June 1977

radio communication

journal of the Radio Society of Great Britain

RSGB AT ALEXANDRA PALACE

Exhibition and Convention Report on p462

▲

A view from the stage of Grand Hall. In the foregound, l to r, John Allaway, G3FKM; Dain Evans, G3RPE; Michael Fadil, G4CCA, the talk-in controller; John Hitchins, G4FGN, the exhibition organizer; Councillor Butler, Mayor of Haringey; and Roy Limb, G8FIA, chief executive of the London Borough of Haringey

The talk-in station run by the Grafton and Southgate clubs with Lionel Rose, G8FZP, at the plotting board

ALL PRICES INCLUDE VAT

AMATEUR RADIO BULK BUYING GROUP

ALL PRICES INCLUDE VAT

A SHORT ESSAY ON COMPONENTS

As it appears that some people have forgotten, and new G8s do not realise, that we sell components, this month we are using this very expensive space to try to list all the components we sell. If the item you require is not listed here it is probably because:

(a) It is not an "Amateur Radio" component
(b) It is not available new at a sensible price
(c) Somebody decided no one would buy it
or (d) We ran out of space

So here goes:

First of all components for designs that have appeared in that excellent magazine "Radio Communication" (Note to editor—no charge for commercial.

THE G3ZVC SSB TRANSCEIVER

PCB, **£2.40**. Toroid, **30p**. MD108 Ring Mixer, **£6.95**.
QC1246 AX Filter, **£31.50** *or* YF-90F Filter, **£22.50** (Not recommended for HF Band use in this project)
MiniKit 1 (containing all the above), **£40.65** or **£31.65**.
MiniKit 2 (semiconductors) **£29.70 MiniKit 3 £4.75.**
SPECIAL PRICE FOR COMPLETE KIT, £73.50 or **£64.50.**
Also available—but not included in kits: *Reprint of article (September 1974)*, **20p** plus SAE, 25Ω Loudspeakers—2½", **£3.10** or 5" **£3.20**. Metal Cabinet, **£2.27**. Min. 50Ω coaxial connectors—PCB mount socket, **58p** and plug, **£1.14**.
Add-on units for the G3ZVC SSB Transceiver available:
2m Preamplifier Kit with tailored bandpass and gain to suit G3ZVC Board, PCB size: 3·5" × 1·8". **Price £5.20.**
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 **£6.90.**
2m VFO Kit (by DJ5HD-VHF Communications, Edition 1/71). This VFO is of the mixer type, having VFO tuning 11 to 13MHz and a crystal oscillator of 62MHz. **Kit price £39.00. VHF Communications Edn. 1/71, £1.00 extra.**
Components for HF Preselector Unit also available—write for details

G3PLX RTTY VIDEO DISPLAY UNIT

Set of integrated circuits (including programmed 74188's), **£55.75.** Veroboards, **£4.30** each.
2513/CM2140, **£9.25**. AY5-1013, **£5.10**. SN74188 (programmed), **£9.50** per pair. 2102-1B, **£2.85.**
Write for details of keyboards and PCB's.

G3TDZ 2m TX/RX (Jan '73)

PCBs: RX, **£2.20** TX, **£1** 3 gang × 17pF, **£2.25** Drive Drum, **34p** C.D. Spindle, **36p** Cord Spring, **8p** 4mm coil Formers, **5p** each or **45p** for 10 Cores, **5p** each or 45p for 10 Ferrite Beads, **2p** each; Trimmers: 10pF, **20p** 35pF, **40p** Filter, **55p** 2½" Loudspeaker, **£3.10** Crystals: (72·05, ·3,· 35, ·4; ·625, ·675, ·75, 9MHz) **£2.80.**
MiniKit 1, Rx, **£13.40** Tx, **£4.95** (State Xtal frequency required).
MiniKit 2, (Semiconductors), Rx, **£5.00**; Tx, **£3.85**, MOD **£1.90.**
MiniKit 3, (Rs & Cs), Rx, **£3.65**; Tx, **70p**; MOD, **£2.00.**
Special price for complete kits, Rx, £21.60; Tx, £9.40; MOD, **£3.85**
(Modulator kits do not include PCB or transformers).
Also available, but not included in kits: *Reprint of article (Jan 73)*, **20p** *plus large SAE.*

G3XGP MINI D.F.M. (Jun '73)

PCBs: I/P Amp, **£1.30** Display, **£1.80** Clock: 1MHz, **£1.45.** Minitron, **£1.80.**
Led, **29p** Transformer, **£2.00** Switch, **55p**, Knob, **45p** 10 turn pot. 1kΩ, **£3.60** 1MHz Crystal, **£4.05** 35pF trimmer, **40p.**
MiniKit 1 (Containing the above), **£23.55.**
MiniKit 2 (semiconductors), **£15.85** (Add **50p** of 30MHz i.cs required —DM7490 & 74HOO)
MiniKit 3 (Rs. & Cs), **£2.95.**
Special price for complete kit (1MHz Clock version), £41.75 (+ **50p** for 30MHz i.cs)
Also available, but not included in kits:
Reprint of article (June 73) **20p** *plus SAE; Metal cabinet,* **£6.85**; 74196, **£1.62.**

Secondly, a design from "Electronics Today International"—

40 WATT 2m P.A. KIT

A Kit for building a 40 watt r.f. power amplifier for boosting the output of 10-watt F.M. mobile transmitters. Automatic solid-state T/R switching is incorporated. Design as published in September 1976 edition of "Electronics Today International". **Complete kit—£18.55** plus **35p** post.

Now for semiconductors—

7400 SERIES TTL

7400	19p	7412	27p	7474	36p	74164	£1.38
7402	19p	7420	19p	7475	56p	74174	£1.19
7403	19p	7421	28p	7483	£1.00	74177	£1.40
7404	24p	7427	34p	7486	35p	74180	£1.30
7406	44p	7428	47p	7490	58p	74H00	35p
7408	26p	7430	21p	7493	65p	74H04	44p
7410	22p	7442	84p	74121	43p	74H10	39p

PLESSEY SL600, etc. I.C.s

SL610C	£2.24	SL611C	£2.24	SL612C	£2.24	SL613C	£3.85
SL620C	£3.38	SL621C	£3.38	SL622C	£8.30	SL623C	£6.12
SL624C	£3.12	SL630C	£2.11	SL640C	£3.75	SL641C	£3.75
SL1496	£1.05	SL78L06	99p	SL301	£2.19	SL3046	80p

Plus lots of other i.cs, transistors and diodes as per our price list. We also have—

FERRITE BEADS and TOROIDS

FX1115 Beads—2p each or **18p** for 10.
FX1886—5mm. Toroid—for use up to 40MHz—**15p** each.
FX1593—½in. toroid for low frequency use—**11p** each.
FX1595—½in. toroid for use up to 10MHz—**16p** each.
FX1598—½in. toroid for use above 10MHz—**28p** each.
4324R/I—similar to FX1588—1½in.—for curing TVI etc.—**30p** each.
FX1898—6 hole bead for suppressing parasitics—**9p** each.

CRYSTAL and CERAMIC FILTERS

We are the leading UK stockists for KVG Filters and normally hold the following range of stock:

Model	Application	6dB8W	Stopband	Supplied	Price
XF-9A	SSB TX	2·5kHz	45dB	2 × Xtals	**£26.35**
XF-9B	SSB RX/TX	2·4kHz	100dB	2 × Xtals	**£35.30**
XF-9E	FM	12kHz	90dB	None	**£32.80**
XF-9M	CW	500Hz	90dB	2 × Xtal	**£25.50**
S.E.1 and Y.T.K.					
QC1246AX	SSB RX/TX	2·4kHz	100dB	2 × Xtals	**£31.50**
YF-90F	SSB RX/TX	2·4kHz	70dB	2 × Xtals	**£22.50**
MURATA					
CFR455H	AM RX	6kHz	55dB	—	**£10.30**
CFS455H	AM RX	6kHz	70dB	—	**£12.30**

STOP—No more space—suggest you send SAE for full price list.

If ordering components, please add minimum of 20p for post and packing.

DEPT. 706, COMMUNICATIONS HOUSE, 20 WALLINGTON SQUARE, WALLINGTON, SURREY, SM6 8RG.
Tel: 01-669 6700 Open 9am to 6pm Mon.-Fri., 9am to 1pm Sat. Closed for lunch 12.45 to 1.45.

RSGB NEWS BULLETIN SERVICE

The RSGB news bulletin, callsign GB2RS, is broadcast every Sunday morning on hf and vhf, giving almost complete coverage of the British Isles. Its main purpose is to provide an outlet for amateur radio news items and announcements which, by virtue of their topicality or urgency, cannot wait for the next issue of *Radio Communication*.

The bulletin is prepared early on Thursday morning, and news items, marked "GB2RS news" should reach RSGB HQ by first post that day (telephoned items can also be accepted until 10am). No guarantee can be given of inclusion in part or whole of any item submitted and, once broadcast, items are not usually repeated.

SCHEDULE

Time	MHz	Location and coverage (hf) or beam heading (vhf) of station
0930	3·65	G2MI, Bromley, Kent (SE England)
1000	3·65	G8ML, Cheltenham (SW England)
	144·50	GM3UAG, Ellon, Aberdeenshire (NNW)
	144·50	G8GGK, Croydon, Surrey (NE)
1015	3·65	GI3GAL, Belfast (N Ireland)
	144·50	GI3TLT, Bangor, Co Down (N)
1030	3·65	G2CVV, Derby (N Midlands)
	144·50	GM3UAG, Ellon, Aberdeenshire (SW)
	144·50	G3PWJ, Brierley Hill (NW)
1045	144·50	G8CDP, Middlesbrough (NW)
	144·50	G8GGK, Croydon, Surrey (SW)
	144·50	G3SMT, Stockport (NNW)
1100	3·65	G5VO, Bridlington (NE England)
1115	3·65	G3LEQ, Knutsford (NW England)
1130	3·65	GM3TCW, Wishaw, Lanarkshire (S Scotland)
1145	3·65	GM3HGA, Aberdeen (NE Scotland)

An rtty news bulletin, callsign GB2ATG, is also transmitted every Sunday at 1200 and 1900 on 3·590MHz and at 1230 and 1245 on 144·6MHz. This bulletin carries items of interest to rtty enthusiasts.

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CONTENTS

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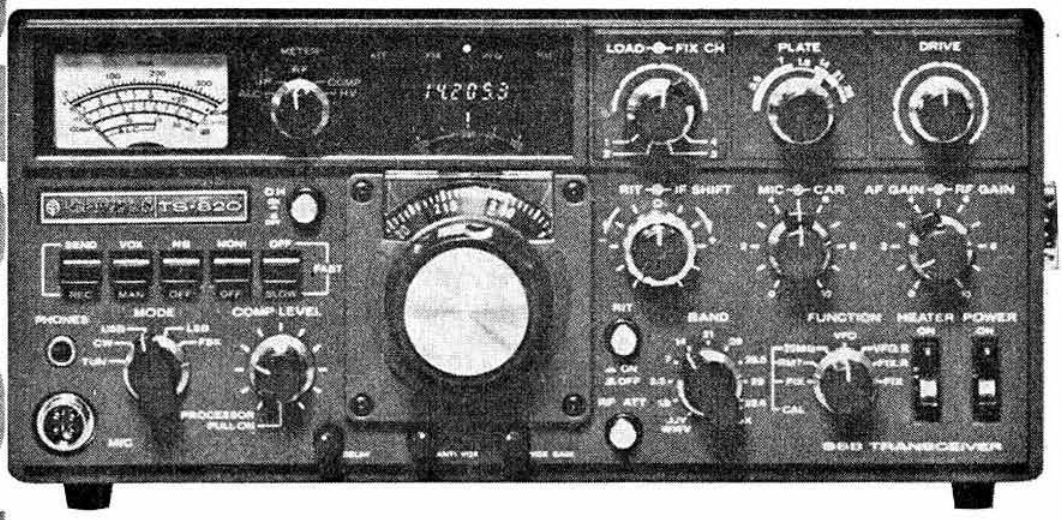
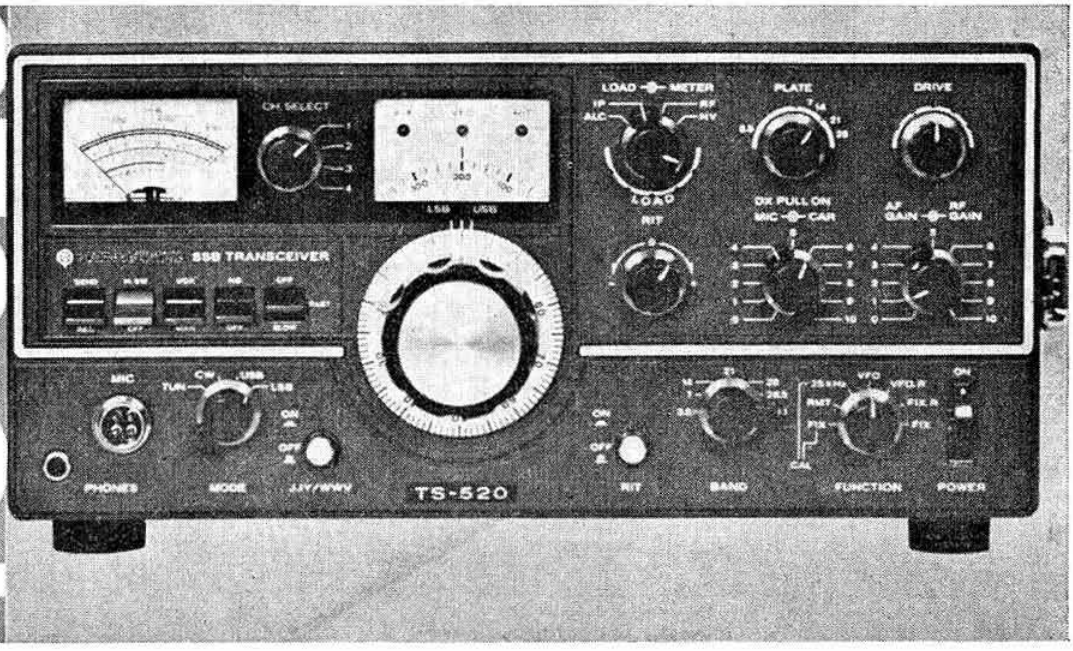
Closing date for contributions unless otherwise notified: 4th of month preceding month of publication.

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

TRIO ... the leaders in

TS-520 TS-820





HF communications

The ultimate transceiver . . . TRIO's TS-820. No matter what you own now, a move to the TS-820 is your best move. It offers a degree of quality and dependability second to none, and as the owner of this superb unit, you will have at your fingertips the combination of controls and features that, even under the toughest operating conditions, make the TS-820 the leader that it is.

Unprecedented demand plus the painstaking care TRIO lavishes on each TS-820 has created a back-log of orders, but rest assured, it's well worth waiting for. Once you have operated the TS-820 you will not be satisfied with anything else.

Features

Following are a few of the TS-820s many exciting features.

SPEECH PROCESSOR ● An HF circuit provides quick time constant compression using a true RF compressor as opposed to an IF clipper. Amount of compression is adjustable to the desired level by a convenient front panel control.

IF SHIFT ● The IF SHIFT control varies the IF passband without changing the receive frequency. Enables the operator to eliminate unwanted signals by moving them out of the passband of the receiver. This feature alone makes the TS-820 the pacesetter that it is.

PLL ● The TS-820 employs the latest phase lock loop circuitry. The single conversion receiver section performance offers superb protection against unwanted cross-modulation. And now, PLL allows the frequency to remain the same when switching sidebands (USB, LSB, CW) and eliminates having to recalibrate each time.

TS-820

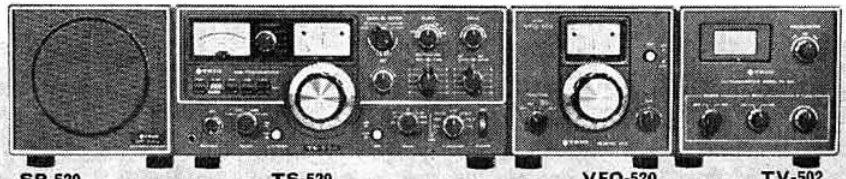
Specifications

FREQUENCY RANGE: 1·8-29·7MHz (160-10 metres)
MODES: USB, LSB, CW, FSK
INPUT POWER: 200W PEP on SSB
160W DC on CW
100W DC on FSK
ANTENNA IMPEDANCE: 50-75 ohms, unbalanced
CARRIER SUPPRESSION: Better than 40dB
SIDEBAND SUPPRESSION: Better than 50dB
SPURIOUS RADIATION: Greater than −60dB (Harmonics more than −40dB)
RECEIVER SENSITIVITY: Better than 0·25μV
RECEIVER SELECTIVITY:
SSB 2·4kHz (−6dB)
4·4kHz (−60dB)
CW* 0·5kHz (−6dB)
1·8kHz (−60dB)
* With optional CW filter installed.
IMAGE RATIO: 160-15 metres: Better than 60dB
10 metres: Better than 50dB
IF REJECTION: Better than 80dB
POWER REQUIREMENTS: 120/220 VAC, 50/60Hz, 13·8 VDC (with optional DS-1A DC-DC converter)
POWER CONSUMPTION: Transmit: 280W. Receive: 26W (heaters off)
DIMENSIONS: 13¼" w × 6" h × 13 7/16" d
WEIGHT: 35·2lb (16kg)

DG-1, digital readout optional

VFO-820

Solid state remote VFO designed exclusively for use with the TS-820 "DXpert" Contains its own RIT circuit and control switch . . . is fully compatible with the optional digital display in the TS-820.



SP-520 TS-520 VFO-520 TV-502

As a TS-520 owner, you go on the air with a sense of pride and confidence. Thousands of these precision-built beauties are in operation all over the world . . . in ham shacks, field day sites, in DX and contest stations and in countless mobile installations. No other rig has ever offered the performance, dependability, versatility and value that is built into every TRIO TS-520.

You have certainly heard the TS-520s clean signal on the air and have probably heard a lot of glowing praise by other hams. So if you don't already own a 520, maybe it's time you did.

MODES: USB, LSB, CW
POWER: 200W PEP input on SSB, 160W DC input on CW
ANTENNA IMPEDANCE: 50-75 ohms, unbalanced
CARRIER SUPPRESSION: Better than −45dB
UNWANTED SIDEBAND SUPPRESSION: Better than −40dB
HARMONIC RADIATION: Better than −40dB
AF RESPONSE: 400 to 2,600Hz (−6dB)
AUDIO INPUT SENSITIVITY: 0·25μV for 10dB (S + N)/N
SELECTIVITY: SSB 2·4kHz (−6dB), 4·4kHz (−60dB), CW 0·5kHz (−6dB), 1·5kHz (−60dB) (with accessory filter)
FREQUENCY STABILITY: 100Hz per 30 minutes after warm-up
IMAGE RATIO: Better than 50dB
IF REJECTION: Better than 50dB
TUBE AND SEMI-CONDUCTOR COMPLEMENT: 3 tubes (2 − S-2001, 12BY7A), 1 IC, 18 FET, 44 transistors, 84 diodes
DIMENSIONS: 13·1" w 5·9" h 13·2" d
WEIGHT: 35·2lb

TS-700G

The same attention to good design embodied in the TS-820 and TS-520 is also evident in the TRIO two metre transceivers. The TS-700G has become the standard by which all others are judged. Full two metre coverage, VFO or crystal controlled. All modes, AM, FM, USB, LSB and CW. Mains or battery operation. Normal and reverse repeater facilities. TRIO exclusive tuning fork access tone generator. Plus, of course, TRIO quality and reliability backed by Lowe Electronics service. If you have not yet seen the TS-700G, go to one of our branches and be prepared to be impressed.
15W output. 0·25 microvolt sensitivity. European standard FM selectivity. This rig has all the others beaten.
PLUS PLUS PLUS. Trio have reduced the price to you. Ask now for details.

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

TRIO

FOR 432MHz ALL-MODE OPERATION....

TOP QUALITY TRANSVERTERS FROM THE PEOPLE WHO KNOW.

In your shack you probably have a transceiver either for 144MHz or for 28MHz.
If this is the case, **YOU** have **NO** excuse for not being active on 432MHz.
With the recent advent of the latest multimode transceivers and hand portable rigs, providing the ideal prime mover for one of our transverters, 432MHz is rapidly becoming the up and coming band for more and more people. Take a listen today and perhaps you will realise the many advantages of moving up onto 432MHz.
Continental stations have been reaping the benefits of 432MHz for some while now. If you are interested in working DX, or simply having a chin-wag with the guy across town, it's about time **YOU** caught on to the new 432MHz trend.
If you're a repeater fanatic there is no need to feel left out. Several 432MHz repeaters are already operational and there are more on the way.

MMT432/28 PICTURED ABOVE

Whatever your interest is on VHF/UHF, 432MHz provides the ideal grounds for operation and development.
For people with 28MHz transceivers our MMT432/28 is compatible, and for those with a 144MHz transceiver, the MMT432/144 is the perfect match. Both units produce an output power of 10 watts (continuous rating), and by using ultra-linear amplifier stages, the "**ON THE AIR SOUND**" is perfectly crisp and clear.
If you haven't yet seen any of our products, we will be exhibiting at most of the rallies and exhibitions this year. If you're not prepared to wait, then please contact us by telephone, post or telex so that we can supply you with any information or equipment you may require.
HEAR YOU ON 432MHz SOON?
PRICES: MMT432/28—£109.13 inc. VAT. MMT432/144—£149.63 inc. VAT.

MICROWAVE MODULES LIMITED

BROOKFIELD DRIVE, AINTREE, LIVERPOOL, L9 7AN

TEL: 051-523 4011 TELEX: 628608 MICRO G.

PAUL
G3VJF

ICOM

INTRODUCE THE MOST EXCITING NEW RIGS YET ON THE 2 METRE MULTIMODE MARKET

IC-211E
£529.00
incl. VAT and delivery

The IC-211E Base Station and its smaller brother, the IC-245E

When it comes to multimode 2 metre transceivers there is nothing quite like the IC-211E, which, although more expensive than its competitors, is really in a class of its own. The new ICOM developed LSI synthesiser provides you with all the advantages of a synthesised transceiver, with a digital display to the nearest 100Hz, without the disadvantage of having several knobs to turn to set up the frequency and consequent inability to "tune the band". The VFO is tuned with a single knob which provides complete coverage of the band in 100Hz or 5kHz steps. The VFO is lockable and the knob is fitted with a flywheel break to facilitate rapid tuning. For even finer tuning on SSB there is an RIT control which automatically cancels itself when the main VFO knob is moved. The RF power is continuously variable from 0.5 to 10 watts and on receive there is an RF gain control which controls the gain of the RF and I.F. stages and backs off the S-meter, providing a "quiet background" when working strong signals on SSB. Dual independent VFOs are incorporated into the LSI chip and there is an accessory termina on the back for a keyboard input. Add to this the features you would expect such as VOX, repeat, reverse repeat and comprehensive metering and you have the 211E.

Its smaller brother, the IC-245E is a very similar animal yet small enough to use mobile if you want to (its size is approx 90 × 155 × 235mm deep). True, you do sacrifice VOX, LSB, RF and MIC gain controls and have less digits on the frequency display. But apart from that you get the same ICOM LSI synthesiser, giving VFOs with any split you like on repeaters, and single knob tuning moving the VFOs in 100Hz or 5kHz steps. This rig is a serious competitor to other manufacturers' "BIG rigs". At a price of £396 inc. VAT it is well worth thinking about an IC-245E.

Don't forget the other items in the popular ICOM range as described in our FEBRUARY advert:
IC-215, IC-202, IC-30A, IC-225, IC-3PA, IC-3PS, IC-20L and BC-20

FOR DETAILS LEAVE YOUR NAME AND ADDRESS OR CALLSIGN ON OUR ANSAFONE (02273 63850) DURING THE EVENING WHEN CALLS ARE CHEAP

Why not see and buy the excellent ICOM range at your nearest Thanet agent—phone for an evening or weekend demonstration.

LONDON—Terry G8BAM (01-556 9366)
SCOTLAND—Ian GM8DOX (078683 3223)
DEVON—Bob G3PQH qthr
WALES—Tony GW3FKO (0222 702982)
MIDLANDS—Tony G8AVH (021 329 2305)
NORTH WEST—Gordon G3LEQ (Knutsford (0565) 4040)
NORTH—Peter G3TPX (022678 2517) . . . Peter has outlets in
HULL—Tony (0482 886392) and the **NORTH EAST**

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YOUR SOLE AUTHORISED UK IMPORTER FOR ICOM

THANET ELECTRONICS

143 Reculver Road, Beltinge, Herne Bay, Kent (02273 63859)

Access

ICOM

DAVE G4ELP

COULD YOU DO BETTER...

THAN BUY AN IC-240 (22 CHANNELS) FOR £198?

In our opinion the IC-240 is by far the best value for money in two metre FM mobile rigs on the market—and judging by the huge world wide demand for these rigs we are not alone in our thoughts. It is not a "flash newcomer" to be scorned but a solidly built, well designed piece of equipment using up to date techniques. The purveyors of another rig of high repute boast its cleanliness of transmitted signal and excellence of receiver design by saying that two of them are being used as a repeater. True, this is a good test which many could not pass and the repeater in question works very well with its associated cavity filters. However, did YOU know that another repeater at the other end of the country has been operating for some time using what amounts to two IC-240s WITHOUT any cavity filters. What's more, plans are afoot to use ONE such rig as the whole repeater. As you know repeaters operate with 600kHz spacing in this country. However, tests with two 240s showed that they could operate at the site of the repeater, without desensitisation, without filters, down to 100kHz spacing between the transmitter and the receiver. How about that Mr W?

Apart from just having a very clean signal the IC-240 has many other advantages over its competitors. For instance, the optimum choice of mic, mic amp and modulator characteristics gives a clear, well clipped signal that is hard to beat—no more woolly signals that are hard to read on the move. Care and attention has gone into the receiver front end, mixer and discriminator design providing an extremely sensitive receiver which up to now has always been quite a bit better than the advertised spec. Oh yes—we have an expensive signal generator too, but it's the IC-240 we are selling and that too has a built-in synthesiser. In fact it is this very point which puts it way above the rest.

As supplied your IC-240 will be wired for 15 channels which are selected by a single knob and displayed on a dial plate which is easy to read. There are 22 channel positions on the switch and you can easily program the remaining positions for the extra channels YOU would like at any of the 80 × 25kHz channels in the two metre band WITHOUT HAVING TO BUY EXPENSIVE CRYSTALS AND WAIT FOR THEM TO BE AVAILABLE. What's more by using 8 switches and diodes and some wire you can make yourself a "VFO" to plug into the socket on the rear to select any of these 80 channels externally. If you are a wizard at logic, or just good at copying other people's circuits, the IC-240 is an ideal set for adding a scanner or a key pad frequency selector.

Add to these advantages the ability to listen on repeater input channels at the flick of a switch, the rugged PA with variable VSWR protection (oh yes, this one works in the wet also), and a built-in tone burst which is wired for automatic operation, when you buy the set from us, and you will see that the IC-240 is by no means just another rig. It is a rugged, reliable top quality product designed and built by the company who have a respected name in VHF—ICOM.

By the way, to help you with the sums, if you bought a crystal controlled set fitted with 10 channels for about £175 and then set about crystalling up the remaining 12 channels this could cost you another £60.—Then you would want 5 reverse repeater Rx crystals at £12.50 and . . . Oh dear! you won't be able to get the same coverage anyway as there aren't enough crystal sockets—IT WILL HAVE TO BE A 240!

ICOM FROM **THANET ELECTRONICS**
HERNE BAY

PAUL
G3VJF

ICOM

DAVE
G4ELP

IC-215
HANDY
FM PORTABLE

15 channels 3 watts

£162.00 with S20, S22, R3, R4, R5, R6, R7, plus continental repeater channels FREE on a limited number while stocks last.

ICOM are pleased to introduce their first FM portable and a careful look at the features will soon show how popular it's going to be. You can use it ANYWHERE. Change vehicles, use it in the shack or take it for a walk to the local high spot and you have the high quality FM communication, for which ICOM are so famous, available all the time. The batteries are larger than those of its competitors, thus giving considerably longer life. The 3 watt output and high sensitivity receiver makes it a useful main station set, where it can be operated from an external power supply and a good antenna system. Thus the IC-215 can be a good starting point for the man who has just obtained his licence and wants to get on the air without having to spend too much money.

LOOK AT THE MAIN FEATURES:

Aluminium Die-cast Frame The IC-215 chassis and main frame are integrated into an aluminium die-casting rendering it light but resistant to vibration or shock when carried.

15 Channels The unit incorporates 15 channels to select from: 12 by the main channel selector and a further 3 by the function switch. All crystals are plug-in-type HC-25/U and are the same as the crystals used in the popular IC-22A. Being fundamental crystals, they are tunable over a reasonably wide range and a separate trimmer is supplied for each crystal making accurate frequency adjustment possible. This is very important for optimum results with minimum interference.

Dual Power Mode The output power can be switched to 3W on HI for long distance work or 0·5W on LOW for short distance contacts or working a nearby repeater. Battery consumption is minimised in the LOW power mode.

Dial Illumination The dial can be illuminated to facilitate night operation. This is controlled by a selector switch on the front panel.

Power Pilot Lamp If the power voltage falls below the required value a red LED power indicator goes out as an indication that the batteries are almost exhausted or the external power is inadequate.

External Power and Antenna Sockets Sockets for external power and antenna are provided on the rear. The antenna socket takes a standard PL259 plug.

Whip Antenna A fully collapsible antenna is built into the top of the rig. This can be unscrewed and removed to provide a screw socket for a flexible helical antenna. We have had an Antenna Specialist flexible antenna specially made and tuned to suit the IC-215.

Meter The meter indicates receive signal strength during reception and relative output level during transmission.

Squelch A sensitive squelch control is fitted rendering the set silent when no signal is being received.

External Speaker Jack An externa ljack is fitted to the front panel for a larger speaker or an earpiece. The internal speaker is muted when this is used.

Discriminator Meter Jack By removing a rubber grommet on the side of the transceiver a jack socket is available for connection of a 50 microamp centre-zero meter. This is very useful when tuning extra receive crystals.

Tone Burst A 1750Hz tone burst is fitted for opening UK repeaters.

Shoulder Belt A shoulder belt is supplied and is fixed to clips on the top of the rig. There is also a microphone hook. The side panels of the set itself are covered in leather simulated vinyl.

Excellent FM Audio Tailoring and Clipping This feature, already well known from the excellent quality produced by the IC-22A, ensures clear optimum talk power without over deviation. This makes the IC-215 a far better rig for use with repeaters and gives an optimum range, for the power used, on simplex contacts.

ACCESSORIES INCLUDED:

- Dynamic microphone
- Microphone Case
- Shoulder strap
- Power supply plug
- Comprehensive English handbook
- External speaker plug
- Discriminator socket plug
- Earphone
- 9 × Dry cells type C (U11)

OPTIONAL EXTRAS:

- IC-3PS Power supply which doubles as a holder for the IC-20L linear and supplies power for both the 215 and the linear.
- IC-20L 10 watt linear amplifier.
- IC-SM2 Desk type condenser microphone with built-in amplifier.
- Ni-Cad Batteries.
- Charger for charging the Ni-Cads in situ.
- Helical stub antenna.

FOR LIST OF AGENTS SEE PAGE 422

DIRECT ANSAFONE 00273 63850

Access

YOUR SOLE AUTHORISED UK IMPORTER FOR ICOM

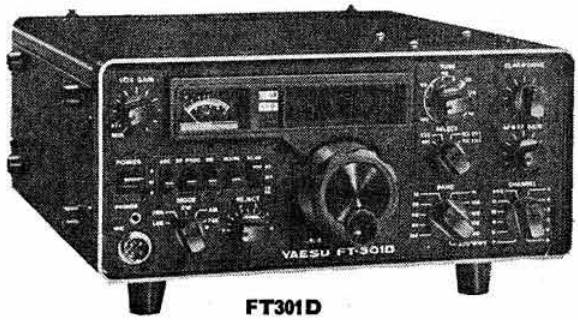
THANET ELECTRONICS

143 Reculver Road, Beltinge, Herne Bay, Kent (02273) 63859 — 2 lines

Access

YAESU MUSEN

FT301 SOLID STATE MOBILE—



FT301D

YAESU'S fully solid state transceiver line features the latest in technology:- Bandpass filters with wideband PA eliminates PA tuning for band changes, RF speech processor, IF tunable rejection control, full no compromise top band to ten (2MHz) coverage

PROFESSIONALLY ENGINEERED TRANSCEIVER RANGE FOR THE UNCOMPROMISING AMATEUR

FT301S 10W analogue	FT301SD 10W Digital
FT301 100W analogue	FT301D 100W Digital

FT301D FEATURES (WITH OPTIONS INSTALLED)

160-10 metre inclusive coverage
Multi mode USB-LSB-CW-AM-FSK
12VDC (234V with FP301 & FP301D)
11¼" (14") × 5" × 11½", 22 lb weight
Silky smooth precision VFO drive
Readout to 100Hz (digital version)
11 fix channels per band Segment
Semi break in with sidetone
4 models—10/100 Dig/analogue
RX on M.S.F. (5MHz) and CB
Front panel microphone gain
R.F. derived feedback circuit
Rejection tuning (I.F. passband)
RF speech processor (in I.F.)
Adjustable carrier level
Fully switchable 3 position A.G.C.
Clarifier (IRT with RT and TT)
600Hz, 2·4kHz, 6kHz bandwidths
Triple PA protection circuit
100kHz crystal calibrator + MSF
Switchable fixed noise blanker

FT301 SPECIFICATIONS

Frequency range
160-10 metres transceive
M.S.F. and CB receive
Modes
USB, LSB, CW, AM, FSK
Frequency stability
>100Hz/½H (A.W.U.)
<100Hz for 10% line change
Backlash
50Hz or better
Antenna impedance
50 ohms, nominal
Power requirements
234V AC with FP301
13·5V DC 1·1A RX 21A TX

Sensitivity
½μV for 10dB N + S/N @ 14MHz
Selectivity
SSB 2·4kHz at 6dB (1·67:1SF)
AM* 6kHz at 6dB (2:1SF)
CW* 600Hz at 6dB (2:1SF)
FSK as SSB
Spurious responses
Image > −50dB
Internal spurious <1μV
Audio output
3W (int. and ext. speaker)
Audio distortion
<10% at 3W output

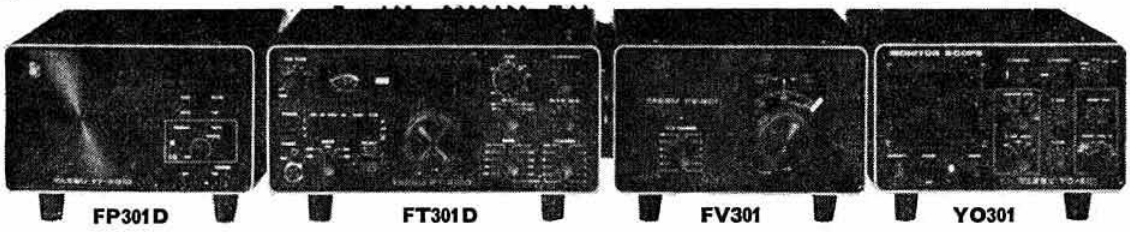
Input power
>200W PIP A3j
>200W DC A1 (50% duty)
>50W A3 and F1
Audio response
0·3-2·7kHz ±3dB
Carrier suppression
> −40dB
Sideband suppression
> −50dB
Spurious radiation
> −40dB
Dimensions
11¼" (14") × 5" × 11½", 22lb

★ THE FT301D AND ACCESSORIES ALL YOU NEED FOR A COMPLETE HOME STATION ★

The FP301D AC PSU with built in speaker, 12/14 digital clock and optional automatic CW identifier.

The FV301 external V.F.O. for split frequency working with a 11 crystal channels (per band segment).

The YO301:- Monitor; TX (1.8-50MHz @10-500W) RX IF (9-10.7MHz). Scope 4MHz BW. 2 Tone Osc., etc.



FP301D FT301D FV301 YO301

AT YAESU MUSEN—AMATEUR RADIO EQUIPMENT IS NOT A SIDELINE BUT THE ONLY BUSINESS. OVER 130 LICENSED AMATEURS PROUDLY PRODUCE THE MOST DIVERSE PRODUCT LINE AVAILABLE, SSB, CW, AM, FM OR FSK FOR MOBILE, PORTABLE OR BASE USE. WRITE TO ONE OF OUR DISTRIBUTORS FOR A FREE CATALOGUE.

YAESU MUSEN

—BASE TRANSCEIVER FT221R

YAESU's state of the art, fully modular, plug in board, multimode, 2 metre transceiver renders over the board "rats' nest" wiring obsolete. A 134MHz, VCO, automatic varicap tuning of transmitter and receiver, gives you an exceedingly clean signal, and a sensitive receiver having outstanding strong signal handling capabilities.

FT221R

FT221R FEATURES

144-148MHz inclusive coverage
Multi mode AM-FM-USB-LSB-CW
234V AC or 12V DC working
11¼" (14") × 5" × 11½", and 22lb
Dual speed smooth VFO drive
Readout to better than 1kHz
44 fix channels (4 × 11) (2MHz)
Semi break-in with sidetone
Unique automatic tone burst
P.T.T. microphone supplied
Front panel adjustable VOX
Front panel microphone gain
ALC external phono socket
70W dissipation PA device
600kHz and repeat shifts
"S"/centre zero/output meter
Clarifier (IRT with RT + TT)
2·4kHz SSB 12kHz FM bandwidth
Adjustable sensitive squelch
100kHz crystal calibrator
Switchable noise blanker

FT221R SPECIFICATIONS

Frequency range
144-148MHz
600kHz + 1 other shift

Modes
USB, LSB, CW, AM

Frequency stability
>100Hz 1½H (A.W.U).
<100Hz for 10% line change

Backlash
>50Hz

Antenna impedance
50 ohms unbalanced

Power requirements
234V AC 30W RX, 90W TX
12V DC 0·6A RX, 3A TX

Sensitivity
0·5μV for 10dB S/N at 145MHz

Selectivity
SSB 2·4kHz at 6dB (1·7:1 SF)
AM as SSB
FM 12kHz at 6dB (2:1 SF)
CW as SSB

Spurious responses
Image > −60dB
Internal spurious <1μV

Audio output
3W (int. and ext. speaker)

Audio Distortion
<10% at 2W

Output power
>14W PEP A3j
>10W F3, A1
>2·5W A3

Audio response
0·3–2·7kHz ±3dB

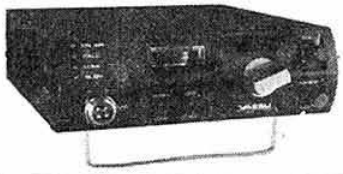
Carrier suppression
> −50dB

Sideband suppression
> −50dB

Spurious radiation
> −60dB

Dimensions
11¼" (14") × 5" × 11½", 22ib

FT223 — THE NEW COMPACT MOBILE 2m FM TRANSCEIVER



The FT223 is an FM transceiver operating on 23 crystal controlled channels (or by external VFO) across 144 to 148MHz. For mobile uses it is safe; illuminated; meter (RX 'S' and TX out) and main dial (when crystal up). LED's indicate; squelch open, high 10W or low 1W operation, on air, or if the special frequency is selected. Housed in heavy metal case and supplied complete with mounting bracket cables, connectors, microphone, etc., it is equally at home as a compact (7" × 2½" (3") × 8½" (10")) base station with a 12V PSU, (0·45A RX, 1·2A LTX, 2·3A HTX). The dual conversion receiver is sensitive (mosfet RF and mixer), and selective, (12kHz at 6dB) delivering 2W to the internal 3" or an external 4Ω speaker. A switchable repeater access tone burst and a tone squelch option (Sub audible selective calling tone T/RX) are all features of this new high quality, low price, transceiver.

OUR AGENTS

Amateur Electronics,
508-514 Alum Rock Road,
Alum Rock, Birmingham B8 3HX

South Midlands Communications Ltd,
S. M. House, Osborne Road, Totton,
Southampton, Hampshire SO4 4DN

Western Electronics (UK) Ltd,
Fairfield Estate,
Louth, Lincolnshire LN11 0JH

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FT101E, EE OR EX FROM SMC FOR SERVICE

The FT101E. A complete mains or 12v. DC station contained in a compact 30 lb. package, 260W, PIP of SSB (with in-built RF speech processor) 180W, CW and 80W or AM 10 to 160m (inc. 10 MHz RX). The sensitive and selective (permeability tuned RF stages and 8 pole crystal filter) receiver offers: threshold adjustable noise blanker, switchable 25 and 100 kHz calibrator, ± 5k clarifier (with separate on/off switch), etc., etc.

The VFO is stable and linear (readout to 1 kHz), external VFO or crystal control can be selected, with LED indicators illuminated accordingly. Carrier level is adjustable for: tune up, AM and for CW operation, whose performance with the semi break-in keying, with side tone, and the optional 600 Hz filter installed is of high order. Linear and transverter provisions are made with sockets for: relay contacts, ALC output, all internal HT supplies, low level RF, heater links and switches, etc., etc.

FT101E

FT200 FROM SMC FOR VALUE!! £249 + VAT. FP £54 + VAT

FP200 FT200

The FT200B. The "Best Buy"—260W PIP (A3), A1) 75W (A3), 80 to 10m. (28·5-29 MHz, 3 other crystals optional). Sensitive and selective 2·3 kHz at 6 dB (1·75 : 1SF). Solid state, stable, linear (readout to 1 kHz), gear driven VFO, 100 kHz calibrator. VOX/PPT, clarifier (±5 kHz). Semi break-in CW with sidetone, etc., etc. The pre mix oscillator system used, yields: low spurii outputs on transmit, and the good signal handling and low noise capability of a single conversion superhet (whilst retaining a 9 MHz IF with high image rejection) and single range VFO stability.

THE VERSATILE ONE — SIGMASIZER 80R ▶

The Sigmasizer 80R offers 80 (25kHz increments) channels on 2M. The received frequency is always indicated on the dial, either transceive (simplex) or for repeaters, the transmitter is automatically shifted down 600Hz. When the receiver is tuned to repeater input channel, the transmitter is automatically shifted upwards thus offering full, simplex, normal repeater or inverse repeater. The built-in tone burst functions only in repeater mode. A further channel may be programmed for instant selection of a local net or RAEN frequency. Automatic final protection, 10W of RF and a generous 2W of audio are available from the unit which draws only 2.2A on 12V DC.

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◀ KP202 TRANSCEIVER

6 channel 144MHz handheld fully crystalled up

The handheld KP202 with its 2W of RF and ½W of audio immunity to image and IF break-through, offers performance to rival all walkie-talkies and many mobile 10W sets. The KP202 is supplied with telescopic whip, leather handle/whip case and F type plug. Accessories include automatic (R channels only) crystal tone burst (**£10.00**), flexi stubby antenna (**£5.80**), leather case (**£4.90**), base charger KCP2s (**£11.25**), set of 10 ni-cads (**£8.50**), F to UHF adaptors (**£1.65**), F plugs, spare whips, spare hods, etc.
SIX CHANNELS fitted S20 and S22 and any 4 of SO, S21, S23, S24, R3, R4, R5, R6, R7 ONLY **£109.50** (+ VAT)

SEIWA MR2 & MS2 ▶

This tiny yet well engineered sensitive Rx is ideal for the SWL, XYL or as a monitor Rx. The MR2 has 12 switched channels, (2 or 4 metre models are available). The MS2 automatically scans 4 channels on 2m.

