Rugby Football Club, Reservoir Road, Barry. Details from sec GW3VPB.
Blackwood (BARS)—Fridays, 7pm. Oakdale Community Centre, Oakdale, Nr Blackwood. Details from sec GW3KYA.
Cardiff (CRSGBG)—Second Monday in each month, 7.30pm. BBC Social Club, 118 Newport Road, Cardiff. Details from GW3GHC.
Pembroke (PRSGBG)—Last Friday in each month. Defensible Barracks, Pembroke Dock. Details from GW3AKO.
Pontypool (PRSGBG)—Tuesdays, 7pm. Educational Settlement, Park Hill Road, Pontypool. Details from GW3JBH.
Porth (Rhondda ARS)—Every other Thursday, 7.20pm. Transport Employers Club, Porth. Details from GW3PHH.
Port Talbot (PTARS)—Thursdays, 7.30pm. BSC Sports and Social Club, Margam. Details from GW3ACF.
Sully (S&DSWC)—Tuesdays, 7pm. Sully Bowls & Social Club, 59 South Road, Sully. Details from GW4CJC.
Swansea (SARC)—Tuesdays fortnightly, 7.30pm. The Commercial Inn, Killay, Swansea. Details from GW4BIQ.
Tonddu (Glamorgan VHF/UHF G)—Third Tuesday in each month, 7.30pm. NCB Social Club, Tonddu, Nr Bridgend. Details from sec GW3ZTH.

REGION 11—RR *(Position vacant)*

Bangor (UCoNWARS)—Thursdays, 5.30pm. Small lecture theatre, School of Engineering Science. Visitors welcomed.
Colwyn Bay (Conway Valley ARC)—Second Thursday in each month, 7.30pm. The Quarries, Llandulas, Colwyn Bay.
Rhyl (R&DARC)—2nd Tuesday in each month. Meetings take place in the lecture room of the Ambulance Station, Coast Road, Rhyl.

REGION 12—RR F. Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR.

Dundee (Kingsway TCARC)—Wednesdays, 6.30pm. Visitors always welcome. Details from GM4AQM, tel Dundee 730265.
Elgin (Moray Firth ARS)—Wednesdays, 7pm. Elgin Technical College, Moray Street, Elgin. GM3TKV is on the air every Wednesday from 7pm on the 80, 40 and 20m bands. Any person interested in joining the MFARS should contact Mr A. J. Wills, 1 Police Houses, Moray Street, Elgin. Tel 3103 extn 45. New members are made very welcome.

Mrs C. H. Parsons receives a bouquet from Mrs F. E. Tribe at the Merthyr and District ARS annual social. Also present (from left): Mr F. E. Tribe, GW8HHY; Mr C. H. Parsons, GW8NP, RSGB President; and Mr R. Thompson, president of Merthyr & D ARS

REGION 13—RR Rev S. J. Smith, GM4DNM, St Ninians, 6 Derren Drive, Cardenden, Fife KY5 0JG.

Berwick (BARS)—Last Sunday in each month, 3pm. Tweed View Hotel. Further details from GM8IIO.

Dunfermline (DRS)—Second Wednesday in each month, 7pm. CCTV Studios, Pittencrieff School, Maitland Street, Dunfermline. Further details from GM8HEY.

Edinburgh (Ferranti, Edinburgh AR Section)—Second and fourth Wednesdays in each month, 7pm. Recreation Club, Stewart Terrace, Edinburgh. Non-Ferranti employees can attend by arrangement with the society. Further details from N. F. MacLeod, GM4DHN, 54 Drumbrae South, Edinburgh.

Edinburgh (Lothians RS)—Next meeting in September. Second and fourth Thursdays in each month, 7.30pm. Adult Education Centre, Riddles Court, High Street, Edinburgh. Sec GM8GEC.

Glenrothes (G&DARC)—6 July (film), 3 August. First Sunday in each month, 7.30pm. Old Nursery Building, Leslie, Fife. Special meeting for project groups every Wednesday. Sec GM3YOR.

St Andrews University (UStAARS)—Details from R. Marchant, GM3ZCQ, Dept of Physics, North Haugh, St Andrews.

REGION 14—RR A. J. Mitchell, GM3UDL, 7 Limetree Crescent, Newton Mearns, Glasgow G77 5BJ.

Ardeer (ARCARS)—Thursdays, 7.30pm. Ardeer Recreation Club, Stevenston, Ayrshire. Details from GM8BOM.

Ayr (ARG)—Every second Sunday evening at the Community Leisure Centre, 24 Wellington Street. Details from GM3THI.

Falkirk (F&DRSGBG)—Temperance Cafe, Lint Riggs, Falkirk. Further details from GM3OQI.

Glasgow University (GURC)—George Service House, University Gardens. Details from hon sec, c/o Dept of Engineering.

Glasgow (West of Scotland ARS)—Wednesday and Friday evenings, 7.30pm. 22 Robertson Street. Programme and further details from GM3RHR, tel 041-772 3805.

Greenock (G&DARC)—Tuesdays and Fridays, 7.30pm. Watt Library, Union Street. Details from GM3LYI.

Motherwell (Mid-Lanark ARS)—Fridays with alternate meetings informal, and RAE classes Wednesdays, 7pm. Wrangholm Hall Community Centre, Jerviston St, New Stevenston. Details from GM3KMG, tel Hamilton 28759.

REGION 15—RR H. J. Campbell, GI8FOK, 26 Kilcoole Park, Belfast BT14 8LB.

Ballymena (BRC)—Tuesdays, 8pm. 86 Old Cullybackey Road, Ballymena. RAE and morse classes. Fridays, club night; Sundays, special projects, 3pm.

Bangor (B&DARS)—20 July (Expedition to Copeland Islands, off North Down coast; this will count for WAB and WAI), 5 Sept (AGM). 8pm. Redcliff Hotel, Seacliff Road, Bangor.

Belfast (QUoBRC)—Tuesdays, 8pm. Queen's University Radio Club, 37 Fitzwilliam Street, Belfast. All welcome.

Belfast (BRSGBG)—17 Sept (AGM). 8pm. 90 Belmont Road, Belfast. Further information from GI8FOK.

Belfast (CoBYMARC)—Saturdays, 2.30pm. 7 Brunswick Street, Belfast. All welcome. Sec GI4CRO.

Mid-Ulster (MURSGBG)—7 Sept (AGM). 3pm. GI4BAC QTH.

North Ulster (NURSGBG)—For details of activities contact GI8AYZ.

REGION 16—RR R. E. G. Kendall, G8BNE, "Wesley", Ranworth Road, Blofield Corner, Norwich NOR 83Z.

Chelmsford (CARS)—First Tuesday in each month, 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details from B. G. Tew, G3WFF, 334 Gloucester Avenue, Chelmsford.

Colchester (U of Essex ARS)—Details from J. Masterton, G8FUL, Eddington 6.

Great Yarmouth (GYRS)—Last Thursday in each month. 67 Southdown Road, Great Yarmouth. Details from G3NHU.

Harlow (H&DRS)—Tuesdays, 8pm. Mark Hall Barn, First Avenue, Harlow, Essex. Details from G3WUX.

Ipswich (IRC)—Every other week. Handford House, Ranelagh Road, Ipswich. Details from G3YWM.

Loughton (L&DRS)—Second and fourth Fridays in each month, 8pm. Loughton Hall, near Debden Station. Sec G4CMD.

Lowestoft (L&DARC)—Twice weekly, 7.30pm. YMCA, Park Road, Lowestoft. Details from G4AJO.

Martlesham (MRS)—Details from G. Murchie, G8AXU. Post Office Research Centre, Martlesham.

Norwich (Norfolk ARS)—Weekly, 7.45pm. Crome Community Centre, Telegraph Lane, East Norwich, Norfolk NOR 36T. Details from G8BLD.

Norwich (U of East Anglia R&EC)—Details from P. Gowen, G3IOR.

Stowmarket (S&DARS)—Details from sec K. J. Bertrard, 35 Curwen Road, Stowmarket.

Vange (VARS)—Thursdays, 8pm. Youth Hall, Barstable Community Centre, South Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon.

REGION 17—RR L. Hawkyard, G5HD, 100 Shirley High Street, Southampton, Hants.

Basingstoke (BARC)—First and third Saturdays in each month. Chineham House, Popley, Basingstoke. 7.30pm. Sec G8FKT.

Basingstoke (UKFMG—Southern)—First Wednesday in each month, 8pm. Chineham House, Popley, Basingstoke. Sec G3ZRM. Details from G8HWO.

Bournemouth (Wessex ARG)—First Friday in each month and the Monday 17 days later, 8pm. Cricketers Arms, Windham Road. Sec G8BBN.

Fareham (F&DARC)—Wednesdays, 7.30pm. Porchester Community Centre, Room 9. Details from G8FFI.

Farnborough (F&DRS)—Second and fourth Wednesdays in each month, 7.30pm. 8th Air Scout's Hut, Rectory Road, Farnborough. Sec G8ECO. PRO G8ATK.

Jersey (JARS)—Sundays, 8.30pm, and Fridays, 8pm. Le Hocq Tower, St Clement, Jersey. Sec Mary McTaggart, 19 Parade Road, St Helier.

Portsmouth (P&DRC)—Wednesdays, 7.30pm. Portsmouth Community Centre, Malins Road, Buckland, Portsmouth. G3NCO.

Salisbury (SR&ES)—Tuesdays. Salisbury Activity Centre, Wilton Road. Sec G2FIX.

Southampton University (SUARC)—Tuesday evenings, also informal meetings every lunchtime during term in the clubroom, Old Union Building. Sec I. Mercer, G3ZER.

Southampton (SRSGBG)—Second Saturday in each month at the Lanchester Building, Southampton University, also Wednesday at the clubroom, Kent Road. Both at 7.30pm. G4AEU.

