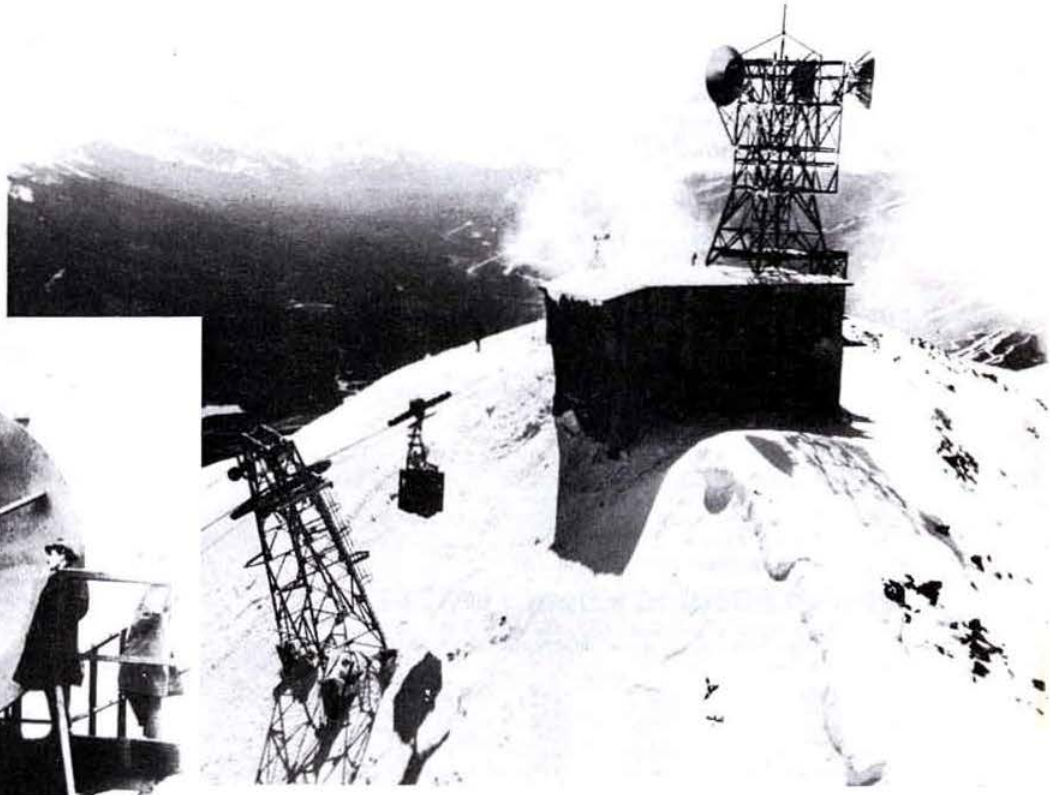
September 1978

radio communication

journal of the Radio Society of Great Britain

DISHES THEN, AND NOW



National Canadian Pacific Telecommunications microwave facility on the peak of Pyramid Mountain in the Rocky Mountains, Alberta. Photo: *CTN*

The antenna terminal at Dover of the first commercial microwave communication equipment linking Dover and Calais in 1931. Photo: *ITT, New York*

ALL OUR PRICES INCLUDE VAT

AMATEUR RADIO BULK BUYING GROUP

ALL OUR PRICES INCLUDE VAT

2m SYNTHESIZER for your Trio or FDK rig

This 2m frequency synthesizer has been designed for use with the Trio TR2200 and TR7200 range of transceiver. But it may be used with any transceiver which will operate with 12MHz transmit drive and 14MHz or 44MHz for receive, only two screened leads being necessary for the inter-connection.

Front panel controls are provided for:

Channel selection — **Fine Tune**

Simplex/Repeater/Reverse repeater — **Power on/off**

The unit is housed in an attractive metal cabinet approximately 7" × 2½" × 5". Power supply requirements + 12 volt at 400mA (this is obtained via the single connection lead).

NEW LOW PRICE—£75.00 (+£1.50 post)
(State rig required for i.e. Trio or Multi-11)

G3PLX RTTY VIDEO DISPLAY

(April 1977 Rad Com)

Kit (excluding modulator, keyboard and P.S.U.), **£83.55**

Set of printed circuit boards **£15.20.** Set of i.c.s. including programmed 74188s, **£61.15;** 2513, **£8.50;** AY5-1013, **£6.25;** 2102-1, **£2.85;** SN74188, **£3.40** each or ready programmed **£8.20** per pair. 7MHz Xtal, **£3.50.**

Flashing cursor kit **£8.60.**

Diode Matrix kit **£13.25.**

Suitable mains P.S.U. Transformer £2.75.

Catronics UHF Modulator, £15.00.

NOTE regarding PROM program: The PCBs and programmed PROMs supplied by us make use of a slightly different program sequence resulting in different pin connections to those published in the 'Rad Com' article. Whilst constructors buying PROMs and PCBs from us will have no difficulty, those producing their own PCBs or having PROMs programmed elsewhere should note this important difference. A detailed modification sheet is available with the PCBs.

NEW KEYBOARD KIT

The printed circuit board is designed to take a maximum of 70 keys but may be assembled with a smaller number of keys for a simpler keyboard.

The board is not dedicated to any specific coding, allowing it to be used for any project whether it requires ASC11, Baudot or any other code. This makes it suitable for many projects including:

G3PLX RTTY VDU
Auto morse sender, etc.

The Keyswitches themselves are single pole push-to-make type and require no extra mechanical mounting arrangements.

A legend sheet is provided with each kit enabling the constructor to label the keys to suit individual requirements.

Price: only £29.00. Please add 50p for postage.

NEW PLASTIC IC's from PLESSEY

New low cost version of the famous SL600 series communication ic's are now available. The plastic versions, designed SL1600 series, are in DIL8 or DIL14 packaging according to type.

	Metal		Plastic	
R.F. Amplifier	SL610C	**£2.65**	SL1610	**£1.82**
R.F. Amplifier	SL611C	**£2.65**	SL1611	**£1.82**
R.F. Amplifier	SL612C	**£2.65**	SL1612	**£1.82**
Limiting Amp.	SL613C	**£4.55**	SL1613	**£2.13**
VOGAD	SL620C	**£4.00**	—	—
AGC Generator	SL621C	**£4.00**	SL1621	**£2.45**
AF/VOGAD/Sidetone	SL622C	**£9.85**	—	—
AM/AGC/SSB	SL623C	**£7.30**	SL1623	**£2.75**
Multimode Det.	SL624C	**£3.70**	—	—
A.F. Amplifier	SL630C	**£2.55**	—	—
Double Bal. Mod.	SL640C	**£4.45**	SL1640	**£2.13**
Receive Mixer	SL641C	**£4.45**	—	—

JAYBEAM VHF AERIALS

We generally have the full range of "Jaybeam" aerials in stock as follows:

FOR 4m. Band:			**FOR 23 cms. BAND:**		
4 ele Yagi		**£12.65**	**D15/1296**	15 over 15	**£23.05**
FOR 2m. Band:			**FOR 70 cms. BAND:**		
C5/2M.	5dB Colinear	**£30.90**	**C8/70**	8dB Colinear	**£39.35**
5Y/2	5 ele. Yagi	**£7.70**	**D8/70**	8 over 8 slot	**£15.45**
8Y/2	8 ele. Yagi	**£10.00**	**PBM18/70**	18 ele. parabeam	**£18.55**
10Y/2	10 ele. Yagi	**£21.30**	**MBM48**	48 ele. multibeam	**£21.65**
PBM10/2	10 ele. parabeam	**£25.37**	**MBM88**	88 ele. multibeam	**£27.65**
PBM14/2	14 ele. parabeam	**£31.15**	**12XY/70**	12 ele. cross Yagi	**£29.70**
5XY/2	5 ele cross Yagi	**£15.95**	**PHASING HARNESSES:**		
8XY/2	8 ele. cross Yagi	**£19.90**	**PMH/2C**	2m. cicular	**£5.05**
10XY/2	10 ele. cross Yagi	**£26.30**	**PMH2/2M**	2m. stacking	**£6.80**
Q4/2	4 ele. Quad	**£16.30**	**PMH2/70**	70cm. stacking	**£5.90**
Q6/2	6 ele. Quad	**£21.70**	**MASTS and ROTATORS, etc.:**		
D5/2	5 over 5 slot	**£13.60**	**SPM**	16' Portable mast	**£9.95**
D8/2	8 over 8 slot	**£18.20**	**PME**	4' extension	**£1.60**
UGP/2	Unipole	**£7.00**	**SVMK**	Vertical mount	**£3.80**
HO/2	Mobile "Halo"	**3.25**	**9502**	Rotator	**£45.00**
HM/2	Halo & Mast	**£3.85**	**TAS**	¼ wave whip	**£13.05**
			5 way cable		**yd. 22p**

Add CARRIAGE as follows: Harnesses, Halos and UGP, 85p. Rotators and all other aerials: To: UK Mainland only, £2.00, Isle of Wight, £2.50, N. Ireland, £3.50, elsewhere, at cost.

JUST PUBLISHED — the 1978 summer edition which includes articles on:

SHF Transmit Converter, 400W 2m Power Amplifier, Electronic Control for Rotators, Atomic Frequency Standards, Synthesizer for 70cm TCVR, 1268MHz Local Oscillator, etc., etc.

Send £1.25 for a copy of this edition or £4.50 for complete 1978 volume.
1977 Subscription also £4.50

VHF COMMUNICATIONS is the English language edition of the German publication *UKW-BERICHTE*, a quarterly amateur radio magazine especially catering for vhf/uhf/shf technology. It is published in spring, summer, autumn and winter.

All special components required for the construction of the described equipment, such as printed circuit boards, coil formers, semiconductors and crystals, as well as complete kits, are available for despatch direct from Germany. Many of the printed circuit boards, in addition to a few selected kits, are stocked in the U.K. A price list of kits and materials is available—send sae for your copy.

ORDERS TO: VHF COMMUNICATIONS
AT ADDRESS BELOW

All prices include VAT but please add minimum of 30p for post and packing. New enlarged Data—Catalogue now available at 45p + large (A4) 18½p SAE.

DEPT. 809, COMMUNICATIONS HOUSE, 20 WALLINGTON SQUARE, WALLINGTON, SURREY SM6 8RG
Tel: 01-669 6700 Open 9am to 5.30pm Mon to Fri, 9am to 1pm Sat. Closed for lunch 12.45 to 1.45pm

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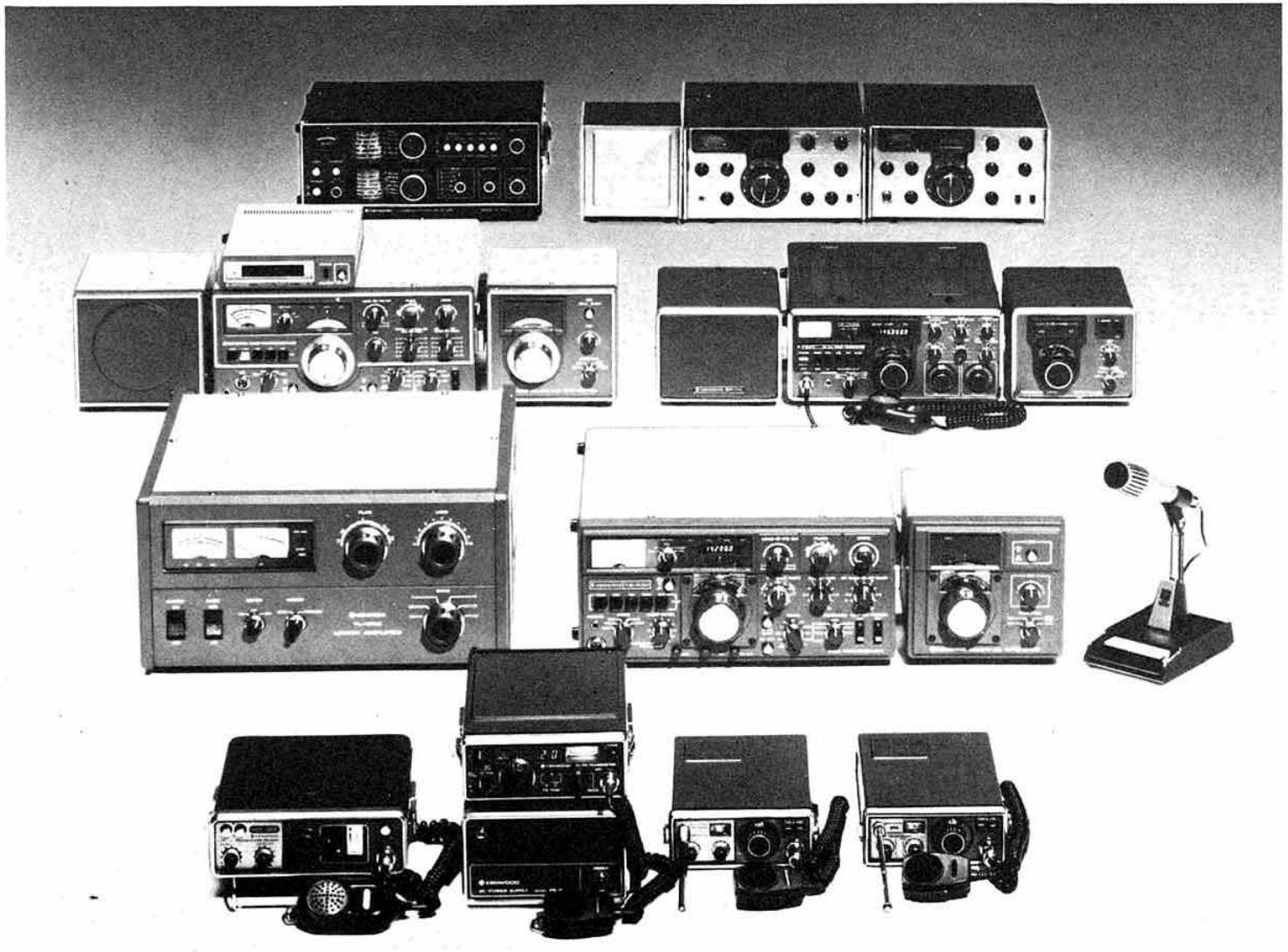


THIS IS BUT A SMALL SELECTION FROM THE MOST EXCLUSIVE RANGE OF TRIO EQUIPMENT FOR THE AMATEUR

Trio company policy has always been to present to the radio amateur the best possible product designed and engineered to the highest standards. Since the company formation in 1947, this policy has been applied constantly and the end result is that the prospective equipment purchaser can choose from the widest possible range of purpose designed equipment available on the market today. Each new design has been carefully considered at all stages to ensure that there is no hasty rushing into the market place with untried products. The care taken by Trio is your guarantee of continued satisfaction as a customer.

We can show only a few items from the Trio range and can offer only brief descriptions. For more comprehensive information, contact any branch of Lowe Electronics or see the equipment at the next rally. In the photograph above, starting at top left we have the:—

R300 All Band Receiver

A popular general coverage receiver covering 170KHz – 30MHz in six bands (not 410-525KHz). Calibrated bandspread for the international short wave bands and all mode AM/SSB/CW reception with noise limiter and crystal marker points at every 500KHz make the R300 a pleasure to use. Operates from AC mains, internal batteries or external 12V supply and is completely self-contained. A first class general purpose receiver. Price **£184.50** inc. V.A.T.

R599D – T599S

The Trio "separates". This pair represent one of the finest amateur radio station combinations on the air. The R599D features all mode AM/FM/USB/LSB/CW reception from top band to ten metres with high performance filters for each mode. Provision is made for fitting optional VHF converters to extend receiving range up to 2 metres. this receiver has the best of everything including operation from AC mains or 12V dc.

The T599S is a high quality amateur transmitter featuring USB/LSB/CW and AM operation on all bands from 80 metres to 10 metres. Transverter outputs are provided for the VHF operator and the transmitter is deluxe in every aspect, including even switchable microphone impedance. Full control facilities are provided – VOX, MOX and break in CW with keyed sidetone. Power input is 180W pep and 80W AM. The next row features the new

TS520S All Band Transceiver

The TS520S is the finest mid-price transceiver you can buy. Covering all bands from 160 – 10 metres, the TS520S runs 200W pep on all bands and has a receiver sensitivity of 0.2μV for 10 dB S/N ratio. Trio built-in features include speech processing, 25KHz calibrator, VOX and break-in CW and operators all over the world will confirm that the TS520S is the most popular transceiver ever. Also shown is the matching DG-5 digital display, unique in having the additional facility to be used as a 50MHz frequency counter. Like all Trio digital displays, the DG-5 measures *true* operating frequency at all time by incorporating all oscillator frequencies used in the transceiver. TS520S is **£525** including V.A.T. DG-5 is **£134** including V.A.T. And the best 2 metre all mode rig, the

TS700S

All mode – AM, USB, LSB, CW, FM, operation with true VFO control plus up to 22 crystal channels, VOX, break-in CW, digital readout, better than 0.2μV sensitivity and 30-40W TX input (15-18W out on all modes) and use from AC mains or 12V dc make the TS700S the rig in most demand today by the more discerning 2 metre enthusiasts. Shown here with the remote VFO700S which virtually gives you a second transceiver with all its facilities. (Incidentally, the VFO will drive the TR7010 using a small adapter unit). Full details available on request. TS700S is **£580** including V.A.T. VFO700S **£89** including V.A.T.

Starting the next row we have Big Daddy, the TL922 HF linear. Certainly the best HF linear on the market today, the TL922 covers 1.8 – 30MHz operation using a pair of 3 – 500Z Eimac tubes running 2.5KW pep input. In real finger burning terms, that means 1000Watts output key down. Loaded with safety interlocks and time delay switch off systems, the TL922 is a superb animal and its low drive requirement (80W for full input) makes it compatible with most HF rigs, not only the TS520S and TS820. Magnificent. TL922 is **£763** inc. V.A.T. Which brings us to the rig that still leads the way in HF transceivers, the

TS820

All I need to say is "listen on 20 metres to the W & K stations – see what they are using". You guessed, the TS820. All band operation 160 – 10 metres, 200W input, superb receiver with every possible refinement including the Trio patented pass band tuning system which has not yet been duplicated in competitive equipment. The TS820 cannot be described in a few lines, you must see the detailed brochure available on receipt of an S.A.E. See April or May *Rad Com* for more detail. Shown here are the matching remote VFO820 and dual impedance cardioid microphone MC50 to complete the station. TS820 **£693** including V.A.T. DG-1 **£136**. MC-50 **£27** including V.A.T.

Now to the front row which means the best, most sensibly designed VHF/UHF gear for the thinking amateur.

TR8300

We start with the TR8300, the latest 70cm FM mobile unit from Trio. Offering up to 22 crystal controlled channels, high power transmitter and a receiver combining high sensitivity with exceptional out of band rejection, the TR8300 is housed in the familiar rugged dust-tight enclosure used in the TR7200G and TR7010. Supplied with all accessories and fitted 4 channels, the TR8300 really has no competition. TR8300 **£244** including V.A.T.

TR7500

When comparing other rigs with the TR7500, you may become dazzled by the thoughts of 800 5KHz channels at your fingertips – forget it – think commonsense and remember that FM in Europe is organised on 25KHz channels so why tune five times as many frequencies as you really need. The TR7500 is the *only* imported FM box to be designed for the British user, the others are simply hand-me-downs from the Japanese home market.

With the TR7500, you can enjoy mobile 2 metre operation at its best. Need S20? turn the dial until display reads 20. Move to S17? turn to 17, it's simplicity itself. Repeater operation is equally easy requiring only the touch of a switch to select either 600KHz normal receiver up shift or reverse repeater operation as desired. Dial readout? you guessed, it's simply 7 for R7, 4 for R4 and so on.

Full band coverage 144 – 146MHz is standard on the TR7500 and as a final point to muse upon, consider what happens if we adopt 12½KHz channels in Europe. With your 5KHz step rig you are up ye creek without ye paddle but with Trio foresight, you are covered since the TR7500 is basically a 12½KHz channel rig and 12½KHz channels are available with minor modification.

TR7500, the *sensible* choice. Still only **£225** inc. V.A.T. Matching PS-6 mains PSU. **£58** inc. V.A.T.

And finally to the two electronic handbags:—

The TR2200GX This is the definitive 2 metre FM portable rig which has won praise from all over the world. Over 2W transmitter output with switched reduction to 400mW for local contacts. High gain receiver with double IF filtering at 10·7MHz and 455kHz for razor sharp selectivity.

The TR2200GX is supplied with all accessories including the battery charger for the optional Nicad battery pack, the removable telescopic antenna, the carrying case, the shoulder strap, external power lead, microphone and handbook. Fitted with 12 channels, the price is only **£172** inc. VAT. If you wish to start out at a lower price, we can supply the rig fitted 3 channels for only **£142**. With all its performance, the TR2200GX is a must for the portable operator. At the price, it has to be the best around. Just look around at the next rally and see how many operators are carrying them. Also available are a mobile mounting bracket at **£10.00**, a matching 10 Watt amplifier for **£45** and a flexible antenna. Send for full details now.

and the TR3200

The newest FM handy transceiver from the every expanding TRIO range. Superb performance for the 70cm operator with all the advantages of portability and TRIO reliability. 12 channel capability in the range 432-436MHz with three channels fitted (SU8, 18, 20). Transmitter output switched 2W/400mW and incorporating the exclusive TRIO 1750Hz tuning fork access tone generator (does that mean you can ring for credit?) High gain 5/8 wave antenna for enhanced performance on transmit and receive. Supplied complete with all accessories as for the TR2200GX and including the all important battery charger. **£185** inc. V.A.T.

We have just received the first shipment of the VB3200 10W amplifier for the TR3200. Rather more complex than the VB2200, the VB3200 also includes a switchable receive preamplifier. Price **£195** inc. VAT. Send for details now.

At Lowe Electronics branches, you will find the widest possible selection of equipment and accessories for the radio amateur and SWL. Outstanding omissions from the photograph are the TR7010, the only mobile SSB/CW rig available at the moment, the new R820 receiver and many more TRIO models.

Keeping in touch with new developments is easy – just send **45p** in stamps to Matlock and we'll forward our comprehensive catalogue, antenna book, secondhand lists and all relevant guff.

For fast friendly advice on all amateur radio matters, why not give us a call or better still pop in to see us. Derbyshire is a nice place to be in the summer and there are lots of places to take XYL and sprogs, so come along and play with the best gear on the market.

LOWE ELECTRONICS LIMITED—NEWS SHEET

So many good things are constantly being added to our stock list that it's difficult to keep track (and even more difficult to find advertising space in magazines). We decided to produce this news sheet to give you brief details of several interesting new lines. If you need more information, simply give us a ring or see us at one of the many rallies which we attend—and so to the goodies, large and small.

DAIWA rotators

At last, a reliable rotator capable of continuous use without going up in smoke! For some time we have been trying out many rotators in the search for something better than usual and we believe we found it in the new Daiwa DR7500 series. You can see from the photograph that the quality of construction in the rotator is very good indeed but the most interesting bit of the system is the DC7001 controller. We're sorry about the name "Round Controller" but we're rather stuck with that.

Basically, the whole system is a closed loop servo which is self aligning and self correcting. The resistance element in the rotator head is part of a bridge system which, if unbalanced, drives a reversible motor in the controller, via a high gain amplifier to turn a balancing resistor (and the indicator pointer) until the system is rebalanced. In practice, what this means is that using the left/right switches on the controller drives the rotator in the usual fashion and the indicator follows the rotation smoothly, quietly and with spot-on accuracy all the time. Further point—the usual rotator system has its end stops at south and if like me you like to work DX from Africa, it's b- - - -y annoying to have to swing the beam all the way around from 5 degrees E of S through 350 degrees to point 5 degrees W of S. With the DC7001, you can have the end stops anywhere you like, just choose your least favoured direction.

Power to the rotator motor is split phase 24V ac so there's no dangerous voltage up the mast. Load carrying and turning torque of the DR7500 is more than adequate for a 3 element tribander and if you really need a big brute there is the DR7600 with even higher ratings. Really, we have found nothing to compare to the Daiwa DR7500 and we are sure that you will agree that it is a new step forward in rotator systems.

DR7500 **£96.19**, including V.A.T. DR7600 **£137.25**, including V.A.T.

Note: The rotators are supplied complete with control box and both upper and lower mast clamps.

Punch kit

We have decided to reintroduce a popular item which we carried some time ago. This is a set of first-class chassis punches in a fitted plastic case which also includes a most useful tapered reamer—believe me, if you've never used a reamer, you are in for a pleasant surprise when you find how easy it is to make a beautifully round holes of any size.

There are five punches, having diameters of 16, 18, 20, 25 and 30mm and the whole kit costs only **£6.48** including V.A.T. Postage is 67p.

Tool Kit

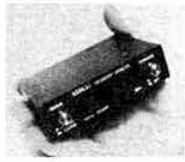
As a further help to home brew (what am I saying?) we now stock a useful little tool kit which comprises a pair of long nose pliers, pair of cutters, pair of very sharp tweezers, and an interchangeable lock-in handle with a selection of flat blade, cross point screwdriver bits and a 6mm box key bit (fits most Japanese nuts resident at the House of the Rising Goon). There is also a very sharp pointed "thing", presumably for extracting Boy Scouts from horses' hooves.

The whole kit is supplied in a nice zipped case and costs a mere **£7.34**, including V.A.T. Post and packing 44p. A nice present, even if you buy it for yourself.

HS-F1

How about a really good rubber flexible helical aerial for 2 metres? The HS-F1 is 7½" long, mounted on a PL259 plug and is of really strong construction. It will fit most 2 metre rigs, screwing straight on to the external aerial connector, and the price is a monumental—wait for it—**£3.38**, including V.A.T. P&P 16p.

FC-5M



I don't know where the name came from since you can hardly have a dishonest frequency counter but we thought that this was an outstanding amateur accessory. It is a five digit frequency counter requiring 12V dc (or 5V if available) for power, and reading to 50MHz. As an additional feature, the FC-5M has a −455kHz offset which allows you to hang it on to the oscillator of your 9R59 (or whatever) and have digital readout. Two major points in its favour: (1) The size—look at the hand and (2) The price—would you believe **£38.00** including V.A.T. A real toolbox item and almost as cheap as a second-hand BC221! (Postage 36p extra).

MIZUHO SB-2M

We are delighted to be stocking and selling the Mizuho SB2-M 2 metre SSB/CW portable. As you can see, it's in the familiar Trio style case but it's smaller than the TR2200 series although it retains the the excellent feature of having all the operating controls on the top face of the rig so that you can actually use it whilst carrying it around—that may sound silly but the only other SSB portable *cannot* be used easily when slung over the shoulder!

Frequency control is by VXO with a range of 50kHz for each crystal fitted; since there are four crystals, this gives a tuning range of 200kHz. As supplied, the SB2-M is fitted for the range 144·1–144·3MHz but other ranges may be used without needing any realignment by the owner.

Power output is around 1W pep and the speech quality is quite honestly the best we've heard in a long time. The receiver sensitivity is also quite outstanding and the use of a high quality 9MHz crystal filter makes the selectivity first class.

The SB2-M uses all the latest semiconductor devices including double balanced mixers for transmit and receive and altogether is a great alternative to the endless procession of FM boxes. Due to constantly falling exchange rates, the price is a little higher than expected but at **£155.00** including V.A.T. it's not expensive.

Mains Power Supplies

We thought that Japanese dc power supplies were very expensive but we have now changed our tune. We have found two mains supplies which cover most amateur requirements and they are at very reasonable prices, i.e. you would find it hard to build them at the price!

The first PSU is a heavy duty 13V regulated supply which will give 3 amps continuous and 5 amps peak. We have tried out all our FM boxes (not the TR7400A) on this, and it handles them all without distress. The supply is protected by an automatic overcurrent trip—in simple terms, you can stuff your pliers across the output terminals and the supply automatically shuts down—remove the short and it resets to normal. The whole thing is housed in a robust metal case measuring 6¼" × 4" × 3". The input cable is 3 core European standard 240V ac and the output is by heavy duty terminals. Really good value for money at **£16.20**, including V.A.T. Post and packing £1.06. The second mains/13V dc supply is rated at 700mA regulated dc output. This may not seem very much but we intend it to be a supply for such rigs as the TR2200/3200 series, the new Mizuho SSB portable and other such rigs.

Housed in a small moulded case, it's a really nice supply and at **£9.72**, including V.A.T., it won't break your heart. Post and packing 67p.

Here endeth Wilson's first letter to the Anglo Saxons. For further details (should I say Revelations?) please do not hesitate to ask us. By the way, if you own a TR7500 and you want to know how to put it on 12½kHz, just send us a self-addressed stamped envelope requesting "7500 info"

ALL THESE ITEMS WILL SOON BE AVAILABLE FROM MATLOCK OR ANY OF THE BRANCHES SHOWN ON THE PREVIOUS PAGE

DIODES/ZENERS

1N914	100v	10mA	.05
1N4005	600v	1A	.08
1N4007	1000v	1A	.15
1N4148	75v	10mA	.05
1N4733	5.1v	1 W Zener	.25
1N753A	6.2v	500 mW Zener	.25
1N758A	10v	"	.25
1N759A	12v	"	.25
1N5243	13v	"	.25
1N5244B	14v	"	.25
1N5245B	15v	"	.25

SOCKETS/BRIDGES

8-pin	pcb	.20	ww	.35
14-pin	pcb	.20	ww	.40
16-pin	pcb	.20	ww	.40
18-pin	pcb	.25	ww	.75
22-pin	pcb	.35	ww	.95
24-pin	pcb	.35	ww	.95
28-pin	pcb	.45	ww	1.25
40-pin	pcb	.50	ww	1.25
Molex pins .01		To-3 Sockets		.25
2 Amp Bridge		100-prv		.95
25 Amp Bridge		200-prv		1.95

TRANSISTORS, LEDS, etc.

2N2222	NPN (2N2222 Plastic .10)	.15
2N2907	PNP	.15
2N3906	PNP (Plastic - Unmarked)	.10
2N3904	NPN (Plastic - Unmarked)	.10
2N3054	NPN	.35
2N3055	NPN 15A 60v	.50
T1P125	PNP Darlington	.35
LED Green, Red, Clear, Yellow		.15
D.L.747	7 seg 5/8" High com-anode	1.95
MAN72	7 seg com-anode (Red)	1.25
MAN3610	7 seg com-anode (Orange)	1.25
MAN82A	7 seg com-anode (Yellow)	1.25
MAN74A	7 seg com-cathode (Red)	1.50
FND359	7 seg com-cathode (Red)	1.25

C MOS

4000	.15
4001	.15
4002	.20
4004	3.95
4006	.95
4007	.20
4008	.75
4009	.35
4010	.35
4011	.20
4012	.20
4013	.40
4014	.75
4015	.75
4016	.35
4017	.75
4018	.75
4019	.35
4020	.85
4021	.75
4022	.75
4023	.20
4024	.75
4025	.20
4026	1.95
4027	.35
4028	.75
4030	.35
4033	1.50
4034	2.45
4035	.75
4040	.75
4041	.69
4042	.65
4043	.50
4044	.65
4046	1.25
4049	.45
4050	.45
4066	.55
4069/74C04	.25
4071	.25
4081	.30
4082	.30
MC 14409	14.50
MC 14419	4.85
4511	.95
74C151	1.90

9000 SERIES

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9309	.35	9601	.20
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7401	.15	7474	.30	74180	.55	74H101	.75
7402	.15	7475	.35	74181	2.25	74H103	.55
7403	.15	7476	.40	74182	.75	74H106	.95
7404	.10	7480	.55	74190	1.25		
7405	.25	7481	.75	74191	.95	74L00	.25
7406	.25	7483	.75	74192	.75	74L02	.20
7407	.55	7485	.55	74193	.85	74L03	.25
7408	.15	7486	.25	74194	.95	74L04	.30
7409	.15	7489	1.05	74195	.95	74L10	.20
7410	.15	7490	.45	74196	.95	74L20	.35
7411	.25	7491	.70	74197	.95	74L30	.45
7412	.25	7492	.45	74198	1.45	74L47	1.95
7413	.25	7493	.35	74221	1.00	74L51	.45
7414	.75	7494	.75	74367	.75	74L55	.65
7416	.25	7495	.60			74L72	.45
7417	.40	7496	.80	75108A	.35	74L73	.40
7420	.15	74100	1.15	75491	.50	74L74	.45
7426	.25	74107	.25	75492	.50	74L75	.55
7427	.25	74121	.35			74L93	.55
7430	.15	74122	.55			74L123	.85
7432	.20	74123	.35	74H00	.15		
7437	.20	74125	.45	74H01	.20	74S00	.35
7438	.20	74126	.35	74H04	.20	74S02	.35
7440	.20	74132	.75	74H05	.20	74S03	.25
7441	1.15	74141	.90	74H08	.35	74S04	.25
7442	.45	74150	.85	74H10	.35	74S05	.35
7443	.45	74151	.65	74H11	.25	74S08	.35
7444	.45	74153	.75	74H15	.45	74S10	.35
7445	.65	74154	.95	74H20	.25	74S11	.35
7446	.70	74156	.70	74H21	.25	74S20	.25
7447	.70	74157	.65	74H22	.40	74S40	.20
7448	.50	74161	.55	74H30	.20	74S50	.20
7450	.25	74163	.85	74H40	.25	74S51	.25
7451	.25	74164	.60	74H50	.25	74S64	.15
7453	.20	74165	1.10	74H51	.25	74S74	.35
7454	.25	74166	1.25	74H52	.15	74S112	.60
7460	.40	74175	.80	74H53J	.25	74S114	.65
7470	.45			74H55	.20		
7472	.40						

74S133	.40
74S140	.55
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STILL VERY MUCH ALIVE & KICKING!