All are double conversion, 12kHz bandwidth, automatic squelch, good audio output and will fit into your top pocket, or on a belt (with optional case). Complete with ni cads, mains charger, speaker, earpiece, aerial. Wt. 7 ozs. Size 122 × 69 × 33mm.
MR2 **£53** + VAT, MR2 (4m) **£53** + VAT, MS2 **£62** + VAT, leather case **£1.90**. Additional channels **£2** + VAT.

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CUSHCRAFT VHF OMNI (Carr. 90p) VAT 12½%

ARX2 Ringo Ranger 145MHz	£21.50	ARX450 Ringo Ranger 432MHz	£21.50
AR2 3dB Ringo Vert ..	£12.75	ABW144 2m Big Wheel ..	£14.50
AR2S QRO AR2	£15.00	ABW12S ABW harness ..	£7.30
CX1000 29MHz Ringo ..	£25.75	ASQ1 2m Squalo	£11.75

JAYBEAM 70 (4m), 144 (2m), 432 (70) (Carr. about £1) VAT 12½%

D5/2m 5 over 5 slot feed ..	£11.00	PBM10/2m 10 ele Para ..	£20.50
D8/2m over 8 slot feed ..	£14.75	PBM14/2m 14 ele Para ..	£25.20
5XY/2m 5 element crossed	£12.90	D8/70 8 over 8 slot feed ..	£12.57
5XY/2m 6 element crossed	£16.10	PBM18/70 18 ele Para ..	£15.00
10XY/2m 10 element crossed	£21.30	MBM48/70 46 ele Mutil ..	£17.50
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Q4/2m element yagi ..	£13.20	PMH2/C Circ. phasing ..	£4.10
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SMC TRAPPED DIPOLES (Post 45p) VAT 12½%

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HP IK P.I.P. 14 SWG	£21.75	braid c/w 75′ feeder, etc.	£21.75

MOSLEY TRI-BAND BEAMS (Carriage £2.50) VAT 12½%

TA33 3 ele. 200W R.M.S. ..	£72.00	TA32 2 ele. 300W. A.M. ..	£49.00
MUSTANG 3 ele. ..	£90.00	MUSTANG 2 ele. 1kW ..	£73.00

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203BA 20m. 4 element ..	£103.40	TH6DXX 10-20m. 6 ele. ..	£164.50
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BGA f.g. ½ 2m fibreglass	£8.75	Trunk Lip Mount	£5.75
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B5U ½ 432MHz	£5.00	Standard base unwanted deduct	£0.50

COAX PLUGS (p & p 30p) VAT 8%

PL259 Standard UHF plug	£0.48	258 Back to back (female)	£0.80
UHF fixed reducer ..	£0.56	"T" adaptor (2F + 1M)	£1.20
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"Solderless" UHF UR43	£0.51	Phono/car to SO239 ..	£0.55
UG**Reducers state UR43 or 70	£0.12	SO239 2-hole socket ..	£0.37

ROPES (Carriage extra) VAT 8%

3mm HT steel ..	..yd.	£0.13	X150 Rustproof 150m ..		£10.85
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AERIAL INSULATORS (Post extra) VAT 12½%

2½" polyprop ribbed ..	14p	SMCP1 8" carbon polyprop	85p
NTI 4½" polyprop ribbed ..	45p	3" porcelain ribbed	33p

AERIAL WIRE (Carriage extra) VAT 8%

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

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AR30 (illus. right near and centre)	£39.50
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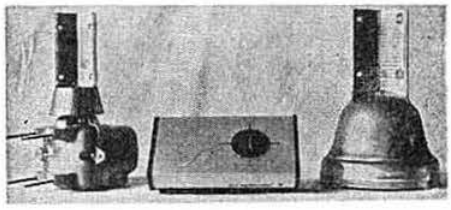
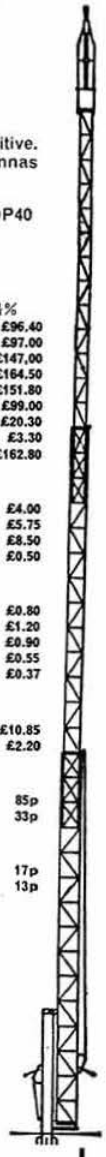
CD44 (C.B. illus. left) med. duty	£95.00
Ham II (C.B. illus. left) heavy duty	£129.00
2010/220 Stolle though Rotator type	£41.25
2030/220 De-luxe Stolle ..	£45.50
CD562	£4.50
RZ100	£10.00
5 core—AR30/40/33/2030 .. per yd.	£0.22
8 core—CD44, Ham II .. per yd.	£0.35





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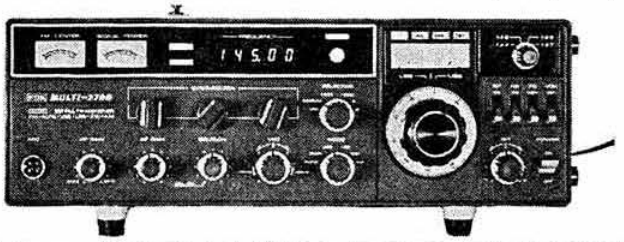

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PA3 2m. miniature pre-amp board	£6.27	(n.c.)

WATERS

Stable tone-burst modules 1750Hz	£3.93	(25p)

POLAR ELECTRONIC DEVELOPMENTS

Magnum 2m. transverter	£151.90	(£1.50)
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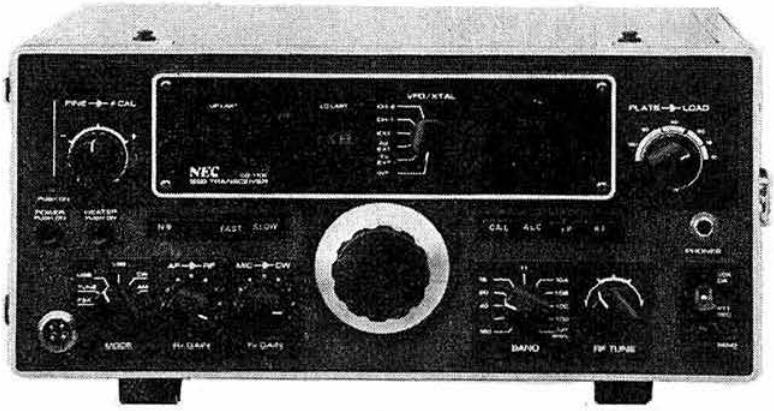
NEC  NEC

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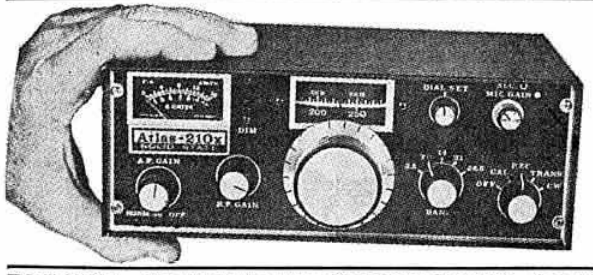

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Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the general manager, from whom full details of Society services may also be obtained.

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EDITOR
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UK corporate: £8, including VAT — **Overseas: £8.**

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COMPOSITION OF RSGB ZONES

Zone A: Regions 1, 2 and 18
Zone B: Regions 3, 4 and 5
Zone C: Regions 7, 8, 19 and 16
Zone D: Regions 6, 9, 17 and 20
Zone E: Regions 10 and 11
Zone F: Region 15
Zone G: Regions 12, 13 and 14

MEMBERS' ADS

Rate increase

The current rate for Members' Ads was introduced in August 1975 and members will need no reminding how costs of everything have increased since then. Not least of these have been printing costs, and it has now become necessary to offset some of these by increasing the cost of Members' Ads.

It has therefore been decided that the flat rate for 40 words or less shall be increased from 50p to 75p.

This new rate will cover only the typesetting costs of the advertisements and it is emphasized that the Society will still subsidize this service to members by continuing to cover the costs of paper and printing, both of which have also escalated over the past two years.

All Members' Ads received up to and including 1 July 1977 will be accepted at the current rate, but after that date only advertisements **at the new rate of 75p** will be accepted.

1952 E II R 1977

The Radio Society of Great Britain extends to HM the Queen its loyal greetings on the occasion of the Silver Jubilee of Her Majesty's accession

QTC

amateur radio news

Member references in data processor

Many non-licensed members have queried the prefix reference "RS" instead of "BRS" before their membership numbers. This change was made to save space on the data processor memory. The use of BRS is still valid as before but by leaving off the "B" in the entries 25,000 spaces were saved.

Also, since the change to the Articles of Association whereby *all* members under 18 years of age, whether they had a licence or not, could remain non-corporate members, the separate associate member numbers were also discontinued and all new members included in "RS" listing. The earlier "A" numbers will eventually be absorbed into the RS references.

The RS references will, of course, be maintained for those members who become corporate members on reaching the age of 18 years, unless, of course, they obtain a licence, when their callsign will replace the "RS" number.

QSL Bureau

Three changes have been made to the list of sub-managers published in the May issue.

Following the death of Mr Len Butler, G2BUL; Peter Lumb, G3IRM, 14 Linton Gardens, Bury St Edmunds, Suffolk IP33 2DZ, has been appointed sub-manager for the group G3IAA-G3KZZ.

Mr Tom Cheesley, G4CHP, has been forced on health grounds to give up the series G4CAA to G4CZZ, which has been taken over by Mr Phil Jobson, G3HLF, 41 The Avenue, Gravesend, Kent DA11 0NA.

Due to pressure of business, Mr Ernie Gibbins has given up the G4FAA-G4FZZ series and the new sub-managers of this section are Mr and Mrs A. R. Burchmore, G4BWV and G8LXK, School Lane, Horton Kirby, Dartford, Kent.

Mr Brian George, G3ZOH, 43 Magnolia Drive, Biggin Hill, Kent, has been appointed sub-manager for the G4G-series.

Facts and figures

The Home Office advises that the following numbers of amateur licences were in force at 30 April 1977:

Class A 16,037 Class B 6,352

At the same date the latest callsigns issued in the G4 and G8 series were G4FZT and G8NHN respectively.

Break-in at Alexandra Palace

During the RSGB exhibition at Alexandra Palace last month, a break-in unfortunately occurred on the Friday night during which, among other items, the following equipment was stolen:

Two items from the Thanet Electronics stand which were almost unique and easy to identify—IC-215 portable vhf 2m transceivers serial numbers 0051 and 0076, which unlike all models normally imported into the UK and other European countries are not fitted with a TONE CALL button. A reward is offered for information leading to recovery of the equipment and a prosecution. Information please to Thanet Electronics or Muswell Hill CID.

From the Doram stand a prototype digital multimeter.

From the Waters and Stanton stand a TM56B receiver, serial number 20067; two multi-2 transceivers, Nos 24580 and 24687; an electronic wavemeter and an AR30 rotator.

RAE manual in braille

The Royal National Institute for the Blind, 224 Great Portland Street, London W1, intends to publish the *Radio Amateurs Examination Manual* in braille if sufficient orders are received. It will consist of four volumes at an estimated price of £4 per volume; subject to 90 per cent discount to blind persons and certain organizations, so that at the estimated cover price the discount price would be £1.60 for the set of four volumes. Orders should be addressed to the RNIB at the address given above.

New NZART president

We are very pleased to hear that Mr A. G. Godfrey (Jumbo), ZL1HV, ex G3DAF, has been elected president of the New Zealand Amateur Radio Transmitters Society for 1977-8.

We wish him every success as leader of the ZL amateurs.

RSGB Region 1 lecture

Over 200 RSGB members attended the regional lecture given on 1 April at the Grappenhall Community Centre, Warrington, Cheshire. The meeting warmly greeted the Society's President, Lord Wallace of Coslany; Dr J. Allaway, G3FKM; J. Bazley, G3HCT, and B. O'Brien, G2AMV, all representing RSGB Council. The meeting was opened by G3SMM, the regional representative, who after welcoming the Society's representatives and extending the thanks of all to Warrington Club for their excellent arrangements introduced the speaker, Mr Peter Jones, G2JT, who then presented his lecture "Antenna systems from vlf to shf".

Mr Jones delivered a most interesting talk and raised several points for discussion which were to a degree covered in a period allowed for questions at the end of the lecture. The vote of thanks to Mr Jones was proposed by Mr K. Birch, G2FOS.

G3SMM then introduced Lord Wallace who spoke to the meeting on Society and other matters. At the end of his address Lord Wallace presented G2AMV with a suitably engraved silver salver on behalf of the amateurs in Region 1 to mark the completion by G2AMV of a record 25 years as representative for the region. G2AMV, who was taken completely by surprise, recovered his composure sufficiently to respond and express his thanks for the presentation. The meeting then closed with the usual raffle draw.

The organizers wish to express their thanks to all the Society members who attended and for making the evening a complete success.

Invitation to Basingstoke

The Basingstoke ARC invite all RSGB members in the Basingstoke area to a meeting of the club on 15 June when Les Hawkyard, G5HD, Region 17 representative, will be present to discuss RSGB matters. It is felt that it will be valuable for members in the area to use this opportunity to convey their opinions to G5HD in person before the Regional Representative's Conference in October.

The club meets at Chineham House, Shakespeare Road, Popley, Basingstoke, which is situated alongside the A33 Reading to Basingstoke Road, adjacent to its junction with the A339 Basingstoke (northern) ring road. The clubroom will open at 7pm and the discussion will commence at 7.30pm.

Radio Amateurs Old Timers' Association

The Nineteenth Reunion of RAOTA took place on 22 April at The Horseshoe, Tottenham Court Road, London W1, when an attendance of 48 was recorded. Lord and Lady Wallace of Coslany were guests of honour. Dr Rudi Stuber, HB9T, of Zurich, was a very welcome visitor.

The next reunion will take place on Friday 21 April 1978, again at The Horseshoe.

Any amateur who has held a transmitting licence for a period of 25 years is eligible to join RAOTA. Those interested in applying for membership should write to the hon secretary, Miss M. Gadsden, 79 New River Crescent, London N13 5RQ, for the necessary application form, or telephone 01-882 1272.

Ex-G Radio Club

Many radio amateurs born in the UK and now domiciled abroad are members of this club which seeks to keep its members in touch with each other and with the UK by means of an excellent bulletin and on-the-air nets. The club is affiliated to the RSGB and actively promotes the Society. Any Ex-Gs who are interested in membership of the RSGB and live in N America can, in the first instance, contact Reg Cherrill, W3HQO, the founder and first president of the club, for further information. His address is 519 Lincoln Avenue, Hulmeville, PA 19047, USA.

Rotarian amateurs

In order that an up-to-date list of all Rotarians in Great Britain who are actively interested in radio may be compiled, would all radio amateur members of Rotary clubs please send a postcard to Rot Reg Leigh, G4EWY, QTHR, or c/o The Rotary Club of Lancing, Sussex, stating name, callsign and frequencies generally worked, together with the name of their club. This includes SWLs.

There is a Rotary net covering RIBI every Sunday morning at 0830gmt on 3.692MHz ± QRM. All Rotarians welcome to join.

Calling all yl amateurs

At the Drayton Manor Rally on 17 April a meeting of yl operators and SWLs was held with a view to forming a British Young Ladies Association. The aims at the moment are to further yl operating in the UK, to promote friendship, and help in any matters arising or relating to yl interests. Would any yl interested in the idea please contact the following: **SWLs:** Miss Brenda Tomlinson, BRS36275, 45 Altrincham Road, Wilmslow, Cheshire. **VHF operators:** Mrs Mary Adams, G8LYM, "Little Croft", Shurdington Road, Cheltenham, Glos. **HF operators:** For those interested in dx: Mrs Diana Hughes, G4EZI, QTHR. For those interested in cw: Mrs Barbara Lambert, G4EKX, QTHR. SSB operators: Mrs Joan Heathershaw, G4CHH, QTHR.

A television and ssb transmitter for 432MHz

by DAVID TAYLOR, GM8ARV*

TELEVISION transmitters, along with many other systems, have undergone fundamental design changes over the last few years. Like ssb, this new approach to tv transmitters involves low level generation at i.f., mixing to final frequency, and linear amplification at final frequency. It is the intention of this article to demonstrate a tv transmitter using this technique and to suggest extensions of the basic design to cover individual operating requirements.

Television, 625 lines and spectral occupation

A complete description of the tv signal would be beyond the scope of this article, but it will suffice to note that the signal contains frequencies up to 5·5MHz (625 lines) or 3MHz (405 lines). In addition a colour signal (yes, some amateurs do use colour) will contain significant components at 4·43MHz. Domestic tv is transmitted by amplitude modulation, and amateurs naturally use the same standard, as they can then use a converter in front of a normal receiver for reception.

On 405 lines the average camera, perhaps using an integral mesh vidicon tube, will have spectral components of up to 2MHz. Consequently with normal dsb a.m. the occupied bandwidth at rf will be no more than 4MHz. With 6MHz free above the old top limit for sound a.m. working of 434MHz there was no problem in choosing a video carrier frequency of, say, 437MHz. One could then be certain that one would spread neither below 434MHz nor above 440MHz.

Now consider the situation with a 625-line signal. Here the signal itself, which may be from a separate mesh tube, could have a bandwidth of 5·5MHz and thus might take up 11MHz of rf spectrum. There is only 8MHz available on the 432MHz band, so users of transmitters without special filters have to be particularly careful about their carrier frequency and video bandwidth. An even worse situation arises if a colour signal is to be radiated, as there is then quite a lot of power at 4·43MHz video frequency, rather than the small amount from a typical scene and camera. Television transmissions in this country are kept within an 8MHz channel. How is this done?

Vestigial sideband transmission (vsb)

Unfortunately it is not yet possible to transmit true single sideband for tv, although with the new generation of synchronous demodulators in i.f. strips this may become possible at some future date. A compromise is to transmit both sidebands for low video frequencies and only the upper sideband at higher video frequencies. The precise point of cut-off is defined as 1·25MHz for the UK, with the cut-off being complete above 1·75MHz video frequency. Were this standard to be used on 432MHz there would be rf right down to 432·15MHz, and this is unacceptable to many users of the band.

*19 Buckstone Court, Edinburgh EH10 6UL.

It is the author's opinion, on which he invites correction, that the European vsb standard could be used with little or no effect being noticed on receivers designed for the UK system. This characteristic has the start of cut-off at 0·75MHz and cut-off is complete by 1·25MHz. Thus the lowest rf would be at 432·65MHz, which at least keeps the ssb and Oscar parts of the band clear. These figures assume that there is a sound transmission at 6MHz above the video carrier for the vocal part of the transmission. If the sound is carried on, say, 144MHz, then the video carrier frequency could be raised by a few hundred kilohertz.

A convenient frequency has to be chosen for the filtering operation and, so that a common i.f. can be used for transmit and receive, the video carrier is chosen as 39·5MHz. Standard television practice is to operate the local oscillator above the signal so that the vsb filter must curtail the upper sideband.

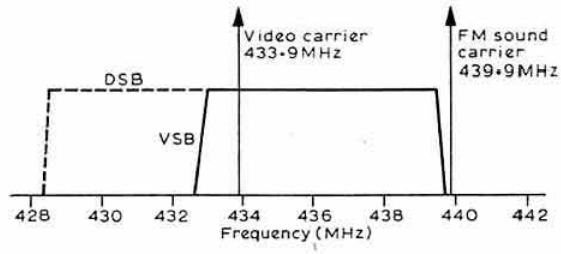


Fig 1. Spectrum of tv signal on 432MHz band

The design used was based on one in *VHF Communications* [1] modified to work at 50Ω, use the UK rather than the European i.f. and to have no preset capacitors, thereby reducing the size and easing the alignment. The performance seems as good as the original should have been, for only a theoretical curve was published. Considerable trouble was taken to terminate the filter in its characteristic impedance. The spectrum resulting from the vsb filtered transmitter is shown in Fig 1 in relation to the 432MHz band.

Circuit description

The block diagram is shown in two parts, before and after the mixer to 432MHz.

I.F. module (Fig 2)

This module produces modulated sound and video signals at i.f. from low level audio and 1V video signals. Extensive use is made of integrated circuits which make the construction of quite complex circuitry child's play. The microphone input at low impedance is amplified by an SL622 which also provides agc. The bandwidth is restricted to 0·3–3·4kHz. SSB is generated in the conventional way with a balanced modulator SL640 and ssb crystal filter. 10·7MHz was chosen because of the lower cost of filters for other modes, should this project turn into the author's 432MHz transceiver!

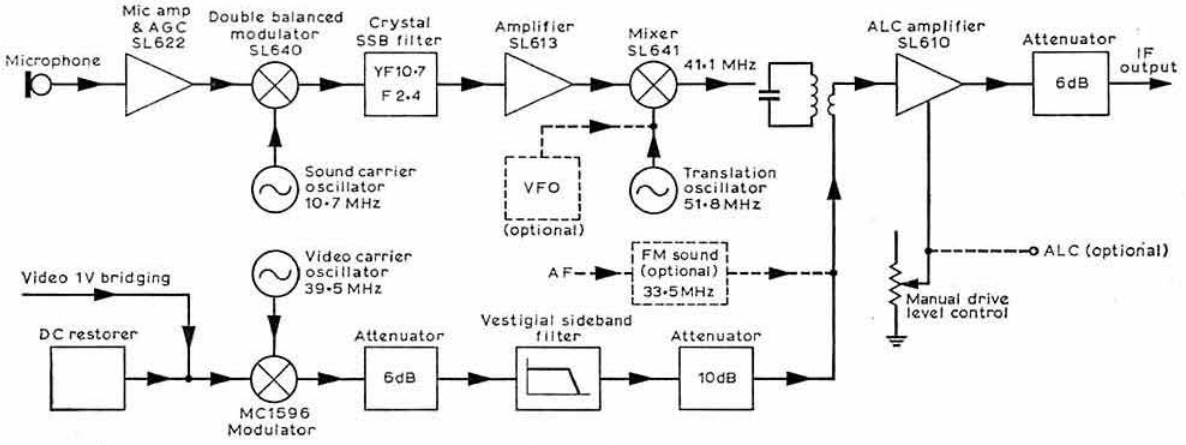


Fig 2. I.F. unit

Once filtered the signal is amplified by an SL613. Note that although this ic is designed as a limiting amplifier it is used here in the linear region.

A frequency translation is used to put the ssb in correct relation to the video signal. If a full vfo coverage is required on transmit then a suitable vfo could be used here in place of the crystal-controlled oscillator. The mixer has a tuned output with a bandwidth of 1·5MHz, enabling one to cover 432–433·5MHz.

Video signals with an amplitude of 1V pp are dc restored. The modulator is not designed to handle a range of video amplitudes as it is anticipated that usage will either be with one camera in a simple system, or with a stabilizing amplifier. A band-limiting filter is recommended if artificially generated video is used, eg from a ttl caption generator. An ic double-balanced modulator is used which possesses more than adequate bandwidth and linearity. The rest carrier amplitude can be set. The output circuit is damped to provide the bandwidth required by the modulated video.

The vsb filter then removes the unwanted sideband and the signal is added at low impedance to the sound path. It is not intended that both ssb and tv should be transmitted at once, but merely incorporated in the same transmitter. However, if it is desired to radiate simultaneous sound then a separate frequency-modulated oscillator could be fed in at this low impedance point [2]. The author prefers sound to be on 144MHz for two reasons. First, it enables a single frequency to be used for sending and receiving sound, thus economizing in spectrum. Second, and more importantly, it alerts operators who are perhaps outside video reception range or not equipped for video that there is activity on video. Many operators have developed an interest in video by hearing it discussed on the air.

The composite i.f. is amplified by an SL610 whose gain can be controlled by a dc voltage. Thus either manual or automatic level control can be provided, and will operate equally well on any mode. A matching network stabilizes the load and output impedances of the i.f. module. Power requirements are 12V for either tv or ssb, and *this is assumed to be a regulated supply.*

Mixer/amplifier module (Fig 3)

A diode double-balanced mixer is used, as it works at fairly high signal levels and has good rejection of the oscillator signal. From comments heard on the air this mixing stage seems singularly difficult to get working when using bipolars or FETs but the author has had no difficulty with the diode block. A local oscillator drive of 16mW is available for the mixer and is produced via the usual oscillator multiplier chain. More than usual filtering is used to ensure good

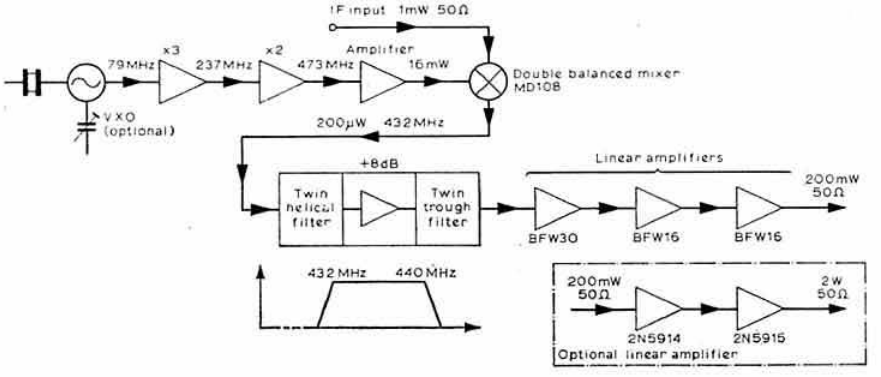


Fig 3. I.F. to 432MHz converter

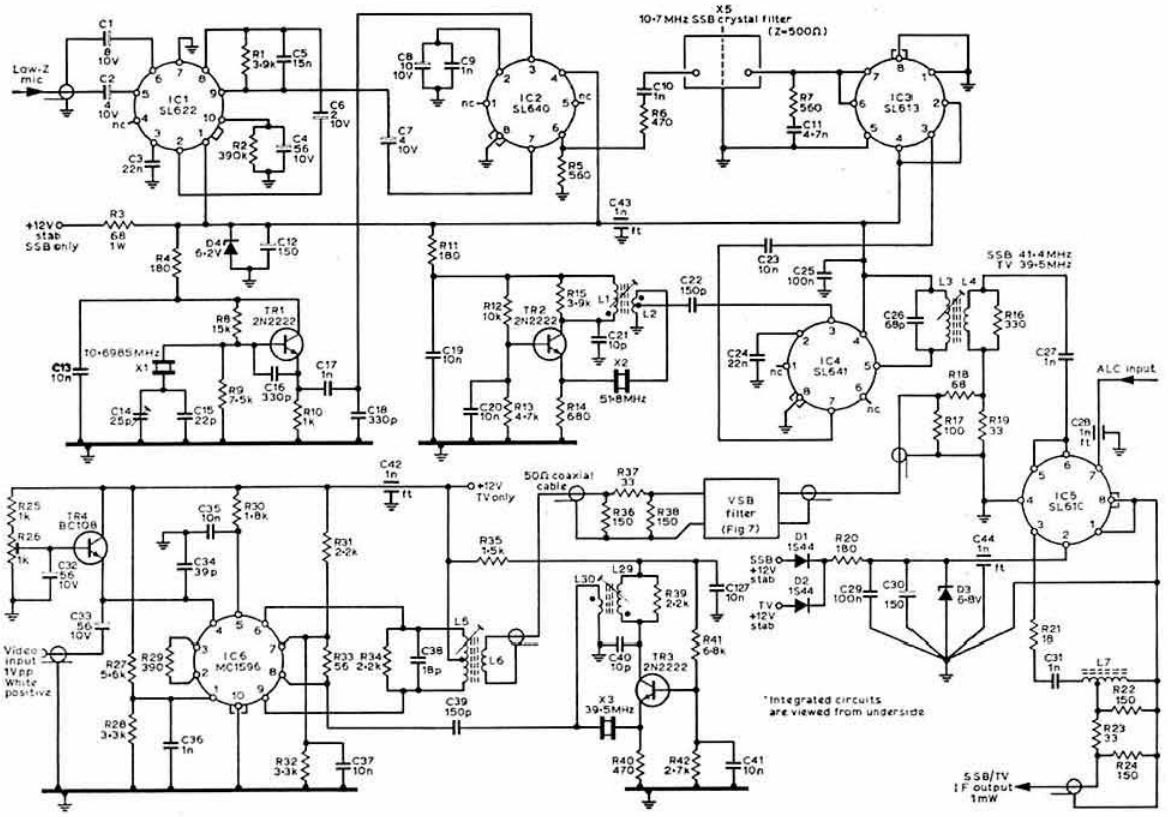


Fig 4. Exciter

spectral purity. It would seem adequate for ssb activity in this location to use a vxo giving an easy ±20kHz and this is shown.

The mixer is followed by four tuned circuits, two helical resonators and two trough lines, to give a flat response over 8MHz but sharp cut-off beyond. Thus the 473MHz local oscillator and image are removed from the output. Filter losses are more than compensated by a single transistor amplifier. The linear amplifiers that follow make up the power to 200mW. A 2W linear amplifier is also shown, but constructors may prefer to use valves rather than the relatively expensive semiconductors.

Detailed circuit diagrams

These are given in Figs 4–7, and in order to conserve space comment on them is confined to those aspects which may be relatively uncommon or need explanation.

Exciter (Fig 4)

The reader is referred to [3] for a full description of the workings and whims of the SL600 series.

The maximum microphone gain is set by R1 and may be adjusted to suit "studio" conditions. C5 provides hf restriction. This is necessary if fm sound is used deviated to the 50kHz broadcast standard and placed only 100kHz from the band edge as suggested. A Pye fm microphone was used. The agc rates are set by C4 and R2. R6 and R7 provide matching to the filter, which was a type YF107F2.4, a low-cost Japanese one providing nevertheless some 70dB ultimate attenuation. The top bandwidth is 2·4kHz and it is suggested that the carrier crystal be positioned so that the audio bandwidth is 0·4–2·8kHz.

The dc restorer is a standard circuit, but TR4 is used in place of a diode so that a lower dynamic resistance is obtained. Bias current into IC6 completes the dc path. C34 was necessary for hf stability. The gain of the modulator is set by R29 and it would be possible to connect hf compensation across it, but altering the sensitivity is not recommended as the stage is optimized for maximum power output by its load impedance and the bias current, set by R30. Increases of sensitivity are possible, but dc drift could become a problem. Decreases of sensitivity would best be handled by an external attenuator. The correct setting of R26 is so that peak white is 20 per cent of full carrier. R19 has been computed to be both the 100Ω resistor of the 10dB attenuator and its 50Ω load in parallel.

Some trouble was encountered with instability in IC5, as it has both negative input and output impedance at certain frequencies. The inclusion of R21 at the output and keeping the input circuit to as low an impedance as possible (hence R16 appearing on the secondary of L3/L4) cured the trouble. L7 is designed to extract the maximum linear power from

Components list

R1, 15, 52	3·9kΩ		**C34**	39pF	C
R2	390kΩ		**C38, 50**	18pF	C
R3	68Ω	1W	**C48, 56, 101**	1·8pF	C
R4, 11, 20	180Ω		**C49**	47pF	C
R5, 7	560Ω		**C51**	12pF	C
R6, 40	470Ω		**C53, 55, 92, 95, 96**	22pF	PFT
R8, 44, 50	15kΩ		**C57**	680pF	C
R9	7·5kΩ		**C59, 94**	220pF	C
R10, 25, 46, 62	1kΩ		**C60, 62**	3pF	TCT
R12, 47	10kΩ		**C61**		G
R13, 56	4·7kΩ		**C63**	560pF	C
R14	680Ω		**C66**	27pF	C
R16, 60	330Ω		**C67**	82pF	C
R17, 63	100Ω		**C68**	6pF	TCT
R18	68Ω		**C69**	12pF	TCT
R19, 23, 37	33Ω		**C70, 72, 78, 79**	0·5-5pF	TCT
R21	18Ω		**C71**		G
R22, 24, 36, 38, 58	150Ω		**C73, 77, 82, 88, 100**	100pF	C
R26	1kΩ	preset	**C75, 86**	200pF	LL
R27	5·6kΩ		**C80, 81**	3·3pF	C
R28, 32	3·3kΩ		**C83, 89**	4pF	DCT
R29	390Ω		**C84**	6·8pF	C
R30	1.8 kΩ		**C93**	6p F	DCT
R31, 34, 39, 42, 48, 53, 59	2·2kΩ		**C97**	10pF	PFT
R33, 43, 55	56Ω		**C99**	13pF	DCT
R35, 45	1·5kΩ		**C102, 103, 106, 110, 111**	25pF	PFT
R41	6·8kΩ		**C104, 105, 108, 109**	200pF	LL
R49	27kΩ		**C107**	10pF	PFT
R51	220Ω		**C112, 113, 114, 117**	1nF	FT
R54, 57	820Ω		**C115**	100nF	P
R61	47Ω		**C116**	150μF	15V T
R64	2·7kΩ		**C118**	27pF	
R65, 69	22Ω		**C119**	220pF	+3·9pF in parallel
R66, 70	330Ω	1W	**C120**	120pF	+270pF in parallel
R67, 68, 71, 72	1·8Ω		**C121**	120pF	+12pF in parallel
C1	8μF	10V E	**C122**	75pF	
C2, 7	4μF	10V E	**C123**	82pF	
C3, 24	22nF	P	**C124**	18pF	+18pF in parallel
C4, 32, 33	56μF	10V E	**C125**	47pF	+4·7pF in parallel
C5	15nF	P	**C126**	27pF	+3·3pF in parallel
C6	2μF	10V E			
C8	10μF	10V E			
C9, 10, 17, 27, 31, 36, 54, 65	1nF	C			
C11	4·7nF	C			
C12, 30	150μF	E			
C13, 19, 20 23, 35, 37, 41, 46, 127	10nF	P			
C14, 47	25pF	PFT			
C15	22pF	C			
C16, 18	330pF	C			
C21, 40, 90	10pF	C			
C22, 39	150pF	C			
C25, 29	100nF	P			
C26	68pF	C			
C28, 42, 43, 44, 45, 52, 58, 64, 74, 76, 85, 87, 91, 98	1nF	FT			

E = Electrolytic
P = Plastic film
C = Ceramic
PFT = Plastic foil trimmer
FT = Feedthrough
TCT = Tubular ceramic trimmer
G = Gimmick
LL = Leadless
DCT = Disc ceramic trimmer
T = Tantalum

TR1, 2, 3	2N2222	**IC1**	SL622
TR4	BC108	**IC2**	SL640
TR5, 6, 7	BF224	**IC3**	SL613
TR8, 9, 10	BFW30	**IC4**	SL641
TR11, 12	BFW16	**IC5**	SL610
TR13	2N5914	**IC6**	MC1496/1596
TR14	2N5915	**Mixer**	MD108

D1, 2	1S44 General purpose Si diode
D3	6·8V Zener
D4	6·2V Zener
X1	10·6985MHz crystal
X2	51·8MHz crystal
X3	39·5MHz crystal
X4	78·9MHz crystal
X5	10·7MHz ssb crystal filter

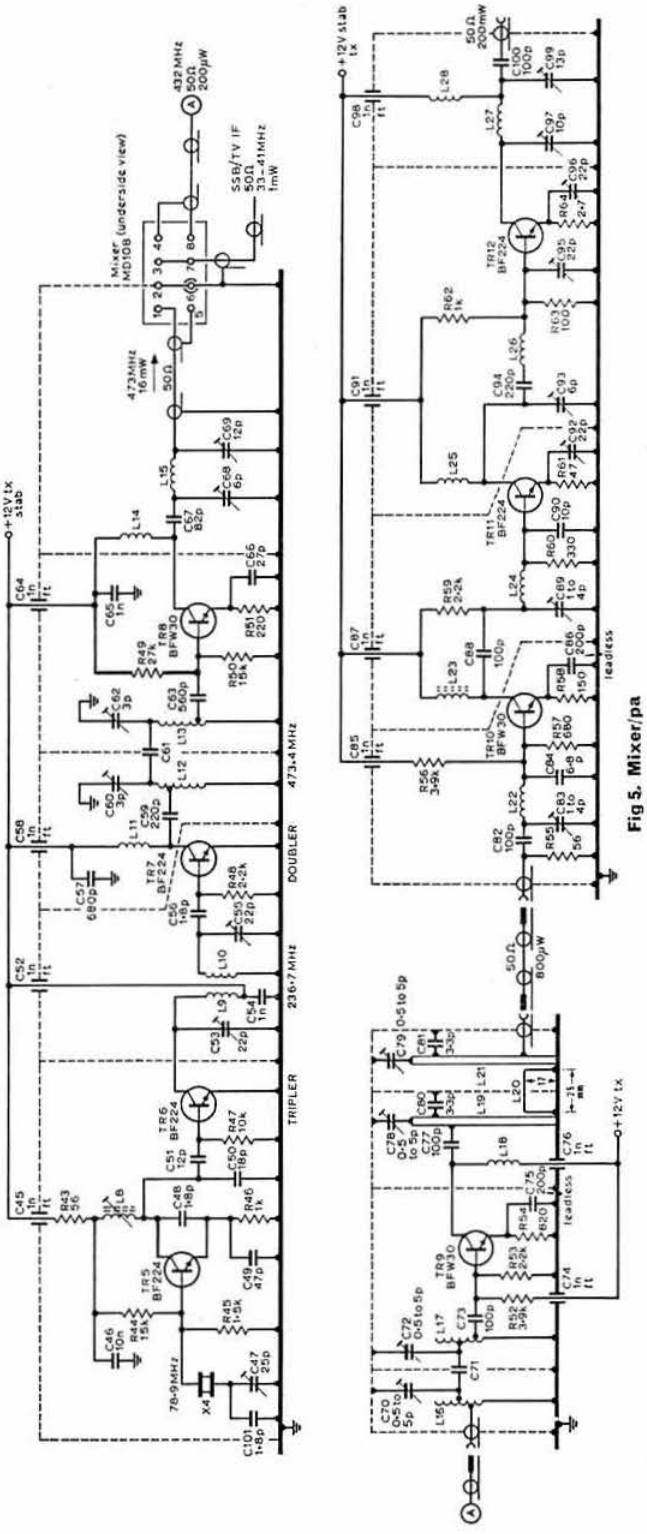


Fig 5. Mixer/pa

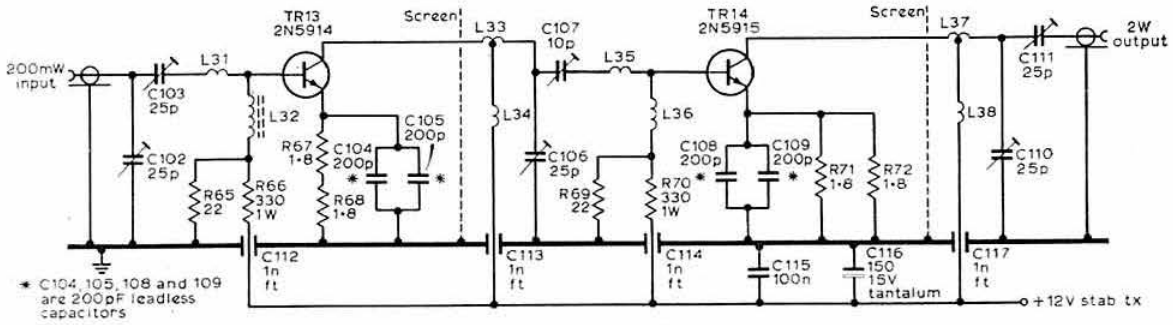


Fig 6. 2W linear amplifier

IC5 into a 50Ω load. Two diodes are used to ensure that IC5 is powered for both ssb and tv.

Mixer/pa (Fig 5)

Little needs to be said about the oscillator chain, with the possible exception of C66 which is used at series resonance as a decoupler. If in doubt use 100pF with short leads. The two bandpass pairs are set for critical coupling by adjusting C61 and the spacing between L9 and L10. Ensure that the circuits are operating on the correct frequency, as, desirable though it may be, no attempt has been made to ensure that the circuits cannot be inadvertently tuned incorrectly. The oscillator chain was constructed in a screened box with only the feedthroughs and the mixer protruding.

The filter consists of one overcoupled pair, the helicals and one approximately critically-coupled pair, on the basis that the drop in response at passband edge of the undercoupled will be approximately cancelled by the overcoupled. In practice the couplings are tweaked until the response looks correct. Iris coupling could have been used and would have been more easily repeatable, but link and capacitance coupling is far easier to adjust.

In the linear amplifier use is made of resonant decoupling for the emitters of two transistors. This technique enables full use to be made of the transistor's inherent gain without having to worry too much about emitter lead length. An assortment of trimmer types was used, C60, 62, 68, 69, 70, 72, 78 and 79 being tubular ceramic and the rest rotary ceramic or plastics according to stock on hand.

2W linear amplifier (Fig 6)

The transistors used are stripline types, but a 3D non-printed circuit layout was used with "lumped" components. The author being a person who enjoys experimenting with circuits and who has little time for making pc layouts prefers the lumped circuit approach. Others are referred to [4].

VSB filter (Fig 7)

This was constructed in the classic form for a filter, the tin-plate sectioned box, in this case 19 by 22mm in section and 83mm long. The compartments were divided according to the lengths of the coils in them. Standard value capacitors were used throughout, those less than 10pF being Mullard ceramic plate and those greater than 10pF close tolerance as available. Lead length on the coils was kept to a minimum.

Construction and alignment

The author used a modular form of construction with interconnections of 50Ω impedance, as this considerably eases the alignment problems. For a transmitter designed to cover a relatively broad bandwidth by means of tuned circuits some form of sweep generator is desirable, and a swept amplitude, swept frequency source is ideal. The alignment source was swept both in frequency and in amplitude to produce a gain versus frequency curve for various input levels. In this way it is possible to observe the response both at low level and near the saturation output power of the transmitter. For ssb working only, the alignment is easier, but the author cannot help doubt the linearity of a transmitter tuned for maximum output as seems to be commonly suggested.