South Dorset (SDRS)—First Tuesday in each month, 7.30pm. Lecture Hall, South Dorset Technical College, Newstead Road, Weymouth. G3WAO.

West Dorset (WDARG)—First Friday in each month, 8pm. British Legion Club Hall, Dorchester. Sec L. A. Barnes, G8GHU, Flat 1, 107 The Esplanade, Weymouth.

Winchester (WARC)—First and third Fridays in each month, 7.30pm. Antrim House, St Cross Road, Winchester. Sec G4BKE.

REGION 18—RR P. J. Fay, G3AKG, 5 Harland Way, The Glebe, Washington, Tyne & Wear NE38 7RB.

(No information received)

REGION 19—RR D. S. Smith, G4DAX, 151 Hamperhill Lane, Oxhey, Watford, Herts.

Ashford, Middlesex (Echelford ARS)—14 July (Club quiz), 31 July (Surplus equipment sale), 11 Aug ("High-power vhf/uhf transmitters" by Cliff Touch, G2HDJ), 28 Aug (VHF NFD finals, and mini-lecture evening). 7.30 for 8pm. St Martin's Court, Kingston Crescent, Ashford. Visitors very welcome. Sec G2FNK, tel Staines 54828.

Barking (BR&ES)—Mondays, 7.30pm (constructional), Tuesdays, 7.30pm (morse classes), Thursdays, 7.30pm (Informal and constructional). Visitors very welcome. Westbury Recreation Centre, Westbury School, Ripple Road, Barking, Essex. Details from G8JEG.

Cheshunt (CRDRC)—Wednesdays, 7pm. Rosedale Sports Club, Andrews Lane (off Goffs Lane), Cheshunt, Herts. Sec R. E. Chastell, 4 Fairley Way, Cheshunt, Herts.

Chingford (Silverthorn RC)—Fridays, 7.30pm. Friday Hill House, Simmonds Lane, Chingford E4. Visitors very welcome. Sec G4AJA, tel 01-529 2282.

Chiswick (Acton, Brentford & CRS)—15 July ("FT101" by G3IGM), 19 Aug (G3CCD as F0UT in France). 7.30pm. Chiswick Trades and Social Club, 66 High Road, Chiswick W4. Sec G3GEH.

Edgware (E&DRS)—10, 24 July (To be announced), 14, 28 Aug (To be announced). 8pm. Watling Community Association, 145 Orange Hill Road, Edgware. Sec G4BZY tel 01-952 2495.

Harrow (RSH)—Fridays, 8pm. Sea Cadets HQ, Woodlands Road, Harrow. Sec G3KDL, tel 01-902 2570.
Havering (H&DARC)—16 July (160m df hunt), 30 July (Junk sale), 13 Aug (VHF NFD arrangements), 27 Aug (160m df hunt), 10 Sept ("Visual communications"). 8pm. British Legion House, Western Road, Romford. Sec G4DEL.
Holloway (Grafton RS)—Fridays, 7.30pm. Archway School Annex, Whittington School, Highgate Hill, N19. Details from John Hitchins, 46 Granville Road, Finchley N12. Tel 01-346 2744.
New Cross (Clifton ARS)—Fridays, 8pm. 224 New Cross Road, London SE19. Details from sec R. A. Hinton, 48 Camilla Road, Bermondsey SE16.
Northolt (British Airways European Division ARS)—First Monday in each month. Trident Club, Western Avenue, Northolt, Middlesex. This club is open to non-BA employees by invitation. Contact G3OUF, tel Amersham 21573 for details. Civil Aviation Sunday net at 1100-1200gmt on 3·68MHz, listen for G3NAF or G3BEA.
Ruislip (UKFMG London)—Second Thursday in each month, 7.30 for 8pm. "The Clay Pigeon", Field End Road, Ruislip, Middlesex. Sec G3TJA.
South Kensington (Baden Powell House Scout ARG)—Third Tuesday in each month, 8pm. Baden Powell House, Queensgate, South Kensington.
Southgate (SRC)—Second Thursday in each month, 8pm. The Green, Winchmore Hill, N21. Sec G4AEZ, tel 01-336 7166.
St Albans (Verulam ARC)—Third Wednesday in each month, 8pm. Market Hall, St Albans. Visitors very welcome. Further details from sec G3YHY, tel Watford 25633.
Stevenage (S&DARS)—First and third Thursdays in each month, 8pm. Hawker Siddeley Dynamics, Gunnelswood Road, Stevenage. Sec Cliff Barker, G4BGP, 473 Canterbury Way, Stevenage.
Wanstead (East London RSGBG)—Wanstead House, The Green, Wanstead, E11. Sec G4DCP, tel 01-432 6122.
Welwyn (Mid-Herts ARS)—Third Monday in each month, 8pm. Welwyn Civic Centre, Prospect Place, Old Welwyn. Visitors very welcome. Further details from sec G3HEA, tel Stevenage 4251.

REGION 20—RR R. G. Mather, G3GKA, 8 Hills Close, Keynsham, Bristol.

Bath (B&DRG)—Mondays, 8.30pm. Church of the Ascension, Claude Avenue, Oldfield Park, Bath. Further information from John Noden, Flat 4, 30 Paragon, Bath BA1 5LY.
Bristol (BRSGBG)—28 July ("ss *Great Britain*" by Commander J. Blake), 17 Aug (Bristol Mobile Picnic at Ashton Court), 18 Aug (Home constructed equipment). 7pm. Becket Hall, St Thomas Street, Bristol 1. Sec G3ULJ.
Bristol (BARC)—Tuesdays, 7.45pm. 24 Bright Street, Barton Hill, Bristol 5. G4BZZ.
Bristol (Shirehampton ARC)—Fridays, 7.30pm. Twyford House, Shirehampton. New members most welcome. G4BOL.
Bristol (BUARS)—Most Saturdays during term time, 2.30pm. Dept of Physics, Royal Fort, Tyndall Avenue, Bristol 8. Full details from G3WDG.
Taunton (T&DARS)—Fridays, 7.30pm. Jelalaband Barracks, The Mount, Taunton. Sec G. Swetman, "Little Copse", Monkton Heathfield, Taunton. Tel West Monkton 298.
Torbay (TARS)—Tuesdays, with special meeting on last Saturday of each month. 26 July ("The weather" by a meteorologist), 24 Aug (Torbay Mobile Rally at Newton Abbot Rugby Ground), 30 Aug (Open meeting). 7.30pm. Rear of 94 Belgrave Road, Torquay. Visitors most welcome. Sec G3IQ.
Weston-super-Mare (WsMRS)—Second Friday in each month, 7.30pm. Room Lewis M2, Worle School, New Bristol Road, Worle. G3PQE.
Yeovil (YARS)—17 July (Tape and slide lecture "An introduction to electronics"), 14 Aug (Tape and slide lecture "Electron tubes"). 7.30pm. The Youth Centre, 31 The Park, Yeovil. Sec G3NOF.

RSGB Groups who wish to be listed in the 1976 "RSGB Call Book" should send particulars of the groups to the Editor without delay.

RSGB QSL BUREAU SUB-MANAGERS

(At 1 July 1975)

G2:	J. W. Russell, G2ZR, 45 Shakespeare Avenue, Bath.
G3, 4 and 5 two-letter calls and GC:	E. G. Allen, G3DRN, 30 Bodnant Gardens, London SW20.
G6 two and three-letter calls; G8 two-letter calls:	A. J. Mathews, G6QM, 62 Ashlands Road, Hesters Way, Cheltenham, GL51 0DE.
G3AAA-DZZ:	C. A. Bradbury, BRS1066, 13 Salisbury Avenue, Cheltenham, GL51 5BT.
G3EAA-HZZ	S. L. Newport, G4DEV, 101 Elibank Road, Eltham, London SE9 1QJ.
G3IAA-KZZ:	G. L. V. Butler, G2BUL, 130 Coulsdon Road, Old Coulsdon, Surrey CR3 2LE.
G3LAA-NZZ:	C. A. P. Henderson, 76c The Avenue, Beckenham, Kent.
G3OAA-PZZ:	J. H. Brazzill, G3WP, 43 Forest Drive, Chelmsford, Essex CM1 2TT.
G3RAA-RZZ:	D. Dell, G3PQF, 6 Rye Close, Cove, Farnborough, Hants.
G3SAA-TZZ:	E. G. Allen, G3DRN, 30 Bodnant Gardens, London SW20.
G3UAA-VZZ:	M. Newton, G3UKW, 2 Marlowe Court, Garforth, Leeds, LS25 1PR.
G3WAA-XZZ:	F. G. Rylands, G2VF, 39 Parkside Avenue. Millbrook, Southampton, Hants, SO1 9AF.
G3YAA-ZZZ:	H. R. Boutle, G2CLP, 14 Queen's Drive, Bedford.
G4AAA-AZZ:	C. Johnson, BRS31379, 118 Harvest Road, Smethwick, Warley, Worcs B67 6NG.
G4BAA-BZZ:	R. F. Rawlings, G3WBV, 74 The Lindens, Field Way, New Addington, Surrey.
G4CAA-CZZ	T. Cheesley, G4CHP, 2 Willows Close, Upper Tasburgh, Norwich NR15 1NE.
G4DAA-EZZ	D. Buckley, G3VLX, 16 Wood Ride, Petts Wood, Orpington, Kent BR5 1PX.
G5, all prefixes:	E. G. Allen, G3DRN, 30 Bodnant Gardens, London, SW20.
G8AAA-GZZ:	A. J. Mathews, G6QM, 62 Ashlands Road, Hesters Way, Cheltenham, GL51 0DE.
G8HAA onwards:	Mrs A. J. Mathews, 62 Ashlands Road, Hesters Way, Cheltenham, GL51 0DE.
GB	C. Turner, G8NL, 56 Sunny Bower, Tottington, Bury, Lancs, BL8 3HL.
GD:	W. P. Waid, GD3GQX, 1 Mount William, Summer Hill, Douglas, Isle of Man.
GI:	R. R. Parsons, GI3HXV, 45 Erinvale Avenue, Finaghy, Belfast.
GM:	D. R. Macadie, GM6MD, 11 Marchmont Road, Ayr, KA7 2SB.
GW:	J. L. Reid, GW3ANU, 28 Waterston Road, Gabalfa, Cardiff.
BRS and A numbers:	D. Bourne, G4CYW, "Roughways", Chub Tor, Yelverton, Devon PL20 6HY.