There seems to be some rumour around that the IC-240 has been discontinued because of the IC-280E. This is not the case. :COM are still making this rig because it has become so popular. Many thousands of its type have been sold and many more will be sold. True, it does not have the digital display and hundreds of channels like some of its competitors—what it does have is an excellent name for reliability, quality of signal and receiver sensitivity which are truly envied by some of its digital cousins. It is still one of the easiest rigs to 'drive' while on the move—and the choice of ANY of 22 channels in the 2 Metre band really is plenty. Very few people ever use more than 10 and many only ever use 3 or 4 channels! Your IC-240 comes programmed for S20 to 24 inclusive and R0 to 9 and the dial is calibrated with the channel numbers. If you wish, you can alter these or add to them merely by adding diodes in a way clearly described in the handbook. At under £200 this represents real value for money (though if the Yen gets much stronger the price of this, along with most of the rest of the amateur gear on the market, will have to go up!)

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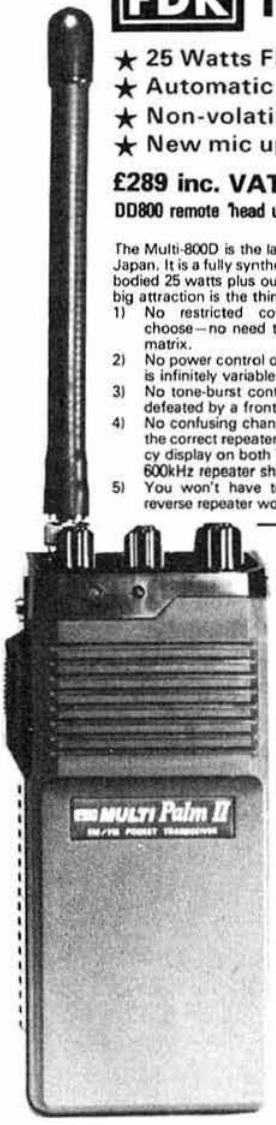
The Multi-800D is the latest 2m transceiver to leave the production line in Japan. It is a fully synthesised transceiver covering 144-148MHz with a full bodied 25 watts plus output to give you longer distance contacts. But its big attraction is the things it doesn't have. Ironical but true!

1) No restricted coverage—you can operate any channel you choose—no need to get the soldering iron out to change the diode matrix.
2) No power control on the rear panel; it's on the front—and the power is infinitely variable between 1 and 25 watts—ideal for transverting.
3) No tone-burst control on the rear panel—it's automatic but can be defeated by a front panel switch.
4) No confusing channel numbers or doubt whether you have selected the correct repeater shift—the bright LED read-out gives true frequency display on both TX and RX even when working normal or reverse 600kHz repeater shifts.
5) You won't have to retune the front-panel frequency selector for reverse repeater working or monitoring the input frequency—the flick of a front-panel control is all that is necessary.
6) The memory is not lost when you switch off the ignition or unplug the rig—it's there always and it can memorise two frequencies not just one!
7) It doesn't just have one repeater shift—you can programme any shift you wish in addition to the 600kHz—e.g. 1.6MHz for 70cms.
8) No wrist-aching tuning either—tuning is manual or electronic—you can take a leisurely stroll at 10kHz per second or race across the board at 500kHz per second.
9) And there are two safety features—every 100kHz of electronic tuning a bleep sounds—this means less looking at the dial and more eyes on the road—and there's also a remote "head-up" display available that enables you to place the frequency read-out in a position near the line of vision.

Having read about the things the 800D hasn't got, an SAE will bring you a four-page brochure about all the things it has got! But hurry—they are in great demand.



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The controls are either on the wrong surface or cannot be seen; the rig is too big as a hand-held and too small as a base station; the aerial is too long and gets broken or, even worse, causes injury; or the thing is just too darn heavy. Whichever way you look at it, there is no truly hand-held portable that overcomes all these problems . . . that is until the birth of the PALM II. The PALM II is different from any other rig.

PALM II
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6 CHANNELS

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INC. VAT

PRICE INCLUDES
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BNC helical whip
S20 & S22.

OPTIONAL ACCESSORIES

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Firstly, it weighs little more than 1lb. and, as such, is unlikely to be a burden to even the most weary of travellers. Secondly, it is half the size of its nearest competitor, which is nice if you have normal pockets, are a little self conscious in crowds and don't have the hands of a heavy-weight boxer. Thirdly, it works well, very well, and its double conversion receiver ensures reception every bit as good as its larger brother, the 2-metre mobile. The transmitter gives in excess of 1 watt output, a fine balance between battery life and effective communication. What is more, it can be crystalled up for extra channels economically, for there is only one crystal per channel. The transmitter has a useful three-way frequency shift—simplex, +600kHz and −600kHz, making it suitable for all European repeaters. And its transmissions don't sound portable at all. This beautiful quality transmitted from the built-in condenser microphone capsule would do credit to many base stations—this means in future you'll be able to recognise the operator and not the rig!

Literally, a hand-full of power, with its flexible whip and diminutive dimensions, this is the one rig you can slip into your pocket and take anywhere. And what value. The price includes NI-CADS, FLEXI-WHIP and 2 of the 6 channels fitted with crystals (S20 and S22). Its advanced circuitry is hidden somewhat by its functional looks but the instant you place this little rig in the PALM of your hand you'll know that the PALM II is the transceiver you've always wanted but could never find.

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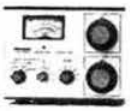
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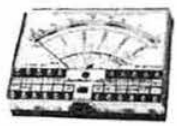
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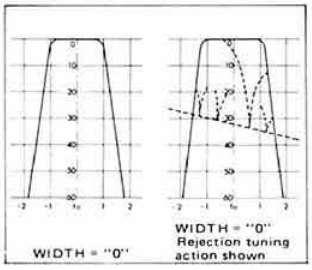
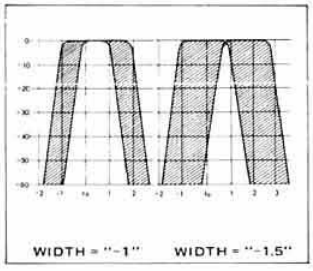
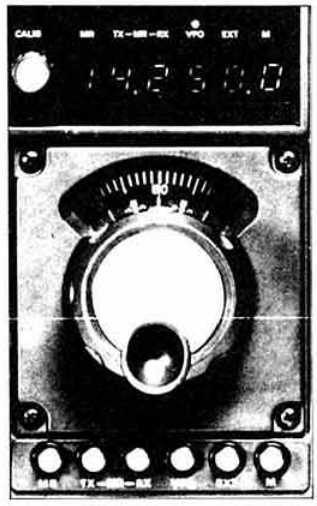
Unique receiver filtering system including rejection tuning, variable IF bandwidth tuning, and audio peak frequency tuning for the ultimate in unwanted signal rejection.

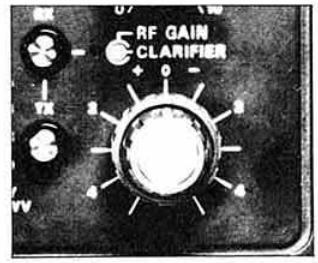




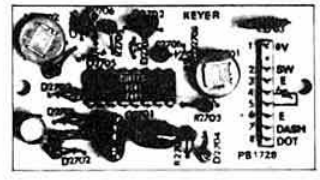
Digital frequency display with memory circuitry for transmit and receive. Ideal for QSY during net operation, multiplier hunting during contests, or daily schedules. Modern PLL frequency derivation for accurate, stable operation.



Offset tuning for either transmit or receive frequency allows precise zeroing in on that rare DX.



Built-in Curtis electronic keyer. That's one less box to pack along while traveling, and the 8043 chip provides excellent immunity from RF interference.



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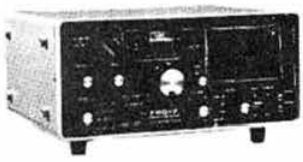

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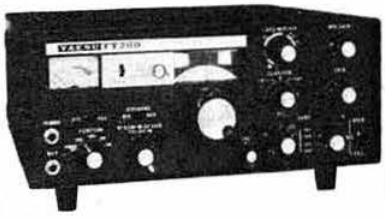

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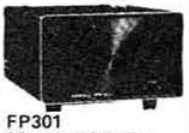

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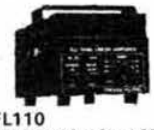
20 Amp 12V PSU

FP301D FP301 + Clock/Ident



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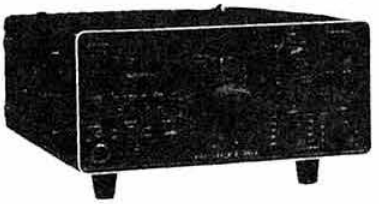
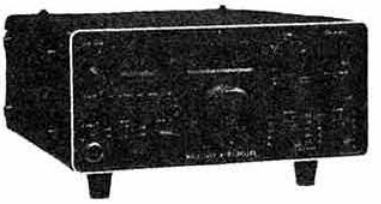
FT101EE Transceiver 10–160m, 230 & 12V
FT101E As "EE" + RF processor



FT301S Transceiver 10–160m, 10W 12V
FT301 Transceiver 10–160m, 100W output



FT301SD Digital transceiver 10W output
FT301D Digital transceiver 100W output

FT7
Transceiver 10-80m, SSB-CW, 10W 12V
DC. VFO to 1kHz resolution

FT227R
Transceiver FM 144MHz 10W Optically coupled synthesiser 5KHz steps.

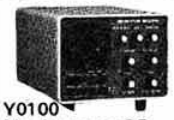
FT223
Transceiver FM 2m, 10W. 23 channels, tone burst. On air-squelch LED's etc.

FT225RD
Transceiver multimode 144MHz Dig and/or analogue, memory, 12 & 234V.

FRG7000
Receiver 0·25–30MHz continuous. Digital readout and clock/timer, switch filters.

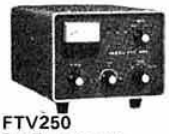
YC500 500MHz digital frequency counters
YC500J 10ppm time base accuracy
YC500S 1ppm time base accuracy
YC500E 0·02ppm time base accuracy

FV101B
External VFO (F × 101)



Y0100
Monitorscope RF. IF. AF.

FTV650B
6(4)m Transvertor



FTV250
2m Transvertor

YH55
Comms phones

YD844
Desk Mic.

YP150
Power meter to 150W

YC601
Digital readout F101

YC221
Digital readout FT221

YC355*
Digital counters.

YD84
Desk mic 600/50K

YD846
Fist mic

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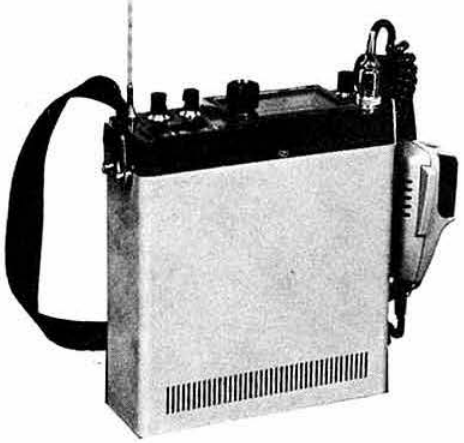
Amateur Radio Equipment



CQ-P2200E
2m FM
Portable
Transceiver

SPECIFICATION

General		Transmitter		Receiver	
Frequency range	144.00 146.00 MHz				
Channels	12 Channels	Emission type	F3	Receiving system	Double superheterodyne
Microphone	Dynamic type (10KΩ)	Transmitting power	3W (at HIGH), approx, 1W (at LOW)	Intermediate frequency	First IF 10.7 MHz Second IF 455 KHz
Speaker	3W 8Ω	Antenna impedance	50Ω		
Supply voltage	Built in batt. DC12V HP-2×8, External power supply 13.5 V	Maximum frequency deviation	± 10 KHz	Sensitivity	S/N 30 dB or more at 1μV input
Current consumption	900mA at transmission 110mA at reception	Modulation	Crystal controlled variable reactance modulation	Squelch	−6 dB or less
Semiconductors in use	29 transistors; 3 FET's: 16 diodes: 2 IC's: 1 LED	Multiplication	12	Pass band width	±10 KHz or more (at −6 dB)
		Undesired radiation	−60 dB or less	Filter	Ceramic filter
		Repeater tone	1750 Hz± 2 Hz	Low frequency output	0.5W (rated output)
Dimensions	196 (W)×69 (H)×219 (D) mm			Overall distortion	10% or less at 1,000 Hz 0·5W
Weight	Approx. 2.6kg (including batteries)				

DESCRIPTION

This is a very well built piece of equipment with robust case and strong webbing carrying strap. All controls are on the top face making operation easy and comfortable. The built-in extending rod antenna can be used as ⅝ or ¼ wave whip depending on the number of sections used. The battery compartment is recessed from the bottom of the unit and is held by one bolt giving easy access to compartment and the battery pack slides out without any connecting wires. External DC supply socket and external antenna socket are recessed into base. The microphone is particularly comfortable to hold and is the right shape and size.

The 1750HZ repeater access tone operates on release of the P.T.T. switch thus giving a tone at end of transmission even on normal simplex working.
The transmitted output is switchable 3w or 1w.
The meter serves as 'S' meter on receive, and battery check on transmit.
An LED "ON AIR" Indicator is provided.
RIT is fitted.
FETS are used for RF stage and an IC for IF stage giving excellent sensitivity, cross mod. and limiting characteristics.

3 CHANNELS FITTED £179 (incl. VAT) **9 CHANNELS FITTED £197 (incl. VAT)**

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Incorporated 1926

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

The national society representing all UK radio amateurs

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

GENERAL MANAGER AND SECRETARY
D. A. Evans, G3OUF

EDITOR
A. W. Hutchinson

ANNUAL SUBSCRIPTION RATES

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

Associates under 18: £3. **Students aged 18 to 21: £4.50.**
(Student applications should give the member's age at last renewal date and include evidence of student status)

Affiliated societies: £6.50 (including *Radio Communication);*
£3.25 (excluding *Radio Communication).*

RSGB NEWS BULLETIN SERVICE

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

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

SCHEDULE

Time	MHz	Location and coverage (hf) or beam heading (vhf) of station
0930	3·65	G2MI, Bromley, Kent (SE England)
1000	3·65	G8ML, Cheltenham (SW England)
	144·50	GM3UAG, Ellon, Aberdeenshire (NNW)
	144·50	G3FZL, London
1015	3·65	GI3GAL, Belfast (N Ireland)
1030	3·65	G2CVV, Derby (N Midlands)
	144·50	GM3UAG, Ellon, Aberdeenshire (SW)
	144·50	G3PWJ, Brierley Hill (NW)
1045	144·50	G8LIC, Middlesbrough (NW)
	144·50	G3FZL, London
	144·50	G3SMT, Stockport (NNW)
1100	3·65	G5VO, Bridlington (NE England)
1115	3·65	G3LEQ, Knutsford (NW England)
	144·50	GI3TLT, Bangor, Co Down (N)
1130	3·65	GM3TCW, Wishaw, Lanarkshire (S Scotland)
1145	3·65	GM3HGA, Aberdeen (NE Scotland)

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

RSGB QSL BUREAU

E. G. Allen, G3DRN,
30 Bodnant Gardens, London SW20 0UD

CURRENT COMMENT

The following item, published in the April 1978 issue of CQ-TV, the journal of the British Amateur Television Club, is reproduced by kind permission of the editor.

What is a demonstration?
by MALCOLM PERRY, G8AKX

What does the general public know about amateur radio? What is the purpose of putting on a demonstration? These are just two of the questions to be considered when putting on a station at various functions (I am not including mobile rallies and the like intended only for the radio amateur).

The general public can be divided into various groups. The largest group knows nothing of or about the hobby of amateur radio, except perhaps the Tony Hancock image of bungling incompetence, or that the man next door causes havoc with the television or hi-fi. Not the best image, to say the least. A minority group has a passing knowledge of the hobby from shortwave listening or from acquaintances who are interested. A demonstration station, therefore, is the ideal way of getting across to the public the ideas and aims of the hobby of amateur radio.

So, with this in mind, put yourself in the position of Mr General Public. You walk into a room and see the back of a man who is talking to a black box. Something you see every day on television. So you walk out. If you are slightly interested you decide to stop. You then try to ask some questions. "Ssh, I'm on the air", is the reply from a faceless head. An interested shortwave listener who asks how much the gear costs may be luckier in obtaining a reply to his question, if there is no contact in progress at the time. "Well", he is told, "this one is £400, that one is £600 or the one there is £500. Plus a few hundred for masts and antennas." The swl decides to take up stamp collecting, and who can blame him?

During a demonstration of amateur tv a voice from the back piped up, "I get a better picture than that at home!" Who was to blame for that remark? The person for not understanding the complexities of transmitting and receiving tv, or the demonstrator for not trying to explain what is involved.

At this point, let us stop and think. What, so far, have we demonstrated to the public? Very little. There is no easy answer, but next time you put on a station at the local flower show (or the like) stop and think. Ask yourself, "Why am I putting on the station?" If it is just to have some contacts from a different location, by all means take your black box—and leave Mr General Public as ignorant as before.

If the answer is, "To try and demonstrate the hobby of amateur radio", then put yourself in the position of someone who knows nothing about radio. Try to make the demonstration eye and ear catching, to make the public stop and take notice, and have some means of explaining simply what is going on.

With this in mind, and a bit of thought, we may be able to get over to the public what amateur radio is really all about. I do not profess to know all the answers, or offer suggestions. All I intend is to provoke you into thinking about what is an excellent opportunity to give amateur radio a better image to the public; which, I think you will agree, cannot be a bad idea. If you have found the answer, or have any ideas, why not get them published so that others may benefit. □

QTC
amateur radio news

"CQ" subscriptions

From time to time the *Short Wave Magazine* prints its version of some event as it affects the Society. Normally the few persons reading this are well aware of the alternatives. However, in an editorial in the June issue entitled "Untimely Inefficiency" the editor accuses the RSGB of withholding monies sent to headquarters for subscriptions to *CQ* magazine. When this statement was seen, the general manager (on 30 May) wrote to *Short Wave Magazine* giving an explanation of the circumstances and pointing out that it was *CQ* that was at fault. The reply from *SWM* contained no reference to the facts of the matter, only a lecture on how to run RSGB headquarters. No publicity was given to the explanation, only a further snide reference in the hf dx feature of *SWM* in the July issue.

An extract from the general manager's letter of 30 May follows: "In the summer of 1977 we, as usual, continued to send renewal and new members subscriptions to *CQ*. We started, in the autumn, to receive complaints that the magazines were not arriving. When this was queried with *CQ* we were told that **they had changed their policy** and now required payment with the order whereas, in the past, they had always invoiced us. Thus the cause of this non-event was their failure to inform us of their change of policy."

Why, at a time when vitally important events are before all radio amateurs, *SWM* could not have sought an explanation by letter or telephone is beyond our understanding.

Society's first hf manager

Dr John Allaway, G3FKM, has been appointed the Society's first hf manager, a post for which he is eminently suited. For many years he has been the contributor of the monthly hf feature *The month on the air* in this journal.

As a Council member and a former President of the Society he has also played an active role in promoting hf affairs at home, and overseas by visits and attendance at international conferences. The Society is indeed fortunate that despite a busy professional life and his many other Society activities, John Allaway has accepted this new appointment.

1978 RSGB AGM

One of the most frequent suggestions put forward to the President's Working Party, was that the Society's AGM be held at a different time and on a different day of the week to the Friday evening on which it has been held for many years.

As a result, and as an experiment, this year's AGM will be held on the afternoon of Saturday 2 December at the IEE, Savoy Place, London, which was last year's venue. This will provide more time for out-of-London members to get to the meeting, and for a longer discussion period.

Licence changes

The Home Office has confirmed that facsimile may be transmitted in the band 3·5–3·8MHz provided that the bandwidth of emissions does not exceed that normally required by telephony signals. The consequent amendment will be incorporated into amateur licences in due course.

A requirement for the issue of a reciprocal licence has been that the holder must provide an address in the UK. This has sometimes presented difficulty for visitors who tour the UK for short periods and who are unable to provide an address. The Home Office has now agreed to waive the requirement for a UK address for touring visitors who require a licence for a period not longer than 28 days.

VHF repeaters

Following discussions between the Home Office and Society representatives, agreement in principle has been reached for the establishment of an additional 15 vhf repeaters in Phase 2 of the plan. Following this decision, the Society's VHF Committee and Repeater Working Group are in touch with the operating groups to finalize the technical details of the stations.

The new repeaters, and the channels provisionally allocated by the VHF Committee and RWG (subject to approval by the RSGB Council), are:

Repeater		Channel
GB3AR	Arfon, N Wales	R4
GB3AS	Caldbeck, Cumbria	R1
GB3BL	Blandford, Dorset	R1
GB3CF	Leicester	R0
GB3FR	Old Bolingbroke, Lincs	R7
GB3HI	Isle of Mull, Scotland	R4
GB3HS	Normandy le Wold, Lincs	R2
GB3MN	Manchester (Stockport)	R2
GB3NB	Tacolneston, Norfolk	R1
GB3NI	Belfast, N Ireland	R5
GB3PR	Perth, Scotland	R3
GB3SR	Brighton, Sussex	R3
GB3TR	Torquay, Devon	R2
GB3WH	Abingdon, Oxon	R4
GB3WT	W Tyrone, N Ireland	R7

The use of channels R8 and R9 was avoided, in line with the latest IARU recommendations. The use of R0, an official repeater channel for a number of years now, was inevitable in view of the unavailability of R8 and R9, but those users of 144MHz already equipped for S0 and S24 will find they have already got the necessary crystals for both normal and inverse R0.

Despite considerable discussion, it was agreed not to introduce 12·5kHz spacing on repeaters yet, but builders of repeaters are being advised to use equipment capable of being converted to this standard in the future. Any future 144MHz units may have to be allocated the interleaving channels R0x etc.

Isle of Man millennium

Following negotiations with the Home Office, the Society is pleased to announce that a special prefix may be used to celebrate the Isle of Man millennium next year. Holders of UK amateur licences using their stations on the Isle of Man may, if they wish, substitute for the prefix of their assigned callsign the letters GT when operating between 0001bst Saturday 30 June 1979 and 2359bst Sunday 8 July 1979.

The facility is subject to two provisions. First, in no circumstances can the callsign be abbreviated so that the prefix is separated from the body of the callsign. Second, use of the temporary prefix *must* be limited to the period given.

The Home Office stresses that this is a one-off concession to mark a significant national occasion, and it is in no way a precedent for similar requests in the future.

French reciprocal licences

It has now been confirmed that the French PTT has increased the cost for a reciprocal licence to 115 French francs. The licence will be valid for a calendar year. It is recommended that money should be transferred by a banker's draft, although it may be more convenient for some to use the Giro International Payment Service, the basic cost of which has recently been reduced by 50p.

"Recent advances in hf communication systems and techniques"

The above-named conference will be held at the IEE, Savoy Place, London, on 27–28 February 1979. The scope of conference papers covers a number of aspects which will be of interest to radio amateurs. These include transmitter and receiver design, signal processing by hardware or software techniques, and interference from other users. The RSGB is co-sponsoring this conference, which is being organized by the Institution of Electrical Engineers in association with other organizations. Further information may be obtained from the Society's hf manager, Dr J. Allaway, G3FKM, QTHR.

Amateur Radio Observation Service

Just a year ago the Amateur Radio Observation Service (AROS) was launched as a service to UK radio amateurs. Its long-term objective is to improve the standard of operating and, hence, the radio amateur image to people outside amateur radio circles. Details of AROS appeared in the August 1977 issue of *Radio Communication* in an article by the honorary organizer —David Pratt, G3KEP. Briefly, the system consists of a facility whereby licensed radio amateurs are notified of breaches of licence conditions which, if heard by official channels, could result in suspension or loss of their licences. AROS observers are located throughout the country and their reports are directed through the honorary organizer to the amateurs concerned. It has

been mentioned before that the standard of operating on the amateur bands is high, this being reflected in the relatively small number of reports which have been sent out over the past year. Those sent out have ranged from out-of-band key clicks, harmonic radiation, third-party messages and the use of morse by Class B licensees.

Other licence misdemeanours have been received, but of a less severe nature. Initially there has been a concentration of effort to check the cases which would result in licence loss rather than a severe reprimand by the authorities. It would be useful to remind readers, however, of the importance of the use of callsigns. Our licence states that we should announce ourselves at the beginning and ending of each period of sending, and that phonetics be used. Many callsigns can be difficult to read, and we should be aware that failure to identify oneself clearly is an infringement of licence conditions. It is always open to discussion as to what constitutes a "facetious or objectionable character", but if the phonetic alphabet given in the notes to the licence is used then there need be no question.

A paper describing AROS was presented at the IARU Region 1 conference in Hungary in April. So enthusiastic were our overseas friends that the conference made a recommendation that similar observation services be established in other countries.

Grateful thanks are expressed to G3KEP and his team of observers. Only good can come out of such a service, for which the Society is thankful.

Old-timers telephony and cw event

For the fourth year in succession RAOTA and the Dutch OTC have arranged an activity period for the first Monday and Tuesday of October, to enable OTs in both countries to keep in touch. The "event" will commence on 3,600kHz on 2 October at 0930gmt and will run until 1530gmt on 3 October. This year there will be no full-time co-ordinators, but PA0DK, PA0PN and G2PT will be available on 3,600kHz at 0930 each day for information. To quote a Dutchman, "After that the hunting is free on the 80 and 40m bands"—with ssb, a.m. or cw.

It is thought that 7MHz will have good propagation during the day between the UK and PA, hence this band may be the busier of the two. Although specially arranged for calls licensed for 25 years or more (several go back 50 years, and G2DX to 1913!) anyone wishing to QSO OTs will be welcome.

The Sri Lanka project

Under the guidance of the Niedersachsen district of the DARC headed by Gerd Schnabel, DJ7GS, a group of West German radio amateurs is to provide a training course for 35 prospective radio amateurs in Colombo. The project has the approval of the Sri Lanka government and is fully supported by the Radio Society of Sri Lanka.

The costs of such a project are considerable but support has been forthcoming from many sources. The basic costs of travel and similar items will be shared between IARU HQ and IARU Region 1: the W German Foreign Office has donated a complete station: the Japanese Amateur Radio League has provided a transceiver: the IARU Region 3 association has made a financial contribution, and the RSGB has provided copies of the *Guide to Amateur Radio* and other books.

This is the first time, to our knowledge, that such a project has been undertaken, and the results will surely be most beneficial to the amateur service. Hopefully it could set the pattern for similar efforts in other suitable countries.

International flavour to SRJ meeting

The 14th meeting of Savez Radio-amatera Jugoslavije took place at Bor in eastern Serbia during the period 6 to 9 July. SRJ holds meetings biennially and this year it was the turn of the Serbian section to act as host.

Foreign visitors included the vice-chairman of IARU Region 1, Wojciech Nietyksza, SP5FM; the president of DARC, Philipp Lessig, DK3LP; Muhammed Al Baghdadi, of the newly formed Radio Club of Baghdad; Karl Bugner, OE1BKW; Josef Goshleberger, OE2JG (representing OeVSV), and delegates from the Romanian and German Democratic Republic societies. RSGB was represented by John Allaway, G3FKM.

Part of the time was occupied observing how teams of enthusiastic young amateurs apply themselves to the serious sport of amateur radio direction finding—the courses for the competitions being sited among the beautiful wooded countryside around Bor. Opportunities also arose—both formally and informally—to discuss current national positions with respect to preparations for WARC. Disquiet was expressed at some of the contents of CEPT proposed footnote 205B; for instance, it had been noted that Switzerland had proposed to CEPT that the whole of the 21MHz amateur band should be reserved for emergency services for the duration of any national disaster, although this has attracted little support. It was also reported that a joint meeting of CEPT and OIRT (the eastern European equivalent organization) was to be held in Moscow during the week beginning 10 July.

Ways and means of helping amateur radio in the developing countries were discussed, and the recent success of Yugoslavian efforts in Iraq noted. The provision of simple and easily constructed equipment to potential amateurs in developing countries, once their governments had given permission, was also talked about, and DARC produced a circuit and details of a suitable unit.

This is believed to have been the first time that a representative of RSGB had attended this kind of SRJ function, and many expressions of pleasure at the Society's presence were made.

President Mischa Danon, YU1AU, asked that his greetings and best wishes be conveyed to all members of RSGB. G3FKM would like to express his gratitude to SRJ for their kindness and hospitality during his visit.

G2AIH 144MHz fm transmitter-receiver

The 10M-5B-1 10·7MHz crystal filter specified in the article is no longer obtainable. A similar filter (Toyocom 10M-6B-1) interchangeable with the original type is, however, available from Ambit International, Brentwood, Essex. The price is of the order of £15 each.

A simple repeater control system

by A. J. OAKLEY, G8IWA*

THIS system was developed for GB3HU, and the prototype was run for some eight months without failure. Having proved the system, the new Mk2 version was produced. This has some improvements, notably the facility for "carrier re-access", and the use of double-sided pc boards. This is the version described, which has been in use with GB3HU and GB3WY since January 1978.

The system uses ttl logic. This was chosen because of its ready availability from many sources, and because no special precautions need to be taken during assembly, testing and use. No attempt has been made to use the latest state-of-the-art techniques, but rather to use well-tried and understood methods capable of being easily reproduced and, more important, easily understood by the average amateur with a basic knowledge of logic.

The whole unit is built up on three double-sided pc boards, which all fit into a single $7\frac{1}{4}$ by $4\frac{3}{4}$ by 2in Eddystone die-cast box. The transmit control relay is mounted outboard in a separate $4\frac{1}{4}$ by 2 by 1in die-cast box to ensure adequate rf screening.

The audio unit is designed to tap into the audio link between the receiver and transmitter, and provides a separate high impedance logic audio output which will suit almost any microphone socket.

The transmitter is relay controlled by an isolated dpdt relay, and all inputs and outputs are isolated from the control circuitry. Power requirements are 5V at 475mA.

One word of advice to would-be constructors. This system, which uses 29 ics, about 90 diodes and has over 800 soldered joints, is obviously not one for the beginner. Nevertheless it is not a difficult project, and the use of pc boards eliminates most potential wiring errors. However, do not be tempted to use anything other than full specification branded components.

The system is divided into three separate units, each on its own pc board, and the boards are interconnected with ribbon cable. Space does not allow a blow-by-blow description of each component in the system; however, the logic used is simple and may be followed through the circuit diagrams. The principle of operation is based on a fixed sequence of events, that may be stopped at the end of any event, restarted at the next event, or else reset to the beginning to start again. This sequence is given in Table 1.

Table 1. Operation sequence

Trigger	Decision	Event
Tone burst	If off frequency	None
	If on frequency	Switch on transmitter
		Send Lo-Dev ID
		Start time-out clock
		Inhibit tone burst decoder
Carrier "Off"	If within 3s after tone	Switch off transmitter at end of ID
		Reset logic
	If beyond 3s after tone	Pause 2s
		Send Hi-Dev "K"
		Enable tone burst decoder
		Pause 7s
		Send Hi-Dev ID
		Close down and re-set logic
Carrier "On"	If before "K"	No re-action, holds state as before pause
	If after "K"	Send Lo-Dev ID
		Reset logic
		Re-start time-out clock
Carrier remains "On"	If over 2 min	Start time-out tones
	If over 4 min	Switch off transmitter

Clock and ID unit

The purpose of this unit is to generate logic pulses, derived from a central clock, for processing by the logic unit. These pulses are generated at the following times:

(i) End of Lo-Dev ID
(ii) End of Hi-Dev ID
(iii) Start of time-out
(iv) End of time-out

Additionally this unit also generates logic pulses, on command from the logic unit, corresponding to the callsign and the "K". These are converted to audio cw by the audio unit.

IC101 is the clock, running at 32Hz. The frequency may be lowered to about 10Hz by adjusting the potentiometer RV120 to enable the individual pulses to be read on an ordinary test meter, and also to enable possible programming faults to be identified by those not experienced in reading cw.

The output from IC101 is gated via IC205 in the logic unit, and then used to control ICs 102, 103, 104 and 105, which together scan the diode matrix, completing a full scan in 16s. The state of the matrix is read at pin 24 of IC205, which is normally at state 0, but changes to 1 if a diode is inserted at the point being sampled.

The matrix is programmed with two complete callsigns, one starting at the beginning of the matrix, and one finishing at the end of the matrix, and also with the "K" after the first callsign. IC106 identifies when the scan reaches the end of the matrix, while ICs 107 and 108 together identify the end of the first ID. (These points correspond with end of Hi-Dev and end of Lo-Dev IDs respectively).

The output from IC101 also drives ICs 110, 112 and 113, the time-out counting chain. IC114 identifies the end of a complete cycle of 256s (the end of time-out), and ICs 115 and 116 together identify the period chosen for the start of time-out.

Logic unit

The function of this unit is to process the logic inputs from the other two units and the receiver squelch, and to provide the command signals to operate the repeater.

*100 Normandy Avenue, Beverley, N Humberside.