Starting with the 800μW to 200mW linear amplifier (TR10–12) the generator may be used to give a flat response over 432–440MHz with optimum linearity. Patience will be required as several of the adjustments interact. Alternatively if only a sweep generator is to hand be sure to vary the output level. A simple diode detector on the output will be adequate

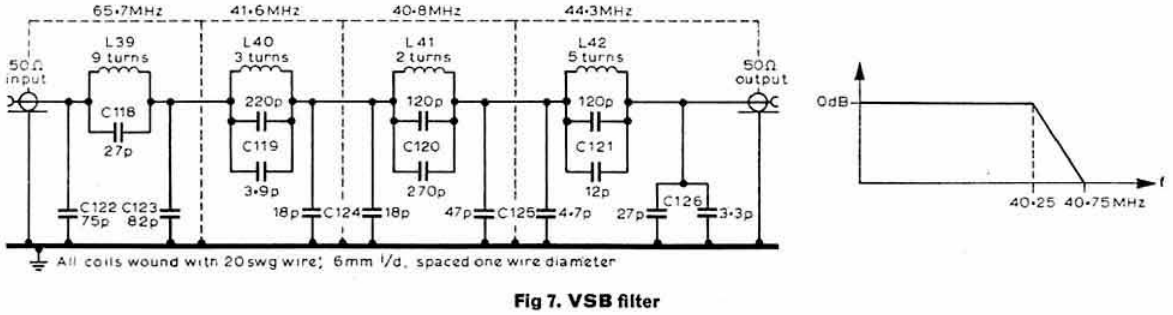


Fig 7. VSB filter

Coil details

Inductor	Turns	Gauge diam	ID (mm)	Length (mm)	Spacing	Former	Comment
L1	12	26g	4		Close		
L2	2	26g	4		Close		Over cold end of L1, tap 1t
L3	6	20g	4		Close		
L4	3	26g	4				Over cold end of L3
L5	12	26g	4		Close		Centre tapped
L6	3	26g	4		Close		Over centre of L5
L7	5	26g				FX1595	Tap 3t
L8	5	26g	4		Close		
L9	3	26g	4	3			
L10	3	26g	4	3			2mm from L9
L11	8	30g	3	2¼			
L12	3½	18g	4	20			
L13	3½	18g	4	20			
L14	5	26g	3	3			
L15	2½	26g	3	2			
L16	3½	2	13	35			Trimmer 1½t, input ½t
L17	3½	2	13	30			Trimmer 1½t, base ½t
L18	3½	30g				FX1115	
L19		1½		60			C77 31mm, C80 42mm
L20		24g					17 × 25mm. Close coupled.
L21		1½		60			Output 10mm, C81 42mm
L22	3	26g	3	5			
L23	3½	30g				FX1115	
L24	4	26g	3	7			
L25	5	26g	4		Close		
L26	1	24g	2½	1			
L27	½	24g	10				
L28	5	26g	3	4			
L29	15	26g	4		Close		
L30	2	26g	4		Close		Over cold end of L29
L31, 35	1	20g	3	3			
L32	2½	26g				FX1115	
L33, 37	1	18g	6	3			Tap ½t from collector
L34, 38	1	20g	6	3			
L36	3	20g	5	5			
L39	9	20g	6				Spaced wire diameter
L40	3	20g	6				Spaced wire diameter
L41	2	20g	6				Spaced wire diameter
L42	5	20g	6				Spaced wire diameter

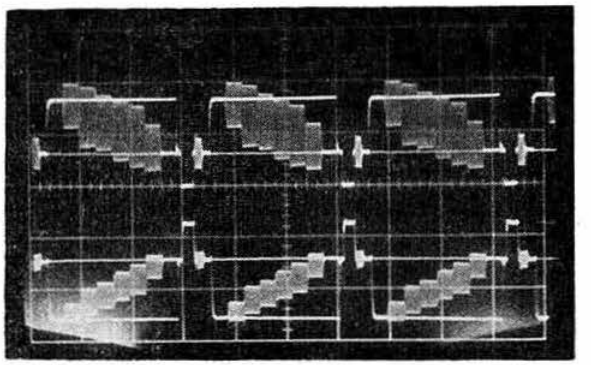
once the amplifier is near to correct tuning, and will enable the tuning point to be optimized. By using a slightly greater input the initial tuning point may be found. The filter module may now be tested sweeping over 428–444MHz and damping each of the coupled pairs in turn to produce the overcoupled and undercoupled responses mentioned above. A slight fall-off towards the passband edges is quite acceptable.

The local oscillator module may be aligned using the absorption wavemeter. The biasing arrangement used, while being very good for short emitter leads, right down to deck, does not allow collector current to be monitored except by disconnecting the collector feedthrough capacitor. The output impedance for the oscillator is 50Ω so it may be checked on a power meter, spectrum analyser etc. C71 is adjusted for maximum output (critical coupling).

Needless to say the mixer does not require alignment, merely connecting into circuit so that the odd colour bead is connected to the large blob. An under-side view is shown in Fig 5.

Once the oscillator chain and mixer are functional they can be used to turn a tv i.f. sweep generator into a uhf one. On uhf the output will be about 7dB less than the source drive. If this alignment source is used be sure that the difference frequency (432MHz) and not the sum frequency (uhf tv channel 26) is obtained. The 2W linear can be aligned in the same way.

There are two adjustments in the video side. L5 is resonated at vision carrier frequency less 2·2MHz (37·3MHz). This is most easily done by stopping the oscillator TR3 and feeding



75 per cent colour bars. Top: input. Bottom: demodulated output

in 37·3MHz via C39. L5 is tuned for maximum output. R26 is set so that white corresponds to 20 per cent of peak sync carrier. Too high a setting would result in positive-going modulation. This could enable a dual-standard transmitter to be built. A multi-turn preset was used for R26.

On the sound strip the only critical adjustment is the carrier frequency, C14. It is set to be 0·4kHz below the lower −3dB point of the ssb filter (for usb on transmit). L3 is adjusted for resonance at the centre of the sound band to be used. If any oscillators fail to start check the phase of the feedback winding. No special crystals were used. Construction was inside a screened box with interior screening to isolate stages and keep the oscillators out of sight of everything. The shortest possible lead lengths were adhered to.

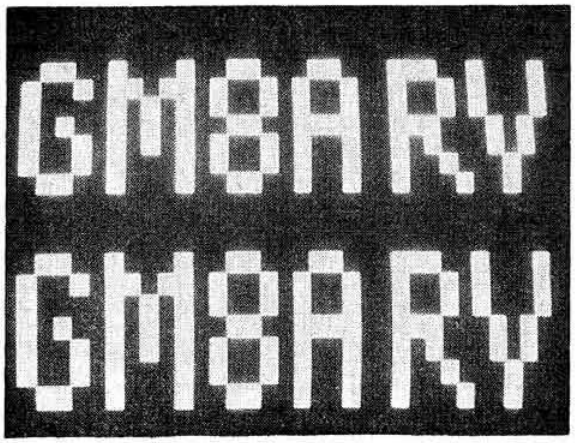
Alignment of the vsb filter

The frequencies shown on Fig 7 are the resonant frequencies of the parallel tuned circuits. Consequently the filter may be aligned by adjusting the inductors to achieve these resonances. The author of the original article [1] used variables for all the capacitors, making nine adjustments in all! While it is not denied that a superior characteristic may be produced by such a preponderance of variables, it is believed that sufficient accuracy for amateur purposes may be obtained by using the nearest fixed values for C and tweaking the Ls.

Alignment now consists of feeding in a generator whose frequency can be determined to 0·1MHz, and monitoring the output into a 50Ω load. L42 is first adjusted for a minimum output at 44·3MHz. For this test disconnect all capacitors other than C121 and C126. Now reconnect C125 and C120 and resonate L41. Coils are adjusted by altering the turns spacing, or in the extreme case changing the size. After reconnecting C119 and C124 resonate L40. This is not quite so easy as the notch falls between the two others. Finally reconnect C118, C122 and C123 and tune L39. At each stage make sure that all the notches set can be seen. There may be some interaction, particularly between L40 and L41. The target frequency response is shown in Fig 7.

Additions and ideas

The units described can form the basis of a station for 432MHz for both sound and tv. There are several ways of extending the transmitter to provide transceive type facilities.



Callsign, closed circuit

Here are a few ideas:

(1) Reception. The 473MHz local oscillator can be used to convert incoming signals to 39·5MHz and these can be fed to a standard i.f. strip for tv, and down converted to 10·7MHz for ssb/cw/a.m./fm.

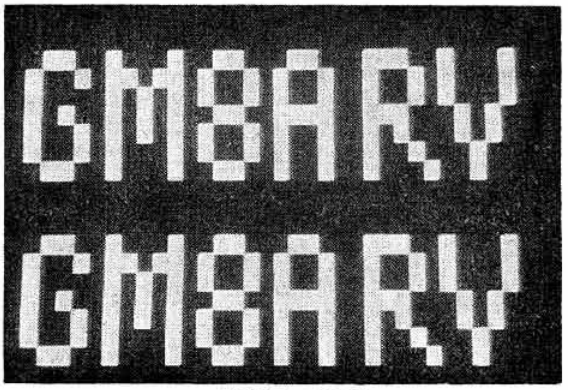
(2) Sound with vision. The addition of a 33·5MHz fm source will enable a broadcast-compatible simultaneous sound to be radiated.

(3) FM transmission. If a varicap diode is used for the ssb vxo then fm could be transmitted for sound use, either on the video carrier frequency for identification purposes or anywhere in the band using the vfo. It could well be feasible to carry both sound and video on the vision carrier, using a.m. for video and fm for sound, although a.m. to pm (fm) conversion in the linear amplifiers and the effect of fm and the receiver filtering would need to be watched.

System description

It may not be out of place briefly to describe the station set-up which the author is attempting to achieve—although ideas will no doubt change.

The author has three tv cameras, one devoted to test cards and two for general views. A master sync pulse generator



Callsign, off air

synchronizes the outputs from the cameras and allows them to be combined in a mixer. The video mixer makes fades, cuts and mixes with inlay and overlay facilities. A digitally-generated callsign can be superimposed on the picture in any of the standard colours and colour bars are available at the flick of a switch.

Two monitors and a colour off-air receiver provide checking of the video feed to the transmitter, preview of a camera, and an off-air check on the outgoing or incoming signal. A 432MHz converter, modified to act both as converter for sound and preamplifier for tv, coupled with a standard tv receiver, comprise the off-air receiver, ensuring good noise performance. The tv, a Sony, happens to tune to 432MHz without alteration.

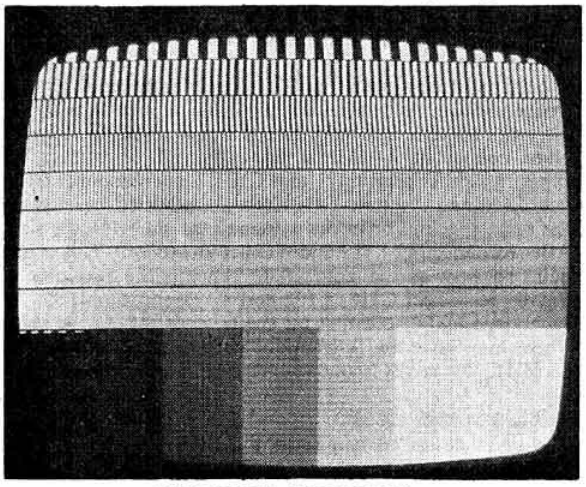
References

[1] "ATV information", J. Grimm, DJ6PI, *VHF Communications*, No 1, 1976.

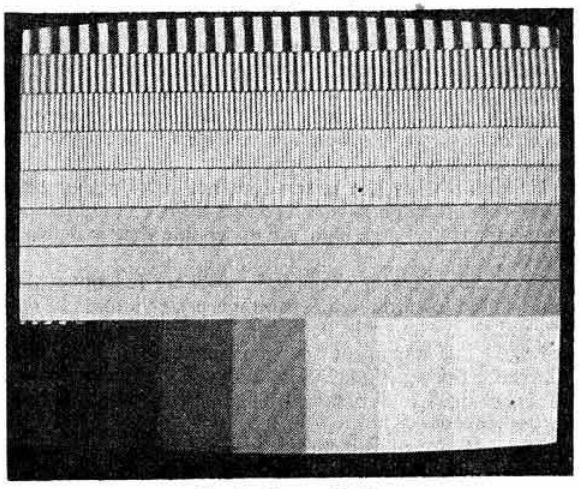
[2] "A modular atv transmitter", G. Sattler, DJ4LB, *VHF Communications*, No 1, 1973.

[3] Plessey Semiconductors *SL600 Series Applications Manual*, 2nd edition.

[4] "Transistorized linear amplifier for 70cm", G. Freytag, DJ3SC, *VHF Communications*, No 1, 1974. □



Test pattern, closed circuit



Test pattern, off air

Crystal calibrator and band-edge marker

by J. YOUNG, BRS33339*

THE advantage this circuit has over the conventional calibrator is that it uses a 7MHz crystal as the reference. This provides a marker at the low frequency end of each hf amateur band, without placing unwanted markers within the band as would a 1MHz crystal in the 10m band, or a 100kHz crystal in any amateur band. This facility enables both sighted and blind operators to tune their receivers to any frequency by first marking the band-edge and then "counting up" using the lower frequency marker pips. The 7MHz output will also prove useful for the initial setting-up of home-made receivers, wavemeters etc. In addition, outputs at 3·5MHz (band edge), 1MHz, 500kHz, 100kHz, 50kHz, 10kHz and 2kHz are available. The 2kHz output is for use with narrow-band receivers only.

The 3·5MHz band-edge marker is produced by dividing the 7MHz output from the crystal oscillator by two. For the 1·8MHz band, the calibrator is switched to the 1MHz position and the second harmonic of this is used to determine the hf end of the band.

Circuit description (Figs 1 and 2)

Two of the four gates in IC1 form the 7MHz crystal oscillator, the third gate is a buffer, driving ICs 2 and 5. With the exception of IC1 all ICs are type SN7490. The SN7490 decade counter has two separate divider circuits; a divide-by-two and a divide-by-five. As such it may be used to divide by 2, 5 and 10. Other divisions are possible by using the internal NAND gate to reset the counter when the required number is reached. This latter technique is used with IC2 to produce a 1MHz output from a 7MHz input. The counter is operated in the bi-quinary (5-2) mode, the internal gate resetting it to zero every seventh input pulse.

The 1MHz output of IC2 is connected to IC3 where it is divided by 2 and 10 to provide output frequencies of 500kHz and 100kHz. IC4, connected in the same way as IC3, has output frequencies of 50kHz and 10kHz. The divide-by-two section of IC5 provides the 3·5MHz output, while the spare divide-by-five section further divides the 10kHz output of IC4 to 2kHz.

All outputs are connected via S1 to the fourth gate in IC1. This gate, together with C4, R3 and D2, forms a monostable; its output pulse duration being such that no harmonics are missing in any part of the hf spectrum. S1 is made from a standard switch kit with a single-pole 12-way, break-before-make, wafer. The adjustable end stop is set to prevent the switch going beyond the eighth position.

The calibrator is powered by four HP11 batteries which are connected via the diode D1. D1 has two functions; it protects the ICs from damage should the batteries be inserted the wrong way round, and, due to its forward voltage drop, reduces the supply voltage seen by the ICs to around 5·3V. The current drawn by the calibrator is about 110mA. This was not considered excessive as it is unlikely to be switched on for more than a few minutes at a time.

Construction

The ICs, crystal and associated components are assembled on a piece of Veroboard 3½in square to the layout shown in Fig 3. The ICs are soldered directly to the copper track as the expense of ic holders was not considered worthwhile and all ICs were tested first. For the short direct links 22swg tinned copper wire is used, the remainder of the board wiring being 24swg pvc-covered wire similar to the type used for internal telephone circuits. Wiring pins are inserted in the circuit board as take-off points for the pvc-covered flexible wiring to S1. A screened lead connects pin 11 of IC1 to a stand-off insulator. R4 and C5 are connected between the stand-off and the output socket.

The calibrator **must** be enclosed in a metal case to prevent unwanted outputs from the divider circuits radiating and being picked up by the receiver. An Eddystone die-cast box, 7¼ by 4¾ by 2in, type 6827P, was used by the author, but only because it was available. A simple case could be made by the constructor from aluminium sheet for much less than the cost of the die-cast box.

The circuit board is fixed to the bottom of the case with four 6BA screws and ¼in spacers. The battery holder is also attached to the bottom of the case. The output selecter switch S1, the single-pole on/off switch and the output socket are on the front face of the case.

* 97 Richmond Avenue, Hillingdon, Uxbridge, Middlesex UB10 9BJ

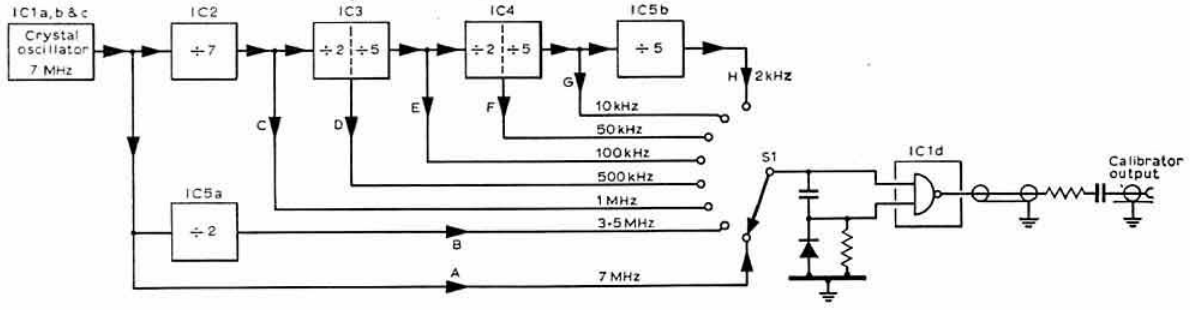
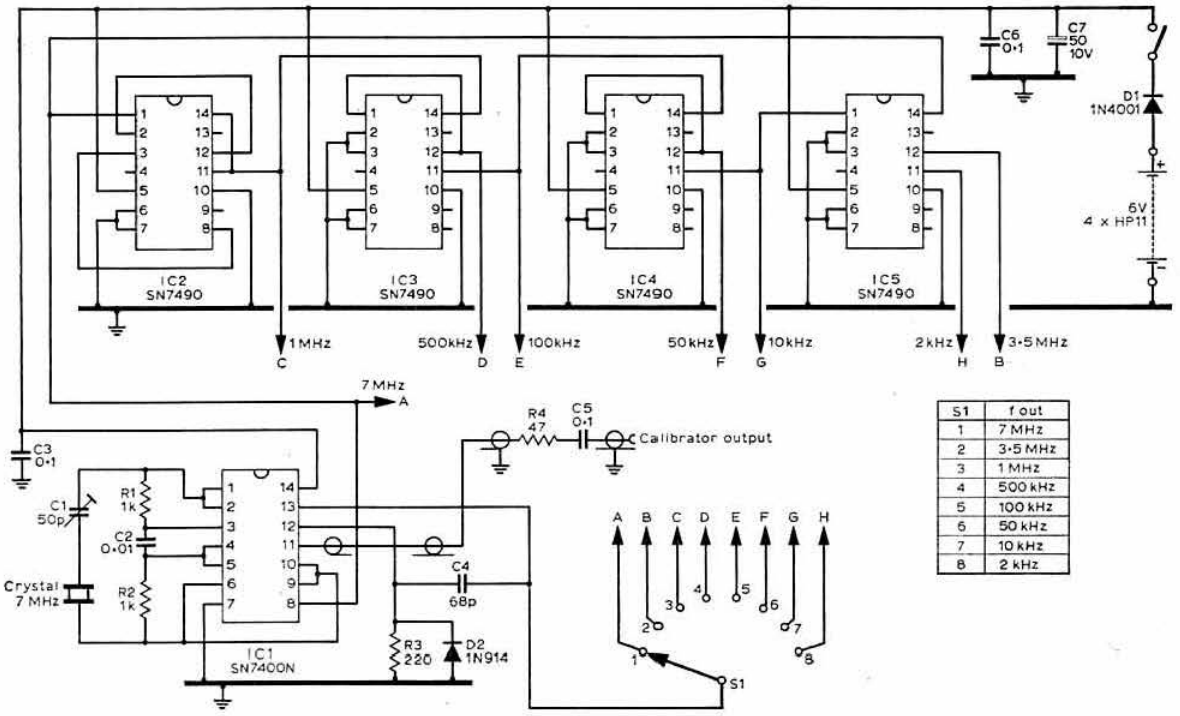


Fig. 1 Block diagram



S1	f out
1	7 MHz
2	3·5 MHz
3	1 MHz
4	500 kHz
5	100 kHz
6	50 kHz
7	10 kHz
8	2 kHz

Fig 2. Circuit diagram

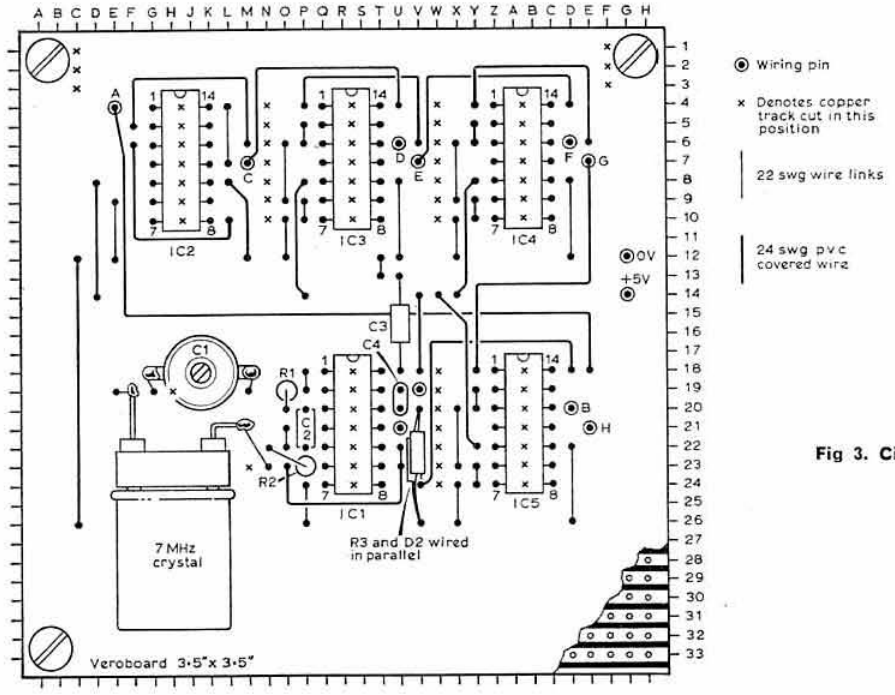


Fig 3. Circuit board layout (top view)

Setting-up

First, make a careful check of all wiring. Then inspect the underside of the circuit-board to ensure that solder has not bridged any of the copper tracks. If in doubt, run a knife blade between each track taking care not to score the copper.

After checking that diode D1 is the right way round, insert the batteries. Switch on the calibrator and select the 7MHz output. A 6in length of wire connected to the marker output socket should provide sufficient output for checking and calibration. With the aid of a communication receiver (bfo on) locate the 7MHz marker. Then switch the calibrator to 3·5MHz, 1MHz and so on, ensuring that markers are heard at frequency intervals corresponding to the selected output.

Finally, switch the calibrator to the 100kHz output and tune the receiver (bfo off) to BBC Droitwich on 200kHz. If the communication receiver will not tune to this frequency, a standard broadcast receiver may be used. The resultant beat frequency is unlikely to be heard as an audio tone, but as a slow rise and fall in amplitude of the BBC transmission. C1 should be adjusted for the slowest rate of change (zero beat). When using the calibrator **do not** connect it directly to the input of the receiver; the output voltage is around 3V peak-to-peak, and could therefore damage the receiver. Always connect it via an attenuator pad or low value capacitor (a few picofarads). If in doubt, use a short length of wire in the output socket as described above.

Components list

IC1	SN7400N	**IC2, 3, 4, 5**	SN7490N
		R3	220Ω 0·5W
R1, 2	1kΩ 0·5W	**R4**	47Ω 0·5W
C1	50pF pre-set	**C2,**	0·01μF
C3, 5, 6	0·1μF	**C4,**	68pF
C7	50μF 10V		
D1	IN4001N or similar silicon diode		
D2	IN914		
Crystal	7·000MHz HC6U and holder		
S1	RS Components standard switch kit Mechanism No 327-428Single pole, 12-way wafer No 327-440		
Battery holder	RS Components No 488-214		
Veroboard	0·1in pitch, 3½in by 3½in		
Output socket	TV type		

With the exception of the crystal, all components may be purchased from Linway Electronics, 843 Uxbridge Road, Hayes End, Middlesex UB4 8HZ. Tel 01-573 3677.

Acknowledgement

The author would like to thank Mr D. Waller, G3SUL, for his help in evaluating this design. □

NEW PRODUCTS

Additions to the Doram range

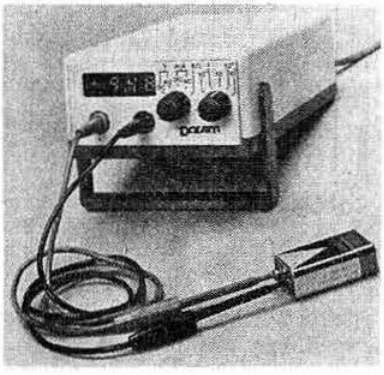
A number of constructional kits have recently been added to the Doram range. Of particular interest are three test equipment kits, namely a digital multimeter kit, a digital frequency meter kit and a xenon ignition timing light kit with built-in strobe facility.

The digital multimeter kit boasts a 3½-digit led display, measures voltage from 100μV to 1,000V ac and dc, current from 100μA to 2A and resistance from 0·1Ω to 2MΩ. The kit comes complete with case, psu and full instructions for only £54.50 + 8 per cent VAT.

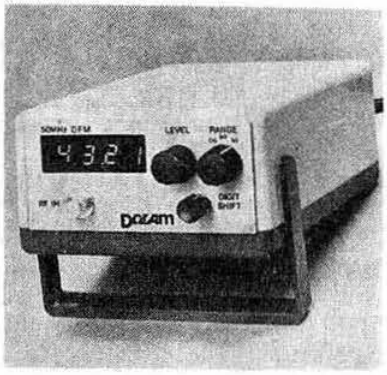
The digital frequency meter kit has a 4-digit readout and reads from 10Hz to 50MHz in three ranges to an accuracy of ±1Hz. Again this kit is complete with case, psu and full instructions for £54.50 + 8 per cent VAT.

The xenon ignition timing light kit features a flash brilliant enough to be used even in sunlight. A useful asset to any motoring enthusiast, this kit incorporates automatic polarity selection and inductive pick-up, making it suitable for use with any 12V car electrical system. When not in use as a timing light, the unit, which is housed in an attractive impact and oil resistant torch-like case, can be used to "freeze" movement using the unique Doram strobe control, which is included in the price of £18.95 + 8 per cent VAT.

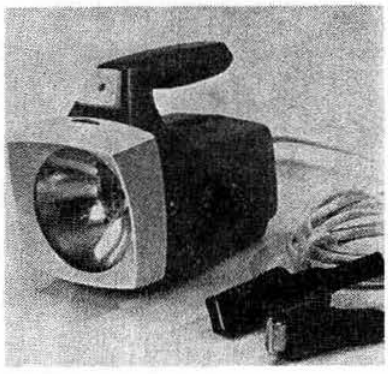
For further details of the range of Doram kits readers should write to Doram Electronics Ltd, PO Box TR8, Leeds LS12 2UF, or telephone Leeds (0532) 34222. □



Digital multimeter kit



Digital frequency meter kit



Ignition timing light kit

technical topics

Pat Hawker, G3VA

LITTLE eddies of wind half-propelled Winston Smith, G1984Z, through the glass doors of Victory Mansions. Inside his flat he slipped past the telescreen and checked the facsimile QSL sheets received from the Ministry of Hobbies (Miniham in Newspeak) and the daily official teletext printouts. The records department had not removed any contacts with unstations, suggesting that the new bandscan and station-ident microprocessors were working well. Indeed the counter showed they had clocked up more than five "Worked All London streets" on the 24GHz satellite repeater since he had last checked, with no more than usual interference from the 27GHz Proles Band. But the fault-diagnosis panel showed an intermittent fault on the photo-isolator interface between the auto-slowscan and the digital autotest unit and would have to be returned to the Ministry of Plenty. That would mean a six months delay, even if the package was not lost by Minipost—now reduced to monthly deliveries. It seemed that the new ccd shift register on the official Miniham Mark 2 autostation (obtained by the ministry from Japan as part of the latest nuclear-waste reprocessing agreement) was puncturing.

He quickly fitted the programs for tomorrow, when his logs had to be filed; glanced once again at the fault panel and squeezed past into the little alcove outside the range of the telescreen, knowing that what he was about to do might result in a stay at the Brixton voluntary correction camp. As a registered national society amateur he should never have gone into that junk shop in the proles' quarter of town. But in the dimness of the shop he had caught the glint of brass—long ago declared a non-material by Miniluv. In dragging out from the dusty shelves an old hand morse key, he had also come across a shabby box containing such unexpected treasures as real valves and variable capacitors and plug-in copper coils, an old *Amateur Radio Handbook*, a soldering iron and a slow-motion tuning dial as used before the compulsory channel synthesizers.

Winston Smith settled down in his alcove. He was going to build his own radio station in the hope that perhaps someone else, somewhere in the world, might still be working secretly on those long-surrendered hf and vhf bands, using the forbidden morse code.

Crystal ladder filters again

The three very practical articles by J. A. Hardcastle, G3JIR, (December, January and February *Radio Communication*) and the various items in *TT* have all underlined the attractiveness of the ladder filter for anyone requiring an effective low-cost ssb crystal filter. All the indications are that with a handful of similar crystals and a few capacitors selected along one or other of the guideliness that have been suggested by F6BQP and G3JIR (and subsequently some further proposals put forward by John Haine, ex-G8CEG) it really is not difficult to put together a reasonable filter at a fraction

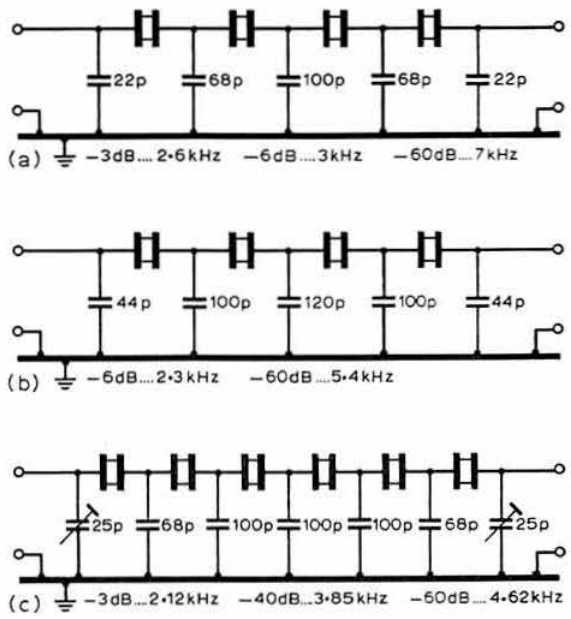


Fig 1. Three examples of ssb ladder filters made by F6CER using sets of crystals taken from commercial 12·781MHz filters intended for 50kHz channel spacing on vhf mobile equipment. Input and output impedances approximately 500–600Ω

of the current cost of the packaged half-lattice type of hf filters.

Hans Kreuzer, DL1AN, for example, writes to say: "I can confirm the results of F6BQP. With four crystals at 4·194304MHz, C0 10pF, C1 50pF, C2 70pF and termination 1,600Ω, the following results have been achieved: 6dB bandwidth 2·1kHz; 20 dB 3·0kHz; 40dB (the limit of the measuring equipment) 5·0kHz. This is very close to the results of F6BQP with 8·314MHz crystals and is in my opinion a fairly good ssb filter. Crystals of 4·194304MHz and 4·33618 MHz are on the market here in Germany for about 3DM."

It will be appreciated that 4·33618MHz crystals are used in colour television receivers to provide the colour sub-carrier reference for the synchronous demodulators, although a typical retail price in the UK is rather higher than the German figure.

In *Radio-REF* (April 1977) G. Richaud, F6CER, commenting on the G3JIR articles, also provides information on two four-crystal and one six-crystal filter he has constructed. His results are of particular interest as the frequencies of his crystals were not identical but were units taken from old mobile crystal filters intended for 50kHz channel spacing, with a centre frequency of 12·781MHz.

In calculating his capacitor values he has disregarded the small differences in crystal frequencies, later making some adjustments. In all three cases (Fig 1) the resulting filters were suitable for use in amateur ssb exciters with filter impedances of about 500 to 600Ω.

It may be remembered that in his Part 1, G3JIR drew attention to a five-section 2MHz filter used in a *Practical Electronics* communication receiver design in 1970 where the crystals were selected to have slightly different frequencies;

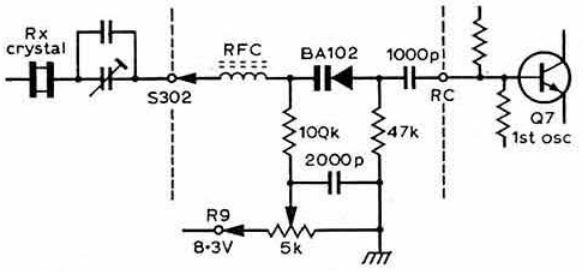


Fig 2. G3OUT's arrangement for adding a "receiver incremental tuning" facility to the TR7200G. RFC, which forms a "pulling" inductance, can consist of 36swg enamelled wire wound on a 3mm ferrite core with a winding length of 7mm

this latest commentary by F6CER should thus further reassure constructors that there is no need to worry about small variations in a batch of crystals, as well as suggesting a possible source of suitable sets of crystals around 10·7MHz or other mobile intermediate frequencies.

Incremental tuning on TR7200G

Andrew Walker, G3OUT, has found that a long hot summer and a cold winter have underlined the fact that "crystal-controlled" mobile equipment is not perhaps as stable as some amateurs fondly imagine. With channelized operation it is a decided advantage to have some form of receiver incremental tuning, if only to cope with those stations who appear to be using S22½ etc.

He has therefore modified his TR7200G for rit, and the general approach may also be useful for those thinking of modifying other channelized equipment and willing to delve into their "black boxes". He writes:

"Study of the TR7200G circuit diagram showed that although adaptation of the second conversion oscillator (10·245MHz) would have been preferable, this would be difficult to get at without removing the printed-circuit board.

"The first oscillator (Q7) is easily located and is also connected to the channel-change switch via a rather long unshielded wire, from a connector pin labelled RC. This pin will be found on the receiver board (speaker cover removed, with front panel facing you) about 1in to the right of the audio output transistors. Half an inch behind this pin is an earth connection. The 8·3V stabilized supply is taken from pin R9 at the front edge of the receiver board. This pin, it should be noted, is to the left of a connection carrying the full 12V receiver line.

"The rit circuit (Fig 2) was wired "floating" between pin RC and earth, although a small pcb mounted vertically between existing components would probably be even more satisfactory.

"Operation of Fig 2 is quite straightforward, with the inductance pulling the frequency lower at maximum capacitance (zero bias) of the BA102 tuning diode. Increasing the bias reduces the capacitance of the diode and raises the crystal frequency through the centre frequency of the channel. With the values shown a shift of approximately ±4kHz was achieved, and this appears to be sufficient for most purposes. The rfc was a ready-made component although a choke wound on a ferrite core, to the details given, worked similarly. Care should be taken to keep the self-resonant frequency of the choke well below the crystal frequency or otherwise self-oscillation will make the crystal redundant!

"The arrangement appears to remain stable over long periods and the only adverse effect was a slight reduction in mixer injection voltage with some crystals.

"The squelch potentiometer on the front panel of the TR7200G was replaced by a dual-concentric pot, and the existing knob carefully modified with a hacksaw, 6BA tap and Araldite in order to provide matching controls, the pa facility being not required."

Using solid-state regulators

Dr Michael Slifkin, G8HES, notes that several firms are currently advertising ex-computer power supply units providing up to 10A at 15V. When used with home-built regulation they can form "superb" and extremely well-regulated units. G8HES has built such a supply using a Signetics NE550 solid-state regulator with a Darlington type arrangement using a TIP41 and two 2N3055 devices.

However, he—and other amateurs using these ex-computer units in this way—have experienced several problems that do not appear to have been described in print:

(1) They are very sensitive to rf and must be well-shielded and decoupled (he recommends 0·01 μF disc ceramics).

(2) These supplies have quick-acting current limiting. When used with an ssb rig such as the TR7010 which draws 3A average on transmit but can much exceed this figure on speech peaks, the current limiting needs to be set well above 3A, or a massive capacitor must be connected across the output to supply the peaks. This problem seldom arises with lower grade units which can often momentarily supply peaks well in exceess of the rated continuous-duty figure. G8HES finds that with his TR7010 and with the current limiting set at 8A, it is still necessary to use 22,000μF of reservoir capacitance.

(3) Most of these power supplies are likely to be used with mobile-type equipment. These almost invariably have inductive filter input circuits, giving rise to two problems:

(a) If the back emf is large enough on switch-on it can destroy the pass transistors. Commercial power-Darlingtons are often protected internally with a diode, although lower-power devices are often without this protection. A "home-brew" Darlington should therefore have a diode connected from the output to the input (ie from emitter to collector of the output transistor(s).

(b) The current sensing in solid-state regulators tends to be upset by the presence of inductors in the load, since this introduces phase-shifts in the line. Regulators of this type were apparently never meant to work into inductive loads. G8HES can offer no easy solution to this problem. It would be possible to remove the inductive filter in the mobile rig, but this is hardly likely to appeal to many; one could do the "sensing" on the transmitter side of the filter, but here again this means modifications to the commercial rig.

Possibly the easy way out is to ignore this particular problem and to accept that from time to time, unpredictably but more often when the rig is switched on before the psu, with no capacitance across the output, the rig will switch itself on and off for very brief periods.

Failure to note these problems as a whole, however, can result in destruction of the pass transistors and possibly (if there is no over-voltage protection) the rig; audio clipping; and "motor boating" as the psu switches rapidly on and off. But despite these warnings, G8HES stresses that these

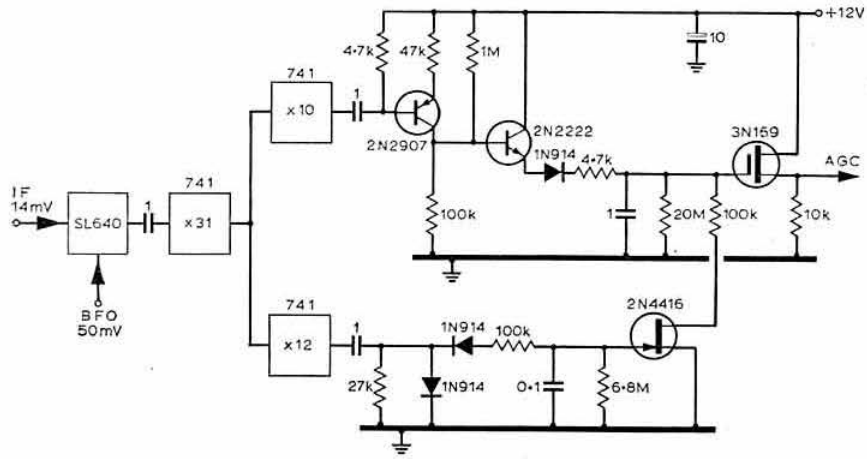


Fig 3. An audio-derived, dual-time-constant agc system and i.f. amplifier in which attack, hold and decay time can be set independently. From an article by DJ2LR in *Ham Radio*

regulators and computer power units enable an amateur to construct power units fully equal to those costing 10 times as much.

Audio-derived agc and compression

In a recent article "I.F. amplifier design" (*Ham Radio*, March 1977) Ulrich Rohde, DJ2LR, points out that amateur receivers often use audio-derived agc in order to save costs. This technique, he points out, is less often used in professional receivers because: (1) inband intermodulation is produced; (2) when used on an unmodulated a.m. carrier, the agc will "pump" and create heavy distortion. It is also rather difficult to obtain a really fast attack time. Even with the popular SL621 he indicates that it is not possible to reduce attack time below about 20ms. For this reason he draws attention to the split system developed by Wes Hayward, W7ZOI ("A competitive-grade cw receiver", *QST* March 1974, p16). This derives part of the agc potential from the i.f. signal and part from the af signal.

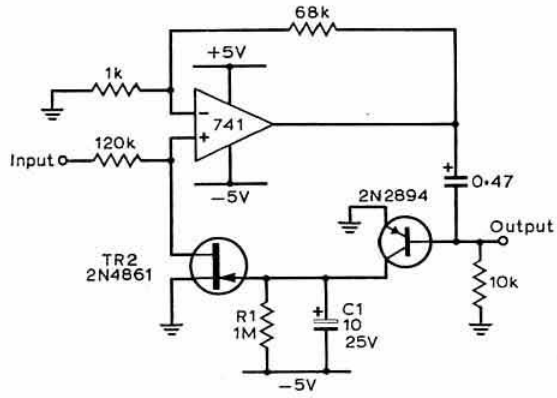


Fig 4. Audio compression or agc arrangement in which the input voltage can vary from 20mV to 20V for almost constant output of 1·4V p-p with a quick response time. The presence of the 120kΩ resistor in the input circuit means that the input signal can have greater magnitude than the supply voltage since it limits maximum signal across the fet to 25mV. The 2N2894 is TR1 (*Electronics*)

For simple ssb/cw receivers he recommends the dual-time constant arrangement shown in Fig. 3. This is an agc system entirely derived from the af signal but it can have a fast attack time due to the use of an emitter-follower stage. DJ2LR states that the actual hold time is determined by the auxiliary pnp circuit which is activated after the signal disappears and which determines the hold and decay time.

In applications where the intention is simply to provide a constant af output from a very wide range of af input signals, rather than to control the i.f. stages of a receiver, a rather different approach is possible. Fig 4 shows a circuit described by Neil Heckt (*Electronics* 31 March 1977). It is claimed that this will cope with an input range of 60dB (20mV to 20V) and provide a virtually constant peak-to-peak output of 1·4V. The circuit has a quick response time of 1 to 2ms and a delay time of 0·4s. The ability to cope with very strong input signals depends on the use of the high-value 120kΩ resistor in the input circuit. The C1 R1 combination determines the delay time: the collector current of TR1 and the value of C1 determine the attack time. The op-amp can be a 741 or any similar general-purpose device.

Another form of compression amplifier is shown in Fig 5. This arrangement comes from K. F. Fehling (*Electronic Design* 1 February 1977, p74) and is a variation of an old technique: using a photoconductive cell in conjunction with a light-emitting diode. With a red led, the photocell should

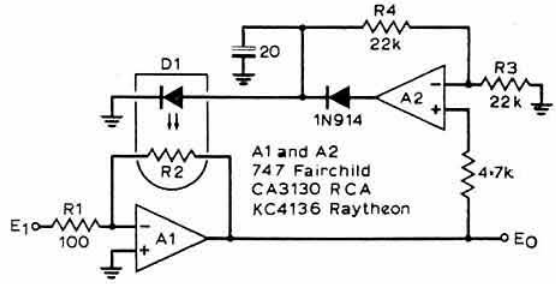


Fig 5. Another form of compression amplifier in which the output can be set from about 0·2 to 3V by changing R3 from 100Ω to open circuit. The frequency response depends on the type of op-amp used. It can cope with input changes of 55dB with low distortion (*Electronic Design*)

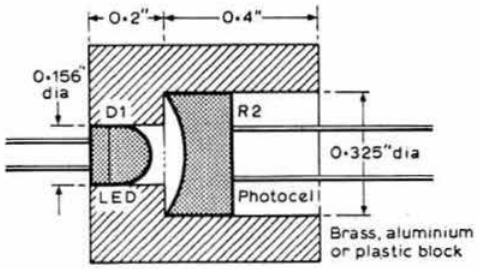


Fig 6. A housing for the led/photocell assembly used in the arrangement of Fig 5. It can be made from almost any material but it must be light-tight. D1: red led (eg Dialco 558-0101-001). R2: photocell CdS type (eg Vactect type VT34L, Clairex CL704L)

have a spectral sensitivity peaking in the red area. That shown has a dark resistance of over 20MΩ dropping to less than 200Ω in maximum light. With the values shown the output is approximately 2V over an input range of 50mV to 30V, but the output level can be changed by adjusting the value of R3 (with R3 of 100Ω the output level is approximately 0·2V). The housing for the optical assembly must be light tight, as indicated in Fig 6.

Simple atv

The notes from GM8BKE (*TT* April, p294) on video modulation and transverters have prompted Lawrence D. Woolf, GJ8AAZ (formerly GC6RAX/T), to send along details of his own arrangement which uses only one transistor and one ic but provides a simple way of getting atv on the air.