RSGB SLOW MORSE PRACTICE TRANSMISSIONS

These slow morse practice transmissions are sponsored by the RSGB. Alterations and additions to this list should be sent to the honorary organizer, Mr M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.

Clock time	Callsign	MHz	Mode	Town
Sundays				
1000	G3HZL	144·160 to south-west	A1/A3J	Isleworth, Middlesex
1000	G3LEQ	1·815 144·250 to north 145·250 to north	A2/A3 A1/A3J F2/F3	Knutsford, Cheshire
1015	G3CGD	1·875	A1/A3	Cheltenham, Glos
1030	G3NPB	1·875	A1	St Ives, Cornwall
1030	G3LR	1·810	A1	Accrington, Lancs
1030	G4DKK	1·970	A2/A3	Caterham, Surrey
1100	G2FXA	1·900	A1/A3	Stockton-on-Tees
1200	G3HVI	144·100 omni-directional	A2/A3	Stoke-on-Trent, Staffs
1230	GC4CHY	144·500 to north	A1/A3J	St Peter Port, CI
1815 †	G3VTY G3YEE	1·915 1·910	A1/A3J A1/A3J	Leeds, Yorks Bradford, Yorks
1830	G3NCZ	1·920	A1/A3	Blackburn, Lancs
Mondays				
1800	G3YEE	145·510	F2/F3	Bradford, Yorks
1800	G3SWR	1·980	A1/A3	Birmingham
1830	G3VBI	1·910	A1/A3	Goole, Yorks
1930	G3RAF	1·910 3·590 144·024	 A1	Locking, Soms
1930	GI3SXG	3·575	A1/A3J	Newtownards, Co Down
2000	G3IBJ	1·910	A1/A3	Southampton, Hants
2000	G3XWZ	1·910	A1/A3J	Mansfield, Notts
2000 †	G3YJI G3YZB	1·845	A1/A3	Walton-on-Thames, Surrey East Molesey, Surrey
2030	G3ASR/A	1·875	A2/A3	Harrow, Middlesex
2030	G3KGU	1·915	A1/A3	Theydon Bois, Essex
2130	G3LQI	145·300	F2/F3	Lancing, Sussex
2230	G3HZL	144·160 to south-west	A1/A3J	Isleworth, Middlesex
Tuesdays				
1100	G3EBU	1·952	A2/A3J	South Woodham, Essex
1800	G3SWR	1·940	A1/A3	Birmingham
1830	G4BNA	3·590	A1	Swindon, Wilts
1900	G4CLN	1·915	A1/A3J	Packington, Leics
1930	G3RAF	1·910 3·590 144·024	 A1	Locking, Soms
2000	GM3UWX	145·575 to south-east	F2	Bishopton, Renfrewshire
2000	G4AEU	1·910	A1/A3	Southampton, Hants
2000	G3LEQ	1·815 144·250 to north 145·250 to north	A2/A3 A1/A3J F2/F3	Knutsford, Cheshire
2045	GM3CRY	3·550	A1/A3J	St Andrews, Fife
2045	G4AEU	145·550 omni-directional vertical	F2/F3	Southampton, Hants
2130	GM3UAG	145·800 to south		Ellon, Aberdeenshire
Wednesdays				
1930	G3RAF	1·910 3·590 144·024	 A1	Locking, Soms
2000	G8QU	1·970	A1	London N22
2000	G3BPE	1·975	A1/A3	Bexley, Kent
2000	G3SWP	1·920	A2/A3J	Doncaster, Yorks
2015	G3WVJ	1·845	A1/A3	Staines, Middlesex
2100	G3HVI	144·100 omni-directional	A2/A3	Stoke-on-Trent, Staffs
2230	G3HZL	144·160 to south-west	A1/A3J	Isleworth, Middlesex

† Alternately

Clock time	Callsign	MHz	Mode	Town
Thursdays				
1800	G3SWR	1·980	A1/A3	Birmingham
1830	G4BNA	3·590	A1	Swindon, Wilts
1830	G3NC	1·968	A1	Swindon, Wilts
1900	G3YEI	1·850	A1	Fleetwood, Lancs
1930	G3RAF	1·910 3·590 144·024	 A1	Locking, Soms
2130	GM4CAU	145·800 to north		Aberdeen
2130	G3LQI	145·300	F2/F3	Lancing, Sussex
Fridays				
1800	G3SWR	1·940	A1/A3	Birmingham
1900	G3NPB	1·875	A1	St Ives, Cornwall
1900	G4CLN	1·915	A1/A3J	Packington, Leics
1900	GC4CHY	144·500 to north	A1/A3J	St Peter Port, CI
1930	G3PQF	144·360 to north-east	F2/F3	Farnborough, Hants
1930	G3RAF	1·910 3·590 144·024	 A1	Locking, Soms
2000	G3LEQ	1·815 144·250 to north 145·250 to north	A2/A3 A1/A3J F2/F3	Knutsford, Cheshire
Saturdays				
0930	G2FNK	1·930	A1/A3J	Staines, Middlesex
1000	G3HZL	144·160 to south-west	A1/A3J	Isleworth, Middlesex
1115	G3HZL	144·160 to north-west	A1/A3J	Isleworth, Middlesex

G3BZU morse proficiency transmissions at 15, 20, 25, 30, 35 and 40wpm are made at 2000 clock time on the first Tuesday of each month on a frequency of 3·520MHz. For 100 per cent copy at 15wpm a certificate is awarded, and endorsement stickers are available for 100 per cent copy at the higher speeds. A charge of 15p or three IRCs is made for the basic certificate, and 5p or one IRC for each endorsement sticker claimed. All claims should be sent to—The QRQ Manager, RNARS, HMS *Mercury*, Leydene, Petersfield, Hants.

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.

MEMBERS' ADS

These subsidized flat-rate advertisements are accepted as a service to members of RSGB. They must be submitted on the Members' Ads order form printed in 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 40p (stamps not accepted). They will not be acknowledged. Those not clearly worded or punctuated will be returned. No correspondence concerning this service can be entered into.

The closing date for each issue is the 1st 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. Advertisements may be edited or abbreviated as necessary.

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

Post to: MEMBERS' ADS, "RADIO COMMUNICATION", 35 DOUGHTY STREET, LONDON WC1N 2AE

SEE IMPORTANT ANNOUNCEMENT ON PAGE 523

FOR SALE

KW (E-Zee) match, £14; KW101 swr meter, £10; or £23 the two. Prefer buyer collects. Carriage extra at 75p each or £1 the two. BRS35571, 8 Whittington Road, Worcester WR5 2JU. Tel 0905 354378.

Redifon GR286, marine a.m./fm (private deck), exc cond, i.f. 10·7MHz easily modified 2m, £30. Marine mf/hf solid-state exciter 1·5–25MHz, emission A1/A2/A3, includes 35 2MHz HC6/U xtals, £25. Carriage, packing inclusive both items. G3JMJ, QTHR.

Codar 160AT5 tx, T28 rx, 12MS psu, control box, cables, 12V mobile, Acos mic, wkg, £28. BCC mobile modified for 2 a.m., QV047 pa, wkg, £10. Woden UM2 and DT1 modulation transformers, £4 pair. Please collect or include carriage. G3FD, QTHR. Tel Southend 554764.

Collins mech filters, 455kHz bandwidths, 3·1kHz, 0·5kHz, £8 each. Dto 7·5kHz, £4. G3AAK, QTHR. Tel Ringwood 3078.

Viceroy mk2 with top band transverter, £50. CR100 rx, good cond, £14. G4AAH, QTHR. Tel Mansfield 31865.

Telequipment S52 oscilloscope, £35. Solartron transistor stabilized psu A5870, £15. EMI WM2 oscilloscope, intermittent fault, £5. Offers accepted on above. RCA AR88D, vgc, £40. Cooper, 45 Nightingale Crescent, Bracknell, Berks. Tel Bracknell 54168.

Storno Viscount, lb fm with cv, £12. Base set 60W fm, £25. *Wanted:* 2m linear amp and psu, prefer two off 4CX150/250 type or two off uhf base for above. J. E. Walton, 2 Billy Mill Avenue, North Shields, Tyne and Wear. Tel North Shields 79887.

Heathkit SB303 rx, £150. 45ft triangular lattice mast, never erected, £30. G8AWM. 54 Horton Hill, Epsom. Tel Epsom 28229.

Drake R4C, MS4, original packing, £240. B40, £18. ETM-2, £18. Modulated BC221, £22. Pair 4CX250B with bases, new, £15. Elliot transistor curve tracer, £8. 2kV 1A transformer, £6. Xtal filters, linear components, sae please. Buyers collect. G3VFO, QTHR. Tel Brighton 684659.

Junkers precision hand key, as new, £11.50. 19in rack mounting cabinet 5ft high, free to collector. G3ZNF, QTHR. Tel Shepshed 2432 after 8.30pm.

Plumbicon camera tubes, separate internal mesh, ideal W7ABW sstv camera in *SSTV Handbook*, very slight blemishes, £15. Dallmeyer Super Six tv lens, fixed focus 50mm C mount, £15. GI3MBB, QTHR. Tel Bangor 61946.

