MAY 1973

RADIO COMMUNICATION

RSGB—Decade three

Opening up the vhf bands

Throughout the 'thirties technical developments in radio continued apace and radio amateurs contributed in no small measure to the advancement of knowledge. This, and their practical experience, was to play a vital part in the second world war, which marked the end of the decade and in which radio amateurs turned their hobby into a vital service to the nation.

The development of vhf communications expanded in this, the RSGB's third decade, and even before the society came of age in July 1934 interest was growing in the 56-60MHz band. A year earlier on 18 June 1933, Douglas Walters, G5CV, and George Jessop, G6JP, became the first amateurs in Europe to establish two-way radio communication in the 5m band between aircraft in flight. They used home-built equipment driven by batteries giving 7W input at the start. (Today, 40 years on, G6JP is still active in amateur radio and is currently RSGB Executive Vice-President.)

Loading up one of the two De Havilland Dragon-Moths used in the pioneer demonstration on 18 June 1933: Douglas Walters, at top of steps, with a transmitter, and George Jessop, at foot of steps, with a 2V filament battery

RSGB Diamond Jubilee Year

1913 – 1973

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Sim, John, Alan and Peter will be happy to demonstrate New Yaesu Gear by appointment. They also have a pretty good selection of second-hand trade-ins at the right price.

Price List

Please note that VAT must be added to the prices below, but carriage is included.

YAESU MUSEN

Receivers

FRdx400 SDL **£175.00** FR50B **£65.00**

FR50B Mods:

We can now modify this receiver for 160m in place of the "AUX" switch position for WWV, and it is a modification we can thoroughly recommend.
We can also extend the 10m band so that instead of covering 28 to 29·2MHz it covers the full 28 to 30MHz for converter use. Note however that the dial remains calibrated from 28 to 29·2. However, it doesn't take long to sort out where everything is.
Finally, for the man who wants everything, we can actually fit a 2m converter which is switched from the front panel. This is the Weir Mosfet Converter which we think is excellent value for money.

Prices of Optional Extras

100 kHz marker crystal **£2.50**
1·5 to 2·0MHz coverage for top band **£5.00**
Extended (28-30MHz) coverage of 10m for converter use **£2.50**
Both the top band and 10m mods. done at the same time **£6.50**
Installation of front panel switched 2m converter to include extended coverage of 10m **£20.00**
If you require any of the above modifications carried out to your FR50B, please advise us and we will arrange Securicor collection and re-delivery for **£4.00.**

Transmitters

FLdx400 **£165.00** FL50B **£75.00**

Transceivers

FT101	**£280.00**	FTdx401	**£265.00**
FP200	**£45.00**	FP501	**£45.00**
FT501	**£290.00**	FP75	**£25.00**
FT75	**£115.00**	FT2FB	**£98.00**
DC75	**£25.00**	(fitted 3 channels)	
Sigmasizer	**£180.00**	FT2AUTO	**£157.00**
FT200	**£145.00**	(fitted 5 channels)	

Linears

FL2100 **£165** FL2000B **£165**

Accessories

Remote VFO's (FV101, FV401, FV200) **£42.00**
Remote VFO's (FV50B, FV50C) **£28.00**
Speakers (SP101, SP401, SP400) **£11.00**
Microphones YD844 (table) **£13.00**
YD846 (hand) **£5.00**
FT101 fans **£9.00**
CW Filters **£16.00**
FT101 AM Filters **£18.00**
Tune-up device: Kit **£1.50**
Assembled **£3.00**

2m Equipment

In addition to the popular Yaesu 2m FM equipment, FT2FB fitted 3 channels at **£98.00**, FT2AUTO fitted 5 channels at **£157** (extra channels **£3.20** each) and the Sigmasizer (200 channels!) at **£180**, we stock the Liner 2 at **£138.** This rig is becoming extremely popular and has revolutionized 2m SSB. It puts out a solid 10 watts of SSB, equally at home, mobile or fixed station, and covers the present SSB portion of 2m 145·25 to 145·49 (fully tuneable on both Rx and Tx). In the event of a change in the Band Plan, the Liner 2 can be made to cover any 240 kHz segment of 2m by simply changing one crystal.
We also stock the range of Braun equipment which has a reputation for top performance and quality.
SE600 DIG. No compromise AM/FM/SSB/CW with digital readout. Propably the finest piece of 2m equipment ever to appear on the market. **£570.00**
SE280. Top quality 80 channel FM rig featuring a crystal synthesizer and separate Rx and Tx channels for repeater working. **£220.00**
DGTC 22 2m Converter **£22.00**
DGTC 1702 70 cms Converter **£40.00**
Finally, we must mention the 2m Converter we fit to the FR50B—this is the Weir Mosfet Converter and very attractively priced at **£13.65.**

Station Accessories

SWR Meters: Asahi twin meter **£8.00**
Hanson single meter **£5.00**
PL259 plugs to suit SWR Meters **30p**, reducers **10p**
Kuranishi Wattmeters **£35.00**
Headphones, low impedence, padded **£3.00**
Microphones: Yaesu YD844 desk type **£13.00** or YD846 hand type **£5.00**
Katsumi EK9X Keyers **£9.00**
CW practice oscillators **£2.20**
Rotators: AR22R **£25.00**, TR44 **£45.00**, Ham-M **£75.00**

WESTERN

OUR YAESU MUSEN MAIN DISTRIBUTOR

WHAT'S ALL THE EXCITEMENT ABOUT!

...the NEW YAESU FT-501 of course!

that new digital readout 500W. p.e.p. SSB transceiver!

COME AND TRY IT, at Totton, after **MAY 10th** (approx.)! It is sure to be **£368.50** (inc. VAT) worth of the world's finest engineering standards that have put the name of YAESU MUSEN right at the top for quality, performance and VALUE FOR MONEY. Value For Money? The FT-101 at **£308.00** (inc. VAT) is still way ahead in the 260W. SSB transceiver class complete with AC and DC power supplies, noise blanker, 10-160m., microphone and speaker all included.

BUY AT PRE YEN RE-VALUATION PRICES at the time of going to press we have FT-75, DC-75, FP-75 at the old price of **£99.00** and **£22.50** (+ VAT) ex-stock and FT-101 MK1 at **£229.00** (+ VAT).

FT75 10-80m. SSB TRANSCEIVER (Ex Stock)

The great new FT75 with an output power in excess of 30W p.e.p. on any band. Equally suitable for mobile or fixed station. Operation could not be easier! You simply select the band, press the channel button and talk. Microphone included.

The FT75 requires the FP75 for mains operation or the DC75 and mobile mount for mobile operation, a VXO facility allows the crystal frequencies to be moved slightly during crowded band conditions.

SPECIFICATION: Crystals fitted: 3·760, 7060, 21·350, 28·550 (14·200 optional extra £2.20) others available to order.

VXO Swing: 3·5MHz, 3kHz, 7MHz, 6kHz, 14MHz, 3kHz, 21MHz, 20kHz, 28MHz, 12kHz.

Size: 210 × 80 × 300 m.m. Weight: 3·8 kg.

RECEIVER: Sensitivity 0·5 μV for 10dB S:S + N. Selectivity: 2·3kHz (—6dB) 4·5 (—60dB). Audio o/p 1·8W.

TRANSMITTER: Modes SSB or CW. Carrier Suppression better than 40dB at 1kHz. Current drain DC standby 1·4A, Heaters of 3·5A, Transmit 5·5A.

This unit is ideal for mobile or fixed operation or as an SSB exciter for use with a 144MHz transvertor.

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	PRICE	+ VAT
HF TRANSCEIVERS		
FT-75. 50W p.e.p. 10-80m. 3 Ch. vxo	£99.00	£9.90
FP-75. AC PSU and Speaker for above	£22.50	£2.25
DC-75 DC PSU. SPEAKER and MOBILE MOUNT	£22.50	£2.25
FT-200 240W p.e.p. 10-80m.	£145.00	£14.50
FP-200 AC PSU and SPEAKER for FT-200	£45.00	£4.50
DC-200 DC PSU for FT-200	£51.00	£5.10
FT-101. 10-160m. NEW MODEL	£280.00	£28.00
FT-401. 560W, p.e.p. 10-80m.	£265.00	£26.50
FT-501. 500W. Digital readout	£335.00	£33.50
VHF TRANSCEIVERS		
FT-2FB 2 m. 12 Channel, 10W. O/P FM.	£98.00	£9.80
FP-2AC AC PSU and SPEAKER	£27.00	£2.70
FP-2 ACB. AC PSU/Spkr. and Ni.cad batteries	£39.00	£3.90
FT-2 AUTO. 2m. 8 Channel, Scanning, 5 xtals	£157.00	£15.70
HF TRANSMITTERS		
FL 50. 50W. p.e.p. 10-80m. VXO control + VOX	£79.00	£7.90
FL400. 240W. 10-80m. Transceivers with matching FR400 receiver	£165.00	£16.50

HF RECEIVERS	PRICE	+ VAT
FR50 fitted WWV and xtal. Calibrator	£69.00	£6.90
FR400DX. 160m. 80-10m. (28-29MHz)	£135.00	£13.50
FR400SDX. 160-2m. 4 Mech. Filters, 28-30MHz	£175.00	£17.50
REMOTE VFO's		
FV-101 for FT-101, FV-200 for FT-200	£42.00	£4.20
FV-401 for FT-401	£42.00	£4.20
FV-50 for FT-75 and FL50	£28.00	£2.80
FREQUENCY COUNTERS		
YC-355. 35MHz. New Model. AC only	£97.00	£9.70
YC-355D. 220MHz. Switched pre-scaler built-in AC and 12V DC	£120.00	£12.00
SPEAKERS		
SP101 for FT-101, SP400 for FR400, FT-401	£11.00	£1.10
SP101P phone patch	£26.00	£2.60
LINEAR AMPLIFIERS		
FL-2100, 1200W. p.e.p. 10-80m. (Matches FT-101)	£165.00	£16.50
FL-2000B. As above. Matches FL400	£165.00	£16.50
FL-2500. 2kW. p.e.p. 160-10m.	£130.00	£13.00

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Whether you are: (a) simply short of space and don't want guys

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The answer is HY-GAINS 18AVT/WB

Take the wide band, omnidirectional performance of Hy-Gains famous 14AVQ/WB add 80 meters plus extra heavy duty construction and you have the new 18AVT/WB ★ True-wave resonance on all bands ★ 52Ω I/P ★ SWR of 2:1 or less at band edges ★ 1kW (AM) ★ Radiation pattern has an outstandingly low angle ★ Roof or ground mounting.

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TYPE 10X. 5150 5260 5690 5800 5910 5970 6110 6210 6243 6350 6440 6450 6510 6550 6594 6616 6650 6661 6720 6750 6783 6805 6990 7320 7550 7566 7600 7633 7683 7716 7750 7766 7863 7933 7950 8007 8133 8146 8161 8238 8266 8300 8350 8381 8423kHz.

TYPE 10XJ, X 24 for 2 Metres. 6100 *6015 6018* 6021 *6023* 6026 *6029* 6032 *6035* 6037 *6040* 6043 *6046* 6048 6051 6054 *6057 6060* 6065 *6068 6071* 6076 6082.

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CRYSTALS TYPE HC/6U £1 each kHz: All in stock in quantity

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2189 2194 2802 2805 2854 2905 2940 2945 2948 2951 2954 2957 2985 3023 3404 3411 3432 3467 3481 3495 4222 4404 4432 4467 4481 4654 4952 5506 5521 5524 5551 5589 5604 5611 5619 5549 5654 6480 6551 6552 6567 6589 6604 6611 6649 6657 6667 6677 6686 7171 7552 7567 7664 7685 8820 8837 8845 8854 8862 8871 8930 8953 8956 8978 9096 9266 9412 9413 9453 9461 9519 9558 9781 9815 9837 9845 9871 10437 12900kHz. Less 25% 10 or more. 31675. .. .. **£1** each

CRYSTAL CONTROL UNITS with 34 xtals 13·54 to 19·87MHz 3 valves EF91 size 4 × 4 × 6" with circuit .. **£4**

CRYSTALS ALL £1 ea.

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7783 7800 7816 7833 7850

15012 15037 13062 15087 15112 15137 15162 15187 15212 15237 15262 15287 15337 15362 15437 15462 15475 15487 15512 15537 15562 15587 15612 15637 15687 15712 15737 15837 15887 15912 15937 15962 15987

FT243/ZCC/DC20. New stock. 5633 5655 5666 5677 5688 5700 5711 5722 5733 5744 5755 5766 5777

CRYSTAL PARCELS. 100 crystals, mixed types & frequencies, our selection, ... **£5**

STORNO CQM33C FM VHF TX/RX, 10 watt output, QQVO3–10 PA with circuit and component details for 2m conversion, 12V transistor PSU. Less control gear **£10**

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2XL (METAL 10X)

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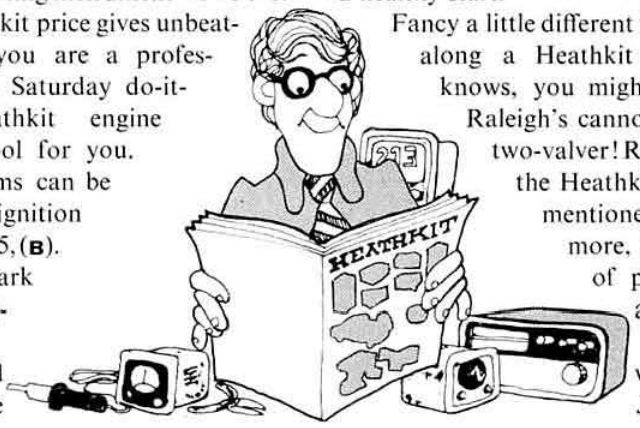

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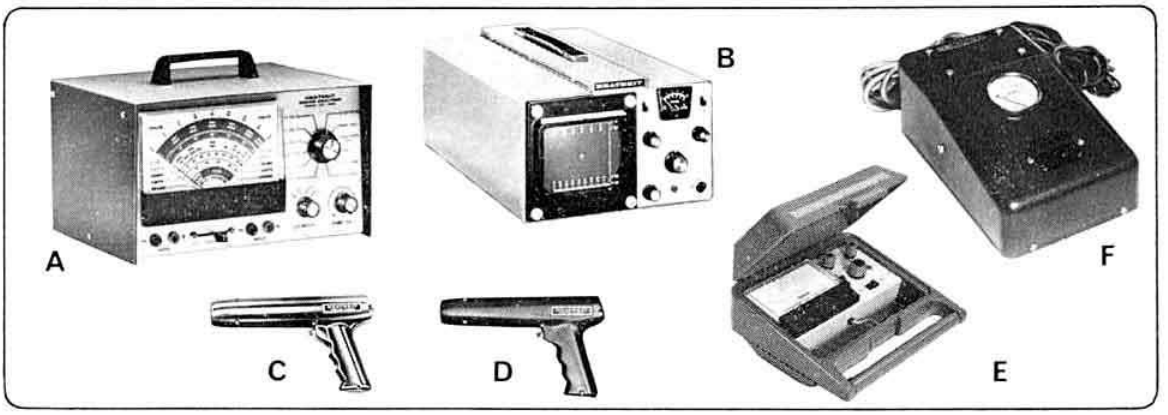

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Current Comment

Subscriptions

WITH the arrival of VAT and the continuation of the inflationary trend it appears likely that the end of year accounts will show only a very small surplus, if at all. However, the year to 30 June 1974 may not be so successful and, indeed, from the present indications the income of the Society will not be sufficient to meet its expenses.

Council, on the advice of the Finance & Staff Committee, has come to the conclusion that an increased subscription is inevitable—a decision that is even harder to make as in addition to the increased costs of the Society there is VAT to be considered.

From 1 July 1973 the subscription for Corporate Members will be £5 per annum to which must be added 50p for VAT making a total of £5.50. Overseas Corporate Members' subs are not subject to VAT and they will pay only £5.

Council feels that every encouragement should be given to the younger members, and this is an opportunity to be of real practical assistance. The subscription for associates is therefore being held at £2. This is inclusive of VAT so the effective subscription is approximately £1.81. It is well realized that at this rate the Corporate Members of the Society are subsidizing the younger members, but this is surely a forward-looking policy.

Adjustments will have to be made to other subscriptions. Family membership will be reduced to £2.50 (25p VAT to be added) while the subscription payable by Affiliated Societies will remain at £4 + 40p VAT (with *Radio Communication*) or £2 + 20p VAT (without *Radio Communication*). The special reduced subscription agreed by Council in certain cases for Senior Citizens will be £3 + 30p VAT.

Subscriptions are payable on the anniversary of the first day of the month of joining the Society. This means that the benefit of a full year's subscription at an increased rate is not reflected in the accounts until an average of 18 months after the increase.

For members who pay by Bankers Order there is a letter insert in this issue of *Radio Communication* asking them to amend their existing Bankers Order by completing and returning the form which forms part of the insert. The early return of these forms to the Society will allow time for members' bankers to process their instructions before the renewal date, and thus avoid the risk of duplicate payments.

QTC AMATEUR RADIO NEWS

HF Contest Log Sheets

Requests for supplies of HF Contest Log Sheets (Form HFC 1) and HF Contest Cover Sheets (Form HFC 2) should be sent to the General Manager, RSGB, 35 Doughty Street, London WC1N 2AE, and *not* to the HF Contests Committee. Please enclose a large stamped addressed envelope with the request. If this simple procedure is followed log sheets will be despatched with the minimum of delay.

Diamond Jubilee HF Contests

These two hf contests, held as part of the RSGB Diamond Jubilee celebrations, take place within the next few weeks. Valuable BOAC "Earthshrinker" and other prizes are waiting to be won. For full details please read the rules which were published in February's *Radio Communication*.

It is hoped that the prizes will be presented at a special Diamond Jubilee evening to be held this coming autumn, to which Miss Speedbird will be invited. Although not eligible to enter, it is understood that GB2SM and GB3RS will be active during the contests to give points to those taking part.

World Telecommunication Day, 17 May 1973

A special station, using the callsign GB2ITU, will be active from 12 to 20 May 1973; A3J will be the mode on all bands 3·5 to 28MHz. The station will be operated by members of Tonbridge School Radio Club, and all contacts will be confirmed via the QSL Bureau. Tim Hughes, G3GVV, Immediate Past-President of the RSGB, is Director of Technology at Tonbridge School.

Marconi/Kemp commemoration in GI

On 6 July 1898 wireless transmission tests were successfully carried out by Marconi and Kemp between Ballycastle, Co Antrim, and Rathlin Island off the north coast of Ireland. These were on behalf of Lloyds of London for the purpose of reporting ships passing the north-east corner of Ireland. As a result the first "public service" of wireless was established in 1898.

To commemorate this, the Ballycastle UDC has erected a memorial which will be dedicated on the 75th anniversary of these tests this year; the City of Belfast YMCA RC and the Ballymena ARC will operate a special station during the first week of July, and special postal covers will be issued for the benefit of charity.

The special hf activity station, GB3MKB, at Ballycastle will be operated by members of the City of Belfast YMCA Radio Club, GI6YM, who will also operate GI6YM/P from Rathlin Island on the vhf bands. Frequencies to be used by GB3MKB will be: cw—3,520, 7,010, 14,050, 21,020 and 28,050; ssb—3,775, 7,070, 14,150, 14,190, 14,300, 21,250 and 28,600. Operation will be from 30 June to July.

Two postal covers, bearing the portraits of Marconi and Kemp or the 1898 Marconi map of Ballycastle and Rathlin Island, and two special hand stamps have been produced. The postmarks from Ballycastle and Rathlin Island will be the GB3MKB callsign. Profits from the sale of covers will be donated to the Corrymeela Community Project, an inter-denominational movement.

The charges for supplying the cover, the stamp chosen and posting on 6 July are:

(1) Cover with Ballycastle or Rathlin Island postmark
using (*a*) Regional decimal 3p stamp .. 15p or 3 IRCs
or (*b*) Marconi/Kemp 9p stamp .. 20p or 4 IRCs

(2) Each postmark on separate covers
using (*a*) Regional decimal 3p stamp .. 25p or 5 IRCs
or (*b*) Marconi/Kemp 9p stamp .. 35p or 7 IRCs

ASSISTANT REQUIRED

There is an immediate vacancy at RSGB headquarters for an assistant to the general manager. This would be an ideal opportunity for a radio amateur nearing retiring age. Salary commensurate with experience.

Write in confidence to: The General Manager, RSGB, 35 Doughty Street, London WC1N 2AE, and mark the envelope "Personal".

Applications with remittance should be sent to "Marconi/Kemp Commemoration", Urban District Council Office, 61 Castle Street, Ballycastle, Co Antrim, N Ireland. Closing dates: All overseas—Saturday 16 June 1973; UK and Irish Republic—Saturday 23 June 1973.

The G5LK Leslie Knight Transmitter for the Blind Memorial Fund

Mr R. S. Holman, G2DYM, of The Old Saw Mills, White Ball, Wellington, Somerset, has launched an appeal to raise funds to provide transmitters and receivers for blind operators as a memorial to G5LK who was blind for some 40 years.

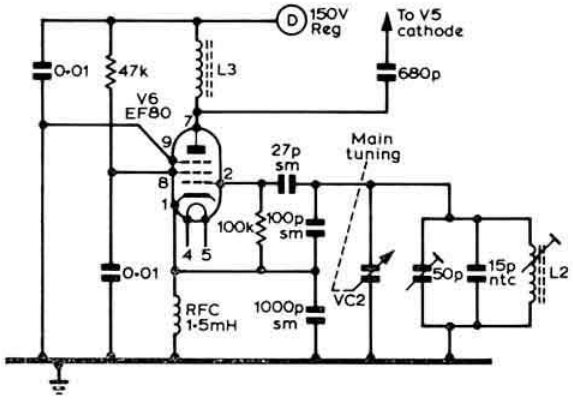
It is intended to supplement the work of RAIBC, to which some 70 per cent of blind amateurs in the country belong, and it will be administered quite separately. RAIBC will assist with advice based on its specialized knowledge.

All offers of assistance: financial, active, or by gifts of surplus or unwanted equipment should be addressed to Mr Holman.

The G2DAF ssb transmitter Mark 3

We show below an amended portion of Fig 2(b) which appeared on page 160 of the March 1973 issue of *Radio Communication*. The amendment published on page 245 last month was not correct inasmuch as the 27pF capacitor should be inserted immediately to the right-hand side of the junction of pin 2 of V6 and the 100kΩ grid resistor.

The author has also notified us of another omission, winding details of T10 which should be added to Table 2: T10 — 7–24MHz — Primary 13t 24swg enam close-wound single layer, secondary 4t 24swg enam at cold end of primary.



Barry College of Further Education Radio Society

The society will once again visit Flatholm Island, on 18-20 May inclusive. Operation will be on all bands 160–2m, using the special callsign GB3FI.

Concurrently operation on all bands from 160–2m will be made from the mainland, located at the Barry Rugby Club, using callsigns GW3VKL/A and GW4BRS/A. On Saturday 19 May the society will hold a social evening at the Barry Rugby Club from 7.30pm onwards. All radio amateurs, their families and friends are welcome.

On Sunday 20 May the mainland station will co-operate with the Cardiff RSGB Group to provide talk-in facilities during the Porthkerry Park pincic. The Rugby Club is located on the edge of the town, on the Barry-Wenvoe-Cardiff Road.

RSGB Diamond Jubilee home-constructed equipment competition

In order to stimulate interest in home construction during its Diamond Jubilee year the RSGB is holding a competition for the design and construction of three types of equipment.

1. A cw and ssb transmitter designed for operation in the band 1·8 to 2MHz. The equipment shall be vfo controlled and comply with the current licence conditions.
2. A single-conversion vhf/uhf receiver covering any or all of the bands at 70, 144 and 432MHz. The receiver should be tunable over the selected band(s) and have a fixed hf or vhf i.f. (eg 10·7MHz). Provision should be made for selection of all or several of the usual operating modes.
3. An item of test equipment of unusual design with applications in the normal amateur station. Professional standards should not be required for calibration.

The following points should be noted:

(*a*) Credit will be given for technical merit and ease of construction. The use of industrial methods and processes not readily available to the home-constructor may lead to a loss of marks.
(*b*) Readily available components shall be used and attention shall be paid to the cost involved.
(*c*) The Society may ask for loan of equipment for test and evaluation.
(*d*) Any entrant shall supply, on request, a technical article on the equipment or sufficient information from which such an article for *Radio Communication* may be prepared.
(*e*) Entries will be judged by nominated members of the Society's Technical and Publications Committee, whose decision shall be final.
(*f*) The closing date for entries is 31 December 1973.

The method by which judging of entries from any part of the UK is to be made will be detailed later.

In each category of the competition there will be two prizes consisting of cash, publications or RSGB membership equivalent to the cost of a five-year and three-year subscription respectively.

It is hoped that many members will take part in this competition. We shall be pleased to receive a preliminary notification of the intention to submit an entry. Correspondence should be addressed to the chairman of the Technical and Publications Committee at RSGB headquarters.

A mast system for dish aerials

by DAIN EVANS, G3RPE*

WHEN operating on the microwave bands, mounting large dishes sufficiently high up on a mast to clear local obstructions can present problems. This is because dishes tend to be quite heavy as aerials, rather awkward to mount (being all curves and no straight lines), and because they have a large windage area—12ft² in the case of a solid dish 4ft in diameter. These aerials, therefore, tend to be more difficult to manhandle than those for vhf, especially under windy conditions.

In the author's case, the manpower available for portable expeditions was usually limited to the proverbial man and a boy: an unconventional mast system therefore had to be developed if regular operation on the microwave bands was to be contemplated. The mast system developed as a result of this need is described below. Although intended primarily for portable operation, it is frequently used as the fixed station aerial. Many of its features are directly applicable to a system intended for permanent installation and, as will be described later, these can be used with advantage for vhf aerials also.

The approach used in its design was the simple one of separating erection into two stages; firstly to raise the mast itself and to secure it; then to lift the dish up the mast and lock it into position. This meant that the mast had to be free of obstructions along its length. Consequently, the mast had to be more rigid than usual, since guys could be easily fitted only above the highest dish position, and connectors joining sections making up the mast had to be internal rather than the more common external clamping sleeves. The method of fixing the dish at the top of the mast had to be simple to make, yet most reliable: the thought of the dish suddenly arriving at 30mph at the bottom of the mast had little appeal. As the vhf/uhf aerials used for talk-back were quite light, these could be fitted to a mast extension and raised with the mast.

The mast system developed has worked better than anticipated. Not only can it be erected easily in the first place, but lowering the dish to alter the feed and raising it again to the top of the mast can be done quickly enough for contest working—par time is one minute flat. Changing the dish itself takes only a minute or two longer. This facility could make the use of mast-head preamplifiers more practical, as they have the reputation of working perfectly at ground level, but misbehaving as soon as they are raised.

There is another consequence which is important from the safety point of view. Because the dish can be lowered when the wind springs up, the guys and stakes need to withstand only the wind forces on the mast and vhf aerials in use, which should not exceed 100lb in a 70mph wind. It is to be noted that the additional windage of a solid dish 4ft in diameter increases this loading to about 250lb, the corresponding tension in a 45° guy being 350lb. Applying a common safety factor of six, the mast, guys and stakes should be able to cope with loads in the region of one ton. Very few amateur installations can cope with this sort of load. Thus, by being able to lower the dish one can avoid the uncomfortable situation where the aerial system is unsafe to leave erected but too hazardous to take down.

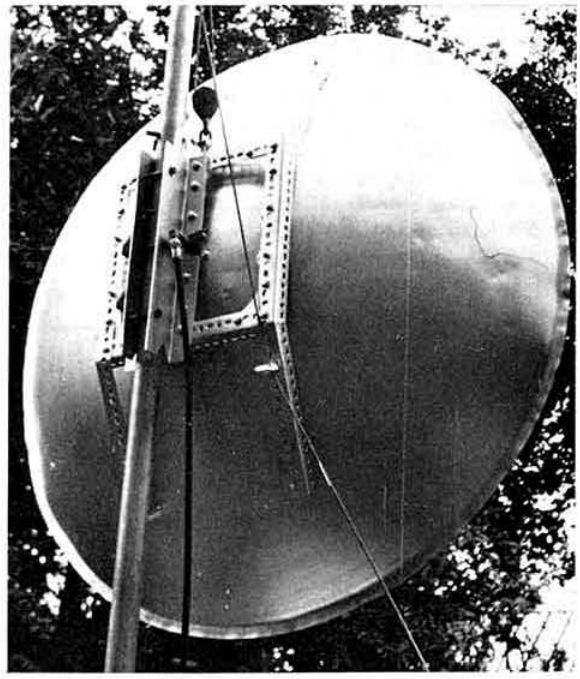


Photo 1. Rear view of dish assembly. The hooks are about to engage with the top support pin

Another feature which has proved most convenient is its adaptability. Starting with two 20ft poles, mast lengths of between 7 and 40ft can be assembled according to the need of the time. Alternatively, two 20ft masts can be erected if certain parts are duplicated.

Construction

An important consideration affecting techniques used in construction is precision of manufacture. The half-beamwidth of a 4ft diameter dish on 1,296MHz is about 6°. The *total* play accumulating in an aerial system, with respect to the ground below, from the dish feed through perhaps several connectors and the aerial rotator, must be less than this figure if the aerial is to point reliably in the optimum direction. At higher frequencies, where advantage may be taken of the very high gain of quite small aerials, tolerances become progressively tighter: the half-beamwidth of a 3ft dish at 10GHz is about 1°. If operation at these higher frequencies is contemplated, then it is necessary to adopt the correspondingly higher standards from the beginning. At the same time, these requirements somehow have to be reconciled with the very real difficulties in working accurately on long poles with hand tools in the back garden!

* 4 Upper Sales, Chaulden, Hemel Hempstead

The answer proved surprisingly easy—to make things "fit where they touch", and to make sure that they touched in the right places. The general methods used in construction are shown in the photographs, and design details in the figures. Few of the dimensions are critical and most can be varied to suit individual cases. Almost inevitably, some lathe work is necessary, but this has been arranged to be straightforward. Points relating to the construction of individual parts are given immediately below.

The mast

The mast is made up from sections cut from standard aluminium scaffolding pole having an outside diameter of $1\frac{29}{32}$in. These poles usually come in lengths of about 20ft, and have proved to have ample strength without being unduly heavy. Roughly speaking, the weight is about 1lb/ft. The wall thickness is about $\frac{3}{32}$in and is sufficient to allow holes to be drilled and tapped without excessively weakening the mast. The mast sections are joined together by internal connectors of the form shown in Fig 1(a). Because the connectors cannot easily be made to be adjustable, and therefore have to be made to fit, it is worthwhile selecting the poles to be used with some care. Points to look for are circularity and freedom from damage, which together will dictate the amount the connectors will have to be turned undersize to pass the minimum diameter. Because of the large leverage involved, a small misfit between the connectors and the pole will lead to a much magnified "waggle" at the far end. As the poles are produced by extruding, there is normally little variation along the length of each pole, although there may be significant differences between one pole and another.

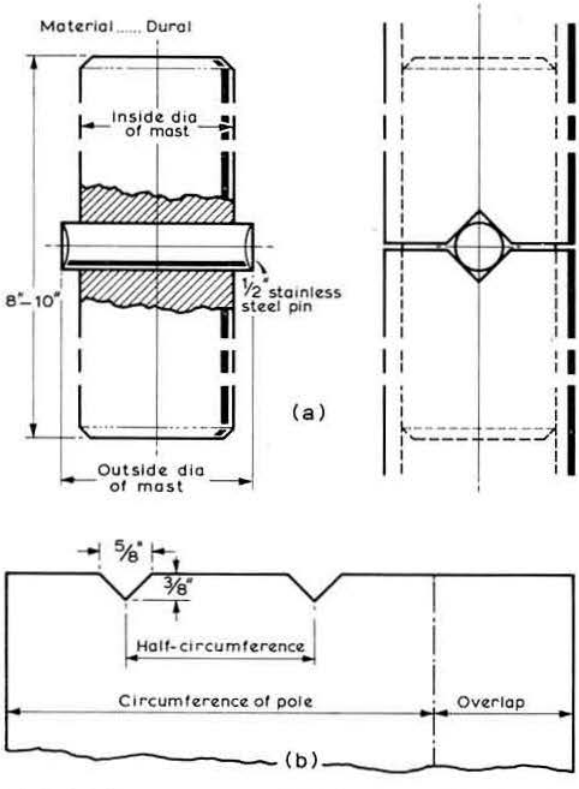


Fig 1. (a) The connectors used to join mast sections together (b) The template used to mark out V-grooves in the mast sections

The work to be done on the poles is as follows:

(a) Cut into convenient lengths, say 7 to 10ft, taking a piece about 1in from each cut and each end as a sample. Mark the end of each section permanently in a sequence such as A, B, C . . . and label each sample correspondingly.

(b) Cut the V-grooves in the ends of the sections by sawing and filing to the dimensions given in Fig 1(b). After cutting, check that there is a continuous gap of about $\frac{1}{16}$in between the ends of adjoining sections when a $\frac{1}{2}$in diameter pin is placed in the grooves, so that there is no contact between the sections except via the pin.

A convenient method of marking out the poles to ensure that they can be cut square is to wrap a sheet of paper around the pole so that its top edge overlaps exactly on the beginning of the second turn. If the point of overlap is marked, the paper can be folded in half to provide a mark for the corresponding point on the other side of the pole. The template shown in Fig 1(b) used to mark out the V grooves can be made in this way.

The connectors

The connectors are turned from dural bar 2in in diameter, the diameter of each end being such as to produce a sliding fit with the sample taken from the corresponding mast section. Generally it will be found that both ends of a connector joining sections taken from one pole will have the same diameter, although a connector joining one pole to another may have ends of slightly different diameter. The ends of the connectors should be marked to correspond with the sections they are intended to fit. Small errors in concentricity of the connectors are unimportant.

The $\frac{1}{2}$in diameter stainless steel pin which transmits rotational forces as well as locating the connectors is preferably force-fitted in place. The connector is drilled with a $\frac{31}{64}$in diameter hole which is progressively reamed out until a 3in long pin can be hammered through. Alternatively, the pin may be glued in place with epoxy resin or even paint. The ends of the pin are then cut to length and turned down to the outside diameter of the mast.

The connectors have proved to be most reliable in use, there being *no* rotational play even when the corresponding grooves have been made inaccurately. There is no tendency for the mast sections to rotate relative to one another: the combined weight of the sections above together with the resolved tension of the guys (which increases as the wind rises) is sufficient to keep them in place.

The mast-head assembly

The assembly is shown in Fig 2(a) and Photo 2. The main body is fabricated from a 6in length of 3in diameter dural, the lower end of which is turned to fit the top section of the mast. A tight fit is not necessary as any play affects only the extension mast. The upper end is turned to provide a bearing surface for the guy plate, and a 1in hole is drilled along its length to take the extension mast. The boss is held in place by a bolt which also forms the bearing for a pulley, holds the pulley guard (essential to stop the line slipping off), and is also the attachment point for the fixed end of the lifting line. The mast extension is fitted by sliding it into the 1in

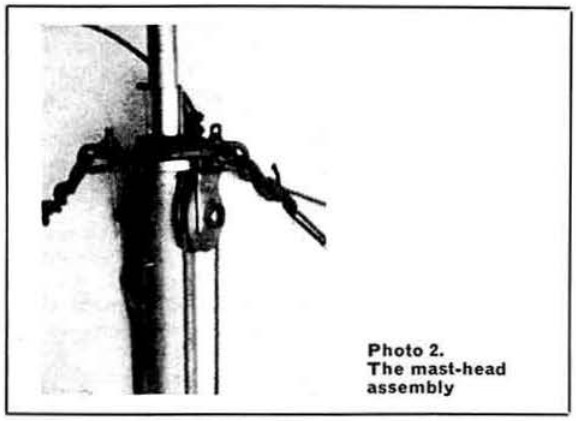


Photo 2. The mast-head assembly

hole in the main body: it is prevented from rotating by the elongated V-slot, shown in Fig 2(b), engaging with the bolt.

The guy plate was made from a standard cast steel pipe flange approximately 5in in diameter. Four $\frac{1}{4}$in diameter holes are drilled on a radius of $1\frac{1}{2}$in to take the guy shackles. The crude but efficient polythene bearing was made by heating the flange upside down on a metal plate with a gas torch and *slowly* melting scrap polythene until the central hole was filled and excess covered the centre to a depth of about $\frac{3}{8}$in. After allowing the plate to cool overnight, the excess polythene was removed by turning.

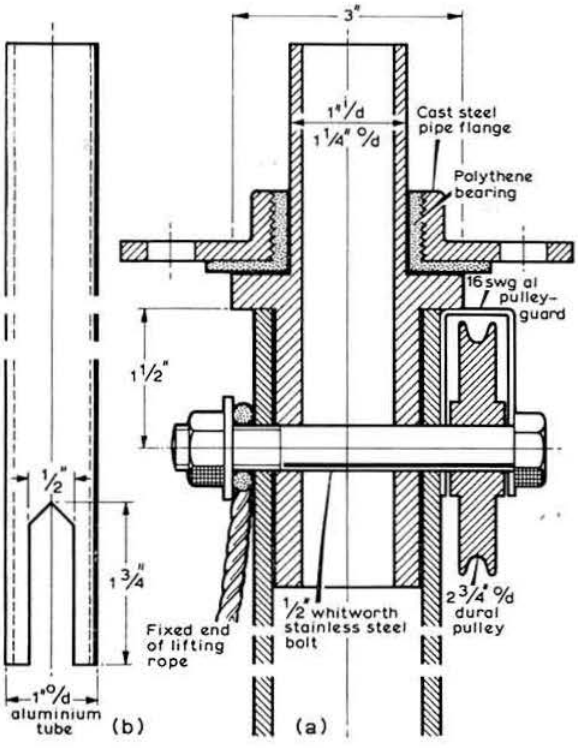


Fig 2. (a) The mast-head assembly, (b) The mast extension

The upper and lower support pins

The top pin supports the dish by its hooks when it is raised, and the lower pin forms a stop for the dish when it is lowered, engaging in the V-grooves in the dish channel section. To minimize bending forces on the mast, the top support pin should be positioned as near to the guying point as possible consistent with the dish clearing the guys.

To drill the mast accurately, the pole is marked using the technique described earlier, and pilot holes are drilled from each side. These are progressively opened out to $\frac{13}{32}$in diameter and a $\frac{1}{2}$in Whitworth tap is passed through one hole and then the second in a single operation. The first hole tapped is then opened out to $\frac{1}{2}$in diameter. The stainless steel pins are threaded for $1\frac{1}{4}$in at one end, and screwed into position as shown in Fig 3.

The bottom assembly

This assembly, shown in Fig 4, is designed so that with the mast vertical, slop-free drive is obtained even though the rotator base is tipped from the horizontal by up to 7°. The holes for the bearing pins are more easily drilled before the tapers are turned. Both bearing pins are force-fitted by the method described earlier, although where some play is permissible, then the lower pin can conveniently be a bolt as shown in Photo 3. The $1\frac{1}{2}$in angle pieces joining the body to the rotator are drilled with $\frac{1}{2}$in diameter holes, the lower surfaces of which are subsequently filed to form a V-groove which positively locates the bearing pin.

One rotator used was a heavy turntable taken from a scrapped lathe. This was fitted to a wooden base, to the sides of which 4ft lengths of Dexion angle can be screwed. Under very windy conditions, these can be pegged to the ground with spikes to prevent the rotator from twisting.

The rotator is fitted with a calibrated scale and an adjustable pointer which has helped considerably in working distant stations. The pointer is set by peaking the aerial on a local station and setting its precise bearing as determined from a 10in map. If the site of a distant station is known, its bearing can be determined from the map and the correct aerial direction set up.

The dish assembly

The dish is attached to a framework made from Dexion angle as illustrated by Photo 1 and Fig 5, the problem of bolting the doubly curved surface of the dish to the angle being eased by using 45mm diameter rubber bungs roughly shaped to fit as spacers. Two eye-bolts are fitted to the framework, one to which the lifting pulley is shackled, and the other through which is passed the free end of the lifting line.

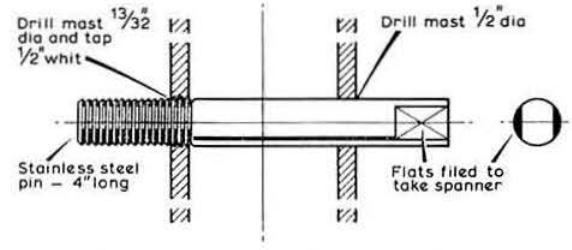


Fig 3. The upper and lower support pins

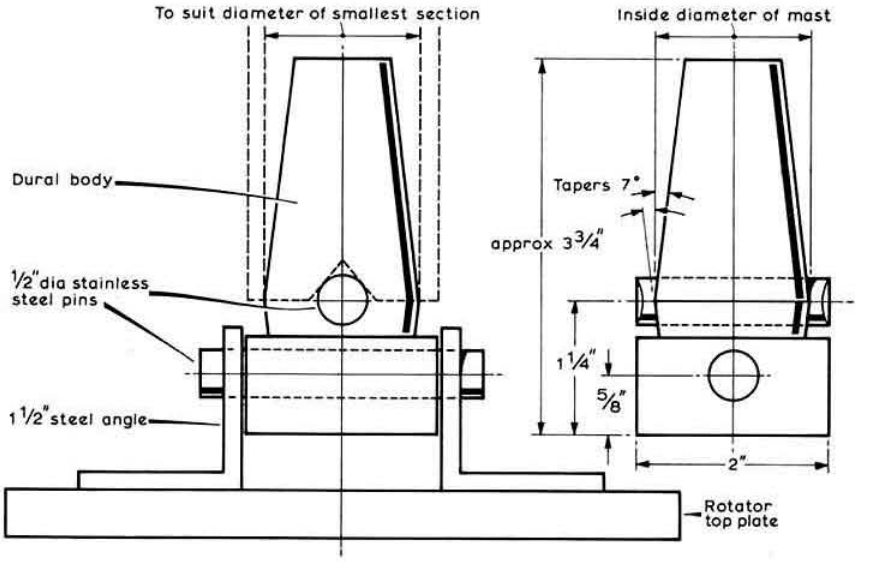


Fig 4. The bottom assembly

To this framework is attached the fabricated channel through which the mast slides. As shown in Fig 6, the channel is mounted 2in off centre to clear the feed protruding through the back of the dish. In the top of the channel, hooks are cut which engage the top support when the dish is raised; at the bottom, V-grooves which engage the lower support pin. By shaping the hooks as shown in the figure, rotational play generally is eliminated. About ¼in of play was allowed in the dimensions of the channel to permit the fitting of low-friction inserts, although these have been found unnecessary in practice. This play does allow the dish to tip slightly, by about 1°, which is unimportant on 23cm and 13cm but could be excessive at higher frequencies.

Operation

The mast is assembled by fitting to the top section the required number of sections using the connectors appropriate to each section. The top assembly is located using the ½in bolt, the fixed end of the lifting line being retained by this bolt. The free end of this line (400lb propylene) is first passed through a single running pulley, then through the pulley in the top assembly to provide a 2 : 1 mechanical advantage. The running pulley is temporarily attached to the lower support pin to keep it out of the way. Any vhf aerial is bolted to the mast extension so that it points at right angles to the top support pin when the extension is engaged with the top assembly bolt.

The four guys are then shackled on. For guys the author uses 400lb propylene line, or ⅛in diameter multi-strand galvanized wire when greater stability is required. The mast is then raised into position using techniques appropriate to the manpower available and the wind conditions.