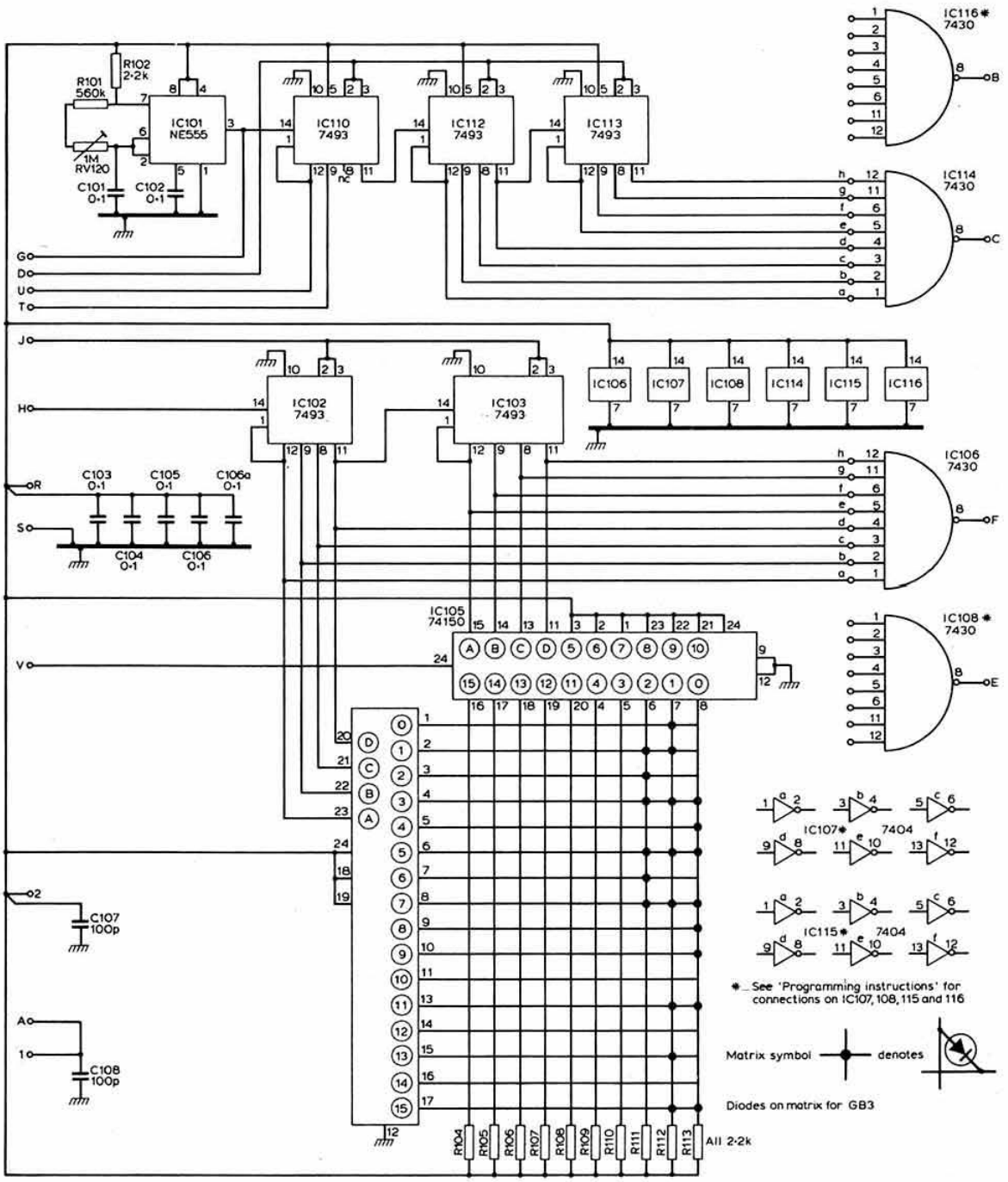
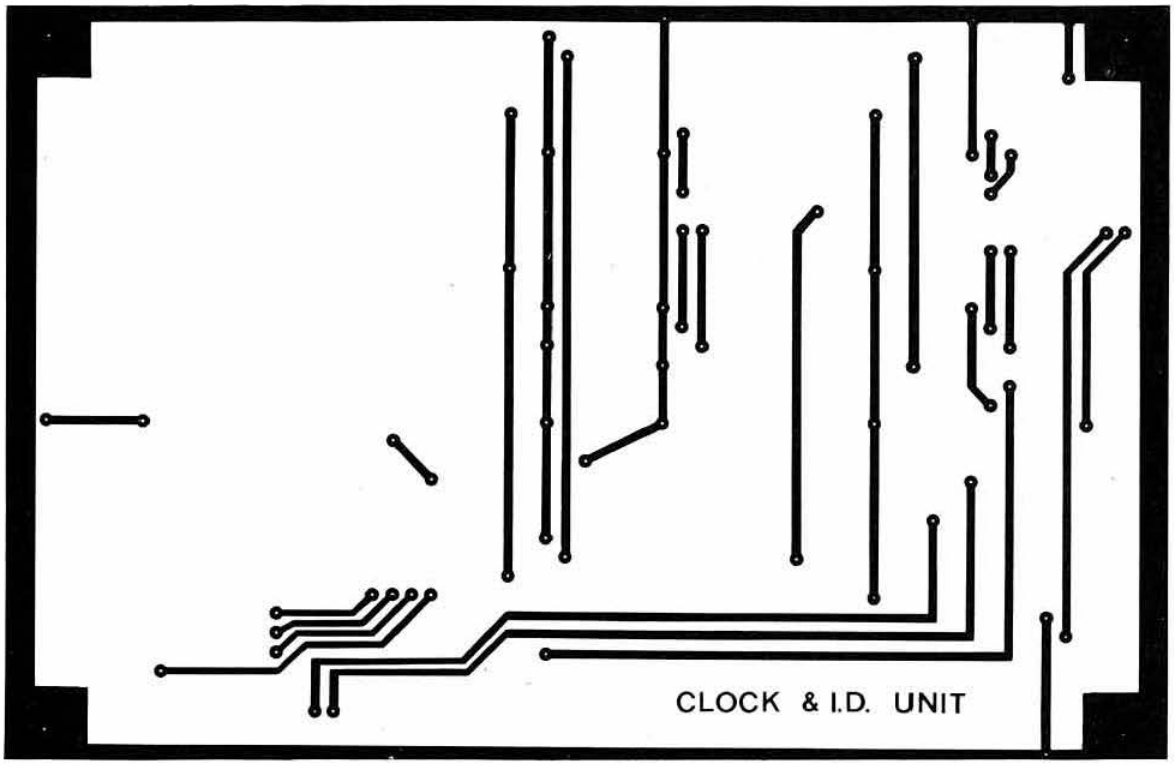
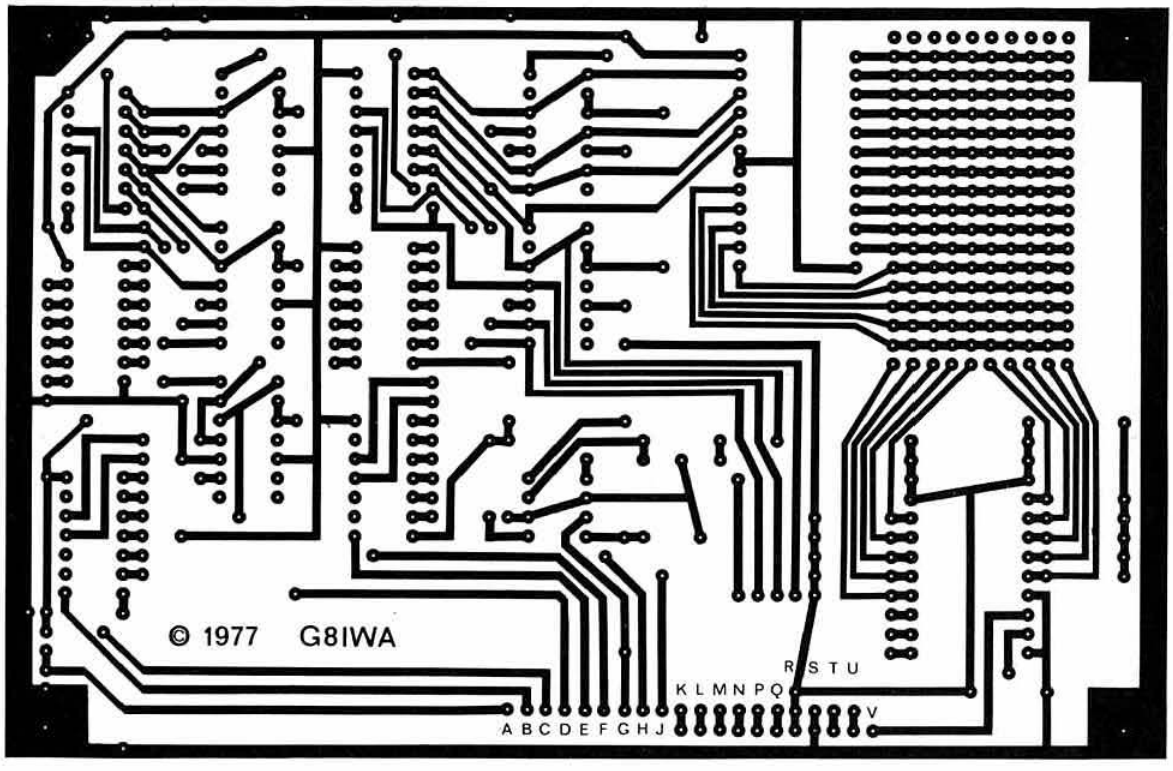


Fig 1. Clock and ID unit circuit diagram


CLOCK & I.D. UNIT


© 1977 G8IWA
R S T U
K L M N P Q
V
A B C D E F G H J

On facing page, from top:

Fig 2(a). Clock and ID unit pcb, component side

Fig 2(b). Clock and ID unit pcb, reverse side

Control of the repeater is by the use of four gate connected flip-flops, IC201 a/b and c/d, and IC202 a/b and c/d. The state of these flip-flops is set by applying a 0 to the appropriate input, via diode OR gates.

IC201 a/b controls the "reset" line of the time-out counting chain, ICs 110/112/113, and the "enable" line of the tone decoding circuit.

IC201 c/d controls one input of IC205c. The other input to this gate is controlled by the clock input, IC101.

IC202 a/b controls the "reset" line of matrix scanning ICs 102/103/104/105, the base of Q201 which switches the "transmit" relay, and also one input of NAND gate IC205d.

IC202 c/d controls IC304a, which controls the "time-out" tone generator.

Q202 and IC203 provide a "logic squelch", which follows the receiver squelch on "Make", but with a delay on "Break". The purpose of the delay is two-fold: (i) in marginal situations when a mobile occasionally drops out for a second or so, the logic does not reset; and (ii) it provides the "pause" between the end of carrier on the input and the sending of the "K". This allows a breaker to make himself known.

IC203a controls the input of IC204. When the output goes from 1 to 0, a 0 pulse is generated by IC204, which resets ICs 201a/b, 201c/d, 202c/d. IC203a also controls the second input of NAND gate IC205d, and one input of NAND gate IC205b, while IC203b controls one input of NAND gate IC205a.

IC206 generates a 0 pulse when the input goes from 1 to 0, and it has been enabled by IC201a/b. The input is controlled via diode OR gates by either the tone decoder, IC303, or IC205d. If the transmitter is "Off", IC206 can only be triggered by the tone decoder. Once the transmitter is "On" IC206 can be triggered by either the tone decoder or the squelch input, so that a tone burst is only required when bringing up the repeater from cold. IC206 is enabled/disabled by IC201a/b, which is set by IC207. This prevents re-triggering of the logic by subsequent inputs to IC206 until the "K" has been sent.

IC206 controls IC302a/b to switch Lo-Dev, sets IC201c/d, and resets ICs 202a/b, 202c/d. This clears the logic every time access is made, and the end of the pulse triggers IC207.

IC207 generates a 0 pulse when the input goes from 0 to 1. The output of IC207 sets ICs 201a/b and 202a/b.

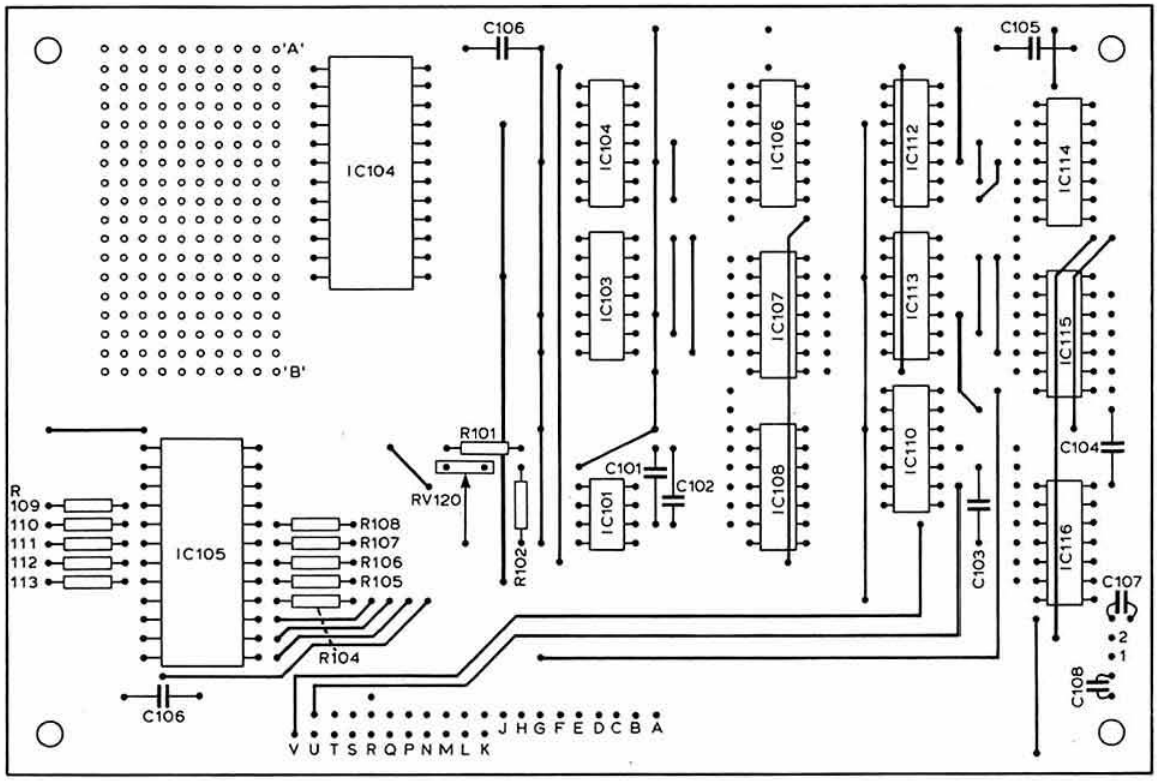


Fig 2(c). Clock and ID unit layout on component side. Matrix formed by wire bridge 10mm high from 20swg wire between rows marked "A" and "B". Diodes fitted, as required, vertically, cathodes to pcb, anodes to bridge

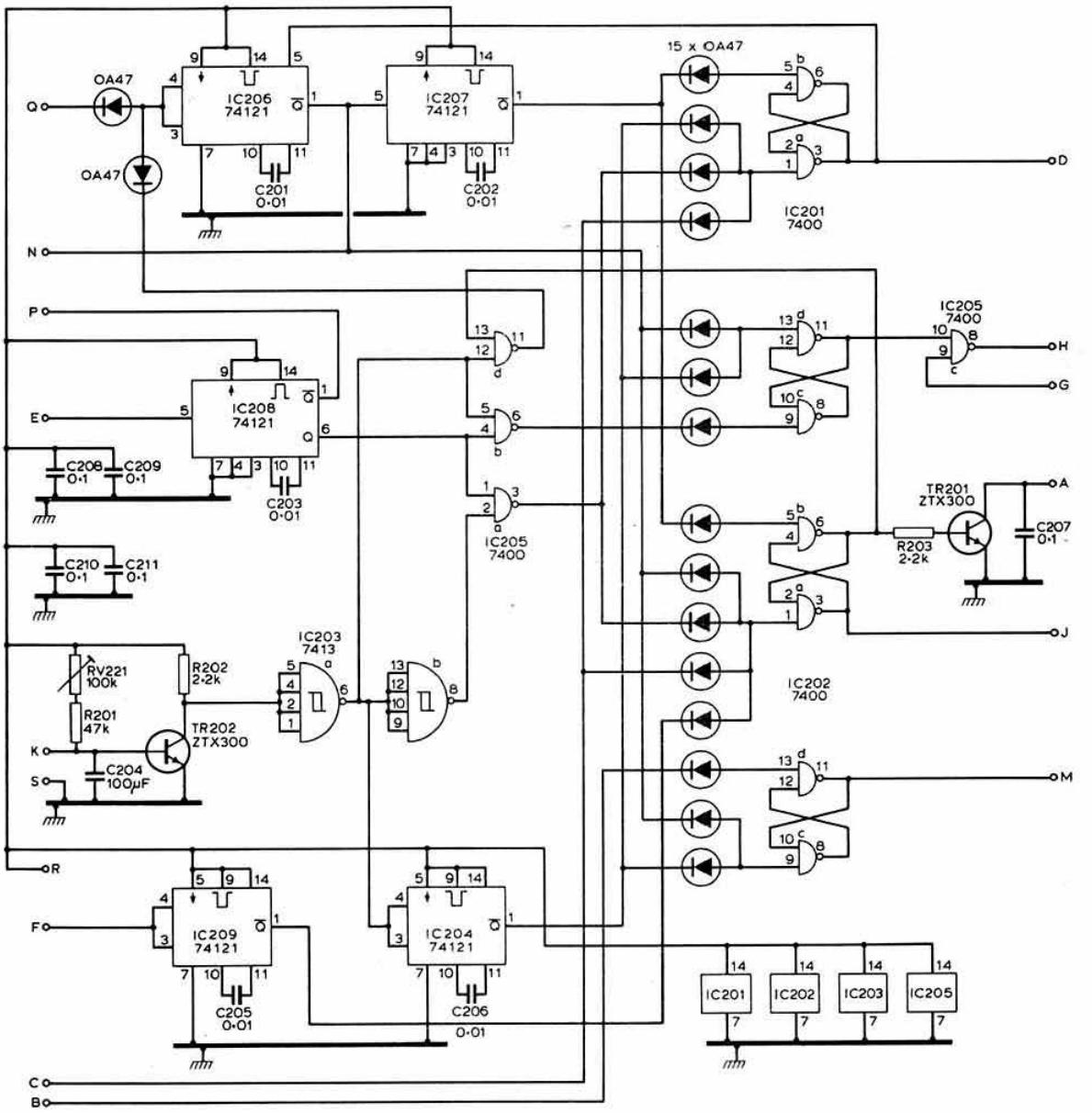
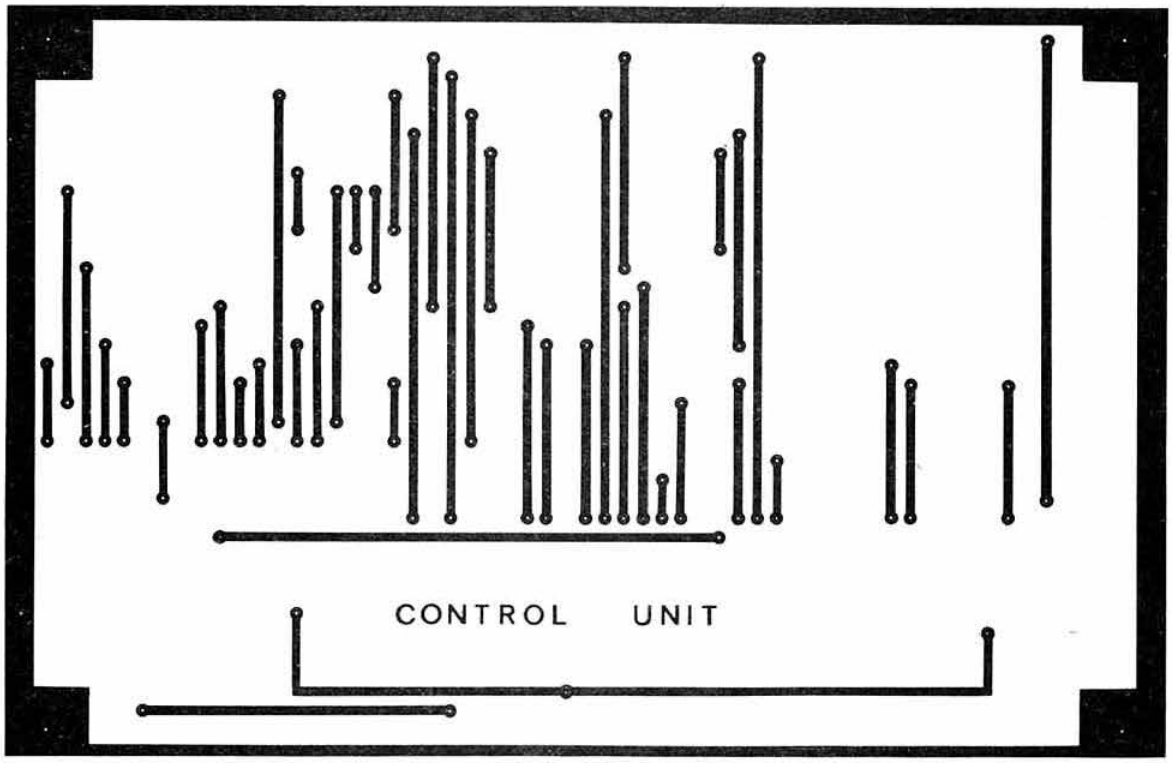


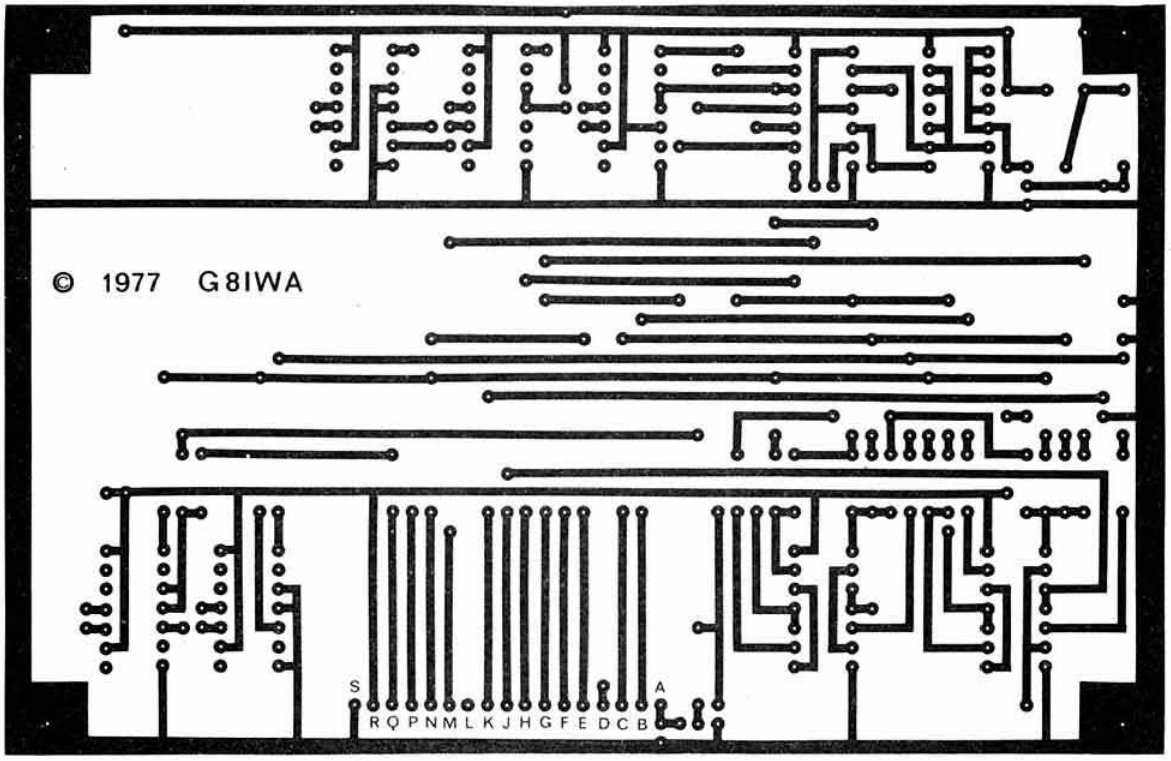
Fig 3. Control unit circuit diagram

On facing page, from top:

Fig 4(a). Control unit pcb, component side

Fig 4(b). Control unit pcb, reverse side


CONTROL UNIT


© 1977 G8IWA
S
A
R Q P N M L K J H G F E D C B

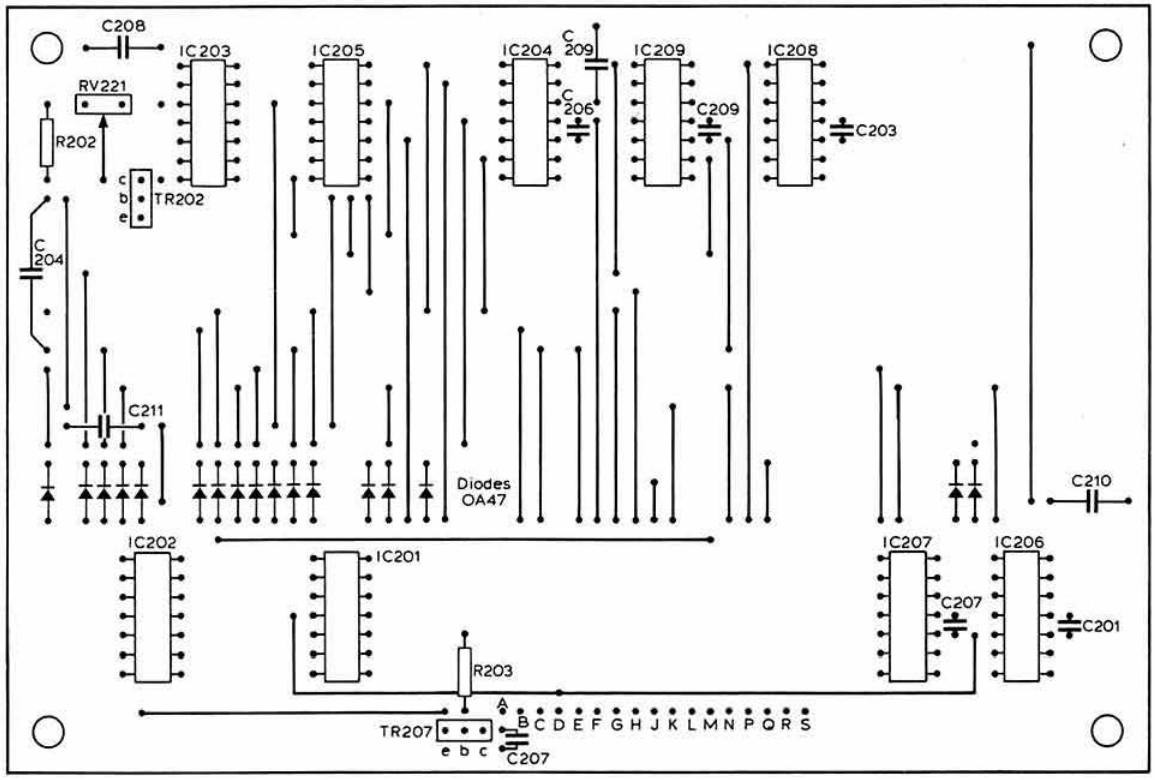


Fig 4(c). Control unit layout on component side

Component list

R101	560kΩ
R201	47kΩ
R302	33kΩ
R304	22kΩ
R306, 310	4·7kΩ
R311	470Ω
R312	47kΩ
R313	10kΩ
All other resistors	2·2kΩ
RV120	1MΩ
RV221	100kΩ
RV320, 324, 325, 327	10kΩ
RV321, 322, 323	100Ω
C107, 108, 207, 318, 319, 320, 321, 323, 324, 325	100pF
C201, 202, 203, 205, 206, 301, 309	0·01μF
C204	100μF
C306, 310	22μF
C307	10μF
C308, 312	0·22μF
All other capacitors	0·1μF
IC101, 301, 305	NE555
IC102, 103, 110, 112, 113	7493
IC104	74154
IC105	74150
IC106, 108, 114, 116	7430
IC107, 115	7404
IC201, 202, 205, 302	7400
IC203	7413
IC204, 206, 207, 208, 209	74121
IC303	NE567
IC304	7420
Q201, 202, 301	ZTX300
All diodes	OA47

IC208 generates a 1 pulse when the input goes from 0 to 1. It is triggered by the output of IC106 at the end of the first ID. The output of IC208 controls the second input of ICs 205a/205b, so that a 0 pulse appears at the output of IC205a, if the squelch is 1, or a 0 pulse appears at the output of IC205b if the squelch is 0. The inverting output controls IC302a/b to switch Hi-Dev.

IC205a resets ICs 201a/b and 202a/b, thus resetting the logic if no carrier is on the input when the first ID has been sent (phantom-bleep). IC205b resets IC201c/d, which stops the counting chain ICs 102/103.

IC209 generates a 0 pulse when the input goes from 0 to 1. It is triggered by IC108 at the end of the second ID. The output of IC209 resets IC202a/b, which switches off the transmitter.

At the start of time-out the output of IC113 sets IC202c/d, enabling the time-out generator.

At the end of time-out the output of IC114 resets ICs 201a/b and 202a/b.

Audio unit

The function of this unit is to identify any tone bursts on the audio signal from the receiver, tapped off the line between receiver and transmitter, and to generate audio signals for ID, "K", and time-out. The audio output must go to a separate input to the transmitter, and its high impedance is suitable for a microphone socket.

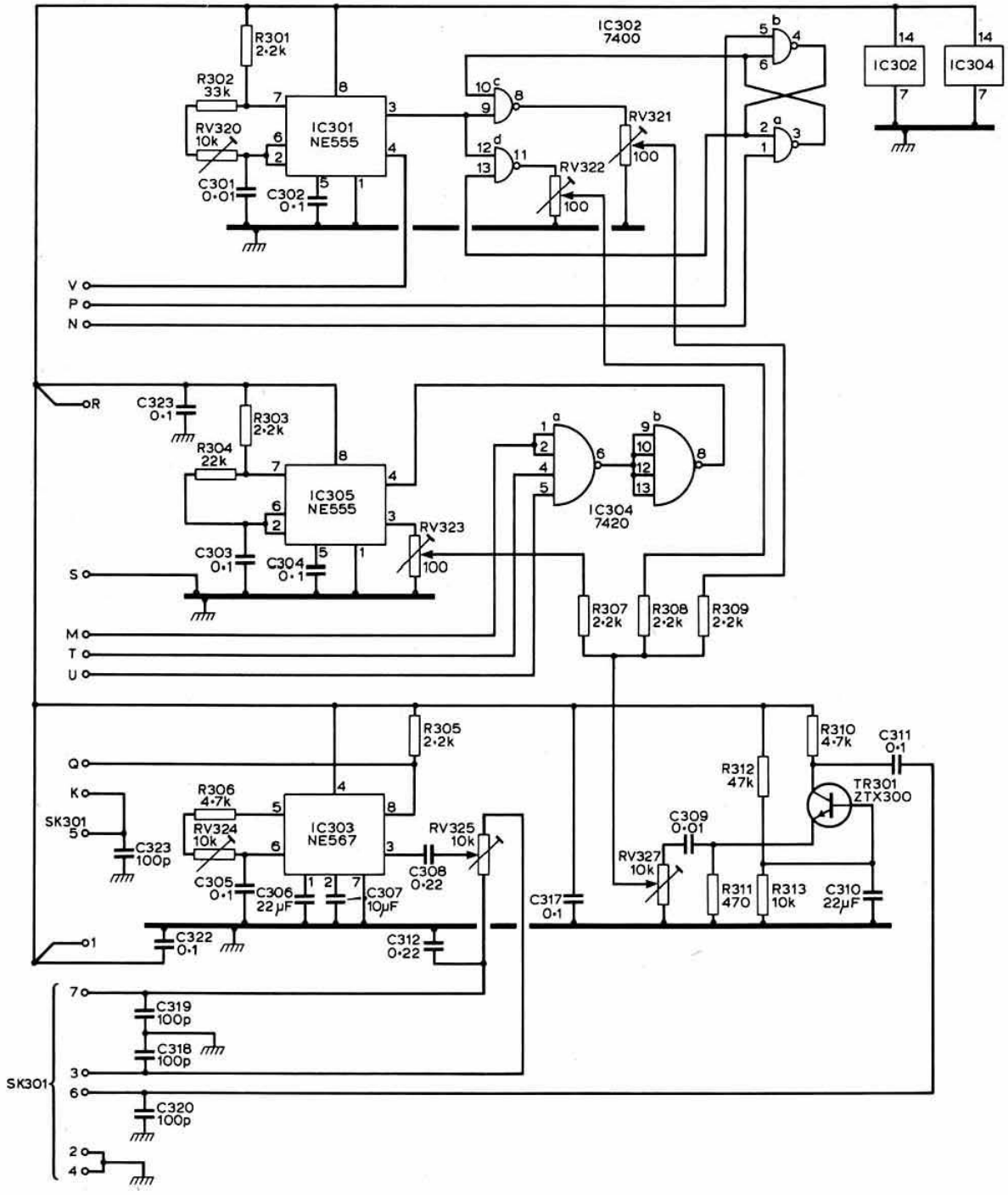
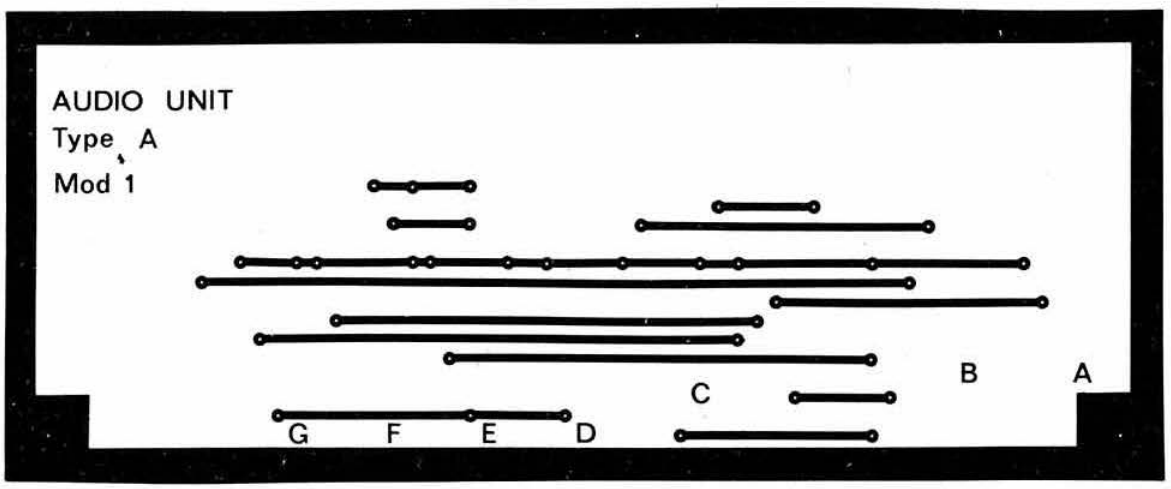
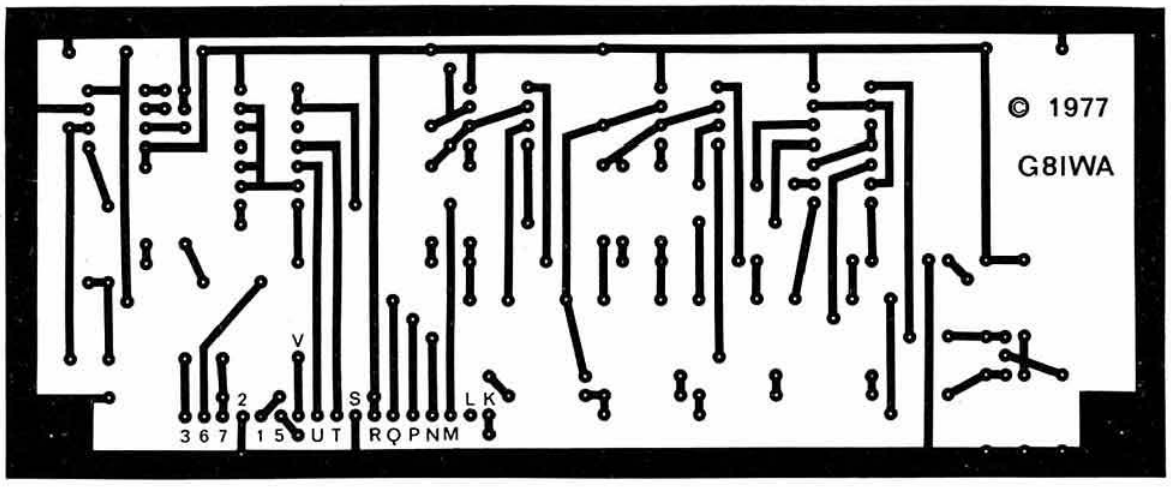
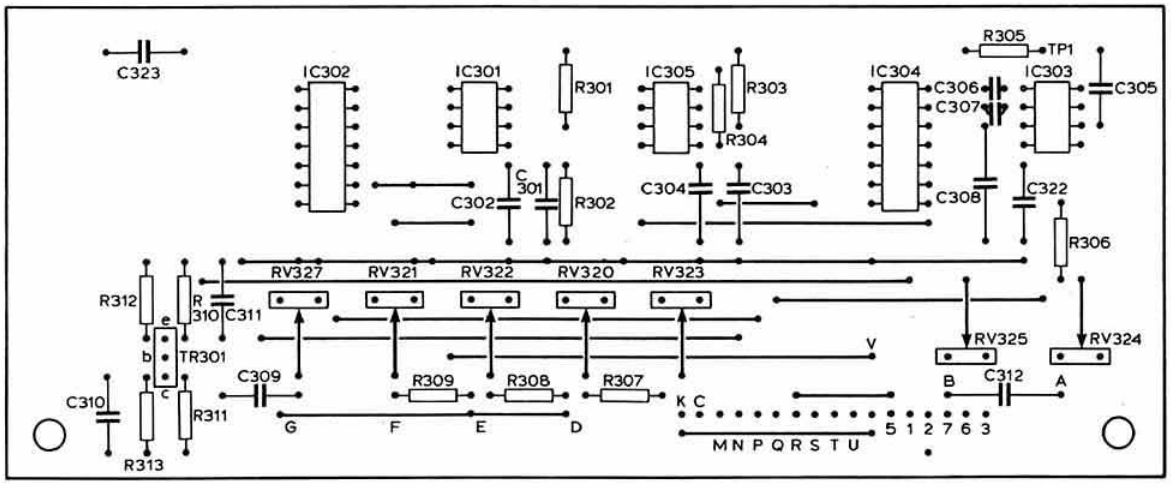