His 436MHz atv station uses an FT620 drive source, with the pa strip removed (since he believes 50MHz is the best drive frequency for a 432MHz transverter) in conjunction with a Modular Electronics transverter (50 to 432MHz transverters are also thought to be available from Microwave Modules).

To receive 432MHz atv stations he feeds the output of the receiver side of the transverter into a Band 1 television receiver; in his case a Sony CVM-90UB which allows him to receive 405-line or 625-line transmissions with negative or positive video modulation. For tv transmission he uses a Plessey SL610c as a 54MHz video modulator: Fig 7. The

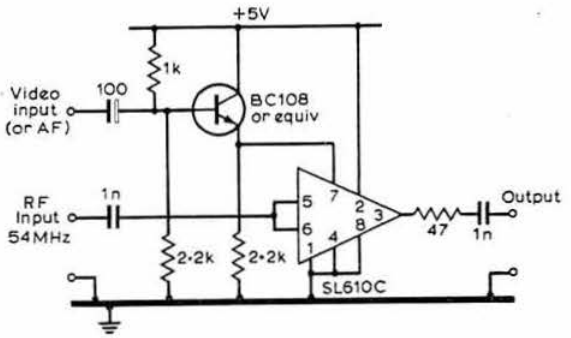


Fig 7. Simple 50MHz video modulator used by GJ8AAZ in conjunction with an FT620 drive source and a 50 to 432MHz transverter

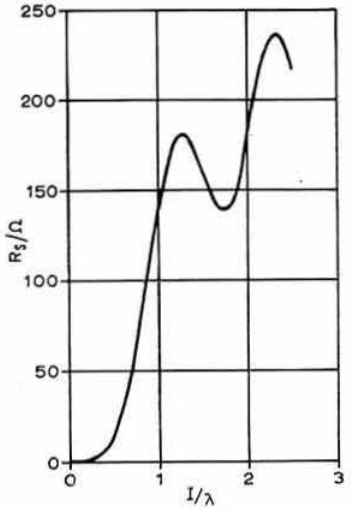


Fig 8. Radiation resistance of loop antennas derived from computer calculations (*IEEE Trans on Ant & Prop*)

video is introduced via an emitter follower on to the agc control point, which gives maximum output from the SL610 with lowest input voltage (ie syncs) and is thus ideal for negative modulation.

He was not concerned with the non-linearity of the gain control curve since the system was being used primarily with a ttl character generator (diode rom with 74154s and 74150 etc to generate callsign). In this case the video signals are simple black and white with no greys, but the system has also been used successfully with a vidicon camera channel.

GJ8AAZ suggests that this system is a nice way of generating totally solid-state video on 432MHz even without a vidicon—the only thermionic device in the entire system being a monitor crt.

Medium-sized loop antennas

In 1972 (*TT* January and March) attention was drawn to the use of small quad-type loop elements which totalled $\frac{1}{2}\lambda$ in perimeter or circumference rather than the conventional 1λ. The suggestion arose from a "Levy-Quad" (dipole-quad) beam with low-impedance feed described in *Radio-REF* by F6AMA; subsequently Les Moxon, G6XN, suggested that better results could be achieved by "inverting" the design, leaving no centre-point "gap" and providing a high-impedance feed from resonant feeders. But he also pointed out that such an element would have a radiation resistance of not more than about 5Ω. While such an element might well be attractive as a single-element loop, its use as part of a two-element quad beam, where radiation resistance would be forced down to a couple of ohms or so, was not really to be recommended.

Since then a short paper by A. Richtscheid in *IEEE Trans on Ant & Prop*, November 1976, pp 889–891 ("Calculation of the radiation resistance of loop antennas with sinusoidal current distribution") has presented a computer analysis of the radiation resistance of loop antennas having circumferences up to $2\frac{1}{2}\lambda$: Fig 8. This provides further confirmation that the radiation resistance of a $\frac{1}{2}\lambda$ loop is bound to be less

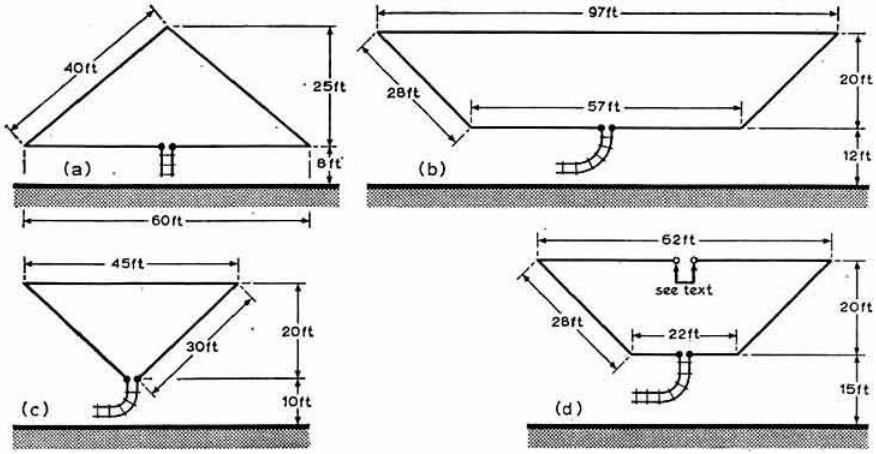


Fig 9. Some experimental loop antennas tried by GI3XZM. (a) 140ft loop to provide $\frac{1}{2}\lambda$ loop on 3·5MHz (open feeder about 15ft long with atu). (b) 210ft loop to provide $\frac{3}{4}\lambda$ loop on 3·5MHz (open feeder about 80ft and also used with G5RV-type feed with open-feeders connected to 75Ω cable at suitable resonant point, permitting operation without balun or atu). (c) 105ft loop to provide $\frac{3}{4}\lambda$ on 3·5MHz (not recommended unless low-loss construction). (d) 140ft loop giving $\frac{1}{2}\lambda$ on 3·5MHz and suitable also for 7 and 21MHz with link shorted and 14 and 28MHz with link open

than 5Ω, compared with about 150Ω for a 1λ loop. Nevertheless it again indicates that $\frac{1}{2}\lambda$ loops *are* usable, even when constructed with wire of normal dimensions, but again emphasizes that loop dimensions less than $\frac{1}{2}\lambda$ call for very low-loss construction of the loop; for example using tubing or the outer conductor of $\frac{1}{2}$in coaxial cable etc.

Someone who has been experimenting with loops of various shapes and of modest dimensions for QRP work on 3·5MHz is Des H. Vance, GI3XZM. It will be appreciated that non-circular loops (eg triangles and trapeziums) enclose less area than a circular loop of the same circumference and so further reduce the radiation resistance. Nevertheless his experiences indicates that in practice such systems, when fed with open-wire resonant feeders, can achieve better efficiency than some of the "bent" dipoles and squashed Marconi-type systems fed against doubtful earths. He believes that medium-sized loop systems have been needlessly neglected in the past.

Fig 9 shows some examples of loops tried by GI3XZM. He has recently estimated typical radiation resistances as about 1Ω for a 0·375λ loop; 3·5Ω for an 0·5λ loop; and 12Ω for an 0·75λ loop. Clearly a 0·375λ loop calls for low-loss construction, but 0·5λ or 0·75λ can be fashioned with wire and yet give a good account of themselves in locations where space is restricted or really good earths not possible. If fed with open-wire feeders it is, of course, possible to use such loops effectively on higher frequency bands, as has been indicated in the past by G6XN. GI3XZM reports effective use of $\frac{3}{4}\lambda$ loops during 3·5MHz club activity periods.

A case of cable rash

A letter in *QST* recently pinpointed a potential danger that can arise from that very common material—pvc or polyvinylchloride.

"The day after I buried a length of coaxial cable leading to my antenna tower I developed a severe rash, similar to hives. The day had been very hot and the cable had lain in the sun for several hours. A doctor confirmed that contact with the cable had transferred some of the plasticizer used in the cable jacket to my skin, and I was allergic to the chemical. I had been sweating and when I dried myself off, the chemical on my hands got all over the upper part of my body. The doctor told me that pvc is a toxic substance and has caused a rare type of liver cancer . . . it is wise to wear gloves when handling this material."

I believe that it is generally accepted that the hazard of liver cancer is confined to the manufacture of pvc rather than during normal use, but the above case history indicates that some care should be taken when handling cable that has become very hot.

Mixed grill

R. R. Pygall, BRS20231 (G9AZK), draws attention to an article by Helge Granberg of Motorola in *Electronics Industry* (January 1977) on a solid-state linear amplifier intended primarily for amateur radio applications. 100W p.e.p. can be obtained from two MRF453 (or similar HEP S3037) devices; or 140 or 180W p.e.p. by substituting MRF465 or MRF421 devices. These powers are obtained with 13·6V on the collectors, allowing direct operation from car batteries. It is possible that details can be obtained from Motorola, if the journal is not available.

"A sewing machine needle may be made into a bit suitable for drilling small holes in printed-circuit boards; carefully break off the eye and the point of the needle and grind a bevelled edge on the tip, using a sharpening stone"—WN7CMZ in *QST*.

C. W. C. Richards, 9M2CER(GW3JET), of Port Dickson, Malaysia, notes the discussion on lightning risks (*TT* January) but is surprised at the singling out of Australia and South Africa as areas particularly afflicted by this problem. He notes that some years ago the IEE's *Electronics & Power* published a map of "iso-ceraunic levels" (ie electric storm intensities) based on the number of days when thunder is audible in a given locality: peaceful Britain has only 5 to 10; Australia and South Africa between 10 and 40; but in Malaysia, Brazil and Zaire it is up to about 140! He notes that when 9M2SEA (the 1975 "Seanet" Convention station) was operating with a 14AVT antenna, one flash of lightning and "the 14AVT was no more . . . only fragmented elements, burnt-out coaxial fittings and charred aluminium brackets". But it impressed a visitor from the USA even more than the lightning-hardened 9M2 gang, although even these were moved "to offer a humble, unspoken prayer at the near miracle that had spared injury and sorrow." □

microwaves

Dain Evans, G3RPE*

The Winchester microwave round table

About 50 people took part in the latest round table. A feature of recent meetings has been the overseas visitors attracted to them, and this time we welcomed VE3GEQ, from Norval, Ontario, who expressed a strong interest in getting on 10GHz and super-refracting all over the Great Lakes. Other overseas visitors were F5FS and F1DCJ who reflect the rapid growth of interest in France in the microwave part of the spectrum. They have promised to keep us posted on progress.

The main business of the meeting was concerned with microwave operating techniques, and among other things this covered: how to point antennas accurately; the pros and cons of tripods and masts for mounting antennas and equipment, and a brief review of microwave radiation hazards. Of particular interest to a number of people was a demonstration by G3WDG of the use of buildings and the sun as "standard" noise sources for checking receivers, more of which later.

Reviewing super-refraction techniques, GW3PPF (from the GW4BRS group) pointed out that over the long paths that were now being worked the errors in the path as calculated from NGRs compared with Great Circle paths could amount to hundreds of metres. This could make the difference between a completely clear path and one which was blocked slightly, and this provoked discussion on the likely effect of such obstructions under humidity ducting conditions. In attempting to review current thoughts on super-refraction, GW3PPF felt that the most important factor was a low wind speed, with what wind there was preferably coming off the land. The general weather conditions did not seem to affect matters as much as had been thought: pressure did not seem to be a direct controlling factor in itself and, as recent tests had shown, ducting was observed in the middle of winter to a degree comparable with that in high summer provided that the air temperature was at least a degree or two above freezing.

One of the advantages of super-refraction as a propagation mode is that one does not have to go climbing mountains to make contacts—in principle one can operate right on the water's edge, which is a splendid way to enjoy one's amateur radio on a hot summer day. Nevertheless there is endless discussion and little evidence on the advantages or otherwise of using a more elevated site. GW3PPF suggested that there may be an advantage when it was windy in that the more turbulent air near the coast could be avoided, an idea which at least can be tested.

As regards visual signs of ducting, GW3PPF thought that if the sky was either crystal clear or misty at both ends then ducting was less likely. A duct which appeared as an orange/brown band above the horizon was a favourable sign, whereas a grey one was not. If it had a sharply defined top edge, then so much the better.

Clearly, the factors which affect super-refraction are becoming more evident, but there still seems much to learn. What seems certain is that some form of super-refraction is present for a much higher proportion of the time than has hitherto been expected, and therefore it should be worth looking for in anything other than a freezing gale.

Each round table meeting has a character of its own. This one seemed to produce lots of small groups talking earnestly about a large number of topics, which produced a splendid atmosphere. Thanks particularly to Ann and Don Hayter for coping with the organizing.

The GB3UOS and GB3WRN beacons

Two new beacons in one month! On 25 April the 3·4GHz beacon GB3UOS (University of Sheffield) became operational. It consists of a 1W crystal-controlled transmitter on 3,456·0MHz which feeds a nominally omni-directional slotted waveguide array of 10dB gain. From its 400m-high site 4km NW Sheffield (ZN42c), it should radiate strong signals to the north, east and south, but it will be blocked to the west by the Pennines. G8AGN would welcome reports.

Later in the month, the beacon GB3WRN became active from the Wrekin, South Shropshire. This is on 1,296·91MHz, and beams north with an erp of 2W using a six-element stack for the antenna. Because of site problems, it is not possible to radiate much power in a southerly direction. It is planned to increase the output power by 10dB at the end of the summer. G3UBX will be pleased to receive reports of its signals.

1·3GHz news

G3NWU and G8DKU are now operational on 1,296MHz from Hartlepool with about 10W fm to quad-loop Yagis, and are looking for skeds. SSB equipment is being constructed.

The QSL cards which accompanied the claim submitted by John Quarmby for a 1,296MHz award for the G3XDY station are an interesting guide to current techniques. As G5UM has pointed out, 10 of the 3-country/30-county cards disclosed that quad-loop Yagis were used. These are taking over from the traditional dish, and rightly so in most cases. A dish 4ft in diameter is a reasonable size for a *sub-reflector*, not a reflector, at these frequencies. Their equipment is typical of current competitive gear for this band. A HW101 plus Magnum transverter is used to provide the 144MHz ssb drive to the G3LTF/G3WDG mixer described in *Radio Communication*, January 1976. This uses a 2C39 mixer and is followed by a 3CX100A5 pa producing 60W p.e.p. output. On the receive side, a masthead pre-amplifier using a BFR91 is employed. The antenna consists of four quad-loop Yagis which are equivalent in gain to a dish about 8ft in diameter. These were mounted 25m agl.

The contacts for the award were made during the July and October microwave contests—and from a site a mere 70m asl. Certificate No 13 for 1,296MHz has been sent to G3XDY. Members who worked considerable distances during last year's excellent openings are reminded that they may claim a Microwave Award for the first contact made beyond a distance of 600km on this band. A QSL to the vhf awards manager, G5UM, together with details of the actual distance worked, is all that is necessary. □

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

4-2-70

Graham Knight, GM8FFX*

GM3PXK contacts K1MON on 144MHz

Central Scotland amateur radio operators are well used to chatting to each other direct or via the GB3CS 144MHz repeater. Unlike their North American counterparts they cannot access the public telephone network (phone patch) with their mobile rigs. Hank Brugsch, GM5BKJ, a newcomer to the Glasgow area, tried an unusual experiment at the Mid-Lanark Amateur Radio Society's recent meeting.

Hank, who is blind—a "white cane operator", he says—comes from Boston, Massachusetts, and he dialled via the transatlantic telephone circuits to the vhf repeater station WR1ABB in Waltham near Boston. With the co-operation of George Caswell, K1MON, and Jim Regan, K1IOE, the Mid-Lanark Club callsign GM3PXK was "on the air" States-side. Club members were able to chat to American operators who found their normal 30-mile range extended to 3,000 miles thanks to the extra-long microphone lead. WR1ABB is mainly financed by the Waltham City Corporation and is connected to the local telephone system.

GM5BKJ had his audience listening to the repeater for 10min and certainly illustrated his talk on the American repeater system in a novel manner. The cost of transatlantic calls will no doubt discourage a Worked All States via the repeater and telephone system. The mind boggles at the thought that in these days of international dialling someone in Britain, totally unconnected with amateur radio, could get a wrong number and be connected to an American repeater.

Repeaters

Recent additions to the list of 432MHz repeaters which appeared in the April *4-2-70* are GB3HU (Hull), GB3IH (Ipswich), GB3LV (Lea Valley), GB3LW (Central London), GB3NK (Chelsfield, Kent) and GB3PH (Portsdown Hill). This means that all the uhf Phase 1 repeaters are now operational, with 31 more in the pipeline under Phase 2, news of which is expected soon. Nine proposals under Phase 3 are awaited by the RSGB.

Beacon news

The RSGB beacon co-ordinator, Brian Bower, G3COJ, has been appointed IARU Region 1 Beacon Co-ordinator by the RSGB VHF Committee. Members may not be aware that the Society is responsible for beacon frequency planning throughout the whole of IARU Region 1, and thus the task undertaken by G3COJ is quite considerable. The Society's data processor is used to prepare lists of all Region 1 beacons above a 50W erp level, and basic information on beacons from Region 1 societies is being obtained to add to that already stored by the data processor. Members with any information should contact G3COJ, QTHR.

Alf Green, G4ABB, reports on the beacons PA0CRB and PA0JTA which were detailed in April *4-2-70*. They can both be heard at his QTH near North Walsham in Norfolk. PA0CRB is on 432·075MHz, although the keyer is intermittent at the time of writing. PA0JTA is a very consistent signal in Norfolk and has recently changed frequency to 144·148MHz. These two beacons are run from the homes of PA0CRB and PA0JTA in Rotterdam.

GB3SU on 70·695MHz from QTH locator ZN61A runs 20W erp to an omni-directional antenna and is a reliable indicator of conditions on the 70MHz band. It was recently heard at S8 for a whole afternoon and evening by GM4CVI operating portable near Selkirk in the Border region of Scotland.

Members of the Moray Firth ARS: (l to r) GM8AZS, GM8LHE, GM8LVG, SWL Dawson and BRS35271, all of whom live in the Elgin area and are much in demand in auroras

DX records

Following the death in 1971 of Fred Lambeth, G2AIW, the particulars of British vhf and uhf record long-distance contacts have been lost. Jack Hum, G5UM, is now compiling a comprehensive list and would like to receive details of any records claimed. Eventually an IARU list of all European records will be made up by SM5AGM.

IARU df championships

The Amateur Radio Union of Yugolsavia is holding the IARU hf and vhf df championships near Skopje. As the event is to be held during the month of September, members planning holidays in this area at that time may wish to form a team or be observers at this event. Further details are available from YU1NQM, or G2BVN, QTHR.

Auroral warning monitors

Several operators are now using auroral monitor receivers as described by Peter Blair, G3LTF, in his March *Radio Communication* article. Alex Dunn reports being inspired by the article to modify a standard 70MHz to 28MHz converter which used a 42MHz crystal oscillator. Alex repeaked the mixer circuit so that the output is now on the 21MHz band. The front-end coils were modified slightly to tune Ch5 BBC television signals in the 63MHz region. The transmissions monitored by GM8DMZ are Forfar on 63·266MHz and the BBC Orkney station on 63·230MHz.

* PO Box 49, Aberdeen AB9 8JA.

Norman Graham, GI3RXV, in County Londonderry, monitors several frequencies for auroral warnings. On 6 April he heard auroral signals from French television stations on 52·230MHz, 52·250MHz, 52·270MHz and 52·400MHz. European fm signals were heard ar on 70·310 MHz. GI3RXV also finds it useful to monitor BBC television signals on Ch3 from Kirk o' Shotts and Shetland. Brian Bower, G3COJ, constantly monitors the Meldrum transmission on Ch4.

GM8DMZ, GI3RXV and G3COJ all had at least five hours' warning of the 6 April event. Many other auroral enthusiasts are known to be making monitors using the methods and equipment described in the G3LTF article.

Auroral reports

The best aurora of the year so far took place on 6 April. GB3SU on 70·695MHz could be heard strongly via the aurora in Aberdeen at 2052gmt although no amateur signals were heard. By 2100gmt the RSGB Auroral Warning Net had alerted stations and within a few minutes operators all over Britain were beaming north-east and working each other by this method.

Peter Heylett, G3IPV, at Bacton, worked GM3JFG in Fortrose in QTH locator XR40C. He had been testing a vhf crystal filter on his receiver when the aurora started, and continued to listen to GM3JFG for two hours—noticing that the beam heading, for peak signals, varied between 015° and 030°. Iain McHardy, GM3JFG, worked more than 60 stations on cw during the aurora—frequently the pile-up of stations calling made it impossible to copy certain far-away stations. Among the stations worked on 144MHz were ON6QW, PA0IHD, 0Z8SL, DM2BYE and DL7QY. Iain's best dx was SP2AOZ at Gdansk in QTH locator FO. UP2BBC was heard calling GM3JFG but could not get through the pile-up.

Ron Adams, GM8LHE, and Dick Noble, GM8AZS, both in Elgin (YR24J), worked several stations, the loudest being G8JHL in Manchester and G8HBQ in Leeds. Gordon Smith, GM4DSZ, in Aberdeen (YR70E), started working stations on cw at 2100gmt and eventually went to bed at 0430 with the aurora still going and stations in nine countries worked. Derrick Dance, GM4CXP, in YP37C stuck mainly to cw and worked a large number of stations including LA8YB (FT13A), SM0FOB (JT62A), SM7FJE (IT69C) and SM0DRV/5 (HR06E). The best dx stations for Derrick were UQ2IV in Latvia (KQ36F) and UP2BBC in Lithuania (LP07J). These two Russian stations appear to be the best dx worked during the event. Derrick beamed his 14-el Parabeam at 050° and used 100W input to a 6/40 for his Russian contacts.

Richard Rimmer, GD3YEO, in XO68E was worked by several British stations and SM0DRV/5, SM5CNF (HU49F), SM4AXY (HT56C) and SM7AED (GQ56B). Arne, SM7AED, has been trying to work GD since 1947 and his contact with Richard gives him country number 37 on 144MHz. Mike Dormer, G3DAH, in AL56H, worked six countries including SM5EJ (HT66E) and LA3UU (FT11A) and like many other correspondents mentions the extremely strong signals coming through from GM3JFG in the Highland region.

Outstanding signals among the stations worked at GM8FFX (YR80J) were G8BHH, Wolverhampton; G8IZS, Wolverhampton; G8JNW, London; GW8CFQ, Wrexham; DC1XC, ON6AT, F1RAC, DM2HRA, LA and SM. Many LA stations in CS, CT and ES squares were worked and nearly all the Norwegian stations were running just 10W output. Although GW8CFQ was always S9 he could not hear the LA and SM stations being worked at good signal strengths from Aberdeen. During a long auroral contact between GM8FFX and SK6AB, the Chalmers University station, the operator mentioned having made three contacts via the aurora on 432MHz with three other Swedish stations.

A further event took place on 8 April and GI3RXV and GM4CXP participated in the second aurora. OZ1OF is reported as having worked UR2RX in this event, which was short lived compared with the continuous eight-hour affair two days earlier. The auroral reports received have been passed on to the Propagation Studies Committee and supplies of report forms are available from G2FKZ, QTHR.

Sporadic-E propagation

The first of this year's sporadic-E signals were heard by Richard Crossley, G4CZP, on the afternoon of 9 April. From his location at Carnforth in Lancashire he heard signals from IW stations in Italy; Angus McKenzie, G3OSS, also heard these signals in London on the same day—unfortunately no contacts were made by either station.

Some operators are now speculating that a 27/28 day cycle, similar to aurora, can cause repeats of sporadic-E openings. A study is being made of the dates of several openings which occurred last year and at first glance repeats do seem to happen.

G3LTF works all continents on 432MHz

Peter Blair, G3LTF, has now worked all continents on 432MHz moonbounce. Peter's contacts via eme with Europe, North America and Oceania are well known. Recently contacts were also established with the three remaining continents of Asia, Africa and South America: JA1VDV at Takasaki, Japan; Peter Carey, ZE5JJ, in Salisbury, Rhodesia; and Jacky Bourvier, FY7AS, in Kourou, French Guiana. These outstanding eme contacts with all the continents are the result of several years of work and experiment by G3LTF and he is to be congratulated on his unique achievement.

Teletext

Sant Kharbanda, G2PU, recently demonstrated the Labgear teletext decoder by showing Ceefax and Oracle transmissions to the Radio Industries Club at Edinburgh. GM3EDZ, GM8BJF, GM4BYF, GM4DSZ and GM8DOX were among the vhf operators present to whom he demonstrated the ease with which the latest Oscar predictions could be obtained. The news that the Central London 432MHz repeater GB3LW was coming on the air that day was only one of several up-to-the-minute vhf items displayed on the amateur radio news pages.

The number of sets able to decode the teletext transmission is growing rapidly and it is Sant's personal prediction that there will be at least 50,000 sets with teletext capability by the end of this year. If vhf news continues to get its present large share of the teletext pages and if items like auroral warnings were incorporated, many operators will be thinking of a teletext decoder as their next project.

DX expedition

Richard Diamond, G4CVI, and John Regnault, G8FQO, went on a week-long expedition to Scotland during the last week in April. They operated from a site five miles south of Selkirk in QTH locator YP36E on the 23 and 24 April. They found the 144MHz cw contest quiet at the beginning with most signals just above the noise. Many were unreadable without their 300Hz filter but some outstanding signals were heard later in the day. Several PA0 stations were worked but generally they found conditions poor. The loudest signals heard during the contest were G3POI, G3JEQ/P and G4DGU.

On 432MHz both GB3SUT and GB3EM could be heard from Selkirk. Outstanding signals on this band were G4CBW and G8JHL, both in Manchester. G3UBX and G8IZS from Wolverhampton were good signals on ssb. The best dx worked on 432MHz from Selkirk was G4AHH in Northampton.

The equipment used by G4CVI and G8FQO was home-brew transverters for 70MHz and 144MHz with 4CX250B amplifiers. An FT101E prime mover was used to drive the transverters, the antennas were a 4-ele for 70MHz, a Parabeam for 144MHz and a Multibeam for 432MHz.

70 centimetres

Paul Widger, G8AGU, in South Molton, Devon, is now running a full 400W output on sideband from a K2RIW design amplifier. Using the high power and an 88-el Multibeam he is able to work to about 250 miles in any direction in spite of local screening. Contacts with Manchester and Southend are being made on a daily basis. Paul finds working dx under average conditions interesting and thinks lots of people tend not to bother unlesss there is a contest or a high pressure system: many contacts have been made over 800km and the best dx to date this year is F9FL at 920km. He is trying hard to work Spain and has already worked stations close to the French/Spanish border.

Meteor scatter

There are now 34 different correspondents in the *4-2-70* meteor scatter file; this is probably only the tip of the iceberg, as the number of stations using this mode is growing every day. Many operators are now realizing that the image of ms requiring high power and huge antennas is not necessarily correct. Undoubtedly, if available, they do help but many ms contacts are made with modest equipment.

Typical of real dx with simple equipment was G4ABB's ms contact with OH5NW near Helsinki in locator NU13E. For this contact he used 60W of sideband from a 6/40 to an 8-over-8 antenna. The QSO was made during the Quadrantids on 3 January and shows ms contacts are a possibility for almost any vhf operator.

Any operators considering trying ms are advised to read Joe Ludlow's article in February 1975 *Radio Communication*. Joe Ludlow is now ZS5JY in Natal, South Africa, but will be home in 18 months to become GW3ZTH again. He sends the following additional advice for newcomers to ms. A better chance of success can be gained by pre-arranging skeds, the addresses of more than 100 ms operators are available from DL7QY. Try to avoid commonly-used frequencies and ensure your sked partner knows the procedure you are to use—this is best done by making out a sked sheet beforehand and mailing him a copy, this can save hours of wasted time. Tape record everything received as a short burst could be missed but could be decoded from the tape later. Joe also encloses the circuit of his automatic tx/rx timer which frees the operator from worrying about whether he should be sending or receiving. A copy of this circuit is available from GM8FFX.

Chris Bartram, G4DGU, in Abingdon, has had recent ms contacts with I4BER on sideband with I2MBC and OE3UP on cw. Nothing was heard, however, on a sked kept with UK5EDP in the Ukraine. Dave Price, GW4CQT, has been working many stations by sporadic ms. Stations worked include SM5CUI (IT09B) completed in 1h 50min with 28 echoes, DL7QY (GM47B) completed in 75min with the astonishing number of 102 echoes, DK5RQ (GI24J) 101 echoes, OE3UP (HI70J) 24 echoes, and best of all SM2CKR (KX12G) completed 22 echoes during the 1h 40min test period. Signals were 2/6 both ways over the 1,920km distance—an excellent contact that most people would have thought impossible except during an actual shower.

REAL DX 1977

70MHz	G4CVI — GM3ZBE	650km
144MHz	G3SEK — UR2RX	1,758km
432MHz	G8AGU — F9FL	920km

The grapevine

After the WAC on 432MHz, what next for Peter Blair, G3LTF? . . . During the aurora many cw operators were annoyed by G8 stations calling on sideband in the cw section of the band . . . There are now 12V linear amplifiers giving 80W true output on the 432MHz band . . . The number of Marc Tonna, F9FT, long-Yagi antennas in use in Britain is surprising . . . G8AGU defines fm as "fashionable mediocrity" . . . Many letters have been received from local groups operating on a.m. between 144·500MHz and 144·900MHz . . . *Mobile News* and *Wireless World* have now mentioned the a.m. revival . . . G8GGK at Sanderstead is an outstanding signal reading the GB2RS news bulletin on Sunday mornings on a.m. . . . DC1XC in FN31A incredibly loud during the aurora . . . I4EAT has already worked GM4CXP by meteor scatter and is now setting skeds with GM3JFG.

Late news

Another auroral event took place on 2 May between 1615 and 1930gmt, a second phase lasted from 2133 until 0130gmt. Richard Diamond, GM4CVI/A (YR80J) worked 60 stations in 12 countries his best dx being OH3PV(LV39F), DM3CPA (GO61F), and SP5JC near Warsaw in QTH locator KM56F. This was a 26-day repeat of the 6 April event. Many letters have been received from a.m. operators who have been working dx in the 144·525 to 144·900MHz segment; typical of these is the George Watson's School Radio Club which reports a recent a.m. contact between Edinburgh and Cornwall. Full details on the A aurora and the a.m. revival next month.

Finally, thanks to all for the mass of correspondence this month, please keep sending in news, views, bouquets and brickbats to GM8FFX, PO Box 49, Aberdeen AB9 8JA. □

swl news

Bob Treacher, BRS32525 *

THE fact that the postman has not brought so much mail for this piece probably lies in the fact that the copy date advised in the last column was for the August issue. Thankfully, the regular correspondents realised this error and supplied some useful material.

10m activity

With the 10m Activity Periods now a part of history, it is useful to look back and prove that they served their purpose to encourage more 28MHz activity during the many months of the sunspot minima. The last activity period was indeed organized as a contest, which seemed to provoke more than the usual number of G stations to use 28MHz. A large number of Gs "kept the pot boiling" until 2000 on 1 May, and it is a pity that the band did not respond by offering more dx signals throughout the day rather than a very good dx opening to Africa and South America between 1800 and 2030. During that time, signals were heard from EL, ZD8, HI, LU, CT3, 7X4, ZP, PY, CE and CX, plus European backscatter signals from 4U1, LX and ON. I am sure everyone appreciated the work done by Dave Whitaker in organizing the activity days and I take this opportunity of thanking him on behalf of the SWLS in our Society.

Table scores

The All-time Countries Table is published for the first time in this issue. Response was a little disappointing but this may be due to the non-appearance of a deadline date for this issue. Your scribe was requested to give details of his all-time score by several regulars, so he has entered the figures and given everyone else a score to beat. There must be many listeners in the country who have all-time scores of over 500. Please forward these figures and then we can hope to publish a more representative table in October.

DX news

Both Dave Sharred and Neville Spry comment on improving band conditions. In recent weeks Neville has heard 6V8DF/5A, HK0TU (QSL confirmation received in less than three weeks), FH0BXZ, D6AC, ZK1BA, KM6EA, FO8DO, VR3AR and KA1IWO on 14MHz, while 21MHz has produced 9V1SP, W4YHK/VQ9 (Chagos), VR4DX, CR3AGD (QSL via SM2AGD) and P29GR. Neville remarks on a huge pile-up on TT8SM on 14MHz and the appalling bad manners shown by south Europeans and Americans, which left him contemplating whether football grounds were not the only place where hooliganism was encountered!

Dave Sharred comments, of course, on 1·8MHz conditions. He passes on the news that the C31FK who appeared a few times is definitely a pirate. His so-called QSL manager, G3NNY, knows nothing of this operation. On a brighter note Dave has added another three to his all-time 1·8MHz score in the shape of W4BRB/C6A, IS0LYN and JA1PIG/PZ.

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

1977 HF Countries Table

Station	10	15	20	40	80	160	Total	Mode
BRS17567	32	148	207	68	115	5	575	ssb
BRS35608	9	127	164	132	84	33	549	cw
A8312	14	120	160	90	111	36	531	ssb/cw
BRS35454	38	129	174	54	89	13	497	ssb/cw
A8841	15	103	178	40	64	0	400	ssb/cw
BRS32286	2	116	134	45	99	0	396	ssb
BRS35943	2	73	114	57	82	7	335	ssb
BRS37587	2	16	32	23	55	4	132	ssb
BRS37884	0	22	29	21	43	2	117	ssb
BRS37583	1	7	9	3	35	3	58	ssb
BRS38280	1	4	24	7	18	1	55	ssb
A9107	1	3	25	4	15	1	49	ssb
A9199	0	6	12	4	8	2	32	ssb

All-time Countries Table

Station	10	15	20	40	80	160	Total	Mode
BRS32525	187	256	278	186	223	25	1,182	ssb
BRS17567	228	260	307	129	216	16	1,156	ssb
A8312	74	189	233	150	181	57	884	ssb/cw
BRS35454	34	169	235	93	135	18	684	ssb/cw
A8841	49	143	245	49	98	0	584	ssb/cw

QSLs have also been returned from PA0HIP/LX and F8EX to boost his QSLd total on this band to 36. Unfortunately, Dave missed out on PJ8CO and ZF1AK. French stations do now seem to be allowed to operate 1·8MHz during contests. Certainly something to listen for during the next big contest.

Robert Maskill, BRS35454, has also been very busy on the hf bands recently. While having his FRSdx400 serviced, he was fortunate enough to borrow an FRG7 from a local amateur, G8FOD. Robert Small, A8841, will soon be moving to Needham Market in Suffolk, and he and his father, G3ALI, will have to be temporarily QRT. However, Robert has been reaping rewards on all bands recently. 9X5SP was a new one on 3·5MHz, while UD6, 4U1 and CT3 were extracted from 7MHz. The 14MHz band produced VE3FXT/S8, KG6RT, HK0TU, CO2HZ, 8Q0A and KA1IWO, which were all all-time new countries. There have also been some good Pacific openings providing stations from KG6, KH6 and KX6. The 21MHz band produced VP8PL from South Orkney while 28MHz accounted for TJ1BB, TU2GM and VU2DK.

Noel Phelps, BRS35608, comments on three new countries which he now has verified on 7MHz, namely HH2EL, 9M2PV and AP2MC, which takes his QSLd total on 7MHz to 151.

Miscellany

Welcome to yet another newcomer, Nick Jarman, BRS38280, who lives in Luton. He uses an hf receiver courtesy of G4FTM and is finding much pleasure in listening on it compared to his modest TRF receiver which covers only 3·5MHz.

Your scribe has been asked to intervene in a private feud! Ian Horwill, BRS38312, and Derek Gilbert, BRS37798, have been challenged by Paul Pasquet, A9105, and Iain Christie, A9201, to see which pair can hear the most stations during 1977. Several queries have arisen and the answers are as follows: 7X5AH is in Algeria and BF1KT is most definitely a pirate! 9K2KB should have been located in Kuwait. Let us hope this is a friendly competition, and we look forward to receiving details of its progress during the next few months.

Although response to G8WS's letter was given a very full airing in the April *Radio Communication*, Dave Sharred mentions the difficulty SWLS would experience if a paid QSL Bureau were to be introduced as suggested. Dave says

(Continued on p461)

the month on the air

John Allaway, G3FKM *

READERS will be sorry to learn that the building containing the administrative Central Bureau of VERON was extensively damaged by fire on 29 March. Those who subscribe to *DX'press* and have not recently received copies are asked to contact A. J. Dijkshoorn, PA0TO, Jan van Geldereef 11, 2253 Voorschoten, Netherlands.

DX news

Several amateurs from the Netherlands will be in Andorra between 12 and 20 June. They will use the following frequencies: 3,502, 3,525, 7,002, 7,025, 14,025, 21,025 and 28,025kHz. They will concentrate on cw operation as these frequencies suggest. Callsigns will be C31NM and C31NN, and QSLs should be sent to PA0ERA or PA0GIN.

VK9ZW on Willis Is is active most week-ends between 1200 and 1400. For the first hour he concentrates on the area 14,150-14,200kHz and looks for Europeans, after this he moves above 14,200kHz and contacts the USA. He has also been reported on 21MHz and on 7MHz ssb.

ZL5DL is located at Scott Base, Antarctica, and has been heard around 14,135kHz at 0430. KJ6DL has now closed down, and those looking for a contact with Wake Is may look for WA7UVU/KW6 who has been reported active on 14MHz ssb between 0200 and 0600.

PJ3BW is on the air from Aruba. He is PZ1BW and he has been using 14MHz ssb. It is understood that visitors to the Cayman Is will in future be issued with calls with ZF2 prefixes. There is a further station active from Haiti—this is HH2MC who has a TS520 and a tri-band beam. He also has an antenna for 3·5MHz and has been noted on 3,800kHz at 0200.

Gibraltar amateurs hold a net on the first Saturday of each month at 1200 on 14,120kHz. They also meet at 2100 on 3,770kHz.

3D2DM is a new licensee in Fiji. This is Dale Meyers, W4BIM, and he will be on the air every fourth week for the next two years.

LA5NM is able to help with QSL requests for contacts with JW4RV, JW4QV, JW5IJ, JW5NM, JW7FD, JW8KT, JW8LU and JW9WT. He also has logs for JW4FG for 1975 and 1976 only. Cards for JW1SO (Bear Is) should be sent to LA4DM.

WA2BCK (T. Nail, 63 S Fisher Rd, Apt C-7, West Seneca, NY, 14218, USA) is trying to close his logs for the following stations for whom he has acted as QSL manager in the past, and those who still need cards are asked to write as soon as possible: CT2BG (Jan 72-Aug 75), ZF1RR (April 73), ZF1KW (April 73), KO2ITU (May 1974), and VP2A (October 1975 only—others go to K2IGW).

OH2HO is in Senegal, has an HW101 and dipole antennas and will be using his 6W8HO call for about three years.

* 10 Knightlow Road, Birmingham B17 8QB.

It is believed that operation of amateur radio stations from Yemen ceased on 11 March. The same situation seems to apply in Nigeria.

K2GMV is hoping to be in Tahiti during June for a three-week stay. He will be active on all bands 7 to 28MHz and his callsign will be FO0PJM.

ZL1BKE was formerly 5W1AN and also YJ8AN. The visit by ZK1BA to Manihiki which was expected to take place during this spring was so short that no amateur operation took place. There is a possibility that a longer visit may be made during July.

Stations using the U60 prefix have been noted. They are celebrating the 60th anniversary of the 1917 revolution. The 4X10 prefix is being used by stations in Jerusalem during the rest of 1977—this marks the 10th anniversary of the re-unification of the city. NP4A was on the air during KP4 amateur radio week and operated by KP4s BDL and DX.

The JARL operated a special station from the Telecommunication Museum in Tokyo between 14 and 22 May. The callsign was 8J1ITU and this is only the second station to use the 8J1 prefix (the first was 8J1WJ from Antarctica).

West Coast DX Bulletin says that K4UTE has D2ASW logs for the period 10 December 1975 to 6 March 1977 (except for 30 October 1976). He also has logs and QSLs for YA2A, YA3A, YA4A, YA5A, YA6A, YA7A, YA8A, YA9A and YA0A, as well as VP5A and now C5AAB. ON5TO has logs for some past 9U5 activities—9U5CR from 1966 to 1973, 9U5RH from 1970 to 1972, 9U5DL from 1968 to 1972, 9U5CB from 1964 to 1971, and 9U5TA from 1960 to 1967. Please send sae/IRCs to O. Timmerman, Boterbekeweg 8, 8200 Brugge, Belgium.

VR1X says that he is now the only station on the Gilbert Is following the departure of VR1AA. He uses a dipole but hopes to have a beam soon. He is looking for UK contacts and operates around 14,300kHz, but does not work European pile-ups.

ZS6AGV is the new operator of ZS2MI on Marion Is and hopes to be very active. He may be found around 1300 between 14,220 and 14,225kHz.

Dxpeditions

A group of New Zealand amateurs, including ZL1s ACI, AJL, BKL, BKX and AVR, hope to operate from the Kermadec Is for a two-week period, probably commencing in mid-October. They will travel on a ship going to Norfolk Is and remain on Kermadec while the ship continues to its destination and returns. Either the VK/ZL or CQ WW DX contest should happen during their stay.

4X4TT operated as VR1AP from the Gilbert Is and as VR8N from Tuvalu. He then hoped to go to Tonga and be active as an A35 until July.

News from overseas

G8FG has informed your scribe that VK5ZB (Ernest B. Stephenson, 1 Emily Ave, Clapham, S Australia, 5062) has taken over the post of secretary/treasurer of the Australian chapter of the Ex-G Radio Club. Readers may like to know that the Ex-G Radio Club consists of members who were born (or whose parents were born) or became naturalized in the UK and who now live overseas. The club holds a world-wide net at 1900 each Sunday on 14,346kHz. Other meeting times are 0830 on Wednesdays on 14,280kHz (for Australasian members), and 0500 on Saturdays on 14,346kHz for the

Pacific area. UK stations are invited to participate. Applications for membership should be made to the UK secretary, F. W. Fletcher, G2FUX, 53 St Ives Park, Ringwood, Hants.

G3PST, who is at present in Portland, Oregon, and using the callsign G3PST/W7, says that he will be active on 3·5, 14, 21 and 28MHz at least until April 1978. He can usually be found around 14,150kHz at 1630 on cw each Sunday, and is looking for old friends and any other UK stations who would care to call him.

Nic Kyriazis, 5B4AZ, CARS QSL Bureau manager, points out that QSL cards are being received for stations using the prefixes 5B1, 5B3 and 5B9. He wishes everyone to know that these calls are not issued to Cyprus amateurs and are being used by pirates. The C4 prefix is also issued to Cyprus but is not being issued to amateurs although a number of pirate stations are using it.

Top band news

The Eighth 160m Activity Periods, held for the purpose of studying trans-equatorial propagation on top band, have once again been organized by PY1RO (Rolf Rasp, PO Box 51, Rio de Janeiro, Brasil). They will take place daily throughout June and July from 0000 to 0030 (and later if conditions are good). European stations are asked to transmit between 1,825 and 1,830kHz (in the "dx window"), South Americans between 1,800 and 1,808kHz, and South Africans between 1,965 and 1,970kHz. Other dx should use whatever segment is appropriate for those they are calling. Please keep contacts short and avoid repeat contacts if others are waiting. Helping weaker stations find the dx is also to be encouraged. After calling "CQ" it is suggested that one's own frequency be checked before tuning elsewhere. It has been found that there are several very good days each season, but that they do not usually follow in sequence so that daily checking is desirable. Please send all news to G3FKM.