The dish is lifted onto the lower support pin and held onto the mast by three $\frac{5}{16}$in bolts, and the feed is fitted. The running pulley is shackled to the dish framework and the lifting line threaded through the second eye-bolt. The dish is then raised with the face of the dish at about 45° to the top support pin, the hooks being engaged by pulling the lifting line sideways to rotate the dish, and finally the line is slackened a little before being cleated to the lower support

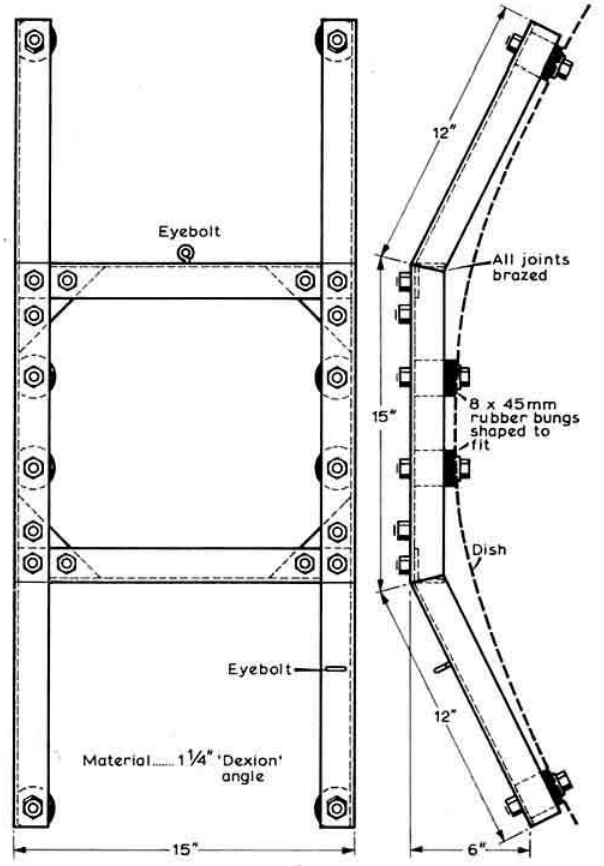


Fig 5. The dish framework. Note the use of rubber bungs as spacers between the angle framework and the doubly-curved surface of the dish

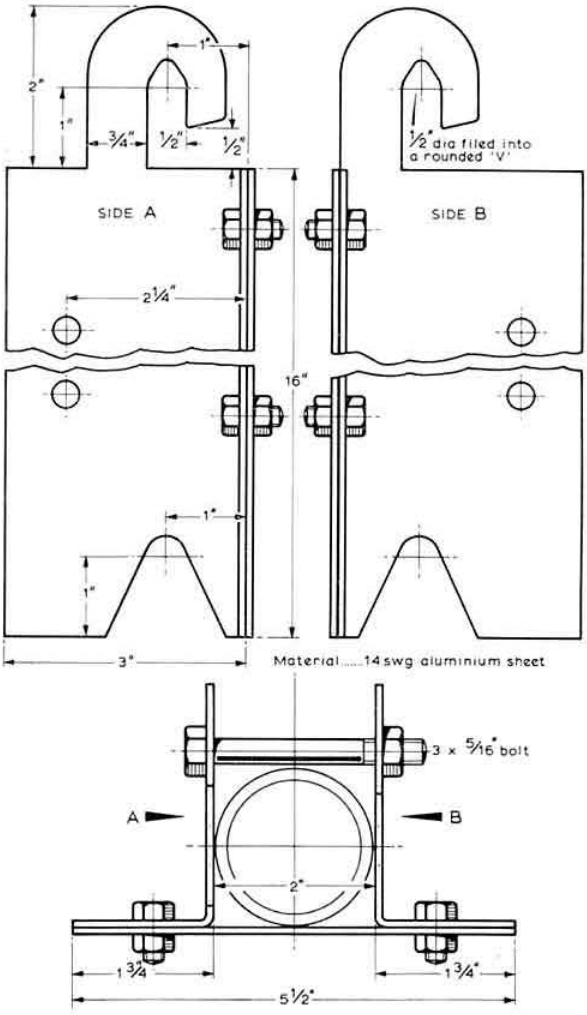


Fig 6. The fabricated channel section through which the mast slides

pin as a safety measure. It is to be noted that the lower edges of the hooks are inclined so that the hooks cannot partially engage.

Lowering the dish is the reverse procedure: the dish is lifted up about ¾in, then rotated in the only direction it can, when it becomes free to be lowered. Once the "feel" of this operation is experienced, then the process can be done easily even in the dark. In high winds the dish may "weathervane", and it may be necessary temporarily to rotate the mast to suit the dish position rather than vice-versa.

The system has given trouble-free performance in dozens of portable operations over several years. Apart from occasionally painting the steelwork, the only maintenance required is periodically to spend a half-hour removing the almost invisible corrosion product from aluminium sliding surfaces. Waterproof carbide paper with lots of water is all that is needed. This maintenance is important as the friction between even slightly corroded parts is very high.

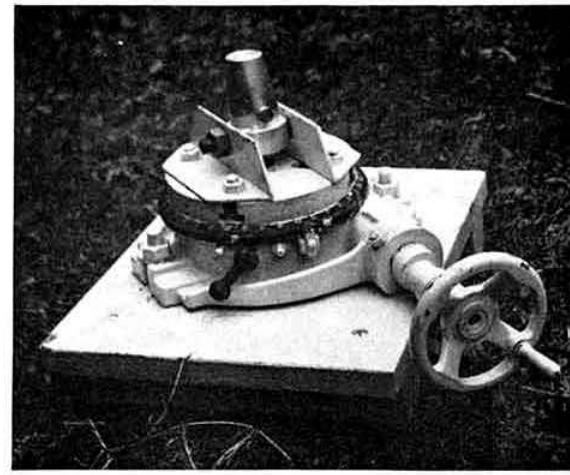


Photo 3. The bottom assembly. Note the use of a tapered boss which ensures slop-free drive even when the base of the rotator is tipped by 7°

Alternative configurations

The mast has also been used for mounting vhf/uhf aerials. Prior to erecting the mast, a 2in inside diameter tube with hooks fabricated at the top is slipped over the mast. The aerials are bolted to the tube which can then be raised and lowered with the same facility as described for the dish. The height to which the aerials can be raised will of course depend on the length of the aerials and the angle of the guys. This height will obviously be lower than that of aerials mounted on the mast extension, but this is the price to be paid for ease of erection. If heavy aerials are to be mounted above the guying point, then the top assembly should be modified to take a larger diameter mast extension.

If the dish need not be lowered frequently, then extra aerials may be fitted to the mast at intermediate points. A convenient method is to screw in an additional support pin from which a second dish can be hung. Another support pin could be used to locate a second guy-ring should this be necessary.

BOOK REVIEW

"Long distance television"

The second edition of this booklet covers many aspects of long-distance television which interest not only the dx enthusiast but also the fringe viewer seeking an alternative programme. After detailing the various transmission systems and channels the text covers propagation, receiver requirements, aerials and aerial amplifiers. The final section deals with station identification and includes a number of black and white reproductions of dx station test cards. Text and diagrams are clearly produced within a glossy card cover.

Long distance television by Roger W. Bunney. Size 15 by 21cm, 38 pages. Obtainable from Weston Publishing, 33 Cherville Street, Romsey, Hants, SO5 8FB, price (post paid) 50p.

A shack-earthed folded vertical aerial for 14MHz

by R. BALDWIN, BSc, G3WZ*

THE design of this aerial was prompted by a move to a new country QTH where an inconspicuous transmitting system was wanted for immediate use, and so the idea of a "shack earth" presented itself.

The old cedarwood shack was brought to the new site in pieces with all its dismantled lining. When new, the hut had been lined with the widest type of aluminium kitchen foil, secured at ample points with hammered-in drawing pins. Over this went the necessary wiring for mains, then hardboard. The original idea was to cut down local radio fields by blocking off the electric vector. It was a Faraday screen with two great holes—the door and window, and there was no evidence that the author's 100W at the previous QTH caused any interference. The additional result of this shiny metal barrier under the shack lino as well as the walls, was that in the coldest winter a 1kW hot-air blower soon got the shack up to a comfortable temperature.

In the new situation about 15ft of plumber's copper tube was buried along with the power and phone lines to the shack. The tube acts as an earth for the shack screening, and the whole is the "shack earth".

A vertical seemed the best sort of aerial to erect for a start, and with four years to sunspot minimum, 14MHz seemed preferable to 21MHz, although the aerial could easily be adapted to 21 or 28MHz, by shortening.

The old bogey of earth resistance being in series with the base currents of a vertical can be reduced to a quarter, of course, by a fold of the aerial ending itself in earth. Then there was a matter of radials to be considered. It was at this stage that the idea of using a self-supporting vertical made of a couple of old tank whips, and earthed at the ridge of the Faraday and heat screen, came to mind.

It proved quite easy to braze the plug-in army sections together. There was no need at all to clean off the paint—the flame did it! Without gear it would have been necessary to find an obliging garage to do the tacking, but as flame welding goes it is a simple matter. At the bottom of each half was welded 3ft of copper braid. The base of each half of the double aerial was sheathed in polythene piping. Two jubilee clips secured the bases to opposite sides of a 3in batten painted green.

Since the quoted resistance at the base of a vertical quarter wave is about 35Ω the expected resistance of the doubled element would be about 140Ω. Thus a matching section in an aluminium box would be necessary and this was calculated out with values shown in Fig 1(a). For the method used see [1].

When the aerial was first tried out, the forward and reverse currents were disappointing because the radiator had been cautiously left about 1ft longer than the calculated length. (It is simpler to cut than add!). Anyone who has tried the matching problem of a grid dip meter to an aerial along coaxial cable will know that it is awkward, but a careful eye can sometimes see the dip centre. Incidentally, the old recipe for this sort of situation was to have a small oscillator

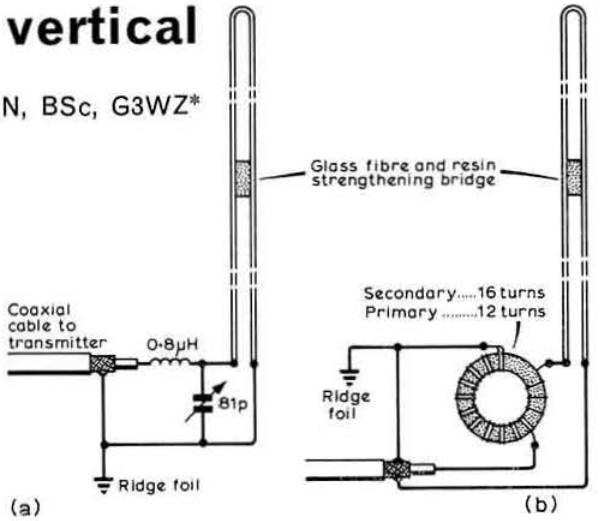


Fig 1. (a) The rejected matching system, (b) the ferrite ring matching transformer

like a grid dip and tightly couple it to the aerial concerned, when pull occurs towards the resonant frequency. Thus the oscillator would be quickened when on a longer wavelength and coupled to a shorter one, and vice versa. Listening is done on a receiver. However, it is unsound—the withdrawal of energy generally slows up the oscillator both above and below resonance. If a gdo proves useless try to obtain a noise bridge—for a good design see [2].

The aerial and its tuning box were earthed to the shack ridge some inches away from the base. It persisted in throwing back some of the power given, perhaps owing to stray capacitance in the shielded box, perhaps because of dead ends of experimental braid here and there.

It was decided to try the two ferrite rings (Mullard FX 1588 toroidal cores) used for baluns so successfully by G3HZP. However, in this case the transformer is unbalanced—earth on each side. (See Fig 1(b)). This made it possible to wind on the ring a doubled length of 16swg enamelled copper wire as a bifilar winding, the kinked end being, of course, the future braid earth running the inch or two to the hut foil. The windings were kept apart with plastic string interwound. In order to match up as recommended as a possibility by G3HZP, [3], the transmitter side was of 12 turns with taps at 10 and 11. The secondary went on alone up to 18 turns with taps at 17 and 16 turns.

The results were dramatic and the up-current shown on the forward diode of the swr meter was improved, while it was necessary to go down to a more sensitive range on the AVO and peer intently in order to detect the return current, on the best tapping. At 16:12 this seemed to show a base impedance of just over 100Ω. The ferrite toroid was encapsulated in epoxy resin of the sort used for repairing car bodies. The whole was secured to the wood base of the aerial by a large nylon screw through the centre of the epoxy case.

References

[1] *Radio Communication Handbook*, 13.28.
[2] *Radio Communication*, September 1972.
[3] *Radio Communication Handbook*, 13.30.

* 11 Meadow Court, Whiteparish, Wilts.

A modern approach to radio teleprinting

by D. J. WALKER, BSc (Eng), G3OLM*

THE current availability of surplus teleprinter machines does not appear to be matched by the availability of simple modern circuit designs which the would-be rttyer requires to get started in this field. It is the object of this article to present some simple, effective and easy-to-build circuits using modern components.

The teleprinter system

The very popular Creed 7B teleprinter and its later developments, type numbered 7B/N3, 54 and 7E, are in fact two quite separate machines comprising a transmitting section which operates a set of keying contacts controlled from the keyboard and a receiving section for converting electrical signals to printed letters.

The teleprinter code is based on a binary or two-state signalling system and the two possible signal states are designated *mark* and *space*.

A graphical representation of a signal for a single letter is shown in Fig 1, in which prior to transmission the signal state is a *mark*. Under this condition the machine is at rest and awaiting the first instructions.

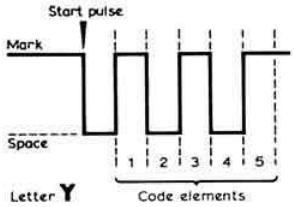


Fig 1. Waveform corresponding to the letter Y. Prior to transmission the signal state is *mark*, while the machine awaits instructions

When the signal state first changes to *space* the decoding operation is initiated and, after a time of 22ms has elapsed, the first of five signal elements representing the chosen letter occurs. The five signal elements may be either *mark* or *space*, depending on the character transmitted, but each occupies a time of 22ms. At the end of this fifth code element the signal reverts to the *mark* condition for at least 33ms, during which time the machine prepares to receive the next instructions.

The electrical signals presented to the receiving section are converted to mechanical movements by means of a polarized electromagnet which is part of the machine. This electromagnet can be operated in either of two distinct ways:

Double-current working in which a current is forced through the electromagnet in one direction for *mark* and the opposite direction for *space* or,

Single-current working in which a current is forced through the electromagnet on *space* only and the magnet reverts to the *mark* condition under the influence of a return spring when the current is removed.

Specific adjustments have to be made to both the electromagnet and return spring according to the mode of operation desired.

Some machines are not fitted with a return spring, in which case double-current working is essential, so it is therefore the preferred method. It is quite easy to arrange a push-pull transistor drive circuit to achieve this and a dual-polarity supply is not required.

RTTY standards

Before satisfactory communication can be effected standards have to be established governing the speed of signalling and modulation characteristics. These standards, particularly speed, have been the subject of controversy for many years, but at the present time operation on the hf bands is predominately 45 bauds as also is vhf operation in the London area.

The method of modulation employed on the hf bands is fsk, (F1), employing a carrier shift of either 850Hz or 170Hz with the *space* frequency below the *mark* frequency. For vhf operation either fsk is used as above, or more popularly afsk (A2), in which an audio-carrier at 2,125Hz for *mark* and 2,975Hz for *space* is amplitude modulated upon the rf carrier.

This second method suggests an elegant way of realizing all of the above forms of transmission. If the signals are first generated at the audio frequencies of 2,125 and 2,975Hz and applied to a lower sideband ssb transmitter then an fsk signal of 850Hz shift results, provided that the ssb filter has a bandwidth of at least 3kHz. Where a narrower filter is employed the signal can still be accommodated if the carrier crystal is moved further away from the passband of the sideband filter. Should the narrow shift standard of

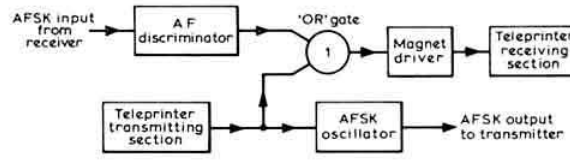


Fig 2. Block diagram of the complete rtty system. The low-level OR gate means that the teletype unit can record not only the incoming signal but also local copy of transmissions

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170Hz be required, then 2,295Hz can be substituted for 2,975Hz. The process can be reversed for reception where signals from the station receiver are processed at audio frequency.

A block diagram of the system is shown in Fig 2. The teleprinter receiving section accepts signals from the magnet drive circuit which is in turn driven either from an audio discriminator in the case of remote signals or from the teleprinter transmitting section to provide a local record of transmission. This method of combining both local and remote signals in a low-level OR gate is advantageous if duplex working is required.

Circuit description

The complete circuit diagram of the rtty unit is shown in Fig 3. The audio discriminator is of the pulse-averaging type and the first stage consists of an integrated circuit amplifier which acts as an amplitude limiter and squarer. The output is differentiated and used to trigger a transistor monostable pulse generator, one pulse being produced for each cycle of the input signal. The mean level of the pulse train is directly proportional to frequency. The resulting signal is applied to a metering circuit to act as an aid to tuning or monitoring, and also, after a section of RC filtering, to a Schmitt trigger circuit, the output of which is near zero for *space* frequencies and +3V for *mark* frequencies or no input.

The signal is then passed to the two-diode OR gate, and on to the push-pull transistor magnet-drive circuit. The remaining input to the diode OR gate accepts the local record signal from the keyboard.

The unit will accept an audio input level of 100mV to 5V and the tuning meter may be calibrated in frequency. When the meter reads about half-scale deflection, corresponding to an audio frequency of 2·5kHz, a sharp transition in output current to the teleprinter magnet from *mark* to *space* occurs.

Although the unit was designed with the object of receiving fsk signals with a shift of 850Hz, the author's unit has been found capable of coping with 170Hz shift although other versions of the unit may require a slight adjustment of resistor R17 to accomplish this.

The afsk oscillator is based on the well-known multivibrator circuit and provides a perfectly adequate degree of frequency stability. The prototype oscillator did not vary by more than 20Hz over a 12-month period. There is no reason why this performance should not be repeated as long as good quality components are used.

The timing components of the circuit are chosen so that the mark-to-space ratio of the output waveform is 1·4 to 1 for both 2,125Hz and 2,975Hz. This has the simplification of allowing the frequency to be switched by controlling one only of the two frequency-determining time constants and at the same time incidentally maintaining the fundamental components of the two frequencies at the same amplitude.

The RC and resistor/diode network following the oscillator is described in [1], and converts the output to a fairly good approximation of a sine wave. The action of the RC section is to render the waveform triangular and the non-linear characteristic of the two back-to-back diodes completes the process and limits the amplitude. Despite its crude appearance this network is surprisingly effective. Output up to 100mV is provided.

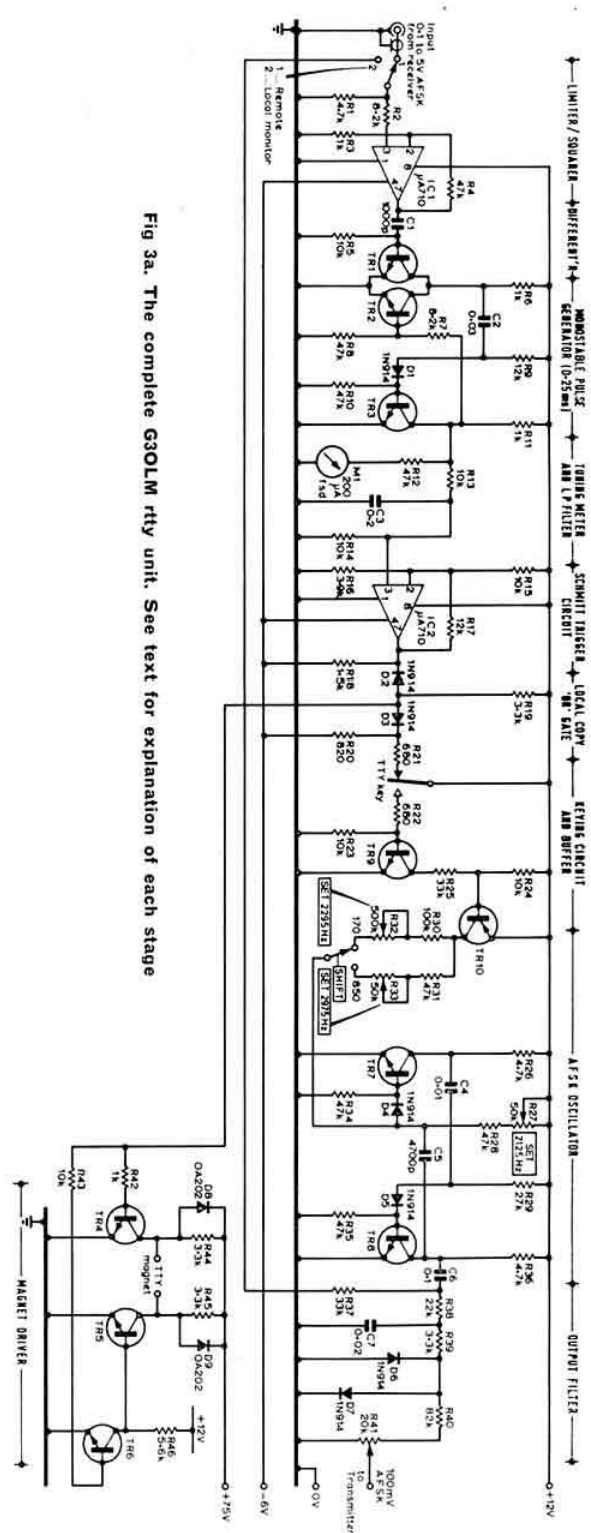


Fig 3a. The complete G3OLM rtty unit. See text for explanation of each stage

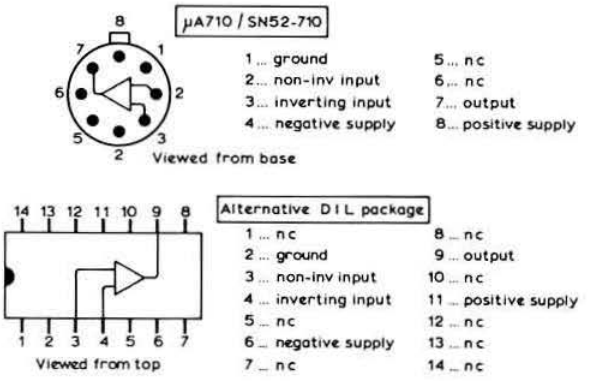


Fig 3b. Pin configurations for the μA710 integrated circuit, available either as TO5 or DIL package. Note that the pin numbering in the circuit diagram (Fig 3a) relates to the TO5 can only. The 74 series integrated circuits are all numbered anti-clockwise from the lower left corner as in the DIL package shown here

A selector switch is provided to enable the afsk oscillator to be used on 170Hz shift if required and a further switch enables the oscillator frequency to be monitored via the discriminator.

The afsk oscillator is keyed from the keyboard via a buffer amplifier from the normally open contact. The normally closed contact provides local copy and must be closed when receiving incoming signals otherwise the machine stays on *space* and "runs away".

Construction

There are no special requirements for mechanical layout so a specific mechanical description is omitted. The electrical design has been arranged to accept a wide range of transistor types, and with the exception of the two magnet-drive transistors almost any small-signal silicon transistors providing a current gain in excess of 20, and operating from 15V, will suffice. The prototype employed 2N708 transistors, except TR10 which was a Mullard OC200.

The two magnet-drive transistors must have a V_{ce}(max) rating of not less than 80V and should be capable of dissipating 1W. Possible types are 2N2102 or 2N2243.

The power supply requirements are +12V at 50mA, −6V at 20mA, and +75V at 50mA.

While it is not necessary for the power supply to be stabilized it is important that it should be well-regulated and the practice of achieving the correct supply voltage by means of a dropping resistor should be avoided. This is particularly important in the case of the +75V supply to the magnet drivers, as transient load variations which result in a rise in voltage above 80V will damage the transistors. Provided these precautions are observed there should be no difficulty in reproducing this design.

The only adjustment required to be made to the unit is the setting of the frequency of the afsk oscillator.

With the key in the *mark* condition the resistor R27 is adjusted to bring the frequency to 2,125Hz by comparison with a calibrated source. The *space* frequency is then set in

Parts list

Complete G3OLM rtty unit

R1 4·7kΩ 20% ¼W
R2 8·2kΩ 20% ¼W
R3 1kΩ 20% ¼W
R4 47kΩ 20% ¼W
R5 10kΩ 20% ¼W
R6 1kΩ 20% ¼W
R7 8·2kΩ 20% ¼W
R8 47kΩ 20% ¼W
R9 12kΩ 5% ¼W
R10 47kΩ 20% ¼W
R11 1kΩ 20% ¼W
R12 47kΩ 5% ¼W
R13 10kΩ 5% ¼W
R14 10kΩ 5% ¼W
R15 10kΩ 5% ¼W
R16 3·9kΩ 5% ¼W
R17 12kΩ 5% ¼W
R18 1·5kΩ 20% ¼W
R19 3·3kΩ 20% ¼W
R20 820Ω 10% ¼W
R21 680Ω 10% ¼W
R22 33kΩ 20% ¼W
R23 10kΩ 20% ¼W
R24 10kΩ 20% ¼W
R25 33kΩ 20% ¼W
R26 4·7kΩ 20% ¼W
R27 50kΩ pot
R28 47kΩ 10% ¼W
R29 27kΩ 5% ¼W
R30 100kΩ 10% ¼W
R31 47kΩ 10% ¼W
R32 500kΩ pot
R33 50kΩ pot
R34 47kΩ 20% ¼W
R35 47kΩ 20% ¼W
R36 4·7kΩ 20% ¼W
R37 33kΩ 20% ¼W
R38 22kΩ 20% ¼W
R39 3·3kΩ 20% ¼W
R40 82kΩ 20% ¼W
R41 20kΩ pot
R42 1kΩ 20% ¼W
R43 10kΩ 20% ¼W
R44 3·3kΩ 20% 3W
R45 3·3kΩ 20% 3W
R46 5·6kΩ 20% ¼W

C1 1,000pF ceramic 20%
C2 0·03μF (3 × 0·01μF) polyester 10% 250V
C3 0·2μF (2 × 0·1μF) polyester
C4 0·01μF polyester 10% 250V
C5 4,700pF silver mica 10% 350V
C6 0·1μF polyester
C7 0·022μF polyester
IC1, IC2 μA710 (SGS/Fairchild)
NB pin Nos shown in Fig 3 refer to TO5 cans only.
D1, D2, D3, D4, D5, D6, D7 IN914
D8, D9 OA202
TR1-TR10 See text

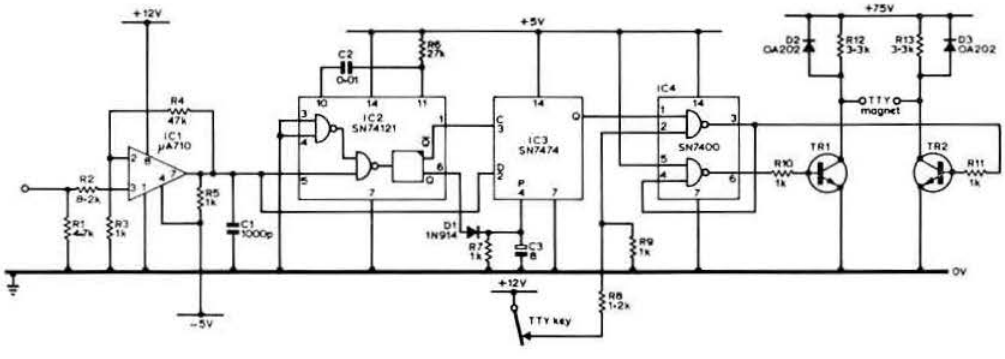


Fig 4. A digital integrated circuit terminal unit

the same way using the appropriate control to 2,975Hz or 2,295Hz.

A digital discriminator

An alternative receiving arrangement using integrated circuit digital techniques is shown in Fig 4. The action of the circuit is as follows:

The first integrated circuit, IC1, limits and squares the incoming signal. The leading positive-going edge of this square wave triggers the following SN74121 one-shot, producing a pulse the duration of which is controlled by the time constant C2/R6.

Two outputs are available—a positive-going pulse at pin 6, which is used to release the preset of the following D-type flip-flop, and a negative-going pulse which is used to clock the flip-flop on the back edge.

When the input frequency is low the D gate of the flip-flop is high when the clock transition occurs and so the output is set high (*mark*). When the input frequency is high the D gate is low at the active clock time thus setting the output low (*space*).

In the absence of a signal the voltage at the preset of the SN7474 falls to zero and the output is then preset to *mark*. The following SN7400 provides a local copy OR gate and a biphase output for the magnet drive.

This circuit is compatible with the afsk oscillator previously described. It is capable of responding to extremely small shift down to 5Hz and the transition frequency can be controlled by C2/R6. This frequency is given by:

Parts list

Digital integrated circuit terminal unit:

R1 4·7kΩ 10% ¼W
R2 8·2kΩ 10% ¼W
R3 1kΩ 10% ¼W
R4 47kΩ 10% ¼W
R5 1kΩ 10% ¼W
R6 27kΩ 5% ¼W
R7 1kΩ 10% ¼W
R8 1·2kΩ 10% ¼W
R9 1kΩ 10% ¼W
R10 1kΩ 10% ¼W
R11 1kΩ 10% ¼W
R12 3·3kΩ 10% 3W
R13 3·3kΩ 10% 3W

C1 1,000pF ceramic 20%
C2 0·01μF polyester 10%
C3 8μF 12V electrolytic
D1 IN914
D2, D3 OA202
IC1 μA710
IC2 SN74121
IC3 SN7474
IC4 SN7400
TR1, TR2 see text

Pin Nos shown in Fig 4 are for μA710s in TO5 cans, and 74 series in DIL packages.

$$f = 1{,}000 \div 1{\cdot}4CR$$

where f is in hertz, C in microfarads and R in kilohms. For the values given, this frequency is 2,650Hz.

While the above circuits do not represent the ultimate in the art, they are nevertheless capable of providing good performance, especially if preceded by a receiver of appropriate selectivity, and it is hoped that readers will be tempted to try their hand.

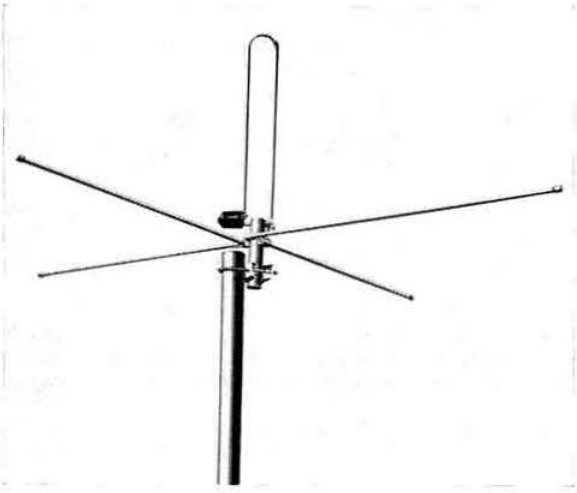
Reference

[1] *Electronic Design* No 6, March 1971, p80.

NEW EQUIPMENT

J Beam 2m ground plane 2/GP

With the increasing popularity of vertical polarization for Raynet and other activities, J Beam Engineering Limited has introduced a ground plane aerial for use on 144–146 MHz.



Its use at the base station, together with vertically polarized vehicle aerials, will ensure improved mobile communications.

The aerial is carefully matched to 61Ω, thereby enabling it to be used on 50 or 75Ω systems with a low vswr. The polar diagram of the aerial is truly omnidirectional in the H-plane, hence giving overall area coverage with no null points.

The recommended retail price is £3.20 + VAT.

BOOK REVIEW

"FM and repeaters for the radio amateur"

This is the latest title in the series of volumes published by the American Radio Relay League. As implied by its title, coverage is given to all aspects of fm operation and to the design and operation of repeaters. The sections dealing with fm receivers, transmitters, and base station and mobile aerials will be of greater value than chapters dealing with the modification of surplus fm gear appearing on the USA market. Some sections of the text have appeared in past issues of *QST* but the material has been updated and the information on repeaters takes account of the latest FCC requirements.

Size 16·5 by 24cm, 232 pages. European price $3.50. Will be obtainable from RSGB.

The Bird Ham-mate power meter

by H. W. REES, G3HWR

The Ham-mate power meter type 4350 was supplied for review by Bird Electronics Ltd, Northwood, Middlesex; UK distributors for the Bird Electronic Corporation, Ohio, USA. It is one of three similar directional power meters developed for the amateur market and is based on the established Thruline professional series of power meters. However, it is a completely new instrument and uses few, if any, of the Thruline parts; in particular there is no provision for changing probes as in the Thruline.

The instrument comprises a length of 50Ω rigid line through the side of which is inserted a directional coupling network, output from the network is dc (the rectifiers are part of the probe) and range switching is by varying the resistances associated with the meter. The whole is assembled in a neat case with the controls beneath the meter on a sloping panel. The direction of coupling is varied by rotating the probe assembly through 180° by a knob on the front panel. The meter has a very open scale, on the 4350 the half-scale points on the two ranges are 80 and 500W and the first division on the lower range is 5W.

The three meters in the series have the following ranges:

Type	Frequencies	Powers
4350	1·8–30MHz	0–200 and 0–2,000W
4351	1·8–30MHz	0–200 and 0–1,000W
4352	50–150MHz	0–40 and 0–400 W

In each case the accuracy specified is ±8 per cent of fsd and the directivity is better than 20dB. The additional vswr introduced by the instrument is not more than 1·1 : 1.

The sample was tested on the low range using a 150W transmitter with the results shown in the table; results on the high range were consistent with those on the low range but it was not possible to test the instrument at full power. A Hewlett-Packard 431B power meter was used as standard with the power reduced through a Bird 8325 attenuator which had been checked at dc. Checks were taken at about 50 and 100W except on 28MHz where the higher power could not be obtained from the transmitter. As can be seen, the results vary from band to band but are well within specification.

TABLE

Frequency MHz	HP 431B power	Ham-mate power	Error (limit 16W)
3·6	48	53	+5
	100	105	+5
7·0	48	45	—3
	100	101	+1
14·2	48	43	—5
	104	93	—11
21·2	43	39	—4
	80	67	—13
28·8	40	37	—3
70·5	34	48	+14

On all bands the directivity exceeded 20dB by a large margin and the additional vswr introduced on 30MHz was less than 1·03 : 1, compared with a through connector. In addition, a test was made at 70MHz to see how rapidly the instrument performance fell off above 30MHz. With an rf power of 34W the meter read 48W and the directivity had fallen to 14dB; these are remarkable figures and indicate that the design is well able to cover its frequency band.

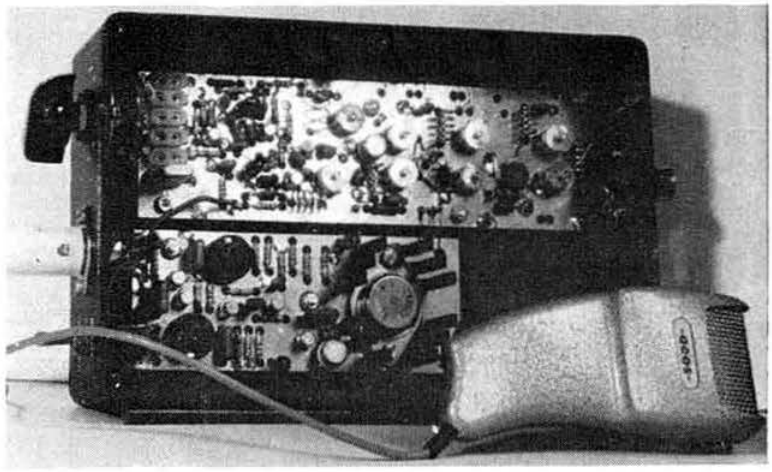
The hf band instruments cover rather high powers for the UK market, the specified limits of ±160 or 80W on the high ranges mean that these are unusable with transmitters which only run these powers at dc. Only the lower range of 200W would be appropriate for a legal cw rig, and the accuracy of the higher range would set a limit to the safe power level of an ssb rig.

The vhf Ham-mate with power ranges of 40 and 400W is much more practical, and a hf band instrument with these scales would be a much more marketable proposition in the UK.

The Ham-mate handbook is an exemplary sample of its kind, the use of the instrument is clearly described, including two-tone testing on ssb; and, after a strongly worded caution not to meddle, there follows all the information that could be needed for servicing the instrument. Although most will find the direct reading of forward and returned power convenient, some may prefer the less useful but familiar vswr, for them an excellent set of conversion charts is provided.

Microwave Modules 5W 145MHz a.m. transmitter

by B. PRIESTLEY, G3JGO



General description

The transmitter is fully transistorized and operates directly from 12V supplies, positive or negative earth (specified when ordered), and is complete with microphone and changeover relay. Although primarily intended as a mobile transmitter, it can give a useful performance as a fixed station. Overtone crystals of 72–73MHz are used, considerably reducing the number of spurious outputs. A series transistor modulates the output stage and to some extent protects it against supply voltage transients. The only controls are the send/receive and crystal switches.

Power output

The approximate power output into a 75Ω dummy load was 2·5W at 145MHz. Without any retuning the crystals were changed and identical outputs obtained at 144·6, 145·4 and 145·7MHz. A change to 143·4 did drop the output to 1·5W. Setting up the transmitter to give a reserve of drive over the band is critical, hence the makers' caution against adjusting the driver section.

Modulation

It was found that the audio gain control need only be advanced about one-fifth of its full travel to permit full modulation. On an oscilloscope, the envelope showed no serious peak flattening or any other distortion. Checks with an audio oscillator and spectrum analyser indicated 10 per cent distortion at 70 per cent modulation and a frequency response 10dB down at 8kHz. There was no measurable skewing of the spectrum which would indicate spurious frequency modulation.

On-the-air tests with a station one mile away confirmed the absence of spurious frequency modulation or excessive spurious emissions provided the modulation level was kept within bounds.

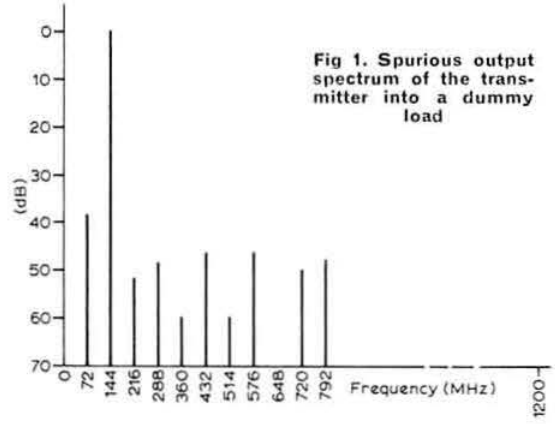


Fig 1. Spurious output spectrum of the transmitter into a dummy load

Spurious outputs

Fig 1 shows the harmonic spectrum when the transmitter was fed into a dummy load. Clearly the use of the 72MHz crystals has yielded a remarkably clean spectrum compared with the average 8 × 18 line up.

Stability

The supply voltage was varied over the range 10·5–12·5V. There was a slight shift in frequency (about 50Hz) over the first volt, and none detectable thereafter. This is quite negligible. Power consumption is 1·2A at 12V.

General comments

This is a good sound design which one can expect to fit and forget.

The modulator is very sensitive, and it is quite easy to over-modulate. Obviously a speech clipper/filter would be a desirable addition, but would increase the cost.

Manufacturers' comments

Microwave Modules Ltd were asked for comments on the review, and made only the following two points:

All units are supplied wired as negative earth unless otherwise specified. However, in the Mark II unit the polarity can be changed by altering a shorting strap on the power socket.

The modulator was designed with a reserve of gain so that it would be possible to use lower output, low impedance microphones instead of the crystal microphone supplied.

C • •

The Intruder Watch

by C. J. THOMAS, G3PSM, GB2IW*

RSGB Intruder Watch Organizer

Following the last issue of the six-monthly summary of intruders, more individual stations and societies within IARU Region 1 have shown interest in participating in the IARUMS programme. Unfortunately a change in address on the part of the Region 1 co-ordinator meant a delay both in answering correspondence and the final draft of the IARUMS Region 1 working regulations. However, all correspondence is now up to date and the working regulations are being finalized. RSGB Intruder Watch headquarters station GB2IW is again operational and stations are invited to write to the author to arrange skeds.

In order to include all relevant information in the six-monthly summaries (sms), the format has been expanded. In addition, in view of interest now being shown in different parts of the world, it has been decided to include reports from sources outside Region 1 in the sms. Meanwhile, a monthly summary is now issued to participating stations and interested parties which lists only those reports received from within Region 1. It is stressed that the sms includes only reports on stations that have been heard on more than two occasions.

* 73 Mexborough Avenue, Leeds LS7 3ED.

The period covered shows a slight increase in the number of stations heard, but this is thought to be due more to an increase in monitoring stations rather than to an increase in intruders.

The situation on 40m remains fairly static with the Radio Peking transmissions being heard world-wide. Although the Chinese Administration has acceded to the International Telecommunication Convention 1965, they have made reservations regarding the assignment and utilization of frequencies. It is hoped that a solution will be eventually found to this problem, but probably only in the long term.

Both 20m and 15m show a slight increase in the number of intruders listed. On 20m the activity in the Middle East of a number of ssb stations is causing concern. Although some of these stations use amateur callsigns, the traffic passed includes diplomatic and para-military messages. One station has been identified as being located in Kuwait and another in Morocco. On the high end of the band a Moroccan cw net is also causing some problems.

On 15m there are still a number of diplomatic stations of unidentified origins. Although information regarding the location and controlling administrations of these stations is still being collected, more information would be very welcome.

Out of a total of 41 intruders on the 10m band during the period, at least 27 are known to be harmonics. It can be seen that if adequate harmonic suppression was carried out the 10m band would be comparatively free from intruders. The national societies in the countries concerned have been asked to bring pressure, where possible, on the administrations in charge of the broadcasting stations.