Fig 5. Audio unit circuit diagram


AUDIO UNIT
Type A
Mod 1
B
A
C
G
F
E
D


© 1977
G8IWA
V
2
S
L K
3 6 7
1 5
U T
R Q P N M


C323
IC302
IC301
R301
IC305
R303
R304
IC304
R305
TP1
IC303
C305
C306
C307
C302
C 301
R302
C304
C303
C308
C322
R306
RV327
RV321
RV322
RV320
RV323
R312
R 310
C311
e
b
c
TR301
V
RV325
RV324
C309
R309
R308
R307
B
C312
A
C310
R311
R313
G
F
E
D
K C
5 1 2 7 6 3
M N P Q R S T U

On facing page, from top:

Fig 6(a). Audio unit pcb, component side

Fig 6(b). Audio unit pcb, reverse side

Fig 6(c). Audio unit layout on component side

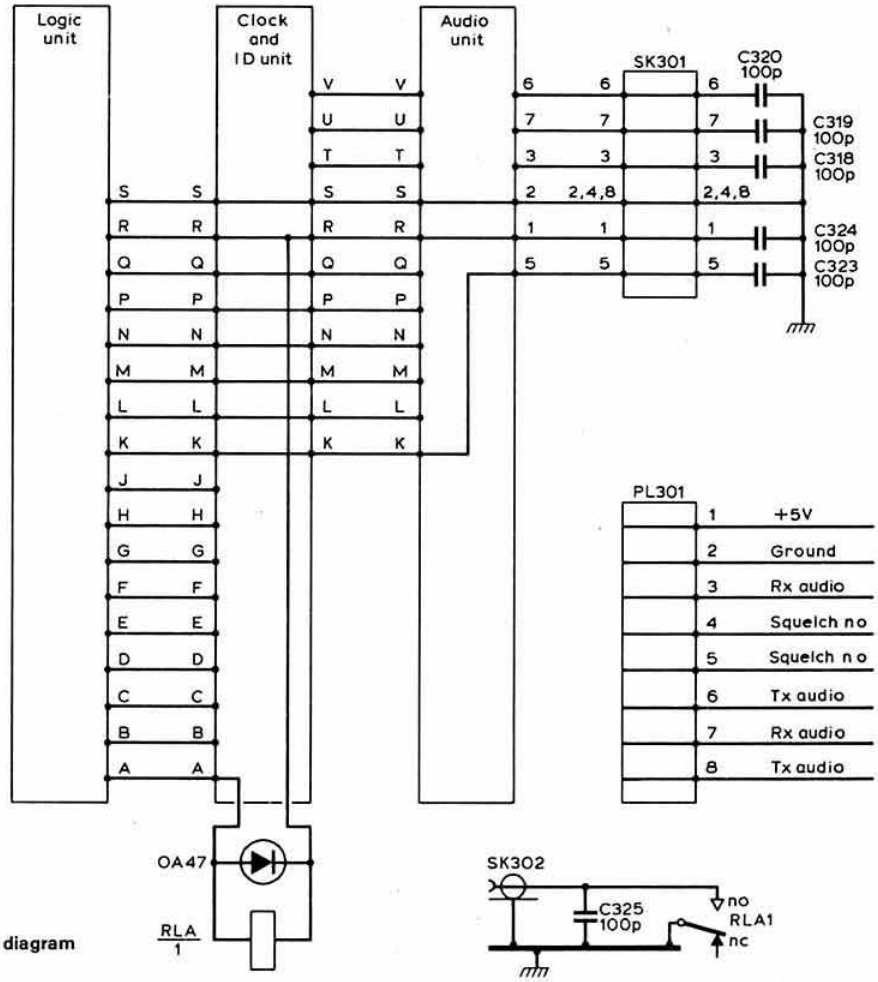


Fig 7. Inter-unit wiring diagram

IC301 is a multivibrator, the frequency of which is controlled by RV320. (This is normally set at 1,750Hz to facilitate users setting up their tone bursts). IC301 is controlled from IC105, so that the output of IC301 is audio cw at 1,750Hz, following the diodes in the matrix. The output from IC301 controls one input of each of IC302c and d.

IC302a/b is a gate-connected flip-flop, the condition of which is set by either IC206 or IC208. The output of IC302a controls the second input of IC302d, and the output of IC302b controls the second input of IC302c. Thus the audio cw output from IC301 can only pass through IC302c or d, depending on which one has been enabled.

The outputs of IC302c/d are taken via level-setting potentiometers RV321 and RV322 to the mixer, Q301, and the relative levels of audio cw can then be set to give Hi- or Lo-Dev.

IC303 is a phase-locked-loop decoder, the resonant frequency of which is set by RV324 (this is set at 1,750Hz). Receiver audio is tapped from the line by C308 and C312, and applied via the level-setting potentiometer RV308 to the input of IC303. When the correct frequency is applied to the input, the output state changes from 1 to 0, which controls the input of IC206.

IC304a is wired as a three-input NAND gate. Two inputs are each controlled by the 16Hz and 4Hz outputs from the counting chain ICs 110/2/3, while the third input is controlled by IC102c/d. The output of IC304a is inverted by IC304b, the output of which controls IC305.

IC305 is a multivibrator running at about 420Hz, controlled by IC304b to send four "dots" per second. The output from IC305 is taken via level-setting potentiometer RV323 to the mixer, Q301.

Q301 is an audio transistor in a common-base configuration. This mixes the low impedance inputs and converts them to a high impedance output suitable for feeding direct into the transmitter microphone socket. The audio outputs from ICs 302, 302d and 305 are all taken via the overall level-setting potentiometer RV327, to the emitter of Q301, and the audio output is taken from the collector. □

The "Phoenix" —a simple five-valve transceiver for the 3·5MHz band

by M. T. Perkins, G3PNI*

Introduction

Several reasons prompted the construction of this piece of equipment, among them:
(a) a desire to "do something with valves" after a lot of dabbling with transistors;
(b) a need for an easily-portable station;
(c) a large amount of, apparently, redundant junk in the shack;
(d) hearing many people expressing the desire to have a go at building a transceiver, but being put off by either cost or complexity.

The result was the "Phoenix", so called because it arose from the "ashes" of the junk box. While not containing anything radical or gimmicky, it did meet one of today's most important criteria—cost effectiveness. The cost was zero, and the effectiveness was well worth the effort required. Ninety per cent of the components came from broken-down old television receivers, and the remainder from an aged domestic broadcast receiver.

* 17 Durban Road, Margate, Kent CT9 2SS

The circuit

It was decided to build a set for the 3·5MHz band because (a) design considerations are less critical than at higher frequencies, and (b) the band always has a high level of cw activity.

Several circuits were tried for the front-end of the receiver; the cascode chosen eventually appearing to give the best gain and selectivity coupled with stability. Coil L1 was found to be broad-banded enough to avoid the necessity of a twin-ganged tuning capacitor, thus obviating the associated tracking problems with two tuned circuits. Capacitor C29 in the anode of V1b compensated more than adequately for any fall-off in gain across the passband. D1, D2 and RV2 comprise a simple balanced modulator, injection being provided by V4a via C18. C6, C7 and R16 tailor the audio by clipping the bass and boosting the treble frequencies. V2a/b is a two-stage audio preamplifier driving V3 to around, in the author's case, half-a-watt output.

The transmitting section is simplicity itself. Valve V4a, a parallel-tuned Colpitts, drives V4b acting as an untuned buffer amplifier. Enough drive is available to run V5 to 5W input. Switching was accomplished by using nothing more than an ordinary dpdt toggle switch. Screen keying was used, as keying the cathode pulled the oscillator too much on transmit.

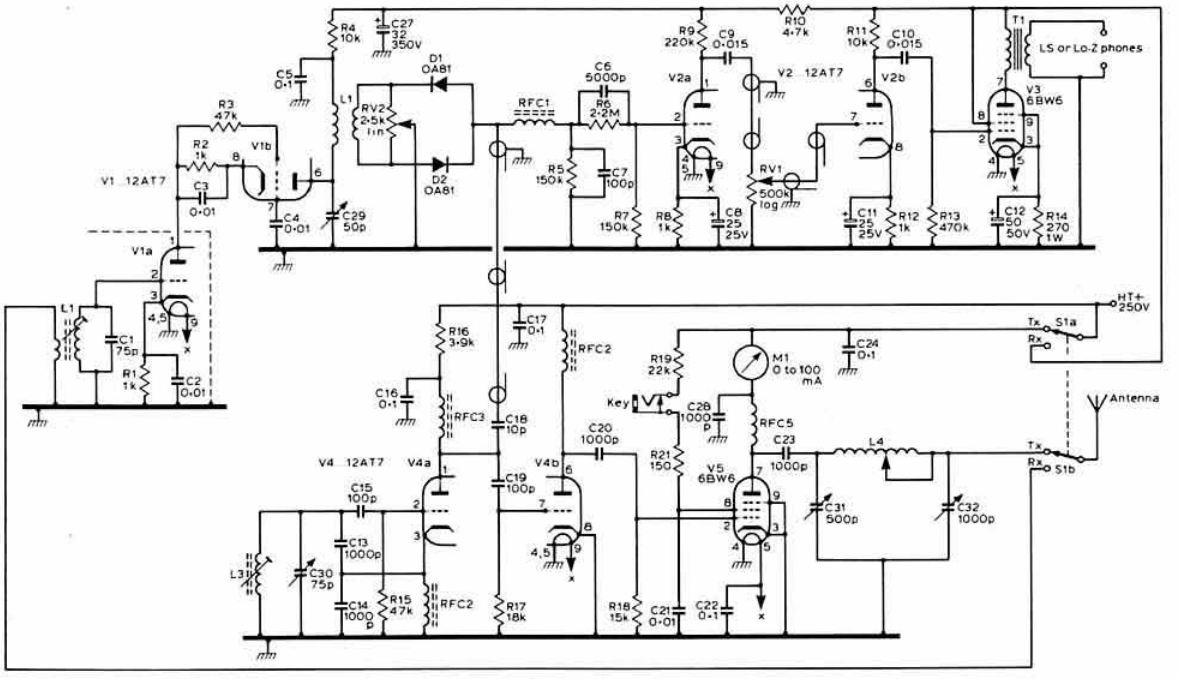


Fig 1. Circuit diagram

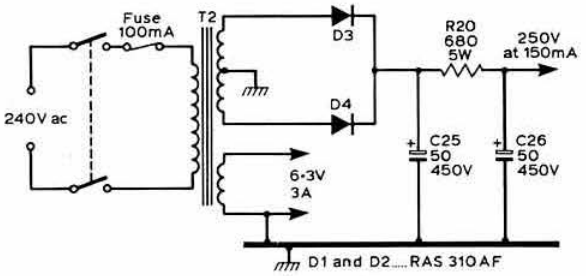


Fig 2. Power supply

Construction and setting up

The unit was constructed on an aluminium chassis (again from the junk box) measuring 10 by 8 by 2½in. The layout, Fig 3, is in no way critical, and can be altered to suit personal taste provided that all rf connections are kept as short and direct as possible.

In setting up, a gdo is useful to pre-align the coils. Check for shorts and circuit errors, switch to receive, set RV2 to mid-travel, connect antenna, and apply mains. With C30 fully meshed, tune L3 to 3·5kHz; a general coverage receiver of known accuracy being the best way to do this. Peak L1 and L2 for maximum signal output at 3·55kHz. If any strong local broadcast signals break through they can be eliminated by RV2. On transmit, set tap on pi-tank to best loading position.

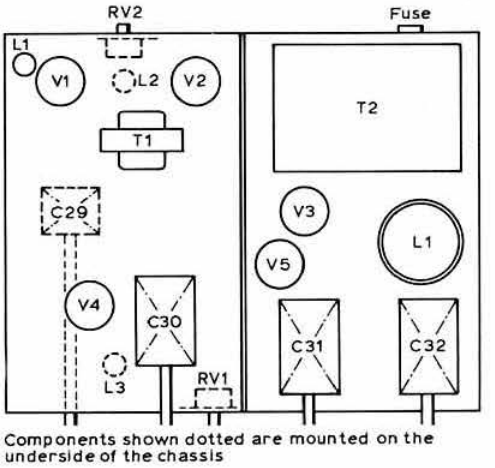


Fig 3. Component layout

Components list

R1, 2	1kΩ	**R13**	470kΩ
R3, 15	47kΩ	**R14**	270Ω 1W
R4, 11	10kΩ	**R16**	3·9kΩ
R5, 7	150kΩ	**R17**	18kΩ
R6	2·2MΩ	**R18**	15kΩ
R8, 12	1kΩ	**R19**	22kΩ
R9	220kΩ	**R20**	680Ω 5W
R10	4·7kΩ	**R21**	150Ω
Resistors ¼W unless otherwise stated			
RV1	500kΩ log	**RV2**	2·5kΩ lin
C1	75pF	**C15,19**	100pF silvered mica
C2, 3, 4, 21	0·01μF	**C18**	10pF
C5, 16, 17, 22, 24	0·1μF	**C20, 23, 28**	1,000pF
C6	5,000pF	**C25, 26**	50μF 450V wkg
C7	100pF	**C27**	32μF 350V wkg
C8, 11	25μF 25V wkg	**C29**	50pF
C9, 10	0·015μF	**C30**	75pF
C12	50pF 50V wkg	**C31**	500pF
C13, 14	1,000pF silvered mica	**C32**	1,000pF (500 + 500 in parallel)
V1a/1b	12AT7	**V4a/4b**	12AT7
V2a/b	12AT7	**V5**	6BW6
V3	6BW6		
D1, 2	OA81	**D3, 4**	RA5 310 AF
T1	3Ω output transformer, primary imp 3,000 – 5,000		
T2	250 – 0 – 250V 150mA 6·3V 3A		
RFC 1, 2, 3, 4	2·5mH on ferrite cores		
RFC 5	2·5mH 100mA rating		
Fuse	100mA cartridge type and holder		

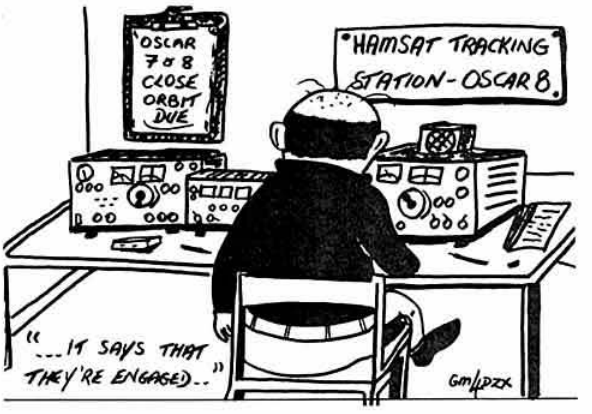
Coil data

- **L1** 50t c/wound 34swg enamelled wire on ⅜in slug tuned former. 5t link on cold end of miniature pvc wire.
- **L2** 60t c/wound 34swg enamelled wire on ½in former. Link 11t c/wound miniature pvc in centre of main coil.
- **L3** 15t c/wound 34swg enamelled wire on ⅜in slug-tuned former.
- **L4** 30t 24swg enamelled wire space wound in 1⅜in dia former tapped at 20 and 25 turns.

Conclusion

Running at 5W dc input, and using a 14MHz dipole with the feeders strapped and fed via an atu, contacts were obtained throughout Europe. On a full-size G5RV antenna it went like a bomb.

This design is a "bare bones" transceiver and offers plenty of scope for improvement for those with the time or inclination. A two- or three-section audio filter would improve selectivity considerably. With suitable adjustment to inductors it could be made usable on the 1·8, 7 or 14MHz bands. Transmitter power could also be stepped up. In these days of the complex high-power ssb black boxes which make transatlantic QSOs routine, it is much more satisfying to do so with one's own equipment on QRP, and good fun too. The author's FTDX560 has been collecting dust for many a month now. □



Modifications to the Yaesu FR50B

by P. R. HALL, A8346*

THE Yaesu FR50B is a very popular and well-known beginner's receiver, giving good performance for a modest financial outlay. However, after working with the receiver for several months, the author found that several design weaknesses came to light. These were, in order of importance:

(a) Strong signal handling and intermodulation performance were not good enough to enable all potential dx stations to be heard, especially on 7MHz, where reception of weak signals between broadcast transmitters was almost impossible. Most of the trouble was traced to the second mixer which, seemingly, overloaded fairly easily.

(b) Selectivity was poor by ssb standards at 4kHz, and the filter shape factor was also poor. Many signals were lost due to strong adjacent stations (3kHz or so away), swamping the i.f. passband.

(c) VFO drift was annoying at times; the receiver needed to be retuned every 5–10min, even on 3·5MHz.

It must be stressed that the author was being quite critical, and required a receiver which would give trouble-free performance without losing any "rare catch" through design weakness. Although the perfect receiver cannot, of course, be realized, the author feels that the simple modifications detailed below go a long way to making a good design into an excellent one.

There are two basic modifications to be carried out: insertion of a crystal filter between first and second mixers, and complete redesigning of the vfo.

*"Little Alscott", Helsby, Cheshire.

Inserting crystal filter

This completely removes overloading of the second mixer, and enables the selectivity curve of the receiver to be brought up to the required standards, ie b/w 2·1–2·4kHz and shape factor better than a ratio of two to one.

First, remove R10 (4·7kΩ) which is a damping resistor across the second signal frequency tuned circuit. This increases premixer selectivity on 7MHz and 3·5MHz. If any instability occurs (it did not in the author's case), thorough decoupling of the rf stage should effect a cure. Try connecting extra capacitors across C12 and C16.

The next step is to bring the first i.f. up from 5173·9kHz to 5·2MHz, for which crystal filters can readily be obtained or made. This is done by removing the second mixer local oscillator screening can, and replacing the 5628·9kHz crystal with one of 5655·0kHz. This crystal can be ordered, fairly cheaply, from various specialists in the business. When setting up the oscillator, the setting of the primary coil of the lo transformer, L19, is very critical, and no oscillation may occur at all if it is not within a turn or so of the correct position. When oscillation has been established, align the oscillator as in the manual. Peak up both cores of L6, the intermixer transformer, for maximum S-meter deflection, using the crystal calibrator as a signal source. The receiver is now operating on 5·2MHz first i.f., and all tuning ranges will be shifted by 26·1kHz.

The crystal filter can now be installed. It can either be a home-made ladder filter, using the cheaply available 5·2MHz crystals, or a commercially made one like the SEI QC1246 AA. In the author's case a QC1246 AC was used, which has a b/w of 2·05kHz. The circuit is shown in Fig 1.

The filter is followed by a conventional fet i.f. amplifier, to overcome insertion loss and present the second mixer grid with a reasonably high impedance. The crystal filter can be fitted between the tuning capacitor compartment and L6, while the rest of the circuitry is easily wired in underneath, there being quite adequate space to work. No specific details are given as almost any component positioning is possible **provided:** (*a*) all leads are kept as short as possible; and (*b*) the input and output circuits to the filter are kept completely

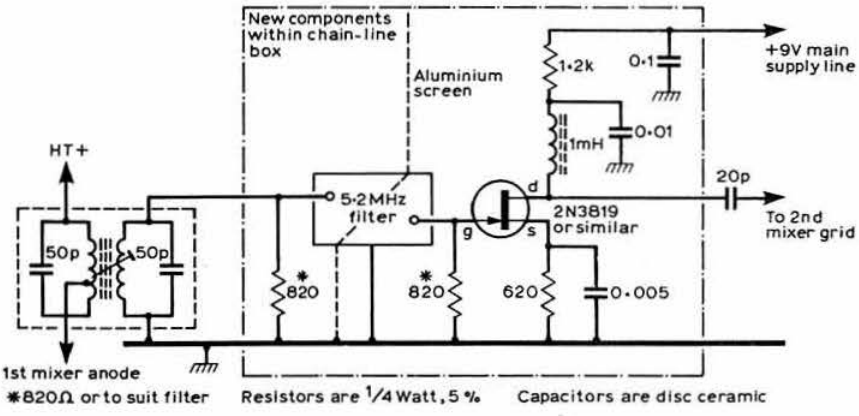


Fig 1. Circuit of crystal filter plus fet buffer, installed between first and second mixers

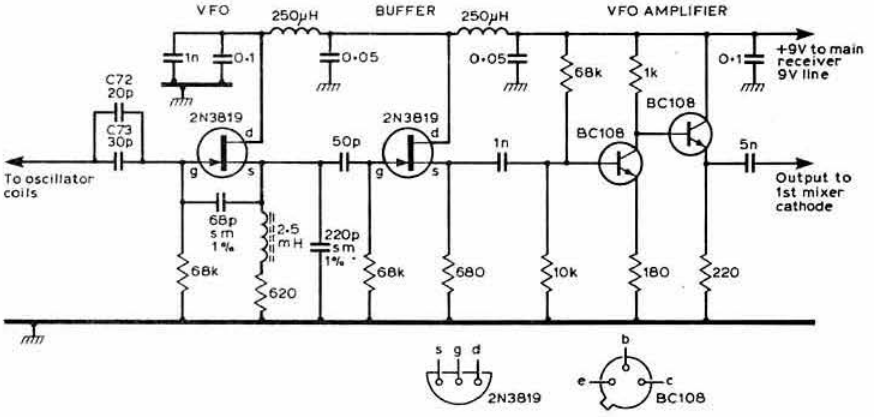


Fig. 2. New fet local oscillator and buffer amplifier stages. Capacitors disk ceramic except: 68pF and 220pF, silver mica 1%; 50pF, preferably silver mica or one removed from original vfo. Resistors ¼W 5% type except: 68k and 620 of the oscillator itself which should preferably be high-stability metal oxide type

isolated. This is very important for best results and, in the author's case, an effective screen was formed from a small piece of aluminium, shaped appropriately and bolted to the chassis.

The main vfo can now be retuned to correct the 26·1kHz tuning error which has been incurred. Follow the instructions in the manual for alignment.

VFO replacement

This procedure is a little more tricky than the filter installation, but still quite possible even for the complete novice. Converting to a fet arrangement gives improved stability (after an initial 15min warming-up period no retuning has been found necessary, even on a 30min QSO) and reduced reciprocal mixing, due to a large reduction in oscillator noise sidebands. The circuit of the new vfo is shown in Fig 2.

The oscillator makes use of the present oscillator coils and trimmers, which are left untouched (except for alignment purposes later on) along with C72 and C73. It makes use of a conventional fet Colpitts circuit feeding into a fet buffer stage, which lowers the impedance, ready for the input of a two-stage bipolar amplifier. Good isolation is achieved and no oscillator pulling is apparent.

By doctoring some of the existing printed circuit tracks, and mounting some of the components under the board, the vfo and buffer were accommodated on the existing pcb, while the two-stage amplifier was constructed on a small 3cm by 3cm piece of Veroboard. The 1nF coupling capacitor and the positive supply line join the two parts together, and hold the small board quite securely. If facilities are available for pcb etching, no doubt the whole circuit could be fitted into the available space—a more satisfactory arrangement.

No exact details are given as it is assumed the constructor will have enough imagination to set out the circuit in a sensible manner. However, the following points should be observed:

(a) Again, all component leads should be as short and direct as possible.

(b) In the oscillator, the 68pF and 220pF values are fairly critical, and very high quality one per cent silver mica capacitors are best used.

(c) The two 250μH chokes, and several other components from the previous circuit, can be used.

(d) Thorough decoupling throughout the circuit is essential; do not use any less decoupling than shown in Fig 2.

If any peculiarities in oscillator performance are noted, for instance non-operation on one band or severe jittering on one band, poor decoupling will almost certainly be the culprit.

After vfo operation has been secured on all bands, the oscillator coils and trimmers should be aligned according to the manual.

Conclusion

Although the modifications described are quite simple, the improvement in performance was found to be very worthwhile. On very few occasions now is receiver performance responsible for missing a dx station, and this is invariably on 7MHz in the evening where only the very rare breed of receiver can cope with the colossal power which some of the intruder broadcast transmitters push out.

If, after modification, intermodulation still occurs, the value of a simple antenna attenuator should not be underestimated. Fig 3 shows a simple circuit which can be accommodated easily in the receiver.

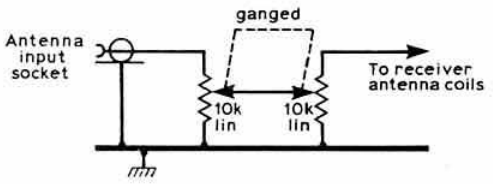


Fig 3. Antenna attenuator (if required). This can be mounted on the front panel in the unused channel selector switch hole

The purpose of this article was to persuade those who normally shy away from construction projects to try their hand at making some really worthwhile improvements to their FR50B. Why should one put up with receiver failings when it is so easy to correct them? It is the author's belief that anybody with a steady hand, and a reasonable knowledge of electronics, could competently follow these modifications. □

technical topics

Pat Hawker, G3VA

REPUTABLE science journals such as the long-established *Nature* usually avoid publishing wild speculations, so it is most interesting to find that Solar Cycle No 21 is continuing to attract ever higher predictions in its columns. The 13 July 1978 issue (Vol 274, pp139–140) includes a letter from R. P. Kane of NOAA, Boulder, Colorado, predicting maximum solar activity of 206 ±42 (ie between 160 and 250) with 66 per cent probability and occurring near the end of 1979. This would put the maximum higher and sooner than virtually all previous predictions. It is beginning to look very likely that 1979–80 will see solar activity of roughly the same order (or even higher) as the record figures of 1957—a complete change around of the low maximum that was forecast by a number of scientists only a few years ago. It is noteworthy that R. P. Kane lists a number of these earlier predictions, and includes that by G8KG in *Radio Communication* in July 1976, one of the first to suggest that we are in for a bumper maximum (G8KG forecast "over 150").

It thus seems vitally important that amateurs should take full advantage of this unusual (and possibly not to be repeated for many, many years) opportunity to investigate ionospheric propagation between, say, 28 and 432MHz. The truly remarkable results already achieved in the 1977–8 transequatorial-mode season, with stations in all six continents achieving long-distance te contacts on 144MHz, and some reports of te even on 432MHz, show that exciting events may be in store for us. Such observations will undoubtedly be tremendously aided by the widespread activity on vhf/uhf today, in many remote areas, compared with the situation that existed in 1957. Such activity owes much to the influence of the Oscar satellites that have encouraged isolated stations to equip for these bands.

Improving the T antenna

Back in July 1970 I introduced in *TT* a modified form of hf T antenna (inspired by the Bobtail), sometimes known as the "inverted ground plane". By top-loading a vertical $\lambda/4$ element with a $\lambda/2$ horizontal section, as in Fig 1(d), one achieves a structure with the maximum current at the high rather than the low end. It is also a form of "vertical" which can readily function also as a horizontal dipole (by using switched open-wire feeders for the vertical section), as suggested in 1972 by Ken Glanzer, K7GCO (*ART*).

It can be argued that raising the high current up an antenna structure can, in some circumstances, increase the theoretical effects of poor earth conductivity; nevertheless, in practice, this form of simple T antenna (which can easily be made from wire rather than tubing)

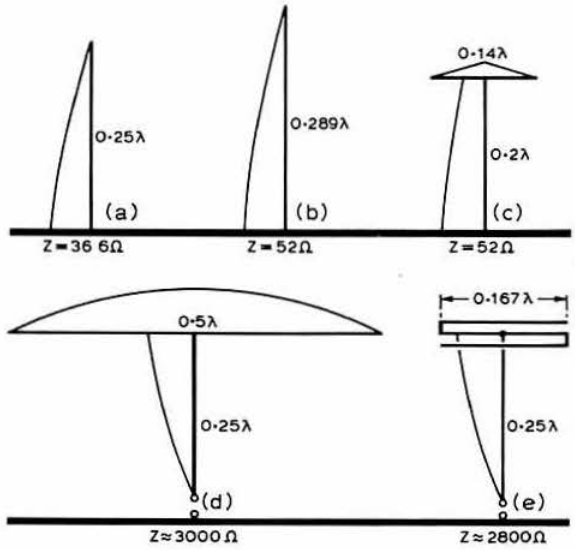


Fig 1. Vertical antennas showing feed point impedances: (a) standard 0·25λ monopole; (b) extended 0·289λ monopole; (c) typical T antenna as used on mf; (d) the inverted ground-plane form of hf T antenna as described in *TT* July 1970; (e) the DL1VU "improved T antenna", with better cancellation of horizontally polarized radiation

does offer useful practical advantages in many typical locations, and does *not* depend upon a good earth connection. Although influenced by earth conductivity, this technique avoids the ohmic losses of the conventional monopole.

In *CQ-DL* (No 6, 1978, pp246–9) Karl H. Hille, DL1VU (9A1VU), provides a further study of this form of T antenna, and comes up with a modification which is claimed to reduce the radiation (and reception) of horizontally polarized signals from the top $\lambda/2$ section. This is accomplished by folding back the wire to form a triple wire, in appearance like one of the old short "caged dipoles": Fig 2. The radiation from the outermost $\lambda/6$ sections balances out the radiation from the inner

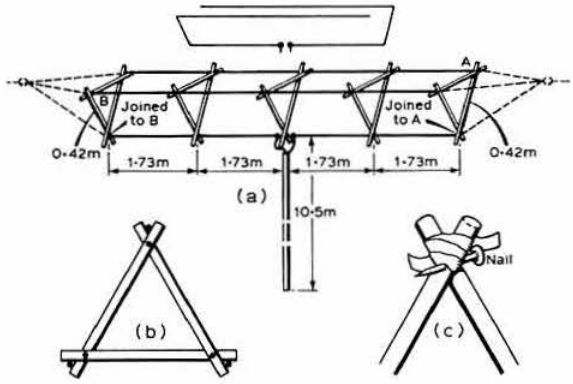


Fig 2. Practical implementation of DL1VU antenna intended for use on 7 and 14MHz, and showing some details of how the cage is made from glass-fibre rods

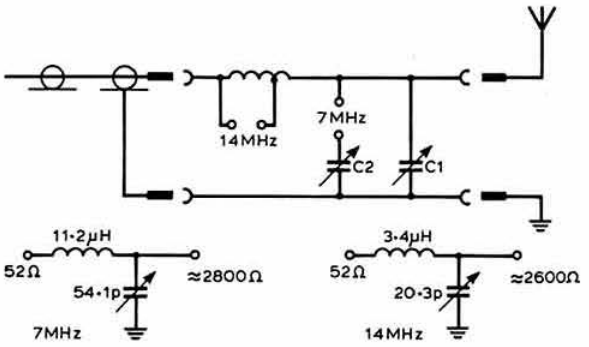


Fig 3. Base matching network for 7 and 14MHz. Typically C1 and C2 are high-voltage 50pF maximum. The inductor has a diameter of 6·6cm, length 8cm, 16 turns copper wire 2·7-3mm diameter, with windings spaced by 5mm. For 14MHz 9½ turns are short-circuited

λ/12 sections where current per unit length is greater. DL1VU uses a framework of simple glass-fibre struts, as shown in Fig 2.