Trio JR599 and TX599 in mint cond, only rx been used, £140 each unit. Tel Leicester 715454 evenings.

Eagle EP50LN multimeter, new, cost £28, accept £14 ono. *Wanted:* Osker swr/power meter or similar. Transverter 28/144MHz commercial or homebrew. Why? G8HPE. Tel Romford 45733.

KW mobile psu, good cond, ready to plug in KW2000A, KW2000B, £25 ono. G6VQ, QTHR. Tel Sedgwick 353.

Sideband filters, 3·1kHz bandwidth, 600Ω Z, high slope cut-off, size approx 6 by 5 by 4cm, frequencies 64 to 108kHz every 4kHz, £4. Also lpf, cut-off 3·4kHz, high Z, size 3 by 3 by 5cm, £1. Tel Melton Mowbray 2755 after 6pm or weekends. G4AMK, QTHR.

Yaesu FT200, ac psu, mint cond, eight months old, fitted with all 10m xtals, £200 ono. Gordon Smith, 58 Springbank Terrace, Aberdeen AB1 2JZ. Tel 0224 51582 evenings.

Hallicrafters Cyclone mk2, 400W p.e.p., one year old, £300. G3ZLN, QTHR. Tel Ipswich (Suffolk) 55200.

Transistor Vanguard with rx, xtals for 145, 145·5, £18. Teleprinters 7E, £15; 7B, £10. Auto sender, £4. Printing reperf with sync motor, £12. G3WFW, QTHR. Tel Bolton 382332.

A.M./CW tx, 150W, 80–10m contained in two steel racks, 813 pa pi-output complete with modulator and power units, contains many useful transformers etc. Also Britannia receiver with power unit. Offers. G3QJ, QTHR. Tel Keighley 4576.

FV 101 outboard vfo for FT101, little used, maker's carton, offer nearest £40 secures. G3HDB, QTHR. Tel 0926 53524.

Pye base tx, QQV06/40A pa vxo, with xtal covering 145MHz, £25. Buyer to collect, sae further details. Pye U450L 70cm tx, vxo with five xtals, good cond, £25. BLY72 £1.50. G8BEQ, QTHR.

BCC 69G 2m tx and 12V supply, £15. Telefunken 85KL mono tape recorder, £35. 80W modulator with UM2, £10. *Wanted:* FV50B. G3KQF, QTHR. Tel Derby 27361.

QTH semi-detached three bed, two rec, utility room, shack, full c/h, det garage, 60ft garden, aerial TA33JR plus 4-over-4 may be inc, located Surrey, £20,500. G3RZM, QTHR. Tel 01-398 3059.

Scope, solid-state Heathkit, IO-103, dc-10MHz, as new, £140. Modulator, a.m., 10W o/p, £5. Various scope tubes from £4. Scope case, £3. Transformers, mains, audio, mod. Mags, collectors items, dating from 1941. Buyer collects. G8CVU, QTHR. Tel Ashford (Kent) 25939.

770R, 19-165MHz fm/a.m./cw, aligned, very good cond, £90. G3BHT QTHR. Tel 021-308 4764.

B/M Vanguard, complete, rx tunable, wkg 2m, £15. Ranger tx modulator wkg 2m, £5. Dash Ranger, complete, 4m, £6. 2m linear, new, 640 tuned lines, £8. 2m linear less valves, £3 or exchange. G4BHM, QTHR. Tel Leeds 664833.

Megahertz xtals for markers, converters, counters etc, HC6U type, 5, 6, 8, 10, 11, 12, 13, 14, 16, 17, 20, 27MHz, £1 each. Also glass envelope type 100kHz, 0·005 per cent, £1.50 each. G4BBR, QTHR.

Liner 2, unmodified, exc cond, little-used, original packing, £110 ono. G8EMO, QTHR. Tel Oakley (Beds) 3304 evenings.

40W xtal a.m. 2m tx with 240V psu. Also Murphy 821 tx/rx. TX section on 2m, rx wkg but unmod valves, suit CR100 rx. Xtals FT243 12·070833, HC6U, 12·116666. Offers, prefer buyers collect 821 tx. Plucknett, 432 York Road, Stevenage, Herts.

Trio JR-599X rx with internal 2m and 6m converters, £130 ono. LM-373 multi-mode i.f. strip ICs, two at £2 each. Harrison, 46 Rush Green Road, Romford, RM7 0PS. Tel Romford 60325 after 5.30pm.

Heathkit DX-100U tx, 160–10m, £33. Buyer collects or delivery extra. *Wanted:* Circuit diagram for Hoover Automatic washing machine type 3208, to buy or borrow. Expenses paid. G4CTL, QTHR. Tel Hornchurch 55591.

Panda cub tx, good cond, £15. G3HWW, QTHR (Thursdays) or G3WVO, QTHR.

G whip, multimobile, complete 10, 15, 20, 30 and 80, unused, £25. *Wanted:* KW linear or similar. G6XJ, QTHR.

5AH and B46 rx with ac/dc psu and atu, wkg with handbooks, tx is a.m./cw, 1·5 to 30MHz continuous coverage, £5 to anyone getting started, or offers. Buyer collects outside Birmingham area. G4AEV, QTHR. Tel 021-449 1521.

Portable generator, 240V, 50Hz, 800W, perfect cond, £50. AVO Multiminor mk4 with leads etc, perfect, £10. Taylor testmeter model 127A with leads etc, £10. Wahl cordless soldering iron with charger, one month old, £10. 23cm varactor tripler, £10. G4CPE, QTHR. Tel Luton 55606.

HRO, psu, nine coils, manual, spare valves, £15. Payne, 71 Grange Road, Orpington. Tel 58455 evenings.

Eddystone EC10 mk2 with ac mains psu, mint cond, £45. Also Microwave Modules 2m converter with 18-20MHz i.f. £12. Buyer to inspect and collect. GW8CGH, QTHR. Tel Bridgend (0656) 58474.

Microphones: Electrovoice 600D mobile, Yaesu YD844, Turner + 2 transistorized, Acos-22, Calrad DM-17, BM-3. New R4C 1·5kHz filter, £20. Heath HM-102. Wilson 10/15/20 monobanders. Webster Bandspanner Master mobile aerials. Grundig TK55 tape recorder. Katsumi MC-701 compressor. Offers. G3DAM, QTHR.

FTDX500 with Shure 201, £150. Yaesu YC305 counter, £80. Excellent AM10D xtalled for 145MHz plus Bantex ¼ whip, £30. Pye base station plus xtals for 145MHz, £40. G3VNP, QTHR.

Eddystone 940 rx, exc cond, £90. Will consider Eddystone EC10 mk2 or EC10A in part exchange with cash balance. Buyer to collect. *Wanted:* 2m converters with circuit diagrams. G4AYV, QTHR.

Pye Cambridge AM10B boot-mounting six channel tx/rx 144/145. Trio 9R59DS. Rotator AR 30. SWR bridge. 144MHz converter, dc power supply. Heathkit OS2 oscilloscope. Heathkit transistor tester IT27: Decade resistance box. Wave meter. All perfect. Offers. G8IVX, QTHR. Tel 021-705 4220.

Pair ITT 6146 valves, £6. Cetron 572B, £9. All brand-new, unused. Type 27 Nombrex transistorized sig gen 150kHz to 350MHz, new with leads and instructions, £12. Add postage. G5FH, QTHR. Tel Highcliffe 5974 evenings

FR50B, with cal, 160m, extended 28MHz for converter, as new, £60. G8AEV 2m converter, £8. Hamgear PM2 preselector, £10. Buyer collects. G. Thompson, 49 Widney Avenue, Birmingham B29 6QE. Tel 021-472 4678.

Marconi TF1330 scope, £40. TF144G, perfect, £20. S27 rx (27–140MHz), £25. Creed 7B/N teleprinter, £10. Eddystone panadaptor EP17R (5MHz i.f.) new, handbook, £40. Unused pair 6LF6, £3. Ditto TT21, £5. Hundreds FT 241 xtals (*not* ch 320-340), 25p each. 6CH6 and EF91 valves, 25p each. Buyer pays postage/freight or collects. G3JKV, QTHR. Tel 0306 4359.

Yaesu FT220 ssb/cw/fm tx, 2m, as new, £270. G8DDW, QTHR. Tel 01-858 3921.

GR54 rx, 200kHz-30MHz a.m./ssb/cw, £25. IT-18 portable transistor tester, £7. IG-82U sine/square generator, 20Hz-1MHz, £18. IC-2008A electronic desk-top calculator, £18. All the above Heath models fully operational in good cond. GI8JLF, QTHR. Tel 02317 5077.

Heathkit GR78 portable gen cov rx with bandspread, comp with manual etc, exc cond, exchange for 2m commercial transmitter with cash adjustment if necessary, or sell for £60. Alec Felthouse, 14 Selbourne Rd, Leek, Staffs. Tel Stone-on-Trent 28407.

Pye Ranger 4m tunable rx, vehicle mounting rack, performs very well and in nice cond, £15. G3XFB, QTHR. Tel Brewood 850033.

Plessey SL600 tx (September 1974 *Radio Communication*) completed pcb for rx section including KVG XF-9B filter with xtals, MD108 mixer, all rx ICs, 2½in 35Ω spkr, tested and working. £32. G8WS, QTHR. Tel 0628 23239 evenings.

FM calling channel xtals, receive 145·5MHz, suit Storno Viscount (two only), 10·3604 MHz, £2.25 each post paid. G8BMI, QTHR. Tel Keighley 62859.

Heathkit HW17A 2m tx/rx, £40. KW Electronics 2m tx, 120W i/p, £40 ono. Ex-Forces rx, needs attention, 32-146MHz, offers. G8HEB, QTHR. Tel 021-357 1924.