Summary of intruders — IARU Region 1
1 July—31 December 1972

Freq (kHz) (a)	Emm (b)	Date (c)	Time (UT) (d)	Calls (e)	Location (f)	Report source (g)	Comments (h)
7,003	A1	0972	1645–1715	EYJ21, RIG77 de UXX20	USSR	1, 2, 7	
		1072	1645–1715				
7,010	A3	XX72	1830–2130	Radio Peking	China	1, 2, 3, 5, 7	B.
7,020	F1	XX72	2030–0100	—	USSR	2, 4, 5	B. S/P
7,020	A3	0972	1930–2030	Radio Peking	China	2	
7,025	A3	0772	HX	Radio Peking	China	2, 3	
		1072					
		1272					
7,035	A3	XX72	1500–2400	Radio Peking	China	2, 3, 4, 5, 7	B.
7,037·5	A1	0972	1300–1700	AH6B, SK4F, S6FH de IAJC	USSR	2	
		1072	1100–1900	YEHQ, 6JSE de IAJC			
7,039	A1	0972	1200–1700	P	DDR*	2, 5	B.
		1072					
7,044	A1	1072	1045–1605	P	DDR*	2	
		1172	1200–1400				
		1272	0530–0700				
7,050	A3	XX72	0300–0800	Radio Cairo	Egypt	1, 2, 3, 4, 5	B.
7,058A	A3	XX72	1430–1600	Radio Peking	China	2, 3, 4	B.
			1730–2330			5, 7	
7,064A	A3	XX72	1430–0130	Radio Tirana	Albania	2, 3, 5 7	B.
7,064	A3	0872	HX	Radio Iran	Iran	2, 5.	B.
		0972					
		1072					
7,075	A3	XX72	1730–2330	Radio Peking	China	2, 5	B.
7,075	A3	1172	HX	Radio Cairo	Egypt	2	B.
7,080	A3	0972	1900–2200	Radio Moscow	USSR	5	B.
		1072					
7,090	A3	XX72	1430–2200	Radio Tirana	Albania	2, 5	B.
7,095	A3	XX72	2000–2100	Radio Pakistan	Pakistan	7	B.
7,095	A3	XX72	1800–2130	Radio Peking	China	2, 3	B.
14,008	F1	0772	1100–1800	de UTS	USSR	4, 6	B. S/P + M
14,016	A1	0772	2000–2100	—	USSR	4	4/C calls
14,027	A3	XX72	0800–1000	Radio Nacional	Spain	2, 5	
			1600–1730	Espana			
14,032	F1	0772	1130–2000	—	USSR	3, 5	B. S/P
		0872					
14,040	F1	0872	HX	—	USSR	3	B. S/P
14,053	F1	0772	0530–2010	—	USSR	5	S/P
14,064	F1	0872	1000–1400	—	USSR	2, 5	S/P
		0972	0400–1600				
14,064	A1	0972	2030–2100	RJF, UIJ2 de ULY4	USSR	5	
14,072	F1	0972	0600–2000	—	USSR	2, 5	B. S/P
		1072					
		1172					
14,076	A1	0872	1230–1500	—	USSR	5	B. 4/C calls
		1272					
14,078	A3j	0872	0930–2315	—	—†	2, 5, 7	Arabic†
		1272					
14,080	F1	0772	0545–1600	—	USSR	5	B. S/P + M
		0872					
		0972					
14,088	F1	XX72	HX	—	USSR	2, 5	B. S/P
14,100A	F1	0872	1100–1400	CWY de TCX	Turkey	2, 4, 5 7	B. CENTO*
		0972					
		1072					
14,104	F1	XX72	0600–1830	—	USSR	2, 3, 4 5, 7	B. S/P
14,110	F1	XX72	0200–1900	—	USSR	2, 4, 5	B. S/P
14,125	F1, F6	1072	0200–1330	—	USSR	2, 4, 5	B. S/P + M
		1172					
		1272					
14,128A	A3	0872	1400–1930	Radio Tirana	Albania	2, 4, 7	B. 2f 7,064A kHz
		1072					
		1172					
14,128	F1	XX72	0530–1700	...	USSR	2, 4, 5	S/P
14,140	A4	1172	0115–0200	—	China	4,7	B. New China News Agency
14,145	A7a	XX72	0700–2100	—	Greece	2, 4, 5	B.
14,150	F1	XX72	1300–1400	—	USSR	5	B. S/P

Freq (kHz) (a)	Emm (b)	Date (c)	Time (UT) (d)	Calls (e)	Report Location (f)	source (g)	Comments (h)
14,155	F1	XX72	1100–1200	BWH de TCX	Turkey	2, 4, 7	B. CENTO**
14,155	A1	XX72	HX	RJF, UIJ2, ULY4	USSR	2, 4, 5	
14,160	A1	XX72	1745–2115	CQ de URD	USSR	2, 4, 5	B. 4f 3,540 kHz
14,176	A1	1172 1272	1440–1935	CQ de SPA6	Poland	2, 4, 5	Spurious
14,181	F1	XX72	1000–1245	—	USSR	2, 5, 7	S/P
14,184·8	F1	0772 0872 0972	HX	—	USSR	3	S/P
14,191	F1, F6	0772	0930–1800	—	USSR	2, 3	S/P + M
14,200	A3	1172	1200–2230	Radio Moscow	USSR	2, 5, 7	B. 2f 7,100 kHz
14,210	A3	0772	1100–1300	Radio Madagascar	Malagasy	6	B. 2f 7,105 kHz
14,216A	A1	1172	1100–1200	de 4CSL	USSR	5	
14,216	F1	XX72	1200–1830	—	USSR	2, 3, 4 5	B. S/P
14,219	F1	0772 0872 0972	1550–1645 0945–1600 1000–1600	—	USSR	5	S/P
14,224	F1	0772 0872 1072	0930–2000 1000–1830 1000–1500	—	USSR	2, 3, 4 5	S/P
14,232	F1	XX72	0800–2330	—	USSR	5	S/P
14,236	A1	0772 0872	1900–2030 1640–2045	—	USSR	5	4/C daily changing calls
14,240	F1, F6	XX72	1015–1130 1630–1830	—	USSR	5	B. S/P
14,248	A1	0772 0872	HX	—	USSR	2, 5	B. High-speed morse
14,255	F1	0872 1072	1030–1230	—	USSR	2, 5	S/P
14,284	A3j	0772	0900–1000	—	—†	2, 5	B. See 14,078kHz
14.335	A1	1272	0900–1500	HQ1, JW3, NT4, UJL, Y7M, 5WK, 9DZ	—**	5	D net
14,336	F1	XX72	1130–1700	de BZP54	China	2, 5	B. New China Press
21,008	F1	1072	1100–1200	—	USSR	2	S/P
21,015	F1	0772 1072	HX	de ZAY3	Albania	3	50 baud P using Int No 2 code. 2f 10,508kHz
21.025A	A1	0872 1272	1700–1830 1430–1930	de AEZ7	Ethiopia††	1	QSX 5,745/ 10,487/15,917 /18,375/ 11,995kHz. 2f 10,512·5A kHz
21,050A	A1	0772	0300–0805	GRV	—	5	See also 21,035A/ 21,325kHz
21,078	A1	0772 0372 0372	0300–0315	de BQZ61	China	4, 5	B.
21,080	F1	XX72	0001–0100 1100–1600	—	USSR	5	B.
21,035A	A1	0372 1073	0300–0315 1515–1530	GRV	—	5	See also 21,050A/ 21.325kHz
21,030A	A1	0972	0900–0915	ANU/USK	—	5	D
21,090A	A1	1172 1272	0900–0915	OCA	—	5	D
21,093A	A1	XX72	0300–1015	VTF	—	5	D
21.090	A1	0772	0300–0815	CQ de LKC	—	5	B. D
21,095	A1	1172	0900–1100	BFU	—	5	D
21,100	P9	0772 1072	0300–0400 0300–1000	—	USSR	2, 5, 7	See also 21,180/21,390 /28,600kHz
21,100	A1	1072	0900–0915	CQ de LKC	—	5	D See also 21,090/ 21,345kHz
21,100A	A1	0772	1100–1300	ZTW	—	5	D
21,100A	A1	0772 0972	0300–0310	VTF	—	5	B. D. See also 21,110 kHz
21,105	A1	0772	0800–0815	GKA	—	5	D
21,110	A1	0772 0872	0800–0810	ZGA	—	5	D
21,110A	A1	0972	0300–0315	VTF	—	5	D. See also 21,100AkHz
21,122	F1	0772	1700–1730	—	USSR	5	P
21,125A	A1	0772 1072	0800–0830 1000–1100	de HZUA	—‡	1, 5	See also 21,135AkHz
21.135A	A1	1172	0300–1215	HZUA, HZUK	—‡	1	See also 21,125A/ 21,185AkHz

Freq (kHz) (a)	Emm (b)	Date (c)	Time (UT) (d)	Calls (e)	Report Location (f)	source (g)	Comments (h)
21,160	A1	0772	1600–1615	CLP, JPK	—	5	
21,180	P9	0772 1072 1172	1200–1600	—	USSR	5	See also 21,100/21,390 /28,600kHz
21,185A	A1	0872	1015–1115	de HZUK	—‡	5	See also 21,125A/ 21,135AkHz
21,190	F1	XX72	0900–1730	RUF de RKD48	USSR	2, 5	B. S/P + M See 28,200 kHz
21,210	F1	1072	0900–1230	RCJ52 de RX137	USSR	5	B. S/P + M
21,230	F1	0772	1600–1700	—	USSR	5	S/P
21,270	A3	0872 1072	HX	Radio Tirana	Albania	2, 5	B. 3f 7,090 kHz
21,300	F1	XX72	0900–1630	RTU, RWF2 de RND79	USSR	5	B. S/P + M
21,320	A3a	1272	1130–1330	Moscow Radio Telephone Station		5	2f 10,660kHz
21,325	A1	0972	0800–0815	GRV	USSR	5	See also 21,050A/ 21,080AkHz
21,340	A1	0972	0900–1600	CQ de LKC	—	5	See also 21,090/ 21,100kHz
21,345	A1	XX72	0800–1315	de BIM41	China	5	B.
21,345	A1	0972	0800–0815	CQ de LKC	—	5	D. See also 21,090/ 21,100kHz
21,378	A1	0772	0800–0815	de BIL36	China	5	
21,380	F1	0872	1300–1545	—	USSR	5	P
21,390	P9	1172	0945–1315	—	USSR	5	See also 21,100/ 21,180/ 28,600kHz
21,400	F1	1172 1272	0900–1000	RWR2 de RPC27	USSR	5	B. Morse
21,405	F1	0872	1230–1530..	—	USSR	5	S/P
21,430	F1	1172	2200–2300	—	—	4	P, 2f 10,716 kHz
28,140	A3	0972	1800–1900,	Radio Moscow	USSR	5	3f 9,380kHz
28,200	F1	XX72	0800–1130	RKD48 de RUF	USSR	5	B. S/P + M See 21,190 kHz
28,200	A3	1072 1172	0800–1130	Radio Cairo	Egypt	5	B. 4f 7,050kHz
28,255	F1	0972 1072 1172	0800–1300	—	USSR	5	B. P
28,280	A3	0972	0800–1830	Radio Moscow	USSR	5	B.
28,300	F1	0972	0800–1400	—	USSR	5	B. S/P. 2f 14,150kHz
28,310	F1	XX72	0800–1400	—	USSR	5	P
28,350	A3	1072 1172	0900–1200	Radio Moscow	USSR	5	B. 3f 9,450kHz
28,360	A3	1072	1100–1830	Radio Tirana	Albania	2, 5	B. 4f 7,090kHz
28,385	A3	1072 1172	0800–1530	Radio Moscow	USSR	5	B.
28,410	A3	1072 1172 1272	0900–1315	Radio Moscow	USSR	2, 5	3f 8,470kHz
28,420	A3	0772 0872	1030–1915 1300–1830	Radio Nacional Espana	Spain	5	B. 4f 7,105kHz
28,432	F1	XX72	1200–1830	—	USSR	5	B. 2f 14,216kHz
28,470	A3	0972 1072	0800–0900	Radio Moscow	USSR	5	B. 3f 9,490kHz
28,480	A3	XX72	1000–1430	Radio Moscow	USSR	5	B. 4f 7,120kHz
28,480	A3	1072	1700–1800	BBC World Service	UK	5	B. 4f 7,120kHz
28,530	A3	0772 0872	0800–2000 1800–2200	Radio Moscow	USSR	2, 5	B. 3f 9,510kHz
28,545	A3	XX72	0800–1830	Radio Ankara	Turkey	2, 5	B. 3f 9,515kHz
28,555	F1	1072	0900–1200	—	USSR	5	P
28,600	A3	0972	0800–1330	Radio Moscow	USSR	5	B. 4f 7,150kHz
28,600	P9	1072 1272	1040–1245 0845–1030	—	USSR	2, 5	See also 21,100/ 21,180/ 21,390kHz
28,610	F1	1072	0800–0930	—	USSR	5	P
28,680	A3	0772 0872	1800–1900 1800–2200	Voice of America	Greece††	2, 5	B. 4f 7,170kHz
28.710	A3	XX72	0800–1830	Radio Moscow	USSR	2, 5	B. 3f 9,570kHz
28,720	A3	0972 1072	0800–1400	Radio Moscow	USSR	5	
28,740	F1	0772 0872	0300–0900	—	USSR	5	P

Freq (kHz) (a)	Emm (b)	Date (c)	Time (UT) (d)	Calls (e)	Location (f)	Report source (g)	Comments (h)
28,740	A3	0772	1900–2200	Radio Moscow	USSR	2, 5	B. 4f 7,185kHz
28,800	A3	0972 1172 1272	0900–1830	Radio Moscow	USSR	2, 5	B. 4f 7,200kHz
28,815	A3	0972	0800–1215	Radio Moscow	USSR	5	
28,845	F1	1072	0300–1500	—	USSR	5	P
28,860	A3	0772 0972	1400–1800	Radio Nacional Espana	Spain	5	3f 9,620kHz
28,880	A3	0772 0872	1400–2000	Radio Budapest	Hungary	5	B. 4f 7,220kHz
28,890	A3	0772 0872	1300–1400 0900–1400	Radio Sweden	Sweden	5	3f 9,630kHz
28,940	A3	0772 0872 0972	1500–2200	Rome Radio	Italy	5	B. 4f 7,235kHz
29,044A	F1	0972 1072 1172	0800–0900 0800–1200 0900–1000	—	USSR	2, 5	B. P
29,055	A3	0972 1072	0900–2300	Radio Moscow	USSR	4, 5	3f 9,685kHz
29.115	F1	0772	1800–1830	—	USSR	5	B. P
29,240	A3	0972 1072	0800–1800	Radio Moscow	USSR	5	4f 7,310kHz
29,320	A3	0972 1072	0900–1830	Radio Moscow	USSR	5	4f 7,330kHz
29,325	A3	0972	0800–1200	Radio Moscow	USSR	5	3f 9,775kHz
29,520	A3	0972 1072	1000–1500	Radio Moscow	USSR	5	3f 9,840kHz

Note. Radio Regulation 218 permits the use of 14,250–14,350kHz by the fixed service within the USSR.

Abbreviations used in table

Columns (a) and (h)
A—Indicates average frequency

Column (c)
XX—Station active throughout complete six-month period.

Column (d)
HX—Station active intermittently throughout 24 hours.

Column (f)
Administering country when different from country of location:
* USSR ** Morocco
† Middle East and Mediterranean Area. ††USA.
‡ Saudi Arabia

Column (g)
1—Amateur Radio Association of Bahrein
2—Deutscher Amateur Radio Club e.V.
3—International Frequency Registration Board (ITU).
4—E. H. Conklin, K6KA.
5—Radio Society of Great Britain
6—Radio Society of Rhodesia
7—Wireless Institute of Australia

Column (h)
B—Station heard on indicated frequency during previous periods.
D—Diplomatic.
P—Printer.
S/P—Scramble printer.
SP + M—Scramble printer and morse.
4/C—Four-character.
Arabic†—Commercial and para-military traffic in Arabic.
CENTO*—CENTO circuit, 45-50 baud printer uses international No 2 code, receive terminal Pakistan.
CENTO**—CENTO circuit, 45-50 baud printer uses international No 2 code, receive terminal Iran.

REPORTS, PLEASE

Frequency selection for AMSAT-Oscar-B (Oscar 7)

As at present envisaged, AMSAT-Oscar-B (A-O-B) will incorporate three communication translators—a 70cm to 2m translator and two covering the 2m to 10m range, one with somewhat higher power than the present Oscar 6 plus another, more or less identical to Oscar 6, which will be used as a "back-up" system should it become necessary during A-O-B's projected lifetime of three years. Of the three translators, only one will be operative at any one time.

Present plans call for the 70cm translator to incorporate an uplink range of 432·125 to 432·175MHz and a downlink range of 145·925 to 145·975MHz. The unit will employ frequency inversion, so that, neglecting Doppler shift, an input signal at 432·125 will be retransmitted by the satellite at 145·975; an input signal using upper sideband will be retransmitted as lower sideband. When this translator is in use, a telemetry and Codestore beacon will be heard at 145·980MHz.

The 2m to 10m translators will employ identical frequency bands. The uplink range will be the same as Oscar 6, 145·9 to 146MHz. As with Oscar 6, frequency inversion will *not* be used. The 2-10 mode will incorporate two beacons, as with Oscar 6—one at 435·1MHz, the other at a frequency in the 10m band to be decided.

In addition to the Oscar 6 configuration, in which a beacon at 29·45MHz is used in conjunction with a downlink range of 29·45 to 29·55MHz, two other alternatives are under active consideration. Were it to be deemed desirable for the beacon to remain at 29·45, the downlink range could be shifted to 29·35-29·45MHz. Alternatively, the beacon could be moved to 29·5 and the downlink placed at 29·4-29·5MHz. Many users have expressed regret that the Oscar 6 downlink extends above 29·5MHz, since tuning that range is inconvenient with several popular receivers in current use. As a consequence, Oscar 6 activity has been concentrated in the lowest 50kHz of its passband.

AMSAT welcomes comments and suggestions from the amateur community concerning these frequencies for Oscar 7. Please address comments to G2BVN, Region 1 IARU, 51 Pettits Lane, Romford, RM1 4HJ.

High frequency propagation experiment

On 30 June 1973 a total eclipse of the sun will take place which will be seen from Mauretania (West Africa), and more than 5,000 scientists and technicians will take part in experiments from observatories situated in Atar, Ouadane, Akjoujt and Chinguetti.

A high frequency propagation experiment in the amateur bands will be conducted by A. Duffau, 5T5AD, who will be staying in Akjoujt (Geographical coordinates 19° 44′N, 14° 25′E) for the duration of the eclipse with a station comprising a KWM-2 transmitter, a Hustler 4 ABV omni-directional aerial and a mobile power generator. This station will work with the special call sign 5T5SOL between 1000 and 1100UT, ie during a period beginning a half hour before the start of the eclipse and ending a half hour after its end. This duration will possibly be lengthened to an hour before to an hour after the eclipse, in order to get a better understanding of the evolution of the propagation conditions. There is a possibility of 5T5SOL working only as a propagation beacon if an automatic keyer can be located in time.

A frequency prediction for the period indicated above is in preparation and will be published in the near future.

It is expressly requested that the 5T5SOL working frequency be kept clear during the period of the eclipse.

The help of all amateurs is requested for this experiment which will certainly contribute to a better understanding of high frequency radio propagation.

Listener reports for the eclipse period should be sent to S. Canivenc, F8SH, 6 rue de Pont-Hélé 22700 PERROS-GUIREC, France, who will act as co-ordinator.

MICROWAVES—1,000MHz and up....

by DAIN EVANS, G3RPE*

Band planning on 12mm

There is an obvious advantage in planning bands at higher frequencies in terms of those used on lower bands: equipment for lower frequencies may then be used to provide calibration markers for free-running oscillators as well as to generate rf directly via multipliers.

The 12mm band now allocated covers 24,000 to 24,250 MHz. Allocating a sub-band as harmonics of 1,296MHz does not appear to have any advantages, and suffers two significant disadvantages:

(a) Neither of the closest harmonics falls within the band: 18 × 1,296 = 23,328MHz; 19 × 1,296 = 24,624MHz. In both cases the 1,296MHz driver would have to be retuned to cover the band, by 3–4 per cent for the 18th and 1·5–2·5 per cent for the 19th, and this could well be beyond the tuning range of some parts of the equipment.

(b) In the case of the 18th harmonic, which could involve multiplication stages of ×2×3×3, none of the intermediate stages fall within other amateur bands. With the 19th harmonic, no intermediate multiplying stages are possible.

Allocating on the basis of 1,152MHz, which is the common driver frequency for bands from 13cm to 3cm, has two advantages:

(a) The 21st harmonic falls within the band: 21 × 1,152 = 24,192MHz.

(b) The third harmonic of 1,152MHz, 3,456MHz, is already established as the preferred frequency on 9cm: a 9cm transmitter may therefore also be used as a driver for a ×7 multiplier to 24GHz. Alternatively, there may be advantages in using a ×7 multiplier first, to 8,064MHz, to be followed by a tripler.

These are both very real advantages, and it seems an obvious choice to plan on this basis. As regards the precise sub-band to be allocated, one suggestion is 24,190–24,200 MHz, which corresponds to a driver frequency of 1,151·91–1,152·38MHz. This fits in well with the current practice on microwaves; that is, to use crystals which nominally generate 1,152MHz, and rely on their inaccuracy to spread activity around multiples of this frequency.

It is to be noted that this band would be adequately protected by guard bands of 190MHz on the low side and 50MHz on the high side, which should be sufficient protection against equipment using free-running oscillators.

A case may also be made for using the bottom 50MHz of the 12mm band on the grounds that this is available on an international basis to amateurs. However, this approach has two disadvantages: it would involve slight retuning of the 1,152MHz driver on to 1,143MHz; it would also preclude equipment using free-running oscillators.

On balance, therefore, a reasonable plan would be to use the frequencies 24,190–24,200MHz for immediate work for both narrow- and wide-band equipment, with the option left open of using the lowest 50MHz for international working as this interest develops.

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

Microwave records

Already there are two amendments to be made to the table on page 202 of the March issue of *Radio Communication*. As reported in the January issue of *QST*, the 23cm record was raised on 26 October from 551 miles to 770 miles: WA2LTM using 200W to a 5ft dish worked W9WCD who was using 1,000W to a 7ft dish. Signal strengths were S4 to S6. It is worth noting that this size of equipment is becoming increasingly common in the USA.

The second record is 13cm e-m-e. On 22 November, K4RJ worked W6YFK over a distance exceeding 2,000 miles, well and truly breaking the 1970 record of 810 miles. This *QST* also reports some moonbounce activity on 50MHz, although the nature of this is not clear.

Activity

After a quiet time over the winter months, during which it has been possible to make a dent in the backlog of technical information sent in, it is nice to record the start of the new season's activity. G3KSU (IoW) is now on 3cm with a separate receiver and transmitter, both using Gunn diodes. A portable vhf receiver on about 100MHz is used as the i.f. amplifier, and the aerials are 20dB horns. Recently he worked G5HD (ex-G3ZKR) over a nine-mile path, and is now looking for schedules with stations line-of-sight to the Isle of Wight. He also reports that G2RY (Bridport) has got similar 3cm equipment going.

Another new 3cm station is G3WJG who now has what can almost be called a "standard" transceiver: a Gunn diode oscillator, a 30MHz i.f. and a small dish aerial. The i.f. is to the G3WDG design as recently published, but modified by changing the local oscillator at 19·3MHz to crystal-controlled, and using damping resistors to broaden the i.f. response.

Moving up on 3cm

One of the problems of 3cm is that while most wide-band activity is at present concentrated in the region 10 to 10·1GHz, that designated for narrow-band working is 10,368MHz and up (ie 8 × 1,296MHz or 9 × 1,152MHz). The reason for initially working at the low end of the band was that much of the early equipment was based on klystrons of the 723A/B type which are difficult to pull to frequencies much above 10,100MHz. Now that Gunn diodes are perhaps in more general use it may be an appropriate time to consider moving wide-band operations up in frequency to that used for narrow-band equipment. This move would have two important advantages: it would make wide-band and narrow-band equipment more compatible; and it would facilitate the use of existing crystal-controlled equipment at lower frequencies to provide frequency markers for wide-band equipment.

Any move, and its timing, must obviously depend on the number of operators who would be embarassed by such a change. Readers are invited to give their comments.

The "yet another" keyer

by R. G. WHEATLAND, G3SZW*

Introduction

This article describes an easy-to-build keyer with the following characteristics:

1. A supply of 8 to 12V positive may be used, as the keyer has a built-in voltage stabilizer;
2. Shortened dots or dashes cannot be made;
3. Readily available components are used throughout;
4. The component layout is not critical, so the constructor may make the best use of available parts;
5. The pulse speed is continuously variable over the normal operating range.

The circuit

The heart of the keyer is a pulse generator producing clock pulses at a controllable rate of 6 to 60pps. The circuit is shown in Fig 1. A 100kΩ potentiometer, R3, allows variation of the pulse rate frequency (prf).

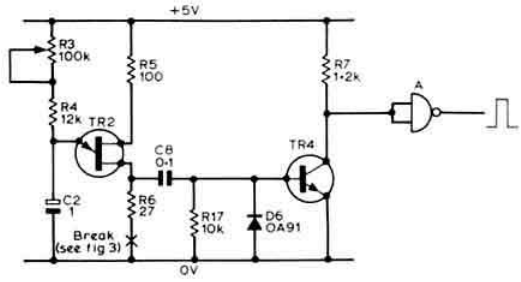


Fig 1. The pulse generator

Morse characters are generated from the clock pulses using D-type flip-flops wired as T type. Fig 2 shows the basic arrangement required to produce dots. When S1 is closed, the flip-flop is clocked by the output from gate A, and the prf is divided by two. The truth table for this situation is given in Table 1(a). With this simple circuit, however, if S1 is made and broken very quickly a shortened dot would result. In order to ensure that a dot of exact length is formed, independently of the length of time for which S1 is closed, some additional circuitry is required, as shown in Fig 3.

The aim is to hold the preset pin of the flip-flop at +5V while the dot is in progress, even though S1 may be open. R8 is adjusted from maximum until the clock starts reliably

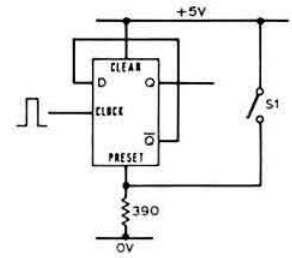


Fig 2. The basis of the morse character forming circuit

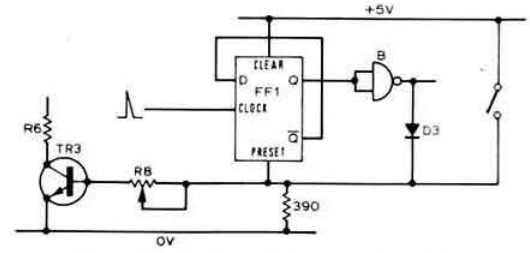


Fig 3. Practical circuit for generating dots

every time S1 is made. In the prototype the optimum value of R8 was 22kΩ.

A further flip-flop, FF2, is used to generate dashes (see Fig 4). This is clocked by the $\bar{Q}$ output of FF1, and the two Q outputs are fed to gate B. The truth table for this arrangement is shown in Table 1(b). It will be seen that by using Q2 output to hold off gate B after pulses 1 and 2, the output from the gate is a dash which bears the correct length relationship to the dot (ie three times as long). The additional components ensure that the pulse duration is not degraded when S1 is opened prematurely. The two flip-flops, FF1 and FF2, are contained in an ic type ZN7474; while the four gates A, B, C and D are in a ZN7400.

The final part of the circuitry (see Fig 5) contains the driver and associated relay. During assembly, R11 is a 50kΩ potentiometer, which is adjusted from maximum until TR5 bottoms hard when S1 is made, and then replaced by a fixed resistor of the measured value; in the prototype this was 3·3kΩ. R12 is chosen in the same manner, with S1 in the

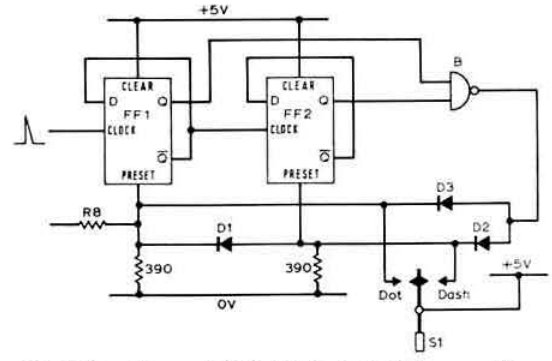


Fig 4. Development of Fig 3 to include dash generation

* 17 Bennings Close, Bracknell, Berks.

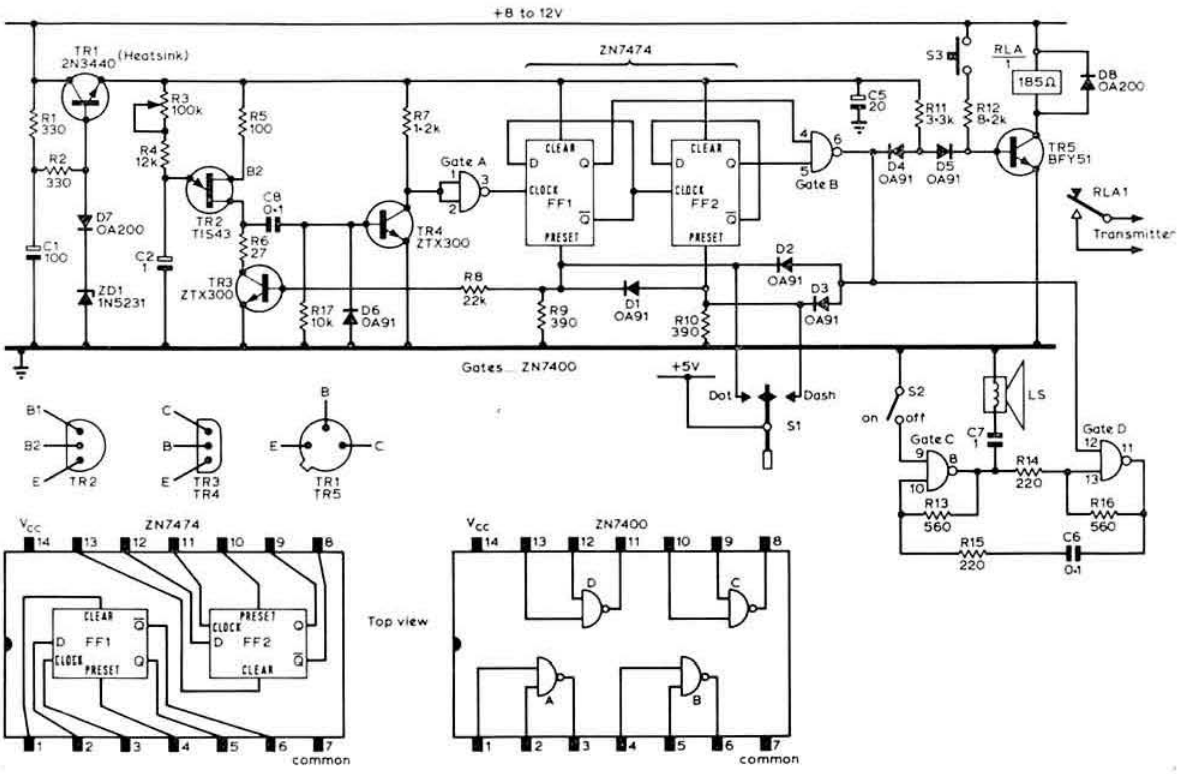


Fig 5. Complete circuit of the keyer. Note the optional monitor circuit using Gate C and Gate D of the ZN7400

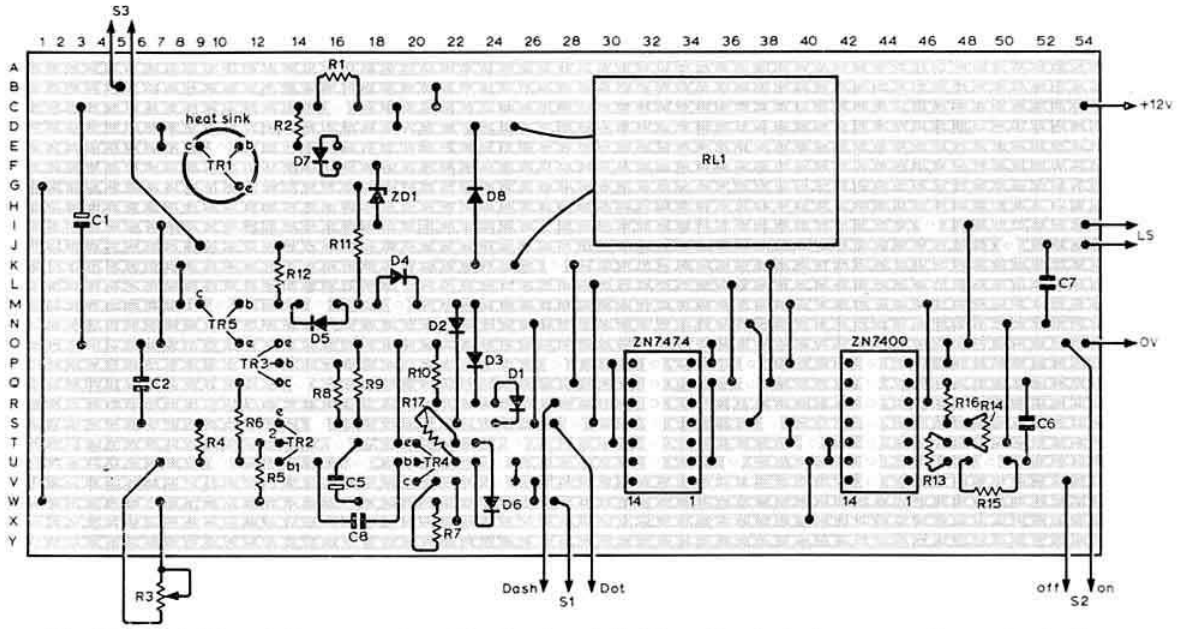


Fig 6. Suggested layout of components on 0·1in Veroboard. Position of breaks in the copper strip are clearly shown

Table 1. Truth tables

(a) Dot (FF1)

Pulse No	Q	$\overline{Q}$
0	1	0
1	0	1
2	1	0

(b) Dash (FF1 and FF2)

Pulse No	Q1	Q2	B
0	1	1	0
1	0	0	1
2	1	0	1
3	0	1	1
4	1	1	0

neutral position and S3 closed. In the prototype R12 was found to be 8·2kΩ. S3 is for transmitter tune-up purposes.

The stabilizer enables any supply voltage from +8 to 12V to be used. As the keyer draws about 100mA it is necessary to mount TR1 in a heatsink. The values of R1 and R2 are calculated from

$$R1 + R2 = \frac{(V - \Delta V - V_0)}{I_0} \cdot h_{FE\,min}$$

$$= 0{\cdot}6k\Omega$$

This simple stabilizer provides adequate regulation under slow dash working conditions, holding the +5V line steady.

Construction

The unit is easily built up on 0·1in Veroboard, and a suggested layout is shown in Fig 6. Switch S1, the dot/dash key, and R3, the speed control, are mounted off the board, and may be positioned to suit the case being used and the operator's preference.

Parts list

R1, 2	330Ω	**C1**	100µF
R3	100kΩ	**C2, 7**	1µF
R4	12kΩ	**C3, 4**	1,000pF
R5	100Ω	**C5**	20µF
R6	27Ω	**C6, 8**	0·1µF
R7	1·2kΩ	**D1, 2, 3, 4, 5, 6**	OA91
R8	22kΩ	**D7, 8**	OA200
R9, 10	390Ω	**ZD1**	1N5231
R11	3·3kΩ	**TR1**	2N3440
R12	8·2kΩ	**TR2**	TIS43
R14, 15	220Ω	**TR3, 4**	ZTX300
R13, 16	560Ω	**TR5**	BFY51
R17	10kΩ	**FF**	ZN7474
All resistors 5%, ¼W		**Gates**	ZN7400
		LS	8Ω

RL1 Varley VP4CBB12, 185Ω
S2 SPST
S3 PB switch
Heatsink Redpoint type 5F
Veroboard, 0·1in spacing, 5in by 2·5in

The monitor circuit, which takes advantage of the two unused gates of the ZN7400, is an optional extra. If it is required, the controlling switch S2 may be mounted off the circuit board.

In general, most of the components are best mounted in the upright position. The copper strips on the underside of the Veroboard can be broken where indicated with a ⅛in drill slowly rotated between the fingers.

The keyer should be enclosed in a metal box, and the paddle contacts decoupled with 1,000pF capacitors.

The author wishes to thank G3TAI for encouragement and thorough testing of the keyer.

All band portable aerial

by H. S. BROWN, G3RFG*

DURING the past six years the author has used many types of portable aerial including long wires that needed some convenient trees or buildings for support, and sky hook aerials using kites or balloons. His present portable aerial, which has proved to be both mechanically and electronically efficient, is designed around interchangeable coils and element lengths, selected to suit the band in use.

Primarily the aerial consists of three lengths of 20 gauge aluminium tubing of 1in diameter, two coils and a base plate that acts as insulator and earth connector. The earth rods double as guy pegs for aerial support. The aerial can be erected by one person in approximately 10min. The overall construction is shown in Fig 1. It will be seen that the lengths of aluminium tubing are linked by a piece of ⅞in diameter Perspex, which is a close inside fit. The selected coils are constructed to fit over this link, and are electrically connected to the aluminium.

Tests with an impedance bridge indicate that the base impedance varies between 25 and 35Ω and vswr checks indicate that the worst figure is 1·3 to 1 using 50Ω coaxial cable as a feeder.

* 36 Three Star Caravan Park, Lower Stondon, Beds.

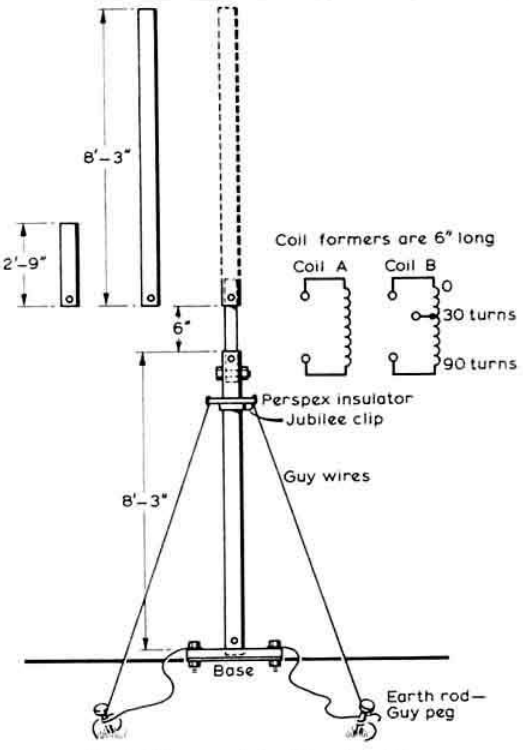


Fig 1. The complete all band aerial

The aerial is adjusted to the desired band as follows:

28MHz .. 8ft 3in section only.
21MHz .. 8ft 3in + 2ft 9in sections (linked).
14MHz .. 8ft 3in + 8ft 3in sections (linked).
7MHz .. 8ft 3in + coil "A" + 8ft 3in sections.
3·5MHz .. 8ft 3in + part of coil "B" + 8ft 3in sections.
1·8MHz .. 8ft 3in + all of coil "B" + 8ft 3in sections.

Construction

The coils are constructed as follows:

Coil "A" consists of 24 turns of 10swg copper wire wound on a 2in diameter former and the turns spaced over 5½in of the length.

Coil "B" consists of 90 turns of 20swg enamelled copper wire close wound on a 2½in diameter former and tapped at 30 turns for the 3·5MHz band. Both coil formers are exactly 6in long, made of Paxolin, and have discs in the end of the coils. The centres of the discs are drilled out to ⅜in diameter to fit over the ⅜in diameter centre Perspex rod of the aerial system, (see Fig 1). The discs themselves are glued and pinned to the coil former.

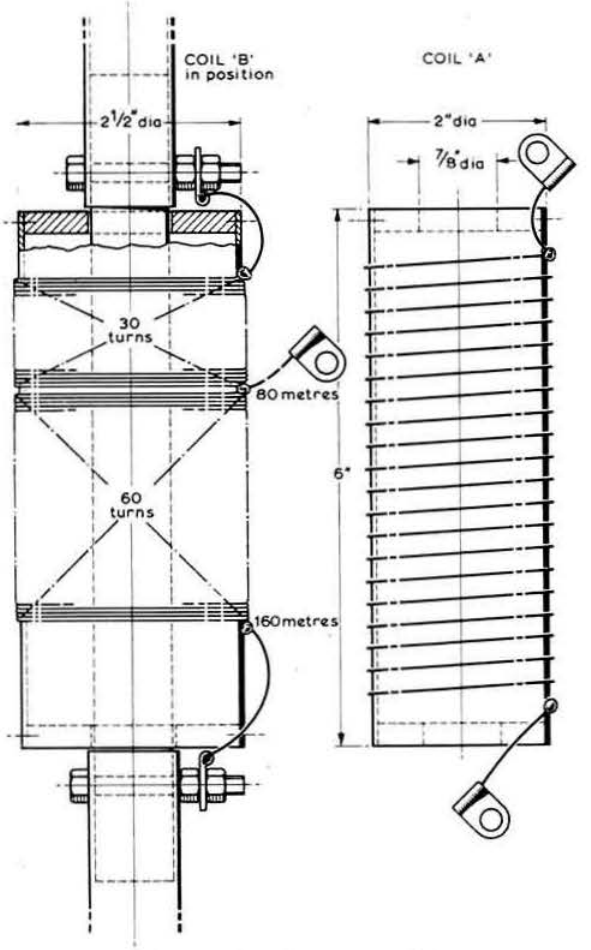


Fig 2. Coil construction details

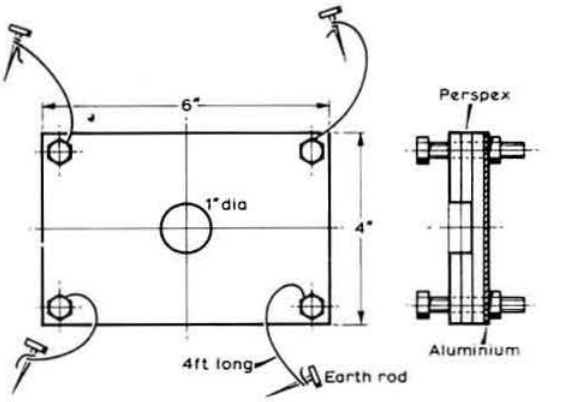


Fig 3. Detail of base plate construction

Fig 2 shows the method of construction of the coils.

The base plate is made from ¼in or ½in Perspex. From Fig 3 it can be seen that the top two pieces of Perspex have 1in diameter holes drilled into them but the third piece is left whole to act as the base insulator. The bottom sheet (of aluminium) acts as a connection between the four nuts and bolts and strengthens the base as a whole. The four bolts are left long in order that they press into the ground to prevent the base from moving. The 4ft lengths of flexible lead are made from thick copper braid covered with the outer sheath of some old coaxial cable.

A 2½in by 2½in piece of Perspex acts as a spreader and aerial insulator and has a 1in hole drilled into the centre and four small holes drilled in the corners to which are tied four 10ft lengths of nylon cord to act as guys. The aerial insulator is passed over the lower 8ft 3in section of the aerial and secured by a Jubilee clip at a height of about 8ft.

Assembly and erection procedure

To erect the aerial proceed as follows:

(*a*) Make up the aerial to the required band.
(*b*) Set the base plate in the desired position.
(*c*) Stretch out the four lengths of earth line and knock in the earth rod/guy pegs.
(*d*) Tie two of the nylon guys to two of the earth rod/guy pegs.
(*e*) Insert base of aerial into the base plate and hold it in the vertical position by pulling on the other two guys.
(*f*) Tie one nylon guy to the third earth rod/guy peg.
(*g*) Tie the fourth guy to the last peg and square all up as required to keep the aerial in the true vertical.
(*h*) Connect the feeder inner to the aerial and the outer braid to one of the nuts and bolts of the base plate.

It can be observed that if additional guys are secured near the top of the 16ft 6in section, the aerial can double as a good mast for a 2m Yagi array.

Results obtained during portable operation with this aerial fed with approximately 20W of rf have been extremely satisfying and rewarding for the effort made in construction.

Materials and supplies

The ⅜in diameter rod which joins the two aluminium parts of the aerial could equally well be made from ebonite, Paxolin, or any good insulating material. All the insulating materials mentioned may be obtained from Glazer Plastics Ltd, 15 High Road, Willesden Green, London, NW10 2PG.

TECHNICAL TOPICS

by PAT HAWKER, G3VA

THERE are two approaches to designing and developing amateur radio equipment—both of which have their merits. One is to concentrate on well-tried and tested circuits and techniques while endeavouring to improve the operational, mechanical and economic aspects of the unit as a whole. The other is to seek to develop fresh ideas and new circuit techniques, if possible in advance of the herd and the market place. This month we provide information which should prove useful to those interested in both these concepts —and for good measure throw in a few items of interest to those who may not want to develop anything just now but like to keep in touch with the technology.