G3YMC reports a contact with JA1PIG/PZ on 11 April. This was the latter's second European contact (the first was PA0HIP) and the question is asked whether this was the first G/PZ contact on the band?

Welcome

The following overseas members joined the Society during April: DA2DS, DC0JW, DB8NM, EA6BK, F1DCZ, F6CWB, F9DI, JR1SWB, KL7BGZ, OZ2DX, SM6COZ, SM6GPV, SV1CS, VE3AIE, VE3BCG, VE3EZF, VE3FDK, VE3GCO, VE3GND, VU2MS and ZE1CH.

Contests

The 18th All Asian DX Contests
1000 18 June to 1600 19 June (Phone).
1000 27 August to 1600 28 August (cw).
All bands 3·5 to 28MHz. There are single-operator single-band categories on each band, single-operator multi-band, and multi-operator multi-band classes. Exchanges consist of RS/T and two figures denoting the operator's age (ladies send 00). Each contact with an Asian station counts one point, and the multiplier is the number of different Asian prefixes worked on each band. Contacts with KA stations do not count nor do those with Minamitori Shima. Final score is the sum of the contact points on each band multiplied by the sum of the multipliers on each band. Separate log sheets should be used for each band and multipliers should be indicated the first time on each band. A summary sheet should be included. Logs must reach JARL, PO Box 377, Tokyo Central, Japan, no later than 30 September and 30 November respectively. Results will be posted to those who include an irc and sae.

The QRP Summer Contest
1500 2 July to 1500 3 July.
Select any five bands from 1·8 to 28MHz. Fifteen hours operation only with the nine hours rest in not more than two periods. Single-operator, cw only. Exchange RST and serial QSO number followed by power input (/1 to /9). Add X if crystal or vxo controlled. Contacts with own country count one point, with own continent two points, and others three. Three additional points for contacts with QRP stations (less than 10W). Multipliers are one for own country and two for others (on each band)—JA, PY, VE, VK, W and ZS call areas each count. QRO stations (over 10W) use /QRO and work only QRP stations. Logs should reach DJ7ST, H. Weber, D-3201 Holle, Kleine Ohe 5, Germany, by 31 July.

In the **1977 QRP Winter Contest, G4BUE** scored 19,336 points, G3DNF 12,528, GM3OXX 5,630, G3NEO 3,674, G8PG 3,040, G4DDX 3,020, G3UYM 2,971, G4AYS 1,960, G3FMW 1,737, G3ESF 756, G3IQF 159, and G3URU 90. (Note "handicaps"—one station using below 3·5W input or xtal control = 1. Both stations QSO points × 2 for one handicap, points × 3 for two, and × 4 for three.)

Results of the **1976 OK DX Contest** have been received. British entrants were (all bands) **G3ESF** (789 points) **GI3JEX** (324), **GC5AGA** (162), G3XFW (109), G6NK (93). 14MHz G4ETK (169), GW3SLA (97). 28MHz GM3MZV (94). 1·8MHz G3XWZ (34).

The IARU Radiosport Championship
0000 9 July to 2400 10 July.
Single- and multi-operator single transmitter. 1·8 to 144MHz. Stations may be worked on each band and if via Oscar count as an additional band. Contacts with own country count one point, with own continent three points, and with others five. The multiplier is the sum of the different ITU zones worked on each band. Exchanges consist of signal report and ITU zone number. Contest forms are available from IARU member societies and entries should be sent to IARU HQ, Box AAA, Newington, Ct, 06111, USA. There are phone, cw and mixed categories.

Results of the **1976 TOPS** contest have been received. **G4BUE** was the winner with 162,023 points. Other UK scores were **GM3CFS** (65,936), G4EOK (58,065), G3LIK (54,641), G4FAM (29,783), G8DI (9,646), G3JFF (9,617), GM4ELV (6,292) and G3WP (264). There were 247 entrants.

Results of the **1976 Scandinavian Activity Contest** have been received from SM0DJZ, and British scores were as follows: (phone section) **GW3SLA**—1, 599 points, **GM4DZX**—1,313, **G4CVZ**—1,040, G3USA—945, G4DBW—705, and G4ALG—522; (cw section) **G3SXW**—8,325, G3TXF—8,096, G4FAM—5,420, **GM3CFS**—4,940, G4ALG—4,466, G3ESF—4,095, GM3YOR—1,674, G3PCW—403, G4DBW—320, and G8QZ—216. It is understood that the rules for the 1977 event will be different from those in previous years. They will be published later.

Awards

Worked All Norwegian Communes Award
Issued by the Vadsø division of NRRL for contact with a minimum of 25 communes since 31 December 1974. Stickers are issued for each additional 25 communes contacted up to the maximum of 454. For WANCA All Class, 454 communes and three of the Norwegian five Arctic/Antarctic areas must be worked. Any bands or modes may be used but not cross band or via repeaters other than Oscar. Minimum reports must be RST 338 or RS 33. QSLs are not required but a list of contacts should be entered in the special record book (available from LA1QK, together with a Post Office Directory, for N.Kr15). The fee for the basic WANCA Mixed award is N.Kr30 and N.Kr10 for endorsements—there is no charge to blind or handicapped amateurs or listeners. All cw, ssb, rtty, sstv, novice (LB) and mobile WANCA may be applied for after the basic award has been achieved and will be sent without charge if application is made at the same time as for the basic award or endorsements, otherwise they cost N.Kr10. Certified record books should be sent to Award Manager WANCA, Sverre J. Schmidt, LA1QK, PO Box 3, N-9801 Vadso, Norway. Proceeds go to Norwegian blind and disabled amateurs.

Bromsgrove Silver Jubilee Award
Issued by Bromsgrove and District ARC for contact with club station GE3VGG and one other member of the club plus 23 other GE stations during the period 4–12 June. Any band/mode may be used but not repeaters or Oscar. Full details from G8KLO (sae, please).

The Helvetia XXII Award
HB9ALF has confirmed that the information given in April concerning the acceptance by USKA of a list of QSLs held, signed by a national society awards manager, is incorrect. Please send QSLs to HB9ALF with your application.

All Japan Districts (AJD)
Available to licensed amateurs and listeners who can produce evidence of contact with or reception of stations in all 10 Japanese call districts (1-0).
Worked All Japan (WAJA)
As above with all 47 Japanese prefectures.
Asian DX Award (ADXA)
As above with at least 30 Asian countries (including Japan).
Worked All Cities Award (WACA)
Heard All Cities Award (HACA)
As above with all Japanese cities (list from JARL, price three IRCs).
Japan Century Cities (JCC)
As above with at least 100 cities. JCC 200, 300, 400, 500 and 600 are issued as separate awards.

Each claim must be accompanied by a certified list from the applicant's national society awards manager (G5GH) that the QSLs have been checked. Only contacts after 29 July 1952 count, and those with KA stations are not admitted. All correspondence should be sent to: Awards Manager, JARL, PO Box 377, Tokyo Central, Japan.

The Stratford Festival Theatre Award
Celebrates the 25th anniversary of the Stratford (Ontario) Festival Theatre. Available to amateurs and listeners for contacts/confirmed reports with/from two Perth County stations using the special VF3 prefix during 1977. Send QSLs and log information plus two IRCs to: SARC, Box 541, Federal Bldg, Stratford, Ont, Canada, N5A 6T7.

QTH Corner

A51RG	Gueltshen, PO Box 1, Thimpu, Bhutan.
A6XP	Bodo Schmidt, German School, PO Box 1465, Sharjah, United Arab Emirates.
ex-A9XU	O. Jackson, 3 Kings Close, Westfields, Lawford, Manningtree, Essex.
D2AFW	R. McClure, 763 Graham Pake Terrace, Battle Creek, Mich, 49017, USA.
CE9BSA	now J. Barba, Canopus 5, Dalinas, Vina del Mar, Chile.
HH2EL	C. Moore, PO Box 1338, Arcadia, Cal, 91006, USA.
HH2MC	Dan Craan, PO Box 501, Port-au-Prince, Haiti.
JW2CF	M. Bjerrang, PO Box 210, 9401 Harstad, Norway.
KM6EB/KH6	S. G. Kibler, Box 14-USNS, FPO San Francisco, Cal, 96614, USA.
KM6FC	via K5YMY, R. Guidry, Rt1, Box 63-CR, St Amant, La, 70774,USA.
VR1AP	(see VR8N)
VR8N	B. Sheinberg, PO Box 22572, Tel-Aviv, Israel.
G3PST/W7	P. Finch, 7940 SW 56 Av, Portland, Ore, 97219, USA.
YJ8KW	(see HH2EL)
3D2DM	via W4UL, 817 Floridatown Rd, Milton, Fla, 32570, USA.
6W8HO	Stig O. Fernstrom, Box 66, M'Bour, Senegal.
8R1ITU	via JARL, PO Box 377, Tokyo Central, Japan.

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

Band reports

Considerable improvement has taken place on the higher frequency bands and much Pacific dx has been in evidence on 14MHz. 28MHz has been interesting and it is possible that many more contacts would be made if more use of "CQ" calls was made. The interference from the USSR continues to cause severe problems for all users of a large slice of the hf spectrum; all protests from national administrations having been steadfastly ignored.

Many thanks to the following for the information used in compiling this section: G2s HKU and WS; G3s HB, GVV, KDB, KSH, RCA and OUL; G4s RZ, DXE, EAN and EHQ; G55JL; G6GH; BRSs 17567, 34348 and 38200; As 8312, 8961 and 9191.

Stations listed in italics were using cw.

1·8MHz. 0400 *K4CYU, N4IN, VE1MX.* 0500 *JA1PIG/PZ, PY1RO.* 2100 *DK8MO/HB0, OE3VP.*

3·5MHz. 0100 FM7AQ. 0500 *JA1PIG/PZ* (Box 123, Paramaribo), VP2s DAC, DQ, KN. 0600 *CN8AD,* KH6IIV, *PZ9AB,* WA0SWE. 0700 K7UA, ZL4s, 7X4MD. 1900 KA6YL. 2000 JA5ANP, KA1IWO, JY5MK. 2100 EL7F, JA6BSM, 2200 A4XFW, ZS5LB, 9G1JK. 2300 A9XBD, CP6EL, PP5AJ, TN8AT, VP2LDJ, VP9IR.

7MHz. 0500 *CE0AE, HC5EE, K7UR, ZL.* 0600 FG7AS/VP2D, *VE7, VK, ZL.* 0800 *9A1AC* (QSL to WA2CMJ). 0900 HM0HQ. 2000 OH9TH/SU. 2100 *CR3AGD, ZS1XRB, 9J2WR.* 2300 9G1JX.

14MHz. 0600 FO8s, ET, EY, KH6, 5W1AU. 0700 FO8s DO, DH, EX, *KH6IJ,* KM6EA/KH6, UA0, *VK,* VR8N, *ZL.* 0800 *EL2EV* (QSL to W3HNK), JT1KAA, KC6JC, KH6, KL7, KX6BU, *OH2BGM/OH0,* ST2SA, VR3s AH, AR, VS5MC, 5W1AP, *9N1MM.* 0900 FK8CP, KS6FO, ZK1DR (Box 127, Rarotonga). 1000 VR1X, XT2AS. 1100 *U60A* (Battleship *Aurora*), XT2AE (QSL via DJ9KR). 1200 *FG7XA,* VE7DIY/SU, VR4DH. 1300 *EA9FH,* VR8N. 1400 KA1IWO (QSL to W7BUN), VS5PM, *YB1WF,* 9M6SN. 1500 *BY4AL,* JW7FD. 1600 FR7BM, KL7HMX, VK6. 1700 VS5MC, ZD7SD, 9M6MA (Box 113, Kota Kinabulu). 1800 TR8BA, VE7, XT2AE. 1900 FG7AO, KH6BB, M1I (QSL to I0BNR), TI9AEL, *ZL1AH, 9M2FK* (QSL to YU4KA). 2000 *CR3AGD,* SV1FT (Crete), TT8SM, VP8PJ, *5Z4NI* (QSL to SM0KV). 2100 *JA8UI/PZ,* 9L1GA (Box 7, Kambia). 2200 VP5BIL. 2400 W6/W7.

21MHz. 0800 A4XHE (QSL to DF2EE), *FR7AT, JA.* 0900 *HM, JA, UM8MAD,* VR4DX. 1000 DU6VFC, *VU2BK, YB0ACT,* 9M2DQ. 1100 AP2s P, ZR, *FL8AL,* ST0RK, 9N1MM, 9VISW. 1200 *VS5MC, VU2BK.* 1300 *HS1ALD,* YB0ACH, 3B6BD. 1400 VP8PL, ZS, 5X5NK, 9K2BE. 1500 HZ1SH. 1600 A6XP, S79R, ZD7SD. 1700 CP, EP. 1800 C5AAB, VP8HA, VP8PC. 1900 VP8ML. 2000 VP8PC.

28MHz. 0800 OD, 4X4. 0900 CT. 1000 EA. 1100 F. 1200 JY5YJ, *3B8MS.* 1300 CT, EA, IS0, PY, ZE, ZP5NA. 1400 FL8NR, PY, *ZS,* 9L1NP. 1500 EL7F, *YU.* 1600 5X5NK. 1700 EA, I, OD, OH, PY, UR, 4X4. 1800 CP6EL, CX, EL, JY, LU, PY, SM, TU2FW, VP8s HA, ML, 8P6FU, 9J2GJ. 1900 CE, CX, EA8, LU, PY, ZD8RR, 2000 CX, LU, PJ2, PY, ZP, 8P6. 2100 EA9FJ, HK4DHR, LU, PJ2AAX. 2200 CT, HI8XKC.

Acknowledgements to the authors of the following for items obtained from their publications: *CQ Magazine* (**W1WY**), the *Ex-G Radio Club* (**W3HQO**), the *29 DX Club* (**VK6RV**), *Long Skip* (**VE1AL/3**), the *West Coast DX Bulletin* (**WA6AUD**), and *DX'press* (**PA0TO**).

Please send all items for **July** issue to **reach G3FKM** no later than **11 June,** and for **August** by **9 July.** □

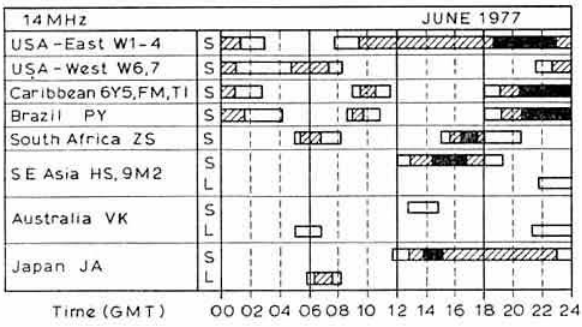
Propagation predictions

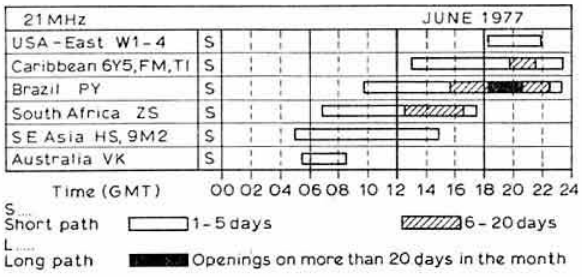
Summer conditions will make dx almost impossible on hjgher bands (at present almost exclusively 21MHz). Because of the still very low sunspot activity at present, **28MHz** will be of little importance, except for brief openings from about 1400 to 1830gmt to Africa and from about 1800 to 2100gmt to South America. Sporadic short-skip conditions will liven up this band and **21MHz** over distances of about 500 to 2,000km. On 21MHz only, traffic with South America and Africa will be certain for a few hours. Under exceptional circumstances North America may be heard, but no traffic will be possible to western North America and Japan.

14MHz will be the main carrier of dx, specially in the late afternoon and evening, but also at night and in the early hours. Summertime conditions mean that it will often be possible to work dx via the indirect path, special mention is given to western North America, Japan, Australia and South America. Sometimes even traffic with South-East Asia and Central America will be possible via the indirect path. The most favourable conditions for traffic with Hawaii on 14MHz via the direct path will be from 0500 to 0930gmt.

Dx traffic will be possible on **7** and **3·5MHz** when the longest part of the path lies in darkness. This is most important for **3·5MHz** as static will be more noticeable on this band than on 7MHz. Local traffic on 7MHz will be interrupted by the dead zone. 3·5MHz can be used for local traffic at the moment and will not be interrupted by the dead zone.

The provisional sunspot number for April 1977 from the Swiss Federal Observatory was 13·2 with solar activity mainly occurring during the second half of the month. The activity associated with the new sunspot cycle continues to increase and the predicted smoothed numbers for August, September and October are 19, 20 and 21 respectively.





HF Propagation Study

Predicted HPFs (MHz × 10) for June 1977

GMT →	00	02	04	06	08	10	12	14	16	18	20	22	24
Aden	172	157	201	252	248	247	244	248	280	281	223	154	172
Ascension	119	117	117	129	249	251	252	257	267	319	284	199	119
Bahrain	169	159	202	243	242	239	235	238	263	299	234	167	169
Bangkok	163	163	200	216	221	219	211	211	228	197	194	168	163
Barbados	194	162	120	141	148	209	227	223	224	232	252	270	194
Bermuda	191	153	117	111	150	192	211	211	211	213	215	244	191
Bogota	194	162	119	139	148	181	224	218	219	227	241	261	194
Buenos Aires	171	162	147	136	110	153	243	239	243	265	298	248	171
Cape Town	136	105	97	209	255	256	257	262	285	206	159	150	136
Colombo	141	161	208	239	239	234	229	230	253	185	159	143	141
Cyprus	162	147	186	224	225	225	221	221	242	276	252	205	162
Dakar	173	154	159	180	249	251	252	257	267	310	321	224	173
Denver	183	148	136	112	116	148	168	182	190	183	186	208	183
Fairbanks	178	167	167	178	178	186	182	185	180	180	180	180	178
Falklands	129	110	106	108	105	145	244	243	249	280	241	161	129
Gibraltar	126	107	97	138	164	163	159	158	162	178	195	164	126
Hongkong	162	166	190	200	210	210	205	202	213	168	169	178	162
Honolulu	173	161	161	167	180	192	167	154	186	188	188	182	173
Iceland	86	81	81	101	130	145	154	152	157	149	138	108	86
Jamaica	191	155	117	138	120	178	213	210	210	211	224	252	191
Lagos	149	148	139	218	255	255	256	262	281	336	266	188	149
Las Palmas	177	153	121	177	221	225	221	218	223	248	274	229	177
Lima	194	144	124	144	126	125	230	227	229	239	265	275	194
Los Angeles	182	152	145	136	112	111	153	177	188	183	191	199	182
Malta	141	124	131	172	194	191	187	186	194	219	228	186	141
Mauritius	120	112	191	253	248	249	249	255	261	187	169	152	120
Mexico	188	150	126	141	128	117	194	201	204	200	206	228	188
Moscow	139	130	162	171	186	185	178	177	178	201	209	180	139
Nairobi	116	120	178	253	251	252	251	258	286	265	168	125	116
New Delhi	162	162	205	224	228	224	216	215	237	239	199	172	162
New York	188	153	121	112	138	176	197	200	201	199	197	214	188
Osaka	171	167	182	183	195	196	196	194	190	174	191	183	171
Perth	164	161	208	238	237	233	174	163	141	154	139	122	164
Rio de Janeiro	183	167	157	120	114	242	246	243	249	277	303	243	183
Salisbury	158	124	131	253	253	256	257	265	288	272	183	176	158
Seychelles	114	124	199	252	244	243	246	252	285	202	125	114	114
Singapore	164	162	205	224	228	224	216	215	177	153	140	116	164
Suva (s)	178	167	173	181	186	167	153	139	110	145	182	176	178
Suva (l)	185	166	140	182	150	161	145	155	144	139	224	230	185
Sydney (s)	162	166	190	200	210	164	158	141	149	144	131	186	162
Sydney (l)	194	167	126	153	125	114	111	107	107	97	139	218	194
Teheran	164	161	208	239	239	234	229	230	253	293	244	191	164
Vancouver	174	155	155	167	158	163	169	176	176	183	183	183	174
Wellington (s)	176	169	171	177	180	172	161	159	141	139	190	177	176
Wellington (l)	195	169	145	119	105	101	100	94	88	86	163	219	195

For information on the use of this table, see page 284, *Radio Communication* April 1976. Please send reports to Mr J. Spurling, G4AQI, 15 Tibbs Hill Road, Abbots Langley, Watford, Herts WD5 0EE.

SWL news

(Continued from p457)

RSGB members would be loathe to send QSL cards to SWLs due to the extra cost involved, thus possibly discouraging SWLs from the hobby because of a bad QSL return rate. However, surely the answer here is to send an sae with your card, which would seemingly solve this problem?

Final

The deadline for the next *SWL News* is 1 July 1977. A bumper mail, please, for the next issue with as much news, views and scores as you can manage. I hope to see as many listeners as possible at some of the many rallies taking place during the summer months. □

Looking ahead

10 September—Scottish Amateur Radio Convention, Adam Smith Centre, Kirkcaldy.
17-18 September—NW Amateur Radio Convention, University of Lancaster.
25 September—Welsh Amateur Radio Convention, Oakdale Community College, Blackwood, Gwent.
15-16 October—Jamboree on the Air.
27-29 October—ARRA Exhibition, Granby Halls, Leicester.
2 December—RSGB AGM, IEE, Savoy Place, London WC2.

RSGB International Radio Communication Exhibition and Convention report

The exhibition was officially opened on 6 May by the Mayor of Haringey, Councillor Vic Butler. In the unavoidable absence of the RSGB President, Lord Wallace of Coslany, he was introduced by the RSGB vice-president, Dr D. S. Evans, G3RPE.

Councillor Butler opened his address by paying tribute to the exhibition organizer, Mr J. Hitchins, G4FGN, and to the many volunteers who had and were working very hard to make the event a success. He recalled his presence at the opening of last year's exhibition and said it was obvious from the greater number of visitors and exhibitors that this year's would be an even greater success.

He went on to say that it was appropriate that the exhibition was being held in Alexandra Palace, which was recognized as the birthplace of television broadcasting. This service owed much to the work of radio pioneers, among them many amateurs. In his opinion, radio amateurs talking person to person did more for world peace than many official bodies, and he was particularly pleased to welcome all the overseas visitors to the exhibition.

After declaring the exhibition open, Councillor Butler was escorted round the many stands by G3RPE and Dr E. J. Allaway, G3FKM, RSGB immediate past-president. At the RSGB bookstall a display of RSGB tee-shirts caught his eye and he later presented one to the chief executive of Haringey, Mr R. Limb, G8FLA, who accompanied him at the opening ceremony.

The Mayor of Haringey opens the event

Around the stands

Aarvak Electronics was showing a useful collection of new and surplus components, which included ferrite rings and rods, miniature coaxial cable and a new range of aluminium boxes.

Amateur Radio Exchange had a wide choice of secondhand transmitters, receivers and other amateur equipment, as well as new equipment from various well-known brand-names.

The **Amateur Radio Mobile Society** stand featured an exhibition of mobile interference suppression equipment as recommended by the ARMS information service. Also available were society ties, mobile logbooks, QSL cards and magnetic callsign plates.

Full-size models of Oscars 6, 7 and 8 were a feature of the **AMSAT-UK** stand, which also had a continuously-running tape/slide show giving details of the construction and launch of Oscar 7.

Axial Products had a display of new components, mainly semiconductors, together with etching fluid.

As usual **B. Bamber** was showing a large range of ex-equipment components, tools and test equipment. The selection also featured a new range of aluminium boxes.

J. Birkett was doing brisk business with the firm's usual large selection of components. There was also some new test equipment, including a novel multimeter with lcd scales which changed according to the range selected.

The **S. J. Branson** stand featured some microwave equipment, including power meters and 2·3GHz gear, in addition to a range of ex-equipment components and test gear.

The **British Amateur Radio Teleprinter Group** had a demonstration of a teleprinter in operation. Available on the stand were PCBs and special components for the G4ATG terminal unit, plus of course the group's popular publication *RTTY the Easy Way*.

The **British Amateur Television Club** had exhibits of equipment for both slow-scan and fast-scan television, with working demonstrations of the W6MXV monitor and the W0LMD keyboard built by G3KRC, and also of a caption generator built to a design published in the club's magazine *CQ-TV*. The display also featured the equipment likely to be required for a beginner's fast-scan television station.

Burns had a large selection of brand-new components and hardware on display, including the latest miniature plate ceramic capacitors. Other items included the TC101 wavemeter, now available ex-stock, and a new applications manual, showing many proven circuits for oscillators, mixers, amplifiers and detectors etc.

C & C Electronics, which specializes in made-to-order crystals, also had on hand examples of its standard range of crystals for vhf equipment.

Catronics was displaying its well-established range of kits based on designs published in various magazines, as well as several ready-made items designed by the firm. These included a new rtty terminal unit, the Eurocat ST5B, which is a refined version of the well-known ST5.

Another new item on display was the Eurocat 144MHz synthesizer. This uses a pll circuit to cover the whole band, and the version shown will plug directly into the Trio TR2200GX, TR7200G and, with slight modification, the TR2200G and TR7200 transceivers. A version suitable for Icom equipment is expected to be available later on.

The familiar collection of the **Clarbrook Engineering** telescopic tubular masts included the new version of the NK mast, which now has plastic thumbscrew locking and keyed sections to prevent unwanted rotation while in use.

Also shown was a new electric winch for the WTM mast which operates off a 12V battery.

Cobham Engraving was busy producing an attractive range of personalized callsign badges on a "while-you-wait" basis.

Corbett Television was specializing in electrical rather than electronic items, and there were large bins full of mains switches, fuseboxes, connectors, plugs and sockets at bargain prices.

Sharing the stand was G. Packer, and a selection of microwave components and new vhf test gear was on view.

CP Developments had an assortment of surplus components, etchant, coaxial cable and some secondhand radio equipment.

Crayford Electronics was exhibiting Antec and Jaybeam vhf and uhf antennas, including the new slim-line Antec helicals with BNC connectors. Helical antennas for the IC215 and TR3200 were also shown, together with a selection of new components, connectors and both new and secondhand equipment.

The display of **CSE Electronics** consisted mainly of surplus components including some test gear, transformers and bargains in coaxial cable.

Datong Electronics demonstrated a range of accessory units, including the well-known rf clipper and general coverage receiving adaptor.

Also shown in prototype form was the "Active Dipole" which is expected to be available later this year. This is an active broadband receiving antenna designed for those listeners with limited space.

G3RPE, G3FKM and Councillor Butler at the RSGB stand. In the background is G4DAX, Region 19 representative, who helped to man the stand

Only 4m long, it has a coverage of well below 200kHz to over 30MHz without an atu, traps or adjustment. This is achieved by the use of a high-performance head amplifier which is claimed to have a low noise and intermodulation level with a constant 50Ω output impedance over the range.

Pride of place on the **Doram** stand went to the ever-expanding range of kits marketed by the firm. New digital kits shown included a voltmeter suitable for panel mounting, a multimeter and a frequency meter. Also featured was a cmos morse keyer which, although the leaflet does not appear to mention it, is based on the G3GJX design published last year in *Radio Communication*.

The **F. R. Galka** stand seemed to have packed in even more test equipment than last year. As might be expected with a firm selling mainly to professional users, the equipment looked clean and serviceable although some items were on the expensive side for the average amateur.

Garex was showing Revco mobile antennas in addition to the well-known Twomobile and Fourmobile transceivers. Also exhibited was a selection of ex-equipment spares, circuit boards and test equipment.

Greenweld Electronics had a wide selection of surplus components including bargain bags of resistors and other items. A new range of small plastic boxes was also featured on the stand.

The **Home Test Co** stand demonstrated an underground cable locator and a low-cost oscilloscope, the Albol 41B. Other items shown included power supplies and custom-built transformers, plus boxes and some used equipment.

Rollercoasters, high power ATUs and meters were some of the many ex-equipment components featured on the **JMG Electronics** stand. The display also included a large selection of ex-government test gear such as oscilloscopes and signal generators.

London Amateur Radio Supplies was selling a collection of used radiotelephone equipment and spares, together with some test gear.

Lowe Electronics was demonstrating the complete range of Trio equipment, including for the first time Trio general-purpose oscilloscopes.

Another new Trio unit on display was the TR7400A mobile fm transceiver, which has a 30W output and is fully synthesized with digital readout. Perhaps a more significant newcomer, however, was the Belcom Liner 70A, a 432MHz multimode transceiver. This rig has a 10W output on a.m./fm/ssb/cw and is vfo-controlled from 430–440MHz.

Also shown was the Daiwa range of high-quality station accessories, including the SW410 which is an in-line power and swr meter for the 140–450MHz range.

The **M & B Radio** stand was packed with a large selection of test equipment including several oscilloscopes. Also on offer were some 13·4V PSUs at bargain prices.

Microwave Modules was showing a production sample of a new 25W combined linear and preamplifier. Housed in a small diecast box, this unit has a 7dB power gain on transmit and an 18dB gain on receive, with a noise figure of 2·5dB.

Another feature of the stand was a 432MHz ssb transverter being tested on a spectrum analyser in order to demonstrate the purity of the output signal.

Modular Electronics exhibited a range of add-on units for vhf and uhf transceivers. New products included a 500MHz prescaler in kit form and a range of six low-power linears for 144 and 432MHz.

There was also a useful selection of vhf and uhf components, including the Signetics SD306 D-mosfet, capable of a 1·5dB noise figure at 144MHz with superior cross-modulation performance.

Polar Electronic Developments was showing a range of add-on amplifiers and transverters for 144 and 432MHz. Also featured was a new solid-state linear in prototype form. This device, capable of 80W output for 10W input, may be switched into Class C for fm operation, giving greater efficiency.

The **Radio Amateur Invalid and Bedfast Club** displayed information about the organization and its activities, as well as a band-edge marker and tuning indicator designed especially for the blind radio operator.

Radio Shack was exhibiting the complete Drake line of amateur radio equipment, including the new high-performance TR-4Cw transceiver. Present on the stand to discuss the equipment were two senior Drake personnel: Milt Sullivan, K8YDO, chief of design, and Don Tyrell, W8AD, sales manager.

Also featured was the HAL all-electronic rtty system which includes a vdu and keyboard.

Radiotronics had a varied assortment of surplus components, ferrite rings and test equipment, including frequency meters and rf millivoltmeters.

The **Raynet** stand featured a large display of photographs of the network's activities, and the new edition of the *Raynet Manual* was also on view.

The **Royal Corps of Signals** had a live rtty link with Colchester in operation. Other items of interest included a complete 225–400MHz trailer-mounted station and a vhf manpack transceiver.

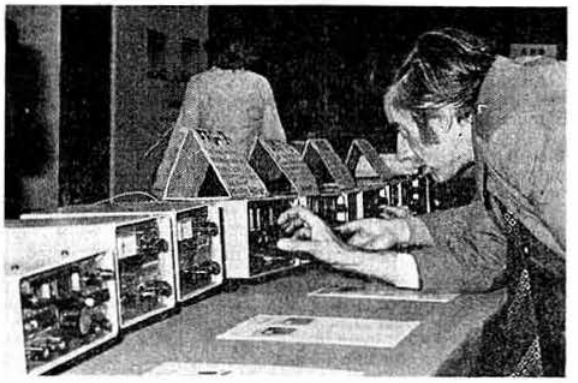
The **Royal Signals Amateur Radio Society** were sharing the stand, and had a display of society ties and other requisites as well as some antique radio equipment.

The **RSGB** bookstall was doing a brisk trade in Society publications, including the new *Radio Communication Handbook* Vol 2.

The RSGB committee stand, which was adjacent to the bookstall, had members of various Society committees on hand to deal with enquiries.

The RSGB microwave stand had a convincing demonstration of 10GHz fast-scan television transmitted live over a 14km path from

Trio offerings by Lowe Electronics



Part of the large range of equipment on display on the South Midlands Communications stand

Ilford. The transmitter used the new Microwave Associates Gunnplexer, and this device was also on display at the stand. Other exhibits included 10GHz transmitters, receivers and wavemeters, and also the famous 10GHz dustbin lid antenna.

The **RST Valve Mail Order Co** was showing some new RCA multimeters and oscilloscopes in addition to a selection of valves.

SGS Electronics was exhibiting a range of test equipment and new components. As with several other stands, the emphasis was on the unusual, and the display included some microwave equipment, a morse keyboard and crash helmets with built-in boom microphones and headsets.

South Midlands Communications was displaying the complete Yaesu range, including the new FT223 mobile fm transceiver, together with most other equipment required in the amateur station.

Items of interest included a new scanner developed by SMC for the Digital 2 144MHz fm transceiver. Using pll circuitry, this scans the whole band in 5kHz steps. The stand also had available a large selection of unusual varieties of Japanese af and rf connectors, including push-in PL259 plugs and back-to-back SO239 sockets.

Thanet Electronics was showing the full Icom range of equipment, including the new IC211E multimode transceiver which was shown under test on a spectrum analyser.

A scanner for the IC240 was shown in prototype form. The device fits inside the rig and there is a small external display.

Waters and Stanton Electronics was exhibiting the complete range of FDK equipment for vhf and uhf. A new addition shown was the TM56B 144MHz monitor receiver which has 10 channels fitted, together with a built-in autoscan facility.

Attracting a lot of attention on the **"Wireless World"** stand was a working demonstration of the G3RVM morse keyboard and memory described in the January issue of that magazine. Other exhibits of interest included a time-code clock and Linsley-Hood cassette deck, both built from *WW* designs.

The programme

Despite the opening day being a weekday, over 1,300 visitors were recorded as they entered the Grand Hall to browse around the stands and purchase the many bargains on offer.

Saturday was the outstanding day with over 2,000 visitors thronging the hall and attending the full programme of lectures catering for many facets of amateur radio. The day ended with a well-patronized dinner and dance as reported below.

More lectures followed on the Sunday and were again well attended. In addition to the trade stands the Members' Mart was an innovation this year which attracted a good deal of interest. Attendance for the last day was again over 1,500, bringing the total number of visitors to the exhibition and convention to well over 5,000. Three of the visitors were the lucky winners of portable television sets for which a draw was held on each day—they were E. C. Lambert, G3FKI, on Friday; G. D. Woodcock, G4AOE on Saturday; and D. F. Billing, G4BPX, on Sunday.

The dinner and dance

The convention dinner was held in the Alexandra Room which comfortably accommodated the 180 or so members and guests who assembled there at 7.45pm. The first after-dinner speaker was Mr R. W. Cannon, CEng, FIEE, FIERE, the technical director of Cable and Wireless Ltd, who clearly stated his interest in amateur radio although other commitments had prevented him from acquiring a full licence. His early introduction to amateur radio had provided a background which was of great value in the professional field, and in his opinion the amateur service was a national asset. The radio amateur is in a unique position of being able to discuss freely technical matters of common interest with contacts all over the world. Further, the limited resources available led to ingenuity, and the solution to a problem was likely to be the efficient answer rather than the expensive answer.

Mr Cannon likened the exploitation of the hf bands by radio amateurs to the present day position, where professionals are using fm and a.m. for mobile communications whereas amateurs have for some time made considerable use of ssb which is likely to be the future pattern. Amateur radio was the means whereby many different threads were drawn together and the speaker noted the presence of Dr J. A. Saxton, CBE, the Director of the Appleton Laboratory, who had twice been President of the RSGB. He was pleased to mention the help of radio amateurs in proving the frequency predictions produced by his organization. During a tour of the exhibition it was pleasing to note the large variety of components now available which should materially help home construction. Mr Cannon then spoke of his great pleasure in proposing the toast of the Society.

In his response, Dr John Allaway, G3FKM, paid tribute to Cable and Wireless in establishing their stations in distant places which had enabled radio amateurs to make contacts which would otherwise have been denied to them. He thanked Mr Cannon for making available the hf prediction tables which appear monthly in *Radio Communication*. G3FKM spoke of his hope that the Society dinner would become an annual event and that during the period before WARC 79 radio amateurs would work together rather than in separate areas according to their interests. It was essential that small nations should be convinced of the scientific and social value of amateur radio. The appointment of Lord Wallace as a Lord-in-Waiting to the HM The Queen was a richly deserved honour for the President and placed him in a unique position to speak for amateur radio. In conclusion G3FKM expressed the sincere thanks of the Society for the presence of Mr Cannon.

In proposing the toast of the guests, Dr Dain Evans, G3RPE, spoke of various interests making up the amateur radio scene, pointing out that Noah was an amateur but that the *Titanic* was completely professional. Among the visitors were Mr Weedon of Cable and Wireless, Mr C. E. Godsmark of the Home Office, and Mr J. Longden of *Radio London*. A welcome was extended to overseas visitors Ph Huis, PA0AD, and Jan Hoek, PA0JNH, the president and secretary respectively of VERON; S. Canivenc, F8SH; and last, but by no means least, to Ed Tilton, W1HDQ, who had surpassed his reputation as one of the legends of amateur radio.

In his response Dr John Saxton promised that he would not on this occasion deliver what he called "his usual sermon" with particular reference to WARC 79. He was happy to be able to reply on behalf of the guests, particularly the ladies who, he felt, were the most important guests on such an occasion. He congratulated the organizers on the exhibition and convention which he was glad to see had attracted an excellent response. In drawing attention to the dictionary definition of "symposium" Dr Saxton emphasized the place of functions such as the present dinner among more serious occasions. The speaker concluded by expressing his thanks, both personal and on behalf of all the guests, for the hospitality of the Society.

After the dinner, dancing continued until midnight, but for those not wishing to grace the floor there was ample opportunity to enjoy the social atmosphere in convivial company.

Credits

Such a successful event could not have taken place without many hours of work by RSGB headquarters staff and a great many volunteers too numerous to mention. However, mention should be made to the sterling work of those members of the Grafton and Southgate societies who once again organized and operated the talk-in stations. To all those who played a part in this event, the Society records its grateful thanks. □

council proceedings

A brief report of the Council meeting held on 14 April 1977

Present: Lord Wallace (*President, in the Chair*), Dr E. J. Allaway, Messrs A. M. Allan, J. Anthony, P. Balestrini, J. Bazley, Dr D. S. Evans, Messrs W. F. McGonigle, B. O'Brien, C. H. Parsons, D. M. Pratt, W. A. Scarr, R. F. Stevens, G. M. C. Stone, C. J. Thomas, D. M. Thomas (*members of Council*), G. R. Jessop (*general manager/secretary*), A. W. Hutchinson (*editor*), Mrs H. M. Allin (*minutes secretary*).

Apologies for absence were received from Messrs J. O. Brown and D. J. Andrews.

Financial report

In the absence of the hon treasurer, Mr Jessop reported on the present income from subscriptions and sales, which was at a high level.

Mr D. Thomas said that a 12-month projection on current figures would show a 5·4 per cent increase on total expenditure, which was a good improvement on last year's figures.

General manager's report

Mr Jessop reported that the programming of the IBM32 was nearer completion. The subscription payments program was not yet complete and a considerable backlog had now accumulated. Headquarters was rather low on man-power. In cases of illness there was no reserve staff available to prevent a backlog of work.

Various minor building jobs at HQ were to be undertaken shortly, in addition to the completion of alterations to the cellar.

Mr Jessop reported that the Finance & Staff Committee had agreed to advertise for a technical secretary, Mr Mynett having turned down this position.

Mr Parsons stressed the need for reserve staff who could deal with the subscription backlog.

Membership & representation

Mr Stevens remarked that he had recently been collecting membership totals from societies in IARU Region 1 and had been disappointed in the RSGB figure compared with others. The number of licensed members in the Society had been 12,500 in 1976 and 12,678 in 1977. Mr Jessop suggested that this was largely due to the removal of duplicated records from the old membership system.

It was resolved:

(i) to waive the subscriptions of 11 members;
(ii) to accept reduced subscriptions from 10 members;
(iii) to grant life membership to Messrs J. A. Fegan, VE3BUL/GW3TTF, and S. L. Norman, G8BDO;
(iv) to grant affiliation to Burnaby Amateur Radio Club, Canada; East Area Radio Society, Ilford; Grampian Repeater Group; Kodak Amateur Radio Society, Harrow; London Transport (District Line) Amateur Radio Club; Loughborough Students Radio Club; Mid-Thames Radio Direction Finding Club; Scunthorpe Amateur Radio Club.
(v) to approve the appointment of the following area representatives: C. Cartmel, G4EST, Liverpool and district; R. H. G. Crabb, G8NAB, south-east Somerset (following the resignation of G8KME, due to ill health); B. Pickford, G4DUS, St Albans area.

Society organization

Dr Evans reported that the Working Party was engaged in gathering ideas and drafting proposals to produce topics for discussion by various groups. Invitations to contribute had been sent to RRs, ARs and affiliated societies. All replies were being acknowledged and views being summarized. Dr Evans gave Council papers which set out ideas on the legal structure of the Society and he outlined various questions the Council should be considering.

Mr Jessop suggested that the amount of work which would be generated by the Working Party could be dealt with only by holding a Council meeting specifically for the discussion of this topic. Dr Evans agreed that there was not enough time to discuss this topic at normal Council meetings.

Mr Parsons said that in his opinion the work under consideration by the Working Party could not be done in much greater detail or more efficiently having regard to facilities available.

Mr Stevens said that all topics now being raised by the Working Party had been discussed previously and he wondered if the implementation of any suggested change to the legal structure would in fact benefit the average Society member.

The Regional Representatives' Conference was then discussed. The need for positive questions and topics for discussion was stressed, and it was suggested that papers be sent out prior to the conference, either stimulating ideas or asking representatives to submit ideas, and that the circulation of reports from Society officers would provide scope for discussion. Committees could also be asked to prepare reports of their current activities.

Marconi Award

Mr Jessop stated that a letter had been received from GEC-Marconi Ltd setting out the following terms of reference for the proposed award:

A. The award to be nominated by the Microwave Sub-Committee and approved by the RSGB Council,
B. A report on the work, subject to the consent of the Marconi Company Ltd, to be published in the Society's journal,
C. The RSGB Council reserve the right to make no award in the case of inadequate standard.

An annual payment of £100 for 10 years had been offered.

The Marconi Company's proposals were approved.

Amateur Radio Observation Service

Mr Pratt gave details of the progress which has been made in setting up the Amateur Radio Observation Service. Ten observers have been appointed and the documentation has been prepared. It is intended to commence operation in September 1977 and a short article explaining to members the working of the service is being prepared for *Radio Communication*.

Committee minutes and recommendations

Council accepted the minutes of the following committee meetings: Microwave Sub-Committee (15.1.77), IARU (27.1.77), TLC (17.2.77), Finance & Staff (24.2.77), Interference (25.2.77), Membership & Representation (10.3.77), Technical & Publications (31.1.77), HF Contests (10.2.77), VHF Contests (12.3.77), Education (5.3.77).

Mr Stevens then explained why the London repeater GB3LO had been closed down by the Home Office. This was not, as rumoured, due to interference, but because of infringement of the licence by use of a uhf link. Council members were asked to make it clear to enquirers that interference was not the cause of the close-down. Mr Stevens added that two members of the group concerned with GB3LO had been invited to the last Telecommunications Liaison Committee meeting.