Such an end-fed antenna will also work effectively on harmonic frequencies, and appropriate matching networks for 7 and 14MHz are shown in Fig 3.

It should be noted that the low end of the wire is "hot" to rf voltages, and suitable precautions should be taken to protect those gardening, etc, around the wire.

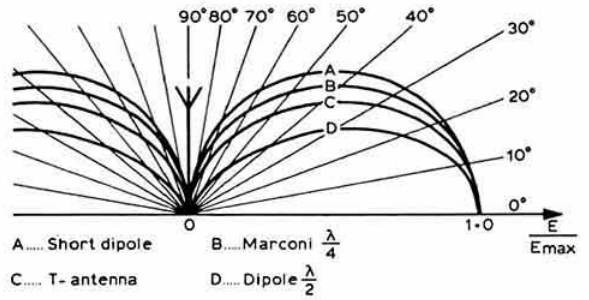


Fig 4. Vertical radiation patterns of vertically polarized antennas over perfect earth

Fig 4 shows how the vertical radiation angle of a vertical antenna varies according to the length of the radiator, although increasing the length may result in high angle lobes. It should also be appreciated that such diagrams are theoretical rather than practical, in that they ignore the very significant effects on the vertical angle of poor ground conductivity.

More on the trapless vertical

The June *TT* included an arrangement by VE3FHS for a 22ft vertical with the matching network "transferred" into the shack by means of a feeder an exact number of electrical half-waves long. This has reminded Cyril Mountjoy, GW3ASW, that a basically similar system was published in the 'forties in (probably) *QST*. This resulted in his using such a system from about 1947 to 1952 on 7, 14 and 28MHz, although with rather different feeder arrangements. Following the loss of his

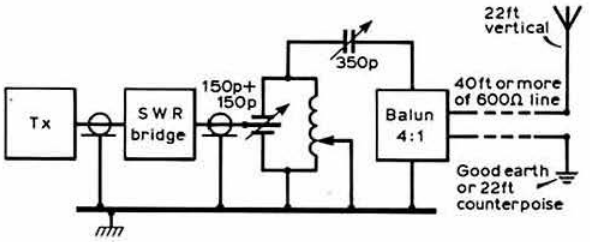


Fig 5. GW3ASW's all-band transmatch unit and open-wire feeder for trapless vertical

mast in last winter's gales, he reverted to a version of this system. He writes:

"With good coaxial cable at around 50–65p per metre one does *not* feel inclined to chop it about to reach the electrical half-wave, simple as it appears. I agree that 600Ω open line can reduce losses (and cost), and I use such a feeder. Originally I had some 100ft of line, but subsequently a change in garden layout meant this had to be reduced to about 60ft, but performance, even on 3·5MHz, was unaffected. More recently I have used 57ft and find that, as long as the *total* length of feeder *plus* the vertical element is slightly longer than a λ/4 on the lowest frequency band, it will operate as readily as with the longer length.

"It appears that the art of using 400–600Ω open-lines has been lost for many amateurs, many of whom have grown up on coaxial cable. It seems to be thought that they are tricky to tune and feed, but I contend that nothing is farther from the truth. For example, a 4:1 balun on the *output* of any atu capable of feeding an end-fed wire is all that is necessary, provided that it is preceded by a series capacitor of about 350pF. The system I use, shown in Fig 5, is based on the so-called "all-band transmatch", one of the best and most flexible tuners I have ever tried.

"A variation of this system is to mount the 22ft vertical as high above ground as possible and to use a 22ft counterpoise attached to the other end of the feeder, insulated from ground."

The "butterfly" monoband beam

For home-construction of compact mono- and multiband hf beams, one of the more successful family of designs has proved to be those proposed by VK2ABQ, described on several occasions in *TT* and *ART*. One advantage is that these can be constructed entirely from wire, using simple wooden frameworks. This, however, is not the only useful approach, as Tom Higginson, GW3AHN, reminds us. He is a long-time enthusiast for the "butterfly" design which, in effect, is a shortened X array and linked with the series of designs put forward some 20 years ago by "Dicky" Bird, G4ZU. This design does not use a wooden framework but is formed by self-supporting tubing, loaded by wire sections.

GW3AHN first built a "butterfly" array in 1962, and since then has worked over 350 countries using a 14MHz monobeam version with power input of some 25W cw and 66W p.e.p. output on ssb. He claims for the "butterfly" array:

(1) Physical size (turning radius) significantly less than

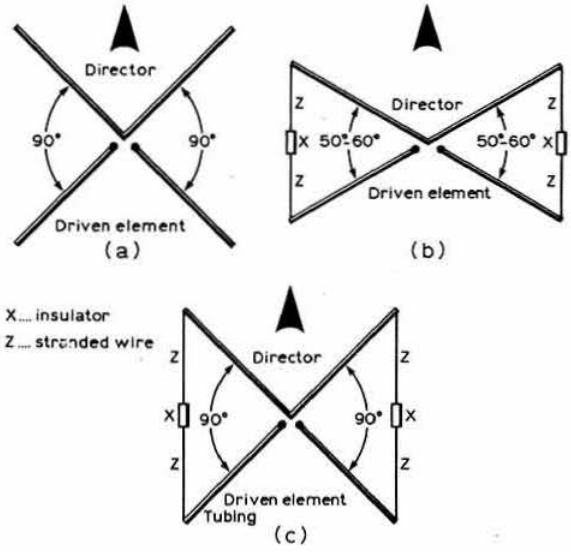


Fig 6. Variations of X and "butterfly" 14MHz arrays as investigated by GW3AHN: (a) all tubular X antenna with director 2 by 17ft 5in (34ft 10in), driven element 2 by 18ft 2in (36ft 4in); provides roughly 4dB forward gain and 12–15dB f:b ratio (according to height)—disadvantages include large size and significant side lobes; (b) Narrow "butterfly" with director 2 by 14ft plus 2 by 4ft 3in (36ft 6in); driven element 2 by 14ft plus 2 by 5ft 6in (39ft)—elements partly 1in tubing plus stranded wire, forward gain roughly 4–5dB (estd), f:b ratio 8–10dB, structure is still large and f:b ratio poor although side lobes reduced; (c) preferred "butterfly" with director 2 by 12ft plus 2 by 7ft (38ft), driven element 2 by 12ft plus 2 by 8ft 8in (41ft), gain estimated by GW3AHN up to 6dB, f:b ratio 15–20dB (estd) according to height

that of a conventional 2-element array (17ft square on 14MHz).

(2) Requires no boom, no framework and less tubing than a conventional array.

(3) Higher gain and better front-to-back ratios than for a conventional 2-element Yagi due to V-shaped elements (this claim is open to debate!–*G3VA*).

(4) Easy to construct from readily available materials at a small fraction of the cost of a comparable commercial beam.

(5) Can be made very rugged by self-bracing, using nylon or polythene cord across the open ends.

Fig 6 shows that the "butterfly" is a development of the full-size X-beam (widely used at one time as a vhf tv receiving antenna). It is recommended that a gdo be used to tune the array. Typically for 14MHz, an array tuned at a height of 8–10ft should be tuned about 250kHz *lower* than the required frequency to allow for the change when raised to full height. 21 and 28MHz versions have been successfully built by scaling the dimensions indicated. A 3-element version has been developed and used successfully by W1BTU (Fig 7): this does require a boom, and I suspect that in practice the forward gain is likely to prove some 2dB or so less than the claimed 8dB. A triband version (using stacked separate elements) was commercially produced in Italy some years ago but is not thought to be still available; however, GW3AHN does not recommend such multiple

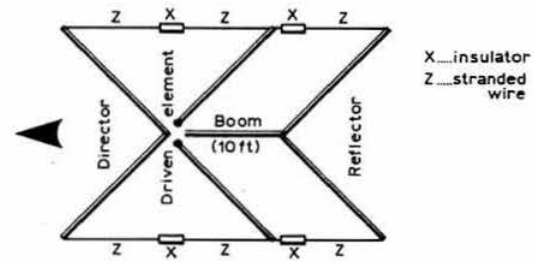


Fig 7. Three-element form of "butterfly" array used by W1BTU. Director 2 by 12ft plus 2 by 7ft; driven element 2 by 12ft plus 2 by 8ft 6in; reflector 2 by 12ft 6in plus 2 by 9ft. Although gain has been estimated as high as 8dB over dipole, a maximum of 6dB seems more probable; f:b ratio given as 20 to 30dB

arrays as these usually present severe problems of interaction and detuning.

The following details of constructional techniques are taken directly from GW3AHN's notes:

"There are many ways of constructing the basic "butterfly" (Fig 6c). One of the easiest is to obtain a steel or aluminium plate about 12in square and of suitable thickness, and then to mount the tubing portion of the elements (usually 1in od) on to the plate with suitable U-bolts, the director elements directly and the driven element insulated from the plate with plastic tube type insulation (plastic hosepipe has proved satisfactory). The outer ends of the tubing are flattened and drilled, and the end wires are attached with suitable bolts, washers and nuts. The two insulators between element end wires can be of plastic or Perspex strip, approximately 9in long. The end wires should be stranded wire (copper, aluminium or galvanized iron appear to be equally suitable), and the length required is dependent on the diameter of the wire. As an example of the effect of wire diameter on frequency, it was found that on 14MHz equal lengths of 7/0·029in and 7/0·036in resulted in a difference of approximately 250kHz (underlining the need to use a gdo to tune the array).

"The 12in square plate can be attached to the supporting mast with angle brackets. The feed point resistance is approximately 30Ω but a reasonably good match can be obtained by feeding the element with 50Ω coaxial cable. It is recommended that the cable be routed down the inside of the supporting mast (if metal) for at least a quarter of a wavelength in order to achieve good balun action. A better match can be obtained by using a λ/4 Q section of 50Ω cable followed by 75Ω cable to the transmitter."

Both the "butterfly" and the VK2ABQ 2-element arrays are particularly useful for amateurs having only small areas available for antennas, as the full-size Yagi beams have a turning radius too great for many gardens and the full-size quad is a fairly formidable structure.

The versatile super-regen

The recent ITU-contributed articles on "Pioneers of Radio" (*Radio Communication* July/August) brought out rather strongly that history depends on the viewpoint of the writer. For example, not everyone is likely to agree with the comment that De Forest "probably

contributed more to the rapid development of radio and the science of electronics than anyone else"—at least consciously. For there is little solid evidence that when he put the grid into Fleming's diode he did so with any real idea of taking radio into a new era of thermionic amplification.

One of those who might have questioned such a statement was the great Howard Armstrong, who for so many years battled with De Forest in patent litigation. Although Armstrong finally lost in the courts, his professional colleagues in the IRE overwhelmingly reaffirmed their belief in the value of his work, and he is today generally credited with the shared development of the regenerative receiver, the practical development of the superhet, as well as being universally recognized as the inventor of the super-regen and as the man who took frequency modulation into the real world of communications and broadcasting.

By one of those strange ironies of history, possibly his most financially successful innovation, the super-regenerative receiver, has been the least utilized. Patented in 1922, following trials by Randy Runyon, W2AG, (who later was to pioneer Armstrong's wide-band fm), the idea was bought in June 1922 by RCA for some $200,000 in cash and an even more valuable 60,000 shares of RCA stock. The intention was to use the super-regen for mf broadcast receivers, but this was overtaken when Armstrong demonstrated a practical superhet.

Today, if one thinks of the super-regen at all, it is usually as the basis of low-grade hand-held transceivers; few efforts seem to have been made to use the improved circuit, using a diode across part of the tank circuit, introduced a decade or so ago by Bell Telephones (still found in an arrangement by JA1BHG in *ART*); this was claimed largely to overcome the problem of oscillator radiation.

In *Radio-REF* (No 6, June 1978) a French listener (REF34,853) draws attention to the basic arrangement (Fig 8) showing how a very simple single-transistor super-regen (plus audio amplifier) can provide an effective monitoring facility anywhere between about 90 and 190MHz (readily extendable down to, say, 28MHz), including the audio channels of Band 1 and 3 television stations; the vhf/fm sound radio stations of Band 2; aircraft and land mobile services; as well as the 70 and 144MHz amateur bands. With the ability to receive either a.m. or fm, it can cope well with monitoring the local repeater channel (although local amateurs will appreciate users ensuring that local radiation is *not* excessive).

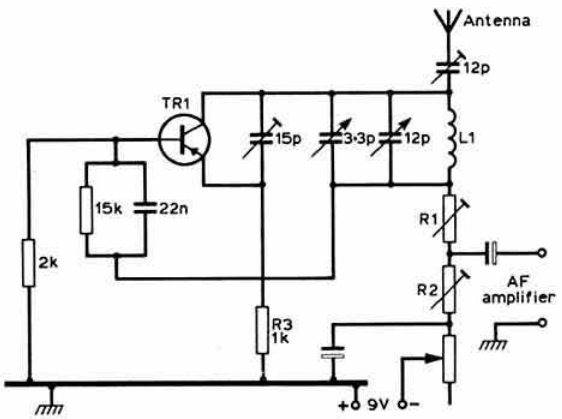


Fig 8. Simple general purpose vhf super-regenerative receiver used by French listener. TR1 AF102, AF139, AF240 or OC171. R1 1kΩ, R2 3kΩ (both can be replaced by fixed resistors after values optimized). L1 four turns silver or copper wire (0·8-1mm), air cored self-supporting with diameter of 1-2cm. Should be mounted on stand-off insulators if coil changing is required to extend tuning range

The preset resistors, R1 and R2, would normally be replaced by fixed values when these have been determined; occasionally it may be necessary to replace R3 with a suitable rfc. Of the various transistors listed as suitable, the best results are likely to be obtained with an AF102. For extended frequency range it should be possible to change L1, using stand-off insulators.

Inter-station "noise" of a super-regen does *not* imply that such a circuit has a high noise factor, the noise is in fact a reflection of the extremely high gain.

IERE conference on radio receivers

The commercial use of ssb for vhf mobile operation using 5kHz channels looks like being made possible by such techniques as the use of a low-level pilot tone or a tone in the centre of the af passband which is then notched out in the receiver. It was interesting to discover that a narrow-band 10·7MHz carrier filter, in one of the prototype equipments shown at the recent Southampton conference, was based directly on the F6BQP crystal ladder design procedure (*TT* September 1976 and *ART6*).

Among items of amateur interest covered by the papers at this conference *(IERE Conference Publication No 40)* were the following:

Active receiving antennas for car radios made highly linear by the application of selective negative feedback... Use of a 5ms ccd delay line to make possible the use of forward feeding agc to combat fast fading in mobile uhf reception... Surface acoustic wave resonators used to provide bandpass filters at vhf and stable oscillators at fundamental frequencies as high as 1·5GHz... Use of hybrid microwave integrated circuits to provide low-cost rf amplifiers up to about 1·5GHz... Opposition to spread-spectrum techniques on the grounds that such systems increase general pollution of the rf spectrum.

Linear direct-fm source for vhf

The difficulty of obtaining satisfactory direct-nbfm from a crystal-controlled oscillator is the main reason for the popularity of phase rather than frequency modulation. However, in *IEEE Transactions on Vehicular Technology* (Vol VT-27, No 2, May 1978, pp43-50) R. Arakelian and Michael M. Driscoll provide a detailed description, together with design equations, for a narrow deviation voltage-controlled crystal oscillator that exhibits a near-linear tuning characteristic. Unlike previously reported circuitry, it is claimed that the new circuit is extremely simple and

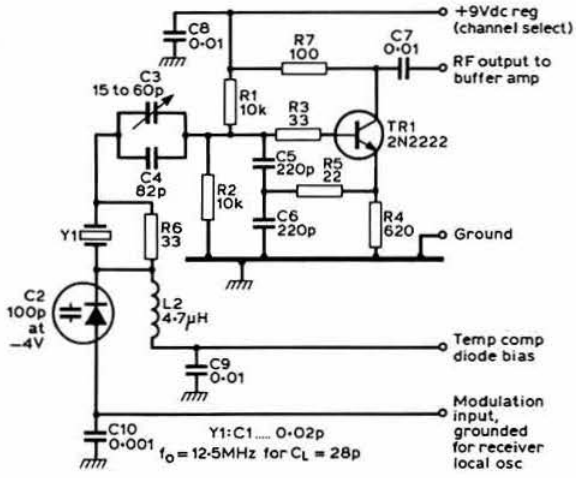


Fig 9. Linear direct-fm crystal oscillator module. A similar arrangement can be used for receiver local oscillator module by grounding af modulation line. The temperature compensation arrangement is not shown

straightforward in design and highly economical to produce, making it suitable for use in commercial mobile radio transmitters and similar applications. As well as providing true nbfm, the circuitry also permits temperature compensation to be applied to an AT-cut crystal, an important consideration for amateurs who wish to come up dead in the centre of the 144MHz channels regardless of ambient temperature. A single temperature compensation control circuit can be used with a number of crystals.

While it is impossible here to go into the full details, Fig 9 shows component values for a typical 12·5MHz oscillator. The varactor is an abrupt junction diode with a capacitance of 100pF at −4V. Sensitivity is given as 250Hz/V, with a maximum tuning range of ±500Hz. The inductance L2 forms, in effect, a vxo type arrangement and requires care: in the original circuit it consists of a moulded 4·7μH choke. It is possible to achieve added flexibility by including a second inductor to provide wider tuning range, with operation nominally at crystal series resonance. However, the single-inductor arrangement, if used at about 12MHz and multiplied up, should provide ample deviation at 144MHz (and possibly also at 70MHz). With the suggested temperature compensated arrangement it is claimed that ±3 parts per million can be "readily achieved", and the authors state that the whole technique adds up to "a linear narrow deviation vcxo ideally suited for mobile transceiver application".

Tie-clip microphone

A few years ago there was considerable use in broadcasting and public address of lavalier microphones, suspended on a neck-cord and permitting a speaker to move fairly freely without significant changes in sound quality or level; precautions were necessary, however, to avoid noise arising from the movement of clothes. They were mostly dynamic pressure microphones with omnidirectional or cardioid pick-up characteristics.

However, the development of the high-quality electret and miniature capacitor microphones has resulted in the present popularity of "tie-clip" rather than neck-slung microphones, and such units are now very widely used in television broadcasting. For communications purposes, of course, any type of microphone that is not intended for close-speaking raises the problems of room acoustics, both echo and ambient noise; these problems were mentioned in *TT* November 1974 and *ART* 6, p219.

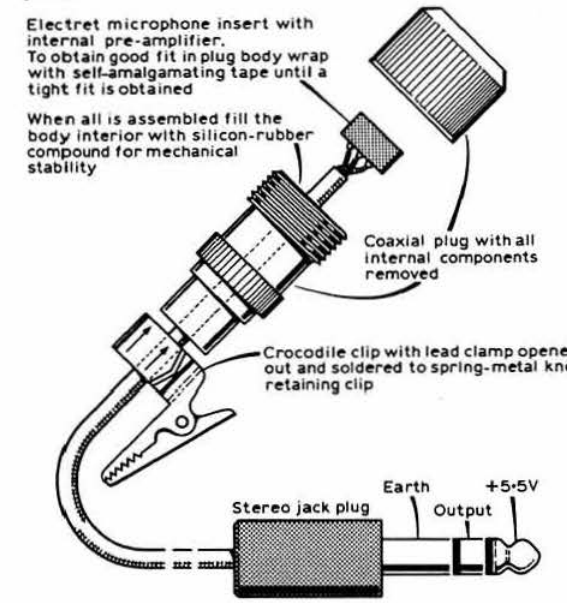


Fig 10. G4EIG's "tie-clip" microphone made by mounting a low-cost insert in a coaxial plug

J. R. Vickerstaff, G4EIG, has sent along details of a low-cost way of mounting a small insert as a tie-clip microphone: see Fig 10. This uses a consumer electret microphone insert of the type found in a lot of tape-recorders. His original model came from an ITT "Combat" children's radio with talk-through facilities, although subsequently he found it possible to obtain these from the manufacturer at a cost of about five inserts for £1!

As indicated in the figure, the inserts can be fitted conveniently in a coaxial plug with a crocodile clip forming the "tie-clip" and a 5V supply feed along the lead by using a "stereo" type jack-plug.

Long-Yagi antennas

Several vhf enthusiasts are concerned that the comments on the NBS booklet "Yagi Antenna Design" by Peter Viezbicke in the April *TT* (which were a follow up to the earlier notes in January) may have left readers feeling that there is little to be gained from studying this work. Although I stand firmly by the criticisms voiced by G6XN on the apparently misleading results with two or

three elements (and there are some other points of debatable validity), there is equally little doubt that this work (which was apparently carried out in the 'fifties but published only in December 1976) does provide at least a working basis for the design of high-gain long-Yagi antennas. The report was surveyed in some detail by Joseph Reisert, W1JR (*Ham Radio* August 1977, pp22–31), and he pointed out that the information formed the basis of the 15-element Yagi by W0EYE (*QST* January 1972 and the ARRL *Handbook*) which has proved one of the more repeatable designs. The full report is available from Superintendent of Documents, US Printing Office, Washington DC, 20402, USA, order SD Catalog No. C13 46:688. The price is 65 cents, but add 25 per cent for other than USA mainland.

At the moment there appears to be a lot of interest in loop-Yagi antennas, now often known as "quagi" antennas. Chris Barthram, G4DGU, has sent along the details put out by K2UYH on the 432MHz Antenna Measurement Event at the 1978 West Coast VHF Conference. Seven designs achieved measured gains in excess of 13dB: a 21-element F9FT-design by WA6OIL and WB6OKK came top with 15·6dB; K6MBE's 16-element "KLM" came next with 15·2dB; then two 15-element quagi antennas with 14·8 and 14·2dB; a 13-element K2RIW with 13·7db; a 19-element F9FT with 13·6dB; and a 17-element Yagi by W7LUX and based on the NBS data with trigonal reflector with 13·4dB. Once again this contest does emphasize how difficult it is to reach or beat 15dB forward gain, even on 432MHz.

LSB/USB reception on IC202

Michel Alas, F1OK, has modified his IC202 vhf transceiver to permit reception of lower sideband ssb signals received between 145·850 and 145·950MHz from Oscar satellites in Mode B.

Fig 11(a) shows the original unmodified bfo of the IC202, while the new arrangements are shown in (b). In the usb position, the bfo is on 10·6985MHz, with the crystal effectively grounded through C61 + C63. With Q17 saturated the fixed capacitor C62 is short-circuited. This fixed capacitor C62, which provides the fixed frequency shift for cw operation, is replaced by a new 3-30pF trimmer, adjusted for lsb reception when Q17 is "cut off". The correct setting for the trimmer (bfo on 10·7015MHz) can be found using a frequency meter or simply by adjustment on ssb signals received through Oscar. Sideband switching can be performed using the existing switch as indicated, either retaining (during lsb reception) the meter light or dispensing with this by adding R (5kΩ).

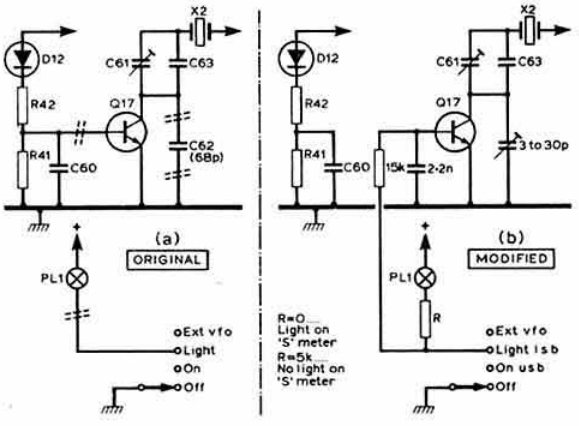


Fig 11. Modification made by F10K to an IC202 vhf transceiver to permit both upper and lower-sideband reception of ssb signals and so enabling the reception of ssb signals through Oscar Mode B

Fig 11(a) shows the original unmodified bfo of the IC202, while the new arrangements are shown in (b). In the usb position, the bfo is on 10·6985MHz, with the crystal effectively grounded through C61 + C63. With Q17 saturated the fixed capacitor C62 is short-circuited. This fixed capacitor C62, which provides the fixed frequency shift for cw operation, is replaced by a new 3-30pF trimmer, adjusted for lsb reception when Q17 is "cut off". The correct setting for the trimmer (bfo on 10·7015MHz) can be found using a frequency meter or simply by adjustment on ssb signals received through Oscar. Sideband switching can be performed using the existing switch as indicated, either retaining (during lsb reception) the meter light or dispensing with this by adding R (5kΩ).

F1OK reports that the modifications can be made without removing the printed circuit board: locate the bfo, remove its top cover by cutting the two-pin base, cut (as indicated in Fig 11(a)) the Q17 base connection and both C62 connections, then solder into place the additional components (3-30pF trimmer, 15kΩ and optional 5kΩ resistor, 2·3nF fixed capacitor). Then align as indicated above.

It should be appreciated that this modification removes the fixed frequency shift provided by C62 between receive and transmit frequencies in the cw mode. It might be possible, using additional diode switching, to retain this facility, but the modification would then probably prove rather more complex.

Lanolin and corrosion

Dick Biddulph, G8DPS, has made some pertinent comments on the various July *TT* items about soldering to aluminium, the protection of outdoor metal-work and beer-can verticals.

Soldering aluminium. While G8DPS agrees with Professor Read that an exposed soldered joint made to aluminium is subject to corrosion that will eventually weaken the bond, nevertheless such soldered joints are used widely in the electric power industry. G8DPS states that the corrosion can be slowed up if, after soldering and cleaning off the flux, the joint is covered with adherent grease such as anhydrous lanolin and applied to the warm metal. An alternative, better for indoors, would be to heat the joint (again after cleaning) and coat with an epoxy resin such as Araldite.

Protecting external metal-work. Again, while G8DPS agrees with all the points made by L. Shelley Ltd, he notes additionally that bolts coated with lanolin on his 144MHz beam were easy to undo even after some five years in service without maintenance. The lanolin was dissolved in natural turpentine (*not* white spirit) and applied to the threads. After tightening the nuts, further solid lanolin was applied to the exposed threads. G8DPS assures us that he has no shares in a lanolin plant but adds, for good measure, that it also prevents car doors rusting through from the inside if suitably applied!

Beer-can antennas. The reason why these are no longer popular, G8DPS believes, is not due to greater sobriety but to the advent some years ago of the ring-pull can which has an aluminium alloy top, and thus introduces the corrosion problem already mentioned.

Incidentally, the 144MHz bean-can sleeve dipole in the July *TT* (Fig 6) showed a 38in length of RG59/U, incorrectly stated to be of 50Ω impedance. In fact, RG59/U is the correct cable but this is 75Ω impedance. Sorry! □

swl news

Bob Treacher, BRS32525 *

DX nets

Some information this time about several nets which may provide interesting dx for many listeners. First, the DX-DX Net meets at 1700gmt on 21·280MHz on Mondays, Wednesdays and Fridays, and the net controller is usually WB8ZJW. The net also meets on **Thursday and Sunday mornings on 14·240MHz at** 0600gmt. A great deal of dx can be heard on this net; for example, 9Y4NP, KH6WF, 6Y5MP, LU4MEE and **FO0AKV were heard during one session on 21MHz.**

The Pacific DX Net meets on Tuesday and Friday mornings at 0600gmt on 14·265MHz. Much dx from the Pacific area can be heard on this net, and it is indeed a good way of collecting some of the rarer Pacific prefixes.

Expeditions

6O1FG and PY0RO were certainly the talking points of the past month, expedition-wise. 6O1FG was very active on 14MHz, working to lists prepared mainly by **Italian friends of the operator, I2FGP. QSL information for the 6OI is via 12MQP, PO Box 4073, Milan,** Italy.

PY0RO and PW0PP were active from St Peter & Paul Rocks and were consistently good signals into G-land. QSL information for both stations is via W1DA, 37 Easy Street, Sudbury, Mass, 01776, USA.

A thank you, and more help

Dave Greenhalgh, ARS39965, thanks all those who were kind enough to help provide the valves which have enabled him to get back onto the amateur bands. In particular, Dave would like to thank Stan White, G3KTR, M. Letherbarrow, Ralph Benton and Stephen Turner.

Nick Jarman, BRS38280, has acquired a small **printing machine but is having difficulty in obtaining** rollers. They should be 6½ by 1in and suitable to fit an Adana five-three machine. Anyone who can help should contact Nick at 34 Broadmead, Luton LU3 1RX.

Reflections

The amount of mail received this time proves that the weather is poor and that schools and colleges have come to the end of another year. Many correspondents comment on increased time to devote to the hobby, and many on the exotic dx they hope will find its way into their logs by mid-September. Ian Marquis, A9140, for example, provides a long list of good dx heard during **late July and early August, with the majority being on** 21MHz ssb. Others are preparing to go on holiday and hoping there is not too much dx around while they are away.

*79 Granby Road, Eltham, London SE9 1EH.

1978 HF Countries Table

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS25429	144	168	195	80	106	14	707	ssb
BRS17567	166	182	210	41	80	5	684	ssb/cw
BRS35943	127	128	165	74	111	4	609	ssb
BRS29641	127	138	171	74	72	4	586	ssb
A8841	91	135	206	58	81	0	571	ssb/cw
A9140	109	123	130	76	68	20	526	ssb/cw
BRS35454	106	109	147	46	66	6	481	ssb/cw
BRS38518	113	112	129	50	46	3	453	ssb
A9191	110	111	135	42	46	0	444	ssb
ARS39965	102	125	122	37	36	7	429	ssb/cw
BRS32286	121	100	116	35	56	0	428	ssb
BRS34740	78	96	120	57	50	7	408	ssb
ARS39965	96	110	114	35	36	5	396	ssb/cw
BRS40154	64	110	175	22	12	1	384	ssb
BRS34740	73	85	99	50	50	7	364	ssb
ARS39018	38	82	111	28	44	3	303	ssb
BRS20185	67	60	82	21	42	2	274	ssb
BRS34658	15	61	98	35	57	4	270	ssb
A9107	43	60	92	20	44	6	265	ssb
BRS39162	60	73	71	18	25	7	254	ssb
BRS37782	49	56	91	19	32	4	251	ssb
BRS27421	0	0	132	45	39	0	216	ssb
ARS39720	35	58	80	17	20	0	210	ssb
ARS38532	69	44	53	17	9	9	192	ssb
ARS39965	47	54	58	9	18	4	190	ssb/cw
ARS38280	46	61	52	12	4	2	177	ssb
BRS18529	6	35	81	3	30	4	159	ssb
ARS37620	4	35	105	5	5	0	154	ssb

Robert Small, A8841, had been catching up on some 7MHz dx and managed to hear innumerable PYs, plus ZP5 and LU. He also comments on JD1YAK, heard on 14MHz, and a number of Pacific stations on 21MHz around 0900—H44, KX6, VR8, 5W1. His QSL return this time is worthy of mention: TI9DX, H5FXT, ZD9GG, HH2A, A35AA and ZK1DR.

Denis Taylor, BRS34740, asks for a comparison between a "Joystick" and an 18AVT/WB. Both antennas obviously have their own performance ratings, which your scribe will not enter into here; however, asked for a personal preference, the 18AVT/WB would be the one he would prefer. By far the best way would be to ask as many users as possible for their opinions and then make a choice.

Turning to Nick Jarman's letter again, we find his friend G4FTM recently retired as a physics master from Denbigh High School in Luton. As a parting gift he was presented with a tower, which left Nick wishing *he* could retire!

Ken Steele, BRS36883, writes contentedly that ZL4HB provided him with his first ZL QSL.

David Whitaker, BRS25429, has, over the last couple of years, kept a file on some 3,000 dx QTHs and QSL managers. If anyone is short of a *DX Callbook*, **he will quite happily supply the information, *provided*** there is an sae enclosed. Dave has recently heard his 315th all-time country in the shape of St Peter & Paul Rocks.

Ken Sketheway, BRS20185, has deserted hf to join the ranks of people changing to vhf. I am sure GM8FFX would appreciate any interesting news of a vhf flavour for his column. However, the QSLs continue to arrive, the latest being D68AD and M1D.

Dennis Byers, BRS40154, draws attention to the fact that the RSGB photographer caught him at Ally Pally (*Radio Communication* July, p619, bottom right-hand picture). Dennis also queries whether there are any amateurs in the VK1 district of Australia. There most

certainly are but it is something of a rarity to hear one. Eric Hall, BRS27421, certainly seems to have no trouble in hearing VK1s—he needs VK8 to have heard all the call districts.

John Holmes, BRS38934, has been studying a number of RSGB publications and improving his cw reception. John mentions the ARRL cw transmissions on 28·080, 21·080 and 14·080MHz, and he has also been monitoring 28MHz for the short skip Europeans which were evident during much of July.

Graham Alston, ARS39018, has been studying for exams recently and has had little time for listening. However, he did manage to log CE0AE and VR6TC for new ones.