Direct-conversion ssb receivers

Nearly three years ago (*TT* September 1970) the view was expressed that direct-conversion receiver techniques were by no means limited to the simple forms which were already by then becoming well known for portable and QRP transceiver applications. At that time we gave some notes and circuits of an advanced two-phase ssb receiver developed by PA0KSB, based on the same form of phasing and quadrature techniques used in phasing-type ssb exciters. These circuits, including the critical 90° af phasing networks, have since been included in *ART4*; another two-phase design, based on packaged B&W phase-shift units was described by R. S. Taylor, W1DAX, (*QST* September 1969 and *TT* November 1969). PA0KSB reported achieving almost 40dB of unwanted sideband suppression; this requires careful adjustment and 30-35dB is more typical. Generally, however, there has been little follow-up on these two-phase ssb direct-conversion designs, and for most amateurs the d-c receiver has apparently been relegated to the role of a cheap and cheerful modern equivalent of the old "straight" receiver—surprisingly effective for some applications but not to be regarded as a real threat to the supremacy of superhet designs. And certainly one must not expect too much from simple d-c receivers based on a mosfet product detector, usually with a very elementary low-pass filter and often suffering from breakthrough of strong broadcast signals, particularly on 7MHz.

But always nagging away at the back of the mind are the basic advantages of the direct-conversion approach (see for example my views in a two-part survey article in *Wireless World*, September and November, 1972). These advantages include the absence of many forms of spurious response (including image and birdies), the complete elimination of high-cost i.f. filters, and suitability for implementation by means of integrated circuits. What has been lacking—at least until very recently—has been an effective approach that avoids the use of precision phase-shift networks. Two-phase ("outphasing") systems even for ssb generation have never proved really popular with home constructors.

Now the answer seems to be looming up over the horizon: the ac-coupled "third method" ssb direct-conversion receiver. A vhf third-method receiver was described by Dr S. R. Al-Araji at the Swansea 1972 conference on radio receivers; a survey of d-c systems by Helmut Spiele, DL6FY, in *Old Man* No 3 1973 reprinted from *DL-QTC* (date unknown) pays particular attention to the third-method approach; and now a most persuasive paper—including an important suggestion on the use of ac coupling—appears in *The Radio and Electronic Engineer* (Vol 43 No 3 March 1973, pp 209–215) by Dr S. R. Al-Araji and Professor W. Gosling reporting on further work carried out at the University College of Swansea. This paper includes circuit details of both two-phase and third-method receivers for vhf applications, but makes it clear that the basic techniques are equally applicable at hf.

The third-method of ssb generation and demodulation was first described by D. K. Weaver in *Proc IRE*, December 1956, though the basic principle stems from a bandpass filter technique of N. F. Barber, *Wireless Engineer* Vol 24 p132 1947. For this reason you may find such designs called Barber or Weaver receivers. The third-method configuration is outlined in *Radio Communication Handbook*. Briefly it uses four balanced mixers, one set operating at af, and two low-pass filters but *no* af 90° phase networks: the basic arrangement of the third-method d-c receiver is shown in Fig 1(b). Fig 2 (from *Radio and TV Engineers Reference Book*) shows the third-method applied to ssb generation, complete with the mathematics.

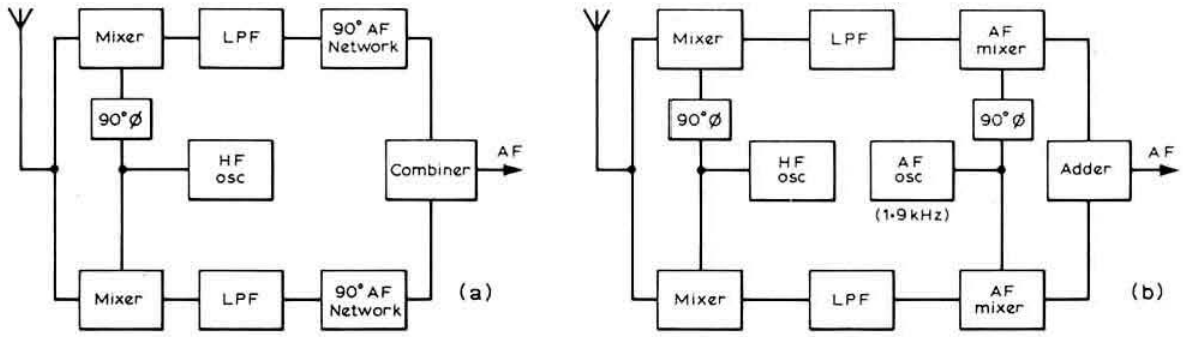


Fig 1. (a) Block outline of two-phase ("outphasing") form of ssb direct-conversion receiver. (b) Block outline of third-method (Weaver or Barber) ssb direct-conversion receiver

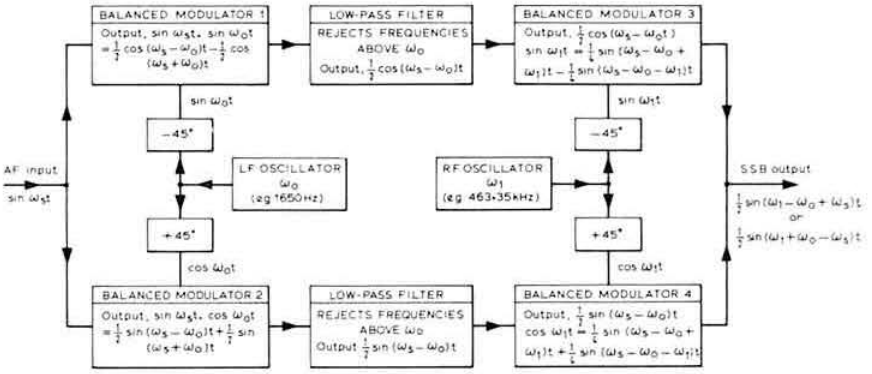


Fig 2. The third-method of ssb generation as used in hf transceiver showing the mathematics of this system. In this case the oscillator phase shifts are shown as two times 45° but this can alternatively be in the form of two 90° shifts. No precise broadband audio phase-shift networks are needed. Reversing the output of balanced modulator 3 or 4 gives choice of upper or lower sideband
(From Radio & TV Engineers Reference Book 4th ed)

Why all the excitement about third-method direct-conversion? What can it do that the superhet or two-phase receiver cannot? And what about all those extra mixers and the need for an af oscillator? To attempt to answer these questions, here are some brief extracts from the paper by Al-Araji and Gosling:

"Although the superhet has been brought to a high state of development it appears to be approaching a limit to further advance . . . in congested radio bands spurious responses have been shown to be the limiting factor to receiver performance . . . both the phasing and the Weaver direct-conversion receiver share a major advantage over the superheterodyne in that they have many fewer spurious responses . . . direct-conversion receivers should be cheaper to construct than superhets of similar specification for a number of reasons—because of the reduction in spurious responses, pre-mixer rf filter specifications can be less stringent; i.f. amplification (at af) uses low-cost af monolithic circuits and does not require tunable components, filtering is by fixed and relatively cheap, low-pass components . . . for all these reasons designers of receivers for ssb applications ought to give serious consideration to the use of the direct-conversion principle."

The paper stresses a number of advantages of the third-method dc receiver over the two-phase approach; it can have better adjacent channel rejection and its spurious response does not contribute interchannel crosstalk. However, a disadvantage of the direct-coupled receiver (ie direct coupling between first and second mixers in each leg of the i.f. network) is that any drift out of balance of the second mixers results in the af oscillator note appearing in the af output, imposing the need for very high stability of these mixers. Theoretically, dc coupling is necessary since any component of the received signal which is at the centre of the received spectrum (ie coincides with the first oscillator frequency) gives rise to a dc component in the output of the first mixers. If ac coupling (ie by transformers, capacitors etc) is used, a deep null appears in the centre of the audio spectrum (Fig 3)—this may not seem elegant but in fact it has virtually no effect on the intelligibility of the signal provided that it is fairly narrow (say between 200 and 500Hz). The paper suggests that ac coupling completely overcomes the problems caused by drift, and allows the ultimate sensitivity of the receiver to be set by the noise level of the early stages. The first pair of mixers need not be balanced; mixer design should preferably be based on devices which have relatively little $1/f$ noise, such as junction FETs. In the Swansea vhf designs CA3049 devices are used as first mixers, MC1596 as second mixers, with 741 amplifier and "active" low-pass filters interposed. The third-method allows very effective use to be made of af filters to determine overall selectivity of the receiver.

The results already achieved at Swansea must certainly encourage us all to look at these techniques to see what they have to offer for high-performance hf and vhf receivers—and obviously there is still plenty of scope for pioneer development work.

In this connection I would like to add a further suggestion. The third-method of ssb generation and demodulation has always lent itself well to a transceiver approach. In the late 'fifties Redifon developed a professional hf transceiver which was based on an early fully-transistorized third-method generator/demodulator working at 465kHz in a compact unit (see *Wireless World* January 1959 for a detailed account of third-method principles and operation of this unit, from which Fig 2 is derived). This suggests that just as the simple d-c receiver readily forms the basis of economical cw transceivers, so could a third-method ssb d-c receiver form the heart of a very economical ssb/cw transceiver. Anyone prepared to take up the challenge?

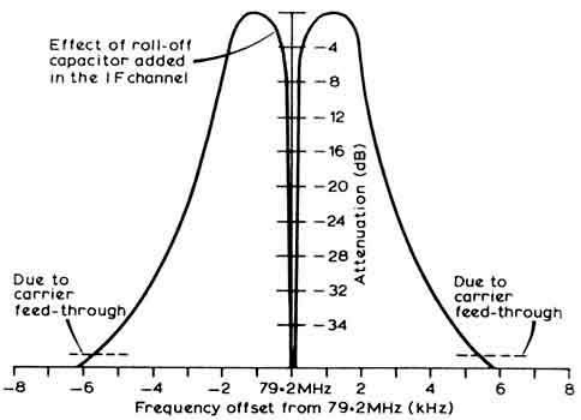


Fig 3. Response curve of an ac coupled third-method receiver showing the deep null in the centre of the band; this does not affect intelligibility and makes the "drift" of the final pair of balanced mixers much less important

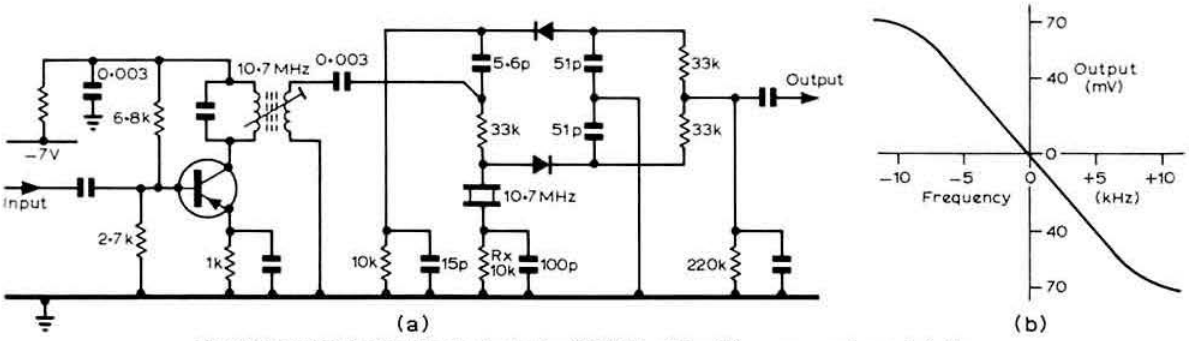


Fig 4 (*a*) **Crystal limiter/discriminator for 10·7MHz nbfm.** (*b*) **response characteristics**

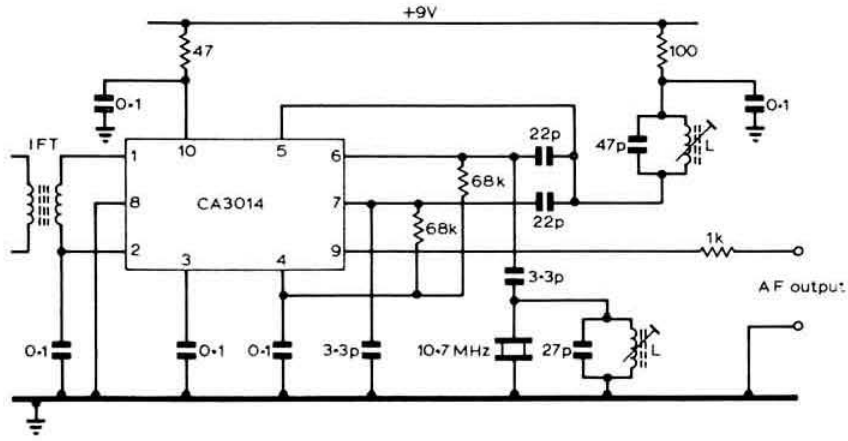


Fig 5. Crystal limiter/discriminator for 10·7MHz as used in uhf equipment

More on nbfm crystal discriminators

In the March *TT*, information was given on the use of quartz crystals in discriminators for nbfm reception; in doing so the question was asked whether any readers could provide further details of such units.

In response, George Jessop, G6JP, has come up not only with the circuits of two such discriminators, both stemming from commercial mobile equipment, but also fully endorses the view that this approach is particularly valuable for any nbfm receivers adopting a 10·7MHz final i.f. to avoid the problems so often involved in multiple conversions. Indeed G6JP says that "after considerable search, I am convinced that this type of discriminator is about the only one good enough for real narrow-band operation at 10·7MHz".

He mentions that the circuit shown in Fig 4(a) was clearly designed some while ago, since the limiter stage uses a 2N937. The excellent characteristics of this discriminator are shown in Fig 4(b), obtained using a Polyscope. If the resistor Rx is short-circuited the curve becomes much steeper and some care is needed to reduce the slope to suit operational requirements. As G6JP puts it: "obviously no ordinary LC circuit can approach this performance."

The second discriminator is shown in Fig 5. This one comes from a fairly recent STC uhf transceiver which has a second i.f. at 10·7MHz including a crystal selectivity filter followed by a CA3028A amplifier which is transformer-coupled to the CA3014 amplifier/limiter/discriminator. The two LC circuits are adjusted for maximum audio output consistent with a symmetrical waveform.

Lower cost power FETs

Some good news for readers who have been following recent *TT* comments on the use of power FETs in balanced and double-balanced mixers of wide dynamic range. Ed Oxner (*not* Oxley as stated in the March *TT*) writes to report that Siliconix are currently preparing data sheets not only for the metal-can (TO52) series of U310-type junction FETs but also epoxy (E310) versions at prices well within reach of the amateur. The E310 will, in fact, be marketed in the USA at under $1, though we have no information on UK prices or just when these devices will be available here.

The company is also going to market U310-type "duals" (that is, two similar FETs within a single device—in both metal-cans (TO78) and epoxy (TO105) encapsulations—and suitable for single-balanced mixers made on printed circuit boards). These will have a special pin arrangement well suited for this purpose: source-gate-drain-drain-gate-source.

It could well be that the E310 type of device could also find useful applications in transmitter exciters though this is not mentioned by Ed Oxner.

Oscillators for vhf converters

As a result of building a G3HBW-type vhf converter, W. H. Bond, G3XGP, has developed some interesting views on oscillators, phase-lock loops and phase comparators. This month we include two of his circuits, those concerned with providing a suitable injection signal for the 40602 dual-gate mosfet mixer.

The original design (*Radio Communication* June 1969, p381) uses another 40602 as an oscillator/doubler and results in the constructor having to face the problem of getting possibly a junk-box 14·775MHz crystal to fire on its fifth overtone without affecting the mosfet's efficiency as a doubler. It can be done, but it can be tricky unless the crystal is very active. G3XGP found that increasing feedback from gate 2 to source helps, but only at the expense of providing a lower injection voltage.

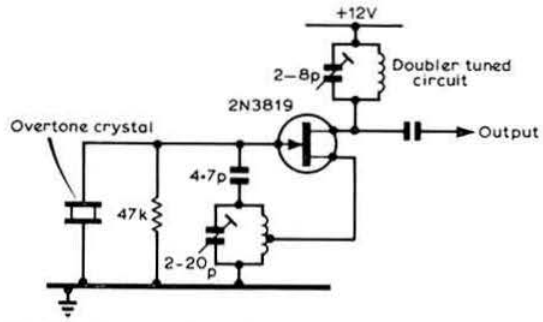


Fig 6. Overtone oscillator/doubler used by G3XGP in G3HBW-type 144MHz converter

So as an alternative, G3XGP abandoned the dual-gate mosfet as oscillator and in his search for a simple substitute worked out on paper the arrangement shown in Fig 6. To his considerable satisfaction, in practice this fired first time. Although it looks rather like a Colpitts oscillator, it is, he points out, in reality a Hartley since the 4·7pF capacitor is providing isolation only, and the feedback is controlled by adjustment of the tap on the inductor. He finds that the average 2N3819 likes to run at about half Idss; this is readily found by connecting source to ground to find Idss (zero-gate-voltage drain current) and then dabbing the lower turns of the inductor with the tap, starting at the lowest position. This circuit has the virtue of safety (in that junction FET gates are not easily blown up), economy, requires few components and offers simplicity. Shunting the drain to source with a 2·2pF capacitor brings it firmly into series resonance at the chosen harmonic and makes it easy to get going for those who do not have a frequency meter available.

G3XGP has tried the circuit with a junk-box 14·775MHz crystal, a good 73·9MHz crystal and a junk-box 83MHz one, all double satisfactorily in the drain tank circuit. Fig 7 shows how a separate doubler could be used, but there seems little advantage in doing this since both arrangements seem to provide about 1V rms output—although possibly it is easier to set up with limited equipment. The coil details are approximately 7 turns 20 swg $\frac{5}{16}$in diameter tapped at 2$\frac{1}{2}$ turns, and 5 turns 20 swg $\frac{1}{4}$in diameter.

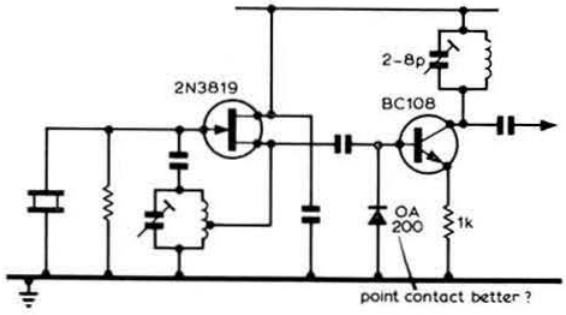


Fig 7. Alternative arrangement to Fig 6, using separate doubler stage

Combating corrosion

From Bob Roberts, G2RO, comes some information on a method of protecting beam elements against atmospheric corrosion which can be a powerful enemy of such elements in industrial or coastal areas. Particular danger points, he writes, are the screws or clamps which join the element sections together, the coaxial and balun connections, and the threaded ends of the U-links which secure the rotators and booms.

He has found that a useful brush-on material which cures to a tough, strongly-adherent rubbery skin (which protects and encapsulates the material on which it is put) is Dow Corning silicone rubber coating 3141 RTV. A 3oz tube, which can be stretched to protect one hf beam aerial, costs £1.75 and is available (COD if required) from British Central Electrical Co, Briticent House, 16–26 Banner Street, London EC1. Acetone (from any chemist) is a suitable final cleansing agent before application.

Epoxy filler adhesives

David F. Whiting, BRS33453, comments informatively on the recent suggestion (*TT*, February) by GM3RKO of using Cataloy as a pill-box "filler" for remote field strength indicators or other out-door units. While he believes that GM3RKO was on the right lines, he feels that it would be better to use one of the epoxy-type filler adhesives. These do not suffer from the drawback of producing heat during curing to the extent that Cataloy does.

BRS33453 lists the more popular and readily available epoxy adhesives, in order of cheapness:

Plastic Padding (hard or elastic): readily available at most hardware shops; sets by acid reaction and is totally water-proof, acid-proof and rigid. Perhaps its most significant advantage is that, once hard, it can be drilled, tapped or machined like steel.

David's Isopon This is almost identical to plastic padding but tends to be far less easy to mix.

Araldite This is perhaps the strongest of any of the materials but also the most expensive; it has extremely high electrical resistance and great durability. It is also a very powerful adhesive and could prove useful for component parts that cannot be bolted or soldered in place, or need to be fixed to, but insulated from, the rest of the equipment. Details on using Araldite for various applications, including the moulding of high-voltage insulators, can be obtained from CIBA Chemicals at Cambridge.

BRS33453 thinks that application notes may also be available on Plastic Padding or Isopon.

State-of-the-art microwaves

We have no intention of straying into G3RPE's pastures but it is difficult to refrain from commenting on some microwave developments which have come to our notice recently for professional applications, and which show how quickly the power levels of solid-state microwave devices are rising.

First Gunn diodes: these are generally thought of as devices delivering perhaps a modest 10mW or so of power. Recently at the Mullard Research Laboratories at Salford an account was given of new Gunn diodes which employ improved techniques for heat dissipation. The result is a series of devices which can deliver a solid 1W of cw power at about 7GHz.

Next avalanche amplifiers: Microwave Associates are now supplying for such applications as microwave links for communications or television avalanche amplifiers which provide 3W output at 6–7GHz or 500mW output at 12GHz.

And finally, a linear transistor amplifier capable of delivering 8·3 to 11·5W over the range 980 to 1,960MHz is described in *RCA Review* December 1972.

Amitron crystal checker

In the January *TT* we included the circuit diagram of a useful-looking crystal checker which had been described by F3RH in *Radio-REF*. What we did not appreciate at the time was that this particular design is in fact one of the series of Amitron kits (UK465: crystal test kit). The Amitron range, which includes many other test instruments, power supply units and all types of radio and electronic units, is currently being introduced into the UK by Amitron UK, 4 & 7 Castle Street, Hastings, Sussex, and will be sold through retailers. Basically Amitron is a subsidiary of GBC Italiana of Milan, Italy, although the kits sold in the UK are being prepared in this country. One gathers that they plan to introduce about 100 different kits during the next few months.

Building a delta-loop quad

Harry R. Habig, K8ANV, who developed the HRH delta-loop beam, first described in *QST*, January 1969 (and see *ART3* or *4*), wrote last year to mention that he receives many letters from amateurs wondering how to get over the problem of putting up a 14MHz "plumber's delight" delta-loop beam, with their long V tubes which are joined at the top with wire.

As a result he made up a scale model of a lattice tower and rotator and arranged a series of photographs to show that with the proper aids it is relatively easy to get one up, even the large 14MHz types—but he advises the use of the mast-to-boom fitting and a "helper" tube. He also advises constructors to note the final location of the grounding on the gamma match. By having the coaxial braid connecting the elements at the apex of the elements he considers that it is possible to achieve a really flat line and cold braid. After many tries with a variety of tubing materials for the dielectric, he found ordinary pure laboratory gum rubber heavy tubing to be the most long lasting in bad weather.

The rubber tubing is unbroken, it runs from the top of the $\frac{1}{4}$in diameter solid aluminium rod (sealed at the upper end) through the gamma fitting at the boom and extends some $\frac{1}{16}$in beyond the end of the fitting; by removing the two little bosses on the line fitting and drawing up the ferral, one then has an excellent "O" ring to effect a really good water seal. The aluminium rod is drilled and split at the coaxial end to receive the male stud on the line fitting; in this way there is no possible way for the weather to cause trouble. The hole in the gamma coaxial fitting is drilled smaller in diameter than the outside diameter of the rubber tubing, which is a snug fit on the $\frac{1}{4}$in rod; thus one stretches the rubber tubing and inserts it through the fitting, positioning the end of the centre rod with relation to the end of the fitting; then *releasing* the tension on the tubing and working it and the rod a little to allow it to set in the fitting, rather like the rubber fitting in the spring shackle of a car. The rubber tubing is then cut (square) about $\frac{1}{16}$in longer from the end of the fitting to form the "O" ring.

This may seem a little confusing and probably anyone tackling a large delta-loop beam would be advised to consult also the original *QST* articles. But it is hoped that this extra information will be of interest even to those content with a less ambitious 21MHz aerial, or the delta-birdcage type of aerial. We are grateful to Harry Habig for supplying the details and photographs.

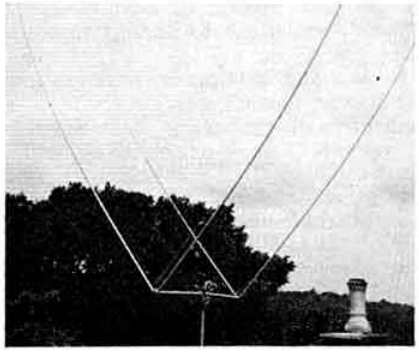


Photo 1. Actual installation. The saddle mounting of the boom-to-mast fitting allows the boom to be rotated for easy work on the elements; the boom can also be lowered down parallel to the mast if necessary. In this instance the feed line runs up inside the 2in diameter mast. The rotator is located on the attic floor, and a 360° rotary coaxial fitting allows the aerial to be swung round and round

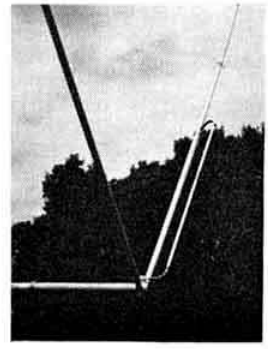


Photo 2. The gamma feed is spaced 4in from the element and on this 14MHz aerial has a total length of 46in

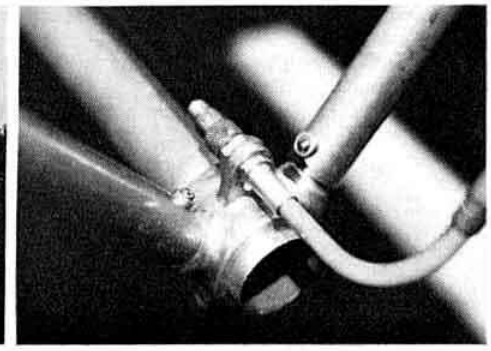


Photo 3. Element-to-boom fitting for 14MHz aerial. Tubing diameter at the base is 1¼in od 0·058in with a second inside tube od 1⅛in. The large tube is 6ft long and the 1⅛in tube 12ft with the 28MHz/12ft/1in tube added to the upper part, making the total element length 23½ft long. Note the earthing of the gamma feed to allow a truly flat line

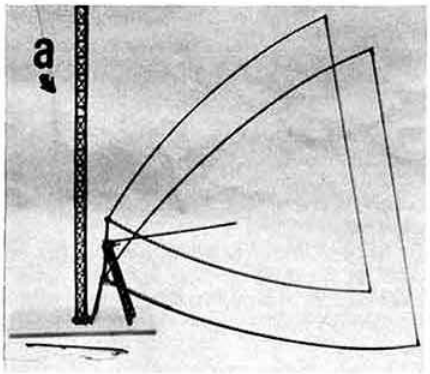


Photo a. Tools needed to instal the delta loop on the tower are: a step-ladder; a gin pole with top pulley; a helper pole made from a 10ft length of 1¼in thinwall electrical conduit having two-screw split clamp on one end to fit the outer-diameter of the boom tube; and enough rope to reach from ground to tower top and back to ground. Assemble the beam on the ground with the mast-to-boom fitting in place. Mast stub facing towards the top centre of the elements; helper pole facing the same way and fastened opposite to the gamma-feed side in order to clear the tower side when the mast stub is installed in the rotor head. This means the helper pole will be facing downwards and close to the tower

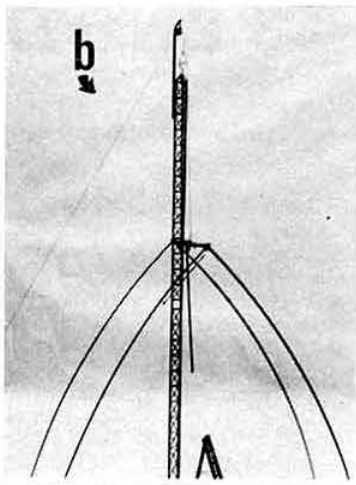


Photo b. At this stage the gin pole has been fastened in place and the rotor installed on the tower stub. The rope has been lowered and fastened to the centre of the boom ready for raising

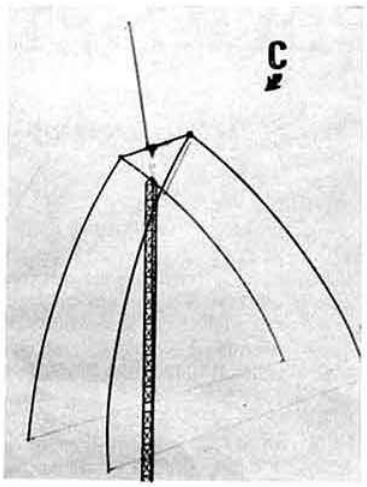


Photo c. The mast-to-boom fitting; mast stub has been lowered into the rotor head and fastened. The rope has been removed from the gin pole and lowered to the ground, and then the rope fastened to the helper pole. The screws on the helper pole are loosened and the pole swung to an "up" position and the screws tightened. The screws tightening the boom-to-mast fitting are then loosened just enough to allow the boom to rotate in the fitting. The helper on the ground then pulls on the rope and brings the beam into its correct "up" position, plumbing it at the same time. The screws on the mast-to-boom fitting are then tightened—and the beam is up

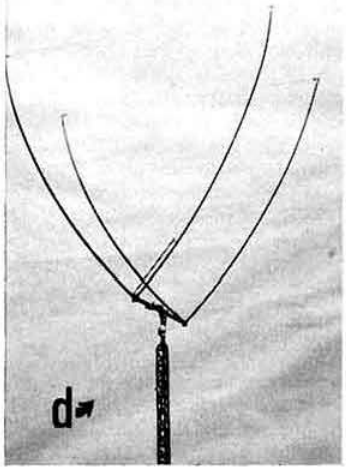


Photo d. Beam in "up" position with helper pole concealed on far side of mast. The helper pole can be used (in this position) to swing the gamma-feed side down parallel to the tower by pulling the heavy bolt on the reflector side and slightly loosening the other bolt. The helper on the ground can now hold the line in tension and the boom can be swung down parallel to the tower, so allowing work to be carried out on the gamma feed. Pulling the rope will bring the boom back into place

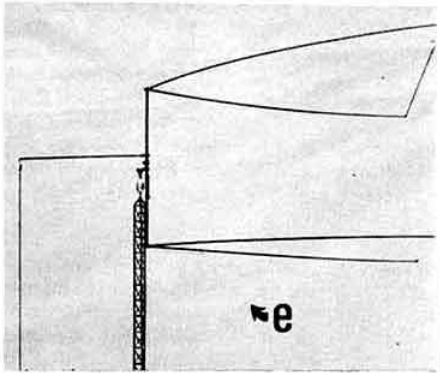


Photo e. Boom parallel to the tower with gamma feed in easy reach

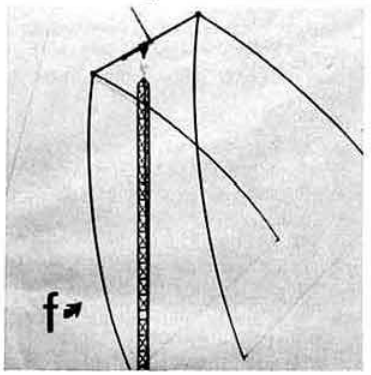


Photo f. Helper pole in place with bolts tightening the boom-to-mast fitting loosened—beam swung down and one big saddle bolt pulled allowing an element tip to be placed near the tower—this would make it easy to change the length of wire or element if necessary

Step-by-step mounting procedure for the delta-loop quad

FOUR METRES AND DOWN

by JACK HUM, G5UM*

E-M-E and Ar

During the second week of March when conditions for earth-moon-earth propagation seemed promising, G3LTF of Chelmsford took part in a series of tests on 432MHz with K2UYH and VE7BBG. Fleeting signals peaked only 1-2dB over noise in a 500Hz bandwidth on 10 March, but next day G3LTF was heard by the Canadian at 2-3dB over noise/500Hz. Both VE7BBG and W6FZJ were heard by F8DO, Peter Blair tells us. The tests produced e-m-e contacts for VE7BBG with K2UYH and W6FZJ (twice) and a near miss with W9WCD.

Another European active on 432MHz e-m-e is PA0SSB. He has a 20ft dish.

Further e-m-e activity on an international basis was planned for the weekend of 31 March and 1 April, which was the second NRL "commemorative test".

* * *

More aurora to add to that reported here last month. G3LTF worked GM4AFG and GM2DRD during the brief opening 1540-1600gmt on 25 March, all three on 144MHz telegraphy.

As always the Meldrum tv transmitter was a valuable indicator of impending Ar. A sudden increase in its QRK, says Peter Blair, often coincides with a lift to SM (beams north to the auroral curtain, of course). Noting people's comments that aurora sometimes "appears suddenly switched on as if someone had pressed a button," he attributes this to a large influx of ionization, probably worth co-relating with magnetic records.

No joke on 1 April: it really *was* the biggest auroral opening in many people's experience, lasting from 8pm until 1am on the Monday, in four spasms. The alerting service provided by GB2RS, which that morning had forecast that something would happen, had ops lying in wait. To G3OSS in north London there they were, ready for swift contacts one after the other with 70W of sideband and a 10-el, GI3RNO, a string of Scots, a GW and plenty of Lancs/Yorks. Not far away G3COJ exchanged telegraphy with UR on the other side of the Baltic Sea, plus LA, OZ and a host of G/GM, of which special mention must be made of G3RIK of Manchester whose 300mW fired north at the auroral curtain gave Brian Bower down in Bucks a 44A signal. And at about this time 'COJ was hearing four British beacons all auroral, as well as DL0PR.

"How does 4m look?" he wondered. And there was GM3UAG workable by G3VPK, G2AXI down in Hants, as well as G3COJ and probably others. On the aurora's second manifestation G3COJ collected GI3RXV on 4m.

Slightly nearer to the auroral source (though not by much) GM3ZVL in Edinburgh, always ready to give anybody anywhere a cw signal, found plenty to work: 35 Ar contacts were made "Tone A" with five countries including his first-ever Belgian, and 22 counties. That should put him in line for an FMD Senior Award on 2m: he received his Standard Award that very week.

Just as the Ar helped GM3ZVL get his first Belgian, so it helped GW8DUP in Swansea get his first GM (lots of others report likewise): all of Ron Harris's contacts were on A3J, right up to GM8FFX/M (yes, on the move on 2m) in Aberdeen.

From 'FFX himself, widely commented on down south as being a huge signal on auroral sideband, comes confirmation that he worked over a dozen stations while mobile, using a Liner 2 and a halo. In all he and GM3ZBE worked over 80 stations, often at 59. Graham Knight's observation of the time span of the aurora has scientific interest: it was first noticed in Aberdeen as early as 1345gmt, continuing until 1830gmt. The second phase started at 2200 and continued until 0030. But as late as 0200gmt on 2 April both GB3VHF and DL0PR were still coming through "Tone A" an hour and a half after the last amateur signal had faded out.

At the height of the opening GM3ZBE checked 432MHz, but the Ar did not seem to affect 70cm.

Planning ahead on 70

The logic of transferring short-haul phone activity from crowded 2m to the more spacious area of 70cm is becoming increasingly appreciated. Already, G8DLQ tells us, Medway members are forgathering in QRP-corner, that new bit of band below 432MHz. They assemble on 430·88MHz with 100mW rigs, using common HC25U type crystals on 14·3 that give excellent fifth overtone in a bipolar or Squier oscillator circuit.

Nearer in to the London conurbation, channelized operation, either a.m. or fm, is establishing itself on 433·2 MHz. Before long, thinks G8AZU, there may actually be a QRM problem on this frequency, and would it not be a good thing while yet there is time to suggest calling and working channels as a guide to future operations? Bryan Coleman's proposals go something like this:

Stage 1: call and work on 433·2, present situation. **Stage 2:** in the next few months, use 433·2 only as a calling channel and move to 433·1 as a working channel. **Stage 3:** calling channel 433·2, working channels 433·15, 433·1 and 433·05 MHz, that is, 50kHz spacing. Ultimately, **Stage 4** would be reached with 433·2 still as the calling channel but working channels at 433·175, 433·15, 433·125, 433·1, 433·075, 433·05 and 433·025MHz, that is, channel spacing now reduced to 25kHz.

At all four stages the international mobile calling channel 433MHz would be preserved.

The very thought of QRM on 70cm may seem laughable to most of us who only discern the mildest traces of it during a cumulative contest, and then only through the accident of beam position. But let us all note that many of the small senders now coming on to the band do not radiate from beams but from omni, perhaps even hand-held, aerials.

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

A code of practice for the use of the 2m band

1. Always operate within the terms of your licence, eg listen on the frequency before transmitting; if it is already in use, choose another.

2. Remember that all stations have an equal right to use any frequency within the band. Leave **GB2RS** news service frequencies clear at the appropriate times: others may wish to listen even if you do not. Vacate Raynet channels when requested to do so during an emergency or an official exercise.

3. Make sure that your transmitter is radiating a pure signal. If possible, use a dummy load for test purposes. Especially remember the following points:
A1 (cw): prone to key clicks unless well-designed keying circuits are used.
A3 (a.m. phone): prone to overmodulation. Avoid spread due to nonlinearity in the modulator, especially apparent when transmitting sibilants.
F3 (fm phone): prone to excessive deviation: ±3kHz is the recommended standard.
A3J (ssb phone): prone to spurious outputs due to mixing processes in the transmitter.
Help others in trouble by informing them courteously of defective signals.

4. Operate within the band plan, remembering that the plan does allow replying to another station on his frequency: but move back to your own zone after the contact.

5. Give callsigns clearly and frequently, using the phonetics as recommended in the licence. Do not forget the need for this when in net operation.

6. Use calling channels with consideration. Change frequency to a working channel as soon as possible after establishing contact. Other stations may be waiting to use the calling channel.

7. When calling **CQ** give your location and indicate your tuning intentions well before the end of your call. If you want stations to answer your call give them time to turn the aerial and select a frequency to suit your tuning intentions. Remember to check your own frequency first before tuning the band for a reply.

8. Use an output power appropriate to the type of contact. If possible reduce your power after contact has been established.

9. Equip yourself for receiving as many modes as possible and bear in mind that there is no "best" mode. All modes have their own particular virtues and weaknesses.

10. Remember others are listening: *your* example will influence them.

11. Above all, be courteous at all times, even if the apparently poor operating practice of another station provokes an emotional response: remember, two wrongs do not make a right.

Large senders will tend to use them, too, in the interests of convenient net operation.

In the next three to five years 70cm as a local band will sound as crowded as 2m does now. Planning its orderly development seems to be the sensible thing to do, *starting now*.

Expeditionaries

A black mark, says G3DAO, for the planners of vhf expeditions that never come off, in spite of advance publicity. And a blacker one still, adds Peter Cutler, for those who fail to say where they intend to appear in the 2m band and on what mode or modes. Needles in haystacks have nothing on magic mystery tours buried somewhere in 2MHz of the 2m band.

Happily, there are plenty of hill-hitters who do what they say they will do, to the delight of the waiting watchers. Exemplars are the 3JFG/8AGU team (G, GM to taste). This year's foray will take them along the Border counties of GM from 18-29 June, moving north in easy stages, and using 144·05MHz telegraphy, 145·4 sideband and 432·15 sideband. Each morning (except Sunday 24 June) they will use 2m ssb from 7.15–7.30am and cw from 7.30–7.45am, with 70cm sideband on request on 2m or by schedule. Evenings 18–28 June 7–7.30pm 2m sideband, 7.30–8pm 2m telegraphy, 8–8.30pm 2m ssb and 8.30–9pm 2m cw. Each evening from 9pm onwards casual operation including 70cm by 2m request or sked. To fix schedules—and this seems particularly important where 70cm is concerned—send an sae to Paul Widger, "Mayfield", Gunswell Lane, South Molton, N Devon.

Another well-organized expedition in prospect is that put on by the GW6GW/P squad, its purpose to activate six of the rarer Welsh counties during the second week of August. Skeds on a.m. phone and cw will be welcomed: sae to Steve Rees, 10 Tudor Crescent, High Cross, Rogerstone, Newport, Mon NP1 9BS.

If you fail to land the Welsh rarebits from GW6GW/P then try for another August expedition to the principality, planned by G8FUR and G8GGP. Obligingly, they say they will put out 2m rf from any Welsh counties which are particularly wanted. State your requirements to Tim Hague, G8GGP, 13 Denesway, Hook Green, Meopham, Kent.

Oscar 6 news

One of the official broadcasters of ARRL news bulletins is W2QFR, and since Oscar 6 went up the orbital predictions have been going out over the 'QFR radioteleprinter. But they have been going the wrong way so far as Europe was concerned, westwards, to give maximum hf band coverage of the USA.

"Couldn't you beam them east?" asked G8LT, Robin Addie of Towcester in Northants, one of the leading G teletypemen. Obligingly, the American agreed to do a repeat after the official ARRL broadcast and to send the info eastabout, with narrow shift (170Hz) to combat QRM.

This transatlantic rtty link has been perfected to the point where G8LT simply leaves his receiver on crystal control spot frequency so that when W2QFR starts up with the familiar "RY RY" sequence, the machinery comes on automatically, prints the copy and shuts itself down after completion.

A reperforated paper tape of each Oscar bulletin is made at G8LT so that it may be retransmitted (on 2m if you like) to British amateurs who want it.

Reading through a 4ft length of impeccably typed bulletin from W2QFR to G8LT we note: "Amateurs seeking additional information about Oscar 6 are invited to join the AMSAT net on Sunday at 1800gmt on 14,280kHz or 1900 gmt on 21,280kHz". Class A licensees who have hf band equipment may care to follow up this one.

The ARRL offers a certificate for through-Oscar contacts. Each new contact via the satellite counts 10pts, each new country 50pts and each new continent 250pts, all on or after 15 December 1972. Accumulate 1,000pts and send confirmatory QSLs to ARRL, 225 Main St, Newington, Conn 06111, which will supply application forms.

Oscar trackers who have followed the consistent operation by F9FT may be interested to know that Marc Tonna at Reims had made over 2,500 through-satellite contacts by the end of March, cw and ssb, representing 41 different countries. He uses a self-designed 5-el on 29·55MHz and a 16-el on 145·95MHz.

Skedspots

Spot frequency for the new White Horse Net in West Wiltshire is 144·41MHz. They forgather most nights at 9pm.

The sudden silence by G8 men on Monday Night Activity Night is because they are all listening to the new slow morse exercises from G3BLP at Dunstable, 144·645 at 8pm. Johnny Haydon's service area extends well up into the Midlands, where he has many assiduous copiers. Mondays are top days for telegraphists in general. If you initially hear no cw in 144–144·15 keep on CQing on different beam headings. Many may be lying in wait.

More good tidings for telegraphists, particularly those who have been heard to ask: "Where are the GMs on cw?".

GM3ZVB, GM3ZVL and GM3OXX will be on 144·1, each evening at 1030 pm beaming south. Contacts well down into England should be possible, thinks Roger Manners ('ZVL of Edinburgh), judging by the sideband signals from 150 miles plus which were being heard in GM during the mid-March opening. Southerners, polish your brasses and head north.

For A3J as well as A1 operators here is some super-dx info from Sweden. On most summer and autumn weekends, and from 7 July to 5 August continuously, SM7DBI and SM7FJE will be on 145·375 sideband and 144·011 cw. They particularly ask for UK people to look for them just after dawn, to catch the early morning lift. Their equipment is potent: two 4X250Bs feeding two 10-el Yagis at nearly 700ft. The QTH is Bo Nilsson, Trumlagaregatan 3, S-231 00, Trelleborg.

"I say again . . ."

It is axiomatic in the communications industry that if you say a thing once nobody takes an ounce of notice. Say it twice and they begin to. Say it again and pennies begin to drop.