Correspondence

Mr Jessop read a letter from G3AQW who reported the case of someone having a pocket-phone confiscated by the police and not been given a receipt for the equipment, which was thought to have been stolen but had been bought recently at a rally. Mr Jessop had checked with the police who confirmed their usual procedure was not to issue receipts.

A letter of appreciation had been received from several radio amateurs for the helpful attitude of Stan Dhanjal of the Post Office Radio Department, Leeds.

Microwaves manager

Dr Allaway reminded Council that no microwaves manager had yet been appointed and he proposed Dr D. S. Evans for this position. This was seconded and approved.

Telecommunications seminar

Dr Allaway read a letter from ICSC giving details of a seminar to be held in London on 21 April 1977, at which various aspects of world telecommunications would be discussed. He had been invited to attend as a member of a panel representing amateur radio during a discussion of citizens' band, but as he was unable to attend his place would be taken by Mr Stevens.

Region 20 ORM

Mr Scarr reported that he had been contacted by the Region 20 Representative regarding a proposed ORM to be held in Devon. This proposal was approved by Council.

your opinion

CW ON 80m
The Editor
Radio Communication
Sir—Following the comments about the use of the cw sector of the 80m band in *MOTA*, March, I wish to raise the following points:
(1) The "one reader" must be an occasional eavesdropper, rather than a regular user of this portion of the 80m band. Indeed daylight cw activity is lower than weekend or evening activity, but most cw operators have usual daytime employment. It would be unreasonable to waive the cw reservation for 24 hours on the basis of eight hours' reduced usage.
(2) There are, at present, several QRO a.m. stations who ignore the band plan and use the sector around 3,575. These stations, mainly "old calls" who should perhaps know better, cause inconvenience to regular cw users of the band by their over-generous use of modulation.
(3) The cw portion is already shared by other interests, including shore-to-ship stations, some of whom are ssb, and would be inconvenienced by an increase in the QRM level. Some of these stations already use dubious channel holding techniques.
(4) The daylight use of the ssb portions of the band appears to be mainly by lengthy "ragchew" and QRO net QSOs. Although we would not wish to question the valuable social pleasure of such communication, there does appear to be increasing social/commercial equipment usage of the amateur bands which does detract from the self-training of the licensee clause of the amateur licence, perhaps more evident in cw operation and equipment construction.
(5) The QRP Club considers 80m to be a valuable cw band and makes an important contribution to the correct usage of the cw portion, especially around the international QRP frequency of 3,540.
(6) As an affiliated society, the G-QRP Club will do everything in its power to retain the cw portions of all the amateur bands. Our members are concerned about the apparant lack of support from the RSGB for cw operation on the amateur bands and we look to the Society to allay our concern in words and action.

George Dobbs, G3RJV, secretary

(G3FKM replies: *The Rev Dobbs lists a number of relevant points. He may rest assured that the Society would also do everything in its power to retain exclusive cw sectors should their exsistence be threatened. The amateur service as a whole benefits from the additional ability possessed by those skilled in the use of the code*).

QSL BUREAU
The Editor
Radio Communication
Sir—If the volume of the outcry about the QSL Bureau is in fair proportion, then its support is amazing indeed. But usually those with a vested interest shout first and loudest.

I have supported RSGB for most of my licensed years and when I am called upon to bear increased membership costs because "combined support of all" is vital, I respond and pay up. But for how long? Certain aspects of membership are more tangible than others, eg *Radio Communication* and the QSL Bureau. Now the value of *Radio Communication* speaks for itself, and as we all receive it we are all equal. I never met a member who did not want the journal, but not so the QSL Bureau.

When times are good no one wishes to be penny pinching, but times are hard and value for money has to be considered. Is it reasonable to expect a free QSL service? A QSL was originally essential because no-one knew what radio could do or how it worked and written proof was vital. But now it is largely a "funthing", to verify that one personally did what is readily known to be possible anyway, a bit like buying a car sticker to show you went somewhere. Even if there were no bureau at all, the really rare event would be worth an air-mail stamp anytime. So why should those wishing a free service expect others to subsidize it? They do not expect a subsidy on their rig or antenna farm.

If what they are saying is that they only joined for the free QSL Bureau and without it they will leave, who now is twisting who's arm? Certainly not me. So can we have some statistics on the QSL Bureau. How many members send cards and/or receive cards? How many members have no wish to use it, (and of course how many do not know!)?

M. K. Dunn, G3KTL

Sir—As one of your overseas members I observe your articles, letters etc with interest. Frequently I have been tempted to write but have successfully withstood the urge until the recent letter of G8WS appeared suggesting charges for use of the RSGB QSL Bureau.

I have been on the air since the "dark ages" when G stations were experimental and sent only "Test", never "CQ". Consequently, I have all the QSL cards I shall ever need. Like Stallworthy I do not send cards except in response to those received. But if one is active in dx he receives many cards each month, entirely unsolicited of course. Remembering my own early thrills in receiving dx QSLs, I answer each and every one and consider this a duty. Once it was inexpensive to reply to QSLs directly, but no longer, and one is fortunate indeed to be able to dispose of outgoing cards via his society's bureau.

I consider operation of the QSL bureau to be one of the most useful services of a society and its funding should be considered as part of the yearly dues. The service should include both incoming and outgoing cards and should be without charge. It is immaterial whether a card is to go one mile or 10,000 miles or whether 40 per cent of the cards are never picked up. It is incumbent on the society to provide the service for those who wish to use it. Note, one never uses all the services provided, **but** if demand exists the service should be provided *gratis*. The QSL is only one step removed from the QSO and that is "What it is all about".

Contrast the RSGB and the ARRL. Both have had incoming QSL services and the RSGB has had outgoing services for many years. Recently ARRL instituted outgoing services but imposes a fixed charge per QSL card. Which society projects the better image of service for its members?

Before closing, I wish to thank G2MI for his exemplary operation of the RSGB QSL Bureau for many years. I would like to congratulate Pat Hawker, G3VA, whose *Technical Topics* monthly excites my admiration. How he does it I do not know, but there is nothing quite like his effort.

Charles Wein, W6UA

Sir—G8WS notes that the QSL Bureau is costly and suggests that users might be expected to pay for the service provided. There are no salaries paid, so costs must result from costs arising from mail out and the distribution of incoming cards to sub-managers.

Some 40-50 per cent of cards sent to this sub-bureau are not collected and the same probably applies to all other sub-bureaux, and it may not be generally known that non-RSGB members use the service, thereby adding to overall costs. As an estimate, half the distribution cost for incoming cards is wasted.

It appears reasonable that the QSL Bureau should be restricted to members only and seems even more reasonable if the QSL service was solely financed by those that use it. It follows that a system which deals with incoming and outgoing mail and operated from under one roof would be viable, and offers advantages to the Society and QSL Bureau users. It is possible that a charge of 2p per card out would cover costs which would include the economical filling of QSL Bureau-supplied franked envelopes, and a small recompense for the QSL Bureau operator(s).

The above lacks detail and careful investigation but as a starting point for improvement in QSL Bureau services, might be considered to have some merit by your readers.

T. Cheesley, G4CHP

Sir—I was surprised to read so many well-considered and largely constructive replies in April *Radio Communication* following my letter on the above subject. One thing seems certain—many members have a high regard for the service offered by the QSL Bureau.

May I please make one comment. My suggestion to use stamps was indeed only a suggestion which it was hoped would stimulate further discussion. I agree that such a scheme would raise some administrative questions. On the other hand, I feel that the difficulties mentioned by some members have been greatly exaggerated and that quite a simple and workable scheme could be evolved, always bearing in mind that the Society is not going to fold up over night if a few members bend the rules. Many national societies outside the UK use the stamp system with apparent success, including the Japanese whom many regard as being reasonably efficient!

A detailed reply to all the points raised by your correspondents would take up a whole page—may I therefore please be allowed to make a few general points.

(1) In the long run the Society has to be a viable organization. If it is in a loss-making situation it only has two alternatives:
(a) to become more efficient;
(b) to increase subscription rates.
(2) Many members use the QSL Bureau but a great many do not. It can be inferred from quite a few letters that the originator's only reason for membership of the RSGB is the QSL Bureau. I think this is rather sad and shows little understanding of the hard work, much of it voluntary or lowly paid, which is put in by all the people who produce *Radio Communication* and use a great deal of experience and expertise in maintaining the RSGB as one of the leading amateur radio societies in the world.
(3) Many members have emphatically endorsed my suggestion in correspondence and during QSOs although the majority of letters you published are somewhat anti!*

Having read and re-read all the letters published I am still of the opinion that a small contribution from members who regularly use the bureau would help considerably in keeping the Society's accounts in the black and so delay further increases in subscriptions. Despite the apparent lack of interest or concern in some quarters I am convinced that there is a great fund of good-will for the RSGB tucked away somewhere.

I must agree that the use of stamps on cards would cause some additional work even if simplified as much as possible. However, I wonder how members would react if it was suggested that they make a small voluntary contribution from time to time based on their own judgement of the value of the bureau to them. Even a G8 + 3 school boy could afford 25p if only once a year! Anybody who can afford to have 500/1,000 cards printed at today's prices would not, I am sure, suffer by sending £1 to the fund. My belief is that if every member using the bureau contributed between 50p and £1 per year the whole deficit could be wiped out.

As a mark of appreciation for the invaluable work done by G2MI (and his xyl) in the past I would like to suggest that the Society should set up a "G2MI Fund" to which donations should be sent and which should be administered by the Society to defray the costs of the bureau. The use of any excess monies would need further discussion.

F. E. Stallworthy, G8WS

* *Including those above, all letters received on this subject have been published*—Ed.

obituaries

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

HM Queen Alia of Jordan, JY1XYL
HM Queen Alia, wife of King Hussein, JY1, died in an air crash on 9 February at the age of 28. Queen Alia was active on vhf fm and took part in the planning of JY1's new radio stations at Amman and Aqaba.

Mr R. S. Biggs, G2FLG
Bob Biggs died on 2 May aged 69. For many years he was an active member of the Contests Committee and was awarded the Founders' Trophy in recognition of his work.

Mr D. Davies, GW2FYW
David Davies died on 15 April at the of 72. He was a dedicated cw operator and while in the Post Office served at Seaforth Radio and Sandridge. He was a member of Conway Valley ARS.

Mr G. Johnson, G3LMK
Gerald Johnson died on 5 November 1976. He operated mainly on 14MHz.

Mr H. Long, BEM, G5LO
Howard Long died on 20 April aged 75. He was an honorary vice-president of Oxford and District ARS and a long-serving member of the RAIBC. He had been confined to a wheelchair since a motor cycle accident in his teens. During recent years he was active on 1·8, 28 and 144MHz.

He was awarded the BEM in 1947 for his wartime monitoring of enemy transmissions.

Mr R. J. Scott, GM4EGE
Ramsey Scott died on 11 April at the age of 22. He was first licensed as GM8ILE in 1974 and was active on 144MHz from his home in Peebles and on many portable expeditions. He gained an honours degree in physics at Edinburgh University and was studying for a PhD at Lancaster University. As treasurer and publicity officer of the University of Lancaster RC he was deeply involved in the forthcoming North-West Amateur Radio Convention.

Mr H. S. Woodhouse, G2AHY
"Woody" Woodhouse died on 2 May. He had been licensed over 50 years and was mainly active on 28MHz. He was a past-president of the Farnborough and DRS and a member of the Reading ARC.

raynet

S.W. Law, G3PAZ *

Derbyshire Raynet call-out
During the recent floods in the Midlands, the Derbyshire Raynet group proved their worth when called out on 26 February by the Erewash Borough Council Technical Services Department via the emergency planning officer to provide communications between the council offices (operating as flood control) and Wilsthorpe Farm Estate, Long Eaton. Part of the estate was under several feet of water and in less than 30min two stations were in position and passing messages between the site and flood control as required by the officers in attendance. Information and requests for the various equipment needed were passed expeditiously, while controller Martin Coldicott, G8DKV, who received the original call-out, organized a shift system to suit all operators taking part. The emergency was covered continuously from Saturday call-out until late on Monday, members remaining on standby at night in case the situation deteriorated.

The council stated that they were very pleased with the service provided. All groups should take note; it can happen to you any time, so keep up to the Raynet standard. Incidentally, G8DKV is not QTHR but has moved to "Keywaydin", 34 Yew Tree Avenue, Ockbrook, Derby DE7 3TB.

London area
Prospective members in NW London should communicate with G3IMI, A. E. Harrowell, 26 Weald Road, Harrow, who is now organizer for this area and would be pleased to receive enquiries from anyone anxious to join a Raynet group locally.

Jubilee beacons
As our readers will be aware, a chain of beacon fires is to be lit covering the length and breadth of the UK on 6 June. It is not known at the time of writing if Raynet will be used for the purpose of control links, but since the proposal has been mooted we trust that we may have a share in this unique and historic venture.

Group news
The Lincolnshire area will be strengthened by the new Lincoln group under group controller G. W. Nash, G3ZOA. Organizer of a new Southampton group is G3ION, QTHR. Nigel Roberts of Prescot, Merseyside, is organizing a group in that area, and a member of the Northumbria Radio Club has been invited to organize a group in Newcastle upon Tyne. There are other applications in the pipeline but more of those later; we will make room, however, for G8DHQ, QTHR who would welcome applications in the Cheshire area.

It is with regret that we note the resignation of Colin Shaw, who has successfully controlled Mid-Warwickshire group for some time. Until a successor can be ratified by the group, G8CXL will hold the reins in his capacity as assistant controller. Bristol controller Brian Goddard now has the callsign G4FRG (see QTHR, G8JBR). Group controller for E Sussex is F. Cristensen, 19 Gore Park Road, Eastbourne. In the Slough/Windsor area, G3UKQ is group controller.

It would seem that our latest figures of 246 re-registrations and 136 new members proved that Raynet is something to be proud of.

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

*130 Alexandra Road Croydon, Surrey CRO 6EW.

contest news

70MHz Open Contest rules

1900–2300/0700–1500gmt, 13–14 August 1977

All entries and checklogs to: VHF Contests Committee, c/o Mr R. Taylor, G4BEL, 12 The Rampart, Haddenham, Cambs.

The VHF Manager's Trophy will be awarded to the leading station.

The following general rules, published in the January 1977 issue of *Radio Communication* will apply: 1, 2, 3, 4a, 5a, 6a, 7a, 8, 9a, 10a, 11–22.

Listeners' contest. Rules 1–3 will apply.

144MHz QRP Contest rules

0900–1700gmt, 31 July 1977

All entries and checklogs to: VHF Contests Committee, c/o Mr F. Mathews, G8ACJ, Easedale, Woodway, Merrow, Guildford, Surrey GU1 2TF.

The transmitter output power shall not exceed 1W cw or p.e.p. If transmitter power reduction is required, then brief details of how this was achieved should be given.

The following general rules, published in the January 1977 issue of *Radio Communication* will apply: 1, 2, 3, 4a, 5a, 6a, 7a, 8, 9a, 10a, 11–22.

Affiliated Societies Team Contest 1977 results

Almost 250 members of clubs throughout the country operated in this contest, and over 8,000 two-way contacts were completed and a clear winning team emerged.

This year the Edgware Trophy goes to the Bracknell Amateur Radio Society. Their team comprised G3YMC, G4ALG, G4AUC/A, G4BRA, G4BRK/A and G4DDL. Their large lead on claimed scores was reinforced during the checking process. Bracknell logs contained no unmarked duplicates and were free from the copying errors only too apparent elsewhere.

Southgate RC did not enter last year but made second place this time, while Crawley ARC retain their 1976 position. Addiscombe ARC in 4th place have moved up from 14th in 1976, while Stockport improved from 33rd to 6th.

The leading individual entry was made by G3XVY. Unfortunately the support he got from his club, the SE Kent YMCA ARC, was limited to two recently-licensed members.

Equipment

Forty-one FT101s, 18 FT401s, 17 FT200s and 28 rigs carrying sundry type numbers but all made by Yaesu indicates the popularity of this marque among cw operators. The only other transceiver running into double figures was the KW2000 series with 21 in use. G3MCK used a co/pa transmitter to make a good score, so maybe Japanese equipment is not indispensable.

The logs

Logs were much better this year. Only one written in red, one typed single-spaced and one with two contacts per line. The unmarked duplicate contact exacted its heavy penalty once again, in some cases from the very individuals who suffered last year. Among leading stations the average loss of points through the AFS bonus not being allowed was 4·4 per cent. This is very nearly twice as high as in 1976 and was due to:

CLUB TOTALS

Posn	Club	Total	Stations contributing to score					No. of entries
1	Bracknell ARS	5,488	G4BRK/A	G3YMC	G4ALG	G4BRA	G4DDL	6
2	Southgate RC	4,849	G3RTE	G3XTJ	G3KTZ	G3RPB/A	G3RWL	6
3	Crawley ARC	4,736	G3GRO	G3YVR	G3JKF	G3MGL	G6RC	7
4	Addiscombe ARC	4,719	G3SJX	G3RQZ	G4ALE/A	G3UFY	G4CDY	5
5	Cray Valley RS	4,649	G4FAM	G4BXT	G3RZP	G3XRX	G2MI	9
6	Stockport RS (A)	4,593	G3NOM	G3FYE	G3PEK/A	G3KJW	G4BUX	5
7	Hereford ARS	4,497	G4CNY	G3HVX	G3WRA	G3WRQ	G3ESY	5
8	Surrey Radio CC	4,393	G3IAS	G3BFP	G6LX	G3EUE	G3RJW	7
9	Reigate ATS	4,094	G3NKS	G5LK	G3KAX	G4DMO	G3ZRF	7
10	Maidstone YMCA ARS	3,947	G3ORH	G3ZSU/A	G3VTT	G3ZWH	G4DUT	7
11	Verulam ARC	3,945	G4BOU	G3JKB	G4DUS	G3YLG	G3LXP/A	6
12	RNARS-HMS *Mercury*	3,680	G3JFF	G3JZV	G4DIU	G3BZU	G4CVT	6
13	Wirral ARS	3,629	G4DLY	G4EWJ	G3OKA	G2FOS	G3UJX	5
14	Sutton & Cheam RS	3,622	G4CWH	G3LCH	G3DCZ	G3CWL	G2DMR	5
15	Govt Commns ARC	3,591	G8DV	G3SSO	G2HDU	G3SNN	G3REP	5
16	Thames Valley ARTS	3,545	G3JEQ	G3OGP	G2KI	G3HFO	G4DZS	8
17	Edgware & DRS	3,526	G3SJE	G3VW	G3GC	G3PSP	G4AEM	5
18	Grimsby ARS	3,326	G3VIP/A	G3RSD	G3IYT	G4EBK	G3HTI	6
19	Worcester & DARC	3,082	G3RMF	G3TQD	G3LQB	G4DXE	G3GJL	5
20	West Kent ARS	2,972	G4DIX	G4CCQ	G4ERW	G4EUK	G4FDC	5
21	Echelford ARS	2,915	G3KKQ	G2FNK	G4CQO	G3MCK		4
22	Bangor & DARS	2,803	GI3SXG	GI3JEX	GI4CIE	GI2FHN	GI3OLJ	5
23	Stourbridge & DARS	2,547	G6OI	G4IP	G4DPQ	G3JEI	G3KZG	5
24	Conway Valley ARS	2,534	GW3CW	GW3GRY	GW3JI	GW3RQV	GW3MDK	6
25	Glenrothes & DARC	2,455	GM3YOR	GM4ALK	GM3PFQ	GM4EJI		4
26	Southdown ARS	2,318	G3KLX	G3WQK	G3YYF	G3SJV	G4EKX	5
27	Torbay ARS	2,317	G3LHJ	G4EDG	G3SNU	G4ELZ	G3GDW	6
28	Shefford & DARS	2,312	G4BWP	G3FJE/A	G4ARL	G3DOT		4
29	Swansea ARS	2,122	GW3OAY	GW4CWQ	GW3INW	GW4BIQ		4
30	Horsham ARC	2,120	G3PYC	G3VQO	G3SWC			3
31	Dunstable Downs RC	2,070	G4ENA	G3HJF	G3HAL	G3BLP		4
32	ARC of Nottingham	1,970	G3SJJ	G6CW	G4DVW	G4ECY/A	G3WFV	5
33	Leyland Hundred Gp	1,944	G3XII	G3WYY	G3HKU	G4BEE		4
34	Leicester Poly ARS	1,754	G3ORY	G3CWI	G4BUD/A			3
35	SE Kent YMCA ARC	1,550	G3XVY	G4EQJ	G4EGQ			3
36	Farnborough & DRS	1,402	G3SVL	G3VAA	G4EFY			3
37	Bromsgrove & DARC	1,373	G4AAL	G6WI	G4DHH	G2CLN	G3RBL	5
38	Clifton ARS	1,354	G3JKY	G4DBW				2
39	Stevenage & DARS	1,317	G4DDX	G3OVT				2
40	RNARS-HMS *Belfast*	1,315	G4EOK	G3PZP				2
41	Stockport RS (B)	1,212	G3RUG	G4BJU	G3DNX	G3BZC	G4FFW	5
42	Maidenhead & DARS	981	G3TWG	G3ZLQ	G3FVC			3
43	Lincoln SW Club	694	G3ZDW					1
44	Eccles & DRS	604	G8VF					1
45	QOCH MYC (RS)	557	GM3ZXH/A					1
46	RNARS-ROSYTH	555	GM3KPD					1
47	First CG (A)	500	GW3XNS					1
48	Gtr Peterborough ARC	390	G4BBA					1
	RNARS-Chatham	390	G2HKU	G3WP				2
50	Norfolk ARC	255	G4EOL	G4DYC				2
51	First CG (B)	160	G4EVN					1

Check logs acknowledged with thanks from: G3JUL, G4FFD, G4ECI, G3LGF, G3IFB, G5BQR, G4DNI, G3RFC and G3IQF

(i) clubs, who, though several of their members operated throughout the contest, did not submit entries;

(ii) the policy of some stations who claimed the bonus for any station who replied to their call, including in one case a UP2.

Failure to copy callsigns correctly led to considerable points loss. A common error was misreading numeral 3 for 4 and vice-versa. It was manifest in some cases that errors had crept in during the making of a fair copy of the log. Clearly no checking took place otherwise how would a callsign with no numeral slip through or a G4 call which will not appear for several years remain unnoticed?

The rules

The only rule to receive widespread adverse comment was that concerning the timing. An increase in the divorce rate can be directly attributed to this contest starting one hour earlier. As usual, however, the weight of comment approving the change balances that against. The purpose of the alteration was to reduce the time during which we suffered the worst of the interference from the Continental stations, and in that respect the change appeared to be successful. The writer's personal opinion is that one's operating performance is unlikely to be at its peak after a large Sunday lunch, and on this one day in the year the meal might be postponed to the evening. However, to promote customer satisfaction, all clubs participating in this year's event are invited to send G3IAS a postcard indicating their preference as to starting time. The votes will be weighted according to the number of valid entries which were received. Get your votes in by 30 June.

Many thanks to those who included comments with their logs. All are read with great interest. Next AFS—15 January 1978.

G3IAS

INDIVIDUAL SCORES

Posn	Callsign	Score	Club
1	G3XVY	1,403	SE Kent YMCA ARC
2	G3RTE	1,329	Southgate RC
3	G3SJJ	1,276	ARC of Nottingham
4	G3IAS	1,252	Surrey Radio CC
5	G4BRK/A	1,247	Bracknell ARS
6	G3NKS	1,246	Reigate ATS
7	G3SJX	1,209	Addiscombe ARC
8	G3YMC	1,194	Bracknell ARS
9	G4ALG	1,182	Bracknell ARS
10	G4CNY	1,176	Hereford ARS
11	G8DV	1,142	Govt Commns ARC
12	G4BWP	1,122	Shefford & DARS
13	G3BFP	1,110	Surrey Radio CC
14	GW3OAY	1,105	Swansea ARS
15	G3HVX	1,099	Hereford ARS
16	G3KKQ	1,075	Echelford ARS
17	G3NOM	1,074	Stockport RS (A)
18	G3JFF	1,070	RNARS-HMS *Mercury*
19	G4EOK	1,065	RNARS-HMS *Belfast*
20	G4FAM	1,054	Cray Valley RS
21	G3RMF	1,037	Worcester & DARC
22	G6LX	1,031	Surrey Radio CC
23	G3JEQ	1,025	Thames Valley ARTS
24	G3GRO	1,024	Crawley ARC
25	G3ORY	1,022	Leicester Poly ARS
26	G3RQZ	1,016	Addiscombe ARC
27	G3FYE	1,015	Stockport RS (A)
28	G4BXT	1,012	Cray Valley RS
29	G3SJE	1,002	Edgware & DRS
30	G4CWH	980	Sutton & Cheam RS
31	G4DIX	977	West Kent ARS
32	G3YVR	975	Crawley ARC
33	G3XTJ	970	Southgate RC
34	G3JKF	965	Crawley ARC
35	G4BRA	953	Bracknell ARS
36	G4CCQ	952	West Kent ARS
	G4BOU	952	Verulam ARC
38	G3RZP	950	Cray Valley RS
39	G3WRA	937	Hereford ARS
	G3JZV	937	RNARS-HMS *Mercury*
41	G3MGL	930	Crawley ARC
42	G3ORH	919	Maidstone YMCA ARS
43	G4ALE/A	913	Addiscombe ARC
44	G4DDL	912	Bracknell ARS
45	G3PEK/A	910	Stockport RS (A)
46	G3KJW	907	Stockport RS (A)
47	G3KTZ	906	Southgate RC
48	G3PYC	904	Horsham ARC
49	G4DLY	901	Wirral ARS
50	G3XRX	896	Cray Valley RS
51	G3LCH	887	Sutton & Cheam RS
	G3VIP/A	887	Grimsby ARS
53	G3SSO	885	Govt Commns ARC
54	G5LK	882	Reigate ATS
55	G4AAL	880	Bromsgrove & DARC
	G3LHJ	880	Torbay ARS
57	G3RPB/A	852	Southgate RC
58	G6RC	842	Crawley ARC
59	G3JKB	835	Verulam ARC
60	G3DCZ	825	Sutton & Cheam RS
61	G3ZSU/A	817	Maidstone YMCA ARS
62	G4DDX	815	Stevenage & DARS
63	G3UFY	814	Addiscombe ARC
64	G4EWJ	805	Wirral ARS
65	G3OKA	802	Wirral ARS
66	GW3CW	795	Conway Valley ARS
	G3VQO	795	Horsham ARC
68	G3RWL	792	Southgate RC
69	G3KAX	785	Reigate ATS
	G2HDU	785	Govt Commns ARC
71	G3TR	784	Crawley ARC
72	G3RSD	781	Grimsby ARS
73	G4CDY	767	Addiscombe ARC
74	G3VTT	762	Maidstone YMCA ARS
75	G3TIR	760	Crawley ARC
76	G3WRQ	756	Hereford ARS
77	G3SVK	750	Southgate RC
78	G3OGP	740	Thames Valley ARTS
	G4DUS	740	Verulam ARC
	G3XII	740	Leyland Hundred Gp
81	G3YLG	739	Verulam ARC
	G3ZWH	739	Maidstone YMCA ARS
83	G2MI	737	Cray Valley RS
84	G2FNK	725	Echelford ARS
85	G3TQD	720	Worcester & DARC
	GM3YOR	720	Glenrothes & DARC
87	G3SNN	712	Govt Commns ARC
88	G4DUT	710	Maidstone YMCA ARS
89	GI3SXG	706	Bangor & DARS
90	G3SVL	700	Farnborough & DRS
91	G3JKY	697	Clifton ARS
92	G3ZDW	694	Lincoln SW Club
93	G4BUX	687	Stockport RS (A)
94	G4EDG	685	Torbay ARS
95	G3LXP/A	679	Verulam ARC
96	GM4ALK	675	Glenrothes & DARC
97	G6OI	670	Stourbridge & DARS
	G3VW	670	Edgware & DRS
99	G4ENA	660	Dunstable Downs RC
100	G4DBW	657	Clifton ARS
101	G2KI	656	Thames Valley ARTS
102	G3FJE/A	645	Shefford & DARS
103	G3GC	642	Edgware & DRS
104	GI3JEX	640	Bangor & DARS
105	G2FOS	635	Wirral ARS
106	G3KLX	632	Southdown ARS
107	G4DIU	622	RNARS-HMS *Mercury*
108	G3HFO	617	Thames Valley ARTS
	G4AXD	617	Maidstone YMCA ARS
	G4DMO	617	Reigate ATS
	G3VAA	617	Farnborough & DRS
112	G3PSP	615	Edgware & DRS
113	G4CQO	610	Echelford ARS
114	G8VF	604	Eccles & DRS
115	G4IP	599	Stourbridge & DARS
116	G3IYT	597	Grimsby ARS
	G4AEM	597	Edgware & DRS
118	G3CWL	595	Sutton & Cheam RS
119	G4EBK	586	Grimsby ARS
120	G3CWI	577	Leicester Poly ARS
121	GM3PFQ	570	Glenrothes & DARC
	GI4CIE	570	Bangor & DARS
123	G3BZU	566	RNARS-HMS *Mercury*
124	G3ZRF	564	Reigate ATS
125	GM3ZXH/A	557	QOCH MYC (RS)
	G3EUE	557	Surrey Radio CC
127	GM3KPD	555	RNARS-Rosyth
128	G3WYY	535	Leyland Hundred Gp
129	G3ESY	529	Hereford ARS
130	G3HJF	526	Dunstable Downs RC
131	G3RUG	523	Stockport RS (B)
132	G4DPQ	521	Stourbridge & DARS
133	G3HAL	515	Dunstable Downs RC
134	G4DZS	507	Thames Valley ARTS
	G3WQK	507	Southdown ARS
136	G3MCK	505	Echelford ARS
137	G3OVT	502	Stevenage & DARS
138	GW3XNS	500	First CG (A)
139	G4ERW	497	West Kent ARS
140	G4AVE	495	Reigate ATS
141	GM4EJI	490	Glenrothes & DARC
142	G3LQB	488	Worcester & DARC
143	G3UJX	486	Wirral ARS
144	GI2FHN	485	Bangor & DARS
	G4CVT	485	RNARS-HMS *Mercury*
146	G3HTI	475	Grimsby ARS
147	G3JEI	472	Stourbridge & DARS
148	GW3GRY	457	Conway Valley ARS
149	G3YYF	450	Southdown ARS
150	GW3JI	445	Conway Valley ARS
151	G3RJW	443	Surrey Radio CC
152	G3SJV	442	Southdown ARS
153	GW3RQV	440	Conway Valley ARS
154	G4DXE	435	Worcester & DARC
155	G3BPM	427	Thames Valley ARTS
156	G4AUC/A	426	Bracknell ARS
157	G3GHI	425	Surrey Radio CC
	GW4CWQ	425	Swansea ARS
159	G3SWC	421	Horsham ARC
160	GW3INW	415	Swansea ARS
161	GI3OLJ	402	Bangor & DARS
	G3GJL	402	Worcester & DARC
163	G4BNT	400	Grimsby ARS
164	GW3MDK	397	Conway Valley ARS
165	G4BBA	390	Gtr Peterboro ARC
166	G3TWG	382	Maidenhead & DARS
167	G4BJU	375	Stockport RS (B)
168	G3SNU	369	Torbay ARS
	G3BLP	369	Dunstable Downs RC
170	G3HKU	360	Leyland Hundred Gp
171	G3JKS	359	Verulam ARC
172	G3ZLQ	339	Maidenhead & DARS
173	G2DMR	335	Sutton & Cheam RS
174	G4BEE	309	Leyland Hundred Gp
175	G4ARL	297	Shefford & DARS
176	G3ANK	292	Cray Valley RS
177	G3JNB	291	Thames Valley ARTS
178	G4EKX	287	Southdown ARS
179	G3KZG	285	Stourbridge & DARS
180	G4EUK	279	West Kent ARS
181	G3BFE	275	RNARS-HMS *Mercury*
182	G4FDC	267	West Kent ARS
183	G4ELZ	261	Torbay ARS
184	G3FVC	260	Maidenhead & DARS
185	G3PZP	250	RNARS-HMS *Belfast*
	G6CW	250	ARC of Nottingham
187	G3DOT	248	Shefford & DARS
188	G3VLX	242	Cray Valley RS
189	G4DVW	237	ARC of Nottingham
190	G4EOL	233	Norfolk ARC
191	G3JJC	230	Cray Valley RS
192	G6WI	227	Bromsgrove & DARC
193	G3WXL	220	Maidstone YMCA ARS
194	G2HKU	200	RNARS-Chatham
195	GW3YLZ	192	Conway Valley ARS
196	G3WP	190	RNARS-Chatham
197	G6NK	182	Thames Valley ARTS
198	GW4BIQ	177	Swansea ARS
199	G4EVN	160	First CG (B)
200	G4BUD/A	155	Leicester Poly ARS
201	G3DNX	147	Stockport RS (B)
202	G4FBI	140	Reigate ATS
203	G4CCX	136	Surrey Radio CC
204	G4DHH	129	Bromsgrove & DARC
205	G3GDW	122	Torbay ARS
206	G4ECY/A	117	ARC of Nottingham
207	G3WVP	94	Cray Valley RS
208	G3BZC	92	Stockport RS (B)
209	G3WFV	90	ARC of Nottingham
210	G4EQJ	87	SE Kent YMCA ARC
211	G4EFY	85	Farnborough & DRS
212	G2CLN	82	Bromsgrove & DARC
213	G4FFW	75	Stockport RS (B)
214	G3REP	67	Govt Commns ARC
215	G4EGQ	60	SE Kent YMCA ARC
216	G3RBL	55	Bromsgrove & DARC
217	G4FKU	54	Torbay ARS
218	G4DYC	22	Norfolk ARC

NFD 1977

Entries will be accepted from stations using the "GE" prefix during the contest, even if their contest application quoted the normal callsign. Stations using the "GE" prefix must use the same call throughout the contest.

Microwave Contest rules

1600–1600gmt, 18–19 June 1977

All entries and checklogs must be sent to: VHF Contests Committee, c/o Mr W. McClintock, G3VPK, Maple Leaf, Great Braxted, Witham, Essex CM8 3EJ.

1. Scoring contacts may be made on any amateur frequency above 3·4GHz, but lower frequencies may be used for setting up contacts.

2. Contest exchanges will be as follows: RS or RST report followed by a serial number, QTH locator, QTH and an eight-character NGR, as defined on the OS 1:50,000 maps. Serial numbers shall begin at 001 for each band. Information should be passed on the band for which points are claimed. All data should be recorded on the log.

3. Each band will be listed separately.

4. Unless superseded by the above, the following general rules will apply: 1, 2, 3, 4b, 5b, 6a, 7b, 8, 9b, 10a, 11–22.

7MHz Contests 1977 rules

Licensed amateurs and SWLs throughout the world are invited to take part in these contests. Log and cover sheets may be obtained from RSGB, 35 Doughty Street, London WC1N 2AE; UK members should enclose a large sae. Entries are to be returned to the address given in rule 8.

TRANSMITTING SECTION

1. The general rules for RSGB hf contests, published in the January 1977 issue of *Radio Communication*, will apply.

2. When. Phone contest from 1200gmt 15 October to 1200gmt 16 October.

CW contest from 1200gmt 15 November to 1200gmt 16 November.

3. British Isles entrants must be members of the RSGB.

4. Contacts. Phone a.m. or ssb between 7·04 and 7·1MHz.

CW A1 only between 7·00 and 7·04MHz.

5. Exchanges. RS(T) and serial number (commencing with 001)

6. Scoring. (i) British Isles stations, for contacts with: European stations, 5 points; stations outside Europe, 15 points; British Isles stations, 0 points; plus 20 bonus points for each different country worked (RSGB Countries List).

In the case of VE, VK, W/K/N, ZL and ZS, each call area will count as a country for this purpose.

(ii) Overseas stations in Europe for contacts with British Isles stations: 5 points.

(iii) Stations outside Europe for contacts with British Isles stations: 15 points.

Overseas stations may claim 20 bonus points for each British Isles numerical prefix worked, ie G2, 3, 4, 5, 6, 8, GD2, 3, 4, 5, 6, 8, GI2, 3, 4, 5, 6, 8, GJ2, 3, 4, 5, 6, 8, GM2, 3, 4, 5, 6, 8, GU2, 3, 4, 5, 6, 8, GW2, 3, 4, 5, 6, 8. Contacts with stations using GB prefixes will not count for bonus points.

7. Awards. The Thomas (G6QB) Memorial Trophy will be awarded to the leading British Isles entrant in the cw event. Certificates will be awarded to the entrants placed first, second and third in the UK, European, and the rest-of-the-world sections in both contests.

8. Entries. Entries must be addressed to RSGB HF Contests Committee, c/o A. M. Smith, 279 Addiscombe Road, Croydon CR0 7HY, England, to arrive no later than 16 December 1977 for the phone contest and by 2 January 1978 for the cw event. British Isles logs must be postmarked not later than 7 November and 28 November respectively.

RECEIVING SECTION

Rules (1), (2), (3) and (8) for the transmitting section apply. British Isles entrants should only log overseas stations in contact with British Isles stations and must record the report and serial number given by the overseas station and the time in gmt. European stations logged count five points, outside Europe 15 points. The bonuses mentioned in (6) above also apply to this section. No more than 20 QSOs made by any one British Isles station may be logged.

Overseas listeners should log British Isles stations and must record the reports and serial numbers given, and the time in gmt. European listeners claim five points per QSO logged, others 15. A bonus of 20 points may be claimed for each British Isles numerical prefix logged. GB prefixes do not count and not more than 20 QSOs made by the same British station may be logged.

Awards. Certificates will be awarded to the leading stations in each section.

First 1·8MHz Contest 1977 results

Generally good conditions were reported by most entrants and there were high levels of activity from most parts of the UK and from the European countries where top band working is permitted. From a count of stations that participated, as listed in the top logs, there were at least 100 who gave points to contestants, but did not send in a log. Of those that did, there were a number with claimed scores that are substantially higher than those recorded in previous 1·8MHz contests under the present rules.

Section A (British Isles) winner G3WPF operated /A from the York Grid Control Centre using an FT101E and an inverted-V antenna with its centre 150ft above ground. Runner-up G3SJJ used a KW204 transmitter, an SB301 receiver and another inverted-V antenna. In third place, G3FXB used a Drake T4/R4 and G4AFS used home-brew, antennas were again inverted-Vs. It is perhaps of interest that nearly all of the top 15 stations used inverted-V antennas of various lengths mounted over extensive counterpoise or buried earth systems.

Section B winner EI2BB made 73 contacts with a HX50A 10W transmitter, a 75A4 receiver and an inverted-V antenna. OK1MAC also had 73 QSOs but one bonus less than the winner. In third place the IRTS Region One Club Station, EI9ONE, operated by EI3CP, made 77 contacts, but less bonus points than the other leaders.

In the under-18 age class, the leader was G4EHF, with a good score of 570 points to give him 11th place. In the competition for the top GM honours for the entrant who made the highest aggregate score in the 2nd 1·8MHz 1976 contest and this event, the clear winner is GM3ZSP with a total for the two contests of 1,165 points, a very consistent performance. GM3ZSP used a TS520 transceiver with a transverter and a half-wave dipole at 60ft.

A number of entrants sent in comments about the contest, about conditions, about the standard of operating and about the county code. The HF Contests Committee thanks all concerned for these comments and will consider them in detail when the rules for the next contest are being formulated. G6LX and helpers also thank entrants for the high standard of logs submitted. Although some entrants have lost points, there were very few duplicates and only one log had to be completely rescored. There were a few hiccups about the correct county code to be used, and for some reason all the entrants in one county used the same, but incorrect, code. (Entrants working these stations have not lost any points).

The Somerset Trophy will be awarded to G3WPF, and the Maitland Trophy to GM3ZSP. Certificates of merit go to G3SJJ, G3FXB, G4AFS, G4EHF, EI2BB, OK1MAC, EI9ONE, OE1TKW and HB9AJU.

SECTION A, UK

Posn	Callsign	Points
1	G3WPF/A	741
2	G3SJJ	696
3	G3FXB	683
	G4AFS	
5	G3ORH	654
6	GM3ZSP	628
7	G3NYY	608
8	G3YMC	606
9	G3OUR	597
10	G4BXT	595
11	G4EHF	570
12	G3WUX/A	541
13	GI3JEX	536
14	G3XDY	518
15	G3XWZ/P	514
16	G3TR	512
17	G3VTT	509
18	G4ALG	506
19	G3LCH	497
	G3OVL	
21	G3TQD/A	486
22	GM3TMA/A	483
23	G4ERW	475
24	G2MJ	466
25	G3RWL	465
26	G3SVW/A	464
27	G3PDL	452
28	G4AAL	450
29	G3RWF	434
30	G6LX	430
31	GW3GWX	383
32	G3WQK/A	382
33	G3VUM	380
34	G3HTI	351
35	G3BTO	344
	G4DUS	
37	G2BTO	308
38	G3RSD	307
	G4ESC	
40	G3ILO	305
41	GU4EON	262
42	G3KSH	258
43	G4EBK	241
44	G3FJE/A	197
45	G3FVW	147
46	G3ULY	43

SECTION B, OVERSEAS

1	EI2BB	403
2	OK1MAC	398
3	EI9ONE	395
4	HB9AJU	149
5	HB9NO	65
6	OE1TKW	60
7	HB9ANW	24

There were 11 check logs from the UK and two from overseas. Many thanks for these, they were most useful.

The following logs were received after the closing date (scores shown are unchecked): PA0DZI (324), OK2BRV (189), OK1DKW (188), OK2PAW (186), OK1HCH (160), OL0CFI (137), OK1MIZ (152).

March 144MHz Open Contest results

After an autumn and winter of poor vhf dx conditions it was a happy chance that brought the first major opening of 1977 on the weekend of the March contest, when stations all over Europe were active. The opening was largely to the south-east, as far as OE, HB and I2, but the sharp-eared were also rewarded by contacts with EA and western EI.

Despite the drafting error in the rules (you did read them, of course?) all open contests are divided into fixed and portable sections if they are big enough, and we have done so here. GW stations take the first five places among the portables, the winner GW8BHH/P doing so largely by virtue of an opening to the Continent just before midnight which did not extend to GW3UCB/P further north. Only two fixed stations had claimed scores over 3,000, and the eventual winner is G8HCL, the runner-up by default being G3UKC.

Although adjudicators are willing to accept computer print-out in reasonable imitation of an A4-size RSGB logsheet, we drew the line at 9ft of Z-fold paper. An alphabetically-sorted stack of logs can only be cross-checked quickly if they are all the same size and shape, and a little trouble on the part of each entrant adds up to a big saving in time and effort for the adjudicator. The entries that lost points for this reason are marked with asterisks.

RSGB contest stationery is available as a membership service to transmitters and listeners alike. Cover sheets, summary sheets and up to 10 log sheets are free (SAE please) from adjudicators or headquarters, and larger quantities of log sheets are sold by headquarters and RSGB bookstalls.

Congratulations to the winners and runners-up, who will receive certificates, and thanks to everyone else for their entries and check-logs.