Vibroplex bug key, £8. Geloso vfo/pa, five-band cw rig, £10. QRO atu, profess cond, integral pws/swc inputs lw/copx switched, £15. G4CJY, QTHR. Tel High Wycombe 444417.

Digital readout tx, 80-10m, similar to FT501, one year old, exc buy at £250 ono. New SSB125T dc psu, £20. 450MHz Starfone (MS) mobile/base, exc cond, £60. G3ZYW, c/o 277 Bloomfield Road, Odd Down, Bath.

Yaesu FL2500 linear, 160–10m, 2kW, immac in orig packing, plus spare valves, bargain, £120. Mosley (American) wide-spaced classic 33·3el, no compromise performance, £50. Zygi 20m aerial (July 1973 *Radio Communication*) comp, £12. G3UDR, QTHR. Tel Bidford-on-Avon 2781.

QQV06/40As, as new, gold-plated pins, £5. Ditto QQV03/20As, £2.50. 4CX250B, as new, £3.50. 3CX100AS, £2.50. 2C39A, £1.50. HC18U xtals, suit TS700, 8·950 (R6), £1. 8·325, 8·375, 8·450, 8·475, 8·525, 8·575, 8·625MHz, 75p. 3·450 to 7·950MHz in 500kHz steps, 50p. G8ENI, QTHR. Tel Cheslyn Hay 415374.

Yaesu FT101B, brand-new in makers sealed carton, £358. No offers. Mr Sheedy, 24 Thornwood Road, London, SE13.

KW Viceroy tx, 180W ssb, 80m to 10m, in working order with ac psu, instructions and circuit diagram, £40 ono. G3NDZ, QTHR.

Plessey SL ICs, unused, two of each 610C, 612C, 621C, £1 each. 640C, 641C, £1.50 each plus p and p. G3IZJ, QTHR.

HA600, exc cond, £40. HW-17 with extra rf amplifier and Heathkit vfo, £50. S27, £20. CR150, £15. HRO coils, 50p each. 31 set, battery, headset, aerial, untested, £9. 88 set, £5. Ekco r/t, £4. *Wanted:* Heathkit gdo. N. Hammersley, 5 Rymers Green, Formby, Liverpool.

B40C rx with product detector, fine tuning and S-meter, £35 ono. DX100U, good cond, £30. Sentinel 2m converter, 2-4MHz, £10. G4CIN, QTHR.

National 121 communication rx for gen cov 550 to 1,600kHz and 1·6 to 30MHz. Good cond, £50 ono. Honeywell, 117 Lenthall Avenue, Grays, Essex. Tel Grays Thurrock 79199.

Pye base TXs, comp with manuals, ready for mod to 2m and 4m, £12 and £15. IOW 10, 15, 20m quad, fb cond, £20. *Wanted:* SB101/102 with or without psu. G4AKD, QTHR. Tel Cambridge 811404.

FTDX401, 18 months old, perfect cond, £165. Buyer to collect. G3MAY, QTHR. Tel 01-808 0197.

Hammarlund HQ170A with 2m converter, £100. KW2000 with ac/dc PSUs, £120. Jason Argonaut a.m./fm rx in walnut bureau and bass reflex 10W speaker with tweeter, £35, will separate. *Wanted:* KW2000B or E. G3VYP, QTHR. Tel 021-747 2358.

FT 75, DC 75 manual and boxes, vgc, £110 ono. Also Vanguard wkg on 145MHz, control box and mic, £20 ono. G3UZI, "Lorien", Rusper Road, Horsham, Sussex. Tel Horsham (0403) 66327.

Heath HG10B vfo, 80–2m plus manual, £20. 572B/T160L valves, unused pair, £10. Japanese bugkey, £3. HW17A, £40. McElroy bugkey, £4. DX40U with homebrew vfo, £12. Clearing shack, sae list. Above carriage extra. G3SYD, 1 Gosden Close, Furnace Green, Crawley. Tel 511708.

Modern bungalow, Sutton-on-Sea, Lincolnshire coast. Three good bedrooms, integral garage, gas ch, loft fully lined containing study/store, exc shack, benches, shelves, eight power points, isolator. Cul-de-sac, convenient village centre. £10,900. G4CTE, QTHR. Tel Sutton-on-Sea 753.

Valves, two off 7094, two off 866A, used but ok, with bases, ex-HT41 linear, £5 lot. One off BGY22 and BGY23 70cm ic modules, 50mW, 7W out, new with data, £20. BAY96 varactors, new, £2.50. CXY11 10GHz Gunns, new, £1. All carriage extra. G3RNV, QTHR.

Yaesu rx FRdx100S, ssb/cw/a.m./fm 160m–2m; Yaesu tx FLdx400 240W, ssb/cw/a.m., 80m–10m, operation as separates or as tx, exc cond, £300 the pair. Hy-gain TH3JR triband beam, as new, £40 ono. GW3SYL, 10 Brookdale Court, Church Village Pontypridd, Glam. Tel Newton Llantwit 3270.

FT200 and FP200 psu, mint with Shure mic, full 28MHz. G8GJZ, QTHR. Tel 09327 85511 ext 125 (day), 86504 (night).

Barlow Wadley XCR30 mk2, mint, £60. Carriage extra. Froggatt, Potter Heigham 456.

Collins original manuals, 51J3, 75A3, 75S3, all mint cond, £4.50 each. HRO dial brand-new, boxed, £5. All postage extra. Command RXs, new in cartons, sae details. *Wanted:* KW107, hf sig gen, TS413A/U, URM25B, or similar instrument, details cond, price. G3GUU, QTHR.

Withers TW phase II 144MHz transverter with psu, dummy load, switchable xtals, transceive or separate tx/rx, ideal for rigs without low-power socket, as new, £80. Del approx 100 miles. *Wanted:* FM rig, mobile or hand-portable. G3OHC. Tel 021-308 2512.

Steel table-top cabinet, 19in panel, moving coil and hand xtal mics, speakers, valves, meters, small electric motor, mains transformers, relays, mains unit, 10W amplifier, radio books, magazines, large wirewound resistors. G3DFS, QTHR. Tel 021-354 7769.

50Ω coax, very low loss, RG214U, super for 70cm, brand new, 50ft, £4.85; 75ft, £6.85; 100ft, £9. Carr paid. G3RYV, QTHR.

EMI WM26 scope, 40MHz wideband and diff plug-ins, dual tb, handbook, spares, good cond, £120 plus carr. Wayne-Kerr lcr bridge B521, good cond, handbook, £25 plus carr. Annakin, 25 Ilkley Road, Otley, Yorks. Tel 3083.

New Heathkit HW-7 QRP tx, never used in transmit, comp with manual and 200Ω phones, £45 ovno. Reason for sale—refused planning permission for hf aerials. Buyer collects. G8ICM, QTHR. Tel Bourne End (Bucks) 26377.

Tuning unit TN18 300/1,000MHz, £8. HRO dial and gear box, £8. *Wanted:* HB/FM Viscount or six-chan dash Cambridge, 12V. GC3HKV, QTHR. Tel (0481) 47278, 6-7pm.

Yaesu FR-50B rx, comp with 100kHz calibration xtal, in mint cond, £50. If possible, buyer to inspect and collect. Tel Amesbury 3062 evenings.

2m dash-mounted Ranger, £12. 6-over-6 for 2m with mast 30ft and home-made rotator unit, offers. CR100/2 good cond, £10. G8BCT, QTHR. Tel 01-540 9391 (day) 01-946 4863 (evenings).

CR100/2 with manual, £10. BC453 Q-fiver, £3.50. BC454 3-6MHz, £3. R1132/1481 re-coiled for 70–80MHz, £3. R1392/62H re-coiled and variable tuned approx 144–146, £4. Carr extra. Armistead, 45 Swanston Gardens, Edinburgh EH10 7DF.

Vanguard AM25T incl remote control, cables, speaker, mic, Diamond ¾ vert aerial, six chan with xtals for 145·00 and 145·08, comp mobile rig, £30. G8HEA, QTHR. Tel Market Drayton 3449.

Drake TR4 tx/rx with ac psu, immac, one owner, £250 plus carr. G3YYI, QTHR.

Strumech 40ft wall-mounted Versatower, £150. Buyer collects. G3JUY, QTHR. Tel Mansfield 21183 for details.

Swan 350 with matching Swan TV2 144MHz transverter (240W p.e.p. input) ac psu, dc psu, £300 ono. G8AWN, QTHR.

Heathkit HW17A, extra i.f. stage, 12V dc psu, £50. G8EZL, QTHR. Tel North Shields 70799.

2m a.m. tx, 3–20 final, plus modulator, with built-in mains PSUs in Imhof cabinets, space for fm modulator or vfo in tx, relay switched, £35 ono. Xtals JAN FT243, 8,023, 8,033, 8,073, 8,075, 8,100, 50p each. Cathodeon, new, unused, 24,020·0, 24,131·6, 24,200, 24,291·6, £1 each. 10XJ 8,007·27, 8,008, 8,013·33, 8,010, 8,015·45, 50p each. SAE please. 12V-250V dc-dc converter by Green, £2. 3N163 p-channel FETs, 2 for 7p; 20 for 55p. Stamps plus sae please. Labgear low-pass filter 75Ω, £1. Pye mains lo-band monitor plus rf-i.f. strip for hi-band, £5. G8APH, QTHR. Tel 02404 3212.

Yaesu FRDX400S rx, £160. Yaesu FLDX400 tx, £140. Complete with manuals, leads and in original boxes, exc cond, del by arrangement. G3UKM, QTHR. Tel 061-439 5756.

Cambridge FM10B, boot-mounting, control box, xtals 70·26MHz, cradle, intercon cable, circuit, £20. Almost new xtals: 44,500 (144·200 receive ssb calling) HC25U, base, £1. 44,633·3 (144·600 receive) HC6U, £1.25. 40,000 (ok 2m conv) HC6U, £1. G3TTC, 5 Hurst Close, Chessington, Surrey.