So we say again: Please do not send QSL-applications for Four Metres and Down Certificates to RSGB headquarters, for they are not dealt with there. Last month your VHF Certificates Manager received *five* fat packets redirected from HQ, all from FMD Award applicants, all costing money to remail, all resulting in delay in processing the claims.

On next to the latest claims to be submitted by the VHF Certificates Manager to the VHF Committee, approved by them and certificates issued by him . . . .

Parchments away

70MHz Transmitting: No 98 to G3JFO of York.

144MHz Transmitting: Nos 312 to GM3OXX/P in respect of some remarkable QRP portable work, and for the home station he collects 313 for GM3OXX; 314 to Anglesey's GW8FOL; 315 to G8BXC, 316 to GM8CHR; 317 to another much travelled portable 8AOB/P, sometime G, sometime GW; 318 to GW8FKB, whose county collecting rate accelerated when he went sideband; 319 to GM3ZVL, again much on sideband but some sensational ones on weak level cw and notably aurora.

144MHz Receiving: very nice to receive a claim from a receiving member. Chris Verstage of Basingstoke, BRS33794, collects Certificate No 24. There is much scope here for other followers of Bob Treacher's *SWL News* column to collect FMD parchments as a result of sending worthwhile reports to metre-wave men, not those in the next county nor the big signals, but those whose CQs go unanswered, and *anybody* on cw, 4m or 70cm (but never forget the sae).

432MHz Transmitting: No 94 to G8AUM of Berkhamsted in Herts—only three 432MHz Receiving Certificates have ever been issued, more scope, again, for the SWLs.

"QSL" means "receipt". In business you would not dream of sending an sae to a payee to get a receipt out of him. In amateur radio it is all too often essential, and not always productive.

"People have been QSLd two or three times with SAEs without result. Quite often club stations are offenders in this respect. Surely if a special request is made plus sae some effort ought to be expended by the recipient, if only to send the chap's QSL back, suitably endorsed," says GW8DUP of Swansea. But Ron Harris has praise for those who ". . .take pains to make me a special QSL either drawn on blank card or on a picture postcard".

For the record

In the VHF Records panel (March, p 202) no record, curiously enough, was printed in respect of the most active band of all, 2m. Tentatively, Johnny Haydon wonders if he could occupy the blank space: then in Surrey, he put the G3BLP signal on that memorable 4 July, 1965, into mid-Europe to work four HG and three YU (we recall that a contest was on that weekend: most of the ops wished they had stayed at home to work the dx!). Any advance on 1,060 miles, Woldingham to Belgrade, YU2BOP? If not G3BLP goes into the panel next printing.

And a claim for the microwave section: G3LQR near the coast of East Suffolk ups the 2·3GHz record to 140 miles. He worked PA0DBQ on 17 December 1972. Signals 589 both ways. The 13cm final at 'LQR is a BXY36 doubler putting 2W into the 2½ft dish. It is worth adding that Simon Freeman believes he can claim the following "firsts": HB9RG 10 September 1966 on 432MHz, LA9T 4 December 1962 on 432MHz, OE2OML on 28 September 1969 also on 70cm, and PA0COB on 1,296MHz on 16 July 1964: ". . . not that it proves anything except that I am on the bands sometimes!" he adds.

Contest currencies

More thoughts about a league table for competing groups in metre-wave contests: G3WOS of Rugby suggests that points should be allocated to groups and individual participants according to the position in each contest: these, totted up over a year, would form the basis of the league table and would show up the active participants. "Test the opinion of the mass public through *FMD*", adds Chris Gare. Over to you, then, contestants, not forgetting that the hardworked VHF Contests Committee would have to shoulder this additional chore—and knowing them as we do we are in no doubt that they would willingly undertake it if there were to be a stated demand.

Few events foster the state of the video art more than the annual National Amateur Television Transmitting Contest. Many 70cm men, we hear, have buttoned on video output to their wideband converters, so it is to be hoped that there will be a record participation in the event next month, 30 June 1700–2300gmt and 1 July 0800–1200gmt, which are just enough hours in which to gather contacts but not too many to induce contest *ennui*.

Running alongside the RSGB 144/432MHz Contest on 5-6 May, the Dunstable Downs club is holding a 1W contest on 144MHz from 10am to 1pm. Scoring will be one point per kilometre. "While we are not seeking entries from non-members we'd like operators to be on the lookout for QRP signals emanating from the Dunstable/Luton area", says secretary G8BPK.

With catlike cussedness the March anticyclonic weather broke up just in time for the 432MHz Open on 31 March/1 April. The portables (and there were many) had a rough time: the ops at G8ELO/P were holding down the tent in

mid-QSO and trying to prevent the station from quite literally taking off. And there was admiration all round for G8AWS/P solo up in the buffeting Peak of Derbyshire, and all night at that. As he approached "zero seven oh" the advantages of concentrating 70cm activity into a one-band contest rather than a two-bander were evident, but many were commenting that 24 hours is unnecessarily long taking into account the number of stations there are available to work on 432. Right now, this weekend another two-bander, but with 70cm concentrated into 10 hours of 6 May.

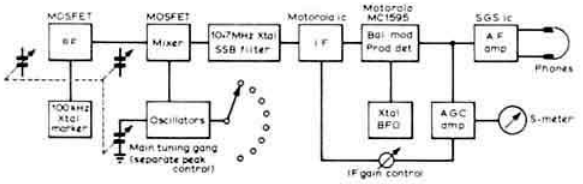
The biggest contest of the year (except for VHF NFD), will be in July when no fewer than 14 parchments will be offered by the VHF Contests Committee in a Jubilee event imaginatively contrived to pit local against local. Discuss this *now* at your club and vhf group meetings: re-read the rules on p 272 last month.

Tech corner

From G6RH (Bob Holmes, Bexley, Kent)

The accompanying block diagram shows a new all-semiconductor receiver which has been built at G6RH including some integrated circuits. It makes a very compact i.f. strip for vhf converters. Nothing like all home made gear. No bought out ready mades at G6RH: receiver, transmitter and even aerials are built at home.

This receiver covers eight amateur bands, four of them in the 28-30MHz area, useful for Oscar 6. The others are 3·5, 7, 14 and 21MHz.



The receiver i.f. strip built at G6RH

From G8AYY (Paul Gaskin, Birmingham)

This is how the bump-thump problem with aerial rotators (*FMD* February) was solved at G8AYY. The notes refer to commercial rotators whose support structure is attached to a wall or roof of a building.

The rotators themselves are not inherently noisy. The problem arises: (1) because the support structure flexes during rotation, and (2) because vibrations from the rotator travel down the support structure into the building, which acts as a sounding board.

Cause 1 was eliminated at G8AYY by installing a W40 Versatower with a CDE TR44 rotator.

Cause 2 was an embarrassment: noise during rotator operation seemed louder inside the house than outside. This was surprising: the rotator was mounted in the masthead unit at 39ft, or 22ft above the wall bracket. The cure was a simple adaptation from industrial practice, namely rubber mounting. Three pieces of foam-backed carpet were inserted at the points of contact between the tower, the wall bracket and the retaining strap.

Because the carpet is in compression it does not limit the support of the tower, the tower itself is mechanically decoupled from the house, and operating hours are now no longer restricted by rotator noise.

VHF BEACON STATIONS

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

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

What they say

"Trying hard to get the FMD Senior Award on cw only, but find the rarer Welsh counties, Northumberland, Durham and—of course—GM very elusive. Any key-man in those regions like a long haul 2m sked?"—G3DAO of Selsey.

"Have worked 32 countries via Oscar 6 but still awaiting an exotic EI!"—EI6AS.

"I agree with the G3WPO comment that Oscar 6 is far from being a non-event. A tune around 29·5MHz when a pass is on still reveals a remarkable amount of translated activity, even after all this time".—G3NHE.

Here and there

Good news from EI6AS: Albert Latham reports that the 4m band in the Republic of Ireland has now been extended to 70·125 to 70·450MHz. The lower edge still does not quite reach the UK telegraphy limit at 70·1MHz . . . but it matters not: most "four meteorites" use the key anywhere in the band to winkle out the weak ones.

G3RND is engaged in receiving weather pictures from satellites and is keen to hear from others seriously interested in this activity. Speedy contact between participants is essential if fleeting opportunities are to be seized, and Joost Berden suggests this be done on 2m or 80m ssb or landline telephone. Contact him by any of these means if you wish to participate (098 382 5398).

Next meeting of the Southern FM Group 2 May (first Wednesday of each month) at Chineham House, Popley, Basingstoke, lecture on "The design and manufacture of quartz crystals" by D. E. Carpenter of McKnight Crystal Co.

25 YEARS BACK

"V.H.F. and U.H.F. Bands. It was reported that a discussion had taken place with the Engineer-in-Chief of the G.P.O. regarding the early release of new V.H.F. and U.H.F. bands and that certain proposals put forward by the Society are being considered by the G.P.O. and the British Joint Communications Board"—report of Council proceedings, *RSGB Bulletin*, May 1948.

STOP PRESS

1974 VHF/UHF Convention. The Winning Post at Whitton has been booked for this event, planned for 6–7 April 1974.

WHITTON 1973

Jack Hum, G5UM, reports on the 19th annual VHF/UHF Convention

WITH the metre wavelengths the fastest growing area of amateur radio activity, the RSGB's VHF Committee is annually faced with the problem of accommodating an increasing number of people into the finite space of the Winning Post Hotel at Whitton for the VHF/UHF Convention. The job was an even bigger one for Convention 19 on Saturday 7 April. Bookings for the banquet approached the capacity of the hall (200 plus). And who could tell how many would turn up for ten bob's worth in the afternoon? As it happened, well over 450 did. The overcrowding problem was reduced by having one lecture area this year instead of two, as in the past. This allowed much more space for the trade exhibitors (who themselves increase in number each year), and for folks to perambulate in the more spacious area thus freed outside the lecture theatre.

The person-to-person communication which is the essence of amateur radio was facilitated by having this extra space to move around in outside the lecture area. Even so, the VHF Committee, recognizing its importance, had introduced something quite new at this year's convention, and that was the concept of informal discussion groups on the Sunday morning, each one under the aegis of a member of the committee.

* * *

Opening the lecture session promptly at 1400, G3FZL covered in 20 minutes several major aspects of metre-wave operation today (and tomorrow):

Contests: last year's code of contest practice, initiated because of abuses during VHF NFD 1971, had virtually eliminated any NFD trouble in 1972. So successful had this been that there would be no power restriction in VHF NFD 73, leaving self-regulation to the common-sense of contestants. But multiple contacts would be banned.

IARU Contests: he urged a better UK entry for IARU events this year. All you had to do was rescore your RSGB entry in IARU km-pt terms.

Beacons: the IARU Region 1 had asked RSGB to plan the whole of the European vhf/uhf beacon chain, a task for which G3JHM had special professional experience. New spots for GB3VHF and GB3GW, which were at present outside the beacon hf-end area, had yet to be decided. He paid tribute to the work done by the Mid-Severn Valley Raynet Group to install a new GB3VHF sender to replace the 1959 model, which had worked so well over 10,000 hours.

Bandplans ("... probably the most sensitive area of discussion among vhf people," observed 'FZL): the VHF Committee had formed a small working group from within their numbers consisting of G3COJ, G3JHM, G3NUE, and G8AXA to examine the whole subject of bandplanning of 2m, to see how far the UK plan could be made compatible with the IARU one, which itself had defects and might be varied at the next IARU conference in 1975. It seemed that at the present time a Code of Practice for the use of the 2m band was an important thing to initiate, and this the VHF Committee had done (see *FMD*).

Repeaters: There are four possibilities: (a) conclude the experiment and discontinue repeaters; (b) extend the present GB3PI experiment to collect further data; (c) extend the experiment to, say, five repeaters located in different parts of the country; (d) conclude the experiment and press for a special licence for repeaters. These alternatives are under consideration by the VHF Committee at present and a recommendation will be made to Council regarding future policy.

Then it was "Over to the Pye Group" for a multiple presentation about GB3PI, its genesis described by G3USB, and its technicalia deployed by G3SXK, G3WKW and G8AYS, how it initially had 1·6MHz spacing and how this was fined down to today's 600kHz, itself posing problems of separating tx signal from a weak incoming rx signal at a differential of 170dB; how the digital callsign was imposed without impairing the QSOs going on through the repeater, and a dozen and one other technical refinements.

Summing up, G3USB reported that GB3PI had been 267 days on-air and only 10 days off, reliability of 95 per cent. Operating tips he gave were: always announce your callsign when bleeping the repeater open, always listen on 145·75 to detect if it is already in use, use minimum possible power to access it, remember it is primarily for mobiles. He urged members to tell him or G3FZL whether they felt the experiment should continue or be wound up.

Convention tea-break was followed by G3RPE on "Microwaves today" and G3JHM on planning television transmitter service areas. It was interesting to observe how closely the two were related. Dain Evans produced formulae to show ranges to be expected on the amateur ultra-highs and Don Hayter expounded on the advantages of dual diversity reception of the very-highs to overcome fading, something which amateurs had seldom tried. Both speakers referred to the critical question of aerial height: "in diversity reception," said 'JHM, "a lower sited aerial would often give improved decibels over a companion more elevated one."

Dain Evans left his hearers with the thought that the amateur could justify himself to the professional by achieving apparently unlikely feats of dx on the microwaves—and here the amateur should be interesting himself in higher-power equipment than he had so far used on the centimetre waves. Don Hayter touched on the VHF Manager's comments about planning Europe's metre-wave beacon chain: he showed a matrix of beacons so deployed that none should interfere with others, and all vhf men in Europe should have at least one beacon within range. He hoped this beacon bandplan would be adopted by IARU.

The close of the three-hour lecture session by 5pm gave members time to see what the trade stands had to offer, more than ever this year, but some reported only modest sales.

* * *

At the dinner it was appropriate that the guest of honour should be Dr John Westhead, chief of Pye Telecoms, who in toasting the RSGB dwelt on the place of the amateur enthusiast in the professional world of electronics, and his value to a company for his green fingers, strong corporate philosophy, his fascination with the oddities of electronics and his ability "to make things work in a grotty world".

In reply, the RSGB President, Dr John Saxton, voiced the thanks of the membership to Pye, not only for making GB3PI possible but for their assistance with Raynet equipment. Touching on this Diamond Jubilee year, the President warned that it did not do to lean too much on the past, but to use past achievements as a basis for further endeavour. None of us could relax our attempts to ward off attacks on our allocations by unsympathetic administrations. In this country we were fortunate in having in the MPT an administration sympathetic to our cause, and he asked Mr West of the Ministry, who was present, to accept the Society's thanks for all that had been done.

Dr John Westhead, left, in conversation with Dr John Saxton. Looking on is Brian Armstrong, G3EDD, RSGB Council member, centre

Then the presentation of prizes: The 1952 Committee Cup in the Constructors' Contest to G8CKN for a 300MHz frequency counter ("... the judges particularly admired the professional finish," remarked the President), and a Certificate of Merit to Ron Ham for his exhibit showing his work on solar noise. To G3BNL/G3EEZ a shared Fraser Shepherd Award for microwave prowess. In the dinner ticket raffle a 70cm J Beam to Mrs G2BLA, another to G3PSH and a clutch of extra gifts donated by exhibitors.

* * *

Next morning while many were still abed 50-plus went back to the Winning Post for the newly instituted discussion session.

SWL NEWS

by BOB TREACHER, BRS32525*

Listener contests

All paid-up listening members of the RSGB are invited to take part in the jubilee contests organized to celebrate the RSGB's Diamond Jubilee. The hf phone contest takes place on 12-13 May and the hf/cw section on 19-20 May. The rules appeared in the February issue of *Radio Communication* and it is hoped that as this is a special event many listeners will enter. Special awards are available to the winners of both sections and those placed second and third will receive a special certificate, as will the leading receiving station on each band.

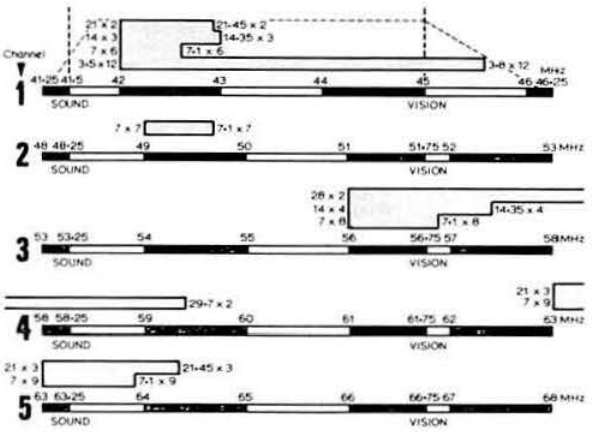
The Cray Valley Radio Society's 4th SWL contest results are now to hand and appear under *Contest News*. Sixty-seven entries were received from nine countries and the standard of logging was on the whole very good. The rules of last year's event were modified to include a neatness bonus and as a result the majority of entries that were received were well written. The writer has a supply of result sheets showing a more detailed breakdown of scores which are available in exchange for an sae. The Cray Valley club is to organize a further contest in the autumn and details will be published in *Radio Communication* at a later date.

News, views and comment

Deryck Buckley, G3VLX, writes giving details of an expedition to Wales in June. Between the 15th and 17th Deryck and Derek, G3XMD, are to activate the counties of Cardigan, Merioneth and Montgomery using the callsign GW3VLX suffixed by /M or /P as appropriate. Activity will be mainly on 40 and 80m during daylight hours and on 1·8MHz in the evenings. They are anxious to receive informative listener reports on their mobile and portable signals and they will QSL all correct reports. Remember to enclose an sae if you desire a card returned direct.

While on the subject of QSLing, Alan Whitmore, BRS32669, informs us that he is QSL Manager for VK9KE who is located at Port Moresby in Papua. Alan will answer all SWL reports providing the information supplied corresponds with the log.

Les Poole, BRS33559, who has overtaken Chris Henderson in the Countries Table, provides a list of really exotic dx heard over the last two months. The hf bands have not been in such fantastic shape but Les has managed to winkle out some useful countries. Les also comments on interference which he is experiencing on the bands. This is almost certainly caused by tv time-base and the answer to this is to site the aerial as far away from the tv set as possible. If the offending set can be located it can be suppressed or filters added. It may interest readers to see diagrammatically where tvi can occur on the amateur bands.



Chris Henderson, A7460, comments on the indifferent state of the bands during March. The low sunspot activity and the presence of a solar disturbance during early March account for this. Chris now has around 260 countries heard but the return rate of his cards are not as quick as he would like!

Dave Whitaker, BRS25429, suggests that the Countries Table should show the mode of transmission received. For comparison purposes this would show how an ssb only swl is progressing compared to an ssb/cw one. The writer thinks that this would be a useful addition, so, in future, claims for the table should state ssb, cw or ssb/cw. With the help of some rare Russian prefixes Dave managed to hear his 100th country on 80m this year on 18 February. Dave is a real 80m fanatic and some of the more interesting dx stations heard in March included CO6RL, CP1EU, FG7XL, VP2EQ, 3E1XIS (special prefix for HP used to celebrate the 7th Bolivarian Games held in Panama City during mid February and early March) and 8R1UGF.

John Fitzgerald, BRS33823, comments on the weird prefixes that were given an airing during the CQ WPX Contest in March. Included in John's haul were CQ6LF, TE2CF, XX7IK, ZX7AAD and 4A4AA/1 representing CR6, TI, CR7, PY and XE1 respectively. Other prefixes reported are CT7, KZ0, 4J9, 4L3 and 4M5. These emanate from CT1, KZ5, UA, UF6 and YV. Correspondence is also acknowledged from A7700, A7951, A8094, A8320 and BRS33539.

All updated scores for the Countries Table and news and comment for inclusion in the July *SWL News* should reach the writer by 2 June 1973.

1973 COUNTRIES TABLE (starting score 100)

	10	15	20	40	80	160	Total
BRS33559	41	132	141	64	67	4	449
A7460	41	110	129	57	97	7	441
BRS25429	20	87	122	68	107	6	410
BRS33823	38	91	120	48	84	3	394
BRS33364	21	91	127	42	78	6	365
BRS6604	24	63	91	84	60	11	333
A8094	43	80	111	33	53	6	326
BRS32286	14	64	87	21	80	0	266
A8320	0	46	67	62	56	0	231
BRS32524	3	45	85	12	78	1	224
A8054	25	32	46	27	41	6	177
A7139	5	30	28	25	41	5	134
A8055	17	21	25	18	35	3	119
A7511	0	16	38	8	45	4	111
A7700	8	24	38	16	21	1	108
A7951	0	5	46	8	27	3	89

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

THE MONTH ON THE AIR

by JOHN ALLAWAY, G3FKM*

READERS will no doubt have noted the recommendation that amateurs should plan to phase out the use of amplitude modulated signals on 1·8 and 3·5MHz during the next few years. This has come about as a result of the international decision that after 1 January 1975 all coastal stations shall use ssb on these frequencies. Similar action by the world's amateurs can only be looked upon as being most desirable.

However, while it seems proper for the amateur service to co-operate on these lines, the writer has reservations concerning the ultimate disappearance of a.m. signals from the lf bands. Many of today's amateurs and short-wave listeners have their interest kindled by tuning in to amateur signals on a broadcast receiver. They will not find this easy if all signals are on ssb.

Perhaps it might be possible for band planning (compulsory if need be) to set aside a small segment of each band where a.m. would still be welcome. G3ZQP, who has studied the situation on the 3·5MHz band, feels that a.m. users are being squeezed down to the low end of the band by the stronger ssb signals and suggests that 3·6 to 3·64MHz might well be left clear for their use.

W2CTN

Readers will be pleased to learn that the report of Jack Cummings' death a short time ago was not correct. Apologies are extended to those concerned, the news having been taken in good faith from another news source.

DX News

Tom Fishpool, VK9KE (formerly G3KEF), has moved from Port Moresby in Papua to Madang in New Guinea, where he expects to operate occasionally as VK9KE/M from mountain areas using his FT101. QSLs continue to be dealt with by BRS32669 (see *QTH Corner*).

Bob Hooper, G3WEV, has emigrated to South Africa and hopes to have a ZS6 call before long. Until he does he may be contacted via ZS6DO who is his brother. When he gets on the air he will favour 21MHz, and says that he is going to operate on sstv and will be looking especially for UK contacts.

DK2SI has returned to Germany and is in the process of having QSL cards printed for his contacts from ZS6AUF/3D6, A2CAL, 5R8AP and FH0DL. ET3ZU will be leaving soon and says that there are still over 1,000 QSLs outstanding for his ET3ZU/A expedition—anyone needing one is asked to apply at once. Aldo is hoping to visit Kamaran, but says that the political situation in the area is not suitable for such a trip at present.

WB8ABN is closing his logs for his F0MH, FG0MH, FG0MH/VE3, PJ8RD, VP2AAB, VP2AZ (9 and 23-25 April 1971), VP2EEL, WB8ABN/HC1, WB8ABN/HK0, ZF1CW and C31ED operations, and also for his wife's transmissions as HC1NMM and HC1MM/HK0.

KH6IAB is Bill Rohrer, W7ZFY, who will be remembered operating from Heard Is for a short time as VK0WR. Martin, formerly VR3O (1962–1964) is once more active as WA6MFY. VS6DO is leaving Hong Kong soon, and VR1AA has already left for a leave which will keep him away from Tarawa until September. He will stay for a further two years after that.

AP2NMK, Feisal, has been reported on the air using low power and working with YA1GNT between 14,200 and 14,215kHz. The call is that of the Pakistan Boy Scout Association and QSLs should be sent direct, not via the AP Bureau which is said to be not functioning.

Dr Tin Maung recently attended the March meeting of the North California DX Association and said that there is little hope of amateur activity being allowed from Burma until such time as there is a change in the policy of the government.

A51TY is in Sydney and frequently talks to A51PN from the station of VK2SG at 1200 on Saturday on SEANET (14,320kHz). A51PN is still quite active with his FT101, FL2100 and dipole, and has been reported on 14,295kHz at 1200. The proposed trip to Bhutan by JA3DJ and others has been postponed until 1974.

1X1XA is said to be the callsign of a scientific expedition which is investigating natural electricity sources in the Arctic. WS5MSC will be on the air from the NASA Johnson Space Center during the flight of Sky Lab 1 scheduled for 14 May.

Fred Powell, well known as 3V8AL, TL8AL, TT8AP, 5U7AL, TY6ATE and W4K1L, is now 9Q5PF. He says that his TY6ATE call has now been reissued. ZD8RW points out that the address of his QSL manager, G8BXU, is incorrect in the latest *Callbook*. The correct one is to be found in *QTH Corner*.

MP4TEE will be using a new callsign—A6XF—with effect from 31 March.

Jacky, ex-3B8CF, is now on Agalega Is and has the callsign 3B6CF. He is said to be crystal controlled on 14,232kHz and is still asking for QSLs via JA0CUV.

Dick Farrow, formerly HC1RF/HD1RF/HC8AA, is currently the operator at WA3NAN (the Goddard Space Centre club station). QSLs for his past activities should be sent to his WB8LUS address.

Unusual prefixes heard during the past month include CQ6, CT7 and XX7, which were used by stations in CR6, CT1 and CR7 respectively for the purposes of the WPX contest. A number of USSR stations used 4J and 4L prefixes at the same time.

China

IARU Region 1 News gives the somewhat encouraging news that the People's Republic of China has acceded to the International Telecommunication Convention, 1965, (with certain reservations). The form of callsign to be issued to amateur stations is as follows: the letter B followed by a letter designating the geographical area, followed by a single digit, and then followed by the letter A, or A with one or two letters. The letters designating the geographical areas are as

* 10 Knightlow Road, Birmingham B17 8QB.

follows: F—Shensi, Honan; G—Nanking; H—Shanghai; I—Kiangsu, Chekiang, Anhwei; J—Hankow; K—Hupeh, Hunan, Kiangsi; L—Chungking, Szechwan, Sikang, Tibet; M—Yunnan, Kweichow; N—Kwangtung; O—Canton, Kwangsi, Fukien; P—Peiping, Tientsin; Q—Hopeh, Shantung, Shansi; R—Jehol, Chahar, Sulyuan; S—Kansu, Ningsia, Chinghai; T—the nine northeastern provinces; U—Sinkiang, and V—Taiwan.

News from overseas

A letter from G3UJF says that Norman Polan, 9H1BX (also G4AJI/ZB2CG), is always pleased to make contact with UK stations. He frequents the Commonwealth net on 14,170kHz, and is often around 21,300kHz especially on Sunday mornings when the Malta net (controlled by 9H1R) meets.

The latest copy of *NARS News* gives the information that there are encouraging signs emanating from NARS contacts with the Nigerian P & T Dept which suggest that some new 5N2 licences may be issued soon. All amateurs at present in Nigeria who have transmitting licences in their own countries are requested to contact John Manger, 5N2AAN, PO Box 1001, Lagos, as soon as possible as they are likely to be the first to be considered. Anyone interested in obtaining a licence and arriving from now on is invited to contact NARS for advice. (PO Box 2873, Lagos).

USSR callsigns

Several additions should be made to the list of identifying letters following the figure 8 in Russian callsigns which was given in April *MOTA*. The amended list is as follows: Turkoman—UK8E, H, W and Y; Tadzhik—UK8J, R and S; Kirghiz—UK8M, N, P and Q.

Dxpeditions

The Canadian World Expedition now expects to set out in December, and full details of their plans should be available from VE6BAA, 210-10428-123 Street, Edmonton, Alberta.

Contests

The RSGB Diamond Jubilee HF Contests
0600 12 May to 1800 13 May (Phone).
0600 19 May to 1800 20 May (CW).

Norman Polan, 9H1BX (see text)

Full rules for these contests appeared in February *Radio Communication*. First prize in each section is a BOAC "Earthshrinker" return air ticket to VP9, VS6, VQ9, VP2L, VP2A or VP7. Do not forget to take part!

YL International SSBers QSO Party
0000 to 2400 on 13 May (CW).
0000 19 May to 2400 20 May (Phone).
Entrants must take one compulsory six-hour rest period in the cw and two in the phone event. Exchanges consist of name, report, ISSB No (if a member), country/state. QSOs count one point with non-member stations in own continent, two in other continents. With members contacts count three and four points respectively. Multiplier is DXCC countries/VE provinces/US states, each counts once only. Stations may be worked on each band. Suggested QRGs, 3,565, 7,065, 14,070, 14,333, 21,070, 21,373 and 28,673kHz. Entry forms may be obtained from W7EOI, L.W. Coleman, 412 19th St SW, Great Falls, Mont, 59404, USA.

The USSR CW DX Contest
2100 12 May to 2100 13 May.
All bands 3·5 to 28MHz. Single-operator (single- or multi-band) and multi-operator single transmitter categories. Listeners may also enter. Stations exchange RST and serial QSO number (starting from 001). Contacts with own continent count one point, with others three. Contacts with own country count only for multiplier. Stations may be worked on each band but a multiplier counts only once. Listeners score one point if one station is logged, and three if both sides are logged. The multiplier is derived from the "R-150-S" list, and in addition Oblasts 02, 13, 14, 56, 84, 85, 86, 87, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 105, 128, 138, 139, 153 and 159 count. Final score is total QSO points multiplied by the multiplier, and logs must be posted to the Radio Sports Federation, PO Box 88, Moscow, USSR, no later than 1 July. A minimum of six hours participation is required to earn a country award and 12 to be a continental leader. Contest contacts may be used in lieu of QSL cards when applying for the various USSR awards.

World Telecomm Contest
0000 to 2400 12 May (CW).
0000 to 2400 19 May (Phone).
Single operator, 1·8 to 28MHz. QSO points as follows: With own country, nil; with other countries in same ITU zone, one (on 3·5 and 1·8MHz, two); with other zones in same continent, two on 14, 21 and 28MHz; three on 7MHz, and four on 3·5 and 1·8MHz. With other continents, three on 14, 21 and 28MHz; five on 7MHz, and six on 3·5 and 1·8MHz. Score is QSO points multiplied by the number of zones worked (each counts once only). Exchanges consist of RS/T and ITU zone (UK is 27). Mail logs to Ministerio das Comunicacoes, DENTAL, 70000 Brasilia DF, Brazil, before 30 June.

The scores of British entrants in the **1972 WPX Contest** other than G callsign holders (which were given in March *MOTA*) are as follows: **GC3YIZ** (All band) 72,062 points, **GM5AXO** (All band) 66,250 points, and **GW4AES** (14MHz) 30,284 points. In the multi-operator section **GC5AYC** (650,962 points) and G4AYL (241,732) should also be listed.

Apologies to readers for the errors in the rules of the **1973 WPX Contest** given in March issue. The very excellent service given by W1WY had not produced the usual photo-copy

QTH Corner

FH8CY	Y. Seguineau, BP 438, Moroni, Comoro Is.
FR7AF	(via F6AXP—see XT2AK).
GC5BCM	via DL2OV, M. Vaupel, Nordstr 58, 4320 Hattingen, Ruhr, Germany.
ex-HC1RF	WB8LUS, R. Farrow, 4612 Cr 177, Clyde, Ohio, 43410, USA.
KA1CQ } **KA1DX** }	via WA6AHF, R. L. Hughes, 17494 Via Alamitos, San Lorenzo, Cal. 94580, USA.
KM6DF	K. W. Phillips, Box 20, FPO San Francisco, Cal, 96614, USA.
PJ8GQN	via W2GHK, DOTM, Box 7388, Newark, NJ, 07107, USA.
PJ8NLO	PO Box 288, Sint Maarten, Netherlands Antilles.
PS0WH	(*St Peter & Paul Rocks*) W3DJZ, 122 Sunset View Dr, Fair Acres, New Cumberland, Pa, 17070, USA
PY0EN	PY1CNY, E. F. Nahra, R Saboia Lima 54, 20000 Tijuca, GB, Brazil.
TA1TS	via W0ETC, 405 N Main, Wheatland, Iowa, 52777, USA.
TU2DV	via WA6NFC, 6593 Hwy 49, Mariposa, Cal, 95338, USA.
TY1AAA	via DJ8DE, J. Franke, Reesenbuettler Redder 61, 2070 Ahrensburg, Germany.
TY7ABM	via DL7JK, K. Schitthelm, Am Goldbergfeld 5, 8018 Hessefurt, Germany.
VK9KE	A. W Hitmore, 7 Fair Isle Drive, Gelndale, Nuneaton, Warwicks.
VP2MYA	via K5RWK, PO Box 232, Richardson, Texas, 75080, USA.
VP7CK	via VL3COK, C. O. King, 26 Hollywood Avenue, North Bay, Ont, Canada.
VQ9M	R. F. Miles, PO Box 191, Mahe, Seychelles.
WS5MSC	NASA, Houston, Texas, 77058, USA.
XT2AG	via F6AJO, G. Badier, 23 Rue Ronsard, 93 Tremblay Les Gonesse, France.
XT2AK	via F6AXP, M. Pomel, HLM Champradet 241,63 Clermont-Ferrand, France.
ZD8RW	via G8BXU, 64 Darvel Down, Netherfield, Battle, Sussex.
ZD7FT	PO Box 33, St Helena.
ZV0WH	(*Fernando de Noronha*) via W3DJZ—see PS0WH.
4S7HB	via HE9GN, E. Berger, Rue Montriant, 20, CH 1530 Geneve, Switzerland.
5B4AA	via G3XMQ, 13 Beacon Heath, Whipton, Exeter, EX4 8NP.
5B4AU	via OE3SPW, P. Salzmann, Fliegerhorst, 3425 Langenlebarn, Austria.
5U7BA	BP 877, Niamey, Niger.
5U7AZ	BP 309, Niamey, Niger.
9G1HO	c/o US Embassy, PO Box 194, Accra, Ghana.

RSGB QSL Bureau, Bromley, Kent, BR2 7NH

HF BEACON STATIONS

Callsign	Frequency (MHz)	Location	Reports to
DL0IGI	28·195 and 28·2 switches to 28·2 MHz between 15-20 and 45-50 min past each hour	Mt Predigtstuhl near Salzburg	DJ5DT, Kollwitzweg 1, D 6100 Darmstadt, FR of Germany
GB3SX	28·185	Crowborough, Sussex	G3DME
VE3TEN	28·175	Ottawa, Canada	G3DME
ZC4CY	28·180	Limassol	Box 216, Famagusta, Cyprus
3B8MS	28·190	Signal Mount, Mauritius	G3DME (Beacon keeper: 3B8DG)

and last year's copy from *MOTA* was reproduced, unfortunately containing the same errors!

The ARRAEM (Morocco) Contest

A special station—CN8MC—will be on the air during the 25th International Fair in Casablanca between 1100 25 April and 0000 13 May. It will only be on 14MHz and a cup will be awarded to the amateur who contacts it the greatest number of times, but not more than twice per day. The Diplome Marocain will be awarded to those who make a minimum of 10 contacts at the rate of two per day. Each QSO must be confirmed by QSL, and entries should be sent to BP 2.510, Casablanca.

Awards

The Worked All GI Award

For contacting two stations in each of the counties in Northern Ireland–Down, Antrim, Armagh, Derry, Fermanagh and Tyrone. Applicants outside Europe need only one confirmation from each. A certified list should be sent, together with 10 IRCs or $1 to the new custodian, L. M. Lyske, GI3CDF, Erinbrook, Killarn, Newtownards, Co Down.

The Diploma Paraguay

For confirmed contacts with five ZP stations (South American applicants need 15).

The All Mediterranean Countries Award

For confirmed contacts with (1) Class A: 40 countries, (2) Class B: 30 countries, (3) Class C: 20 countries, out of the following: CP, ZP, PX, HA, HB0, HV, LX, OE, OK, UC, UG, UO, 3A, YA, AC, XW8, JT, 9N1, UL7, UM8, UI8, UJ8, TZ, XT, 5U7, TT, TL, 5X5, 9X5, 9U5, 7Q7, 9J2, ZE, A2, 7P8, ZD5 and 4U1.

The All Zone 11 Prefixes

Class A: 30, Class B: 19, and Class C: 12 prefixes from ZP1-ZP9, PY1-PY0, and the special prefixes issued to zone 11 stations during contests. For each of the three awards a certified list of contacts plus five IRCs should be sent to Radio Club Paraguayo, Awards Manager, PO Box 512, Asuncion, Paraguay. All contacts must have been made after 15 May 1952.

Worked All Eire Counties (WAEIC)
Worked All Eire Provinces (WAEIP)

The former is issued in three classes—Class 1 for 26, Class 2 for 18, and Class 3 for eight counties contacted. The latter for working four stations in Leinster, four in Munster, one in Connaught, and one in the portion of Ulster which is in Eire. QSOs must have taken place since the second world war. Send log extract, certified by two amateurs, with 40p, $1, or 10 IRCs to IRTS, 125 Cooley Rd, Drimnagh, Dublin 12. Band and mode endorsements are available, and the award is issued to listeners on a "heard" basis.

Odds and ends

G3HQU reports that his callsign is being used by an unauthorized person on 3·5MHz a.m. The genuine G3HQU uses only ssb.

G3GFP is also suffering from pirating of his callsign and is receiving a large number of QSL cards many of which are for alleged contest contacts, and some have been sent to him via VP2LX.

Information on how to obtain confirmations from VE1IE (who resides on a rare island for those working for IOTA) would be much appreciated. One listener has already submitted 14 requests, each accompanied by an irc, at a total cost of £1.43½!

Readers who may be interested in obtaining a regular supply of used postage stamps (including high values from registered mail, and issues from some of the more remote territories) are invited to contact BRS3129, 62 Belmore Rd, Norwich, NOR 72T.

F0MA, the callsign which belongs to G3XRM, is being used illegally on 3·5MHz by someone who calls himself Ferg.

Band reports

A very poor month dx-wise has produced only a small number of reports. The *West Coast DX Bulletin* sunspot counts indicated considerable activity in mid-March with about 12 groups visible (at this time your scribe noted a morning opening into the Pacific via the North Pole on 14MHz). Since then conditions have fallen off greatly on the hf bands.

Many thanks to the following for the information from which this section has been compiled: G2HKU, G3DO, G5JL, G6GH, G3s GVV, NKQ, RPB, UOL, YOB, ZDF and ZPW, BRSs 2098, 17567 and 31301, and As 7511 and 8113.

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

1·8MHz. 0000 *EP2BQ*. **0500** KV4FZ, *8P6DR*. **0600** *W1, 2, 3, 4, 5* and *8, W9*. **0700** *VE3QU*. **1900** *VK3CZ*. **2000** *VK5KO*. **2200** *4W1AE, 5Z4KL*. **2300** *JY9FOC*.

3·5MHz. 0000 W1-W4, W9, VP2s SG, SQ, YV1BI, 6Y5PO, 9Y4AR. **0100** WA2COJ/HH4, HK0BKX, KG4FL, KV4FC, PJ8GQN, PZ1CU, TJ1AD, VP1BH, YV7GC, ZF1GC, 4M4AGP, 8P6s AH, CX, 8R1G. **0200** FG7XL, FP8DH, KP4ARW/HI8, VP1JP, VP9GE, W0PAH, 3E1XIS (Keith, G3KWT), 6Y5s. **0300** VP7ND, W5s, 9H5C. **0400** KZ5JF, WA5LTS, K5PFL. **0500** 5N2ANN, **0600** HK3LT, *OH0NJ*, ZLs. **2000** 5X5NK. **2100** *A4FE*, DU1EJ, 9H1BX. **2200** FP8DH, TY1AAA. **2300** CO2AA, EA6BZ.

7MHz. 0000 A2CCY. **0100** *FG7AE, KP4UW*. **0400** 5X5NK. **0600** *K7STZ*, ZLs. **0700** EA9AI, VKs, ZLs, *ZS3YK*, 3A2EE. **0800** CT3AR, *JA1YHA*, PYs, VKs, 6Y5EE. **1700** DU1EJ. **1900** 6W8DY. **2000** A4FE, CR4BS. **2100** ELs, ZD8KO, ZS2MI, 4X25OC. **2200** FL8OM, *5T5FP*. **2300** *DL2GG/YV5*, 4J9B (= UA9), *4S7DA*.

14MHz. 0000 *JT0AE*, ZV0WH. **0100** *YK1BG*, 9N1MM. **0700** KC6SK, KJ6BZ, TU2BX, YJ8s EE, XX, 3D2FM. **0800** JD1AHC, JYs, 1HCT, 6HNI (YL), 9VO (Box 5089 Amman), KS6DH, ST2SA, *UPOL21*, VKs, VK0WW, YJ8BD, YK1AA, ZLs, 5X5NK. **0900** *FK8KAA, VR4AA*. **1100** FG0GE, KA1CQ, KG6SW. **1200** KG6s, 4J9B. **1300** A6XF (= MP4TEE), C29ED, *CR8AK*, JT1AT, 6J9AA (Mexico). **1500** DU1JMG, HS4AGZ, VK9XW, 4W1AF. **1600** KM6BI. **1700** KH6BB, *OX3AX*, VK3ES, VP8KF, ZB2CO, 8Q6AC. **1800** AP2TU, ET3DS, TJ1AX, *YB0AU, 9V1RJ*. **1900** CR3AB, FL8BH, *KH6IAB*, VP9s, VQ9R, 4W1AF. **2000** HR3AC, TE2CF (= TI2CF), VPs 2MYA, 8JD. **2100** CR5SP, VP2s *GLE*, KH, ME, ZD7FT, 5Y4XLW, 8P6FB. **2300** VKs, VP5LD (Turks), *ZD9BM*, 9M2DQ.

21MHz. 0900 ZB2CO, 9M2DQ. **1000** *KG6AAY*. **1100** CQ6FF, CR3KD, VK9RY, 5Y4XLW, 9E3USA. **1200** KG6SW, 4W1S, 9G1HO. **1300** KC6SK, PS0WH, VS6FB, VU2DK, ZD3D, ZV0WH, 5B4AO, 8R1W. **1400** MP4TDM, ST2SA, *ZF1GA*, ZX7AAD (= PY), *3B8DA*, 5B4AU, *5R8AG*, 8R1UGF. **1500** HR1KS, JY6UAA, TT8AC (QSL to DJ1LG), 9K2ZW. **1600** A2CCY, VQ9HCS, 5B4AM. **1700** VP2MYA, XX7IK (= CR7), 9G1HO, 9Y4EH. **1800** EA9EJ, W7VAQ/HK2, KC4USP, YV9AJ, ZD8RR, 9H4G, 9X5NA, 9Y4EH. **1900** 9Y4MFY (Tobago). **2000** KG4FQ.

28MHz. 0900 *CQ6LF*, ZS3JJ. **1100** A4FD, CR6, CR7, EP2SP, FL8QM, TT8AC, VK6s, 5Y4XKL, 7Q7NP. **1300** CR7. **1400** CX, LU, ZD7BB. **1500** CE3GO, OA7BI, VP8DG, W1-4, 3B8CV. **1600** PY, VO, ZS. **1700** 9Y4EE. **1800** EA9EJ, EL8I, VP8KF. **1900** PY, PZ. **2000** LU, W4.