G3SEK

FIXED STATIONS

Posn	Callsign	Points	QSOs	QRA	Pwr/op	Ant	Ft
1	G8HCL	3,412	464	ZL58	100	4–14Y	72
2	G3UKC*	2,869	356	AL56	250	14P	75
3	G8GAJ	2,684	328	YN39	400	14P	65
4	G4FTF	2,569	264	ZN53	20	8Y	35
5	G8KMI	1,836	219	ZK40	100	8/8	165
6	G8AZA	1,825	178	ZO69	100	14P	40
7	G3VZJ	1,799	273	ZL45	300	14P	25
8	G3XDY	1,704	152	AM76	400	8/8	35
9	G6UW	1,664	192	AM61	75	8Y	60
10	G4CZP	1,659	190	YO77	120	14P	35
11	G3ERN	1,514	210	AL11	15	8/8	33
12	G4COO	1,476	208	YN47	125	2–6Q	30
13	G3XFW	1,408	188	YK07	100	8Y	24
14	G4ECQ	1,313	166	ZM41	75	6Q	34
15	G4FBK	1,247	212	ZL39	200	10P	40
16	G8KMG	1,244	158	ZL10	15	10Y	20
17	G8HAF	1,164	132	ZN44	100	8/8	45
18	G8AHK	1,148	204	ZL68	10	10Y	135
19	G8KOM	1,130	155	ZL36	30	10Y	25
20	G8ERW	1,005	155	ZL30	10	6Y	45
21	G8JXV	978	132	ZL60	25	8/8	38
22	G8IXG	935	186	ZL46	40	8Y	30
23	G8LDY	918	136	ZL30	10	10Y	50
24	G8IFT	905	154	YM50	50	8Y	23
25	G4EEE	881	147	ZL55	40	14P	40
26	G8HHI	874	104	ZL56	60	14P	30
27	GD2HDZ	851	45	XO68	60	6Q	25
28	G8LVM	782	132	ZM14	10	10XY	40
29	G8LLG	781	78	YK38	80	14P	35
30	G3FIJ	770	94	AL05	50	8Y	35
31	G8IWA	768	97	ZN18	10	14P	30
32	G3KPU	700	114	ZN56	35	8Y	33
33	GU4ASO	694	93	YJ48	80	8Y	45
34	G8BKR	686	94	YL48	10	6Q	46
35	G8GHD	676	124	ZL59	10	8Y	12
36	G8KAX	668	122	AL32	80	5	28
37	GW4ARC	647	107	YN53	100	8/8	60
38	G4AZA	621	105	ZL24	75	4Q	25
39	G3FPK	620	59	ZL60	75	10Y	35
40	G4DBX	611	130	YN78	12	8Y	60
41	G8LXJ	600	77	ZK18	100	8/8	18
42	G8LHT	572	93	ZN34	10	4Q	40
43	G8MFJ	552	94	ZL42	12	8Y	30
44	GM3PXK	545	44	YP11	380	10Y	100
45	G8KSS	508	76	YL38	10	13Y	28
46	G8HGN	442	52	AL31	10	14P	40
47	G8ITS	410	126	ZL40	120	6Q	25
48	G2BLA	372	48	ZL20	50	6/6	47
49	G5KV	369	87	ZL46	65	8Y	35
50	G4BBA	316	32	ZM39	60	6Q	50
51	G4FOD	307	49	YL29	60	10XY	24
52	G8EDG	292	59	YM40	37	8Y	25
53	G8IEM	280	26	ZK15	7	5Y	30
54	GI8BPC	222	24	WO19	50	10XY	50
55	G8FDL	221	80	YN38	20	10Q	20
56	G8JWF	219	49	ZL32	3	8Y	20
57	G8FEQ	168	36	AL11	15	5Y	24
58	G3ILO	157	25	YL29	50	10Y	30
59	G3SMM	133	34	YN49	45	8Y	35
60	G8KLO	71	39	YM60	1	5Y	30

PORTABLE AND /A STATIONS

Posn	Callsign (/P)	Points	QSOs	QRA	Pwr o/p	Ant	Ft
1	GW8BHH	14,649	801	YM44	350	14P	33
2	GW3UCB	12,585	841	YN75	400	2–14P	40
3	GW3OXD	12,004	759	YM55	100	2–10Y	30
4	GW3WRA	11,614	742	YL05	25	6Q	30
5	GW4FDX	8,271	569	YL15	60	10Y	20
6	G8BQX	7,420	582	AK03	400	14P	45
7	G3PIA	7,115	658	ZL33	300	14P	48
8	G3VCP	6,517	488	AK11	175	10Y	30
9	GD3FLH	5,674	368	XO67	100	14P	20
10	G4BRA	5,259	569	ZL26	400	2–10Y	35
11	G3GQC	4,898	531	ZN63	250	14P	32
12	G3PMH/A	4,850	553	AM21	400	10Y	120
13	G3VRE	4,527	530	ZL52	250	14P	30
14	G4CDU	4,330	351	XK27	100	14P	25
15	G3LCH	4,196	402	AL66	—	10Y	30
16	GI8IWD	3,835	371	YK28	45	6Q	24
17	G3WIR	3,823	435	ZL17	25	14P	47
18	GI4BAC	3,761	220	XO61	13	10Y	20
19	GW8CSA	3,566	306	YL15	80	13Y	20
20	G3FJE	3,441	472	ZM79	80	2–8Y	40
21	GW4ALE	3,404	342	YM75	60	2–10Y	24
22	G8MCQ	3,399	329	YK19	80	8/8	40
23	G4ERP	3,276	406	ZL01	200	14P	36
24	G4FOX*	3,256	414	ZM26	40	8/8	26
25	G4DAG	3,071	431	ZM25	70	8Y	32
26	G3YMD/A	2,874	266	AL76	130	14P	37
27	G8KJF	2,588	310	ZL30	96	2–8Y	35
28	G8ILO*	2,191	303	YO78	25	6/6	12
29	G3KUE	2,123	203	YN18	60	10Y	35
30	G3UES/A	1,860	283	ZL48	250	14P	45
31	GI4DBB	1,855	108	WP76	10	8Y	20
32	G8JXP	1,842	216	ZM41	12	14P	35
33	G8JJR	1,811	247	ZN46	10	5Q	15
34	G3XZW	1,803	201	YK05	10	14P	30
35	G8LED	1,796	318	XM45	60	10	42
36	G3ZLQ	1,764	258	ZL35	25	14P	30
37	G4DSP	1,760	207	AN61	200	6Q	35
38	GU4EON/A	1,754	199	YJ48	80	8/8	70
39	G6YB/A	1,719	259	YL49	400	14Y	48
40	G8HQR	1,715	185	YK18	60	8Y	25
41	G8LVS*	1,670	288	ZL18	6	8/8	30
42	G4BZD	1,556	180	ZN44	20	8Y	15
43	G8GPO	1,484	182	ZO44	10	5Q	12
44	G4CLB	1,366	234	ZL26	50	10XY	20
45	G4BP	1,262	162	ZO58	50	14P	40
46	G8IPX	1,236	118	YK31	3	4Q	20
47	GM8KRL*	1,129	115	YP14	3	6Q	12
48	G4CWS/A	1,048	140	ZN18	400	10XY	40
49	G3ZQU/A	959	109	AM66	75	10Y	40
50	G8KKC	924	196	ZL59	50	5Q	30
51	GW8KYV	518	71	YN73	10	6Y	16
52	GM8DQK	12	2	YS54	3	6Y	13

G8DVT disqualified, rule 12f —no distances or directions logged.
Thanks to the following for check logs: G8LWJ/P, G4EAN, G8KNL, G8JGK, G2BQ, G3BPM(/P), G4ASR/P.

LISTENERS

Posn	Station	Points	QSOs	QRA
1	BRS35217	1,333	111	ZN13
2	BRS35669	1,025	165	ZM74
3	A9108	1,018	144	ZN71
4	BRS31038	793	75	YN75
5	BRS15822	630	—	ZL40
6	A9199	583	95	ZM05
7	BRS37223	293	43	ZM14

A8550—no itemized score—claimed total 981.

DF Qualifying Event Salisbury

Date: 10 July 1977.
Map: OS Sheet 184 Salisbury and the Plain.
Assembly: 1300bst for start at 1320bst.
Location: Two miles south of Amesbury off A345 road, NGR 158382. Intending competitors are asked to notify Mr A. Newman, 74 Victoria Road, Wilton, Nr Salisbury, of the number in their party requiring tea, as soon as possible.

March 70cm Open Contest results

For the first time only ssb-equipped stations entered. Despite very poor conditions several stations made 500km plus contacts. One portable station radiated a very poor signal and, after a number of complaints, belatedly decided to investigate and cure the problem. The committee decided to be lenient on this occasion.

Certificates are on their way to winners and runners-up.

Thanks to PA0MAR, PA0HOP, G8DVT and FIDEBE/P for check logs, and apologies to G4DDK for listing him as G4DKK in two previous contests.

G5HD

PORTABLE STATIONS

Posn	Callsign	Score	QSOs	QRA	Best dx (km)	Pwr	Antenna
1	G3UBX	723	117	YM36	502	50	2 × 18 el
2	G4BRA	704	132	ZL26	425	400	24 el LY
3	G3JQA	662	132	ZN61	445	350	14/14 el
4	G8HVY	641	79	YK28	553	400	2 × 19el LY
5	G8AWM	562	86	ZK34	456	400	24 el LY
6	G4CQR	347	53	AK04	360	100	88 el MB
7	GW8ITZ	325	67	YN75	355	10	46 el MB
8	GM4DMZ	301	34	XO26	505	50	46 el MB
9	G3BPM	272	80	ZL77	360	10	88 el MB
10	G3UKC	267	44	AL76	330	10	46 el MB
11	G4BVE	265	68	YN29	342	10	18 el PB
12	G4ERP	257	57	ZL01	223	6	46 el MB
13	G3GQC	249	65	ZN63	410	10	46 el MB
	G8GMC	249	63	ZL53	260	10	18 el PB
15	GW4FDX	229	43	YL15	293	8	68 el MB
16	G4ASR	188	16	XJ05	490	96	88 el MB
17	G4DLB	168	44	ZM73	197	120	15 el PB
18	G8GBY	127	43	ZN18	178	60	18 el PB
19	G3SDC	110	44	ZM24	165	10	18 el PB
	G8AYY	110	38	ZN71	160	10	14 el PB
21	GD3FLH	71	13	XO67	425	10	45 el MB

FIXED STATIONS

Posn	Callsign	Score	QSOs	QRA	Best dx (km)	Pwr	Antenna
1	G3VPK	455	71	AL14	522	160	68 el MB
2	G3XDY	451	67	AM76	501	250	88 el MB
3	G3JXN	252	76	ZL39	377	180	46 el MB
4	G3OHM	189	49	ZM41	270	10	68 el MB
5	GD2HDZ	168	24	XO68	425	100	18 el PB
6	G3BW	162	20	YO33	460	120	68 el MB
7	G8GP	146	49	ZL50	305	25	18 el Yagi
8	G4FMD	133	30	ZL22	220	12	18 el PB
	G4BWW	133	33	YN35	330	100	8/8 slot
10	G8HHI	121	35	ZL56	245	10	18 el PB
11	G3FIJ	94	18	AL05	275	10	48 el MB
12	G8AZA	90	18	ZO69	412	100	18 el PB
13	G5UM	89	27	ZM35	154	12	14 el Yagi
14	G8HGN	88	26	AL31	272	10	88 el MB
15	G3WFM	69	31	ZL30	152	25	8/8 slot
16	G8DLX	59	25	ZM54	140	14	18 el Yagi
17	G8DKF	48	16	YM40	148	10	18 el PB
18	G8BKR	43	11	YL48	190	10	46 el MB
19	G3HCW	42	22	ZN24	120	10	18 el PB
20	G4FBK	41	27	ZL39	135	3	48 el MB
	G4EEV	41	13	ZO58	270	10	46 el MB
22	G8FDL	33	15	YN38	133	3	10 el quad
23	G4CBZ	30	13	ZL80	170	5	48 el MB
24	G8ITS	27	20	ZL40	95	3	18 el PB

3·5MHz Field Day 1977 rules

Members who enjoy low-power contests are invited to take part in this year's event. It is hoped that the excellent weather enjoyed by participants last year will also prevail this July.

1. The general rules for RSGB hf contests, published in the January 1977 issue of *Radio Communication*, apply.
2. **When.** 0900gmt to 1600gmt Sunday 17 July 1977.
3. **Eligible entrants.** Multi-operator and single-operator entries will be accepted. A maximum of two operators per station is allowed.
4. **Contacts.** CW(A1) only in the 3·5-3·6MHz band. It is suggested that operations are confined to the region 3·510-3·550MHz.
5. **Exchanges.** Exchange RST, serial number commencing with 001, location and county. The location must be defined by a place name.
6. **Scoring.** Fifteen points for a contact with a portable or mobile station, five points for a contact with a fixed station.
7. **Power.** The maximum power input to the pa stage must not exceed 10W. The power for all parts of the station must be derived from dry batteries, accumulators or "natural" sources, eg solar cells or wind generators. The practice of "float" charging from petrol or diesel generators is not permitted. Entrants are also asked to give details of how the maximum input is adhered to, especially in cases where commercial gear is used.
8. **Aerials.** No part of the aerial is to be more than 35ft above the ground.
9. **Logs.** Column (5) to be headed "Callsign of operator"; column (6) "Location and county of station contacted".
10. **Award.** The Houston-Fergus Trophy will be awarded to the entrant with the highest checked score.
11. **Entries** must be addressed to the RSGB HF Contests Committee, c/o C.A.P. Henderson, 76c The Avenue, Beckenham, Kent.

RSGB 21/28MHz Telephony Contest 1977 rules

Licensed amateurs and SWLs throughout the world are invited to take part in this contest for single-operator stations. As in 1976, this contest is for a total of 12 hours and the scoring system is based on multipliers. UK entrants should note that entries must be postmarked not later than 15 days following the contest. Overseas entries must arrive not later than Monday 5 December 1977.

General

A station whether fixed, portable, mobile or alternative address may be logged only once on each band for the purpose of scoring.

Transmitting Section

1. The general rules for RSGB hf contests, published in the January 1977 issue of *Radio Communication* will apply.
2. **When.** 0700 to 1800gmt Sunday 9 October 1977.
3. **Eligible entrants.** Single-operator stations only, in two sections,
   (a) **British Isles Section:** RSGB members resident in the British Isles.
   (b) **Overseas Section:** Licensed amateurs in all parts of the world except the British Isles.
4. **Contacts** may be made using any telephony system for which the entrant is licensed on the 21 and 28MHz amateur bands. Stations may be contacted once on each band (see **General** above).
5. **Scoring: British Isles Section.** Each completed contact will score three points. The final score is the number of countries worked on 21MHz added to those on 28MHz and multiplied by the total number of points. A country worked on both bands therefore scores two multipliers. For the purpose of scoring, the RSGB countries list will apply, with the exception that VE, VK, W/K/N, ZL and ZS call areas will each count as a separate call area. *Note:* Different USA prefixes for the same district may not be counted more than once, eg W1, WA1, K1, N1 etc is a single call area for the purpose of scoring.
6. **Scoring: Overseas Section.** Each completed contract with a British Isles station will score three points. The final score is the number of British Isles prefixes worked on 21MHz added to those on 28MHz and multiplied by the total number of points. A prefix worked on both bands therefore scores two multipliers. The British Isles prefixes are: G2, 3, 4, 5, 6, 8, GD2, 3, 4, 5, 6, 8, GI2, 3, 4, 5, 6, 8, GJ2, 3, 4, 5, 6, 8, GM2, 3, 4, 5, 6, 8, GU2, 3, 4, 5, 6, 8, GW2, 3, 4, 5, 6, 8. Contacts with GB stations do not score for points or for multipliers.
7. **Entries** should be sent to R. L. Glaisher, 279 Addiscombe Road, Croydon CR0 7HY, England. Entries must arrive not later than 5 December from overseas and UK entrants must observe General Rule 8f (see above).
8. **Awards.** The Whitworth Trophy will be awarded to the leading entrant in the British Isles Section. Certificates will be awarded to the leading entrant in the Overseas Section, and to the second and third stations in both sections.

Receiving Section

1. The general rules for RSGB hf receiving contests, published in the January 1977 issue of *Radio Communication*, will apply.
2. **When.** 0700 to 1800gmt Sunday 9 October 1977.
3. **Eligible entrants.** The contest is open to all SWLs throughout the world. All entrants agree to be bound by these rules.
4. **Scoring.** British Isles listeners may only log overseas stations working British Isles stations in the contest. Overseas listeners may only log British Isles stations in contact with overseas stations in the contest. For the purpose of scoring, the following applies:
   (a) **British Isles listeners.** Each complete log entry will score three points. The final score is the number of countries heard on 21MHz added to those on 28MHz and multiplied by the total number of points. For the purpose of scoring, the RSGB countries list will apply, except that VE, VK, W/K/N, ZL and ZS call areas will each count as a separate call area (see note re USA in Rule 5 of Transmitting Section).

(b) **Overseas listeners.** Each complete log entry will score three points multiplied by the total number of British Isles prefixes (as shown in Rule 6 of the Transmitting Section) heard on each band.

5. Entries. As Rule 7 of the Transmitting Section.

6. Awards. The Metcalfe Trophy will be awarded to the leading British Isles entrant. Certificates of merit will be awarded to the leading overseas listener and to the runners-up in each section.

IARU Region 1 VHF/UHF/SHF Contests 1976

The official results have now been received from Italy (ARI) of the IARU Region 1 vhf/uhf/shf contests for 1976. Extracts are published below. A copy of the results booklet is available for each entrant. Those wishing to receive one are invited to send an sae (A5 format approx 8in by 6in) (postage stamps value 6½p) to: G. M. C. Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23 3BN.

All readers are reminded that similar contests are to be held this year on 3-4 September (144MHz) and 1-2 October (uhf/shf). An increase in UK entries to IARU events would be welcomed.

G3FZL

IARU Region 1 VHF Contest September 1976

144MHz Fixed Stations

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	DC8RLA	692	178,107	145	G8BBC	330	19,946
2	DL0RI	560	115,418	172	G8BKR	98	17,332
3	DM5TI/A	494	114,330	235	G4AZA	81	11,804
				259	G2BLA	80	9,141
41	G3OSS	361	47,038	301	G3FPK	27	6,601
91	G8AZA	113	27,565	415	G8JBH	16	889

Total entries 430

144MHz Portable Stations

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	F6CVN/A	475	170,061	50	G3TNO/P	394	80,107
2	OK1KTL/P	501	146,181	51	G4BEM/P	525	80,062
3	OK1KRA/P	482	132,217	81	G8HDR/P	302	60,293
				94	G3OGY/P	309	53,573
12	G3PMH/P	502	113,528	173	G8JTP/P	223	34,378
17	G4BPO/P	443	109,145	182	G4BWP/P	245	33,672
25	GW8IZS/P	480	107,271	278	G8HCI/P	90	16,477
27	G3PIA/P	519	103,284	284	GM8KYL/P	85	15,720
33	G2FJA/P	436	93,775	333	GI3YOR/P	36	7,802
37	G3VCP/P	391	88,105				

Total entries 388

IARU Region 1 UHF/SHF Contest October 1976

432MHz Fixed Stations

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	DC8RAA	222	46,650	93	G3SBV	38	2,313
2	DJ4WGA	143	29,154	97	G8EOP	25	2,182
3	ON5NK/A	127	29,138	106	G8IQL/A	31	1,920
				113	G4ASR	24	1,803
47	G8GP	43	5,589	115	G8HGN	19	1,669
53	G3DKX	31	5,177	118	G3WHL	21	1,613
64	G3OHM	38	3,968	119	G8HBQ	25	1,597
68	G3NKL	30	3,705	156	G3RND	6	524
83	G6XM	23	2,767	158	G3RQZ	12	467
87	G8IDZ	29	2,549	165	G8BBN	6	344
92	G5UM	25	2,344	173	GI8EWM	5	170

Total entries 179

432MHz Portable Stations

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	F9FT/A	167	52,658	41	G3AKF/P	78	9,192
2	F2TU/P	170	45,196	42	G4BRA/P	75	9,150
3	OK1KIR/P	157	41,603	50	G3WIR/P	65	7,534
				78	G8IWD/P	24	2,524
17	G4BPO/P	94	19,185	86	G3OUT/P	17	1,811
19	G3PMH/P	109	17,800	87	G8GLM/P	26	1,790
27	GW3UBX/P	85	14,930				

Total entries 110

1,296MHz Fixed Stations

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	DK2DPX	25	3,049	28	G3SBV	8	232
2	DL9GU	20	2,334	30	G8EOP	5	209
3	DK0TD	20	1,912	32	G3NKL	4	195
				34	G8GDZ/A	4	158
22	G6XM	7	399	35	G4DKX	5	157
24	G3TQF	5	313	37	G8IDZ	4	106
26	G3WHL	7	300	40	G4ASR	2	81
27	G3RQZ	8	281				

Total entries 43

1,296MHz Portable Stations

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	OK1KIR/P	24	5,367	17	G3ULT/P	17	1,331
2	PA0MS/P	28	3,860	23	G3XDY/P	9	950
3	DC9ZU/P	28	3,128	25	G4BRA/P	12	701
				30	GW3UBX/P	3	419
5	G3WIR/P	9	1,929	33	G3PQY/P	7	362
6	G4BEL/A	23	1,805	34	G3UUT/P	4	298

Total entries 39

2,304MHz Fixed Stations

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	DK2DPX	10	894	3	DL9GU	7	569
2	DL8AQA	6	580				

Total entries 7—none from UK

2,304MHz Portable Stations

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	OK1KIR/P	6	1,139	3	OK1WFE/P	3	532
2	DC1GS/P	7	947				

Total entries 8—none from UK

10,368MHz Portable Stations

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	G8BDJ/P	5	183	7	G8JNI/P	1	25
2	G3KSU/P	3	169				
3	OE1RVW/P	2	129				

Total entries 7

Overall winners

Portable

Posn	Callsign	432 × 1	1,296 × 5	2,304 × 10	Total
1	OK1KIR/P	41,603	26,835	11,390	79,828
2	PA0MS/P	40,064	19,300	2,620	61,984
3	F9FT/A	52,658			52,658

Fixed

Posn	Callsign	432 ×1	1,296 ×5	2,304 ×10	Total
1	DC8RAA	46,650	—	—	46,650
2	PA0VV	26,759	9,150	—	35,909
3	PA0EZ	25,819	6,360	—	32,179

Contests calendar

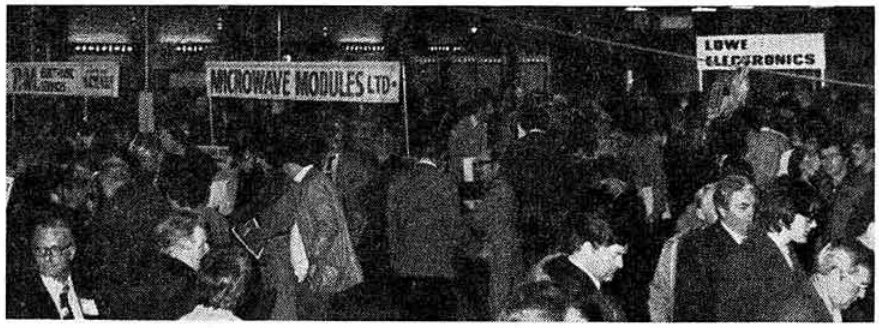
11-12 June	HF NFD (Rules in February issue)
18-19 June	Microwave (3·4–24GHz) (Rules in this issue)
19 June	DF Qualifying Event Rugby & Coventry (Rules in May issue)
19 June	10GHz Cumulative (Rules in May issue)
25-26 June	Summer 1·8MHz (Rules in May issue)
2-3 July	VHF NFD and SWL (Rules in May issue)
10 July	DF Qualifying Event Salisbury (Rules in June issue)
17 July	3·5MHz FD (Rules in June issue)
17 July	10GHz Cumulative (Rules in May issue)
24 July	DF Qualifying Event Stratford
31 July	144MHz QRP
7 August	DF Qualifying Event Chelmsford
13-14 August	70MHz Open (trophy) and SWL (Rules in June issue)
14 August	RSGB Region 1 VHF
21 August	DF Qualifying Event Slade (Birmingham)
21 August	10GHz Cumulative (Rules in May issue)
3-4 September	SSB FD (Rules in April issue)
3-4 September	144MHz Open (trophy) and SWL (Rules in June issue)
18 September	DF Final South Manchester
18 September	10GHz Cumulative (Rules in May issue)
1-2 October	UHF (432MHz–2·3GHz)
8-9 October	21/28MHz (Rules in June issue)
15-16 October	7MHz Phone (Rules in June issue)
23 October	70MHz Fixed
October–November	432MHz Cumulative
5-6 November	7MHz CW (Rules in June issue)
5-6 November	144MHz CW
12-13 November	2nd 1·8MHz
4 December	144MHz Fixed

NRSA Convention and Exhibition

The annual convention and exhibition of the Northern Radio Societies Association took place at Belle Vue, Manchester, on 24 April. It was the largest event ever staged by the NRSA and several thousand people attended. All the best-known trade names were present, as were representatives from most amateur radio clubs in the north-west.

The Club Stand Trophy was won by South Manchester RC and the Inter-Club Quiz was won by Bury RS. First prize of a portable television set was awarded to Mr Jim Whittle, G3EKP.

Bill Furness, G3SMM, left, looks on as Basil O'Brien, G2AMV, presents Geoff McBurney, G4AUR, with the Club Stand Trophy



General view of exhibition

Mobile rallies calendar

5 June Maidstone YMCA ARC Mobile Rally, "Y" Sports Centre, Melrose Close, Loose, Maidstone, Kent. Talk-in on 160m, G3TRF; 2m G3YSC. Admission: (on foot) adults 25p, children 10p; (by car) £1 including parking and passengers. Details from G3WXL, QTHR.

12 June Longleat Radio Rally, Longleat House, Longleat, nr Warminster, Wilts. This year the rally will take place in conjunction with the Silver Jubilee events at Longleat House, where the band of the Royal Signals and the Royal Marines Reserve Unarmed Combat Display Team will be in attendance. The band of the Royal Signals will "beat retreat" on the forecourt of Longleat House at 6pm. The President of the RSGB, Lord Wallace of Coslany, will be present. Talk-in stations will be operational on 160, 80 and 2m (callsigns to be announced). As well as trade stands there will be a grand raffle, RSGB bookstall and a bring and buy stand. Overnight camping is permitted from 6pm on Saturday 11 June. No charge is made for entrance to the rally, but visitors must pay for entrance to Longleat Park. Details from G3ULJ, QTHR.

12 June Elvaston Castle Mobile Rally, Elvaston Castle Country Park, 5 miles SW of Derby on B5010. Talk-in from 10am on G8KGC/P 2m fm S22, and ssb; G3EEO/P on 160m. G3ZBI/P exhibition station. No charge for rally but local authority parking charge of 25p per car and £1 per coach. Details from G3WFU, QTHR.

19 June Bangor & DRS Annual Mobile Rally, Castlewellan Forest Park, Co Down. From noon.

19 June Royal Naval ARS Mobile Rally, HMS *Mercury* on South Downs between Clanfield and East Meon. Signs on A3 S of Petersfield and A272 W of Petersfield. Gates open 11am. Talk-in on GB3SN, 2m; 4m, 3,660kHz. In addition to usual attractions there will be arena displays by Cowplain NTC Band, Volunteer Boy Cadet Corps Field Gun teams, Kelly Squadron of HMS *Mercury*, and pre-1963 racing cars. Details from G3LIK, QTHR.

10 July Upton Radio Rally, Hill High School, Upton-on-Severn. Details from G8ASO.

16 July Hornsea ARS Mobile Rally, Hornsea School and Hall Garth Park, Hornsea, N Humberside. Held in association with Hornsea Carnival. Details from G4CHH, QTHR.

17 July Cornish RAC Mobile Rally, Truro Rugby Club Ground. Details from G3NKE, QTHR.

24 July Anglian Mobile Rally, 9am to 6pm, Stanway School, Colchester. Talk-in on 2 and 80m, G3CRC and G4CRA. Usual attractions. Details from G3YAI, tel 0255-21664.

7 August **RSGB National Mobile Rally, Woburn Abbey** (This rally has been reinstated)

14 August Derby Mobile Rally. Lower Bemrose School (Rykneld School). Details from G3FGY, QTHR.

14 August Pembroke RSGBG Bucket and Spade Party, Regency Hall, Saundersfoot. Details from GW3XJQ.

21 August Preston ARS Mobile Rally, Walton le Dale County Secondary School, Bamber Bridge, Preston (one mile from junction 29 on the M6). Talk-in on 2m. Trade stands, raffle, bring and buy stall, plenty of parking space. Doors open at 11.30am. Details from G8KTM, QTHR.

28 August Torbay ARS Mobile Rally, Haldon Racecourse, nr Exeter. Details from G3UIQ, QTHR.

18 September Peterborough Mobile Rally, Walton Secondary School, Mountsteven Avenue, Peterborough. Talk-in station G3DQW on 2m. Details from G3EEL, QTHR, tel Peterborough 62881/65423.

25 September Harlow & D ARS Rally, Netteswell Comprehensive School, Harlow. Details from G3WUX, G8FRG, G3YDI, QTHR.

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				
0900	G3WNR	145·600 omni-direct	F2/F3	South Shields, T & W
1015	G3CGD	1·875	A1/A3	Cheltenham, Glos
1030	G3NPB	1·875	A1	St Ives, Cornwall
1100	G2FXA	1·900	A1/A3	Stockton-on-Tees
1130	G3BLS	1·920	A1/A3	Osney, Oxford
1200	G3HVI	144·750 omni-direct	A2/A3	Stoke-on-Trent, Staffs
1230	GU4CHY	144·500 to north	A1/A3J	St Peter Port, CI
1500	G4EHW	144·250 to southwest	A1/A3J	Peterborough
1815	G4DVZ	1·915	A1/A3J	Leeds, Yorks
Mondays				
1830	G3VBI	1·910	A1/A3	Goole, Yorks
1830	G3LR	145·525	F2	Accrington, Lancs
	G3NCZ			Blackburn, Lancs
	G3ZQS		A2/A3J	Darwen, Lancs
1900	G3ZRZ	1·980	A1/A3	Blackpool, Lancs
1900	G4FKZ	3·575	A1/A3	Chadderton, Lancs
1930	G3RAF	1·920 3·550 145·250 omni-direct	A2 A2 A2 or F2	Locking, Avon
1930	GI3SXG	144·110	A1/A3J	Newtownards, Co Down
2000	G3IBJ	1·910	A1/A3	Southampton, Hants
2000	G3XWZ	1·910	A1/A3J	Mansfield, Notts
2000	GM4ELV	3·570		Arrochar, S/Clyde
2030	G3ASR/A	1·875 144·175 omni-direct vertical	A1/A3J A1/A3J (lsb)	Harrow, Middlesex
2130	G3LQI	145·300	F2/F3	Lancing, Sussex
Tuesdays				
1830	G4BNA	3·590	A1	Swindon, Wilts
1830	G3LR	145·525	F2	Accrington, Lancs
	G3NCZ			Blackburn, Lancs
	G3ZQS		A2/A3J	Darwen, Lancs
1930	G3RAF	1·920 3·550 145·250 omni-direct	A2 A2 A2 or F2	Locking, Avon
2000	G4AEU	1·910	A1/A3	Southampton, Hants
2000	G4EZA	145·525 omni-direct vertical	F2/F3	Colchester, Essex
2045	GM3CRY	3·550	A1/A3J	St Andrews, Fife
2045	G4AEU	145·550 omni-direct vertical	F2/F3	Southampton, Hants
2130	GM3UAG	145·400 to south	A1/F3	Ellon, Aberdeenshire
Wednesdays				
1830	G3LR	145·525	F2	Accrington, Lancs
	G3NCZ			Blackburn, Lancs
	G3ZQS		A2/A3J	Darwen, Lancs
1900	G3ULY	1·826	A1/A3J	Culgaith, Cumbria
1900	G4FKZ	3·575	A1/A3	Chadderton, Lancs
1930	G3RAF	1·920 3·550 145·250 omni-direct	A2 A2 A2 or F2	Locking, Avon
2000	G8QU	1·970	A1	London N22
2000	G3BPE	1·975	A1/A3	Bexley, Kent
2000	G3SWP	144·200 omni-direct	A2/A3J	Doncaster, Yorks
2000	G4EHW	144·250 to southwest	A1/A3J	Peterborough
2000	GM4DSZ	144·230 to south-south-west	A1/A3J	Aberdeen
2015	G3WVJ	1·845	A1/A3	Staines, Middlesex
2030	G4FFC	145·575 to south	F2/F3	Pertenhall, Beds
2100	G3HVI	144·750 omni-direct	A2/A3	Stoke-on-Trent, Staffs
Thursdays				
1830	G4BNA	3·590	A1	Swindon, Wilts
1830	G3NC	1·968	A1	Swindon, Wilts
1830	G3LR	145·525	F2	Accrington, Lancs
	G3NCZ			Blackburn, Lancs
	G3ZQS		A2/A3J	Darwen, Lancs
1900	G3YEI	1·850	A1	Fleetwood, Lancs
1900	G3BLS	1·920	A1/A3	Osney, Oxford
1930	G3RAF	1·920 3·550 145·250 omni-direct	A2 A2 A2 or F2	Locking, Avon
1930	G3ASR/A	1·875 144·175 omni-direct vertical	A1 A1/A3J (lsb)	Harrow, Middlesex
(1st and 3rd weeks of month only.)				
1930	G3ZRZ	1·980	A1/A3	Blackpool, Lancs
2030	G3KGU	1·915	A1/A3	Theydon Bois, Essex
2130	G3LQI	145·300	F2/F3	Lancing, Sussex
Fridays				
1830	G4CRI	3·525	A1	Helston, Cornwall
1830	G3LR	145·525	F2	Accrington, Lancs
	G3NCZ			Blackburn, Lancs
	G3ZQS		A2/A3J	Darwen, Lancs
1900	G3NPB	1·875	A1	St Ives, Cornwall
1900	GU4CHY	144·500 to north	A1/A3J	St Peter Port, CI
1900	G4FKZ	3·575	A1/A3	Chadderton, Lancs
1930	G3PQF	144·360 to north-east	F2/F3	Farnborough, Hants
1930	G3RAF	1·920 3·550 145·250 omni-direct	A2 A2 A2 or F2	Locking, Avon
2000	G4EHW	144·250 to southwest	A1/A3J	Peterborough
Saturdays				
0930	G2FNK	1·930	A1/A3J	Staines, Middlesex
1145	G4DYF	3·590	A1/A3	Sevenoaks, Kent

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.

Footnote. It would be helpful to stations making simultaneous transmissions (G3ASR/A and G3RAF) if listeners when reporting, indicated the band that was used for reception.

Special event stations

4 June, Leyland Festival Radio Station (GAS Radio Group)
This station will be on the air from Worden Park, Worden Lane, Leyland, from about 10am as part of the Festival events and Silver Jubilee celebrations. Planned stations: GE4BOB/A and GE4BEE/A on hf ssb/cw and GE8IYA/A on 144MHz ssb/fm/a.m. Special QSL cards will be sent via QSL Bureau, and incoming QSLs should be sent to G4BEE, QTHR, from whom further information may be obtained.

4-12 June, Silver Jubilee Carnival and Fete
A station using the callsign GE8JC will operate from the site of the event which will be held on Kempsey Common, Worcester, on 7 June. Special QSL cards. Special certificates to stations able to confirm contacts with GE8JC and any station in or near Kempsey, NSW, Australia. The station is being organized by Worcester and DARC and QSLs should go to G3LQB. Operation on all hf bands, especially 14MHz.

13-16 June, GM3USL/A
This station will be operational from Garnock Academy from 7 to 9pm on hf and vhf during Kilbirnie Civic Week. QSLs to GM3USL, QTHR.

25 June, Kendal Grammar School Fete
Exhibition station G3NQX/A will be operational during the afternoon on ssb 10 to 160.

members' ads

SEE ANNOUNCEMENT ON PAGE 435

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 alternate issues 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 50p (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. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

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.

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

FOR SALE

Yaesu FR400SDX, all options except fixed channel xtals, going gen cov, £150. Tel Ruislip 39576 evenings or weekends.

SSM 2m Europa-B, mint cond, valves and all leads, £75. Datong rf clipper, £20. CR100, £15, buyer collects. G2ACZ, QTHR. Tel 052 13 3233 after 6pm.

RAE ICS manuals, £30 ono. J. Guy, 25A Station Road, Wimborne, Dorset. Tel 020125 4570.

BC221 wavemeter, charts, mains psu, stabilized, cct, £15. Stabilized psu, 220-270V dc, 500mA, £10. G30JE, QTHR. Tel 01-660 5717.

Vespa mk 2 tx, mic, spares, £80. 12AVQ, 10, 15, 20m vertical, unused, £22. G4BNB, QTHR. Tel 01-504 3260.

Cambridge AM10D, 6ch, wkg 2m, £30 + £2 p/p. 12·5kHz 6ch, £35 + p/p. *Wanted:* Bird wattmeter hf and vhf elements. G8JEW/G4FRD, QTHR. Tel N Shields 79887.

4m Pye base station tx, less xtal, £10. VHF valve rx chassis for conversion to 2m, £3. G8MQK. Tel 061-764 1504.

Get mobile on 2m for £37! Storno Viscount xtalled and aligned 145·5MHz, 8W rf out, very clean cond, comp with controls, mic, brand-new Panorama 5⅛ whip and fitted 4ch xtal unit. G8JNS. Tel 01-733 3995.

Munston TS497B sig gen, 2·0-400MHz, mod and carrier meters, piston attenuator, internal mod 400 and 1kHz, slow-motion drive. Heathkit factory-built counter 1B1103. Philips fet multimeter PM2403. Labgear CM6014/DA wideband antenna amp. Heathkit factory-built HD1250 gdo, never used. Offers. G8EZT, QTHR.

Westminster hi-band 6ch 12·5kHz, S-meter fitted but not wired, xtals S20, requires retuning but oscillators on channel, £40 ono. BC221 with charts and psu, £15. Sentinel mf converter, £10. All plus carr. G8HXE, QTHR. Tel Bolton 384903.

TR2200GX, S20, S21, S22, R5, R7, nicads, in box, as new, £125. G4BCN, QTHR.

Pye Pocketphone 70 (PF2FMB) manufactured for 2m, 2W out, 3ch, fitted R6/S20, ± 7·5kHz filter, with mic/spkr, spare battery, leather case and shoulder strap, antenna, xtal toneburst and 50s led, service sheets, £90 plus carr. G8AVR. Tel Temple Combe (Somerset) 587 evenings.

Trio JR310, narrow 10AZ extra mechanical filter, matching spkr, manual, original packing, exc cond, revalved, looks new, £80. No longer wanted as now gen cov swl. Bennett, 1 Whitehaven Road, Bramhall, Stockport, Cheshire. Tel 061-439 1346.

Swan Cygnet 260 80-10m ssb, tx/tx, integral ac-dc psu, with mic and auto transformer, £130. Buyer collects. G8JMF, QTHR. Tel Stowmarket 3870 evenings.

Trio JR500SE rx, amateur bands 3·5-29·7MHz, as new, with manual and original box, £36. G4ATU or G4EYP, QTHR. Tel Richmond (Yorks) 3066.

Trio 7200G, automatic toneburst 7ch, little used, £140. Barlow Wadley XCR30 Mk2, good cond, £85. G3LRK, QTHR. Tel 021-455 8520.

Exchange 10 TT12/CV524s for two 4-65As with bases or why? G4QK, QTHR. Tel Bridgwater 4508.

KW Match 75Ω swr meter, £5. Telford TC7 mk2 rx, 28-30MHz comp with G8AEV 2m converter and band searcher plus remote tuning precision pot, optional, £30. Lowe vhf 12V monitor rx, fitted S0, S20, S21, S22, R6, R7, R5 (spare), usual data, £25. Carr extra. G2BPC, QTHR.

EC10 Mk1, mint, with hb mains psu, £50. Dash Cambridge 4m, £24. Boot Cambridge 70·26/·375 cable/box, £30. Pye base station 144·3/145 tx/rx, tunable, £30. High power, mid-band boot mobile, comp, £20. Carr extra or collect. G3WSN, QTHR. Tel Chelmsford 72841.

Blank QSL cards, one type only, sae for sample, 8p per 10 plus p&p. G4FDC, 41 Wiltshire Way, Tunbridge Wells, Kent TN2 3DD.

Trio 2200GX, S20, S22, S24, R4, R5, R6, R7, case, nicads, charger, £110. G4CIN, QTHR.

Linear valves, new, QY4-400, 650W p.e.p. output, £16,50 each, post free. G3OWQ, QTHR. Tel Sandwich 3997.

Homebrew 2m converter, 4·5-6·5MHz i.f., £4.75. Londex relay, 24V, type 7024, £4. Two meters 1mA and 50μA, 1⅝in by 1⅝in, £1.95 each. 40MHz xtal, £1. Ex-Cambridge mixer unit, 10·7MHz to 455kHz, 75p. Carr extra. G8CJO, QTHR. Tel Bristol 772435.

4m boot Cambridge, £30. Low-band base station, £25. High-band AM10B, £25. 2m fm base tx, £30. Cossor 1052 scope, £10. Marconi vhf sig gen type 41, £15. Philips hf valve voltmeter GM6014, £25. Laycock, 54 Arundel Drive, Fareham, Hants.

Liner 2 wkg, unmodified, £110. *Wanted:* wartime RAF signals manuals, AP-1186 series, also other RAF books on wartime radio and radar equipment. G8AVJ, QTHR. Tel 051-722 1178.

Eddystone EC10 Mk1, modified, with SL640 balanced modulator in product detector and built-in 2m converter, tunes 4-6MHz, £40 ono. Will deliver reasonable distance. G8DRN, QTHR.

Barlow Wadley XCR30 with fm, VFA antenna and 2m converter, in perfect cond, £100 the lot. Derek Vivian, 4 Woodstock Road, Croydon, Surrey. Tel 01-686 5303 evenings and weekends.

HW32A, mint, £70. USA 19 set, Russian markings, offer. MW/LW rx with 10W amp spkr, ex schools unit, £10. SAE for meters, transformer psu list. Cain, 18 Oaky Balks, Alnwick, Northumberland.

Trio 7010 2m ssb tx/rx, fitted extra xtals, 40841 preamp, mobile mount, six months old, £145. G3KMS, QTHR.

Liner 2, PA3 preamp, mobile mount, manual, R115E psu, £130. G3ZTI. Tel Cheltenham (0242) 21881.

Comp home/mobile station: Drake TR3, RV3, ac psu, spkr, DC4 psu, mobile mount, Hustler antenna, bracket, cable harness, resonators for 10m/15m, £350. Owner buying new Drake line. Tel 0474 4694.

KW 52Ω lp filter, £12. KW 75Ω 100W dummy load, £11. QQV06-40 2m anode lines, silver plated, £3. G4BWW, QTHR. Tel Southport 67397.

Comp station: TC7 28-30 rx; converters SSM 144/28, MM 432/28; 50W fm/a.m. 144MHz tx; 40W a.m. 144MHz tx, needs mod transformer; G3EMU 8MHz vfo with cct; Teleton 730 reel-to-reel tape recorder; crt type VCR188; 3,584·00 xtal for 1,750Hz toneburst; xtals for 2m, 8,043·0, 8,063·888, 8,065·277, 8,066·667, 8,077·083 (HC6/U); 8,061·0, 8,075·0, 12,045·833 (FT243); 8,013·53 (CR1A/AR); valves, radios, boards, etc, all types of components. SAE for details. *Wanted:* ICOM IC201. Geoff Plucknett, 432 York Road, Stevenage, Herts after 1 July.