FT2 auto, exc cond, handbook, fully xtalled, £110 ono. 160m mobile aerial G-whip Ranger, with mount, new, £5. 160m tx, a.m./cw, mains, immac. audio and cw break-in etc, £15 ono. 01-648 5895.

Trio TS510 and psu with spare pa valves, all leads and plugs, £130. G. Park, 11 Ramsgreave Road, Blackburn, Lancs BB1 9BH. Tel Blackburn 40169.

LC10FM control box, £2. 19in rack chassis (Pye F450T), £5. 1·47MHz ssb filter SSB1/U with xtal and cct, £5. AM10D manual, £1. Del by arrangement. *Wanted:* Pye Westminster case and chassis (no electronics). G8HNN, QTHR. Tel Worcester 51956.

ICOM IC21 with IC21 vfo, both in good cond, modifications: extra 10·7 filter, separate 455kHz i.f. strip with bfo for a.m. and ssb, £135 ono. Prefer buyer inspects and collects. G8DBO, QTHR. Tel Melbourne (Derbys) 3275.

Atlas 180 with Atlas 230V mains psu and mobile mount, £250. Complete set G-whip 10 to 160 with mount, £10. Hy-gain 18AVT/WB, £25. Heathkit SB610 signal monitor, 110V, £35. Set manuals, the lot, £310. G3NYH, QTHR.

Collins 75A4 rx, £220. Hallicrafters HT32B tx, £110. Absolute top-quality equipment in perfect cond. Prices include Securicor delivery. GI3KDR, QTHR. Tel Holywood 3983.

KW Valiant 160 to 10 with psu, all gen, £20. *Wanted:* KW Vanguard, good price for good tx. Also 9R59DS or sim gc rx, approx £30. Will travel 50 miles. Details please. Paul, G4DNI, 1 Harvey Close, Upper Caldecote, Beds.

9R59DS, xtal, cal, stab, as new, £45. Heathkit HR10B, factory-checked, £40. Pye Vanguard AM10B, cables, controls, spkr etc, conv 2m, £10. Murphy MR820/50 high band, no mic, otherwise complete, £4. Collect or carr extra. GM8GUX, QTHR.

R107 rx for spares, exc dial etc, £5. Buyer collects. Paul, G3YPO, QTHR. Tel Darton (Yorks) 2874.

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Mains 1·2kW Honda generators, rrp around £190, £130 plus carr. U450L, complete tx and transistor rx, control unit, cabinet, manual, £50 plus carr. G8HVV, QTHR. Tel Lindfield (04447) 2893.

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44·9333	44·9416	44·9500	44·9583	45·0083	45·0166	45·0250

Additional Frequencies
145MHz 10·3246/44·7666 70·26MHz 29·7800

REPEATER I/P CHANNEL CRYSTALS

R5	R6	R7
145·125	145·150	145·175
44·8083	44·8166	44·8250

CONVERTER CRYSTALS IN HC18/U PRICE £2.65

144/28	144/4	432/28	1,296/28	144/28
38·6666	70·0000	101·000	105·666	116·000

PYE POCKETFONE CRYSTALS IN HC18/U PRICE £5.09/PAIR
433·2MHz TX 12·0333 RX 84·5000
GB3PY TX 11·9819 RX 84·5300

100kHz CRYSTALS IN HC13/U PRICE £2.50
1000kHz CRYSTALS IN HC6/U PRICE £2.50

10% discount on orders of 5 or more crystals. As a result of discussions with H.M. Customs and Excise, we are now able to offer all our crystals at 8% VAT as from 10 June, 1975. This is because all the above crystals are in specifications suitable for industrial and commercial use. We should like to apologize for any inconvenience caused as a result of these changes.
Please add 8% to the above prices. All prices include post and packing.

WATERS & STANTON
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Your South Eastern Yaesu Stockist

BY 'PHONE *Simply telephone your Barclaycard or Access No. for immediate despatch* **Tel. 03 704 6835**
BY POST *State clearly your requirements enclosing cheque or postal order*
CALLERS *You are always welcome to come and inspect the equipment in our showroom*
FOR ALL ENQUIRIES *PLEASE ENCLOSE STAMPED ADDRESSED ENVELOPE*

YAESU EQUIPMENT (ex VAT)

FT101B 160–10m tcvr. 240V/12V	£330.00	(n/c)
FR101D 160–2m rx 240V/12V	£330.00	(n/c)
SP101 matching speaker	£13.00	(1.00)
FV101 remote vfo	£48.00	(1.00)
FT401B		(n/c)
SP401 matching speaker		(1.00)
FT200 80–10m transceiver	£170.00	(n/c)
FP200 matching spkr./AC supply	£45.00	(1.00)
FT220 2m SSB/FM tcvr. 240/12V	£264.00	(n/c)
FT224 2m FM tcvr. 24ch. toneburst	£130.00	(n/c)
FP2 matching AC/charger supply	£38.00	(1.00)
YC355D 200MHz counter 240/12V	£125.00	(n/c)
YO100 monitor scope (superb)!	£93.00	(1.00)
FT2 Auto	tba	(n/c)
Sigmasizer (80 channel)	tba	(n/c)

JAYBEAMS VHF ANTENNAS (inc VAT)

4m 4 element yagi	£8.50	(1.00)
5Y/2m 5 element yagi	£5.38	(75p)
8Y/2m 8 element yagi	£7.00	(75p)
10Y/2m 10 element yagi	£13.75	(1.00)
PBM14/2m parabeam	£21.12	(1.25)
D5/2m slot fed yagi	£9.90	(1.00)
D8/2m slot fed yagi	£13.12	(1.00)
5XY/2m 5 el. crossed yagi	£10.25	(1.00)
8XY/2m 8 element crossed yagi	£12.75	(1.00)
10XY/2m 10 el. crossed yagi	£17.63	(1.50)
XD/2m crossed dipoles	£7.19	(75p)
UGP/2m ground plane	£5.19	(75p)
HM/2m Halo with mast	£2.75	(50p)
D8/70cm slot fed yagi	£11.25	(1.00)
PBM18/70cm parabeam	£13.12	(1.00)
MBM46/70cm 46 el. yagi	£15.12	(1.25)
MBM68/70cm 68 el. yagi	£20.12	(1.50)
12XY/70cm 12 el crossed yagi	£20.88	(1.00)

Full range of phasing harnesses and brackets in stock S.A.E. for catalogue.

HY-GAIN ANTENNAS (inc VAT)

12AVQ 10–20m vertical	£31.88	(1.00)
14AVQ 10–40m vertical	£45.00	(1.00)
18AVT 10–80m vertical	£65.00	(1.25)
TH3 jnr 600W 3 element beam	£92.50	(1.50)
TH3 Mk 3 2kW 3 element beam	£124.85	(2.00)

G-whips mobile antennas—ex. stock
VHF 2 & 4 metre whips—ex. stock

2 METRE SSB (inc VAT)

Liner-2 2m ssb transceiver	£181.25	(n/c)

TRIO (inc VAT)

QR66 receiver 160–10m plus general coverage 230×/12V	£162.50	(n/c)
Matching calibrator	£10.95	(25p)

LOWE 2m MONITOR RECEIVER (inc VAT)

2m FM 6 channel receiver complete with all channels fitted	£38.75	(50p)
2m FM receiver less xtals	£24.95	(50p)
Channel xtals	£2.00	(10p)

2 METRE HAND PORTABLES (inc VAT)

KEN KP202 handi-talki 2 metre fm transceiver. 6 channels with 145 & 145·5 fitted. Over 2 watts output. Highest powered model on the market with very good audio! .. £93.75 (50p)
Tone burst option available plus leather case, helical whip, ni-cads and base charger.

TONE BURST MODULES

Dual 1,700 & 1,750Hz o/p	£4.60	(25p)

ROTATORS

AR30	£27.00	(1.00)
AR40	£32.00	(1.00)
CDE44	£64.80	(1.25)
Ham M	£97.20	(1.50)
Stolle 2010	£33.48	(1.00)
Stolle 2030	£37.80	(1.00)
5 core control cable	18p yd	(1p)

AERIAL FEEDERS

50 ohm UR43	yd	18p	(1p)
50 ohm UR67/RG8U	yd	36p	(2p)
75 ohm standard	yd	10p	(1p)
75 ohm UHF low loss	yd	14p	(1p)
300 ohm feeder	yd	8p	(1p)

MICROWAVE MODULES (inc VAT)

NEW! 70cm transverter	£77.55	(50p)
2m converter 2-4/4-6/28-30	£19.00	(25p)
4m converters 28-28·7	£19.00	(25p)
70cm converters 28-30/144-146	£22.63	(25p)
2m dual o/p pre amp	£11.25	(25p)
1,296MHz converters 28-20	£29.99	(25p)
2m converter 28-30/116 osc o/p	£17.60	(25p)

NEW!

Technical Associates Complete receiver audio filtering unit

Suitable for ssb & cw
1watt o/p drives loudspeaker
8 positions of selectivity
80/110/180/200/1,500/2,000 2,500Hz/High Pass

Only **£26.00** + VAT (50p)

STATION ACCESSORIES

SWR meter 160–2m	£7.50	(35p)
SWR meter + power meter 160–2m	£11.50	(35p)
Baluns 1kW 75 ohm	£4.95	(25p)
Baluns 1kW 50 ohm	£4.95	(25p)
Insulators	12p	(2p)
Dipole centre insulator SO259	£1.75	(20p)
Wightraps 1kW pair	£4.60	(35p)
HP3A TVI filter	£2.16	(5p)
1¼ inch ferrite cores	30p	(n/c)

MINI-PRODUCTS COMPACT BEAMS

HQ-1 hybrid quad 10–15–20m	£56.00	(1.50)
B24 2 element yagi 10–15–20	£44.00	(1.50)
RK3 reflector element for B24	£27.00	(1.00)
C4 vertical 10–15–20	£27.00	(1.00)

It seems the word has got round that our recently introduced TECHNICAL ASSOCIATES speech processor is not just another "black box". Many of you were sceptical that a unit half the price of its competitors could be so effective and distortion-free. Well I'll let you into the story behind it.