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

Please send all items for the **June** issue to reach G3FKM **no later than 7 May** and for **July** issue by **6 June.**

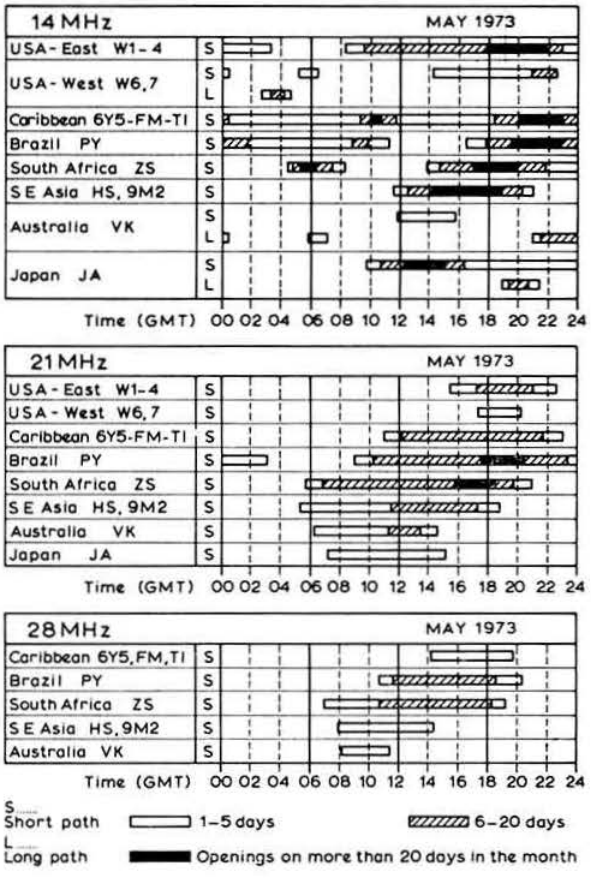
Propagation Predictions

High summer conditions begin in May in the ionosphere. This means relatively low F2 MUFs in the northern hemisphere, decreasing still further to reach their lowest point towards the end of July and the beginning of August. Low F2 MUFs mean bad dx conditions on the high frequency bands, 28 and 21MHz. Therefore, only Africa and South America will be heard on **28MHz** on favourable days (days with above average F2 MUFs). On **21MHz** conditions will be slightly worse compared to last month, only South America and Africa will be heard with certainty. Sporadic short skip conditions will liven up both bands from time to time over distances of about 2,000km.

Summer conditions will improve dx working on **14MHz** during the evening and night, and it is possible that on favourable days the band will remain open for traffic with South America and Africa. However, traffic with South Africa might be interrupted as it is now winter in the southern hemisphere. There is also a possibility of dx on this band via the indirect path, eg to the west of North America, Japan and Australia. Traffic with Hawaii is possible via the direct path on favourable days from 0600-0900gmt, sometimes also from 0430-0600 and 0900-1000gmt.

Conditions on **7** and **3·5MHz** will change little from those of the previous month, only on **3·5MHz** will local traffic be interrupted by the dead zone.

The provisional mean sunspot number from the Swiss Federal Observatory for March 1973 was 45·4. Solar activity was reasonably evenly distributed throughout the month. The predicted smoothed sunspot numbers for July, August and September are 34, 32 and 30 respectively.



CROSS-TALK

An Interference Committee feature

RFI—"Don't go it alone"

by G. SLAUGHTER, G3PAO*

Experience is a great chastener and if the Interference Committee's experience is any yardstick, then rfi can be likened to time and, like it, may well be with us forever! It is a wise amateur who appreciates that freedom from trouble today is no guarantee of freedom tomorrow, for neighbours can change television sets and audio equipment in just the same way as the amateur changes or modifies a transmitter or receiver.

If rfi is encountered, the operator ought not to see the situation as one of defeat and guilt, but rather as an opportunity to put into practice some of the principles and knowledge inculcated in passing the RAE and the subsequent extension of knowledge gained in furtherance of the hobby.

There are many end-points where rfi may emerge, which can be proved by the wide-ranging nature of the Interference Committee's correspondence. Piped tv, masthead amplifiers, hi-fi, colour tv—all cause some of the difficulties that beset members. Certainly many excellent articles appear from time to time in *Radio Communication* and elsewhere in connection with interference problems, but these are not always to hand when required or may need experience in construction to use. Whatever the cause and effect may prove to be, the problem of the angry or resentful neighbour can be the most difficult to overcome. For this reason a recommended procedure is for the amateur to seek guidance at an early moment in his trouble, rather than to permit the situation to deteriorate to such a state where a technically adequate solution to the interference factor cannot be applied to the affected equipment because of badly strained relations between the parties concerned.

When amateurs belong to a club operating an rfi clinic or group, then a prompt recourse to this group is essential. However, circumstances deny many operators an advantage of this kind; for these the remedy is to get in touch with the Interference Committee via RSGB headquarters. A member seeking help in this way will receive an acknowledgement and a confidential questionnaire to fill in, and the latter, when duly completed and returned to headquarters, will be passed to the committee for attention by a member or members most suitably qualified to deal with this particular type of interference. The questionnaire is a vital factor; it should be filled in honestly, conscientiously and comprehensively if an erroneous diagnosis is to be avoided.

It might be thought that here the matter ends, and quite often so far as the amateur affected is concerned it may well be so, but not for the committee. For the committee member(s) handling the problem must report back to the committee (which usually meets monthly) to assess action taken, in progress, for classification, or if necessary for further joint consultation. On average, some 40 cases are in progress at any one time. Not all members write back to advise whether the rfi has been successfully cured or not, but *all* results, negative or positive, are important. The committee would welcome this feedback to assist in the technical analysis and maintenance of records.

It will be appreciated that the opportunity of a personal visit by a member (or members) of the committee to the operator's own QTH may be geographically impossible, but it should be recorded that several extremely difficult cases have been dealt with in this way.

It has been noted that the advent of colour tv on uhf has changed the nature of amateur queries received, since a greater proportion of the vhf/uhf enthusiasts are experiencing difficulties. Up-to-date techniques for the effective alleviation of these newer problems is very much the concern of the Interference Committee, and it is now representing the amateurs' point of view to the radio trade. One well-qualified member regularly attends meetings of the BREMA (British Radio and Equipment Manufacturers Association) Interference Committee, where the Post Office is also represented. This is clearly a very useful point of contact indeed, and a privilege greatly valued by the RSGB. It is hoped also to put the Society's view to RTRA (Radio & Television Retailers Association) for passing on to its members. By this means it is hoped that the local dealer will be a little more sympathetic, knowledgeable and helpful when called in to assist in cases of amateur breakthrough.

The committee feels that there are still many amateurs needing aid, who for one reason or another are reluctant to grapple with this problem of interference. For these: the committee would like to help, is pleased to help, and can help, if it is asked. If there appears to be a little delay in a reply to a query, please remember that the Interference Committee members, as do all Council and committee members, work in their own time and are all volunteers.

* 6 Leggatts Wood Avenue, Watford, Herts.

INTERFERENCE PROBLEMS

Members accused of causing interference or who suffer interference from external sources are invited to seek the assistance of the Interference Committee in solving their problems.

Enquiries should be addressed to: The Chairman, Interference Committee, RSGB, 35 Doughty Street, London WC1N 2AE.

YOUR OPINION

The Editor
Radio Communication

Sir—We should like to add our comments on the recent criticisms of the *Radio Communication* frequency predictions (with which we have no connection.)

Forecasts are based on a predicted ionospheric index figure which can be directly related to the monthly mean sunspot number. The earlier that MUFs are worked out, the less accurate they are likely to be, since the predicted figures are revised monthly as readers will have noticed. Due to deadlines for publication dates, etc, the information on which frequency predictions are based can never be entirely up-to-date, although one would not normally expect any discrepancy to be very large.

However, in March 1972 the measured value of one widely-used ionospheric index rose suddenly to practically double its predicted value: between April and August it remained between roughly 60 and 90 per cent above the forecast, dropped to approximately 40 per cent in September and October, and returned to near the expected figure in November.

This unexpected and relatively long-lasting discrepancy could be responsible for the significant increase in observed muf above predicted values which has been commented upon in previous correspondence.

We agree with 9M2DQ that frequency/time graphs give a better picture, not only of expected band utilization, but the effect on this in ionospheric conditions differing from those assumed when compiling the predictions.

Yours faithfully,
E. L. Devereux, ex-G3CCZ/VP3CZ/6YACZ
C. E. Stone (Mrs), G3SGN

The Editor
Radio Communication

Sir—I should like to add my own comments to the letter from G4AHN and G8CKZ in the March issue.

I cannot help feeling that the procedure adopted by some notable stations during the 144/432 MHz Open Contest recently, is not within the spirit of the contest. In working several stations in parallel, a contest station does gain in scoring, as was quite obvious from the stations observed, and requires above average facilities in terms of both equipment (ie several receivers) and in operators.

To "tune both ends in and the middle out to both ends" requires four receivers and at least four operators at any one time. This type of requirement excludes the average contest group, and certainly the individual, and leaves, basically, the "professional" amateurs. Are they not really defeating the whole object of a contest by using what must certainly be an unfair advantage? By all means let us have well-disciplined operators, but do not overdo it.

Might I finish by agreeing most definitely with Rule 10 for VHF NFD 1973.

Yours faithfully,
B. W. Oughton, G4AEZ

The Editor
Radio Communication
Sir—While I am prepared to concede that Pact International Electronics Ltd have produced a most elegant and useful soldering iron with some novel features, (*RC* March 1973, p 177), they have certainly not produced "The world's first cordless soldering iron".

The first time I used one of those was in 1936 when I was a schoolboy. It was automatically recharged from the gas main when the iron was placed on the stand, it had a high thermal capacity, and was a most useful and versatile instrument.

Yours faithfully,
Ian Ford, BRS24601

The Editor
Radio Communication
Sir—*Radio/tv comedians*

Where is G3IOR's sense of humour?

Tony Hancock's "Radio Amateur" is generally accepted to be among the best half-dozen sketches he ever performed, otherwise we can be sure the BBC would not have repeated it. If it is a question of "Licence and Ham" or no "Licence" at all there is really not much argument is there?

Cheer up!

Yours faithfully,
G. B. Moser, G3HMR

PS. Who is this chap "Oscar" everyone is talking about?

The Editor
Radio Communication
Sir—*Facts wanted—fm as a system.*

One is left with the impression that Mr Priestley has already decided against fm before getting the facts he asks for. He does not specify for what purpose his fm system is intended. Is it wide band or narrow band, mobile, television and broadcasting, high or low power, portable or fixed stations, "earth bound" dx on hf bands exceeding, say, 3,000 miles, or vhf dx of a few hundred miles, and, most important, commercial or amateur application? Without clearly defined parameters no investigation is worth starting, and no conclusion worth listening to.

Using a particular system under conditions which are already well known to be marginal is a typical amateur activity which many of us enjoy. Success or failure under such conditions proves nothing. Repeated success means the conditions were not marginal, so does repeated failure!

Yours faithfully,
A. Stuart McNicol, GM3UU

Editor's note
Two other letters in reply to G3JGO's letter were received, from G2CD and G3PGO, but are too lengthy for inclusion here. All three were forwarded to G3JGO who replied as follows:

The Editor
Radio Communication
Sir—History has a habit of repeating itself!

In the early days of ssb the enthusiasts had to work near the band edges to avoid jamming. Then ssb became "with it" and it was proved that it had a 9dB gain. (The fact that this assumed full sinewave drive which conveys no information and would melt most linears was irrelevant!)

NBFM (which is the only sort we amateurs can use, Mr McNicol) has been used for years as an anti-rfi device, but with an envelope detector it has generally been regarded as a poor substitute for a.m. Now, sudddnly, fm becomes "with it" too.

Personally, I do not believe any system is a sacred cow, nor do I believe theoretical analyses which ignore the nature of speech waveforms! Has anyone any practical basis for the sudden superiority of a 60-year-old system?

Yours faithfully,
B. Priestley, G3JGO

OBITUARIES

Mr U. J. C. Goulder, G3IUF
Joe Goulder, of Bourne, Lincolnshire, died recently. He had been active on all bands down to 70cm for a number of years, and was a keen constructor of his own gear.

Major I. McAnsh, G3HAY/ZL2BW
We have recently learned of the death of Ian McAnsh on 29 May 1972, at Nelson, New Zealand. He was particularly well-known for his activities in encouraging amateur radio at the various British bases round the world, where he served, his last duty station being Singapore, where he held the callsign VS1BU. Since his retirement to New Zealand, his on-the-air activity had been restricted to the 80m band.

Mr A. R. Osborne, G4OV
Bert Osborne died in Bridport General Hospital on 27 March. First licensed in the 'thirties, he was heard regularly on all bands from 80 to 2m.

Mr J. M. S. Watson, G6CT
Jimmy Watson died at the age of 59, after a short illness, at Lymington, Hants, on 18 March. He was first licensed in 1932, when living at Westcliff-on-Sea, and maintained his interest in amateur radio up until the time of his death. During the pre-war years he worked closely with G5UK, G6IF, G2SO (now ZE3JO), G5VQ and G5XI; the latter two were present at the funeral.

We have also been advised of the death of **Mr F. Sinclair, G3SYU,** on 28 February.

SPECIAL EVENT STATIONS

Bath & West Show, 30 May-2 June
See also p116 February issue
This event is now also being run as a mobile rally, with talk-in on 80 and 2m. Amateurs assisting with the running of the special event station during and before the show, will be guests of the secretary, Lord Darling, at a ham dinner, to be held on the evening of 1 June. Visiting amateurs and SWLs will be able to purchase tickets at nominal cost. Advance admission tickets to the show, and all information from Lord Darling, Secretary, Bath & West Show, 3 Pierreport Street, Bath, marking application "GB2BWS". All station enquiries to G2DYM, QTHR.

Dundalk Maytime Festival, 18-27 May
The Dundalk ARS will be operating a special station, callsign EI0DMF, for the duration of the Maytime Festival. Operation will be on all bands, 80-10m, from 1900-2400 weekdays, and all day Saturdays and Sundays.

Long Eaton Carnival, 19 May
The Amateur Radio Club of Nottingham will be putting G3LEC on the air from the Long Eaton Carnival, West Park, Long Eaton. Operation will be on ssb, 10-80m, and possibly 2m a.m., and all contacts will be confirmed by a special QSL card, via the bureau. Further details from G8FRB, QTHR.

Newcastle-under-Lyme Charter Celebrations, 16 May-15 June
The University of Keele ARS, in co-operation with other North Staffs amateur radio societies, will be operating GB2OCC on all bands 160-2m, throughout the period of the celebrations, which commemorate the octocentenary of the town's charter. Offers of assistance with the running of the station from North Staffs amateurs would be welcomed, all enquiries should go to: V. J. Reynolds, G3COY, tel Stoke-on-Trent 44875 or Keele Park 371 ext 128.

Wootton Wawen, Solihull, 30 June-1 July
To commemorate the 1,250th year of the village church at Wootton Wawen, a special callsign GB3WWW has been requested. It is expected that operation will be from 6pm 30 June to 6pm 1 July, on all bands 10-160m.

CONTEST NEWS

IARU Region 1 VHF and UHF/SHF Contests

Starting in 1973, a number of revisions have been made to the rules of the annual IARU Region I VHF/UHF/SHF contests. First of all, and most welcome, it has been agreed that the starting and finishing times should be brought forward to 1600gmt. Secondly, the September event will now be held on 144MHz only, and we would like to see a much larger entry from UK stations. As in previous years, the UK entries for the October contest will be judged and published as for any domestic events, and the RSGB will award its own certificates to the UK winners.

September 1973 IARU Region 1 VHF Contest rules

The following rules have been extracted from the general rules for IARU Region 1 vhf/uhf contests:

1. Eligible entrants. All licensed radio amateurs resident in Region 1. Multiple operator entries will be accepted provided only one callsign is used. Contestants must operate within the letter and spirit of the contest and at no greater power than permitted in the ordinary licences of their country. Stations operating under special high power licences do so *hors concours* and cannot be placed in the contest proper.

2. Sections.

(i) Fixed stations 144MHz

(ii) Portable/mobile stations 144MHz

Portable/mobile stations may not change their location during the event.

3. Date and time. 1600gmt on 1 September to 1600gmt on 2 September.

4. Number of contacts. Each station can be worked once only, whether fixed, portable or mobile. If a station is worked again only one contact will count for points, but any duplicate contacts should be logged without claim for points and should be clearly marked as duplicates.

5. Types of emission. Contacts may be made on A1, A3, A3j, F2 or F3.

6. Contest exchanges. Code numbers exchanged during each contact shall consist of the RS or RST report, followed by a serial number commencing at 001 for each band and increasing by one for each successive contact. This exchange must be immediately followed by the QRA Locator of the sending station. (Example 579021YG46E.) QTHs may also be exchanged if desired.

7. Scoring. Points will be scored on the basis of one point per kilometre. The final claimed score must be shown at the top part of the first sheet.

8. Entries. Entries must be set out as shown in the example below. (See notes and VHF NFD Rule 19). They must be postmarked not later than 18 September and must be addressed to: The Chairman, VHF Contests Committee, 20 Harcourt Road, Wantage, Berks. Late entries will not be accepted.

9. Disqualification. Entrants deliberately contravening any of these rules will be disqualified. Minor errors may result in loss of points. Errors in callsigns and code numbers will be penalized by deducting the following percentage of claimed scores for both stations.

One error: 25 per cent. Two errors: 50 per cent. Three or more errors: 100 per cent.

The claimed contact will be disqualified for

(a) an obviously wrongly stated QTH when no QRA Locator is exchanged, or (b) a time error of more than 10 minutes.

10. Judging. Submission of a log implies acceptance of the rules. The decision of the organizing society is final.

11. Awards. The winner of each section will receive a certificate. The top scorer, whether fixed or portable, will be awarded the Region 1 VHF Trophy. The winner in the remaining category will be awarded the PZK Cup.

October 1973 RSGB UHF/SHF Contest rules (as part of IARU Region 1 UHF/SHF Contest)

1. Eligible entrants. As for September VHF Contest above.

2. Sections. There will be two sections, fixed and portable/mobile, on 432MHz and every other higher frequency amateur band.

3. Date and time. 1600gmt on 6 October to 1600gmt on 7 October.

4-7. As for September VHF Contest above.

8. Entries. Entries must be set out as shown in the example below. (See notes.) They must be postmarked not later than 22 October and addressed to: The Chairman, VHF Contests Committee, 20 Harcourt Road, Wantage, Berks. Late entries will not be accepted.

9-10. As for September VHF Contest above.

11. Awards. The winner of each section will receive a certificate.

Notes

1. In some countries it is customary to use a band identification letter (A for 144MHz, B for 432MHz, etc). Should this letter be used or not used, no penalty will be exacted.
2. An RSGB cover sheet (Form 427) and RSGB log sheets may be used for entries, which should otherwise be in the IARU format given below.
3. In the case of the September VHF Contest, entrants in RSGB VHF NFD may enter both the radial ring score and the score based on points per kilometre on the same log sheet (see rules for VHF NFD). Scoring for the October contest will be points per kilometre only, on all bands.

Sample contest log sheet

Contest..... Date..... Claimed score.....
Section..... Callsign.....
Name .....
Home address .....
Location of station: Latitude ..... Longitude: .....
Height above sea level in metres.... QRA Locator .....
Transmitter ..... Input power ..... watts
Operating frequencies ..... Crystal or vfo .....
Receiver ..... Aerials .....

Date time	Call-sign	Serial numbers		QTH	Emission	Dist. km	Points claimed
		Sent	Received				

Declaration

I declare that this station was operated strictly in accordance with the rules and spirit of the contest and I agree that the ruling of the organizing society shall be final in all cases of dispute.

Date ..... Signed .....

RSGB 21/28MHz Telephony Contest 1973 rules

Radio amateurs and SWLs throughout the world are invited to take part in this contest for single-operator stations. Each overseas entrant will receive a copy of the results by surface mail. Suitable contest log and cover sheets may be obtained from The General Manager, RSGB, 35 Doughty Street, London WC1N 2AE.

GENERAL

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

TRANSMITTING SECTION

1. The **General Rules for RSGB HF Contests** published in the January 1973 issue of *Radio Communication* will apply.

2. When. 0700gmt 13 October to 1900gmt 14 October.

3. Eligible entrants.

(a) Home 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 telephone system for which the entrant is licensed on the 21 and 28MHz amateur bands.

5. Scoring. British Isles stations may not work each other for points. Overseas stations may only claim points for contacts with stations in the British Isles.

(a) **British Isles stations.** Each completed contact will score five points. In addition, a bonus of 50 points may be claimed for the first contact with each country "on each band". For the purposes of scoring, the RSGB countries list will apply, with the exception that VE, VK, W/K, ZL and ZS call areas will each count as a separate country.

(*b*) **Overseas stations.** Each completed contact with a British Isles station will score five points. In addition, a bonus of 50 points may be claimed for the first contact "on each band" with each of the following British Isles prefixes. **G** 2, 3, 4, 5, 6, 8; **GC** 2, 3, 4, 5, 6, 8; **GD** 2, 3, 4, 5, 6, 8; **GI** 2, 3, 4, 5, 6, 8; **GM** 2, 3, 4, 5, 6, 8; **GW** 2, 3, 4, 5, 6, 8.

(*c*) Separate **check lists** showing the bonus points claimed for "each band" should be included.

6. **Entries** should be sent to: The RSGB HF Contests Committee, c/o M. Harrington, 123 Clensham Lane, Sutton, Surrey, England. Entries should be posted to arrive not later than Monday 10 December 1973.
7. **Awards.** The Whitworth Trophy will be awarded to the leading home section entrant. Certificates will be awarded to the leading station in each continent in the overseas section.

RECEIVING SECTION

1. The **General Rules for RSGB HF Receiving Contests,** published in January 1973 issue of *Radio Communication*, will apply.
2. **When.** As rule 2 of the transmitting section.
3. **Eligible entrants.** The contest is open to all short-wave listeners throughout the world. All entrants agree to be bound by these rules.
4. **Scoring.** British Isles entrants may only log overseas stations working British Isles stations in the contest. Overseas entrants may only log British Isles stations in contact with overseas stations in the contest.
   (*a*) **British Isles entrants.** Each complete log entry will score five points. In addition a bonus of 50 points may be claimed for the first station logged in each country "on each band". For the purposes of scoring, the RSGB countries list will apply, with the exception that VE, VK, W/K, ZL and ZS call areas will each count as a separate country.
   (*b*) **Overseas entrants.** Each complete log entry will score five points. In addition, a bonus of 50 points may be claimed for the first station logged, "on each band" of the British Isles prefixes listed in rule 5(*b*) of the transmitting section.
   (*c*) **Check lists.** As rule 5(c) of the transmitting section.
5. **Entries.** As rule 6 of the transmitting section.
6. **Awards.** The Metcalfe Trophy will be awarded to the leading British Isles Entrant. Certificates will be awarded to each continental leader of the overseas entrants.

June 1973 Microwave Contest rules

Date: 16–17 June 1973.
Times: 1600 to 1600gmt.
All entries and checklogs must be sent to: VHF Contests Committee, c/o 11 Liphook Crescent, LONDON SE 23.

1. Scoring contacts may be made on any amateur frequency above 1GHz, but lower frequencies may be used for setting up contacts.
2. Contest exchanges will be as follows:
   On the 1,296MHz band; RS or RST report followed by a serial number, QRA Locator and QTH.
   On each of the other bands: RS or RST report followed by a serial number and a code word of the operator's own choosing (eg "Centimetric Overture"). The same code word cannot be used on more than one band. Contestants must record their code word clearly on the 427 Cover Sheet accompanying the entry log for each band. If the station has not already been contacted on the 1,296MHz band, the QRA and QTH may be substituted for the code word. Serial numbers shall begin at 001 for each band, and information should be passed on the band for which points are claimed. All data should be recorded on the log.
3. Scoring will be as follows:
   1,296MHz band: two points per kilometre.
   2·3GHz band: three points per kilometre.
   Other bands: five points per kilometre.
4. The same callsign must be used on all bands for all scoring contacts.
5. Unless superseded by the above, the following General Rules will apply: 1, 2, 3, 4b, 6b, 7b, 8b, 9a, 10a, 11–24.

June 1973 70MHz Open Contest rules

Date: 9–10 June. **Times:** 1600–1600gmt.
All entries and checklogs to: VHF Contests Committee, c/o 20 Harcourt Road, Wantage, Berkshire.
The following General Rules, published in the January issue of *Radio Communication*, will apply: 1, 2, 3, 4b, 5a, 6a, 7a, 8b. 9a, 10a, 11–24. At the discretion of Council, the VHF Manager's Trophy will awarded to the winner of this contest.

Summer 1·8MHz Contest rules

1. The **General Rules for RSGB HF Contests,** published in the January 1973 issue of *Radio Communication*, will apply.
2. **When.** 2100gmt Saturday 23 June to 0200gmt Sunday 24 June 1973.
3. **Eligible entrants.** The contest is open to licensed amateurs in all parts of the world. Multi-operator entries will be accepted. There will be two sections:
   (*a*) British Isles stations.
   (*b*) Overseas stations.
   British Isles entrants must be members of the RSGB.
4. **Contacts.** CW (A1) only in the 1·8–2·0MHz band. County code letters, as published in the January 1973 issue of *Radio Communication*, must be sent after the report/serial-number group by all British Isles stations, eg for a contact from Surrey—579001 SY.
5. **Scoring.** British Isles Section—three points for each contact with a bonus of five points for the first contact with each new county within the British Isles, and with each new country outside the British Isles.
   Overseas Section—Overseas stations may claim points only for contacts with British Isles stations, and will score three points for each contact plus a bonus of five points for the first contact with each new British Isles county.
6. **Logs.** Column (5) of the log must be headed "County Code Letters Received". Multi-operator entries should show the callsign of the operator against each contact, and the names and callsigns of each operator should be listed on the cover sheet.
7. **Entries** must be addressed to RSGB HF Contests Committee, c/o S. V. Knowles, G3UFY, 32 Nursery Road, Thornton Heath, Surrey, CR4 8RF.
8. **Awards.** Certificates of merit will be awarded to the three leading entrants in each section.

February 1973 70MHz Open Contest results

The contest was supported by 36 entrants and from the few comments received it appears that most contestants are reasonably content with the rules. The few complaints received failed to focus upon any common cause for discontent.

Most contestants found conditions to be poor and many experienced deep QSB on some of the long path contacts. The leading stations were composed of portable stations who elected to brave the snow-covered hills in order to collect their share of glory. The overall winner was the Golden Valley VHF Contest Group whose station GW4ABR/P was operated by G3SNN and G4BEZ. The best fixed station entry was received from G3NEO, who was placed fourth a few points ahead of two other fixed stations, and a special Certificate of Merit will be awarded for this entry.

Posn	Callsign	Cnty	Score	QSOs	Best dx	Km
1	GW4ABR/P	MG	504	60	G3DAH	365
2	GW4BUC/P	DB	441	70	G3DAH	340
3	G3NJN/P	LE	292	44	G3VPK	365
4	G3NEO	YS	284	46	G3DAH	265
5	G3OHH	SD	280	40	G3DAH	295
6	G3RLE	YS	274	38	G3DAH	332
7	G4ARD/P	BD	267	73	GD2HDZ	362
8	G3TDM/P	OX	244	51	GD2HDZ	310
9	G3JEQ	SY	220	60	G3RLE	285
10	G3OBD/P	WE	176	48	G3NEO	
11	G6HD	KT	164	46	GW4ABR/P	292
12	G5UM	LR	160	36	GD2HDZ	268
13	GD2HDZ	IM	155	19	G4ARD/P	362
14	G3NPI	BE	154	39	G3NJN/P	340
15	G3WMR/P	SY	151	45	GW3ZEQ/P	275
16	G3DOV	NK	143	24	GW4ABR/P	275
17	G3LVP	EX	135	35	GW4ABR/P	300
18	G3RDQ	BS	128	30	G3NJN/P	320
19	G3WOS		127	30	G3NJN/P	240
20	G3KIN	SY	126	40		
21	GW3ZEQ/P	DB	120	22	G3WMR/P	286
22	G3TVW	EX	117	31	GW4ABR/P	275
23	G3ZLQ/P	OX	104	30	G3NJN/P	320
24	G3PGN	EX	102	34	G3RLE	200
25	G4AAW	SY	100	38	GW4ABR/P	255
26	G3KSU/P	HE	85	21	G3OHH	280
27	G3FIJ	EX	76	15	GW4ABR/P	322
28	G3VPF/P	DT	71	17	G3VPK	258
29	G3COJ	BS	68	20	GW4ABR/P	235
30	G3VKV	GR	59	13	G3NJN/P	260
31	G3XTQ	BD	51	15	GW4ABR/P	150
32	G3HBG	SY	42	12	GW4BUC/P	300
33	G3YQW	SX	33	15	G3TDM/P	135
34	G3WKS/A	SX	32	20	G4ARD/P	103
35	G2FJA	KT	15	11	G4ARD/P	86
36	G3UVS	DN	10	4	G3AET	80

DF Qualifying Round—High Wycombe

Date: 10 June 1973.
Map: OS Sheet 159 (The Chilterns).
Assembly: 1300bst for start at 1320bst.
Location: Old loop road on A40 half a mile south-east of Studley Green NGR 798948. Frequencies and callsigns will be announced at the start.

Intending competitors are asked to notify Mr G. T. Peck, Dell Cottage, Horsleys Green, Stokenchurch, Bucks. HP14 3UR, of the numbers in their parties requiring tea as soon as possible and not later than 1 June.

DF Qualifying Round—Chelmsford

Date: 24 June 1973.
Map: OS Sheet 162 (Southend-on-Sea).
Assembly: 1300bst for start at 1320bst.
Location: Tiptree Heath approximately three miles due west of Witham on the south-east side of B1022 NGR 883148. Frequencies and callsigns will be announced at the start.

Intending competitors are asked to notify Mr M. Hawkins, 24 St Cyrus Road, Colchester, of the numbers in their parties requiring teas as soon as possible and not later than 16 June.

1973 432MHz Cumulative Contests results

Interest in 432MHz appears to be static, with the level of activity during the 1973 Cumulatives remaining about the same as last year. Very many more stations came on the air for short sessions than sent in contest entries, and most of the leading logs contained a high proportion of callsigns not common to other entries.

While the popularity of high-gain, narrow-beamwidth arrays accounts for the good reports exchanged on many long-distance contacts, these aerials must undoubtedly carry some of the blame for the too-frequent complaints of rock-bottom conditions. Propagation was, in fact, quite good during the first two sessions, and normal for the remainder.

Many devotees of 432MHz obviously use the Cumulatives as offering better opportunities for a QSO rather than as having any real interest in contests. As G3PMX so rightly says, "The event deserves better support, perhaps more purpose is required to encourage participation." C.S.

Posn	Callsign	Score	QSOs	Best QSO	Km	Cnty	Pwr	Aerial
1	G3EOP	355	67	G8CTT	250+	YS	90	46 mb
2	G3KMS	340	68	G8AHF	334	LE	120	46 mb
3	G8APZ/P	262	78	G8EOP	265	BE	25	18 pb
4	G8BGC/A	237	77	G3KMS	265	HE	150	4 × 8/8
5	G8ANZ	200	40	G3KMS	240	ST	24	2 × 18 pb
6	G8BIL	196	55	GD2HDZ	270	WK	38	46 mb
7	G8ATK	173	65	G8BYV	200+	SY	10	2 + 18 pb
8	G3EHM	169	109	GD2HDZ	220	SD	100	2 × 46 mb
9	G8ACB	168	49	GD2HDZ	228	SD	55	2 × 46 mb
10	G3UBX	154	52	GD2HDZ	239	SD	20	4 × 46 mb
11	G5UM	152	65	G3ZJY	216	LR	15	14 el
12	G8CTT	145	114	G8EOP	275	KT	30	46 mb
13	G8ERW	140	56	GW8AWS/P	258	HF	26	18 el
14	G3ZMD	139	55	G8EOP	216	BD	30	46 mb
15	G4AEQ	123	42	G8BGC/A	250+	LE	1 o/p	46 mb
16	G3WOS/P	120	54	G3ZUL	120	BD	30	2 × 46 mb
17	G3ZUL	115	35	G8AYN	184	WR	32	18 pb
18	G4ADC	114	56	G8ACB	138	BD	30	46 mb
19	G3PMX	109	36	G8AYY	215	EX	7 o/p	18 pb
20	G8AAY	94	20	G3SXK	229	DT	28	18 bi square
21	G3EIK	92	34	G8EOP	220	HF	32	46 mb
22	G8CIT	82	50	G8AKE	156	MX	25/90	18 pb
23	G8ATD	78	34	G8EOP	230	BD	24	46 mb
24	G8AZU	73	53	G3NNG	86	MX	10	46 mb
25	G8BVF	62	28	GD2HDZ	175	LE	6	46 mb
	G8AQZ	62	29	G3KMS	260	ST	25	8/8 slot
27	G8BDO	52	34	G3EHM	67	NM	0·04	8/8 slot
28	G3ZOD	51	27	GD2HDZ	150+	CH	18	15 el
29	G3NZG/P	48	20	G8CUT	250	DT	25	8/8 slot
30	G8CQE	46	56	G8AKT	85	SY	15	18 pb
31	G8VN	45	35	—	50+	DY	22	10 el
32	G3FIJ	35	15	—	150+	EX	12	18 pb
33	G3SHY	22	20	G5UM	51	NM	25	46 mb, + 8/8
34	G8BKR	17	11	G8ACB	125	GR	8/25	46 mb
35	G4BKY	2	2	G8AII	19	GR	10	18 el

Colchester VHF/UHF Contest Rules

Date: 5–6 May 1973.
Time: 1600 to 1600gmt as per the open contest.
Scoring: RSGB ring system.
Modes: A.M., fm, ssb, cw, rtty.
Bands: 2m, 70cm, 23cm.
Rules: As general rules of RSGB with following addition:
Only contacts with Colchester radio amateur stations will count (also for SWL scoring), these will be identified by giving CRA after the serial number.
Operators: Any radio amateur or SWL.
Awards. Prizes will be awarded for first in each band and first/second overall contest, SWLs first/second overall contest.

Cray Valley RS 4th SWL Contest results

Posn	Listener	Total	Posn	Listener	Total
1	S. Green, G13863	91,356*	35	D. Johnson, A7511	12,684
2	C. Henderson, A7460	80,298*	36	M. Curtis, BRS30137	11,798
3	R. A. Treacher, BRS32525	67,209	37	W. M. Edwards, BRS33328	11,765
4	S. Phillipo, A7531	53,939	38	B. Harrison, BRS33083	11,651
5	J. Fitzgerald, BRS33823	53,898	39	G. Park, A7966	11,285
6	J. Young, A7058	53,635	40	B. Taunton, BRS33442	11,066
7	R. Shilvock	53,224	41	T. Endo, JA1-1176	10,859
8	D. A. Whitaker, BRS25429	51,811	42	B. Hughes, BRS25901	10,754
9	A. West	51,165	43	R. James	10,578
10	S. Foster, G10173	46,720	44	D. Churchill, G14000	9,658
11	H. Ohnuki, JAI-11166	45,506*	45	C. T. Jowett, A7058	9,529
12	C. Duinkerken, PA-1722	43,112*	46	P. Davise	9,460
13	R. Baker, BRS32804	40,668	47	R. Hammond, A8078	7,342
14	J. Skidmore, BRS26431	38,164	48	Christina Millington, A7783	7,211
15	R. H. Nicholls, A6265	37,711	49	K. Grabban, A8055	7,205
16	N. Paterson, A6214(GM)	34,582*	50	P. Homer	6,969
17	A. Hall	28,392	51	P. Eaton	6,830
18	J. Guy, BRS33370	24,512	52	M. Austin, G12941	6,739
19	R. J. Ware, BRS32457	24,008	53	R. N. Osborne, A8093	6,233
20	F. C. Handscombe, A7850	23,873	54	H. Klein, PL-12275	6,034
21	M. Bell, A8066	23,253	55	P. J. Whybrow	5,878
22	F. C. Powell, BRS18461	23,018	56	J. MacDonald	5,031
23	R. D Graves, A7159	22,845	57	A. E. Pobjoy	4,055
24	M. Hardy, ZE-101	20,519*	58	S. K. Parry, A7767	3,694
25	S. C. Wessely, A7768	20,275	59	P. Steinkamp	3,557
26	J. R. Lord, A7731	19,906	60	R. Dickens, A8121	3,223
27	R. W. Thomas, BRS15822	19,248	61	T. Cooper, BRS28005	3,195
28	S. Scott	19,034	62	M. Schluter, A7951	2,217
29	K. Muller, 3D6-14035	18,486	63	T. Martin	965
30	R. Parker, A8017(GW)	18,426	64	B. Keal, A8030	864
31	N. Clarke, A7637	17,900	65	R. Dawson	304
32	B. McLean (GM)	15,373	66	Gina Kiss, HA5-185	182
33	D. E. Green, A7497	14,844	67	M. Sakai, JA2-5022	100
34	O. L. Cross, BRS33364	14,703			

National Amateur Television Contest

Organized by the British Amateur Television Club.
Dates and times: 30 June, 1700-2300gmt;
1 July, 0800-1200gmt.

The same station may be contacted in each of the two sessions but not twice in the same session.
Eligible entrants. All amateurs licensed to transmit or receive amateur television.
Sections
(a) Portable stations
(b) /A and fixed
(c) Stations which can only receive amateur tv.
Calling. Call "CQ video contest" on either 70cm or 144MHz and announce which band you will be listening on.

Contest exchanges shall consist of:

(a) Serial number given by sound. The serial number shall commence at 001 and advance by one for each contact throughout the whole contest.
(b) The QTH(QRA) Locator and station location which shall be given by distance in kilometres and bearing from a well-known town or city.
(c) The vision signal report based on the BATC reporting chart of 0–5.
(d) The frequency of the vision signal received, as given in the vision caption. (No points will be deducted if this is not given).

Contest entries. Logs should contain the following information in this order:

1. Date and time in gmt.
2. Callsign of station contacted.
3. QTH(QRA) Locator received.
4. Station location as received.
5. My report on his vision signal and serial number.
6. His report on my vision signal and serial number.

7. The frequency of his vision signal as transmitted on his vision caption (frequency to be to two decimal places).
8. Points claimed for the contact.

Scoring. Each contact shall be scored at **one** point per kilometre between station locations.

All entries should be accompanied by a cover sheet giving the following information:

1. Name and address for correspondence.
2. Callsign used.
3. QTH(QRA) Locator as transmitted.
4. Station location as transmitted.
5. Frequency of vision carrier as transmitted by vision caption.
6. Claimed total score.
7. Brief details of vision station.
8. Best contact distance in kilometres.
9. Any other comments.

NB. All entrants must operate within the terms of their licence.

All entries must be postmarked not later than 23 July and should be sent to: The Adjudicator, BATC, 10 Pilgrim Road, Droitwich, Worcestershire WR9 8QA.

Contests calendar

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

RAYNET

by S. W. LAW, G3PAZ*

We trust that we speak to the converted if we repeat that one of the most important aspects of communications is absolute accuracy in the passing of messages, and particularly in Raynet must we ensure that every message which is passed is completely accurate in the minutest detail.

The average radio amateur is well known to be meticulous in ensuring that the vital content of a QSO is absolutely accurate, as it must be if the log entry is to comply with regulations. Especially is this so if points are to be gained or lost in a contest. Can we afford to be less particular if a life may be at stake? Raynet is no idle pastime to while away the odd few hours; it is vital that we make it crystal clear to those to whom our service is offered that radio amateurs and Raynet in particular can safely be entrusted with the type of messages that must at all cost be accurately transcribed. It is their way of life and, we repeat, it could readily save lives!

Raynet Committee

The meeting which was to have been held in mid-March had to be cancelled at short notice due to the chaotic conditions consequent upon the railway dispute. At the time of writing it has not been possible to arrange an alternative date, but every effort is being made to do so. We ask for the indulgence of correspondents who may be awaiting replies.

Activity in Wales

Alan Glassford, GW3ACF, would be very glad to hear from prospective members in Glamorgan, particularly in the Port Talbot area. Alan is QTHR or is available on the landline at Burton Ferry 812475. We hope to hear that he will not be disappointed in the response to this request. Meanwhile we hope to have more to report from the principality in due course. It is an important and hazardous area with difficulties in radio coverage on account of the terrain.

Safety and rescue

We have been taken to task (and rightly so) by a correspondent who is a long-established and fully-qualified industrial safety engineer in several fields for mentioning only a minor source of information of the hazards that might be worthy of study by our group controllers in order to expand their awareness of conditions and methods outside their normal experience, thus improving the efficiency of our system.

Let us hasten to point out, therefore, that the fountain head of accident prevention has been for many years past the Royal Society for the Prevention of Accidents (RoSPA). We speak from our own personal experience when we assure members that there is little in this sphere which is not covered by the knowledge and expertise of this long-established organization. Despite the fact that their wide activities have been somewhat curtailed by the withdrawal of Government support in the early 1950s, a great deal of information is available on request and we believe that free lectures and films are still to be had for the asking. By all means contact RoSPA and explain your aims and the facilities offered by Raynet. You may learn a lot.

The South-east

The Surrey group was due to hold a concentrated exercise in the sector under the control of G3XUU at 0930gmt on Sunday 29 April. De-briefing will be carried out by Surrey controller G3HVE and the results added to the store of knowledge gleaned over the many years of the group's experience.

Honorary registrations secretary: **Mrs Jane Balestrini, "Merrivale", Willow Walk, Culverstone, Gravesend, Kent DA13 0QS.**

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

MOBILE RALLY NEWS

ARMS Mobile Rally, 17 June
The ARMS will be holding this year's mobile rally at RAF Cosford, 8 miles NW of Wolverhampton, on the A41 and near the Shropshire/Staffordshire border. There will be a 2m and 160m talk-in, and a large trade show—inquiries for this to Mr W. S. Barwick, 34 Malvern Road, London N8 OLA. Other attractions include the RAF Historic Aircraft Museum, gliding, etc, details from G3FPK, QTHR.

Bath & West Show, 30 May-2 June
(See also *Special Event Stations*)
It has been decided to run a mobile rally at the show, with talk-in on 80 and 2m, in addition to the special event station already publicized.

Cardiff RSGB Group Mobile Rally, 20 May
The site of the Cardiff Mobile Rally will be Porthkerry Country Park, near Barry, which is 300yd from a beach. It will start at 1.30pm, talk-in facilities being available on 144·480MHz. Among the attractions will be a df hunt on foot (160m), to begin at 3pm. For further details see *Club News*, Region 10.

Cornish RAC Mobile Rally, 8 July
The Cornish Rally will be held at the Treviglas County Secondary School, Newquay, Cornwall, and talk-in will be available on 2, 4, 80 and 160m, from 10am onwards. The usual high standard of attractions will be maintained, with stalls, sideshows, raffles, etc.

Elvaston Castle Mobile Rally, 10 June
Elvaston Castle is situated by the B5010, which runs from the A6 to the A6005, five miles SE of Derby. Talk-in will be available from 10am onwards, with G3EEO/A on 160m, G3VKH/A on 4m, and G3ZBI/A on 2m. There will be trade stands, bring-and-buy sale, a white elephant stall, and a police dog display, along with the usual prize draw. Further details from Mr P. Neal, G3WFU, 94 Jubilee Road, Shelton Lock, Derby, DE2 9FD.

Hull Mobile Rally, 27 May
The second mobile rally to be held by the Hull & DARS will take place at the East Riding College of Agriculture, Bishop Burton, Nr Beverley, Yorkshire. The grounds will be open from 1200 onwards, and talk-in facilities will be available on 160m (G3AMW/A) and 2m (G8GBY/A). As last year, the emphasis will be on attractions and entertainments for all the family and will include children's film show, technical lecture, mobile treasure hunt, refreshments and barbecue, bring and buy sale, and trade stands, etc.

Northern Mobile Rally, 20 May
This rally has already been publicized, see the March issue, page 203. However, it should be noted that the date has been changed (previously it was given as 27 May). Talk-in facilities will be available on 160m and 2m, and the rally will begin at 12 noon. Venue as in *Mobile Rallies Calendar*.

Preston ARS Mobile Rally, 19 August
(Note this is a new date). Site is Kimberley Barracks, Deepdale Road, Preston, Lancs (free car-parking facilities). There will be talk-in on 160m and 2m, trade stalls, refreshments, licensed bar, and bring & buy stall.