Ian Marquis, A9140, also provides a good list of dx captures; F0APA/FC on 7MHz ssb being a European rarity. Scalps collected on 28MHz include D2AFO and D4CBS, plus 8P6, HC and C6. The 28MHz band is also mentioned by Dave Greenhalgh, ARS39965. He has been listening for the various beacon stations, mentioned a few months ago, as a guide to the band being open. Such monitoring has provided JY and 6Y5 as new ones.

Paul Corrigan, BRS35121, is a new contributor and runs a DX160 into a long wire. The hobby has brought him many hours of pleasure and has also helped him to meet some of his "locals". This is, of course, one of the major attractions of amateur radio and is one reason why the hobby grows and grows.

Set listening periods

Dave Whitaker, BRS25429, suggests a series of slps designed to activate all six bands. The 28MHz slp held last year was his brainchild, and he is willing to organize these. No doubt we will be able to publish the rules etc, when they have been formulated, in a later issue.

First-timers

Four new contributors this time: George Wiltshire, BRS39060, who sent a photocopy of his first QSL received—from P29NNL; I. P. LePage, BRS40292, who resides in GU, is a newcomer to the hobby and I am sure everyone wishes him all the best; Anthony Dawe, BRS38518, who listens with an FRG7 connected to a "Joystick", and Mike Tubby, ARS38532, who seems to listen mostly between 0100 and 0200!

Finally

That is all for another month; with so many contributors, I hope I have squeezed something in to keep everyone happy. Correspondence is also acknowledged from A9107, A9191, BRSs 39162, 37620, 34658 and 18529.

Deadline for November is **25 September,** and **please note the new QTH.** All mail should be sent to this QTH and not the old one. 73 until next time. □

oscar news

Oscars 7 and 8 continue to be operated in the same schedule as during the past two months. On several occasions unusual propagation conditions have made over-the-horizon reception possible on Oscar 7 Mode A, and VU2RM has been heard by several UK stations. Unfortunately the propagation is not two-way.

The W6PAJ Oscar 8 calendars were unfortunately based on incorrect radar tracking, in that the object thought to be Oscar 8 was in fact the first stage casing some 1,700km ahead of the spacecraft. To correct the figures given in the W6PAJ orbital calendar (not the calendar produced by the University of Surrey) it is necessary to add 5min 40s for the month of September, with further incremental additions of 1min per month.

A summary of the satellite characteristics is given below:

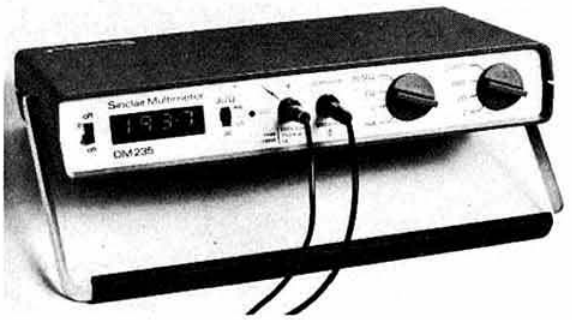
Satellite and mode	Uplink passband (MHz)	Downlink passband (MHz)	Telemetry beacon (MHz)
Oscar 8 Mode A	145·85 –145·95	29·4 – 29·5	29·402
Oscar 8 Mode J	145·90 –146·00	435·2 –435·1	435·095
Oscar 7 Mode A	145·85 –145·95	29·4 – 29·5	29·502
Oscar 7 Mode B	432·125–432·175	145·975–145·925	145·972

	Oscar 7	Oscar 8
Period (minutes)	114·94	103·23
Inclination (degrees)	101·7	98·9
Longitude increment (°W per orbit)	28·7	25·8
Maximum communication range (miles)	4,900	4,000
Number of orbits per day	12·5	14
Altitude (miles)	910	545
Maximum access time (minutes)	24	7

NEW PRODUCT

Digital multimeter

Sinclair Radionics Ltd has announced details of its new digital multimeter, the DM235, a six-function 3½ digit bench-top and portable instrument. It is designed to measure dc and ac voltages and current, resistance and semiconductor junction tests with a total of 26 ranges. The display comprises 8mm leds and the weight is less than 1½lb. The DM235 is powered by four U11 cells, or alternatively from the ac mains with an adapter. The size of the instrument is 10 by 5·8 by 1·6in.



The price is £49.80 plus VAT. Further information can be obtained from: Instrument Division, Sinclair Radionics Ltd, London Road, St Ives, Huntingdon, Cambs PE17 4HJ. Tel St Ives (0480) 64646.

4-2-70

Graham Knight, GM8FFX*

Auroral reports

Six radio events took place on 4, 8, 14, 18, 19 and 22 July, with an additional visual aurora on 26 July. This last event was seen clearly by GM3GAY at 2300gmt from his home by the sea at Banff, but no radio signals were heard via this aurora. The 4 July aurora was quite extensive, with John Dougherty, G4FUT, at Sunderland, working DM2ARE in QTH locator square HM52j, F8TG, SP1ADM and SP2LU. Ray Bennett, GW4GSS, worked OH0AA in this event but ignored other OH stations calling, preferring to look for new Russian countries—too late Ray discovered that OH0 is Aaland Island and a separate country from "ordinary" OH stations which are in Finland—GW4GSS has still to work Finland! In the same event G4DKX heard strong signals from the GB3LER beacon on 144·965MHz on a beam heading of 40°, and Ned went on to work many LA and SM stations.

A very large sunspot measuring 1,275 millionths in area was seen by several observers between 10 and 14 July. Many operators were expecting a huge aurora but in fact the ensuing events were short lived and comparatively weak. The opening on 14 July started at 1530gmt and continued until 1740gmt, with G4CMV, GI8EWM, GM8HSY, GM8NCM and GW8FKB being the strongest stations heard at Aberdeen, but the dx was mainly confined to inter-UK and LA stations.

The most interesting auroral report comes from Willie Low, GM8NSU, in Aberdeen, who heard the Faeroes expedition station via the aurora between 2230 and 2300gmt on 22 July. The OY station peaked slightly to the west of north at 350°. GM8NSU, using 10W, could not contact OY70: the expedition station was obviously aware of the event as they made many "CQ aurora" calls on both the cw and ssb calling frequencies, but these apparently went unanswered. The new OY beacon could not be heard aurorally on this occasion at GM8NSU.

European Es net

The European sporadic-E warning net is made up of four circles which link:

The Northern Group—LA2PT, LA9JJ, SM4COK, SM5AGM, OH2BEW, OH5NW:

The Eastern Group—HG5BME, HG5FN, YO2IS, LZ1BW, UB5WN:

The Southern Group—HB9RO, I4BER, YU1NPW, OE6CR:

The Western Group—G3NSM, G3SEK, DL7QY, PA0MXA.

These four circles are linked to several other circles within Britain itself. The result is that news of an opening anywhere in Europe soon gets telephoned around and a great many operators are immediately on the band monitoring for Es propagation. Bob McHenry, G3NSM, is very pleased with the speed at which the net operates, but is anxious to remind some British members that the net is a two-way system. As with the auroral system, if you notice the opening first, telephone before going on the air.

Another Supreme Award

At the end of May G3CO turned in a claim for the 432MHz Senior Award and duly received No 45. As he already held 144MHz Senior Award No 100 and 70MHz Senior No 34 he automatically qualified for the "goldleaf status" and Supreme Award No 22.

John Swinnerton of West Hertfordshire, G2YS, has received only the second 70MHz Standard Award to be issued this year, No 130. Two Standard 432MHz Awards have been issued to G4AEZ of Enfield in North London, one for his home station and the other for portable contacts made under the callsign G4AEZ/P. Members seeking awards are reminded that claims may be made for four categories of callsign: home station, portable (at any location), alternative address and mobile. Claim forms are available from G5UM QTHR on sending an sae.

Mention was made by Charles Suckling in the June *Radio Communication* of proposed new Microwave Awards. VHF operators will be interested to know that the VHF Committee is also considering adding to the existing awards, probably on a countries plus QTH locator squares basis. It is felt that a new award would be of special interest to those operators who have already received the Supreme Award and have no further certificates to strive for on vhf.

Predicting auroral events

The RSGB and the British Astronomical Association auroral warning system links visual and radio observers in Britain with a similar system on the Continent. Within a few minutes of an event starting, a number of operators will have received a telephone warning, and the appearance of these stations on the air calling "CQ aurora" soon makes the event known to all the dx operators on the band.

Many operators keep special 27-day auroral calendars on which they record both the visual and radio events which are reported in *Radio Communication* and on the GB2RS News Bulletins. The auroral calendar shown here, which started on 1 January 1977 and records auroral events until 1 August 1978, demonstrates the correlation between the visual and radio events and the fact that auroras often repeat 27 days later. This calendar shows that in the period 1 August 1977 to 1 August 1978 British observers recorded 70 visual auroras and 100 radio events. These numbers are considerably higher than in the same period for the previous two years, thus reflecting the recent increase in solar activity as Cycle 21 gets under way.

The auroral warning calendar is very easy to use—simply circle any radio events and dot any visual auroras. An operator who was on for the 21 September 1977 event would have been prepared for the repeats which occurred on 18 October, 14 November and

*PO Box 49, Aberdeen AB9 8JA

1977 and 1978 27-day auroral warning calendar

JA 1	†28	†24	23	19	16	12	9	5	SE 1	28	*25	21	18	14	†10	†*9	*5	*2	29	25	*22	18	14	11	7	4
2	†29	†25	†24	20	17	13	10	6	2	29	26	22	19	15	11	10	6	†*3	†*30	*26	23	19	15	12	8	5
3	†*30	†26	25	21	18	14	11	7	†3	30	†*27	23	20	*16	12	11	7	*4	31	27	24	20	16	13	9	6
*4	†*31	†27	26	22	19	15	12	8	4	OC 1	†*28	†24	21	*17	13	12	8	5	JE 1	28	25	21	17	14	10	7
5	FE*1	†28	†27	23	20	16	13	9	5	†2	*29	†*25	22	*18	14	13	9	6	*2	*29	†26	22	18	15	11	8
*6	2	MA 1	†28	†24	21	17	14	†10	†6	3	*30	†*26	23	19	15	14	*10	7	3	*30	27	23	19	16	12	9
7	3	2	†29	25	22	18	15	11	7	*4	31	*27	†24	20	*16	15	*11	8	*4	JL 1	28	24	20	17	13	10
8	4	3	30	26	23	19	16	†12	8	*5	NO 1	28	25	21	17	†*16	*12	*9	*5	2	29	25	21	18	14	11
†*9	5	4	31	27	24	20	17	13	9	†6	2	29	†26	22	18	†*17	*13	10	6	3	30	26	22	19	15	12
†10	†*6	5	AP 1	28	25	21	18	14	10	7	3	†30	†27	*23	19	†*18	*14	11	7	*4	31	27	23	20	16	13
†*11	7	6	2	29	26	22	19	15	†*11	†*8	4	DE†1	†*28	*24	20	19	*15	12	8	5	AU 1	28	24	21	17	14
†12	†8	7	3	30	27	23	20	16	12	9	5	†*2	†*29	25	*21	20	16	13	9	6	2	29	25	22	18	15
†13	9	8	4	MY 1	28	24	21	17	*13	†10	6	†*3	†30	26	22	21	17	14	10	7	3	30	26	23	19	16
†*14	10	†9	5	*2	29	25	22	18	14	†*11	†*7	†*4	31	27	23	22	18	15	11	*8	4	31	27	24	20	17
†15	†11	†10	†*6	*3	30	26	23	19	15	12	†8	5	JA 1	†28	24	23	*19	16	*12	9	5	SE 1	28	25	21	18
†16	†12	†11	†*7	4	31	27	24	20	16	13	9	6	2	†*29	25	24	20	17	13	10	6	2	29	26	22	19
†*17	†13	†12	†*8	5	JE 1	28	25	21	†17	†*14	10	7	†*3	30	*26	25	21	18	14	11	7	3	30	27	23	20
18	†14	13	9	6	2	29	26	22	†18	†*15	*11	8	†*4	†*31	†*27	†*26	22	19	15	12	8	4	OC 1	28	24	21
19	†15	14	10	7	3	30	27	†23	†*19	16	*12	9	5	FE*1	†*28	†*27	*23	20	16	13	9	5	2	29	25	22
20	†16	15	11	8	4	JL 1	28	†24	†20	17	*13	10	*6	†*2	MA*1	28	*24	*21	17	*14	10	6	3	30	26	23
21	†17	16	12	9	5	2	*29	25	†*21	†*18	†*14	†*11	7	3	*2	29	*25	*22	18	15	11	7	4	31	27	24
22	†18	17	13	10	6	3	30	26	†*22	†*19	†*15	12	8	4	3	30	26	*23	19	16	12	8	5	NO 1	28	25
23	19	18	†14	*11	7	4	31	27	23	20	16	13	†*9	5	4	31	27	24	20	17	13	9	6	2	29	26
24	20	19	15	12	8	5	AU 1	28	24	21	17	14	10	*6	5	AP 1	28	25	21	*18	14	10	7	3	30	27
25	21	20	16	13	9	6	2	29	†25	22	18	15	11	7	6	2	*29	26	22	*19	15	11	8	4	DE 1	28
†26	22	†21	†17	14	10	7	3	30	†*26	23	†19	†16	12	8	7	*3	*30	27	23	20	16	12	9	5	2	29
†27	*23	†22	18	15	11	8	4	31	27	†24	20	†17	*13	†9	†*8	*4	MY*1	28	24	21	17	13	10	6	3	30

† = Visual * = Radio

11 December. As the calendar shows, many events repeat in 26 to 28 days, often three or four times, proving that this method can be used successfully. It is also interesting to look at the calendar with hindsight—with the exception of 8 December 1977 the aurora of 18 September repeated consecutively 27 days later seven times. Did we miss an aurora on 8 December or was the event of 4 January and its subsequent repeats unconnected?

The latest information on solar and magnetic activity, along with details of the latest auroras, are given in the GB2RS News Bulletins on Sundays. Start marking those circles on the auroral calendar now and report your dx contacts to *4–2–70*.

Faeroe Islands expedition

The multi-operator Danish expedition to the Faeroes from 28 June to 26 July was a resounding success. Following close on the heels of the Dutch expedition to the Shetlands, OZ7IS and his crew have proved yet again that it is possible to go to the far north in Europe and still work outstanding dx on both the 144MHz and 432MHz bands. During the first few days on the islands the group set up two new beacons on a site beside the troposcatter and radar stations. OY6VHF is the beacon on 144·885MHz and runs 10W to a four-element antenna beaming south-west. OY6UHF is on 432·885MHz and runs 10W to a five-element antenna again firing south-west towards Denmark. The beacons are sited 350m above sea level, and both antennas are fed with RG17 coaxial cable to ensure low losses. The OY6VHF beacon can frequently be copied in Aberdeen by GM8NSU, and both beacons have been copied as far away as Hamburg by DC1XC.

Due to the extremely high winds and adverse weather conditions, the Danish group built an operating hut at the top of a hill near the beacon sites. The equipment used ran 200W on 144MHz to a single F9FT 16-element Yagi antenna, and on 432MHz the power output was 300W which fed a group of four F9FT 21-element Yagis. A wide-band log periodic antenna was used for television reception, and the strength of the BBC and IBA transmissions from the Shetlands was used as a guide to propagation conditions.

Their 144MHz signal was fairly easy to work from northern Scotland, even by low power 10W stations with indoor horizontal antennas. On the night of 11 July there was a spectacular troposheric opening from the Faeroes to Denmark and Germany. DL7QY, DC1XC, OZ1OF and PA0VV were among the Continental stations exchanging 5 and 9 plus reports with the expedition station on 432MHz. Earlier in the day G3LQR and G2CIW had been having a technical discussion on 432MHz when OY7O broke into the contact. In fact OY7O later said he had great difficulty in breaking in on their contact! This contact gave Simon Freeman, G3LQR, his 100th QTH square on 432MHz. G4DKX, who had worked OY5NS the previous week on 144MHz, completed the double by also working the expedition on 432MHz.

On several evenings the OY7O group were able to work long queues of Continental stations on both 144 and 432MHz, sometimes to the chagrin of British operators who were able to hear the high power signals from the Faeroes but were unable to attract their attention due to their own lower power. At Aberdeen the expedition was heard on several different days, and the standard of operating was extremely high. A believed first was established by a contact between GM8FFX and OY7O on 432MHz.

OY5NS, who is a permanent resident on the islands, sometimes operated in tandem, and Neils also worked some of the dx stations. Niels is in QTH locator WW77f on a lower site to the north of that used by the expedition. The Glenrothes group expedition to the Faeroe Islands coincided with the Danish expedition, and in view of the weather conditions were kindly offered the use of the OY7O purpose-built hut at the top of the hill.

Before leaving the islands the Danish group also set up a working repeater for OY on channel R1. The group expect the repeater to develop vhf interest in the Faeroes and hope it will encourage OY stations to buy multimode rigs for use on the islands.

Expeditions to TF and EI

The expedition by the Glenrothes group has moved from the Faeroe Islands to Iceland just as this magazine goes to the printers. GM3YOR/P has had problems with the multi-speed meteor scatter tape recorder, and this has limited possible contacts. The Nag144 linear and other equipment are working well, and Clive Penna, G3POI, was worked from Iceland on 27 July at 0300gmt. DK3XT in FN31h had a meteor scatter contact between 0200 and 0400gmt on 31 July, and RSGB member DK3UZ in EN20c exchanged 2 and 7 reports on ms with the TF expedition on 1 August. The distance between the German stations and Iceland is over 1,920km, and it is believed the DK3XT contact is a first on 144MHz.

The Cambridge University expedition to Eire is also in full swing as this is written. The group has already operated from the very rare QTH locators of WL, UL, VL, UM and VM but has had conditions which are only average. Nevertheless some excellent contacts have been made, and G3FPK at Croydon and G3POI in Sevenoaks have worked the group at most locations. A full report on this enterprising expedition will appear next month.

Sporadic-E facts and fiction

There were many sporadic-E openings during the month of July, the longest-lasting and most chaotic taking place on 8 and 10 July. In the words of DK3UZ, the band was open for too long and too many operators were going mad. A great many operators have claimed contacts which were incomplete. A contact can only be claimed when the callsigns and reports are correctly exchanged and both stations acknowledge that the QSO has been completed by exchanging R on cw or Roger on telephony.

It should go without saying that hearing an Italian sending you 5 and 9 is not a QSO if seconds later he disappears, you cannot (obviously) send him a report which can be verified—this is not a contact. GM8FFX worked two Italian stations on 10 July, but has since received by direct mail QSL cards for 11 contacts varying from HB9 and OE to the Isle of Capri. An amazing number of claims for the "Real DX" box have been received—it appears that stations everywhere, from Gozo to Turkey and from Moscow to Archangel, were working each other on 144MHz. There were undoubtedly some gigantic distances worked but some of the claims are of cosmic dimensions.

For this reason it has been decided to keep the 144MHz Es "Real DX" entry the same for a further month. The few operators trying to pull a fast one are surely unaware that there is close liaison between all the European vhf editors—especially between DL7QY of *Dubus*, G3FPK of *Short Wave Magazine* and GM8FFX. The practice of making exaggerated claims for chart entries is well known in the music business, but old 'FFX has been in that too and recognizes a "hype" from long experience—**real** claims for the "Real DX" box only, please.

Real contacts were made by GJ8ORH on 8 July when he worked I4EAT, I7AQI/4, I4DCV, I4CIL, I7ERT, YU2CKL (HD30a), I7ECT (HB27b), YU1NXA (HD08h), YU1PEK/2, I0SNY/3 and IT9VMN. GJ8ORH was also active for the 10 July opening, which started at 1800gmt with LZ1AB in QTH locator square LC27d and continued with YU4VIP (JD12c) and ended with YU1NDL (JE37f) at 1925gmt. G4DKX also caught the big openings with confirmed contacts to I2CVG (HV18g), I7LQY (IV63e), I7CVN (IB75g), I7WAS (JA62e), LZ2KVI (LD24e) and LZ2BW, LZ2AR and LZ1AG all in MC64e. On 8 July G3NSM at Oxford worked IT9TDN (HY68b), IW0AIO (GB14j), I7EGT (HB27c), I7WAF (JA62e), I0JFE (GC45e), IC8ZUQ in HA32g on the Isle of Capri. On 10 July G3NSM worked YU2CKL (HD30a), YU0ON (HD28c), I4BXN (FE88c), YU2RGO (HF20c), and last QSO of the night at a late 2149gmt with IW0AQD (GC45e). Bob also heard but did not work SV1CS in Athens.

REAL DX 1978

70MHz ar	G3SPJ-GI3RXV	570km
70MHz tropo	G3WIE/P-GM4DIJ/P	595km
144MHz tropo	GM8MBP-DF5GX/P	1,300km
144MHz ms	DK3UZ-9H1BT	2,021km
144MHz Es	GW4CQT-LZ1AB	2,205km
144MHz ar	G4FUT-RR2TEJ	2,100km
144MHz eme	GW4CQT-W6PO	8,439km
432MHz tropo	VK6KZ-VK3ZBJ	2,460km
432MHz eme	G3LTF-JA6CZD	13,600km

Repeater group of the month—Sheffield

The vhf repeater GB3HH is located 425m above sea level at the University of Sheffield's Department of Electronic and Electrical Engineering's microwave antenna testing range at Harpur Hill near Buxton in Derbyshire. The transmitter has been built from modified Pye boards and delivers 6W to a Jaybeam colinear antenna. The receiver is a much modified Pye AM10f base station which is used as an i.f. for a Microwave Modules converter on 145·700MHz. Single antenna working is achieved with the aid of six cavity filters, three in each leg. The logic was completely "in house" conceived, designed and built, using cmos; the total current drain being in the order of 70mA at 13·5V. The complete station works from a float-charged accumulator, battery-alone operation being indicated by a letter B sent instead of the first pip during the re-access period.

Operation through the repeater is very simple, despite rumours to the contrary, but the logic was designed for use with automatic tone bursts of 400ms plus or minus 200ms. GB3HH is tone and audio access (minimum 4s audio), tone re-access, with a talkthrough time of 2min; the timer reset always being indicated by the low deviation callsign. The re-access period is indicated by four pips, the first of which can be replaced by the letter H or L to indicate a station is greater than a nominal 2kHz high or low of the input frequency of 145·100MHz.

The repeater has been reliable and most trouble has been encountered with the antenna and feeder system, especially the "rusty bolt" effect causing scratching

and signal break-up on the input. The environment is not exactly clement; for example, the anemometer which was brought 200m down the hill from the GB3HH site two years ago because it blew away, registered a peak of 105mph during the winds last Christmas.

GB3US on RB0 is the callsign of the Sheffield uhf repeater which came into service in January. The transmit antenna is a Jaybeam colinear fed with 2W, and the receive antenna is a four dipole stack. The antenna favours a north-easterly direction down the Don valley. The logic for this repeater is very simple—tone access, tone re-access, 2min talkthrough—and is the logic unit which controlled GB3NA before it changed to its present GB3HH Mk2 logic. Information about the two repeaters can be obtained from G3RKL at Sheffield University.

Linears for 432MHz

Tom Melvin, GM8MJV, recently operated portable from the XP, YP, YR and ZR QTH squares on 432MHz using an FT101 and a Microwave Modules transverter to feed a Polar Developments linear amplifier type EDL432P. During a stop-off at Aberdeen to repair a wind-damaged antenna, Tom took time to check the swr of his 79½ element shortened Multibeam. With a little adjustment to the driven antenna the swr was back to 1·5 to 1. A check on the 'FFX Bird 43 Thruline wattmeter revealed a power output of the combined equipment of 65W. This neat mains-powered amplifier has been mentioned before as being used by television enthusiasts, but this was the first time there had been any opportunity of checking the power output. GM8MJV was powering the station from a 300W Honda generator but there is now another linear available which operates on 12V dc.

The new Microwave Modules 432MHz linear runs 100W output from a battery supply. It will be popular with contest groups and can be driven fully with 10W of drive. This linear has reverse battery protection, closes down unless it is fed into a good matching antenna, and has built-in thermal protection. G4AWU has had one of the first delivered to him, and he mentions a gain factor of 10 with the amplifier, 1W of drive for 10W output, 6W of drive for 60W output etc. The amplifier has been completely designed and constructed by Microwave Modules right down to their own custom-made finned heat sink.

Both linears have advantages: the Polar one is easy to use at home by simply plugging into the mains, but needs a generator for portable use; whereas the Microwave Modules unit is great for the car or portable but needs a hefty 12V dc power supply for home use.

"Firsts" and "Farthests"

The table printed in page 415 of the May *4 – 2 – 70* was intentionally headlined "Believed UK vhf firsts" with the object of encouraging members to cap or correct the information given. This they have done in no uncertain terms, reports Jack Hum, G5UM, the RSGB vhf awards manager, who is co-ordinating UK claims for "Firsts" and "Farthests".

For example, Brian Bower, G3COJ, believes that the late G5YV may well have established the first UK to UP contact on 144MHz by meteor scatter on 13 December 1964. Are there any prior claimants? This does not invalidate later claims to have worked UP etc by other modes such as aurora or even tropo. For this reason it is important to state mode of propagation when making claims; G5UM will then be able to compile separate listings of ms, aurora, tropo etc.

Going well back in vhf time, the following 144MHz claims have been made as a result of the May paragraph:

G3WW to OZ2FR, 1 June 1951 (on a.m.)
G8MW to GC3EBK, 1 March 1953.
G8WW to OK1VR/P, 27 October 1958.
GW8SU to GC2FZC, 28 June 1958.
GW3MFY to HG3GG, 4 July 1965.
GW3MFY to EA1AB, 27 March 1965.
GW3MFY to YU3UBJ, 4 July 1965.

Fausto Minord, 14EAT sends details of the following UK-Italy firsts:

G5NF to I1KDB, 14 June 1965.
GW3ZTH to I4BER, 21 October 1973.
GM3LAV to I1DAN, 4 July 1965.
14EAT to GI3JLA, 21 May 1975.
I6ZAU to GD2HDZ, 24 May 1971.
I4EAT to GJ8EZA, 14 December 1977.
I4MZY to GU3YIZ, 12 December 1977.
G8HTE to IT9TAI, 23 June 1976.
GI8KIA to IT9TAI, 14 June 1977.
G3SEK to IS0PUD, 23 June 1976.
GW4CQT to IS0PUD, 23 June 1976.
G3POI to M1C, 3 January 1976.
IT9TAI to GC3YLI, 23 June 1976.
GC2FZC to IT9PLT, 29 June 1976.

Late news

The Glenrothes Radio Club's expedition to Iceland in August enabled many European operators to work TF on 144MHz for the first time. GM8NCM and GM3YOR/TF worked G3POI, DK3XT, DK3UZ, DJ9CZ, SM3BIU, SM4FVD, SM4DHN, DK5AII, OZ1OF, G4FUF, SK6AB, PA2WDH, and G3SEK via meteor scatter, and SM3AKW, SM3BIU and SM3GFL via aurora on 4 August. The Cambridge University Group's expedition to Eire went well, with many tropo contacts from the rare QTH locator squares of WL, YL, UL and UM. The Cambridge expedition also worked DL7QY, SM7AED and SK6AB via meteor scatter. A late-in-the-year sporadic-E opening occurred on 8 August at 1730gmt when G8LKR in Hitchin worked three stations in Rome and I2KSX/8 in HY4Oh locator. A new transequatorial research beacon has been put on the air from a 1,585m asl site near Pretoria in South Africa, callsign is ZS6DN and the frequency is 144·130MHz. During the August Perseids shower, PE1AVU had ms contacts with C31OK(AC), I4XCC, HB0QQ, HG5KDQ, UK2BAB(MO) and UA3LBO(QO). Full details next month.

Finally, thanks for the mountain of mail and telephone calls. Record your news item on the *4-2-70* answering machine by ringing 0224 780347, or post to PO Box 49, Aberdeen. □

microwaves

Charles Suckling, G3WDG *

Forthcoming round table meetings

Two round table meetings will be held in the near future. The first will be at the IBA Engineering HQ, Crawley Court, near Winchester, on 17 September, starting at 11am. The main discussion topic will be the design and construction of equipment for 24GHz. One major development which will be mentioned is the availability of the GDO33 Gunn oscillator assembly from Plessey, which sells for about £20, and produces around 30mW at 24·125GHz. Further details of the meeting may be obtained from G3JHM.

The second meeting will be at Sheffield University on 7 October, starting at 2pm, and is being organized by G8AGN. It is hoped to cover some of the topics raised at the last meeting, such as G-line feeders as an alternative to coaxial cable, and ssb operation on microwaves, but the main discussion will centre on 10GHz equipment and operating practice.

Beacon news

The current trend of one new microwave beacon per month is continued by the commissioning of the Edinburgh 1·3GHz beacon, GB3EDN. It is located on top of the electrical engineering department building of the University of Edinburgh, and runs approximately 25W erp on 1,296·99MHz. The antenna consists of two corner reflectors, beaming NE and NW, giving coverage of east central Scotland, the Edinburgh area, and up the east coast towards Aberdeen. It is well sited for the North Sea, and ought to be audible in Scandinavia under good conditions; GM8BJF has recently worked SM6HYG over this path. Reception reports would be most welcome and should be sent to GM8BJF, 8 Lorrenie Drive, Edinburgh.

The GB3IOW 1·3GHz beacon is continuing to provide a most useful service. The writer has received the beacon while operating mobile on the A34 between Oxford and Southampton, the best dx being 80km over an obstructed path. The receiving antenna was a dipole, mounted 3ft above the roof of the vehicle. An interesting feature of the signals was that, while driving past objects at the side of the road such as buildings or hedgerows, two carriers (sometimes three) could be heard, separated by up to about 100Hz. When the terrain was clear, only a single signal was received. A possible explanation of this is that the doppler shift of the signal would be different according to whether the signal was being received either direct or by reflection, since the relative velocity would be different in the two cases. It would be interesting to see what effect this would have on the reception of ssb signals while mobile!

*Physical Chemistry Laboratory, South Parks Road, Oxford OX1 3QZ.

Two new beacons are planned for 10GHz. The first is being constructed by the SW Herts UHF Group. This will operate from Bushey Heath near Watford, and the callsign GB3SWH has been applied for. Further information can be obtained from G8EIM. The second beacon, currently at the proposal stage, is planned to operate from Emley Moor, to be co-sited with the existing 432MHz and 1·3GHz beacons. It will also use the callsign GB3MLE. Further details are obtainable from G8AGN.

Cross-Channel contacts on 10GHz

During the July stage of the 10GHz cumulative contest, a number of contacts were made across the Channel. F6DLA/P, operating from Fecamp (AJ13H), worked G3JHM/P (Beachy Head) and G8BDJ/P (Chanctonbury Ring), at 110km and 136km respectively. F6DLA was using a 60cm dish and 10mW Gunn transmitter. Both these contacts were well beyond line-of-sight, and what is surprising is that the weather seemed to be totally unsuitable for super-refraction, with gale force squalls, almost total cloud cover and intermittent rain. Signal levels of 20dB above noise were reported, which means that the path loss could only have been about 10dB greater than the line-of-sight value, implying considerably enhanced propagation conditions. This would not have been expected considering the poor weather. Clearly our current understanding of over-sea propagation needs some revision! G3JHM/P also had one-way contacts with F6AJJ/P and F1BQ/P, who were using the same site as F6DLA.

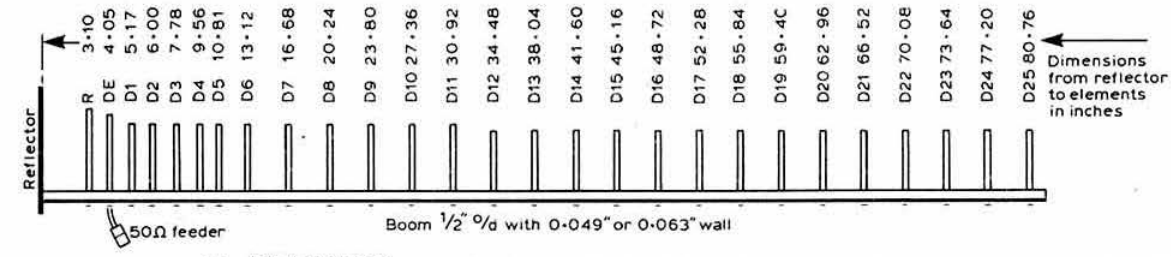
The G3JVL loop-Yagi antenna

Since the original design of the G3JVL loop-Yagi antenna was published in *Microwaves* in January 1975, a large number of these antennas have been built, usually with excellent results. The success of this antenna must surely be responsible, in part, for the recent rapid development of the 1·3GHz band.

In the light of the experience gained in constructing these antennas, and after a considerable amount of further painstaking development, G3JVL has come up with an improved version, which is shown in Fig 1. The basic constructional details may be found in the *VHF/UHF Manual* p8.48, and an improved method of mounting the driven element in *Microwaves* July 1976.

The modifications made to the original design are the addition of another director loop between original elements 6 and 7, a decrease in the circumference of directors D12 onwards, and the addition of two extra directors at the end of the antenna. These changes may be incorporated easily into existing antennas, and should improve the gain by 1·5dB. A longer version has also been built, by adding 11 more directors at 3·56in spacing, producing a further 1·7dB gain. The circumference of the new directors is 7·7in; D19-25 are also changed to this size.

One or two points should be made about the construction of the antenna. First, the position of the elements should be marked out starting from one end of the boom, as shown in Fig 1, rather than by marking out the individual spacings. This avoids a large cumulative error occurring in the positions of the elements.