Some while ago we decided to produce our own speech processor that would be superior to those currently available. I said to the designer "Look, I want you to design me a speech processor; I want the distortion to be kept below 1%; I want the gain to be similar to that from a linear; I want to completely eliminate those horrible room noises transmitted by other processors and the end product has got to be cheaper than anybody elses!" Poor lad, you should have seen his face. Anyway, to cut the story short, he returned a few weeks later. He said, "Pete, we've done it. We've employed the latest studio compression techniques with a very rapid decay time that is variable, and we've included a noise gate to suppress room noise. The circuit uses 14 discrete transistors and is dc coupled to keep distortion low. And I've managed to keep the price down to **£26.25** including VAT plus 50p postage". At that price they proved to be unbeatable and we were swamped with orders. Production was accordingly stepped up and we can now generally supply from stock. How long we can keep the price at its present level I don't know but with our money back guarantee you shouldn't miss the chance to get one of the best buys in amateur radio today.

73's Peter G30JV

P.S. We still have a few Shure 444 mics in stock at the old price of **£13.00** plus 25% VAT and 50p postage. Drop Jeff or me a line or phone in your credit card number for instant despatch.

SOLID STATE MODULES

2m or 4m Europa B	£88.00	(1.00)
As above less valves	£74.00	(1.00)
Matching power supply	£34.00	(1.00)
2m converter 2-4/4-6/28-30	£16.20	(25p)
70cm converter 144-146	£16.20	(250)
2m pre amp	£7.36	(25p)
PA3 compact pre amp	£5.94	(25p)
70cm pre amp	£9.72	(25p)

MICROPHONES

Shure 201	£6.95	(30p)
Shure 444	£16.25	(50p)
Yaesu YD844	£18.66	(50p)

MFJ PRODUCTS (USA) (inc VAT)

CWF-2BX boxed cw audio filter	£16.15	(30p)
SBF-2BX boxed ssb audio filter	£18.23	(30p)
CWF-2 unboxed cw filter	£10.42	(30p)
CWF-3 unboxed cw filter	£6.25	(30p)
100BX 100/50/25kHz boxed xtal calibrator	£13.30	(30p)
MFJ-100 calibrator unboxed	£10.82	(30p)
MFJ 100 calibrator less xtal	£7.35	(30p)
CMOS Electronic keyer with monitor	£24.38	(50p)

SPECIAL SIGNAL PUNCHING PACKAGE

Technical Associates Advanced speech compressor with variable compression, decay time and noise gate provides the most economical way of increasing talk power WITHOUT ANY DISTORTION. Still offered at **£22.68** (30p) it's a bargain with the famous Shure 444 mic at **£35** the two units, it's unbeatable! Order yours now and save money.

WANTED—clean second-hand transceivers receivers, etc.

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HOCKLEY AUDIO - SPA ROAD - HOCKLEY - ESSEX

HIRE PURCHASE PRICES INCLUDE VAT (unless stated) **9-5.30 pm Early closing WEDNESDAY** **Tel: 03-704 6835** **TRADE-INs**

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AMATEUR RADIO BULK BUYING GROUP

PLEASE NOTE NEW TELEPHONE NUMBER

We have now moved into larger premises—giving us room to expand our activities and offer an even better service to our many customers
Callers are welcome at our Carshalton office—but please telephone first. Mail orders and enquiries should continue to be sent to our Old Coulsdon address

ALL PRICES INCLUDE VAT

THE G3ZVC SSB TRANSCEIVER

PCB, **£2.20** CRO71-8A Toroid, **24p** MD108 Ring Mixer, **£6.80** QC1246 Filter, **£29.70.** **MiniKit 1** (containing all the above), **£38.85** **MiniKit 2** (semiconductors), **£28.40** **MiniKit 3** (Rs & Cs), **£3.65.**

SPECIAL PRICE FOR COMPLETE KIT, £70.50.

A cheaper 6-pole filter (YF90/F/S) is now also available at **£17.50.** This will obviously not give the performance of the QC1246 but is probably satisfactory for VHF use.

MiniKit 1A (with this filter), **£27.60. Complete kit, £58.30.**

Also available—but not included in kits: *Reprint of article (September 1974)*, **20p** plus SAE; 25Ω Loudspeakers—2½", **£1.56** or 5", **£2.03**; Metal Cabinet, **£1.55**; Min. 50Ω coaxial connectors—PCB mount socket, **51p** and plug, **99p.**
The first of a series of add-on units for the G3ZVC SSB Transceiver are now available:

2m Preamplifier Kit with tailored bandpass and gain to suit G3ZVC Board. PCB size: 3·5" × 1·8". **Price £5.05.**

12V to 6V Regulator/1W Audio Amplifier Kit to power the G3ZVC Board from + 12 volt supply and provide increased audio output. PCB size: 3·5" × 1·8". **Price £7.65.**

2m V.F.O. Kit (by DJ5HD-VHF Communication, Edition 1/71).
This V.F.O. is of the mixer type, having VFO tuning 11 to 13MHz and a crystal oscillator of 62MHz. The 135-137MHz output is fed into the MD108 mixer stage on the G3ZVC board. It is designed for operation on 12V supply. **Kit price £36.50**
VHF Communications Edn. 1/71 75p extra

HF Band Preselector (from data supplied by G3ZVC)
Top capacity coupled, double tuned circuits requiring 2 coils per segment 10/15/20m, 40/80m, 160m plus a 2 gang variable capacitor. RF Amplifier and pre-driver for 12BY7A etc., may be added by 1 coil per segment plus extra gang tuning capacitor each. (i.e. Complete RF Amp + Preselector + Pre-driver for 6 bands requires 12 coils and 4 gang capacitor).

Neosid coil former assembly 26p each; 2 gang X 100pF variable capacitor £3.90; additional gangs £2.20 each; Coil winding data and circuits included FREE.

Full details of above kits will be sent on receipt of sae. Coming soon: 8W and 25W P.A.s for 2m.

IGNITION SUPPRESSION COMPONENTS

We have the widest range of suppressors available as follows:

Screened Plug Connectors (essential for VHF), straight or angled—**78p.** Plug In Distributor Suppressor—**55p** 1μF Capacitor, available with normal push fit lucar connector, large lucar or fully insulated with wire connnections, **28p.** 2μF, normal or large lucar conector, **45p.** 2·5μF Coax type. **£1.63.** 3μF Capacitor for Lucas ACR alternator, **£1.43.** 3A Chokes, **66p.** 7A Chokes, **£1.00.** Solid Copper Stranded Ignition Cable, **7p per ft.** Connectors, **18p for 6.**

SEMICONDUCTORS (INC SL600 SERIES)

The following is a selection from our range of brand new semiconductors—all carrying full manufacturer's warranty:

BC213, **23p**; BF224, **28p**; BF245A, **69p**; BF245C, **69p**; LM309K, **£2.50**; LM380, **£1.26**; SL610, 611, 612, **£2.00**; SL613, **£4.30**; SL620, 621, **£3.00**; SL622, **£7.55**; SL623, **£5.57**; SL624, **£2.83**; SL630, **£1.87**; SL640, 641, **£3.65**; SN72741P, **49p**; TIS88A, **36p**; 2N3819, **39p**; 2N3866, **£1.08**; 40673, **61p.**

CMOS I.C.'s at LOWEST PRICES

A complete range of brand new full sepc. branded CMOS i.c.s at lowest ever prices: **4000** 30p **4001** 30p **4002** 30p **4009** 73p **4011** 30p **4012** 30p **4013** 73p **4016** 76p **4017** £2.03 **4020** £2.27 **4023** 30p **4027** £1.09 **4033** £3.23 **4042** £1.85 **4043** £1.81 **4050** 67p **4055** £1.35 **4056** £1.69 **4069** 47p **4510** £2.44 **4511** £2.63.

The above is a selection from our wide range—full details in our price list.

NEW DECON DALO PEN

We were first to bring you the Deacon Dalo printed circuit board pen and now we are first to bring you the new improved "Quick-Dri" version. Still the same price from us —**85p.**

FILTERS IN STOCK (KVG & MURATA)

We are now the leading UK stockist for KVG Filters and normally hold the following range in stock:

Model	Application	6dB BW	Supplied with	Price (inc. VAT)
XF-9A	SSB TX	2·5kHz	2 × Xtals	**£22.85**
XF-9B	SSB RX/TX	2·4kHz	2 × Xtals	**£30.80**
XF-9E	FM	12kHz	None	**£28.65**
XF-9M	CW	500Hz	1 × Xtal	**£22.90**

We also now have Murata **SFW-10·7MA** in stock at **£1.20** (equivalent to SFG-10·7MA).

REPEATER ACCESS GENERATOR

2 tone version available with the following features: *2 separate oscillators for improved stability, both presettable for frequency (despatched set to 1700Hz and 1750Hz) with provision for a third tone by adding 4 components *each frequency individually selectable by switch *switchable repeat time—approx. 45 seconds (for European repeaters and > 1 min. (for UK repeaters) *provision for adjusting "on" time *built in stabiliser and reverse polarity protection diode *small size—approx. 1·6" × 2·4" × 0·5", *100mV into low impedance with optional high impedance link output. Requires 9-15V supply.

Price £8.50. Availability: Generally from stock.