1973 Spalding Tulip Time Rally, 6 May
The site for the rally is a pleasant riverside situation, with camping and caravan facilities, at Surfleet, four miles north of Spalding on the A16 Spalding-Boston road. The picnic site, venue for the event, is immediately south of the bridge and on the east side of the road. Among the attractions will be a display of vintage radio by the Wireless Preservation Society, amateur television by BATC, prize for longest distance travelled to rally, refreshments, trade stands, bring-and-buy, etc. Talk-in stations as follows: G3VPR/P on 1,980kHz, G3MMS/P on 2m, G3YFS on 4m. Further information from Roy Harrison, G3VPR, 38 Park Avenue, Spalding, Lincs.

White Rose Rally report
This was the first mobile rally of the 1973 season, taking place at the Lawnswood School, Leeds, on 1 April. Organized by the White Rose Radio Society, it was an outstanding success with an estimated 2,000 visitors attending.

Twenty-five mobiles were worked by the top-band talk-in station G3XEP/A, while 31 mobiles were worked by the 2m talk-in station G4BAO/A. Despite the ogre of VAT, the dealers reported brisk business.

A feature of the rally is the raffle and the photograph shows White Rose president G3YFP, left, and secretary G3YED officiating.

Photo: G3FCW

Mobile Rallies Calendar

6 May	Spalding Tulip-Time.
13 May	South Leicestershire, at Westfield Activity Centre, Rosemary Way, Hinckley, Leics.
20 May	Cardiff RSGB Group, Porthkerry Country Park, near Barry.
20 May	RAIBC Picnic, with Southampton RSGB Group, at the Fairground, Broadlands Estate, Romsey, Hants.
20 May	Northern, at Moorgrange Secondary School, West Park, Leeds. (Note change of date).
27 May	Hull & DARS, at Bishop Burton, near Beverley, Yorks.
27 May	Maidstone, "Y" Sportscentre, Melrose Close, Maidstone.
30 May—2 June	Bath & West Show, Shepton Mallet, Somerset.
10 June	Elvaston Castle. Elvaston Castle Countryside Park, Nr Derby.
17 June	ARMS, RAF Cosford, Shropshire.
24 June	Bristol City and County RSGB Group, at Longleat, Warminster, Wilts.
1 July	South Shields and DARC, at Redwell School, Prince Edward Road, South Shields.
7 July	Hanworth Carnival, Hanworth Air Park, Hanworth, Middlesex.
8 July	Cornish, Treviglas County Secondary School, Newquay, Cornwall.
8 July	Upton, Worcester & DARC.
15 July	Scarborough ARS, Burniston Road Barracks, Scarborough.
22 July	Anglian, Suffolk Showground, Bucklesham Road, Ipswich.
22 July	Southdown, Polegate, Wilmington.
5 August	RSGB Woburn Abbey Rally.
12 August	Torbay ARS, Newton Abbot Rugby Ground, Newton Abbot, Devon.
12 August	Derby, Rykneld School, Bedford Street, Derby.
19 August	Bristol Mobile Picnic Ashton Court Bristol.
19 August	Preston ARS, Kimberley Barracks, Deepdale Road, Preston, Lancs. (New date).
23 Sept	Harlow & District, Netteswell Comprehensive School, Harlow.

CLUB NEWS

REGION 1 — RR B. O'Brien, G2AMV

Ainsdale (ARC)—Members should contact N. Horrocks, G3CUZ, for details of meetings.

Blackburn (ELARC)—First Thursday each month, 7.30pm, Edinburgh House, Shearbank Road, Blackburn. Secretary: W. E. Baxendale, G8FDG, "Juverna" Westland Avenue, Darwen, Lancs.

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

Bolton (B & DARS)—White Lion Hotel, Moor Lane, 8pm, on the 3rd Tuesday in each month. Topband net 1200gmt on Sundays. Secretary: S. Macdonald, G4AQB, 8 Archer Avenue, Bolton.

Bury (B & RRS)—Second Tuesday each month, 8pm, George Hotel, Market Street, Bury.

Carlisle (C & DARS)—Mondays, 7.30pm, Currock House, Lediard Avenue, Currock. Secretary: G8GSE, 6 Carlton Gardens, Stanwix, Carlisle GA3 9NP.

Cheshire (Mid-Cheshire ARC)—Wednesdays, 7pm, Technical Activities Centre,Winsford Verdin Comprehensive School, Grange Lane, Winsford. Nets on 160m, 7pm, Mondays; on 2m, 7pm, Tuesdays. Details from G3JWK.

Chester (C & DARS)—Tuesdays, 8pm, YMCA Chester, except the 1st Tuesday in each month which is a net night on 145·08MHz and 433·15MHz. Further details from G8AYW, G6AHC/T, QTHR.

Douglas IOM (D & DARS)—Secretary, GD3YUM, will be pleased to hear from any member who intends to visit the island.

Eccles (E & DARC)—Tuesdays 8pm, Bridgewater School, Worsley, Manchester. Club 2m net 1100am, Sundays, on 145·65MHz. All visitors and prospective members welcome. Secretary: G4AFQ, QTHR.

Furness (FARS)—Members meet each Thursday at the Cavendish Arms Hotel, Dalton-in-Furness. Projects and lectures are a regular feature. Vistors are welcome.

Lancaster University (UOLARS)—We hold meetings every Wednesday at 7pm, in Furness College, together with RAE and morse clases. The society is active on the hf bands and 2m, using G3ZBY and G8DOU. The rtty gear is also operational on these bands. Skeds and visits welcomed, enquiries please to Colin Pegrum, Department of Physics.

Leyland Hundred (ARG)—Second Monday each month, 7.30pm, Rose & Crown, Ulnes Walton, Leyland. Net night Saturdays, 2000gmt on 145·8MHz. Details from F. Harrison, G3XII, 78 Lancaster Lane, Leyland, Lancs. The group is running a bring and buy stall at the NRS Convention at the Wythenshawe Forum on 6 May. Bring your surplus gear and raise some capital.

Liverpool (L & DARS)—Tuesdays, 8pm, Conservative Association Rooms, Church Road, Wavertree. Secretary: G3WCS.

Liverpool (NLRC)—Tuesdays, 8.30pm, informal meeting at the "Nags Head", Thornton, Crosby, Liverpool 23. Visitors welcome. Secretary: Alan L. Hart, G4BLI, 50 Strawberry Road, Liverpool, L11 7AD.

Liverpool University (LUARS)—Meets every lunchtime in the Radio Room, Students' Union. Please arrange visits with the secretary: Nigel Pope, G4AXA, c/o Students' Union, 2 Bedford Street North, Liverpool 7.

Manchester (M & DARS)—Wednesdays, 7.30pm, All meetings include morse classes. 205 Droylesden Road, Newton Heath, Manchester 10, Secretary: G3IOA.

Manchester (SMRC)—Fridays, 8pm, at the Sale Moor Community Centre, Norris Road, Sale, Cheshire. The vhf lads meet on Mondays at 8pm at the club shack, Greeba, Shady Lane, Manchester 23, with operation of G3UHF on 2m and 70cm. 4 May (Rag chew), 11 May (DF demonstration and practice), 18 May (AGM, please arrive early), 25 May (Talk by the winner of the home-built equipment contest), 1 June ("Batteries, part 2" by W. L. Seddon, G3VIW), 8 June (Review of club project, QRP transmitter), 15 June ("And now for something completely different"), 22 June ("Transistorized regulated power supplies" by D. C. Holland, G3WFT), 29 June (Mini df contest). The club is also running an RSGB DF qualifying round on 20 May, details from G3WFT. Visitors are welcome on both Mondays and Fridays. Hon sec: G3WFT, QTHR.

Manchester University (ARS)—G3VUM is active on all hf bands and now also on 2m. Details may be obtained from G4AZA, G3ZNS or G3XDY. The programme of lectures, visits, RAE and morse tuition continues as previously. Enquiries may be addressed to any of the above at the University Union, Oxford Road, Manchester.

Preston (PARS)—10 & 24 May, 7 & 21 June, 5 July, 7.30pm. Windsor Castle (Private room) St Paul's Square, Preston. Secretary: G. Earnshaw, G3ZXC. Morse practice, 7.30pm, main feature 8pm.

Stockport (SRS)—Second and fourth Wednesdays each month, 8pm, Blossoms Hotel, Buxton Road, Stockport. Secretary: G. R. Phillips, G3FYE, 6 Ross Avenue, Davenport, Stockport.

Thornton Cleveleys (ARS)—First and third Wednesdays, 8pm, St John Ambulance Brigade HQ, off Fleetwood Road North (behind Police Station), Thornton, Lancs. Project group meets on Fridays, 7.15-9pm, at the Project Laboratory, Rossall School, Fleetwood. Work in hand includes 160 and 2m transmitters and receivers. Please note acting secretary is: J. Duddington, G4BFH, The Grove, Thornton Cleveleys, Blackpool.

Warrington (W & DARS)—Tuesdays at Thames Board Mills Social Club, Alford Hall, Manchester Road, Warrington. Secretary: G3ZRN. Alternate meetings are devoted to beginners.

Wirral (WARS)—First and third Wednesdays each month, 7.45pm, Soorts & Recreation Centre (Old Drill Hall), Grange Road West, Claughton, Birkenhead. Secretary: G3WSD.

Wirral (Wirral DX Association)—Last Thursday each month at members' homes. Visitors are welcome—please inform secretary beforehand. May at G4AHC. Please note new secretary: T. O'Neill, G4AHC, 41 Willoughby Road, Wallasey.

Northern Radio Society's Annual Convention will take place on 6 May. Please note new venue which is the Wythenshawe Forum.

Merseyside members meet for lunch on the first Monday of every month at the Strand Hotel, Brunswick Street, Liverpool. It is essential to book beforehand through either G3VQT or G2AMV.

REGION 2 — RR J. E. Agar, G8AZA

Club secs: please note change of address, J. E. Agar, G8AZA, 291 Overdale, Southwold, Cayton, Scarborough, tel 883200. Please confirm club news on standing entries.

Denby Dale, Huddersfield (DD & DARS)—16 May (Visit to Yorkshire TV, Leeds), 30 May ("Measurements and equipment" by L. M. Doughty, MSc), 13 June (Visit to BBC, Holme Moss), 27 June ("4m and down" by J. P. Billingham, G4AGQ), 7.30pm at Denby Dale Pie Hall. Further details from J. Clegg, G3FQH, 8 Hillside, Leak Hall Lane, Denby Dale, Huddersfield, HD8 8QZ.

Middlesborough Post Office ARC (POARC)—Every Thursday, 7.30pm, at 200 Marton Rd, Middlesboro. Also active in Teeside Raynet Group, Sundays at 1900 on 145·8. Club callsigns: G4BAY and G8GPO. Details from hon sec: G. Gaunt, G8CDP QTHR, or phone Middlesboro 38237.

Otley (ORS)—Please note change of date for Northern Mobile Rally in Mobile Rally Calendar. Details from hon sec: D. G. Mott, Otley Amateur Radio Society HQ, Otley.

York (YARS)—Thursdays, 7.30pm, at 61 Micklegate, York. Future programme will include a talk on "DX experiences" by the club president, G3TMN, date to be fixed. Details from hon sec: G3WVO, K. R. Cass, 4 Heworth Village, York.

REGION 3 — RR B. Kennedy, G3ZUL

Birmingham (MARS)—15 May ("RTTY" by G3MNV), The Birmingham and Midland Institute, Margaret St. *G3ZMT.*

(Slade)—4 May ("A portable receiver in an evening" by J. Smith, G3JZF). Club meetings on 18 May, 1, 15 and 29 June, 8pm, Church House Erdington, Birmingham 23. *G4BRT.*

(South)—Club meets on first Wednesday of the month at Hampstead House, Fairfax Rd, West Heath, Birmingham 31. *G8GDZ.*

Bromsgrove (B & DARC)—No information. Club meets on second Friday of the month at Royal Oak, Barley Mow Lane, Catshill. *G3VGG.*

Coventry (CARS)—4 May (Night on the air), 11 May (2m night), 18 May (Night on the air), 25 May (Possible visit to Elmdon Airport), 1 June (Preparation for NFD), 8 June (Night on the air), 15 June (Night on the air), 22 June (Treasure hunt), 29 June (Portable night on the air), 8pm, Baden Powell House, St Nicholas St, Radford Rd, Coventry. *G3TFA.*

Cannock (CCARS)—No information. Bridgetown Social Club, *G8EHY.*

Dudley (DARC)—1, 15 May, 12, 26 June, 8pm, Central Library, St James's St, Dudley. *G3PWJ.*
Hereford (HARS)—4 May (Cider Festival participation), 18 May (To be arranged), first and third Friday of each month, Civil Defence HQ, Goal St, Hereford. *BRS30628.*
Lichfield (LARS)—No information. Club meets first Monday and third Tuesday of each month at the Swan Hotel, Lichfield. *G8EID.*
Mid-Warwickshire (MWARS)—No information. Club meets at 28 Hamilton Terrace, Leamington Spa. *G3UDN.*
Nuneaton (NARS)—No information. Club meets on the first Tuesday of the month at Nuneaton Technical College, Hinckley Rd, Nuneaton. *G4AEH.*
Rugby (R & DR & EC)—Club has informal meetings on the last Tuesday of each month at the Lawrence Sherriff Arms in the town centre. *G3YQC.*
Redditch—No information. Club meets at the Old People's Centre, Park Rd, Redditch.
Solihull (SARS)—No information. Club meets at the Manor House High St, Solihull. *G4ABV.*
Shrewsbury (SARS)—No information. Club meets every Thursday at Harlescott Youth Centre, Sundorne Rd, 7.30pm. *G3UQH.*
North Staffs (NSARS)—No information. Club meets every Monday at the Harold Clowes Community Centre, off Dawlish Drive, Bentillee, Stoke. *G4BEM.*
University of Keele. (UoKRS)—GB2OCC on the air on all bands from 16 May-15 June. *G3COY.*
Stoke-on-Trent (SoTARS)—No information. Club meets at 2a, Race Course Rd, Oakhill, Stoke-on-Trent.
Stourbridge (S & DRS)—At the recent AGM the following officials were elected. President: Dr P. Sugden, G8DZQ; secretary: B. Powell; treasurer: R. Wright, G8HET. 1 May (Informal at Shrubbery Cottages), 21 May (To be announced), 5 June (Informal meeting at Shrubbery Cottages), 18 June ("Radio and television servicing" by A. Parkes). Club meets at Longland School, Stourbridge, 8pm. *BRS32183.*
Stratford-upon-Avon (SuA & DRC)—No information. *G8GAG.*
Sutton Coldfield (SCRS)—No information. Club meets at 8pm at Sutton Coldfield, Town Football Club Social Centre, Coles Lane. *G8ALO.*
Wolverhampton (WARS)—7 May (Home-built gear competition), 14 May (Natternite), 18 May (Annual dinner, Tattersall Suite, Wolverhampton Race Course), 21 May (Discussion on printed circuits), 2 June (Demonstration station at the Tipton Carnival), 4 June ("Policing of Motorways" by Chief Inspector Hanbury), 11 June (Natternite), 18 June (Discussion on power supplies). Morse classes every Friday evening at hq, 7.30pm, Neachells Cottage, Stockwell End, Tettenhall. *G3UBX.*
Worcester (W & DARC)—Meetings are now held at the Old Pheasant, New St, Worcester. 7 May ("Mammoth tanker navigation and docking"), 19 May (NFD planning), 4 June (To be arranged), 16 June (To be arranged), *G8ASO.*
Wrekin (WARS)—2 May (Film night), 9 May (Portable expendition finalized), 16 May (2m aerial erection, G3ZME on the air), 23 May (RAE post-mortem), 26-28 May (Portable expedition, GW3ZME/P), 30 May (Discussion on the portable expedition), 6 June (Films), 13 June (Natternite), 20 June (Fault finding competition), 27 June (Club project). Club meets every Wednesday at Ketley Bank Youth Centre, near Oakengates, except first Wednesday of the month when held at Walker Technical College, Wellington, 8pm. *G3UKV.*
Midland Video Group (BATC)—The next meeting will take place on 18 June at Tube Products Sports and Social Club, Oldbury, Worcs. G5KS, QTHR for further details.

REGION 4 — RR T. Darn, G3FGY

Derby (D & DARS)—2 May (Surplus sale), 9 May (Surprise night), 16 May (DF practice night), 23 May (Expedition to Andorra—ARCON), 30 May (Film show), 2/3 June (NFD at Drum Hill, Little Eaton), 6 June (Surplus sale), 13 June ("Inverters" by Dr T. Beaumond, G3VLF), 16 June (Exhibition at Darley Dale Scouts field day), 20 June (DF practice night), 27 June (Recordings from the society's archive), 7.30pm, Club Room, 119 Green Lane, Derby. Officers elected at the AGM were: chairman, T. Darn, G3FGY; vice-chairman, J. D. Bosworth, G8BAV; secretary/treasurer, F. C. Ward, G2CVV; Committee: W. Barker, G3WAL, Mrs R. I. Buckby, R. I. Buckby, G3VGW, C. Doughty, BRS34012, G. Gregory, K. Griffin, BRS31618, D. Powell, G3RLB, M. Shardlow, G3SZJ, H. Stratton, G8HCS and R. Webster, BRS30300.
Grimsby (GARS)—Alternate Wednesdays, at the Community Centre, Duncome St, Grimsby, 9 and 23 May, 6 and 20 June, commencing at 7.30pm.

Philip Lawson, A7866, (right) receiving a replica of the Founder Members' Trophy at the Derby and District ARS AGM from T. Darn, G3EGY, society chairman. *Photo: M. Shardlow, G3SZJ*

Lincoln (LSWC)—9 May (Open night), 16 May (DF evening), 23 May (Films), 30 May (Treasure hunt), 6 June (Open night), 13 June (Discussion evening—a chance to meet Tom Darn, Region 4 rep), 20 June (DF evening), 27 June (Treasure hunt). All meetings are held at Lincoln Astronomical Society Lecture Room, Westcliffe Street, off Burton Road, Lincoln. Visitors and prospective members are always welcome
Mansfield (MARS)—Club meetings are held on the first Friday of the month at the New Inn, Westgate, Mansfield, starting at 7.30pm.
Melton Mowbray (MMARS)—18 May ("Contest operating" by R. Winters, G3NVK and P. Crust, G3XYC). All meetings at St John Ambulance Hall, Astordby Hill, Melton Mowbray, at 7.30pm.
Nottingham (ARCON)—Every Thursday, 7.30pm, at the Sherwood Community Centre, Mansfield Road, Nottingham. Details of events on Radio Nottingham.
Spalding (S & DARS)—Just received, a copy of the Spring "Spalding Radio News" a very interesting and well produced magazine, congrats to all concerned (G3FGY). 18 May (Natter nite, at the Ship Albion (Lounge bar)), 7.30pm. 15 June (Tape lecture and films), Teacher's Centre, Knight Street, Pinchbeck, Nr Spalding at 7.30pm. 6 May (Tulip time rally at the Picnic Site, Surfleet). Everyone welcome.

REGION 5 — RR P. J. Simpson, G3GGK

Bedford (B & DARC)—3 May (Junk sale, auctioneer extraordinaire: G3XKB), 10 May (Inventors club + NFD planning), 17 May ("Some digital techniques in communications, 1," by G8HGW), 24 May ("Direction finding on 2m, practical equipment" by G5AGU, G4AHE), 27 May (Spring holiday Net, 3·750 at 10.30 local), 31 May (Planning G3WTP club station and NFD plans), 2/3 June (NFD), 7 June (Setting up G3WTP club station and NFD pm) 14 June, ("Some digital techniques in communications, II" by G8HGW), 21 June (2m fox hunt), 28 June (Members' equipment, bring along an item of kit, homebrew or commercial for a 5min demo). 7.30pm, "The Dolphin", The Broadway, Bedford. Hon sec: John Bennett, G3FWA, 47 Ibbett Close, Kempston, Bedford.
Bishop Stortford (BS & DARC)—No details. Contact hon sec: Arthur Stanley, G3WUR, 42 Havers Lane, Bishop Stortford, Herts.
Cambridge (C & DARC)—At the AGM on 9 March the following officers were elected for 1973: chairman—G4AKD; treasurer—John Watson; secretary—G5BBP. The retiring officers reviewed the year's events and concluded by presenting the Granfield Trophy to Malcolm Witham and Roger Mann for services to the club. Future meetings will consist of one main meeting per month on the first Friday at Brooklands House, Brooklands Ave, Cambridge and all other Fridays will be informal/constructional at club hq. 4 May ("World on a bicycle, part 2"), 1 June ("Filters" by G3YFZ). Hon sec: S. Stimpson, G5BBP, c/o club hq, Corporation Yard, Victoria Rd, Cambridge.

Romance in Region 5. Miss Barbara Clements, G8FDE, a member of the Cambridge and Ely radio clubs, and Mr Colin McManus, G8FFC, of the Peterborough club, whose first QSO in September 1971 was followed by their first meeting at the March ARS dinner/dance last year, are now engaged. Barbara took the RAE in May 1971 at the age of 17 and became the 100th licensed member of the Pye Telecoms Amateur Radio Group. Barbara is a secretary with Pye Telecoms and Colin is a radio and tv engineer

Photo: Peterborough Evening Telegraph

Dunstable Downs (DDRC)—4 May (Between week), 11 May ("70cm PAs" by G6JP), 13 May (DF hunt, 2m), 18 May (Between week), 25 May ("PSU for a Pye Cambridge" by G8FAL), 1 June (Between week), 8 June ("The non-professional approach" by G3HAL), 15 June (Between week), 22 June (Annual fun night, G3WBC), 24 June (DF hunt, 2m), 29 June (Between week). 8pm at Chews House, 77 High St South, Dunstable, Beds. Hon sec: C. G. Powell, G8BPK, 1 Wenwell Close, Aston Clinton, Aylesbury, Bucks.

Ely (EARS)—7.30pm, alternate Thursdays, Adult Education Centre, St Mary's St, Ely. Hon sec: Peter Brown, 59 Fieldside, Ely.

March (M & DARS)—Tuesdays, 7.30pm, 88B High St, March. Hon sec: R. E. Ludman, 7 Elwyndene, March, PE15 9BL, Cambs.

Peterborough (PR & ES)—Fridays at 7.30pm in Peterborough Technical College. Hon sec: A. H. Jackson, G8GNV, 57 Peterborough Road, Castor, Peterborough.

Shefford (S & DRS)—Meetings Thursdays, 7.30pm at Church Hall, Ampthill Road, Shefford, Beds. Hon sec: Chris Davies, G8DUY, 17 Brigham Gardens, Biggleswade, Beds.

Stevenage (S & DARS)—Meetings first and third Thursdays each month at 7.30pm in Senior Staff Canteen, Hawker Siddeley Dynamics Ltd, Gunnels Wood Rd, Stevenage, Herts. Hon Sec: F. Collett, G3OVT, 8 Silam Rd, Stevenage, Herts.

REGION 6 — RR L. W. Lewis, G8ML

Cheltenham (RSGB Group)—First Thursday in each month, 8pm at Royal Crescent Hotel, Clarence Street, Cheltenham. 3 May (Talk by Freddy Butler—Butler Oscillator fame, on his latest ideas, including "Power control of motors etc"), Thursday 17 May (Visit to Gloucestershire Police HQ), 7pm, numbers limited. *G2FWA.*

Chiltern Amateur Radio Club—Main meeting 25 May, 8pm ("Slow scan tv" by G3MED).

Gloucester (ARS)—First Thursday of each month at the Oddfellows Club, Barton Street, Gloucester, 7.30pm. Also each remaining Thursday of each month at the Drill Hall, Education and Leisure Centre, Chequers Road, Gloucester. In March a dinner/social was held to celebrate the 50th anniversary of the club. It was announced that G3MA had been the secretary for 26 years. Is this a record? *G3MA.*

North Bucks (ARS)—14 May ("British Rail telecoms"), 11 June (Talk and demonstration by J. Bryant of Plessey on the SL600 series) 18 June (Visit to Daventry). Meetings at Wolverton Youth Club, second Monday every month at 8pm. *G8AAT.*

REGION 7 — RR R. S. Hewes, G3TDR

Acton, Brentford & Chiswick (ABCRC)—15 May (Speech processing for ssb, discussion), 19 June ("The new Avo" by R. Dickins), 7.30pm, Chiswick Trades & Social Club, 66 High Road, Chiswick 4. Hon sec: W. G. Dyer, G3GEH, QTHR.

Addiscombe (AARC)—Every Tuesday from 9pm, "Prince George' High Street, Thornton Heath. Hon sec: S. V. Knowles, G3UFY, QTHR.

Ashford, Middlesex (Echelford ARS)—14 May (Mike York, G4ASW, talking on subject of his choice), 31 May (Being arranged), 11 June (Surplus equipment sale), 28 June (John Waller, G4DAV, talking on "Air traffic control"). All visitors welcome, 7.30 for 8pm, St Martins Court, Kingston Crescent, Ashford. Hon sec: Vic Higgs, G3WVJ, QTHR.

Barking (BR & ES)—Every Thursday in each month, 8pm. Slow morse classes every Tuesday, 7.30 to 9.30pm. Meetings & classes held at Westbury Recreation Centre, Westbury School, Ripple Road, Barking. All visitors welcome. Further details from hon sec: H. G. Davidson, G3FZT, QTHR.

Bexley Heath (North Kent RS)—Second and fourth Thursdays of each month, 7.30 for 8pm, Congregational Church Hall, Bexleyheath, Kent. Hon sec: Ronald Wells, G4ARP, QTHR.

Burnham Beeches (BBARC)—First and third Monday in each month, 8pm, Hedgerley Scout Hut, Hedgerley, nr Slough, Bucks. All visitors welcome. Further details from hon sec: Nina Appleby, G8ENX, QTHR.

Cheshunt (CDRC)—First Friday in each month, 8pm, Methodist Church Hall, opposite Theobalds station. Hon sec: Richard Cudwell, G3ZZQ, QTHR.

Chingford (Silverthorn RC)—Every Friday in each month, 7.30pm, Friday Hill House, Simmonds Lane, Chingford, E4. Hon sec: M. Higgins, G8BUF.

Cray Valley (CVRS)—3 May, ("TVI causes and cures" by Andrew Holloway, G3VUQ), 17 May (Natter nite), 7 June (To be announced), 21 June (Natter nite), 8pm, United Reformed Church Hall, Court Road, Eltham, SE9. Hon sec: P. F. Vella, G3WVP, QTHR.

Croydon (Surrey Radio Contact Club)—Third Tuesday in each month, 8pm, "Swan & Sugarloaf", Brighton Road, South Croydon. Further details from hon sec: Sid Morley, G3FWR, QTHR.

Crystal Palace (CP & DRC)—19 May ("Transmitter measurements" by Bob Burns, G3OOU), 16 June (To be announced), 8pm, Emmanuel Church Hall, Barry Road, SE22. Hon sec: Geoff Stone, G3FZL, 11 Liphook Crescent, SE23. Tel 699 6940.

Dartford Heath (DF Club)—First and third Friday in each month, 8pm, The Scout Hut, Broomhill Road, Dartford. Further details from Hon sec: Maureen Worby, G3XVC, QTHR.

Dorking (DR & DRS)—Second and fourth Tuesdays in each month, 8pm, "Surrey Yeoman", Dorking. Hon sec: P. B. Gilbey, 6 Hawkwood Rise, Gt Bookham, Surrey.

Ealing (E & DRS)—Every Tuesday in each month, 7.30pm, Northfields Community Centre, Northcroft Road, Ealing, W13. Details from hon sec: J. E. Alban, G3JEA, QTHR.

East London RSGB Group—Third Sunday of each month, 2.30pm, Wanstead House, The Green, Wanstead, E11 (200yd from Wanstead Underground Station). Details from chairman: Arthur W. Rix, G3RYF, QTHR.

Edgware (E & DRS)—10 May (To be announced), 24 May (Informal), 14 June (To be announced), 28 June (Informal), 8pm, Watling Community Association, 145 Orange Hill Road, Edgware. Further details from hon sec: Alan Masson, G3PSP, QTHR. Tel 950 6827.

Gravesend RSGB Group—Every Monday in each month at 7.30pm, "Windmill Tavern", Shrubbery Road, Gravesend, Kent. Area representative: P. F. Jobson, G3HLF, QTHR.

Guildford (G & DRS)—Second and fourth Fridays in each month, 8pm, Model Engineering HQ, Stoke Park, Guildford, Surrey. Further details from hon sec: Peter Hopwood, G8CQM, QTHR.

Guildford (University of Surrey E&ARS)—18 May ("Getting going on microwaves" by Dain Evans, G3RPE), 8pm, further details from K. Wass, G8FQH, sec, EARS, c/o Students' Union, University of Surrey, Guildford.
Hampton Court (Thames Valley ARTS)—1 May (Being arranged), 5 June (Being arranged), Meetings held at *new* QTH, 8pm, King George Hall, Esher, Surrey. PRO: Rob Muir, G3LHN, QTHR.
Harlow (DRS)—Every Tuesday in each month, 8pm, Mark Hall Barn, First Avenue, Harlow, Essex. Details from hon sec: Vic Heard, 106 VicarageWood, Harlow.
Harrow (RSH)—Every Friday in each month, 8pm, Harrow Sea Cadets HQ, Woodlands Road, Harrow, Middlesex. Refreshments available during evening. Further details from hon sec: Les Light, G3KDC, QTHR.
Havering (H & DARC)—2 May ("SSB on vhf" by G4ALN), 16 May ("VHF developments" by G3WSN), 30 May (HF NFD arrangements), 13 June (Film show by G3JVZ), 27 June (VHF/UHF receiver practical evening with G8CDB). 8pm British Legion House, Western Road, Romford. Hon sec: Sam Hobday, G3SKV, QTHR.
Holloway (Grafton RS)—Every Friday in each month, 7.30pm, Archway School Annexe, Whittington School, Highgate Hill, N19. Hon sec: H. D. Ashcroft, G8AYU, QTHR.
Ilford RSGB Group—Every Thursday in each month, 8pm, Mortlake Road (off Ilford Lane), Ilford. Hon sec: Derek Sapsworth, G3YMW, QTHR.
Kingston (K & DARS)—9 May (Surplus equipment sale), 13 June (Converting radio telephones), 8pm, please note *new* QTH, The Berrylands Scout Troop, Stirling Walk, off Grand Avenue (behind Surbiton Lagoon), Berrylands, Surrey. Hon sec: Dick Babbs, G3GVU, QTHR.
Loughton (L & DRS)—First and third Fridays in each month, 8pm, Loughton Hall, nr Debden Station. 11 May, 8 June (Informal), 25 May, 22 June (To be announced). Hon sec: David Bowers, 12 Theydon Park Road, Theydon Bois, Essex.
New Cross (Clifton ARS)—Every Friday in each month, 8pm, 225 New Cross Road, London, SE14. Details from hon sec: R. A. Hinton, 58 Camilla Rd, Bermondsey, SE16.
Northolt (BEAARS)—First Thursday in each month, 8pm, BEA Trident Club, Western Avenue, Northolt, Middlesex. (This club is open to non-BEA employees by invitation. Contact David Evans, G3OUF, Tel Amersham 21573 for details.)
Paddington (P & DRS)—Meeting day changed to first Thursday in each month. 3 May ("A.M. & fm techniques" by G8AQO), 7 June (Being arranged), 8.30pm, Beauchamp Lodge, Warwick Crescent, W2. Hon sec: Mike Pawley, G8AWV, QTHR.
Purley (P & DRS)—4 May (Natter nite), 18 May (AGM), 1 June (Natter nite), 15 June (Being arranged), 8pm, Lansdowne Hall, Lansdowne Road, Purley, Surrey. Hon sec: Alan Frost: G3FTQ, QTHR.
Reigate (RATS)—1 May (Natter nite), 15 May (Talk on DF), 5 June (Natter nite), 19 June (Surplus equipment sale). Main meetings held at St Marks Hall, Alma Road, Reigate. 8pm Natter nites held at Marquis of Granby, Redhill. Hon sec: F. Mundy, G3XSZ, QTHR.
Scouts (Baden Powell House ARG)—Third Thursday in each month, 8pm, Baden Powell House, Queensgate, South Kensington, SW7. Further details from hon sec: Alf Watts, G3FXC, QTHR.
Southgate (SRC)—Second Thursday in each month. 8pm, Civil Defence Hut, Bowes Road, N11 (nr Arnos Grove underground station). All visitors welcome, sec: John Bachelor, G3XMV, QTHR.
St Albans (Verulam ARC)—16 May ("Quartz Crystals" by G. S. Moore, G3RVU), 20 June (To be announced), 7.30pm for 8pm, except May meeting which is 7.30 start for NFD briefing. Hon sec: Hugh Young, G3YHY, QTHR.
Sutton & Cheam (SCRS)—15 May (NFD 1973 planning), 19 June (NFD discussion and surplus equipment sale), 8pm, "The Harrow", Cheam, Surrey. Hon sec: Jack Korndorffer, G2DMR, QTHR.
UK FM Group (London)—Second Tuesday in each month, 8pm, Scout Hut, Hayes Road, Southall, Middlesex. Further details from pro: Mike Tooley, G8CKT, QTHR.
Welwyn (Mid Herts ARS)—10 May ("Microwave equipment" by G3RPE), 14 June (Club project—2m df/portable rx. Portable 2m tx/rx, final evaluation and debugging session). 8pm, Welwyn Civic Centre, Welwyn. Hon sec: Andrew Marshall, G8BUR, QTHR.
Wembley (GECARS)—Every Thursday in each month, 7pm, Sports Club, Preston Road, North Wembley. (This club is open to non-GEC employees by invitation. Tel Dain Evans, G3RPE at 01-904 1262, during business hours for details).
Wimbledon (W & DRS)—Second and fourth Friday in each month, 8pm, St John Ambulance HQ, 124 Kingston Road, Wimbledon, SW19. Further details from hon sec: F. W. Hill, G3WDO, QTHR.

REGION 8 — RR D. N. T. Williams, G3MDO

Brighton (BTCARC)—7 May (Talk by GPO representative), 21 May (RAE exam discussion). Further details of meetings from hon sec: G2CMH, 35 Wilmington Way, Brighton, BN1 8JH.
Canterbury (EKRS)—17 May (External speaker), 21 June (Tour of millimetre aerial installation at UKC). Further details of meetings from G3MDO, QTHR.
Canterbury University (UKCRC)—Details of club meetings from K. Beesley, G3UXE, Eliot College, University of Kent at Canterbury.
Crawley (CARS)—Every fourth Wednesday in the month at United Reform Church Hall, Ifield, Crawley. Further details of future meetings from G3MGL, 41 Gainsborough Road, Tilgate, Crawley.
Eastbourne (SARS)—Meetings held first Monday in the month at Victoria Hotel, Latimer Road, Eastbourne. PRO: G3JFM.
Horsham (HARC)—1 May (Members evening, Guide Hall, Denne Rd, 2000), 15 May (Informal, "Star", Roffey), 5 June ("Receiver design" by G3GRO), Guide Hall, 19 June (Informal, "Star", Roffey). Further details of meetings from T. Wadsworth, G3NPF.
Maidstone (MYMCAARS)—Meetings held at "Y" Sports Centre, first and third Fridays devoted primarily to beginners.
Mid-Sussex (MSARS)—Meetings held at Marle Place, Leylands Road, Burgess Hill. 31 May (Constructional contest), 28 June (Windmill mobile evening). Further details of meetings from G3RXJ, 87 Meadow Lane, Burgess Hill.
Rochester (MARTS)—Every Friday evening, 2000hrs, at Aurora Hotel, Gillingham, Kent. RAE classes now being run for prospective licensees. Discussions for a proposed moon bounce are now being held in the club room. Further details of future events from H. E. Willis, 111 Laburnham Rd, Rochester.
Tunbridge Wells (WKARS)—Alternate Fridays at Art Centre, Monson Rd, Tunbridge Wells. Further details of meetings from H. Richards, 17 Reynolds Rd, Tunbridge Wells.
Worthing (W&DARC)—Every Tuesday, 8pm, at Rose Wilmot Youth Centre, Littlehampton Rd, Worthing. Further details from G8ETL, 12 Bramble Cres, Worthing.

REGION 9 — RR H. W. Leonard, G4UZ

Bristol (City & County RSGB Group)—21 May (Brains trust), 26 May (Mini-Convention at Royal Hotel, details from G3GKA), 24 June (Longleat Mobile Rally), 25 June ("Swindon projects" by G3LTZ). 7pm, Becket Hall, St Thomas Street, Bristol 1. *G3ULJ.*
Bristol (BARC)—Every Tuesday, 7.45pm, 24 Bright Street, Bristol 5. *G3XEI.*
Bristol (Shirehampton)—Every Friday, 7.30pm, Twyford House, Shirehampton, Bristol. *G5AQZ.*
Bristol (University ARS)—Most Saturdays during term time, 2.30pm, dept of Physics, Royal Fort, Tyndalls Park Road, Bristol 8. *G8CVS.*
Cornish (CRAC)—First Thursday each month, 7.30pm, SWEB Clubroom, Pool, Cambourne. *G3XTF.*
Newquay Group (CRAC)—Fortnightly on Wednesdays, morse instruction at each meeting, 7.30pm, Treviglas School, Newquay. *G3THT.*
West Cornwall Radio Group (CRAC)—Second Tuesday and fourth Thursday of each month, 7.30pm, the Western House, Penzance. *G3UCQ.* Further details of Cornish, Newquay and West Cornwall groups gladly supplied by G3NKE, QTHR.
Exeter (EARS)—Every Tuesday, 7.30pm, Community Centre, St Davids Hill, Exeter. Hon sec: Jack Bawden, 232 Exwick Road, Exeter EX4 2BA.
North Devon (NDRC)—Second and fourth Wednesdays of month, 7.30pm, "Grinnis", High Wall, Sticklepath, Barnstaple. *G4CG.*
Plymouth (PRC)—First and third Tuesdays of month, 7.30pm, Virginia House, Bretonside, Plymouth. *G4BCX.*
Saltash (S & DARS)—First and third Fridays of month, 7.30pm, Burraton Toc H Hall, Saltash. *G3ZHM.*
South Dorset (SDRS)—First Friday of month, 7.30pm, Alma Road section of Weymouth Technical College. *G3VPF.*
Taunton (T & DARS)—Every Friday, 7.30pm, Jelalabad Barracks, The Mount, Taunton. Hon sec: G. Swetman, "Little Copse", Monkton Heathfield, Taunton. Tel West Monkton 298.
Torbay (TARS)—Every Tuesday with special meeting on last Saturday of month. 25 May (NFD preparations), 30 June ("Solid state transmitters" by G3NBR), 7.30pm, rear of 94 Belgrave Road, Torquay. Visitors most welcome. *G3NQD.*
Weston-super-Mare (WsMRS)—Second Friday of month, 7.30pm, Room Lewis M2, Worle School, New Bristol Road, Worle. *G3PQE.*

Group of Aberdeen Amateur Radio Society members and friends at their annual dinner/dance on 16 February at the Queen's Hotel, Aberdeen *Photo: Aberdeen Journals Ltd*

Yeovil (YARS)—Every Thursday. 10 May (AGM), 17 May ("Home-built communication receiver" by Steve Jones, BRS33517), 7.30pm, The Youth Centre, Park Lodge, Yeovil. *G3NOF.*

REGION 10 **RR D. M. Thomas, GW3RWX**

Blackwood (ARC)—Fridays, 7.30pm, Oakdale Community Centre, Oakdale, Blackwood, Mon during school terms. *GW3TUG.*
Barry College of Further Education (ARC)—Thursdays, 7pm, College of Further Education, Colcot Rd, Barry, Glam. Please see *QTC* entry for details of the complete Marconi-Kemp tests, and associated social. See March issue for advance details of projected air visit to Bologna next year. *GW3VKL.*
Cardiff (RSGB Group)—Monday 14 May, 7.30pm, Monday 11 June, 7.30pm, BBC Club, Llandaff, nr Cardiff. *GW3GHC.* The annual Mobile Picnic will be held at Porthkerry Country Park, nr Barry, on 20 May. It will open at 1.30pm, and there will be a 160m DF Hunt on foot at 3pm. There is a beach 300yd from the car park. There will be a bring and buy sale preceding this event at the Barry Rugby Club at 10.30am. The Rugby Club is situated left of the A4050 Cardiff/Barry road before entering Barry, and this is the site which will be in use for the Marconi Commemoration Station on 19/20 May. (See separate *QTC* item in this issue.) Talk-in on 144·480 will be available at both events.
Haverfordwest (ARS)—Tuesdays, 7.30pm, hq, Rosemary Lane, Haverfordwest, Pembs. *GW3YBB.*
Hoover (ARC)—Mondays, 7.30pm at Hoover Social Club, Hoover Works, Pentrebach, nr Merthyr, Glam. Mr F. E. Tribe is now chairman, the club callsign is GW3RDB. Secretary: Mr J. A. Brown, GW3RNC.
Pembroke & District (RSGB Group)—Last Friday of each month at the Defensible Barracks, Pembroke Dock, 7.30pm. *GW3LXI.*
Pontypool (RSGB Group)—Tuesdays, 7.30pm, during school terms, at the Educational Settlement, Rockhill Rd, Pontypool, Mon. *GW3JBH.*
Port Talbot (ARS)—Second Tuesday of each month, 7.30pm, at the Rail & Transport Club, Station Rd, Port Talbot. The Annual Social on 10 April was its usual success, and is one of the highlights of the social scene in Region 10. Sec: GW4BIQ.
Sully & District Short-wave Club—Tuesdays, 7pm, at the Annexe, Sully Bowls & Social Club, 59 Port Rd, Sully, Glam. VHF is the current activity, and a full programme of co-operation with other local field events is in hand. *GW4AMV.*
Rhondda (ARS)—Meets at Rhondda Transport Employees Club & Institute, Porth, Rhondda, Glam. *GW3PHH.* The dinner and dance to celebrate the RSGB Diamond Jubilee on 26 April was an event which really put the society on the map. There was a large attendance, the chief guest being the Mayor. Council was represented by the Zonal Manager, Mr C. H. Parsons, and the Region by Mr Dave Thomas, GW3RWX. Cyril Parry, GW3PHH, and his merry men are to be congratulated on an outstandingly successful event.
Swansea Radio Society—Please note that some re-organization has taken place in this society, which now meets on the first and third Tuesdays of each month at 7.30pm at the Commercial Hotel, Killay, Swansea. *GW3OGG.*
South-east Wales Raynet Group—Details from GW3ZFG, tel Cardiff 62411. Information has been received from Raynet HQ that anyone in the relevant area wishing to join Raynet should contact Alan Glassford, GW3ACF, tel Burton Ferry 812475.
University College of Wales, Cardiff (ARS)—Details from the secretary, c/o Students Union, Dumfries Place, Cardiff.
University College of Wales, Aberystwyth Radio & Electronics Society—The joint inter-society meeting held on 21 February was a very successful event. A number of papers were read, including one on the commissioning of the Birmingham Radio Tower, one on manufacture of printed circuits and one by R. W. Thomas, GW3RWX, on receiver design. The Centenary Celebrations of the College included the operation of an amateur station using the callsign GB3UCW from 26 February to 3 March. The station was kept busy, and a large number of contacts were made. All communications to the secretary, Students Union, University College of Wales, Aberystwyth.

REGION 11 **RR P. Hudson, GW3IEQ**

Conway Valley (CVARC)—5 May ("Operating top band" by Francis Dorken, GW3GCZ, also "Some more medical electronics" by Dr Meek), 11 June (AGM). Meetings commence at 1930, The Quarries, Llanddulas, Abergele.
Rhyl (R&DARC)—8 May ("Electro-optical communication" by M. Theaker), 12 June (AGM). Mona Hotel, Rhyl.