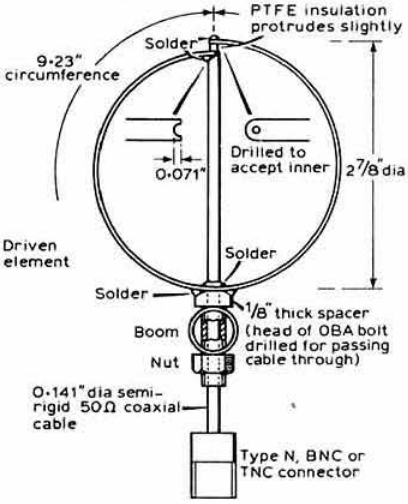


Fig 1. The modified G3JVL loop-Yagi antenna. The element circumference is 9·23in, including gap where feeder is connected; the material is ⅜ by 0·028in copper strip and is soldered directly to feeder. The circumferences of the aluminium strip reflector and directors are: reflector, 9·67in; directors D1-11, 8·25in; directors D12-25, 8in. Thickness and width as for driven element

Table 1. Correction factors to be applied to element lengths to compensate for changes in element thickness and width, and boom diameter, of 1·3GHz antenna

Thickness (in)	cf (%)	Width (in)	cf (%)	Boom dia (in)	cf (%)
0·028	0	0·1	+0·4	0	−0·7
0·063	0·6	0·1875	0	0·5	0
plot straight line		0·25	−0·3	0·75	+0·9
for other dimensions		0·375	−0·95	1·0	+2·1

Second, the dimensions of the elements must be adhered to as closely as possible. Bad construction will lead to loss of gain. Care should be taken in the attachment of the feeder to the driven element. The correct method is shown here; the small wires shown in the original design should not be used.

In the event of the specified materials not being available, some changes may be made to the thickness and width of the elements, and to the diameter of the boom, by altering the length of all elements to compensate, as detailed in Table 1. It may be found an advantage to use thicker, wider elements, to increase the strength of the antenna. As an example, an antenna could be made using a 0·75in diameter boom, and 0·25 by 0·063in loops. The correction factor would be 0·9−0·3+0·6 = 1·2 per cent. Thus all elements (ie reflector, driven element and directors) should be made 1·2 per cent longer, but the element spacing is not altered.

Provided that the antenna is constructed carefully, its feed impedance will be close to 50Ω. If an swr or impedance bridge is available, small final adjustments may be made by bending the reflector loop towards or away from the driven element.

Other versions of the antenna have been constructed for 432MHz, and 2·3, 3·4 and 10GHz. The dimensions of these have been derived by simply scaling linearly all the antenna dimensions, ie element thickness, width and circumference, height of driven element, spacing of driven element from the boom, element spacings, boom diameter and sheet reflector dimensions.

More than one antenna may be stacked to achieve extra gain. However, several points should be borne in mind when this is done, or poor results may be obtained. Perhaps the most critical factor is the impedance matching of the antennas. If individual antennas are mismatched, this tends to affect the impedance of the array quite seriously. Therefore additional care should be taken in the construction of the antennas, or preferably they should be measured and optimized. It is also most important to ensure that the antennas are connected in phase. This means that, for example, the outer of the feeders should go to the left-hand side of all the driven elements, when the antennas are mounted in the array. It is worth rechecking that this is the case with the antennas installed, as it is easy to make mistakes. Needless to say, equal lengths of cable should be used to join each antenna to the power divider. The stacking distance is the one parameter which may require some experiment. The original specification was 27in for 1·3GHz, but scaling this linearly to 432MHz in the construction of the G3OUR moonbounce antenna seemed to give too large a spacing—strong sidelobes and excessive narrowing of the main beam resulted. Referring this back to 1·3GHz would suggest an optimum spacing of 18–24in; less than 18in should be avoided as the antennas could well start to detune each other.

One final point to be mentioned concerns the mounting of antennas. Vertical masts are essential—any horizontal elements, such as a mast or stacking structure, within the field of the antenna can cause severe detuning. Versions for 432MHz will require bracing of the boom to prevent sagging, and wooden or metal struts are suitable. If metal struts are employed, it is essential that they are in the vertical plane, which will normally be the case. □

the month on the air

John Allaway, G3FKM *

YOUR scribe has spent a very unusual but interesting month—mostly off the air (or, alternatively, *in* the air!). Visits to the DARC meeting at Friedrichshafen and the SRJ biennial get-together at Bor, in eastern Serbia, brought the opportunity to meet many well-known hf band operators. A group of the amateurs who took part in the Clipperton Is expedition was at Hamradio 78—one of these was Jacky, F6BBJ, whose name often appears in *MOTA* in connection with visits to rare locations, usually in the Indian Ocean area. One consequence of the FO0X operation was the arrival of nearly 30,000 QSL cards at the home of HB9MX in Winterthur—G3FKM can confirm from his personal visit that these are being very efficiently dealt with in spite of the rather daunting fact that the first batch of FO0 QSLs was discovered to be too large for the standard envelope!

Many over-the-air friends were met in person in Yugoslavia, and it was particularly interesting to be able to spend time with Muhammed Al Baghdadi—from the newly-set-up station YI1BGD in Baghdad. In all, a very stimulating experience, and proof of the ability of amateur radio to foster international goodwill and friendship.

Readers will be very sorry to learn of the death of James Pershouse, 9M2DQ, a very well-known character on the dx bands.

Would anyone having information on the present whereabouts of VS9ASP or VS9PJV please contact G3FKM?

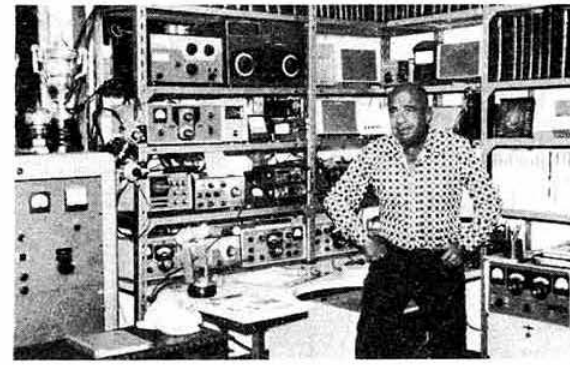
Top band news

G3CWI reports that WA8MOA will be active on 1·8MHz as VK9ZR from 26 August to 4 or 5 September at sunrise and sunset times. He says that the midsummer conditions have been excellent with really strong dx signals. OE8WKL/5N2 was worked on ssb and cw at 0200, and PY0RO at 0300. LU1DZ, LU8DQ, JA1PIG/PZ and PY0MAG have all been heard or worked from the UK.

News from overseas

Apologies are due to VR8O—the information given in an earlier *MOTA* that he was formerly VR1O and, therefore, David Appleton was not correct. David Ereckson is on Tuvalu for a one-year stay as the radio technician at the weather station, and he returns to New Zealand in December. He finds propagation into Europe rather poor on 14MHz, but better on 21MHz (over the North Pole) and he says that he will be in the 21,300–21,350kHz area around 0800 on most Saturdays and Sundays. It seems that his callsign may change on 1 October when Tuvalu becomes independent.

*10 Knightlow Road, Birmingham B17 8QB.



Juan Repiso Conde, EA2CA, operates this impressive collection of Collins, Drake, Kenwood and Atlas equipment from his home in San Sebastian. He may be remembered as EA9DE (Rio de Oro, 1954), EA9DE (Ifni, 1959), and PX1DE (Andorrs, 1959)

Bob Boughton, VP2AZB, closed down on 26 June and may be back in the UK by now. He made 7,820 contacts from Antigua with 95 different countries using low power and a vertical antenna; however, he suggests that a linear would be most useful to anyone else visiting the island, as would a rotary beam—interference from North and South America is quite high. Bob has been running a class for aspiring amateurs, and he hopes that several more VP2As will appear soon. However, an import duty of 42 per cent on the declared value of radio equipment makes everything very expensive, and even simple items are difficult to obtain. Anyone wishing for a QSL from VP2AZB for a contact made between February 1977 and June 1978 should apply to the address in "QTH Corner".

Jim Smith, P29JS, has written on return from his VK9YS/VK9YL expedition. He and Ann, F6CYL, operated from 31 May until 13 June and made 9,700 contacts. VK9YL worked 126 countries and VK9YS 121. Problems were experienced from salt corrosion of the four-element beam, which finished up being used for 14MHz only. Four days before the end of the expedition a small lizard caused a short in the SB200 linear, and a problem arose in the rf amplifier section of the TS820. However, a most enjoyable time was had on the island, and about 10 hours each day was spent on the air. A delta loop was used on 21 and 28MHz—very few W stations were worked on 21MHz, and even fewer on 28MHz.

A further letter from John Sainsbury points out that his call is in fact VR1AY and not VR1WJ as originally expected. The Controller of Telecommunications has confirmed that John is now the only active VR1 on the Gilbert Is and that there is no one on the British Phoenix Is. Ocean Is is being depopulated as the phosphate operation is coming to an end. The VR1AY location is on the ocean side of the atoll, with 80ft palm trees to hand to act as antenna supports.

John Evans, G3WET, is in Tonga until sometime in September, and has been given the callsign A35JE. He

has been on 14,347kHz at 0645 on Saturdays using A35WL's FT301-D. Unfortunately he has no beam or linear, and conditions into Europe have not been good. Tongan licences have to be approved by the Cabinet and signed by the Prime Minister, and there are currently about six resident amateurs. However, there are many visitors from ZL/W/VK who operate.

DX news

PJ2VD is returning to Holland, and all QSLs for contacts with PJ1VD, PJ2VD, PJ4VD, PJ7VD and PJ2YL should be sent to the address in "QTH Corner".

The station using the callsign OJ0BW is now definitely known to be a pirate. All stations legally licensed in Finland must be members of their national society and SRAL has no record of OJ0BW. A genuine station—OJ0MA was due to be put on the air by a group of OHs during August, and this group might also have used the callsign OJ0MA. OH0NA, who used to be a lighthouse keeper on the reef, is now living on the Aaland Is, and there are no residents on Market Reef.

LA9WT will be on Jan Mayen for four months from mid-November. His callsign will be JX9WT and he will use a three-element beam and linear. Main operating frequency is likely to be around 14,220kHz but he will also do some cw work. SM5AHK operated from Faro Is, Gotland, early in August as SL1FRO.

A6XP has told K6XP that at present amateur radio is not allowed in the United Arab Emirates.

Stations in the Philippine Is were allowed to use the 4D prefix from 10 June until 10 July to celebrate the 80th anniversary of the ending of their ties with Spain. 4D80DU was operated by PARA from the site of a former Scout jamboree.

There are now 17 licensed amateurs in Haiti, and the HHRC is reported to have applied for membership of IARU. Haiti was one of the earliest member states of the ITU.

ARRL has announced that Spanish Sahara, EA9, was deleted from the DXCC country list with effect from 1 August.

Long Skip has given a schedule for VR6TC's appearances on the bands (as supplied by ZL1AZV). Tom is usually on 14,180kHz between 0630 and 0700 on Mondays, and also keeps a schedule with ZL2FR on the same frequency between 2130 and 2145 on Tuesdays. After this he goes to 21,350kHz from 2245 until 2300, at which time he beams into the USA.

It seems that 7Q7LW is genuine. He has been worked on 28MHz and should be QSLd via Box 31, Zomba, Malawi.

FB8ZM is often around 14,040kHz at 1000, and at 1100 he moves to 14,225kHz. There has been activity from FB8XS, Bruno; FB8YF, Andra; and a new operator FB8ZN, Jean Michele. FB8ZN QSLs should be sent via W4LZZ, 8XS to F5VU and 8YF to F6DZL.

GM3DZB has written to say that he has recently obtained a QSL confirmation from AC3PT for a contact made in 1974. This came by return air-mail in reply to a letter addressed to P.T. Namgyal, The Palace, Gangtok, Sikkim.

It would appear that the station using the callsign YI1BGD on cw was not genuine as no morse operation took place from the genuine Baghdad station before mid-July.

KM6BI left Midway Is during June, and QSLs for contacts with the station between 1 January 1973 and August this year should be sent to the address in "QTH Corner". KM6EA cards go to Box 146, Metaline, Wash, 99152, and KM6EB to 10023 Hiram Way, Lakeside, Cal, 92040. KM6FF is now in Hawaii and asks for QSLs via the KH6 bureau. QSLs for KM6FD should now be sent via WA9CHG, and those for KM6FC to K5OA.

Dxpeditions

K5YY should be in East Africa at the time this is being read. He intends to visit Southern Sudan (ST0), and has been issued with the callsign D68AF for use in Comoro where he hopes to be on the air with Robin, D68AD. He has a French licence—F0ALZ—and plans to use it as F0ALZ/FH0 from Mayotte. He will then go to Mauritius as 3B8YY and will visit Alex, 3B8DA. If possible a visit to Rwanda will be arranged. The whole expedition will last up to seven weeks and is being supported by the Northern Californian DX Foundation.

WB6JPZ and W6MJE will visit Hong Kong from 10 to 24 September, and will operate from a site 1,800ft asl. They will have a four-element beam and dipoles, and will cover 3·5 to 28MHz. Their callsign will be VS6HK.

K2IGW will be in St Lucia for the period 18 October to 1 November and covering the CQ WW DX Contest. His callsign will be VP2LBH and he will operate on all bands 1·8 to 28MHz.

West Coast DX Bulletin says that there is a rumour that VK9XR/MM will visit Peter Is (68°47'S, 90°35'W) in the Bellingshausen Sea. The island belongs to Norway and could well qualify for separate country status. This is projected for the December/January period.

Transport difficulties have meant that the Mellish Reef expedition will be delayed until mid-September. The team will leave Australia on 16 September and be on the air about four days later.

There is a possibility that a group of Japanese amateurs may pay a visit to Okino Torishima.

The expedition to San Felix Is planned for this autumn will probably use the callsign CE0XX and should be on the air from 25 to 30 October.

Welcome

The following overseas amateurs joined the Society during July: DL8KG, EA8CR, F1EBK, F8OP, HB9AKP, HK4CCX, K1UJ, VK2LI, VK5NVV, VK5RY, VK5US, VP2AG, VU2ST, WD5FZL, W1EJ, W1XP and 9K2FP.

RSGB HF Convention

Readers are asked to note (in their 1979 diaries) that it is planned to hold an hf convention in Birmingham on Saturday 15 September next year. Lectures on hf matters, and films of interest to hf band users, will be on the programme, and the event will be followed by a dinner at which it is hoped to have some of the IARU "team" on its way to Geneva and WARC as guests. More about this later.

Contests

VK/ZL/Oceania Contest

1000 7 October to 1000 8 October (Phone and rtty).
1000 14 October to 1000 15 October (CW).
Exchange RS/T plus serial number (from 001). Contacts with VK/ZL count two points, with other stations in Oceania one point. Final score is total QSO points multiplied by the sum of VK/ZL call areas worked on all bands (each area may be counted on each band). Logs must show date, time, station contacted, serial number sent/received. Underline each new VK/ZL call area contacted and make a separate log for each band used. A summary sheet—showing callsign, name and address, equipment used, points and multipliers for each band and a signed declaration that all rules have been observed, should be enclosed. Note that entries may be single or multiband. Certificates will be awarded to the top scorer in each country in each category. Listeners may take part and should log VK/ZL stations only—recording date, time, call, station being worked, RS/T of station heard and serial number being sent. Phone and cw is a combined contest for listeners. All logs should be posted to reach NZART Contest Manager, ZL2GX, 152 Lytton Road, Gisborne, New Zealand, no later than 31 January 1979.

The CQ WW DX Contests

0000 28 October to 2400 29 October (Phone).
0000 25 November to 2400 26 November (CW).
All bands 1·8 to 28MHz. Exchanges consist of RS/T plus *CQ* zone number (UK is in zone 14). One point is gained for contacts with one's own continent, and three with others. Only multiplier credit may be claimed for contacts with stations in one's own country. The multiplier is the total number of DXCC countries and *CQ* zones worked on each band added together. There are three categories of entrant: (a) single-operator single- or multi-band, (b) multi-operator, single transmitter (all band) and (c) multi-operator, multi-transmitter. In category (c) several transmitters may operate simultaneously but only one signal may be radiated on each band at any one time. Entrants should use separate log sheets for each band and follow the layout of the official log form with 40 QSOs per page. Log and summary sheets may be obtained from *CQ* by sending a large self-addressed envelope and ircs to: CQ WW DX Contest Committee, 14 Vanderventer Avenue, Port Washington, LI, NY, 11050, USA. This is also the address to which entries should be sent. Note that those for the phone section must be postmarked before 1 December and for the cw section before 15 January. (A small supply of log sheets and summary forms may be available from G3FKM—sase, please.)

The YL/OM Contest

1300 30 September to 2400 1 October.
Exchange RS/T plus serial number (from 001). Members of Elettra Marconi RC will also give their membership number. One point is scored for phone and two for cw contacts. Multiplier is the number of European DXCC countries and YL members of the YLRC contacted. Send logs before 30 October to Award Manager, I0VOK, PO Box 4059, 00100 Roma. Use separate logs for each band and complete summary sheet.

QTH CORNER

FH8YL	via I8JN, G. Mauro, Via Tiberio 72-B, I-80124 Napoli, Italy.
GU5C1A	N6MA, D. P. Gagnon, 3800 J Street, Oxnard, Cal, 93030, USA.
H44ZZ	PO Box 654, Honiara, Guadalcanal, Solomon Is.
KM6BI	J. Daugherty, W8TIX, 1019 Lareno Rd, Lancaster, Ohio, 43130, USA.
DA1GR/OH0	Box 395, APO New York, NY, 09611, USA.
OJ0MA	Karl-Erik Eriksson, SF-22430, Saltvik, Finland.
PJ2VD	now PA0VDV, Fazanthof 57, 3755 EE Eemnes, Holland.
PW0PP	via W1DA, G. E. Hitz, 37 Easy St, Sudbury, Mass, 01776, USA.
PY0RO	
VE3FXT	Box 431, Cambridge, Ont, Canada.
VP2AZB	R. D. Boughton, G3RBB, 16 Western Avenue, Daventry, Northants.
VP2LBH	K2IGW, 341 Tracey Lane, Grand Island, NY, 14072, USA.
VP2LFH	PO Box 93, Castries, St Lucia, W Indies.
VP2VEN	J. Sherwood Charlton, 515 Curtis St, Albany, Calif, 94706, USA.
VS6HK	S. C. Shallon, Box 2055, Culver City, Calif, 90230, USA.
VS6HU	L. R. Howard, W8YAG, 1625 E. Grand Blvd, Detroit, Mich, 48211, USA.
YI1BGD	now PO Box 5864, Baghdad, Iraq.
YU9DX	YU2DX, T. Durgec, PO Box 266, 58001 Split, Yugoslavia.
ZF2AC	N3JL, J. J. Lynn, 19153 Brooke Grove, Galthersburg, Md, 20760, USA.
ZF2BN	W4HET, P. E. Schmid, 8703 Westwood Drive, Vienna, Va, 22180, USA.
ZL2ALU/K	J. J. Thompson, PO Box 10116, Wellington, New Zealand.
ZS8BRG	G3SEF, R. Frew, 11 Pool View, Great Wyrley, Walsall, Staffs WS6 6PA.
5W1BN	R. Senones, 95-161 Kauopae Place, Milliani Town, Hawaii, 96789.
601FG	via I2MQP, P. M. Ambrosi, PO Box 4073, Milan, Italy.
6Y5PJ	now GW4HAT, P. A. Jones, 6 Gwelfor, Killay, Swansea SA2 7NX.

RSGB QSL Bureau, G3DRN, 30 Bodnant Gardens, London SW20 0UD

Band reports

Mid-summer conditions have been reasonably good, and propagation on 21MHz in the early morning has been good into the Pacific area at times. Early in July VK/ZL signals were good on 14MHz between 2030 and 2200. Interference from the USSR "woodpecker" continues to cause problems, even up to the 28MHz band. Peak solar flux level in July seems to have been on the 12th when it reached 175, and during most of the period the Ap index was low—with a high of 45 on 14 July.

Many thanks to the following for information used in this section: G2DHV, G2HKU, G3s HB, CWI, GVV, KSH, LOL, RCA and UOL, GM3LYY, GM4CHX, G4s EHQ, EMX and FMO, G5JL, G6GH, G8MFS, BRSs 17567, 31301 and 33915. A log was also received from SU1ER.

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

1·8MHz. 0200 *K1PBW, K2GNC, VE1AXT,* OE8WKL/5N2. **0300** *PY2FOS, PY0RO, W2LT.*

7MHz. 0500 *KP4ERX, N6HR, PY0RO, VE3IXE, VP2MBB, ZL2OM.*

14MHz. 0100 EP2TW, HH2MC, VP2MZZ. **0500** VE6-VE7, W5-W7. **0600** CE0AE, *HH2T,* KH6s. **0700** FB8YF, FK8CP, FO0AKV, H44DN, KA1NC, KH6s, KM6FC, VKs, VK9ZM, VR3AH, W6-W7, ZL2BJU/K (ex-VR8A), 3D2UP. **0800** A35WL, C21EF, FO8FC, HC8GI, *OH2BDA/OH0,* VK9NI, VR1AG, VR8O, W6-W7, ZL4LR/A. **0900** FO0BG, FO8DH, KC4AAA, KL7NA, VS5DX, ZK1CX. **1000** 5W1BN (QSL to KH6JEB). **1100** FO0AKV (QSL to KV4CF), KA1NC (QSL to K4JEX), OJ0MA. **1200** VS6HF. **1400** *OJ0MA.* **1500** *HM1JJ.* **1600** C31MS (QSL to EA3MS), *JD1YAH,* YI1BGD. **1700** AP2AD, *J28AG,* YB1BF/7, 3B6DA. **1800** J28AZ, LA6IV/ST (QSL to LA2IJ), 6O1FG. **1900** JW9UV, JX3P (QSL both to LA5NM), SM2ALH/4U (QSL to SM2DLZ), *4K1GM.* **2000** HH2SD, OY9J, TR8MC, VK4SD, VP8PM, WA6GPW/VQ9. YI1BGD. **2100** HR6SWA, HS1WR, PY0RO, S79RD, VR3AH, OE5CA/YK, WB5LBJ/4D6 (QSL to K7LAY), 4U1UN. **2200** *AP, VK, VP8AI,* 9N1MM, 9X5NH (QSL to DL8OA). **2300** CE0AE, EP2PQ (QSL to PA0WGS), JT1KAE, *KL7, OX, TA2HIA, YS10.* **2400** YS1AJE.

21MHz. 0600 *J28AY*. **0800** *AH6II, FO8EI, FO8FA* (BP 426, Papeete), *FR7BN,* VR8O, *VU2SV, 5W1BN.* **0900** H44ZZ, KM6FC, OJ0MA, SU1CR, VR8O. **1000** H44CF, KX6MP, P29CC, S79MC, TJ2P (op G8KW), 5W1s AX, BD, BN. **1100** H44s CF, LU, ZZ, KX6DF, P29s MF, NNL, PW0PP, 5W1BN. **1200** APs, JAs, P29JS, *WH2AAG* (Guam). **1300** KX6BU, 5W1BN, 9L1CA. **1400** DU1EJ/3, SU1MI, G4BHT/4X. **1500** J28AY, P29NKV, TJ1AF, VU2LOA, 4D80DU. **1600** *FH8CY, JD1YAH,* 4D8KDU, *9M2FK, 9M8HG.* **1700** CO2FRC (CO2KK, Box 1, Havana), JD1YAK, KC4AAD, *PY0MAG,* ZD7PV, 9L1AP. **1800** KH6WF, HS1WR, TF6M, 3V8BZ. **1900** KH6CF, KX6MS, YC1WS, 5Z4NH, 9K2FX. **2000** D68AD, HH2MC, OX3CW, WD9FCC/VQ9, W6-W7. **2100** CE9AT, JAs, W7s, OE5CA/YK, ZL2ACP. **2200** CE0AE, JAs, PYs, *UA0UBI,* XE4FP (?), ZLs. **2300** KH0WJ, VKs, VR6TC, W6-W7, ZLs.

28MHz. 0600 *DL0IGI,* ZE2JV, *3B8MS, 5B4CY.* **0800** CT, F, UA9, UR. **1000** C31MK, SV, ZS, 4Z4. **1100** VU2KT. **1200** SM, ZE, ZS3, ZS6. **1300** LU, PY, YB0AB. **1400** SM2ALH/4U. **1500** LU, PY, ZS6BQI (ex-G4BEK). **1600** CE3FH, LU, PW0PP, ZE. **1700** JR3, WA7JRL/SU, UM8MAD, VP5KK (QSL to KP4AXM). **1900** CE, CX, KV4, PJ, GM3YOR/TF, VP2, W5, ZD7PV, 9Y4. **2000** C31NT, CX8DT, DL, HB, KV4CI, OH, OK, LU, PY, ZD8, 6Y5, 8P6. **2100** HC, J3, KP4, LU, PY, W9, YN1PJ, ZP. **2300** C31QR, TI.

Many thanks to all who have sent in information and to the authors of the following publications for items abstracted: *DX News Sheet* **(Geoff Watts),** *Long Skip* **(VE1AL/3),** the *West Coast DX Bulletin* **(WA6AUD),** *DX'press* **(PA0TO),** *CQ Magazine* **(W1WY),** and the *Ex-G Radio Club Magazine* **(W3HQO).**

Please send all items for the **October** issue **to reach G3FKM** no later than **8 September,** and for **November** issue by **7 October.** □

HF propagation study

Predicted hpfs (MHz × 10) for September 1978

GMT =	00	02	04	06	08	10	12	14	16	18	20	22	24
Aden	196	167	186	309	351	365	376	368	369	308	249	208	196
Ascension	235	228	199	192	327	366	371	383	382	376	317	251	235
Bahrain	178	154	192	298	343	352	360	347	351	285	232	192	178
Bangkok	148	133	191	266	305	318	326	317	305	265	202	164	148
Barbados	211	183	168	153	188	308	329	323	323	328	317	266	211
Bermuda	197	166	153	139	153	266	307	301	299	303	307	261	197
Bogota	205	176	164	149	197	223	327	315	312	319	315	267	205
Buenos Aires	221	209	188	177	201	318	352	352	352	355	328	260	221
Cape Town	228	197	166	270	348	371	382	392	388	365	288	249	228
Colombo	167	149	201	291	336	346	350	340	326	288	224	183	167
Cyprus	169	147	155	262	304	324	324	321	324	284	224	183	169
Dakar	221	208	174	200	313	356	355	365	364	365	313	247	221
Denver	172	145	129	121	135	131	191	239	266	271	258	219	172
Fairbanks	158	136	134	166	188	188	199	206	211	211	208	171	158
Falklands	225	210	192	185	187	317	352	359	362	362	323	256	225
Gibraltar	128	116	105	133	194	218	218	216	221	213	186	147	128
Hong Kong	139	131	178	244	286	300	307	262	235	219	188	155	139
Honolulu	158	134	128	145	211	174	173	152	187	246	221	173	158
Iceland	108	93	93	110	163	185	194	197	192	192	168	130	108
Jamaica	197	168	155	141	186	209	307	304	301	305	305	260	197
Lagos	238	221	195	246	342	371	375	390	389	379	307	249	238
Las Palmas	196	178	157	168	271	312	313	313	317	313	277	221	196
Lima	215	192	176	158	221	211	337	329	329	333	322	266	215
Los Angeles	172	145	129	121	141	131	139	218	262	261	248	213	172
Malta	141	126	121	190	237	258	260	257	263	241	202	154	141
Mauritius	208	177	183	307	359	371	385	378	375	322	263	218	208
Mexico	183	154	133	129	186	166	243	282	282	285	276	232	183
Moscow	125	110	110	195	228	244	258	252	252	230	180	141	125
Nairobi	215	182	182	301	354	371	380	383	351	333	268	223	215
New Delhi	153	140	197	277	317	327	335	324	280	228	201	169	153
New York	185	158	140	131	131	211	279	288	288	289	281	234	185
Osaka	141	131	157	221	256	276	253	216	185	169	157	155	141
Perth	166	148	201	290	332	343	331	290	279	216	186	181	166
Rio de Janeiro	227	211	194	182	214	350	352	336	331	341	326	258	227
Salisbury	225	197	186	295	355	375	383	392	389	347	280	235	225
Seychelles	215	174	183	313	336	338	351	370	374	315	257	195	215
Singapore	153	140	197	277	317	327	335	324	322	274	211	169	153
Suva (s)	144	130	141	199	235	248	258	248	208	233	182	168	144
Suva (l)	235	230	195	241	263	229	211	201	164	206	315	256	235
Sydney (s)	139	131	178	244	286	300	288	263	230	191	188	155	139
Sydney (l)	214	192	176	159	230	197	177	161	150	161	247	262	214
Teheran	167	149	201	291	336	346	350	340	341	279	216	181	167
Vancouver	164	141	131	131	162	148	152	183	194	214	228	191	164
Wellington (s)	141	131	155	221	248	270	266	234	202	191	178	152	141
Wellington (l)	225	218	195	191	191	172	143	143	131	216	257	253	225

Bands recommended are those between hpf and half hpf.

Propagation predictions

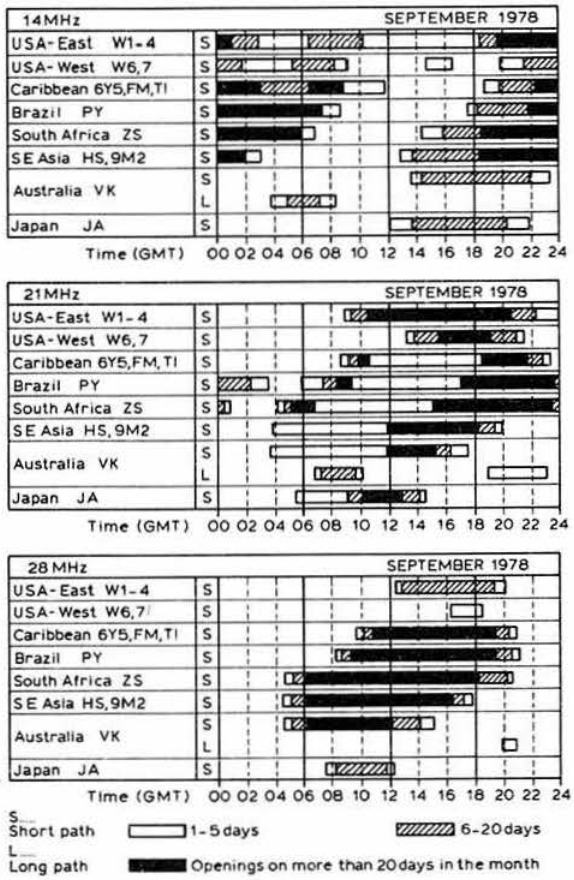
From September onwards there will be a steady increase in F2 mufs, and dx conditions on the hf bands will improve to reach their maximum towards the end of October. On favourable days (days with above average mufs) North America (east coast) and Japan will be heard again on **28MHz.** However, the west coast of North America will only be heard under exceptional circumstances, more probably towards the end of the month. On the whole, conditions for traffic with North America and East Asia on the hf bands will be easier for stations in the southern part of the country. Traffic with Central and South America, as well as South-East Asia and Australia, will be certain; again, this will improve as the month advances.

The improvement of conditions on the **21MHz** band will not be quite as noticeable as on 28MHz and will mainly be confined to traffic with North America, Japan and Australia. As it is now spring in the southern hemisphere the band will remain open longer to Australia and South Africa. During September the possibility of short skip via sporadic-E will come to an end.

As the nights lengthen in the northern hemisphere, traffic with North America will worsen during the last half of the night.

On **7MHz,** distances covered will increase during daytime. Possibilities of dx will increase on this band with the seasonal changes, when the path lies mostly in darkness and QRM permitting. Distances covered will also increase on **3·5MHz,** and local traffic will be interrupted by the dead zone in the last half of the night.

The provisional mean sunspot number for June 1978 from the Swiss Federal Observatory was 94·1. During the third week of the month the daily number reached a peak of 158. The predicted smoothed numbers for October, November and December are 107, 112 and 117 respectively.



Nominations for election to the 1979 RSGB Council

The Society's Articles of Association require Council to notify all members who are entitled to vote of those Council members who retire at the end of each year.

The Council members retiring on 31 December 1978 are as follows:

ORDINARY MEMBERS

Lord Wallace of Coslany, BRS3003634, who does not wish to be nominated for re-election.
Mr G. M. C. Stone, G3FZL, who will accept nomination for re-election.
Mr C. J. Thomas, G3PSM, who will accept nomination for re-election.

ZONAL MEMBERS

Zone B
Mr W. A. Scarr, G2WS, who will accept nomination for re-election.

Zone C
Mr D. J. Andrews, G3MXJ, who will accept nomination for re-election.

Zone E
Mr D. H. Adams, GW3VBP, who will accept nomination for election.

Zone G
Mr A. M. Allan, GM3ZBE, who does not wish to be nominated for re-election.

Note that Mr Adams was co-opted on to Council in January 1978 and that Mr Allan retired from Council due to pressure of other commitments on 22 July 1978.

NOMINATION PROCEDURE

Any qualified member of the Society (ie a corporate member for not less than three years, immediately prior to nomination) may be nominated to fill the vacancies on Council which arise from the retirement of Council members.

Any 10 or more fully-paid-up corporate members may nominate any qualified member for Council by delivering, in one closed envelope to the secretary of RSGB, their respective nomination in writing. The written consent of the nominated member to accept office if elected must also be enclosed. Any individual member may only nominate one candidate for election.

Nominations, indicating whether for ordinary or zonal membership, should be addressed to: The Secretary, RSGB, 35 Doughty Street, London WC1N 2AE, and must arrive not later than 10 October 1978. Nominations for zonal Council members must be from residents in the appropriate zone. In the same envelope nominees should include biographical details for publication in *Radio Communication* at the time the nominees are announced.

Probably the most forcefully expressed comment made to the 1977 President's Working Party concerned the difficulty many people faced in deciding for whom to vote in the Council elections on the basis of the information hitherto given. Consequently, Council has decided that an experiment should be made this year which allows candidates to give more information. The following rules shall apply:

(a) Each candidate is allowed a maximum of 150 words to express the information he or she would like to convey. The candidate may also use a suitable black and white photograph (head and shoulders).
(b) Bona fide statements will receive the absolute minimum of editing consistent with good style and factual accuracy. Council reserves the right to terminate the experiment if judged unsuccessful.
(c) Candidates must declare any commercial interests in the field of amateur radio.