Single tone version previously advertised still available at **£5.50 (state 1700Hz or 1750Hz).**

CRYSTAL CALIBRATOR

Catronics model M6 giving outputs at 1MHz, 200kHz, 100kHz, 50kHz and 25kHz at the flick of a switch, with harmonics audible up to 2m band. 6 volt supply. Complete PCB module, accurately set to frequency and switch assembly—**£8.90.** Also now available—kits of parts for regulator for operation on 9 to 20 volt supplies, **£1.60.**

MICROWAVE MODULES LTD.

Large stocks of the following available for immediate delivery:
2m Converters with 28-30MHz O/P, **£16.42** Local oscillator output version for transverter use, **£17.60.**
2m Mosfet **Preamplifier** giving 18dB gain, **£9.72.**
70cm units: Converters with 144-146MHz O/P, **£19.55** and 28-30MHz O/P, **£19.55.**
Varactor Tripler with 14W max O/P, **£18.90.**
SSB Transverter for operation with 28-30MHz equipment. 4W O/P on 70cm. In stock soon at **£67.**

'VHF COMMUNICATIONS'

Subscription Rates: 1970, 1971 — **£2.45** per year
1972, 1973, 1974 — **£2.85** per year
1975 — **£3.20**

Individual back copies — **85p**
Binders, to hold 12 editions (3 years), **£1.35**

All above are post free, from UK stock

A number of PCBs are stocked in the UK as follows:
DC6HL001, **£4.30**; DC6HL003, **£2.35**; DC6HL007, **£2.60**; DC6HL009, **£2.87**; DJ4BG006, **£1.82**; DJ6ZZ001, **£3.90**; DJ6ZZ002, **£4.30.**

We are also agents for **Mini-Beam** HF aerials, **Microwave Modules** converters etc and **Swan Transceivers.** Write for free Price List (SAE please). **All prices include VAT at current rates.** Please note that our minimum UK post & packing charge, except where indicated is 15p. Export orders welcome—add 60p postage.
Cheques and P.O's should be crossed and made payable to "Amateur Radio Bulk Buying Group" or pay by **GIRO**—Account no. 31 523 4008.

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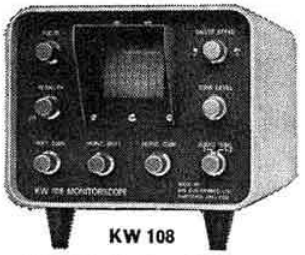
NEW TELEPHONE NO.—01-668 6701 (10 a.m. to 7 p.m., 1 p.m. Sat.)

PROFESSIONAL PERFORMANCE with KW

KW 2000E & Power Supply

KW 2000E Transceiver covers all HF Bands 10–160 metres (10 metres in 4 Bands). 500kHz vfo. SSB/CW. Outstanding Tx audio quality. Excellent Receiver signal-noise figures. Includes VOX, break-in CW, 100kHz and WWV calibrator. Reliable 6146's in pa.

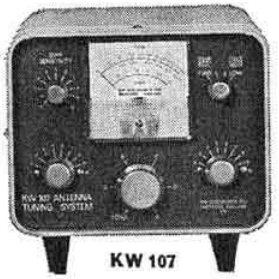


KW 108

KW 108 Monitor Scope Monitor your transmissions 10–160m, two-tone test generator incorporated to ensure optimum linearity for ssb.

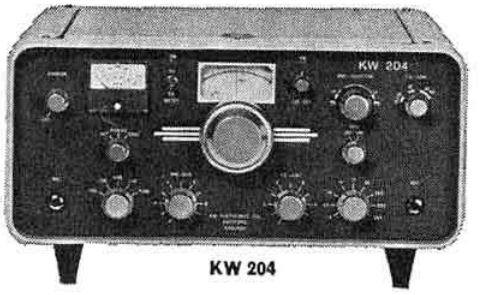
KW 1000

KW 1000 Linear Amplifier 10–80 metres. 1200 watts p.e.p. input max. Designed to be "driven" by KW 2000A/B/E or other Unit of similar power rating. In-built 2·5kV psu. PA tubes pair T160L. Very quiet in operation.



KW 107

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



KW 204

KW 204 Transmitter Well known for really good audio quality (ssb) and a favourite with cw enthusiasts. 10–160 metres. Reliable PA Tubes (2 × 6146).

Stockists for Hy-Gain beams and verticals. CDR rotators, Shure microphones etc.

KW spares are normally carried for a minimum of five years after date of manufacture of equipment.

Other KW Favourites. KW 1000 Linear Amplifier KW E-Z match ATU; KW 160 ATU; KW 103 SWR/RF Power meter; KW Dummy Load; KW Traps (The original and best); KW Trap Dipoles; KW 109 Supermatch (High Power Version); KW Low pass Filter; KW Balun; KW Antenna Switch.

KW Communications Products (DECCA COMMUNICATIONS LTD)

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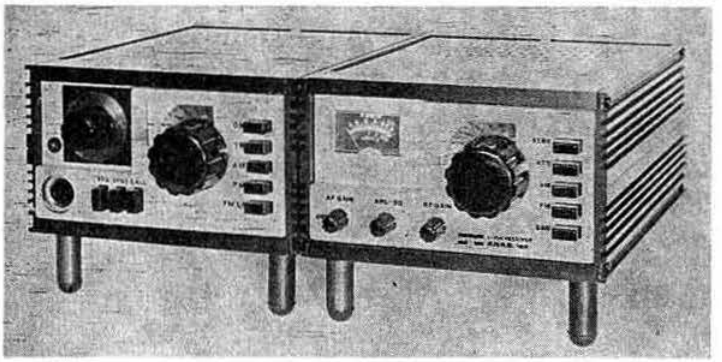

ARAC 102 MOSFET RECEIVER

28-30MHz . 144-146MHz AM, FM, SSB

12V DC OPERATION IDEAL FOR OSCAR 7 TRACKING £105

ATAL 228 TRANSMITTER 144-146MHz AM/FM 8 watts £145

IMPORTANT ANNOUNCEMENT

Please note that as from July 26th the above premises will be closed and we shall be operating from the 1st August 1975 from larger premises at 47, WARRINGTON ROAD, LEIGH, LANCS. These are situated on the A574 Turn at the Greyhound Motel on the A580 (East Lancashire Road) Easy Access to the M6/M61/M62 and M63 Motorways. FULL DEMONSTRATION FACILITIES WILL BE AVAILABLE.

Stockist for the current range of equipment available

★ YAESU ★ DECCA COMMUNICATIONS ★ SWAN ★ STE(Milan) ★ DRAKE ★ OMEGA ★ HY-GAIN ★ G-WHIPS ★ ATLAS ★ SPACEMARK ★ C.D.R. ★ MICROWAVE MODULES ★ ELECTRONIC DEVELOPMENTS ★ SOLID STATE MODULES ★ SHURE ★ AMTRON ★ BARLOW WADLEY ★ EAGLE ★ KATSUMI ★

Send for details and current price list. Due to high rate of postage SAE with all general enquiries please.

ACCESSORIES

All prices include VAT at current prices

Twin Meter SWR Bridge	£11.20	Post 20p
Single Meter SWR Bridge	£8.60	,, 20p
Omega Noise Bridge TE-701	£18.75	,, 20p
Omega Noise Bridge TE-702	£26.25	,, 20p
Planet Speech Compressor	£32.39	,, 30p
MF100 Audio Generator	£22.00	,, 30p
Morse Practice Oscillators	£3.50	,, 20p
Dipole "T" Pieces	32p	
3" Ceramic insulators	32p	
2½" Plastic insulators	15p	

PL259 Plugs 45p SO239 Sockets, 40p; cable reducers 14p; 300 & 75 ohm twin feeder, 8p yard: UR43, 16p; UR67, 40p; Due to postal increases minimum postage charge 20p.

TERMS

We can offer on the spot Credit and HP terms, Part exchanges welcome. We are always in need of good secondhand equipment. If you require top price for your equipment we can sell it for you at a small commission. Full after sales service. All equipment is guaranteed air tested.

Our new Telephone number will be 052-35 76790

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Tel. Crayford 24625 (STD 03225)

MICROWAVE MODULES	
4m & 2m Converters	£15.20
with LO o/p	£16.30
70cm Converter	£18.10
23cm Converter	£24.00
70cm Varactor	£17.50
23cm Varactor	£25.00
2m Preamp	£9.00
ELECTRONIC DEVELOPMENTS	
4m & 2m ssb Transverter	£87.96
KEN 2m HAND PORTABLE	
KP202 6 channel	£75.00
Set 10 nicads	£8.50
Charger	£8.80
SWR BRIDGES	
SWR10	£6.30
SWR50	£11.20
KEN SPEECH PROCESSOR	
KP12	£44.00
INOUE	
IC22A	£115.00
IC210	£200.00
IC225	£195.00
PL-VI VFO	£42.00
IC3PA psu	£35.00
Crystals each	£2.00
BELCOM	
Liner 2	£145.00

BURNS KITS		
FMDI FM detector		£8.30
TBG2 tone burst		£7.55
TTI Tx timer		£5.50
SPI Speech processor		£7.65
PMI Phase mod.		£6.90
MAI 2m preamp		£5.10
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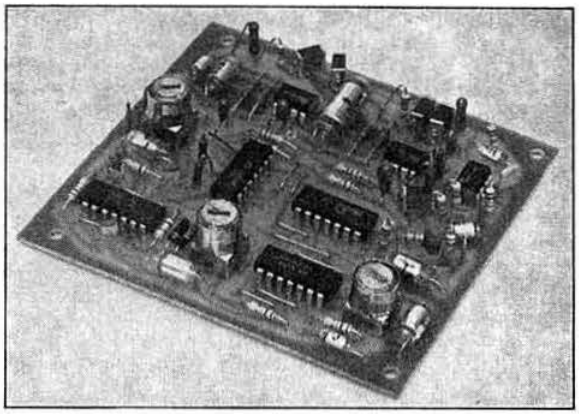

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