REGION 12 **RR A. J. Oliphant, GM3SFH**

Aberdeen (AARS)—Fridays, 7.30pm. *GM3HGA*, tel Aberdeen 33838 for venue.
Dundee (Kingsway Technical College ARC)—Wednesdays 7pm (Morse practice 6.30pm). Kingsway Technical College, Old Glamis Road, Dundee. Visitors always welcome.
Inverness (IRS)—Fortnightly on Fridays at 7.30pm. Next meeting 4 May, Cameron Highlander's Memorial Youth Club, Planefield Road, Inverness. L. Bell, 114 Glenurquhart Road, Inverness.
Lerwick (LRS)—Every Tuesday at 7pm, clubrooms, Abbsbrae House, Lerwick. *GM4BBL*, tel Lerwick 1233.
Lhanbryde (MFARS)—Wednesdays, 7.45pm, St Andrews School, nr Lhanbryde, Elgin, Morayshire. *GM3UKG*, tel Clochan 225.
Queen's Own Cameron Highlander's Memorial Youth Club Radio Section—Tuesdays, 7.30pm, Planefield Road, Inverness. Section caters for all young people from 13 years interested in

learning and obtaining practice in the elements of radio technique. Bill Begg, 68 Tomnahurich Street, Inverness.
Thurso (CARS)—Second Tuesday in each month, 7.30pm, Scapa House, Thurso. *GM4BKO*, tel Thurso 3704. Visitors always welcome.

REGION 13 **RR V. W. Stewart, GM3OWU**

Berwick (BARS)—Last Sunday in each month, 3pm, Tweed View Hotel. Further details from C. H. Crook, G3YOG, 19 Hatters Lane, Berwick-upon-Tweed or from the AR, G. Shankie, GM3WIG, 8 Ettrick Terrace, Hawick, Roxburghshire.
Dunfermline (DRS)—Second Wednesday in each month, 7pm, CCTV Studios, Queen Anne school, Dunfermline. Further details from G. Martin, GM3NVQ, 42 Rose Street, Dunfermline.
Edinburgh (LRS)—Second and fourth Thursdays, 7.30pm, 66 Hanover Street, Edinburgh. Further details from K. C. Henderson, 97 Ganton Road, EH5 3NH. (Tel 552 2147.)
Glenrothes (GDARC)—6 May (NFD preparation), 2-3 June (NFD participation), 7.30pm, Old Nursery Buildings, Leslie, Fife. Details from A. B. Givens, GM3YOR, 41 Veronica Crescent, Kircaldy, Fife.
St Andrews (UStAARS)—2 May ("Radio over the years"), 7 May (Bell Telephone Laboratories), 5pm, Dept of Physics, North Haugh, St Andrews. Further details from R. Marchant, GM3ZCQ, as above. No further meetings until next term.

REGION 14 **RR M. A. Comrie, GM3YRK**

Ayrshire (AARG)—6, 20 May, 2/3 June (NFD), 1 July, 7.30pm, YMCA, Howard St, Kilmarnock.
Ardeer (ARCARS)—Thursdays at 7.30pm, Ardeer Recreation Club, Stevenston, Ayrshire.
Falkirk & District (RSGB)—Temperance Cafe, Lint Riggs, Falkirk. Date and time from J. Ramsay, 78 Wheatlands Ave, Bonnybridge, Stirlingshire.
Greenock & District (ARC)—Tuesdays and Fridays at 7.30pm, Watt Library, Union St, Greenock. Visitors welcome. All enquiries to hon sec: N. C. Henderson, GM3LYI. Club callsign GM3ZRC.
Glasgow University Radio Club (GURC)—George Service House, University Gardens, Glasgow. Details from hon sec: c/o Dept of Electrical Eng.
West of Scotland Amateur Radio Society (WoSARS)—Wednesdays & Fridays at 8pm, 81 Virginia St, Glasgow. Details from hon sec: Mike Parks, GM8HBU, 6 Stamperland Hill, Clarkston, Glasgow.

REGION 16 **RR D. F. Beattie, G3OZF**

Chelmsford (CARS)—First Tuesday of the month, 7.30pm, at Marconi College, Arbour Lane, Springfield, Chelmsford. Details from G3YNV.
Colchester (CRA)—Every Wednesday, 7.30pm, Colchester. Two meeting places—2 and 16 May, North East Essex Technical College, Sheepen Road, Colchester. 9, 23 & 30 May, The Amenities Centre, Reed Hall Lane, Colchester. Details from E. T. Jacobs, 26 Pondfield Road, Colchester.
Gt Yarmouth (GYRC)—Last Tuesday of the month, 7.30pm, at the Central Library, Gt Yarmouth. Details from A. D. Besford, 49 Blake Road, Gt Yarmouth.
Ipswich (IRC)—Where possible, two meetings each month at Handford House, corner of Ranelagh Road and the main London Road (A12) at 7.30pm. Only one meeting in May—9 May. 6 June ("Slow-scan tv" by G4AJX). Other meetings on 13 and 27 June. Details from G3YWM.
Norfolk (NARC)—Every Wednesday, 7.45pm, Crome Community Centre, Telegraph Lane East, Norwich. 9 May (Informal), 16 May (Visit to BBC Tacolneston), 23 May (Informal), 30 May (Film night). Details from G4AUV.
Norfolk Raynet—will be holding their annual social function on Sunday, 1 July, at Barford village hall (seven miles west of Norwich —NGR TG113077) from 1100 to 1800. All the usual attractions, everybody welcome. Details from G3HRK.
Stowmarket (SDARS)—First Monday in each month, 7.30pm, The Adult Centre, Stowmarket High School, Onehouse Road, Stowmarket. Details from G3XAP.
Vange (VARS)—Every Thursday, 7.30pm, Scouts Hall, Fairview Road, Basildon. 3 May (Questions and answers), 10 May (Walkround DF Hunt), 17, 24, 31 May (Lectures). Details from Mrs D. Thompson, 10 Feering Row, Basildon, Essex, SS14 1TE.

University of East Anglia (UEAREC)—Meetings are held during term times in Room 0.29, UEA Village. 4 May ("The perils of the dxpedition to Mellish Reef", by VK4KS), 24 May (Visit to Royal Naval Reserve Communications Centre, Norwich). Details from G3IOR.

REGION 17 **RR L. N. G. Hawkyard, G3ZKR**

Reading (RARC)—Club meetings on Tuesdays, 7.30-9.30pm on 8 and 22 May, 5 June and 19 June in the clubroom of the White Horse, Kidmore End Road, Emmer Green, Reading. All welcome.
Harwell (AERE ARC)—Meetings on the third Tuesday of each month, also informal meetings and junk sales every Friday lunch time. 7.30pm at the Social club, AERE, Harwell, Berks. *G3NNG*.
Southampton (RSGB Group)—Saturday 12 May, and 9 June, at the Lanchester Building, Southampton University. Every Wednesday evening at the clubroom, Kent Road, 7.30pm. *G5HD*. Tel 773378.
Swindon (SDARC)—2 May (Informal meeting), 16 May (Mobile fox hunt), 30 May (Talk on the construction, tuning and use of open wire feeders), 7.30pm, Penhill Junior School.

Region 1 Diamond Jubilee Dinner

Over 80 RSGB members and guests from Region 1 celebrated the Society's Diamond Jubilee at a dinner held at the Strand Hotel, Liverpool, on Friday 23 March. Regional Representative Basil O'Brien, G2AMV, was chairman and master of ceremonies after having put in a tremendous amount of effort in organizing the function.

The toast to the Radio Society of Great Britain was proposed most competently by Norman Kendrick, G3CSG, who in the course of an entertaining speech gave a novel view of one aspect of consultancy. Council member Len Newnham, G6NZ, guest of honour, replied on behalf of the Society and kept his audience absorbed with details of the early days of amateur radio, backed up with membership lists and other records of the London Radio Society, the forerunner of the RSGB. He dwelt on the relationship of the Society with the authorities and how many problems could be ironed out by personal contacts. He ended with a plea to all members to use the amateur bands, especially the less popular ones, as much as possible, so that there would be no risk of us losing them through lack of use.

The toast "The Ladies" was proposed by Bert Donn, G3XSN, who revealed some of the indignities his xyl had been obliged to put up with in the cause of radio over the years, including radio amateurs trampling through her bedroom en route to her husband's shack in the attic. The reply to this toast was done most charmingly and competently by Eileen O'Brien, G3WIO, who described herself as a reluctant radio amateur. After having put up with husband Basil's absorption in radio for many years, she had tried to get absorbed in it herself, even going to the extent of qualifying and getting a licence, but she remained unenthusiastic. She felt that radio was definitely a man's hobby.

Undeterred by these comments, Basil rounded off the speeches with some well-chosen remarks (together with one remark which turned out to be not so well chosen for an audience of this nature and caused much merriment due to the double entendre).

Altogether a most successful evening, and one which reflected great credit on its organizer and all who assisted. *G3UJX*

Looking ahead

4 May—RSGB Dinner Club, Royal Westminster Hotel, Buckingham Palace Road, Victoria, London.

6 May—Northern Radio Societies Association Convention, Forum Halls, Wythenshawe, Manchester (Note change of venue).

26 May—Bristol '73 Mini-Convention; Royal Hotel, Bristol.

22 September—Region 10 ORM and dinner, University College, Park Place, Cardiff.

MEMBERS' ADS

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

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

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

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

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

FOR SALE

Trio JR500S communications rx, fitted top band, xtal clbrtr, switched agc, perf cond, £40 ono; Shure 201 mic, brand new, never used, £4. G3YYG, 10 Roseheath, Hemel Hempstead, Herts. Tel Hemel Hempstead 57547.

SSB Monitor scope, Heathkit, SB610, assembled but not used, complete, £25. G3HRY, QTHR.

Lafayette HA600 rx, gd cond, £30; Joystick vfa with Joymatch £5; Trio hdphns, HS4, as new, £3; TW 2m cnvrtr, £4. R. D. Graves, 2 Banchory Rd, London SE3 8SW. Tel 01-858 7912.

One pr ex-army 88 sets, with batteries, one pr phones, cct diag and xtals. R. Webster. Tel 031-336 4546.

Galvanized turnbuckles 75p ea; microwave (USA) test mtrs, TS 3A/P, in canvas carrying bag, £3 ea; microwave fittings and adaptors, sae; 4 × 150As new, £3; Cambridge low band, complete, very clean, £22. GM3BQA, QTHR. Tel North Berwick 2519.

Quantity 25V, 5W voltage regulators, type PA264, data sheet, 5 for £1; last listed over £1 ea; Solartron Varipack 0–500V, 100mA, metered 0-4-6·3V, 3A, manual, £4.50; two 2·5kV 300 mA mains trnsfmrs, £1.50 ea, carr extra. J. H. Lepper, 128 Sheephouse Hill, Fauldhouse, West Lothian, Scotland. Tel Fauldhouse 433.

AR88LF with case, S-mtr, handbk, matchg spkr, exc cond, £40, will del 50 miles. G3JTX, QTHR. Tel Botley 2516.

CCTV monitors, 21in, £10; Pye pulse and bar gnrtr, Pye valve spg; Pye window gnrtr, offers; Pye test wvform gen, p.a. type, horns, 15in moving-coil spkr, ring for details. G8GQS, 7 Orchard Close Morton, Gainsborough. Tel 3940 2802, day.

Three band 2-el quad aerial, never used, buyer coll, £20. R. Matteis, The Old Swan, Marsh Gibbon, nr Bicester, Oxon OX6 OHH. Tel Stratton Audley 509.

DX100U, AR88LF, both vgc, £20 ea or £35 pr; compact 10–160m a.m./cw h/brew, 50W tx, Geloso vfo/p.a., no psu, £10, buyer coll, Phone 9–5 for appt. Flt Lt Russell, i/c RAF Newton ARC, nr Nottingham. Tel E Bridgford 291, ex 270.

Mohican, clean with handbk, £20 ono; Heathkit rf sig gnrtr, needs slight attn, with handbk, £8; also assorted 2A Reed relays with 15V coils, details on request. G8DUY, QTHR. Tel Biggleswade 312628.

Solartron CD7115·2 prof scope, £35; Cossor 1035 £11; BC221B with inbuilt psu, £18; TF428B, vtvm £5; TF885 sine/square oscillator, 25Hz-5MHz, £19; TF948, 20–80MHz, a.m./fm, £12; Vortexion 12V/mains audio amp, 25W, £6. B. S. Homer, 32 Iron Mill Lane, Crayford, Kent, DA1 4RR. Tel Crayford 24625.

Pye Cambridge AM10B on 2m, with control gear and 8MHz xtal, £27.50; 4m version less control gear, £17.50. J. J. Kayminski, 1 Campbell Road, Bournemouth, Hants.

BC454 £3.50; BC455 £3; Parmeko trnsfrmr, 620-550-375V as specified G2DAF Mk3 ssb tx, £5; C-core 450-350V etc (both 250mA), £4.50; Aveley dc-dc conv, 12V in, 600V, 150W, ideal /M, £10; PTC-2007 lowband, fair, £5 carr extra. G3MOE, QTHR. Tel Cheltenham 0242 24217.

11 copies *Panetarium* mag and six *Hermes* mag, carr pd. **Wanted** Heath SB640 vfo, 2m transvtr, GEC 989/1 stereo fm hi-fi tuner. A. L. Taylor, 8 Heythrop Drive, Middlesbrough.

Drake 2B rx plus 2BQ Q-mult, spkr unit, mod top band, vgc, £75 ono, pref buyer coll. G3AJX, QTHR. Tel Winchester 61605.

Complete Pye Ranger 2m a.m., tx/rx, dashmounting with transistor psu, rx, fully var over 2m wkg cond, £5, write or phone. GM8BKE, QTHR. Tel 041-942 1406.

All types of teleprinter spares, 7, 7B, 8, 85 models, DL6EQ TU, 4X150s and bases, xtals (fltr and others). G3LPB, 1 Silverdale Rd, Falmouth, Cornwall.

Pye 2107 boot Ranger on 2m, 2-channel tx, control box and cables, no xtals, £12; HRO, 7 coils, £8, buyers coll; 44·766 HC6U xtal for 145·00MHz Cambridge rx, £1. G3UJK, QTHR. Tel 0494 25491.

Collins 75-S1 rx, fitted extra cw fltr, exc cond, superb performance, £145. Exchange for Drake 2B with cash adjustment, all letters answered by return. Tel Washington (Co Durham) 463707 evng or write G3OWM, QTHR.

AR88LF £25; K6AXN 23cm convrtr with ps, £6.50; two 180Ah 6V batteries £2.50 ea; hybrid 70cm convrtr, buyer coll. G3EEZ, QTHR. Tel W'ton 751378.

Eddystone 888A, gd cont, S-mtr, £65, no offers, buyer coll. G3WGK, QTHR. Tel 025-485 2674.

Due to future QTH QSY, TH3JR 3-el beam plus 50ft coaxial cable; Joystick aerial with Minimitter atu, £25 ono, carr. extra. Doug Brabner, 33 Peashill Close, Sileby, Leics, LE12 7PT. Tel Sileby 2255.

KVG fltr, XF9D, £10 ono. G3OCB, QTHR. Tel Stithians 480 (Cornwall).

TR 2m tx/rx, 3 xtals, rx tuneable + halo, £15 ono; G2DAF 160m ssb tx, £15 ono; DX100U + manual, £30. G3ZOD, QTHR. (22 Naples Road). Tel 061-480 0251.

RA1 rx, ldspkr, xtal clbrtr, £27; PR30 preselector £5; QPM16 Q-mult £6; DX100U tx, £40; DP4 mic £8; HM11U swr bridge £4; BIU balun £3, all with hdnbks in exc cond. A. C. Butcher, 30 Hughenden Ave, High Wycombe, Bucks. Tel High Wycombe 24835.

DX40 and VF1U, good cond, with handbks, 7MHz xtal, h/brew relay control system and bug key, £22, buyer coll pse. Walters, 61 Sussex Gdns, Chessington, Surrey. Tel 397 6924.

AR88D with S-mtr, vgc, £45; 2m converter, 24–26 i.f., £5; Pye Ranger tx, transistor modulator and psu, wkg, 2m, £8; Pye Vanguard, wkg, 2m, exc cond tunable rx and pre-amp £28, GW3VPL, 102 Commercial Rd, Taibach, Port Talbot, Glam. Tel Port Talbot 5459.

Cheap ic mounting, ic socket pins in lengths of 100 for 60p (5p p&p), sae details and samples. G8BGW, QTHR.

800MHz scope with pulse gnrtr, 75V o/p down to 3ns, manual, £30; Ediswan If gnrtr £5; Muirhead T-attenuator, 0–1dB steps, £3; tube for CD1014/2 £15. **Wanted** R1933. Tel Cobham (Surrey) 3117.

TRIO JR310, ex cond, £65 ono; BC221 with charts £15. M. Marment, 35 Lidford Tor Ave, Paignton, Devon. Tel 0803 55488.

Valve vmtr CT54 and orig mains psu, £8. 5 Oxford Close, Gomersal, Cleckheaton, Yorkshire BD19 4QU. Tel 0274 24258 (8 to 4.45).

Complete stn QSY to VK, £225 ono. FL400DX FR400DX, mic, phones leads V4–6 aerial, lpf swr, spkr, pref sell as one. G3PLQ, 2 Eton Rd, Burnham-on-Sea, TA8 1PP, Som. Tel Burnham-on-Sea 3291 (work only).

Pye a.m. Westminster on 2m, £55; Pye base stn, 6-40 pa, mic and book, £25; pr field telephones with cable, £5. G8EII. 76 Wilshere Cres, Hitchin, Herts.

Pye Reporter modified 2m with transistor inverter psu, very clean, £15; Pye video stblzng amp £3; valves, 813 QY4-400, 2 of QY4-250, 6 of QY3-125, all 50p ea; EMI shf Klystron, R9531, 50p. G. T. Barrell, 34 Churnwood Rd, Colchester, Essex. Tel Colchester 74917.

VHF lo-band a.m. R/Ts, Murphy, 25W (320 p.a.) £4; 7W dash mounting £2; Rover 10W hybrid £5; Cossor /M tx/rx £2, as seen; buyer coll. G8AKA, QTHR. Tel Mortimer (Reading) 332582.

Complete stn, KW2000A with ac psu, manual, spare valves, mic, swr bridge and rf indicator, leads for everything incl, gd cond with orig packing, £165 ono. P. Leach, 27 Grosvenor Road, Heaton Moor, Stockport, Cheshire.

Diamond KB105, 80-10, vertical, with 50 ft 5Ω coaxial cable, connectors, vgc, £25, buyer call or carr extra. G4AQH QTHR, Tel 01-653 7623.

Heathkit HW17A tx/rx and 6/6 aerial, £45; Eddystone EC10 £30. G3ZYQ, QTHR. Tel 01-363 3363.

Hammarlund SP600-JX8 Cab model, £100; Labgear Commercial hf ssb tx/rx, LSM100 £55; BC342 £9; Lafayette PF60 152/174MHz, £15; Telequipment Serviscope £6; 50W a.m./cw tx, offers, CRTs, valves, cct boards, sae list. A. H. Cain, 18 Oaky Balks, Alnwick, Northumberland. Tel 2487.

NCX5 Mk2 and NCX/A psu, exc. all bands, very stable, £175. G2TS, QTHR. Tel Harrogate (0432) 2130.

2m Pye base tx, 320 p.a., fm/a.m., £15; 70cm cnvrtr, 9–11MHz i.f., £2; 30W mod trnsfmr £1.50; Pye Ranger rx, tunable, £5; EC10 £40; 2m pre-amp £4; 2m cnvrtr, 4/6 MHz £11, all fb cond. G8ESK, QTHR. Tel Bradford 45611.

HRO with six coils and psu £20; 52 set with psu, immac, £25, buyer coll or pay carr. G. Ridgeway, 18 Aldbrough Walk, Darlington, Co Durham, DL1 4TT.

Pye Cambridge AM10DV, dash mounting, £20. Stockley, "Oakdene", Town St, Upwell, nr Wisbech, Cambs. Tel Upwell 2249 after 6pm.

Ferranti CRTs, CV8514, two only, your price, unused. G4AK, QTHR. Tel Blackmore (ex) 822910.

TA33JR and AR22 rotator, weatherworn but wkg (300+ countries), both with mnfctrs installation instrctns. **Wanted** neat static gear for 160. G2RO, QTHR. Tel Torcross (Devon) 616.

4CX250B and base and 500-0-500V trnsfmr; quantity 450V electros for smoothing, £10, carr by arrangement. G8BZN, QTHR. Tel Hinckley 34500 after 6pm.

Top band tx, built-in psu, modulator, vfo, size 8 by 6 by 11in, wkg exch, interest /M portable unit or bits, why, £8 ono; mtr, 200μA, 4½in, round, £1.50; 50mA, 3½in round, 75p. GM3SYD, 22 Greensway Newmachar, Aberdeenshire, AB5 0SL.

18AVQ £10, buyer coll. G3JKA, QTHR. Tel Byfleet 44790.

Mullard valve test cards, 20p ea or exch, sae list; stroboscope £22; 2207 40W Ranger, complete, wkg on 4m, £20; 2 Redifon high band a.m. TX/RXs, less mics, £4.50 ea, buyers coll. G3TGF, QTHR.

Marconi B43/R220 4m tx/rx with Marconi mtchg 4-el Yagi and heavy-duty feeder, rx tunable, tx switched freq, perf cond with handbks, £25 ono, buyer coll. J. R. Easton, 48 Crawford St, Motherwell, ML1 3AF. Tel Motherwell 65443.

FL200B, gd cond, £70. **Wanted** QY4-400 valves, cw fltr for SB102. Johnson, 42 Browick Rd, Wymondham, Norfolk. Tel Wymondham 3352.

Erskine 13A db scope, spare tube, rf probe, £15; Channel Master rotator £12. **Wanted** Heath SB640 vfo. G3TND, QTHR. Tel 027-587 2241.

Late 800W Honda gnrtr, offers; 4 new Texas 2N3632 power transistors, unused project, £4.25 ea; KW77/2 rx, offers. Barry, 25 Campbell Ave, Acomb Rd, York. Tel 59861 ext 294, daytime.

Late KW Vespa MkII, 6LQ6 p.a., psu, improved keying, little used from new £90, ono. G3HIS, QTHR. Tel Cheadle (Staffs) 2378.

Eddystone EC10, 550-30MHz, gd cond, £40; Codar PR30 preselector, £4; 2m cnvrtr i.f. 16-18MHz, changeable, 9V, £8 ono or why, letters only. T. P. Ellis, 13A Lower Edgeborough Road, Guildford, Surrey.

Opportunity GI5ABZ going home, teleprinter, Creed 7B, power supply, all commercial, scope, V-tuning unit, all complete and in gd wkg order, £45; Pye 2m a.m. Ranger with xtals, 145·8MHz, £6. GI5ABZ, QTHR.

Exch Marconi TF329E cct magnification mtr complete with manual for model 8 Avo or sim quality multmtr in gd cond. J. H. Reed, 158 Uttoxeter Rd, Mickleover, Derby. Tel Derby 53074.

AT5 /M, 12V psu + control, as new, with diag, £14; 12AVQ with 50Ω coaxial cable and info sheet, £13; Pye 2m base stn, 320A, ok but needs attn, £10 ono. G3ZLH, QTHR. Tel Chirk 2414.

HRO psu, 7 coils, bndsprd, 10 and 80m xtal cnvrtr, 15 and 20m, £20, buyer coll. G3SUD, QTHR. Tel 021-359 2903.

Crystals, 8·95MHz, HC18U, (x15 + 10·7 = 144·95), 75p; 5MHz, HC6U 75p any three, £1.80, send 3p sae with remittance and order. R. Bowell, 16 Margarite Way, Wickford, Essex.

Truvox tape rcrdr (cost £45), £20; RSGB 2m Nuvistor cnvrtr £5; Jason vhf fm tuner unit £5; Mullard 3 + 3 amp £2. Phone 0604 43020 (Northampton).

Heathkit 32ft lattice tower, perf cond, £25 ono. A. Reynolds, Rosedene, Queen St, Shrewsbury, Shropshire. Tel Shrewsbury 4802.

Green 2M20 2m tx, wkg, gd cond, xtals on 144·96, 144·26 and with Shure 201 mic, £15; G3POQ, QTHR. Tel Hailsham 840376.

Ex school radio, receives BBC1, 2 & 4, powerful amp, ideal as public address, £5; Kansas guitar and carrying case, immac cond, as new, genuine reason for sale, £15 ono. D. Pollington, 27 Stoke Ave, Hainault, Ilford, Essex. Tel 01-500 6922.

Pair walkie-talkies, £8 or offer; transistor short wave radio, £7 or offer; Zenith Trans-oceanic Royal, £40 or offer. G3PPK, QTHR. Tel home, Uxbridge 36989, office 01-573 0496.

Eddystone 840C rx, mint cond, fitted S-mtr, Sentinel 2m cnvrtr, immac, first offer over £40 secures. J. Champion, Ard-na-Coille, Newtonmore, Inverness-shire. Tel Newtonmore 214.

Panda PR120V tx, 120W, a.m./cw, 80m–10m; Codar rf preselector, offers pse. G4BEC, QTHR.

EC10 mains and battery packs, £36; Airmec 723 scope, needs attn, £5; 4X250 bases with chimney, £2.50 ea, carr extra. GSBJD, QTHR. Tel 0946-810 047.

Japanese bug key, BK100, brand new, £8; Brown Bros (USA) heavy-duty beautifully made keying lever, £11; Junker hand key, gd cond, without dust cover, £5. GI3SHI, 52 Beverley Gdns, Bangor, Co Down N Ireland. Tel Bangor, Co Down, 60517.

KW2000 with KW ac/dc PSUs /M aerial and spare 6146s, exc cond, £110 ono; G2DAF lin with int psu and spare QY3125s, £18 ono. G3NPZ, 35 Iron Mill Close, Fareham, Hants. Tel Tichfield 43894.

Trio TS500 tx/rx ac power unit with spkr, £90. Derrington, 42 Higher Warborough Rd, Galmpton, Brixham, Devon. Tel Churston 3470.

Evershed Vignoles 250V megger, little used, with case, £20. P. M. Cleaver, 56 Main Rd, Dovercourt, Harwich, Essex. Tel Harwich 2195.

Trio 9R59DS plus SP5D spkr, 18 months old, exc cond, £40; Hamgear PMII preselector, £5 ono; Codar 12MS /M psu, plus 12RC control unit, £8 ono. No phone calls please. G3YPP, QTHR.

Telescopic steel tower, 40ft, 2 section, new, never erected, £65, you coll, del may be possible at extra cost. Evans, 4 Gower Cres, Baglan, Port Talbot Glam, SA12 8BT. Tel Briton Ferry 812376.

Panda Cub tx, in-built variable bias, £20 ono; Hartley 13A scope, photostat manual, rf probe, £25 ono; Halina 35mm camera, model 35X, mint, kept as spare, £6 ono, buyers coll pse. G3IXO, 13 Beech Rd, Shipham, Winscombe, Somerset. Tel Winscombe 2360 (0934-484).

CR70A, with spkr and mods, gd cond, £15 ono; would swap with adjustment for 160-20m battery portable rx for stateside visit, or why. Andrew and Martin Sibley, 25 Church Hall Rd, Rushden, Northants, NN10 9PA. Tel Rushden 4008.

Swan 350, ac psu and spkr in mtchg cab, dynamic ptt mic, exc cond, £130. GM3RXU, QTHR. Tel 041-884 5365.

Shack clear out, trnsfmrs, valves, gear, etc, send sae for list, psu to run IC20, FT2F etc, over-voltage protection, int spkr, die-cast box, £10, pref buyer insp. L. W. Jones, 261 Richmond Rd, Sheffield, S13 8PA. Tel 396774 after 6pm.

KW2000A with ac psu and dynamic mic, exc cond, £140 ono, carr arranged if required. R. J. Trebilcock, 20 Spinney Brow, Cromwell Rd, Ribbleton, Preston PR2 6YG. Tel Preston 709160.

Katsumi AT8 cw monitor £5; KW Q mult £3.50; Codar AT5 tx, £15; xtal clbrtr No 10, £2. **Wanted** commercial and amateur receiving equipment, pre-1930. G3KDP, QTHR. Tel Aldridge 51352.

CT54 Micovac valve vltmtr, ac & dc to 480V, rf probe to 200MHz, 5 ranges, resistance to 10MΩ, battery-powered, £4.75, postage pd. G3XHX, QTHR. Tel Liskeard 3749.

2m G8AEV cnvtr £8; Nuvistor 2m cnvtr and psu £5; JR310 with calbtr, mint, £60; Hamgear PMII preselector £5, buyer coll. G. Thompson, 49 Widney Avenue, Selly Oak, Birmingham 29. Tel 021-472 4678.

Heath Apache tx, plus SB1OU, exc cond, with hndbks, £50 ono; 2·5kW mains isolation trnsfrmr £10 ono; buyer coll or pay carr. **Wanted** self-supporting tower, trap vertical, FV400s, remote vfo. Stephens, 6 Norse Way, Sedbury, Chepstow, Mon. Tel Chepstow 2475.

KW2000A dc psu £25 ono; PR30X with plug-in 100kHz clbrtr, £7. **Wanted** walkie-talkie(s) for 10m or 2m, would arrange swap. Robertson, 31 Greenways, Bow Brickhill, Milton Keynes, MK17 9JP. Tel Bletchley 2463.

KW Vespa MkII tx and mtchng psu/spkr unit, 220W, p.e.p, all hf bands, vgc, £75. S. Braidwood, Carr-Saunders Hall, Fitzroy Street, London W1P 5AE. Tel 01-580 2936.

Heathkit Mohican with manual, £22 ono; 3 met balloons, 8ft dia, canned, £1 ea; PO relays and keyswitches, very cheap, coaxial relay. P. Heap, 198 Abbots Road, Abbots Langley, Watford, Herts. Tel Kings Langley 63889.

RTTY stn, complete Creed 7B printer with silence cover term unit, with afsk ident ms indicator connecting leads for FT101, KW2000, plug into mic skt and type. **Wanted** FL2100 lin. G3RQY, 15 Tiercel Ave, Norwich, NOR 76R. Tel Nor 42967.

FTDX401, FL200B, matching spkr, remote vfo, Oscar pwr-mtr, all very little used, will separate, offers pse; 18AVQ/WB, in used cond, £15. G3RUI, QTHR. Tel 0494 25645.

Books as new, *Mics* (price new £3.75) £2.75; *Intro to Valves* 37p; *Magnetic Amps* 45p; *Microwave Spectroscopy* 45p, *Thermionic Vacuum Tubes*, 55p, *Waveguides* 45p; *Physical formulae* 45p; *Basic Electronic Ccts* 80p. H. H. Seynour, 6 Chichester Bldgs, Swan Mead, London SE1 4RY.

KW Viceroy 3A, new 6146s, £65. **Wanted** Hammarlund HQ180A, Yaesu, FT200 or FT401. G2FUU, QTHR. Tel Nazeing 2274.

14AVQ + 80m loading coil, £16. Tel Bracknell 3111, ext 219.

Heathkit dc psu, HP13, £18; tatty 2m /M rx/tx, rx tunable but as 1·4MHz out, to feed into car radio, £8. Martin, 114 Briggs Fold Rd, Egerton, Bolton, Lancs. Tel Bolton 57775.

Ham Radio, Nov 1970 to Oct 1971, £1.50 complete; Heathkit RA1 amateur bands 160 to 10m with Q-mult, £25; assortment active FT241 xtals; info and comps reqd, best uhf aerial amps. D. Walsh, Ballylynch, Carrick on Suir, County Tipperary, Ireland.

HW100 tx/rx plus HB power supply with built-in spkr, exc order, £100; Pye Cambridge AM10B plus control box, spkr and mic, rx tunable 2m, rather dirty but wkg, £10, buyer coll. G3WFM, QTHR. Tel Potters Bar 51532.

Tidying shack, several Rangers with transistor psu, low band, £4.50; tx on 2m, £7; tx/rx on 145MHz with xtals, £11.50; good Creed teleprinter No 54 with desk etc, £25 ono. G3EGO, QTHR. Tel Leeds 661708 engs.

KW2000B with ac psu, hardly used, £180 ono, will del up to 50 miles; Samson ETM2 electronic keyer, with monitor, £15. G3YEI. QTHR. Tel Fleetwood 4446.

Trio TS510, as new, all extras fitted and some spares, £140; FL1000 lin, spare valves, £70, both items mint and hp available, also Hamgear PMII, £5. GW3TMP, QTHR.

Hammarlund HX50 tx, cw/a.m./ssb, 160-10, £80; Eddystone EA12, £120; 840C £35; Admiralty pattern 100335, exc modern rx, 60kHz to 30MHz, modular cnstrctn, geared drive, bargain, £45; 4m tx, 50W 4-el beam, £25. G3GTX, QTHR. Tel 01-398 4697.

KW600 lin, mint, £60; KW2000 + ac psu, mint, £120; 1 KW transfmr 2 × 120V-240V, £7 inc carr; Heath USC1 pre-amp, 2 × MA12, 12W amp, mint, £25; Heath FM4U FM tuner, mint, £12. E. Searle, 3 Home Farm Cottages, Sunninghill Park, Ascot, Berks.

RTTY complete, consists terminal, scope, monitor, bandpass fltr, 7B, modern silence cover, all-transistor, very compact with data, £40 ono; Eddystone EC10, gd, £32 ono. G. Overton, 49 Hazel Road, Loughborough, Leicestershire. Tel Loughborough 66023.

Hammarlund SP600, J11 rack-mounting, £75, buyer coll. J. R. Avery 49 Clifford Rd, Wallasey, Cheshire L44 4DN.

180W ssb tx & psu £60; KW Valiant & psu £25; 2m Ranger £10; low band base stn £5, morse course £2.50, buyer coll or carr extra. **Wanted** FL200B. M. Goodrum, Flat 3a, Priory Meadow School, Rochford Road, St Osyth, Clacton CO16 8PH. Tel St Osyth 820735.

KT340 rx, stab osc, separate bfo, £18, TCS13 tx, int modulator preamp, £12, both exc cond; psu 234A, £2; Solartron stab psu 250/300V 50/75mA, £3.50, all items + carr; junk sale of transfmrs, valves, chokes, etc, callers only. GM3CTQ, QTHR. Tel 041-942 7802.

Heath HW12A tx/rx, as new, with home made psu, £50. E. Murphy, 65 Silverknowes Cresc, Edinburgh 4. Tel 031-335 7288.

Collectors items, ancient valves, type SG20 QTY2, cond mint, except one has top terminal nut missing in orig boxes by Mullard Valve Co Ltd, offers to GM3SYD, QTHR.

Pye F3OU uhf base stn, tested with 30W o/p on orig freq, £35, inc hndbk. G8GNE, 11 Brewin Ave, March, Cambs. Tel March 4257.

FT101, 160/10, fan, May 72, £220; G2DAF lin, 2½kW, psu, £30; FT2F, Nov 72, 8 xtals, £65; set G whips 160/10, £12, all mint and complete. G3TFN, QTHR. Tel 061-761 2952.

Parkair 15W/SS vhf rx, 118-136MHz, tunable, plus 6 xtals channels, with squelch and 50 kHz fltr, as new, with hndbk, would convert to 2m, solid state, genuine offer, £80 ono. J. L. Lockwood, 29 Coppice Ave, Hellesdon, Norwich. Tel Norwich 48685.

Eight bound volumes of *Practical Electronics*, covering all issues to date, £10, plus carr. G3TNB, QTHR. Tel Tadley 3421.

Few high band dash Rangers, modified for 2m, cases resprayed, as new, less tx and first osc xtals, £7 ea. G3VPT, QTHR. Tel Norwich 898715.

KW Vanguard, 80-10, £15; Elizabethan 100W a.m. cw, £10. G3KIP, QTHR. Tel Tunbridge Wells 23336.

VHF hi-band 10W base stns with hndbks, GR236, private unit, 7-channel a.m.-fm, £30; GR236 international unit, 28-channel, fm, £25; SEA Combi 6-channel fm, with rcu, £18 ono. G3JMJ, QTHR. Tel 073-271 3467.

Airmec 712 vtvm £5; microwave S-X band Q-mtr with psu, several verniers, £12; radar resonator £3; strobe unit £9; frequency mtr, RCA 50Hz-50kHz £5; 1,000pF disc ceramic, 25 for 45p. **Wanted** AR88 or sim. R.C. Whitbread, 32 Ironmill Lane, Crayford, Kent, DA1 4RR. Tel Crayford 24625.

Heath SW717 rx, 4 months old, mint, 550kHz-30MHz, bfo, S-mtr, int spkr and power supply, bargain for swl, £25 ono. R. Buttery, 55 Northumberland Rd, Kettering, Northants. Tel Kettering 3154.

EICO 710 grid dip 0·4mH, 250mH, exc cond, 115V ac, £6; Mombrex type 62 CR bridge £5; 457kHz glass 8041·66, can-type xtals, 75p ea; Eagle CT10, 16Ω tweeter, £1.20, inc carr. G. Hill, 19 Station Rd, Tadcaster, Yorks. Tel Tadcaster 2253.

Lafayette HA350, CR100, 893 dial DET24, vhf/uhf plumbing. G2CPM, QTHR. Tel Newbury 464.

25W 2m a.m./cw tx, built-in push-pull mdltr, switched xtal-controlled exciter and pa mtr, key socket for grid-block keying, xtal mic i/p socket, QQVO3-20A pa, £25 ono. G3TDR, QTHR. Tel Staines 56513.

KW Vanguard, 160-10m, gd wkg order, £25, buyer coll. G5FG, 14 Swallow Gdns, Hatfield, Herts.

FT101, vgx, £190 ono; FL400, vgc, £125 ono; 20MHz freq counter, £15; 8-el 2m Yagi £2; 19in rack, £1. G8FAP, QTHR. Tel Kings Langley 62438.

Miniature air trimmers, 10pF and 15pF, 2p; disc ceramic capacitors, 1kpF, 1p; 20kpF, 1½p; 47kpF and 100kpF, 2p; 75Ω BNC plugs 7½p, 1kpF feed-through solder-in type, 50 25p; 100 45p. G8BYL, QTHR.

Heathkit DX100U, gd cond, £35 ono; Minimitter MR44, all-band rx, £15 ono; R1481 (R1132A variant), modified, psu, £3; pr KT88s, £1 ea. G3ETY, QTHR. Tel 061-740 9385.

KW Geloso amateur band cnvrtr £8; Jones Micro-match indicator and coupler £5; Eddystone 688 spkr £3; Sontronics bandscanner £5; BC453 command rx £3; early twenties wireless and horn spkr, offers, all plus carr, sae. G3ZCO, QTHR.

Heathkit RA1 rx, with xtal clbrtr, £25; R209 rx, with S-mtr fitted, £15, buyer coll or carr extra. Ian Medlicott, 108 Heol Isaf, Radyr, Glamorgan. Tel Cardiff 842509 evenings.

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Codar AT5 tx with ac power supply. G8UA, QTHR.

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Frequency mtr BC221M with orig charts. G8FRE, QTHR. Tel 894 5090.

Mark 2 Vespa or 2DAF if wkg, or sim tx, state price and cond, must be in gd order, coll no problem. G8CVD, QTHR.

Crystal set and B2 spy set, wkg cond for son, both must be in first class order/appearance. G3ZAI, 147 Seymour Place, W1. Tel 01-723 8081, business.

Three AR88LF i.f. trnsfmrs or two trnsfmrs and one xtal load. J. E. Cronk, 6 Anvil Ave, Litlington, nr Royston, Herts. Tel Steeple Morden 465.

Copies of *Radio and Television Servicing*, volumes 1955 to 1967, pse state price and cond, all replies answered. P. L. Nicholls, 19 Davison Road, Smethwick, Warley, Worcs B67 6JL.

Buy/loan handbk cct diag, Eddystone S640 rx, costs refunded. M. Lewis, 10 Kenmore Drive, Filton, Bristol.

Top band xtals, ¼ or ⅛in pins, pse state freqs. G3KRH, QTHR. Tel 01-455 5039.

July and August 1969 issues of *CQ* and July 1971 issue of *Ham Radio*—offers to G5UBL c/o 48 Blackbrook Park Avenue, Fareham, Hants.

CR tube CR93D or DHM 10/93 for Cossor scope 1035 Mark 3. 37 Charlestown Rd, Manchester M9 2AB. Tel 061 795 0150.

Recent copy RSGB *Radio Communication Hndbk*, also TA33 jnr. S. R. Bradford, 18 Newey Rd, Coventry.

DX100U, offers to G3SM, 66 The Drive, North Harrow, Middx. Tel 01-868 6841.

Circuit and/or handbk of Murphy taxi radio, type MR960, either to photocopy, extended loan until mod completed or purchase. G8FZP, QTHR.

Beam TA33 or quad, can coll any distance. G. Brown, 146 Arle Rd, Cheltenham, GL51 8LH. Tel 0242 55204 after 5pm.

Conversion details for Pye AM25B Vanguard, high band (148-174 MHz) for 2m, loan or buy, rsnble price paid. Cusworth, 10 Juniper Grove, Watford, Herts. Tel Watford 35587.

Buy or borrow constrctn manual Heathkit UXR1 transistor radio. Fuller, 136 Croydon Rd, Penge SE20.

Scottish flag; will trade American '72 Callbook, ARRL '71 Handbook, and VHF Manual, or buy. WA1PDN, Websterville, Vermont 05678, USA.

Information on vhf sig gnrtr CT53, prompt return of anything loaned, expenses paid. G3ZVI, QTHR. Tel Cheddington 668684.

Buy or borrow hndbk-cct for solar scope type AD557. G3UKC, c/o K. Beasley, G3XUE, Elliot College, The University, Canterbury, Kent.

Up to £200 available for best commercial tx/rx or matched separates, all replies answered. G3RDT, Derwent, Chapel Lane, Bagshot, Surrey. Tel Bagshot 73577.

CRT ICP1 or DH391, or wld consider GEC Miniscope. G2FMR, QTHR. Tel Leamington Spa 35311.

Plessey PR153. G3FIA, QTHR. Tel 021-357 3783.

Y-amp, CAM111, to fit Cossor CDW110 scope, will buy amp in any cond, or exch for high-gain differential plug-in type CAM112. H. Richardson, 18 Forestdale, London, N14 7DT. Tel 01-886 4186.

EMI Fisk solariscope in gd cond. Townshend, 4 Harbour View, Fowey, Cornwall. Tel Fowey 3289.

Heath SB400 or SB401. **For sale** 3FIF loading coil, top band, £2. G3EBH, QTHR. Tel Lincoln 50637.

Many types of units of World War II vintage for archaeological colln, especially RAF radar units, manuals, etc, cond is immaterial, but must be unmodified, some army and naval eqpmnt also needed. Dr G. E. Winbolt, 4 Castle Rd, Pucklechurch, Bristol. Tel Absow 2350.

Marconi TF1330 scope with spares, trnsfmr faulty, £50; TF867 sig gen £115; communications rx, GR64, £18. M. R. Kidman, 27 Norton Cresc, Towcester, Northants.

Urgently, 23D 2·5in crt for Cossor 1039M oscillograph, details of reliable tube to K. R. Davis, GC3GPL, Haut du Pre, Fern Valley, St Helier, Jersey, CI.

Kokusai MF455-15K or sim fltr, pref with lsb carrier xtal and data. G3NUA, 68 Southbrook Ave, Hartlepool, TS25 5JB.

5BP7 scope tube with or without scan coils; focusing coil for same, pse state cond and price. D. Johnson, 29 Chatburn Rd, Clitheroe, Lancs BB7 2AW.

Low band Pye Bantam a.m. in gd cond. GI4AXV, QTHR. Tel Belfast (0232) 76467.

CORRECTION!

BURNS ELECTRONICS CATALOGUE

(April '73) Layout 13, page 17 is incorrect. Locating pip should be between the Source and Drain, not as shown.

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(Classified advertisements continued on p. 376)

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