VDU, modern Cossor ASCII keyboard, 5k memory, full data, £100. Pair 10m 5W transceivers, £30. Pye Mercury tx/rx, 160-80-40m, solid state, 12V, mobile, new, £100. Beautiful ASCII keyboards, £20. AVO valve tester, £10. All with manuals. Many other bargains. G4FNY. Tel 049-47 4483.

Unfinished projects components clearance: Cathodeon 1in vidicon, £5, buyer collects. Three bridge rectifiers, 100V at 3A, 45p each. Bridge rectifier 100V, at 6A, 80p. Four stud diodes, 100V at 40A, lot for £3. Sixteen 2N3055s, 20p each. Five 2N3715s, 20p each. Ten BD121s, 25p each. Fifty SN7476s, 25p each. Fifty 2N4123s, 15p each. Postage extra. G8CHE, QTHR. Tel 01-953 2030 (9am-5pm).

HRO rx, part modified B7Gs, psu, 4 bandspread, 2 gen cov coils, connectors, S-meter, needs attention, otherwise vg wkg order, £25. Minimitter Mercury tx, comp connector, manual, vg wkg order, with lpf, £30. Both for £50. Spare valves with above items. G3MMT, QTHR. Tel Burnham 4639.

Creed 7ERP printer, plus base, good wkg cond, 45 band, £25. Low- and high-band Vanguards, converted and wkg, £15 each. Pye FM20 tx, plus xtal for PI, £30. Pair new 90mAh nicads for Pocketphones, £12. G3TGF, QTHR. Tel Orpington 26802.

Telford TC10 tx Mk 2, 144-146, all mode, 10W, automatic toneburst, 144·300 xtal, 12V or mains, £135. Telford TC7 Mk2 rx, 28-30MHz, a.m. fm, plus bfo, £25. G8KPA, QTHR. Tel 021-427 7104 evenings.

Simplex rotary ironer, 110V, £10. Cased auto tranformer 230/110V, 1,000W, £10. National HRO mobile, 6V input power pack, £6. HRO manual, £1. Buyers collect or plus postage. Wilcock, 19 Cavendish Avenue, Cambridge. Tel 0223 47220.

Trio 9R59DS rx. Eddystone S640. Trio with box, handbook, etc. Also Heath morse practice oscillator, £50 the lot ono. 55 Portfield Street, Hereford HR1 2SE.

Heath DX100U a.m./cw tx, with aerial c/o relay and wiring etc. Both in mint cond, £35. G4DWQ, QTHR. Tel Southport 73443.

QM70 2m low-power transverter, £45. Jaybeam Q6/2m, £15. SSM 2m preamp, £5. All brand new in cartons. Hi-band AM10D Cambridge, mint, unmodified, £40. Advance CVT, mains imput, 110V output, 400W, new, £20. All plus carr. BC342 spares, new case, front panel, etc. State wants. G3GUU, QTHR.

Yaesu FRSDX400 rx, rf att, FLDX400 tx. Mint cond, will include Cossor 339A scope, mic, swr bridge, etc, £300 the lot ono. G4BNM, QTHR. Tel Wellingborough 76568.

Inoue IC2F deluxe, S0, S18, S20, S22, R6, R7, mosfet rf stage and improved modulator, £50 or offers, or swop TR2200 with cash adjustment. *Wanted:* Westminster W15AM hi-band, any cond. G4DCQ, QTHR.

FT200, FP200, mint cond, with full 10m, £260. G4EZX, QTHR. Tel 0274-41390 evenings.

KW Vanguard 10/160m, 50W a.m./cw, £25. 2m 10XJ xtals, 6·0544 MHz, 8·0612MHz, 8·0793MHz, 8·0925MHz, 75p each. Bantex 5⅛8 2m whip, £4. GW4EVX, QTHR. Tel 0244 814693.

GEC colour tv rx with stand, good cond, exchange for hf bands rig, FT200, KW2000A, HW101, or separates. Why? 2m a.m. tx and modulator, 16W, requires 250V dc 6·3V, with three xtals, mic, good cond, £10. GM3LVG, QTHR. Tel Cumbernauld 22635.

Trio 9R59DS, good cond, voltage stabilizer, £45. Eagle super regen rx, ideal beginner's set, £7. Pye Ranger taxi phone, ideal 2m conversion, £7. Ian Caple. 20 Taunton Close, Sutton, Surrey. Tel 01-644 4896 evenings.

Technical Associates speech compressor and audio notch filter, £10 each, including postage. AR88D, unmarked, unmodified. RCA manual, spare valve kit, £50. Buyer collects. GW4FGT. 37 Dinerth Road, Colwyn Bay, N Wales. Tel 0492 48733.

Trio JR500S and preamp, hb 4-network atu, £60. *Wanted:* 2m fm/a.m. rig. Squance. Tel 0247 66256 evenings or 0232 20864 daytime.

Advance D1 sig gen, 1μV—100mV, six bands, £6. TS24/ARR2 vhf test oscillator, cavity tuned, less two valves, £2.50. BCC modulator (two OC35s), inc psu and compressor, £5. Ten loudspeakers, £1.50. 25kHz bandpass filter, 450kHz, 80p. G8KDL, QTHR. Tel 01-203 3138 evenings.

FR50B, mint cond, 160-10m, xtal calibrator, spare valves, handbook, £65 plus carr. G13GTR, QTHR. Tel Holywood 3890.

2m ground plane antenna, £5. Hamgear PM11A preselector, mains operated, vgc, £10. 38·666MHz xtal, £1.50. 8·1MHz xtals, £1. HC6/U types. Dick, tel 0376 21869 after 6pm.

Eddystone 770R, good wkg cond but no case, £55. Buyer inspects and collects. Anyone still work a.m. on four? Ideal mobile rig. Garex Four mobile, three xtals and full tune rx. G3ADZ, QTHR. Tel Rugby 815222 evenings or weekends.

Creed 75 rtty printer with quiet cover, exc cond, £25. Electric typewriter, 16in cartridge, spotless, wkg, cond, cost £230, sell £80. Hewlett Packard HP25 calculator, ex cond, comp equipment, cost £139, £50. Will swap lot for any good rx. Ask for photos. Carr paid by me. Turner, tel 0842 2484 ex 40, 9am-5pm.

FRDX 400 rx, plus 2m, 18 months use, £170 ono. SWL must sell, hoping G8 after May RAE, needs money for 2m equipment. Inspect and collect. Pitter, 59 Greenhill Way, Farnham, Surrey. Tel Farnham 24030 evenings or weekends.

Heath HR10B amateur bands rx, with SB600 spkr, £50 ono. D. K. Walker, 90 Mayes Lane, Ramsey, Essex. Tel Ramsey 447.

FT101B, cw filter, Holdings G3LLL rf clipper, mint cond, recent comp service, £410. 5A 6-30V psu, perfect, £15. Bantex 5⅛8, 145MHz whip, plus magnetic mount, £15. Carr extra. G4DXG, QTHR. Tel 01-679 3215 after 7pm.

New mains transformers, 1,185-0-1,185V, 360mA, £8.50. Mains transformers, 450-0-450V, 500-0-500V, 250mA, £4.50. Mains transformer, 230-0-230V, 2×6·3V, £3.50. New mains transformer, 0-465V, 350mA, 50V, 50mA, 6·3V, 6A £5. TVI filters, £1.25. Two 866 Mercury rectifier valves, £2. SAE enquiries. Carr extra. G4DFE, QTHR.

IC201 with preamp plus R5 and R7 xtals, £290. Bauer keying paddle, £4. 12AVQ triband vertical, £20. Standard C146A and accessories, £95. Extra simplex channels for C146A, S20 and S21, £3.50 each. G4BXT, QTHR. Tel Dartford 74729.

Heathkit HR10B, 10-80m, bfo, a.m., avc, ham bands, 1MHz xtal calibrator, manual, good cond. G8DFZ, QTHR. Tel Otley 3083 after 6pm.

DB scope C1-16, comp, handbook and all accessories, £30 ono. Eddystone 680X with angle feet, £45 ono. G30XV, QTHR. Tel Daventry 2265.

Toneburst cmos, simple reliable design, size 1 by 1 by ¼in deep, £2.75 inc postage. *Wanted:* two NEC PC20C audio ICs, state price. G8ARQ, QTHR.

Liner 2, fitted preamp, immaculate cond, £105. G4DUE, 18A Spencer Close, Potton, Sandy, Beds. Tel Potton (0767) 260552.

FT200/FP200, immac, full 10m coverage, built-in MFJ cw filter, £220. Datong rf clipper module, with Farnell stabilized psu type MU, built into professional cabinet, £25. GM3HBT, QTHR. Tel Larkhall 883306 after 6pm.

MPG Opto Electronics MHS500 infra-red light emitter. MRH500 ditto rx. Assembled with GaAs emitter, prefocused with all lenses. MTX 321/2 coupler, two sets new, unpacked, circuitry etc. Reasonable offer. GC3HLS, QTHR. Tel 0534 52242.

Yaesu FT221R, two months old, mint cond, all accessories, in original packing, £320. G3UEP, QTHR. Tel Chillerton (098 370) 306.

TR2200G, fitted S0, S20, R5, little used, comp with manual and accessories, £100 ono. 4m a.m. Cambridge, fitted 70·20, 70·26, 70·375, wkg fb, comp, with manual. £38 ono, carr extra. Would swop both items for IC202 or Liner 2. GI4EQX, QTHR. Letters only please.

Pye Pockephone, single unit, compact, xtalled and wkg on SU8 (433·200MHz), comp with new leather carrying case and nicads, £40. GM8FVC, QTHR. Tel Polmont 712800.

Liner 2, £120. Hammarlund HQ110A 160-10m rx, vgc, £65. Pye 2m Vanguard, 20W, £15. Pye 2m Rangers, 10W, £12, 20W, £18. Pye 4m base, 25W, wkg, 70·4MHz, £30. Two 2kV at 400mA mains transformers, £8 each. Microwave Modules 2m converters 28-30MHz, £12 ono. G8IXH, QTHR. Tel 01-449 8658.

B40, 0·64-30·5MHz miniature valves, S-meter, cw filter, works well, £30. G4CHL, QTHR. Tel Gravesend 86233.

QTH nr Swindon and M4, good vhf site, 3-double-bedroom house: lounge, sep dining room, kitchen, bathroom, cloakroom, garage, 40ft Versatower, space for caravan, £18,500 or swop 3-bedroom bungalow similar cond in Dorset or SW Hants. G6XM, QTHR. Highworth 762540.

FT200B and FP200B, ac psu, spkr, black, latest model, hardly used, looks brand new, perfect, all 10m xtals, manual, buyer collects please, £275. G3KZU, QTHR. Tel Oxford 63000 evenings.

Trio TS515, PS515, blower fan, never on air, £295, KW107 atu and KW trap dipole, £60. 2m converter, 28-30MHz, £12. Tel-Stor telephone answering machine, with cct, £187. All ono. buyer collects, or carr extra. R Wilson, 5 St. Mary's Road, Nantwich, Cheshire. Tel 0270 64050.

KW2000B transceiver and ac psu, spare set, little used, mint cond, £205, delivered BRS. Dongan transformer, 200/220/250-110V, 250W, weight 10lb, £4 plus carr. GD3TIU, QTHR. Tel Marown (0624) 85-442. Moving QTH.

Heathkit SB303, SB401, very clean cond, cw filter, cables etc, £345. Microwave Modules MMT144/28 transverter, as new, £65. MMC/144/LO converter, £16.50. 18AVT trap vertical, £40. All with manuals. G3VZJ. Tel Reading 413891.

ET560, hb linear TA33, Datong clipper, £300. Liner 2, £90. Plus carr. G3YQA. Tel 0964 30253.

Property of the late G3LMK: Heathkit HW32A 20m single band, ac psu, spkr, mic, mint cond, £70. Belcom ac psu for Liner 2, mint, £24. Trapped dipole, 80-40, new, £18. 2m 5-over-5 slot-fed antenna, used, £5.50. G4EPN, QTHR. Tel Sapcote 3404.

Microwave Modules 4W transverter, 28-432MHz, £60. Microwave Modules converter, 432MHz, i.f. 18-20MHz, £10. Datong UC1 up-converter, £80. Datong speech clipper, £20. Magnum 4 28-70MHz transverter with 4-el Jaybeam, £60. IC202 with 25W linear, £160. Yaesu FV200 vfo, £25. G4DSC, QTHR. Tel Ripon 2230.

Eddystone EA12 rx, vgc, handbook, £150 ono. *Wanted:* xtals for FT2FB, HC25U, any channel. S23 for TR2200G. G8KLO, QTHR. Tel Bromsgrove 76941.

AR88D. Gen cov and amateur bands (160-10m) rx, a.m. ssb, immac, performance superb, comp with spare valves, tuning dial, switches, capacitors and manual, will deliver approx 50 miles, available for inspection, £65. Lees, 450 Castle Lane West, Bournemouth. Tel 517200 after 6pm.

Avometer model 40, Mullard 510 amplifier, mains transformers, choke, mics, Heavyberd train controller, ammeters, voltmeters spkrs, relays, plugs, sockets, spring gram motors, trans coil turret, cabinet, valves, variable capacitors, air trimmers, large wire resistors, coils, coil sockets, books. G3DFS, QTHR.

Pye W30AM and W15AM, single ch, wkg on 145·0, all gear, no xtals. Offers. G3PIN, QTHR. Tel Penkridge 2472, evenings.

National Panasonic tape recroder, wkg, £20. Microwave Modules 2m preamp, £10. Globetrotter multiband rx, wkg, £10. Junker precision hand-key, £25. Heathkit code oscillator, wkg. £7. M. L. Sufit, The Chestnuts, Branch Hill, Hampstead, London NW3 7NA. Tel 01-435 1717.

Sommerkamp FL200B, £80. FR100B, £65. Manuals, mic, leads, very good appearance and wkg order, no modifications, phones. G2DPA, QTHR. Tel Beverley 882673.

SB200 linear, exc cond, £165. Buyer collects or pays carr. Pair 572Bs, used only few hours, £13. Pair KW 7MHz traps, unused, £7. G3NLY, QTHR. Tel Burntwood 71447.

B40 rx, 0·64-30MHz, xtal calibrator, a.m./ssb cw, S-meter, internal spkr, bandwidth 1kHz, 3kHz, 8kHz, £30. Lafayette HA800, 80-6m, a.m./ssb/cw, xtal calibrator, S-meter, manual, £45. G8JBX. Tel Camberley 24706.

FRDX400, 160-2m fm/cw filters, £175 ono. G-whip, 160/80, 20/15/10, with base, £14. NCX3 with mains psu and Shure 201 mic, £100. 1976 USA/dx callbooks, £3.50 each. GW4AEC. Enquire GW4ECG, QTHR.

Belcom Liner 2, unmodified, boxed, with matching Belcom psu, little used, buyer collects. £125. G4DOL. Tel Weymouth 75239 after 6pm.

Collins R390/URR 0·5-32MHz digital, all filters, manual, vgc, £330. Collins HiStab 2-3MHz pto, model 70E-15, never been used, £45. Aird, 5 Whitfield Way, Kingsthorpe, Northampton. Tel Northampton 845442.

FT101, unmarked cond, fan, never used mobile, £285. G2KU, QTHR. Tel 01-657 1126.

Icom IC202, £130. 8-el Jaybeam, £6. Both used few hours only. Buyer collects or pays carr. G4BMX, QTHR. Tel 045-388 3808.

Army 62 set, good cond, OK for 160m and 80m, 4W input, £15 ono. G3XYF, QTHR. Tel Driffield 84441.

Storno Viscount, rf preamp fitted, 4ch, S21 to S24, £35 plus carr. G3NOH, QTHR. Tel Watford 33351.

Liner 2, Belcom psu, usual extras, £120. G8CIG, QTHR. Tel Caterham 47674.

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IC22, excellent cond, fitted 10ch toneburst, £135 ono, carr by arrangement. APT modular psu, 12V/1·5A, fully protected, £10 ono. Dummy load 68Ω/100W, £1.50. 2m preamp £5. 2N5575, 70V/80A, 150W, transistor, (ft = 500kHz), £3. G8CHE, QTHR, tel 01-953 2030 office hours only.

PR120V a.m./cw tx, rf unit, 150W mod UM2, psu 350V at 250mA, 750V at 200mA, wkg order, deliver 30 miles, £20. *Wanted:* Shure 444 or similar. G3OCA, 1 Chesterton Road, Spondon, Derby. Tel 0332 62818.

Advance xtal calibrator type 74, gives 5MHz and 1MHz pips up to 250MHz, useful for calibrating VFOs etc, with handbook, bargain, £5. QQV03-20A ex-equipment, £2. Twin-beam Cossorscope, professional type, good wkg cond, £35. Tel 09074 3134.

Cossor double-beam scope 339A, £20. Hamgear 160m converter, £8. Marconi TS909, comp, requires attention. £5. 38·666MHz xtal. G8HBW, QTHR. Tel Aldridge 54166.

Heath AR14 stereo rx and amplifier, four spkrs not boxed, needs slight attention, never used, £30, or exchange for KW Vanguard or similar tx. Tel Brightlingsea 3071 or preferably write Keeling, 14 Pertwee Close, Brightlingsea, Essex CO7 0RT.

Collins 75S1, 32S1, unmodified, cw filter, spare valves, manuals, Shure 201 mic, £375. Heath Monitorscope HO-10, ok except duff mains transformer, £25. Telequipment D31 double-beam scope, band-width dc to 6MHz, timebase 18 speeds, modern with miniature valves, £25. Lavender Cottage, Staffordlake, Bisley, Woking, Surrey.

Xtals for standards and ladder filter experiments, 5,000MHz HC6Us, 8,950MHz HC18Us, also some 8,000MHz HC18Us, all at £1 each. Send sae with remittance and order to Richard Bowell, 16 Margarite Way, Wickford, Essex.

2m ssb transverter TV502 for TS520, mint cond, very little use, rx preamp fitted, all cables, manual etc, £115 ono. Storno Viscount with control unit/spkr, fitted xtals for 6ch. £30. G8WS, QTHR. Tel Maidenhead 23239.

TS700, mint. LA106 linear, with fan, very little used. Eddystone 730/4 with Hamgear preselector and spkr in matching cabinet, and manual. Realistic offers. G8IRU, QTHR. Tel 044-274 3474.

Cossor vhf a.m. Packsets CC3-AB3 71·5-100MHz, 4-off, some require attention, less antennas and battery packs, otherwise comp, one manual and one antenna available, all for £18 ono. Peter, 297 Herbert Avenue, Parkstone, Poole, Dorset BH12 4HT. Tel Parkstone 732856 evenings.

Pye PFI Pocketphones with nicads, vgc, xtalled for 433·2MHz, 2 pairs available, with cct diags, £30 per pair ono. Riddoch, Environmental Health Dept, 58 Bank Street, Lochgelly, Fife.

Standard 826MB, fitted S20-S24, plus 145·00, 145·05, LO, excellent cond, includes manual, mobile fixture, £98. G4FVF, 62 Mount Culver Avenue, Footscray, Sidcup, Kent. Tel 01-302 2039.

KW2000B psu, mic, good cond, £170 ono. M. Wallis, 6 Tenby Road, Keynsham, Bristol. Tel Keynsham 61326.

FT75 with matching external vfo, mains and 12V PSUs, ideal for mobile and portable, £160 or vno. Paul Whatton, 21 High Street, Dover, Kent. Tel (0304) 206230.

Panda 32ft galvanized steel beam tower in excellent cond. Tapering from approx 5ft to 1ft, dismantles into two half-sections, £50 ono. Also prop pitch motor and selsyns etc. G3FEV, tel 061 766 3981.

Pye PF1 Pocketphones with new batteries, £23. Ultra 3A4 hand portable low-band tx/rx, nicad, mic, whip and cct, £15. Londex relay with plugs, £6. ATE transistorized fm modules with R5 xtals, tx, 4W output, £18, rx, £18. Carr extra. G8ENI, QTHR. Tel Cheslyn Hay (0922) 415374.

Pye Cambridge AM10D 6ch tx fm, rx a.m., wkg on 2m, £35. Army 62 set plus calibrator, £25. Joymatch tuner 3A, £2. *Wanted:* tilting blocks for Eddystone 888A. P.M. Cleaver, 86 Main Road, Dovercourt, Harwich, Essex. Tel Harwich 2195.

Eddystone 730/4, £110 ono. Metrix 5,000V insulation tester, unused, £50 ono. 6146A, new £2, 2 only. G8ATA, QTHR.

QQV02/6, 80p each. QQV03/20A, £2 each. Two 951 coaxial relays, 12V, £4 each. 4 × 500pF variable capacitor, new, £2. Two Toko MFH41T mechanical filters, £1 each. Two Cathodeon BP25 xtal filters, £2 each. *SWMs* July 1971 to March 1976, comp, good cond, £4; 35 earlier issues, some poorer state, £1. 70cm tx, a.m./cw, 25W input, vxo, full metering with mic, xtals, external psu, £15. 4m Vanguard tx, modified, £4. Buyers collect mags and txs. G3ZMD, QTHR. Tel Luton 25115.

Marconi sig gen TF801/A1 10-300MHz, good cond with handbook, recent new osc valve, £35. Military version Marconi fm deviation meter covers to 500MHz, superb cond, with handbook, £35. G3HTC, QTHR. Tel Sunbury 84422.

Cambridge AM10D, low-band, serviced by manufacturer, £30. Storno CQM13, low-band, serviced by manufacturer, £40. Both comp, immac cond. Teleprinter with power pack, paper tape, no covers, £15. No reasonable offers refused. G8KVU, QTHR. Tel Coventry (0203) 77197.

Trio 2200G with usual 12ch fitted, automatic toneburst, all accessories plus spare mic, carrying strap, dc lead, £120. Lowe 2m monitor receiver, 2ch fitted, £15. Both perfect wkg order, will exchange for 11ch 7200G or IC22A with cash balance if neccessary. P. I. Martin, 47 Rumfield Road, Broadstairs, Kent. Tel 0843 20592.

TS700, orig packing, manual, rev/rep auto/burst audiomod centre zero fm, £300. Panda Cub, £25. G2DAF, tx, PSUs, £25. Heathkit GD69, £10. IT12/20, HFWI/40 GD69/10, IP2B, £30. Labgear 6004/PG625, £45. Degausser, £10. 25 radio and tv books, £50. 13·5V valve FMRFA, 80W out, £60. Retirement sale 9 June 1977. G3BKL, QTHR. Tel Winterslow 862489.

Europa 2m transverter, just been serviced by SSM and new valves fitted, cables for FT101, £50. Eddystone EC10, Mk 1, fb cond, £55. Wilson, Allaleckie, Dollar, Clacks, Scotland.

AM10D/2m 6ch, four 2m xtals, external vfo, £50. Low-band AM10B, cables, boxes, £15. Telequipment D43 dual-beam scope, good cond, £100. AVO8, good cond, £30. G3LCS, QTHR. Tel 0908 313379.

Heath SB310 rx. Covers amateur bands to 20m, modified to receive 15m, easily modified to receive part of 10m, includes ssb, cw and a.m. filters, £95. G8IBV, QTHR. Tel Gloucester 36119.

2m linear, QQV06-40A with neat matching mains psu, £20. Microwave Modules 2m converter 144/28LO £15. G3AAV, QTHR. Tel Leeds 751100.

Power meter, Marconi TF1152A, 10/25W dc 500MHz, £35. 70cm solid-state pa unit, 6W in, 25W out, 12-15V rf sensed tx/rx switching with coaxial relays, £30. TR2200GX, mint cond, nicads and 4ch fitted, comp with original accessories and packing, £115. 2m solid state pa unit, 400mW in, 24W out, 12-15V rf sensed tx/rx switching, £30. G4EWR, QTHR. Tel Cranleigh (04866) 6023.

Property of deceased amateur: test equipment, signal generators, Q-meters, capacitance bridges, frequency counters, valves and components. Far too many items to list in detail. Phone G8FSZ 01-837 8688 (daytime) or Byfleet 48307 (evenings after 7pm). Must clear, I need my shack back!

Parts for 2m linear: 4CX250B valve bases, £5. Chimneys, £3. Silver-plated anode line for *VHF/UHF Manual* design, £4. All new and unused. 4CX250B valves, used but ok, £3. Carr extra. Haseldine 15 Wheeldon Way, Hulland Ward, Derbyshire. Tel Hulland Ward 530.

Liner 2, fitted preamp, new mic, immaculate cond, plus handbook, £115. Smith. Tel Worcester 354679.

2m 6-el quad, brand new, never used, £15. 2m 8-el Yagi, £6. Special Jaybeam heavy-duty 2m two-way harness, UR6T type coaxial cable, N-type fitting, £8. Poulter, 119 Aragon Road, Morden, Surrey. Tel 01-330 3031 after 6pm.

Hammarlund HQ170 rx, amateur bands only, 160-6m, vgc, buyer collects. £95 ono. G4EZT. Tel Maidenhead (0628) 27105.

Jaybeam Q6 quad, nearly new, £13. Metalwork for 70cm coaxial line, 4CX250B amplifier including uhf base, £6. Good 3-20A £2. *Wanted:* 150ft RG214U coaxial cable, or similar uhf low-loss coaxial cable. G8HDR, QTHR.

KW103 swr/power meter, £10. TTC swr single meter, £5. TTC hand-held mic, 50kΩ, £5. All mint. GM3GJB, QTHR. Tel Falkirk 23608.

Liner 2, very good cond, little used, £115. G8KAH. Tel 0904 768686.

Telford TC9 fm tx, £40. Storno fm tx/rx, suit 2m, compl, £12 ono. Pye Ranger, £3. Three 110V selsyns, £5. TX coaxial cable, 30m, 75Ω, £4. 1,000pF variable tx capacitor, silver plated, £1.50. HB 2m tx, a.m./cw, £8. G4ENC, QTHR. Tel 070984 3632.

G2DAF tx, psu, needs realignment to obtain full output on 10m, two new 6146Bs fitted, £50 ono. Buyer collects. GW3UZS, QTHR. Tel 0222 41049 after 6pm.

2m fm auto-scanning tx/rx Yaesu FT2-Auto, fully xtalled, mains/12V, comp handbook, leads, etc, £120 or exchange Liner 2 with psu or IC202, TR7010 with cash adjustment. Sentinel 2m converter, i.f. 9-11MHz, Codar CR70A, £30 pair, would split. G8BPV, QTHR. Tel 0242 27148.

Liner 2, mint cond, £100. Home-brew tri-band 2-el quad, fibreglass spreaders, alloy spiders, £20. Home-brew tilt-up tower, £20. G3TYT, QTHR.

Trio TR7010 2m ssb tx/rx, mic, 5/8 whip, mint cond, £165, or part exchange Atlas tx/rx. Trio TS520, 4 months old, £385. *Wanted:* small scope, 12V 4A mains psu. 3·395MHz xtal. G3NZT, QTHR. Tel Newby Bridge (Cumbria) 550.

Arac 102 2/10m rx, ssb/fm/a.m., £80. Trio VB2200 pa for 2200G, 15W out, £35. Both ono. G4AOK, QTHR. Tel 061-969 9559.

NR56VFI rx with matching hb 2m tx. Xtal tx/rx on S0, S20, S22, R5, R6 with 144-146 rx coverage, preamp, toneburst, mic, £55. MMC 432/28 converter, £12. 5FP7A equivalent crt, deflection and focus assembly, £7. All plus post. GW4FRE via G8JMO, QTHR.

Heathkit IG-102 sig gen as new, with manual, £28. Microwave Modules modified converter, 432-28MHz, mint, £15. *Amateur Radio Awards* book, 75p. Buyers collect please. G8KLI, QTHR. Tel 021-472 4678.

Westminster W25/fm, tx/rx, hi-band, now on 2m, boot with 10ch control box and long cable, £60. TW phase 2 2m/10m transverter (uses 6-40A), and ac psu, £45. Buyers collect. G4AXS, QTHR. Tel Barham (Kent) 381.

KW77 amateur bands rx, triple conversion, 1·8 to 28MHz, cw/a.m./ssb, usb/lsb, switched selectivity and slot filter, £92 ono. Buyer inspects/collects or pays carr. G3DVL. Tel 0273 29801 ext 423 daytime, 0273 558412 evenings and weekends.

Lafayette HE30 amateur and bc rx, plus data, £15. Three Murphy MR821 tx/rxs, one xtalled 144·350, inc data, £20. 2N5162 500MHz TO60, pnp, 50W, emitter to case, £4. Heavy psu, £10. Sell or exchange vhf/uhf gear. G8FKC, QTHR. Tel 07613 4216.

TR7010 2m ssb/cw tx/rx, with mobile mount, mic, etc, in good cond, £130. GI8JWG/GI4FVM, QTHR. Tel Belfast (0232) 613300.

Codar AT5 tx, grid block keying, ac dc PSUs, £25. G4BYG, QTHR. Tel 0430 40584 after 6pm.

Panda Cub tx, £20. Buyer collects. P. Walton, 17 Bryn Bras, Llanfairpwll, Gwynedd. Tel Llanfairpwll 764.

WANTED

Urgently required: Hallicrafters SX140 rx. Dell key 50Ω coaxial relay, 50Ω dummy load, both 150W. 14AVQ or similar trap vertical comp. G8CEW, 7 Gaisford Road, Worthing, Sussex BN14 7HP. Tel Worthing 208405.

Two hb/a.m. Bantams, will buy or exchange for two lb/fm. GU-3HKV, QTHR. Tel (0481) 47278, 6-7pm weekdays.

Separate vfo 5-D for Trio TS510. G3NXM, QTHR. Tel Shipley (0274) 51373 evenings.

Panoramic Adaptor 1031A or Eddystone EP series. Why? No junk, must be first class. G2HIX, 2 Westbrook Drive, Chesterfield S40 3PQ. Tel 0246 6215 evenings.

4m transverter from 28MHz required for Northampton Radio Club, Commercial with preference for Europa. *For sale:* Pye PF1 Pocketphones, good cond, less batteries, £22. G8GHZ, QTHR. Tel Northampton 61794.

MX138 or similar Geiger Müller tube for school experiment. G3TAL, QTHR, Tel 0703 848640.

RAE home study course for 16-year-old keen member. Price must be reasonable. Also magazines and books on amateur radio. Steven Bratt, 64 Harts Road, Ward End, Birmingham B8 3JZ.

G2DAF tx, mk3 preferred, well constructed tx only please. Consider one almost completed. G3KAJ, 15 Linden Grove, Hartwood Park, Chorley, Lancs. Tel 71343.

Decca Navigator mk5 rx and/or handbook. Marconi H4000. Heathkit SB401 rx. Heathkit SB620. Lafayette Precon converter. Mogford, 27 Ynysmaerdy Road, Briton Ferry, Neath, W Glam SA11 2TE.

4CX250B vhf sockets, two required for eme work. GW3XYW, QTHR, Tel 0792 882292.

Siemens E52B, E566 receivers. CT436. KW107. AVO8, mk3, 4 or 5. R483/FRR. FRDX400 or 500. Manuals, TM11-487 A or H, TM11-899. TM11-5056. G3GUU, QTHR.

Pye Bantam and Cambridge AM10B. Preferr unmodified multichannel hi-band sets, but anything comp and in reasonable or repairable cond considered. Your price paid for suitable equipment. GM30FT, QTHR. Tel 041 946 0441.

Eddystone 770R rx or any good aircraft and public service band portable. Part exchange for brand-new Harvard Radio cassette recorder. L.D. Ireland, Carnhell Green, Camborne, Cornwall. Tel Praze 236.

New TZ40, 6B4G valves. Split stator 250pF section, single 500pF, wide spacing for atu. G3LBN, QTHR.

Codar AT5 tx. Codar T28 rx. 12V psu. Mobile remote control unit, etc. Good wkg order. G3JPX, QTHR. Tel Canvey Island 63004.

Beg borrow or buy R216 manual. All costs refunded. G8IBV, QTHR. Tel Glos 36119.

CCTV cameras, not wkg, any cond. HW101, HW100 or any tx/rx in a not-wkg cond, with or without psu. Manual for Trio TS500, buy or pay for loan to copy. G3YFO, QTHR. Tel Burnham 61696 after 6pm.

PF1 Pocketphones must be in fb cond and have batteries. Would like 433·2 xtals but will take any xtals and even none at all. Will pay post. Tel Manchester (061) 789 4518.

2m fm tx/rx, IC22A or similar for disabled harmonic G8CCP. G2FLG, QTHR. Tel 01 550 8185.

Magazines: *Radio Communication, Short Wave Magazine, CQ, QST,* etc, especially in comp years. Smillie, 43 Newton Road, Knowle, W Midlands.

52 set psu and rx outer case (comp rx and psu considered if cheap). Pye Bantam or similar portable on 2m. Early plate cameras, accessories and books pre-1930. Please state price. G8LQL, QTHR. Tel Brock 40389 after 6pm.

Novice BRS. Codar rx, atu and rigged antenna but no technical skill, urgently requests on-site help from local licensed operator to set up station for optimum reception of a.m./ssb. Dave Browne, 265 Mays Lane, Barnet, Herts. Tel 01 440 5486.

Marine vhf radiotelephone, wkg, MPT approved. J. Woonton, 21b St Ronans Road, Southsea, Hants. Tel Portsmouth 831222 after 6pm.

Trio TX310, wkg. AR88D wkg, unmodified. Could collect. Edwards, Farmborough, Chudleigh, Newton Abbot, Devon. Tel 0626 853258.

FR50B and FL50B or other modestly-priced rig for new station near Portsmouth. Gent, High Trees, Coldhill Lane, Lovedean, Portsmouth. Tel Horndean (0705) 593107 evenings or weekend.

FS10007P 2m tx/rx. Good heavy-duty rotator CD44 or better. GU8HT (GC8HT) QTHR.

Counter and display unit type MDA75209, or counter tray and escutcheon for Racal 1218 rx. HF ssb/cw tx or tx/rx. G3KDA, 26 Evesham Road, Cookhill, Alcester, Warks. Tel Alcester 3066.

Manual or cct diag for Solartron Scope CD1212, to buy, hire or borrow. G4PDS, QTHR. Tel Bridgwater 662450.

Pye Cambridge, dashmount, hiband, any cond, vhf/uhf 50Ω dummy load, 25 to 100W (N or BNC connector). 4CX250B valve, base and chimney for 70cm. MMC 432/28 converter, G8JTJ, QTHR. Tel Newton Abbot 68187.

CCT diag Philips oscilloscope type GM5655. G8JYD, 71 Woolton Hill Road, Woolton, Liverpool L25.

Codar T28 rx in good cond and unmodified. G3HBZ, QTHR. Tel Sunbury-on-Thames 82262.

Hallicrafters SX28 or S20R receivers for cash. G5BPS, QTHR. Tel Harrogate 887606.

KW7 antenna tuning system. Bird Thruline wattmeter with or without inserts. Heathkit HW12 tx/rx with dc psu. Atlas 180 tx/rx. Details and price to G3UPB. Tel 089-524 3323, 8am-5pm.

Wanted by collector. Old radio equipment from first world war and the 'twenties. Transmitters, receivers — spark, valve, or crystal. Good boxed components, mics etc considered. Info/sketches to Ron Irving, G3SYX, Fir Glen, Beesby Road, Maltby-le-Marsh, Alford, Lincs.

SSTV monitor and flying spot scanner. Please write (no phone calls or callers): P. Johnson, G8KNV, The Nevil Crest and Gun, Eridge Green, nr Tunbridge Wells, Kent.

Mullard 2-valve preamp control unit Mk2. G8CCN, QTHR. Tel 0268 710547.

2m dash fm Westminster in good order. GU3HKV, QTHR. Tel 0481 47278. 6-7pm.

"Elements of radio" by Marcus and Marcus. A. Jolly, 20 Crawford Avenue, Chorley, Lancs PR7 2QT. Tel 02572 4628.

Desperate, can someone assist with circuit or manual for Jason vvm. Grateful for any assistance. G3ESB, QTHR. Tel Derby 671526.

MFJ cw filter, or Tech Associates bandpass filter. Details to G3CPM, QTHR. Tel Broadway 2753 evenings.

Exchange Texas Instruments calculator SR50 with charger for good gen cov rx, eg Trio 9R59 or similar for junior operator. GM3UTQ, QTHR. Tel 03553 2369.

Telford TC10 Mk2, Liner 2 or similar ssb or fm sm box, must be in perf wkg cond and cheap, preferably within reasonable distance of Bath. Ian Greenshields, G4FSU, Monksilver, Limpley Stoke, Bath. Tel Limpley Stoke 3215 evenings.

Loan or buy instruction book, circuit diagram or alignment data for USSR Astrad rx, No F8, TR1Y, B205. F. N. Brocklesby, 34 Littlecote, Petworth, W Sussex.

TS700G. GDO, swr meter, wavemeter, sig gen, each for 144MHz operation. G2HNO, QTHR. Tel 0202 708405.

Keen collector wants xtal sets, early components, Eddystone baseboard ceramic valveholders, pair Lissen or Colvern dual-range screened coils, Varley If transformers, Igranic honeycomb coils and holders, grid leaks, hf chokes, Eddystone SW manuals. Catalogues, books, magazines. Send list with prices. N. Richardson, 2 Edna Road, Maidstone, Kent.

One 7MHz bandspread coil set for HRO rx, good. H. Graepel, Kinsale, Co Cork, Rep of Ireland.

MM converter, 70cm 28-30MHz i.f., and 2m. 4-6MHz i.f. Panel-fitting control cable socket for 10-channel W15U, also manual, could photocopy and return if necessary, all costs met. Salisbury, GW8KSF, QTHR.

For German rx KwEa and UkwEe, any spares, especially valves RV2P800, RV12P4000, STV100/60, also for KwEa, crystal units, meter, "Kontrolltasten" panel. Also seeking second world war E52 rx and German vhf/uhf equipment of this period. G8LIU, QTHR. Tel Uxbridge 30006 evenings.

Circuits and information for T1154. Morse key assembly headset for 62 set. *For sale:* HQ1 Minibeam, £30, buyer collects. DF-1X 600Ω stick mic with table stand, £6.50. G3SKK, QTHR. Tel Rayleigh 774385.

DC psu comp with connectors for FT200. GM3GFO, QTHR,

70MHz transverter, 28MHz input. Also Microwave Modules 70/28MHz converter. G8GP, QTHR.

Five Pye Westminsters, high band, a.m., transistorized. Details please to G4DMX, QTHR. Tel 0742 364767.

Manual for DST100 Mk2 to buy or borrow, any reasonable price paid. G8LTU, Stoneleigh, Allonby, Maryport, Cumbria. Tel 090 084 271.

TS700 or FT220/1 in exchange for Liner 2 with preamp. Praktica LLC with 135mm auto telephoto and electronic flash. G8JXC, QTHR. Tel 0782 535379 (Stoke-on-Trent).

For 23cm loop quad antenna VJC77J varactor diodes, 2C39 pa, Bird Thruline 43. *For sale:* coaxial 6-way switch, dc-2GHz, 50V. Offers G4DED, QTHR. Tel 086-75 2215.

Pye ssb 125T i.f. and product detector pcb and 1·4MHz carrier xtal. *For sale:* Pye Cambridge AM10B for 2m, boot mounting, less control box, £15. Pye 2780 14in video monitor, £15. G. T. Barrell, 34 Churnwood Road, Colchester, Essex. Tel Colchester 74917.

QTH (furnished, to rent), preferably dx location, for at least one year starting late September in E Kent area, within travelling distance of Canterbury. Required by three members of university staff. G8KDU, QTHR.

Pye U10B handbook and tx oscillator-modulator board. G4DPZ, QTHR.

One or two masts or poles, 20-30ft, to be as inconspicuous as possible. Details, price to G2FQZ, Resting Oak Cottage, Cooksbridge, Lewes, East Sussex. Tel Barcombe 400741 (home), Newhaven 3871, ext 40 (office).

Hallicrafters SX110 rx with manual, any cond as long as comp. Price and full details to Homewood, 73 Hughenden Road, Hastings, Sussex TN34 3TF.

Circuit and/or handbook for Solartron Solarscope CD1014·3. Buy or borrow for copying. GW8UH, QTHR. Tel 0222 36737.

FT22IR, TS700G, IC202, 12-15V, regulated psu. G2HNO, QTHR. Tel 0202 708405.

AC psu type 924 for EC10/1. BRS36293, tel 01-222 3985 after 6pm.

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2N5946	10w	6dB	12·5V 470MHz	**£9.46**
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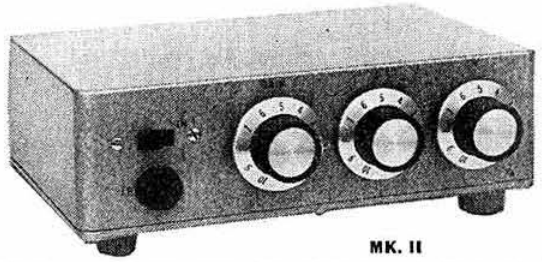

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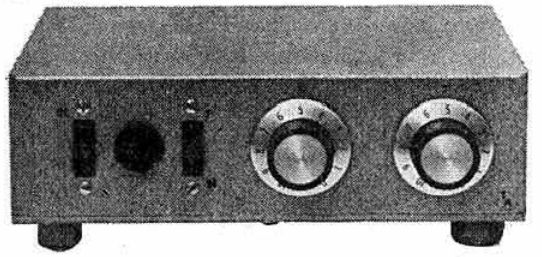

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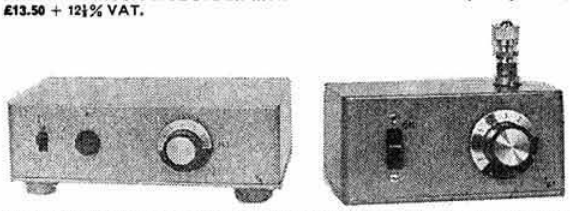

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144·030 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144·4/433·2 ..	a	b	a	b	b	c	b	c	b	b	b	b	b	b
144·480 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144·800 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144·850 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145·000/SO ..	a	a	a	a	a	a	a	a	a	a	a	a	a	c
145·050/R2T ..	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·075/R3T ..	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·100/R4T ..	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·125/R5T ..	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·150/R6T ..	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·175/R7T ..	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·200/R8T ..	a	a	a	b	b	a	a	a	b	a	a	b	a	b
145·300/S12 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145·350/S14 ..	b	b	c	b	b	b	b	b	b	c	c	b	b	b
145·400/S16 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145·500/S20 ..	a	a	a	a	a	a	a	a	a	a	a	a	a	c
145·525/S21 ..	a	a	a	a	c	a	a	a	b	a	a	b	a	b
145·550/S22 ..	a	a	a	a	c	a	a	a	b	a	a	b	a	b
145·575/S23 ..	a	a	a	a	c	a	a	a	b	a	a	b	a	b
145·600/S24 ..	a	a	a	a	c	a	a	a	b	a	a	b	a	b
145·650/R2R ..	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·675/R3R ..	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·700/R4R ..	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·725/R5R ..	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·750/R6R ..	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·775/R7R ..	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·800/R8R ..	a	a	a	a	a	a	a	a	b	a	a	b	a	c
145·95 ..	a	b	a	a	b	b	b	b	b	a	b	b	b	b

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For further details and application form please write to **The Engineering Recruitment Officer, BBC, Broadcasting House, London W1A 1AA** quoting reference number 77.E(R) 4036/RC and enclosing an addressed envelope at least 9"x4". Closing date for completed application forms is 14 days after publication.

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