Representation

Council has approved the following appointments resulting from nominations received after the closing date in the recent elections:

REGIONAL REPRESENTATIVES

Region 13—A. B. Givens, GM3YOR, reappointed.
Region 20—G. Mather, G3GKA, reappointed.

AREA REPRESENTATIVES

Basingstoke district—P. J. Sterry, G3CBU.
Cardiff & district—T. J. Brooke, GW3GHC.
Central Fife area—D. W. Dalrymple, GM3OLK.
East Cornwall*—W. J. Colclough, G3XC.
East Sussex—M. Welling, G3ZFE.
Farnborough—R. J. Harrison, G3TMQ.
Hereford area—S. Jesson, G4CNY.
Leicestershire—N. J. H. Grassby, G4CPY.
Preston—G. Lancefield, G3DWQ.
Southampton—J. R. Compton, G4COM.
Stockport—J. Heywood, G8BHQ.
Tayside area—I. Coulson, GM8KIE.
Wirral—K. Birch, G2FOS.
York—K. R. Cass, G3WVO.
NW area of Region 7—J. Korndorffer, G2DMR.

* In the June issue of *Radio Communication* Mr B. H. Body, G8JML, was listed as area representative for Cornwall. Before the announced deadline for the receipt of nominations, two names were received for Cornwall but one was considered invalid for technical reasons. However, the difficulties were resolved and, following discussions with the nominees concerned and the regional representative, it has been agreed to divide the county with a line drawn from Newquay in the north to St Austell in the south.

Mr B. H. Body, G8JML, will represent the part of the county west of the line and Mr W. J. Colclough, G3XC, will represent the part of the county east of the line.

obituaries

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

Mr S. Brown, GW4ELI
Simon Brown died on 23 June as the result of an accident, aged 20. He was first licensed as GD8IQM, but soon became GD4ELI. While still at school he made a name for himself in the dx section of 3·5MHz, and was well known to all users of the band. He moved to Wales in 1976 to study electronics and had just successfully completed his second year at university.

Professor D. R. Chick, G5BSU
Professor Chick, who died on 11 June, became a member of the RSGB in 1947. He was well known for his considerable support of the UoS AMSAT Telecommand Group, as head of the Department of Electronic Engineering at the University of Surrey.

Mr T. Delvin, G2FLK
Toby Delvin died recently, aged 63 years. He had been a member of the RSGB East London Group, and was well known for his matter-of-fact approach to most subjects and arguments that went on over the air.

Mr S. Garrity, G3ZAK (ex G8BBG)
Sam Garrity, who died on 8 July aged 64, was well known on 144MHz and the hf bands, and, until recently, was active on 3·5–28MHz ssb. As an enthusiastic member of radio clubs at Doncaster and Mexborough, he did much to help and encourage many newcomers to amateur radio.

Mr A. Hey, G6KC
Alec Hey, who died on 17 July, had held a transmitting licence since about 1930, and worked mainly on the 14MHz band. He had many friends all over the world, one of his most exciting contacts being with Captain Carlsen of the *Flying Enterprise* after the vessel was shipwrecked.

Mr R. Hill, G2ATD
Ray Hill, who died on 20 February, was operational until his death; his main interests being cw on the 14MHz band and skeds with his many friends overseas. He was one of the founder members of North Kent RS and was once a member of RNARS. He had held a full licence since 1945, having previously held an AA licence.

Mr N. Leworthy, G3SYV
Noel Leworthy died on 17 May following an accident. He was an enthusiastic amateur and a member of Plymouth RC for 18 years, having joined as a swl. He served the club in various capacities and had held various offices.

W. E. Longmire, G3TKL
"Bill" Longmire, the founder and president of Thornton-Cleveleys RS, died on 4 July aged 83. He had had a colourful career, serving in the

wireless section of the Canadian Army during the Somme battles of 1914–18, and being awarded the Military Medal. He obtained his full amateur licence rather late in life, when he was about 70 years old, and comparatively recently he secured morse speed certificates issued by the RNARS. He was a craftsman in diverse fields, always ready to further the cause of amateur radio.

Mr G. Moon, G3YAX
Gabe Moon, who died on 23 June, was very active on 14MHz and 144MHz on ssb and fm, and enjoyed a good rag-chew on the morning 14MHz nets where he had many friends.

Mr J. Pershouse, 9M2DQ
James Pershouse died on 1 July in Penang Medical Centre. He had many contacts with the UK and had had QSOs with G6RC on 761 days since 1969. He was also a member of RSARS, and regularly took part in the Commonwealth net run by G3LQP during 1971–4.

Mr R. Sinclair, G3VAD
Robin Sinclair, who died recently in a motorcycle accident, was a well-known amateur in the Harlow area, and a lecturer at Harlow Polytechnic.

Mr R. R. Stringer, G3DKF
Roy Stringer, who died on 14 May aged 61, was licensed in 1946 and was operational until his death. His main activity was on 144MHz, being the holder of a Senior VHF Award, and he was well known for his aurora and sporadic-E contacts. He was a member of the RAIBC, being confined to a wheelchair for some years prior to his death. Ready to help others at all times, he assisted a number of amateurs in their efforts to pass the morse test.

Mr M. F. Wilkins, G3YOH
Maurice Wilkins, who died on 3 August, was a founder member of Shirehampton ARC and an RAE course lecturer for several years. He was active on all bands from 1·8 to 28MHz and, latterly, 144MHz.

We have also been advised of the death of:
Mr J. Neil, G3UXN, on 9 March.

RAE courses 1978–9

(See also the list on page 707 of the August issue)

Bangor. Bangor Technical College, Bangor, Co Down, N Ireland. Mondays and Thursdays, commencing mid-September. Enrolment from 7 September. Further details from the college, or the class tutor, Cyril Billington, GI3WSS, tel Holywood 4277.
Barry. Barry College of Further Education, Colcot Road, Barry; tel Barry 733251. Tuesdays 6.30–9.30pm. Enrolment week beginning 11 September. Fees, for under 18 years, £5·50; for over 18 years, £6·50.
Bedford. Westfield School, Chester Road, Bedford. Tuesdays (RAE) and Mondays (morse), both for 20 weeks duration. Enrolment 13 and 18 September, 7–8pm. Fees are £7·50 approximately for each course. Further details from G3YUQ, G4FUO, or Mrs E. M. Adamson, tel Bedford 67353.
Birmingham. Brasshouse Centre, Brasshouse Passage, Birmingham B1 2HR. Enrolment week beginning 11 September. Further details from G3KPT.
Borehamwood. Borehamwood College of Further Education, Elstree Way, Borehamwood, Herts; tel 01-953 6024. Tuesdays and Thursdays 1900–2100, commencing 26 September. Enrolment 13–14 September, 1600–2000. (Please note that this class is aimed at the December 1978 examination, to the old syllabus.)
Brentwood. Brentwood Adult Education Centre, Bishops Hill Centre, Rayleigh Road, Hutton, Essex. Commencing 28 September. Enrolment 12 September, 1900–2030. Further details from the tutor, T. E. Downing, G3MXH, tel Billericay 54370; or from the centre, tel Brentwood 218593.
Burgess Hill. Marle Place Adult Education Centre, Leylands Road, Burgess Hill, West Sussex. Tuesdays 7.30pm, for 30 weeks commencing 19 September. Further details from the centre, tel Burgess Hill 6355.
Bury. Bury Metropolitan College of Further Education, Market Street College, Room A18, Bury; in conjunction with Bury Radio Society. Commencing 25 September, 7–9.15pm. Enrolment 7 September, after 6.30pm.
Canterbury. Canterbury College of Technology, New Dover Road, Canterbury. Mondays 6.30–9pm. Enrolment 8 and 11 September, or at classes. Further details from the college, tel Canterbury 66081.
Chippenham. Chippenham Technical College, Cocklebury Road, Chippenham, Wilts SN15 3QD. Enrolment 7–8 September. Enquiries to Head of Engineering Department, or the course tutor, tel 0249 50501/4.
Crawley. Sarah Robinson School, Ifield, Crawley, West Sussex. Mondays 7–9pm, commencing 25 September. Enrolment 13–14 September. Further details from R. Scrivens, G3LNM, tel Crawley 22540.
Dover. Dover Radio Club Shack, YMCA, Leybourne Road, Dover, Kent. Mondays 7.30–10pm, commencing 25 September. Further details from G4EGQ, tel Dover 203000.
Dudley. Dudley Technical College, Dudley DY1 4AS. Commencing September. Enrolment 5 September, 6.30–8.30pm. Further details from the college, tel Dudley 53585.
Hatch End. Hatch End High School, Hatch End, Middx. Wednesdays, with morse, commencing 27 September. Enrolment, at Nower Hill School, 16 and 19 September.
Hemel Hempstead. Dacorum College, Marlowes. Tuesdays 6pm, commencing 12 September. Enrolment 4–5 September. Further details from course organizer, C. Burke, G3VOZ, tel Hemel Hempstead 833300.
Huddersfield. Milnsbridge Adult Education Centre, New Street, Milnsbridge (off A62). Tuesdays 7–9.15pm, commencing 3 October, and Thursdays (beginners' practical) 7–9.15pm. Enrolment at Princess Alexandra Walk Exhibition, week ending 9 September, or at classes. Further details from Mr Edinburgh, tel Kirkburton 2905.
Ilford. Ilford Evening Institute, Gants Hill, Cranbrook Road, Ilford, Essex. Mondays, commencing 25 September. Enrolment week commencing 11 September. Details from the instructor, tel 01-804 9373.
Knottingley. Knottingley High School, Knottingley, West Yorks. Enrolment 11 September. Enquiries to A. E. Ashby, 22 Rossiter Drive, Knottingley, West Yorks.
London. Amberly Road Adult Education Centre, Paddington, London. Mondays and Thursdays, with morse, commencing 18 September. Enrolment 7, 8, 11 and 13 September.
Loughborough. Loughborough Technical College, Radmoor, Loughborough, Leics LE11 3BT. Tuesdays 6–7pm (morse) and 7–9pm (theory and practical), commencing 19 September. Enrolment 11–12 September, 6–8pm. Fee £9·85. Further details from G. M. Allen, Department of Electrical Engineering, tel Loughborough (0509) 215831.
Loughton. Loughton College of Further Education, Borders Lane, Loughton, Essex. Tuesdays 7–9.30pm, commencing 19 September. Enrolment 5–7 September, 6–8.30pm, or at commencement of course. Further details from Mr Gardner, Head of Engineering and Science Department, tel 01-508 8311.
Manchester. Openshaw Technical College, Whitworth Street, Openshaw, Manchester 11. Tuesdays 6.45pm, with morse, commencing 18 September. Enrolment 4–6 September, 6–8pm.
Morden. Merton Technical College, Morden Park, London Road, Morden, Surrey. Tuesdays (morse) 7–9.30pm, for 30 weeks, and Wednesdays (RAE) 7–9.30pm, for 33 weeks. Enrolment 11–12 September, 2–4pm and 6.30–8.30pm.
Morley. The Technical Institute, Fountain Street, Morley, West Yorks. Morse course for beginners, Mondays, commencing 18 September. Further details from G4ZDU, QTHR.
Newcastle. Gosforth Adult Association Classes, Gosforth High School, Gosforth, Newcastle Upon Tyne. Tuesdays (theory) and Thursdays (morse) 7–9pm, commencing September. Enquiries to the Principal, Gosforth Adult Association, Gosforth High School, Knightsbridge, Gosforth, or to G3FPE, tel Newcastle Upon Tyne 668439.
Portsmouth. Portsmouth Further Education Centre, Drayton Road, North End, Portsmouth. Tuesdays and Thursdays. Details from the Principal or G6NZ.
St Helens. College of Technology, St Helens, Lancs. Mondays and Thursdays, with full laboratory facilities. Enrolment 4–6 September, 6–8pm. Full details from E. H. Lewis at the college, tel St Helens 20831, or at home, tel St Helens 52926.
Southampton. Glen Eyre Further Education Centre, Southampton. Enrolment 12 September, 6.30–8pm.
Stevenage. Stevenage College of Further Education. One evening per week, commencing September. Enrolment first week in September. Further details from the college.
Stockport. Avondale College, St Lesmo Road, Stockport, Cheshire. Enrolment 5–6 September. Further details from G8BHQ.
Swindon. The College, Regent Circus, Swindon. Mondays 7–9pm, commencing 18 September. Enrolment 5–7 September. Further details from A. Macdonald, G3NPM, at the college, tel Swindon 29141.
Swinton. Moorside High School, East Lancashire Road, Swinton, Manchester. Thursdays, commencing 28 September. Further details from G8BFP, tel 061-794 3706.
Weybridge. Brooklands Technical College, Heath Road, Weybridge, Surrey. Wednesdays, commencing 20 September. Enrolment 11–13 September, 2–4pm and 6–8pm. Fees are dependent on number of students enrolled at start of course, so early enrolment is advised. Further details from Mr Teague, tel Weybridge 53300.
York. York College of Art and Technology, Tadcaster Road, York. All details from the college.

NATIONAL FIELD DAY 1978 RESULTS

For several weeks prior to NFD, the hf band conditions had been excellent, with both 14 and 21MHz open for dx for long periods each day. Many groups were looking forward to a repeat of the 1977 contest with record high scores and long runs of first contacts with the USA to bolster their scores. Special high gain fixed antennas orientated towards the north-west to take advantage of the expected propagation were erected by some entrants; but as often happens during an NFD contest, it was not to be. During the week preceding the contest weekend there was a large solar flare which caused a radio blackout during part of Friday followed by a period of poor and disturbed conditions with high levels of sporadic-E activity on 28MHz. Conditions started to stabilize towards the end of the contest, but by then it was too late for the majority of entrants to benefit.

The lack of dx, long periods of short skip and sporadic-E completely changed the nature of the contest, making it much more of a European affair with groups slogging to make contacts with the DL and HB9 portables. While this pleased some entrants and gave them record band scores, the majority seemed disappointed with the poor conditions and the high levels of QRM from Europe. The prevailing conditions provided some quite amazing results, and this makes NFD 1978 quite different from any previous Field Day contest.

In the Open Section there was a sensational finish, with the Channel Contest Group and the Glenrothes & D ARC being placed joint first. Record scores were achieved in the Restricted Section and on several of the individual bands. On 28MHz the high level of sporadic-E favoured the northern part of the UK to a much greater extent than the Midlands and the south, and this produced another tie situation between Glenrothes and the Northern Contest Group.

The weather forecast for the weekend was for generally fine weather during the Saturday, but with a possibility of thunderstorms during Sunday. For once the forecasters got it right and all groups seemed to have enjoyed erecting their stations in real summer weather. During Saturday evening the static levels started to build up, causing problems for many groups working the lower frequency bands. Severe thunderstorms developed on Sunday, and, while they were localized, they constituted a real danger to many groups. A number of entrants played safe by closing down and taking shelter, but others stayed on, and there were several very near misses. Several transceivers were damaged, and one group reported a fused atu with connection wires welded to the earthed chassis! After the thunder came the rain and the wind. Two groups in the home counties suffered from severe tent damage, and others had to abandon their sites until the rain stopped and the flood waters receded.

Faulty generators caused many problems, but most entrants managed to complete the contest by making emergency repairs or by resorting to spare or borrowed units. A new difficulty, reported by a number of groups in the Restricted Section, was that of "hot" equipment, resulting from a voltage node on the antenna feed system being in the wrong place. Keyers and other equipment malfunctioned and there were many "burnt" fingers. Some entrants had to revert to the older type mechanical bugs and straight keys, and then found they had forgotten how to use them! (This might account for some of the strange morse that was heard on the bands.) Others found that an electronic key that would work on one band was hopeless on another, and one group was forced to use three separate keyers to enable them to operate on the three hf bands.

Open Section

This is the third bout in the heavyweight contest for top NFD honours since the changed rules were introduced for NFD 1976. The first of these new-style contests was won by the Glenrothes & D ARC by a points decision over the Channel Contest Group. In 1977 Channel had a clear win over Glenrothes,who were the runners-up, and this set the scene for a needle match in this year's contest. The two groups were very evenly matched, and throughout the 24 hours the lead changed a number of times. At the halfway mark Glenrothes were 60 points clear of Channel, but they then lost ground to the Sussex group who were making a fast run of contacts on 14 and 21MHz. Glenrothes countered with a long spell of contacts on 28MHz, where the bonus points and good conditions to Europe gave them a chance to catch up. A final slog on 21MHz put the two leaders on virtually level pegging on claimed points. In the checking process, which necessitated a recount and a final contact-by-contact scrutiny by three members of the HF Contests Committee working as a team, both groups lost points in roughly the same proportion to their claimed scores. This resulted in a tie, the first time that this has ever happened in an NFD contest. Taking account of the 800 plus contacts made by both groups, this is a remarkable achievement and both groups are to be congratulated on a most unusual finish. Channel, G4DAA/P, and Glenrothes A, GM4GRC/P, will be presented with the NFD Shield jointly at the 1978 AGM and they will share the trophy for six months each. Glenrothes are really in the money, as they also win the Scottish NFD Trophy and share the band honours for 28MHz.

NFD Trophy

Channel Contest Group	3,055 points
Glenrothes & District ARC	3,055 points

Gravesend Trophy

Swansea ARS	2,725 points

Bristol Trophy

Northern Contest Club	2,852 points

Scottish NFD Trophy

Glenrothes & District ARC	3,055 points

Frank Hoosen (G3YF) Memorial Trophy

Telford & District ARS	1,627 points

Leading scores on individual bands

1·8MHz	Sutton & Cheam RS	376 points
3·5MHz	Shefford & District RS	1,058 points
7MHz	Verulam ARC	1,016 points
14MHz	Telford & District ARS	1,627 points
21MHz	Guernsey ARS	726 points
28MHz	Glenrothes & District ARC	980 points
	North Riding AR Group	980 points

Overseas stations giving most points to entrants

Europe:	OK3CAU
Africa:	ZS6ME/P
Australasia:	VK6PG

GM4GRC/P was operated by GM3OLK, GM3YOR and GM3ZSP, and their 3,055 points came from 813 contacts. They used an FT-101B transceiver feeding a triband Yagi and 18AVQ trapped vertical, for the higher frequency bands, and separate dipoles for the lower frequencies. Channel had to make an additional 60 contacts on the non-bonus bands to equal the score of the Scottish group, and they did this with a 3-band cubical-quad and separate lower frequency band dipoles fed from a T4/R4 combination, with a separate SB-301 receiver for band checking.

The Gravesend Trophy is awarded to the runners-up in the section that has the most entries, and again this goes to the Open. GW5ZL/P are the winners with their third place score of 2,725 from 743 contacts. Last year they were the Restricted Section winners using a 264ft c/f antenna and an FTDX-500 transceiver. This year they added a triband Yagi and a separate R4 receiver to their 1977 station equipment.

In previous NFD contests, under both the original and the revised rules, the favourite rotary beam antenna had been the multiband cubical-quad; this year there was a general move to the 3- and 4-element triband Yagi, and only a small number of groups retained the quad. Other antennas used in the Open Section included fixed arrays of the lazy-H configuration, a stacked 8-element W8JK, several V-beams, a rhombic and a 6-element delta loop. As these were mostly orientated at the USA, they did not prove as useful as was hoped. For the lower frequencies, most groups used separate dipoles or 264ft c/f wires. Although the cover sheets and the rules do not require entrants to give details of their masts, three groups included this information. Two managed to hire (or borrow) trailer mounted 60ft tilt-over telescopic towers intended for mounting floodlights, while the third had the loan of a complete street lighting service vehicle with hydraulically-operated platform lift and built-in 5kVA generator.

Only a few entrants seem to have taken advantage of the rule that permits the use of a second receiver for band checking. This is a surprise, as those that had the facility reported that it was of great help in keeping an eye on 28MHz.

OPEN SECTION

Posn	Group	Callsign	1·8MHz	3·5MHz	7MHz	Points 14MHz	21MHz	28MHz	Total	Number of contacts
1	Channel Contest Group*	G4DAA/P	200	184	350	1,056	652	613	3,055	873
	Glenrothes & D ARC—"A"*	GM4GRC/P	248	302	541	464	520	980	3,055	813
3	Swansea ARS*	GW5ZL/P	282	112	232	648	667	784	2,725	743
4	Racal AR Gp*	G3RAC/P	240	110	578	1,123	209	434	2,694	733
5	Teesside Contest*	G3ZEM/P	314	265	496	786	452	254	2,567	728
6	Guildford & D ARC—"A"	G6GS/P	258	296	725	337	244	692	2,552	644
7	North Riding AR Gp	G3GKI/P	246	290	462	263	156	980	2,397	560
8	Torbay ARS—"A"*	G3NJA/P	322	339	389	360	449	492	2,351	603
9	East Notts Contest Group	G3TBK/P	252	298	555	383	319	322	2,129	583
10	Medway Radio Contest Group	G3ZYV/P	310	206	480	301	259	546	2,102	542
11	Leyland Hundred AR Gp—"A"	G3GGS/P	318	298	316	382	394	332	2,040	519
12	Leicester Polytechnic ARS	G3SDC/P	244	216	531	472	268	268	1,999	570
13	Hull & D ARS	G3AMW/P	92	278	442	394	162	630	1,998	547
14	Cornish Radio Amateur Club	G4CRC/P	188	213	253	301	249	760	1,964	451
15	Newbury & D ARS	G3WOI/P	210	216	339	345	167	682	1,959	506
16	Reading ARC	G3ULT/P	264	352	422	396	145	358	1,937	486
17	Horsham ARC	G3TNO/P	288	212	477	582	313	60	1,932	574
18	Kingsway Technical College ARC	GM4AAF/P	62	197	262	451	293	666	1,931	527
19	"The Hamsters"*	GM3SSB/P	66	193	286	309	254	814	1,922	461
20	Oxford University RS	G3OUR/P	224	267	240	508	432	160	1,831	525
21	Greenock & D ARC	GM3ZRC/P	6	163	119	346	537	614	1,785	465
22	Bromsgrove & D ARC	G3VGG/P	30	113	257	612	223	526	1,761	463
23	BSC Port Talbot ARS*	GW3EOP/P	209	90	348	554	231	320	1,752	490
24	Leicester RS	G3LRS/P	252	114	522	371	159	306	1,724	479
25	Worthing & D ARC	G3WOR/P	0	279	342	529	77	484	1,711	480
26	Grimsby ARS	G3CNX/P	332	212	285	241	200	406	1,676	421
27	Telford & D ARS*	G8AX/P	0	0	0	1,627	0	0	1,627	559
28	Liverpool & D ARS	G3AHD/P	228	227	210	219	566	176	1,626	437
29	Scarborough ARS	G4BP/P	74	290	540	254	340	118	1,616	452
30	Bangor & D ARS	GI3XRQ/P	104	122	209	232	226	708	1,601	409
31	Cray Valley RS & Crystal Palace & D RS	G3RCV/P	160	72	372	742	194	30	1,570	482
32	Ainsdale RC	G2OA/P	228	128	212	255	271	464	1,558	373
33	Chiltern ARS	G3CAR/P	284	232	82	147	221	590	1,556	361
34	West Kent ARS	G3WKS/P	0	267	449	307	302	130	1,455	445
35	Wirral ARS	G3NWR/P	244	239	292	325	314	0	1,414	412
36	Cheltenham ARS	G5BK/P	136	31	285	312	194	396	1,354	347
37	Hereford ARS	G3YDD/P	0	0	0	1,350	0	0	1,350	455
38	Mansfield RS—"A"*	G3GQC/P	0	0	0	1,263	0	0	1,263	460
39	Conway Valley ARS	GW6TM/P	132	178	388	129	252	68	1,147	336
40	Easington & Hartlepool ARC	G4APN/P	234	12	428	163	223	62	1,122	302
41	Dumfries & Galloway R & EC	GM4HAA/P	0	148	12	539	42	332	1,073	305
42	Shefford & D RS	G3FJE/P	0	1,058	0	0	0	0	1,058	431
43	Harlow & D ARS	G6UT/P	0	1,025	0	0	0	0	1,025	416
44	Berwick & D ARS	G3KMR/P	0	0	0	1,018	0	0	1,018	366
45	Verulam ARC*	G3VER/P	0	0	1,016	0	0	0	1,016	381
46	"Pitsford Pirates"	G3UIN/P	0	165	97	237	207	306	1,012	286
47	Ilford RSGB Group	G3XRT/P	304	286	311	75	23	0	999	309
48	Preston ARS	G3KUE/P	56	195	279	61	186	220	997	283
49	Southdown ARS	G3WQK/P	0	127	203	434	26	202	992	293
50	Crystal Palace & D RC	G3VCP/P	0	0	0	29	349	612	990	222
51	Farnborough & D RS	G3RRA/P	0	0	872	0	0	0	872	277
52	Salisbury R & ES	G3FKF/P	0	0	780	0	0	0	780	278
53	Clifton "240V ac"	G3GHN/P	0	0	226	416	116	0	758	243
54	Edgware & D RS—"B"	G3GC/P	0	0	728	0	0	0	728	224
55	Guildford & D RS—"B"*	G5OD/P	0	0	715	0	0	0	715	316
56	North London CW Club	G3KTZ/P	0	0	0	683	0	0	683	231
57	Bury RS*	G3BRS/P	0	0	0	664	0	0	664	219
58	Maidstone YMCA ARS	G3TRF/P	6	74	146	381	50	6	663	200
59	Clifton Battery Wireless Club	G3JKY/P	0	375	0	0	0	0	375	126

Note: Contacts made are claimed numbers, not checked figures. * Inspected stations.

Thames Valley ARTS operated from the luxury of a member's caravan on the heights of Henley Fort, Guildford. Seen here are G8SM, with G3JEQ on the key, picking them off on 21MHz

The Bury RS NFD station at Ashworth Valley, near Bury. G4FOT on the key, swl Gordon Glover logging. Photo: *G8LWK*

RESTRICTED SECTION

Posn	Group	Callsign	1·8MHz	3·5MHz	7MHz	Points 14MHz	21MHz	28MHz	Total	Number of contacts
1	Northern Contest Club*	G3VMW/P	322	305	510	427	365	923	2,852	721
2	Stockport RS*	G6UQ/P	182	193	579	591	387	722	2,654	689
3	Guernsey ARS	GU3HFN/P	102	66	361	650	726	566	2,471	713
4	SRCC Croydon RSGB Gp*	G6LX/P	202	359	506	534	228	632	2,461	598
5	Bracknell ARC*	G4BRA/P	244	193	563	495	366	594	2,455	665
6	East Barnet ARC	G3YDX/P	278	379	546	317	249	598	2,367	613
7	Sunderland RSGB Group	G3RDI/P	194	294	394	488	327	542	2,239	579
8	Addiscombe ARS—"A"	G4ALE/P	272	391	406	272	548	328	2,217	597
9	White Rose RS	G3XEP/P	284	129	333	439	334	554	2,073	535
10	Bristol Contest Gp	G6YB/P	242	326	498	429	225	318	2,038	550
11	Crawley ARC	G3TIR/P	246	344	532	369	82	434	2,007	526
12	Government Communications ARC—"B"*	G3NKS/P	242	238	505	437	307	276	2'005	546
13	Oxford & D ARS	G2DU/P	156	338	467	367	497	92	1,917	569
14	Hinckley Point Radio Contest Gp (Bridgwater)	G4EBU/P	296	235	426	310	270	332	1,869	489
15	Cannock Chase ARS & Blake School RC*	G6SW/P	252	360	407	398	331	120	1,868	508
16	Gloucester ARS*	G3MA/P	308	238	407	283	220	378	1,834	469
17	G4KF Contest Group	G4KF/P	238	160	234	352	217	558	1,759	441
18	Sutton & Cheam RS	G2DMR/P	376	255	440	407	108	160	1,746	494
19	Stourbridge & D ARS	G6OI/P	0	194	324	427	141	658	1,744	454
20	Verulam Training Group*	G3JKS/P	134	251	217	433	230	452	1,717	436
21	Echelford ARS*	G3UES/P	186	186	570	232	189	342	1,705	467
22	Blackpool & Fylde ARS	G8GG/P	170	229	175	412	219	486	1,691	410
23	Plymouth RC	G3PRC/P	100	40	197	573	301	476	1,687	419
24	Garendon School RC	G3MKX/P	42	295	465	331	265	288	1,686	470
25	Glenrothes & D ARC—"B"*	GM4GWL/P	232	220	168	299	231	486	1,636	405
26	Radio Club of Worksop	G4CRE/P	74	279	395	311	190	376	1,625	426
27	Edgware & D RS—"A"*	G3ASR/P	262	316	0	267	292	422	1,559	388
28	Government Communications ARC—"A"*	G3SSO/P	286	140	288	391	110	332	1,547	387
29	Thames Valley ARTS	G3TVS/P	310	245	192	139	190	450	1,527	364
30	Caterham Radio Group	G4APL/P	190	242	234	272	128	412	1,478	378
31	Norfolk ARC	G3PNR/P	198	158	195	406	156	364	1,477	401
32	Colchester Radio Amateurs	G4CRA/P	312	295	522	266	17	8	1,420	434
33	Addiscombe RC—"B"	G3UFY/P	310	223	445	356	47	0	1,381	370
34	Stroud & D ARC	G3SZS/P	330	225	429	305	49	26	1,364	374
35	Worcester & D ARC	G3GJL/P	140	249	205	436	307	0	1,337	407
36	Vange ARS	G3YCW/P	144	178	399	374	169	72	1,336	412
37	Stevenage & D ARS	G3SAD/P	0	234	537	274	190	66	1,301	398
38	Maidenhead & D ARC	G3WKX/P	78	206	222	218	144	220	1,088	299
39	Chingford Group	G8JM/P	172	202	240	174	92	198	1,078	296
40	Breckland Group	G3HGE/P	288	295	228	176	15	0	1,002	272
41	Mansfield RS—"B"*	G3KDQ/P	358	0	0	0	0	526	884	165
42	Scunthorpe ARC	G4FUH/P	0	119	177	165	80	294	835	220
43	Grimsby ARS	G3YMF/P	0	190	141	146	229	30	736	224
44	Eccles & D RS	G3GXI/P	0	81	199	142	73	164	659	180
45	Thornton Cleveleys ARS	G4ATH/P	46	60	245	32	218	16	617	191
46	Coulsdon ATS	G4FUR/P	68	0	141	154	0	248	611	141
47	Weston-super-Mare RS	G2WS/P	66	196	309	2	8	0	581	203
48	Havering & D ARC	G3TTB/P	0	0	0	0	520	0	520	159
49	Torbay ARS—"B"	G3GDW/P	22	49	202	112	0	12	397	125
50	Leyland Hundred ARS—"B"	G3WYY/P	0	0	0	0	0	146	146	24

Note: Contacts made are claimed numbers, not checked figures. * Inspected stations.

Restricted Section

The contest for the Bristol Trophy was a battle between two northern groups and the Channel Islands. With a substantial use of 28MHz, the Northern Contest Group ended the event ahead of the other groups with a checked score of 2,852 from 721 contacts, an all-time record for a Restricted Section entry. In second place, also with a fine score of 2,654 points and 689 contacts, was the Stockport Group, with Guernsey third with a score of 2,471.

Northern, G3VMW/P, used an FT-101B transceiver feeding a 264ft c/f wire antenna, with G3SJJ, G3VMW and G3WPF as the operators. The Stockport entry, G6UQ/P, was keyed by G3FYE, G3KJW, G3NOM and G3PEK, and they had an FT-401 and a 200ft c/f wire. GU3HFN/P also used an FT-101, but their antenna was a double extended zepp c/f erected as an inverted-V with shorting sections to retain resonance on the six bands. Possibly due to their location and the GU callsign, their operating pattern was quite different from other stations in the Restricted Section, with more dx worked on 21 and 14MHz. Operators at Guernsey were GU3MBS, GU4CHY, GU4EON and GU5CIA.

Much more detail was given by entrants on the antennas that were used and, apart from two unknown types, the majority were of the centre-fed and inverted-L configuration. There seems to be a difference of opinion as to the best length of top for a c/f antenna, and entrants used anything from 100ft to 500ft. The most popular lengths were around 265ft, but the G5RV and trapped 138ft dipole were also widely used. The inverted-L was in favour this year, with lengths of 210, 260, 300, 350, 400, 450 and 500ft being used. There were a few off-centre-fed wires using tuned feeders and several trapped verticals. Among the non-standard types, there was a 3·5MHz delta loop fed with tuned line and elongated so as to keep within the 35ft height limit (more like a folded dipole?), a sloping V-beam using a single support, an "M"-antenna and the "single element echelon" mentioned in the 1977 report. A sketch showing this latter antenna suggests that it is really a 200ft top with the ends brought down to ground level and fed by open wire against ground. The "M"-antenna derives its name from its appearance when viewed from the side. It is basically two inverted-Vs in series end-fed against ground.

The belief that if it is fine at the start of a field day it will remain so was shattered when worsening weather brought this trouble to Crystal Palace & DRC. Photo: *G4AVV*

Scottish NFD Trophy
As reported earlier, the winners are the Glenrothes & D ARC, with the Kingsway Technical College, GM4AAF, in second place. This is a repeat of the results for 1977. Congratulations to both groups.

28MHz
Apart from two African stations and a single USA contact, the contest traffic on the band was with UK and European fixed and portable stations. Daylight E-layer propagation was consistent on both days and, while this favoured the northern counties, there were some openings in the south. Record numbers of DL and HB9 portables were worked, and this, combined with the double points bonus, provided a firm basis for many groups to make their best ever NFD scores.

The band honours this year go to two groups who operated in the Open Section. They tied with a top score of 980 points. The first of the leaders was G3GKI/P, the North Riding Group, who made 153 contacts on the band, with G3GKI, G3PEJ and G3TZU doing the work. They used a TS-820 feeding a 3-element Yagi and a 14AVQ vertical, with a G5RV as a back-up. Equal was Glenrothes "A", with 162 contacts, and in third place were the winners of the Restricted Section, the Northern Contest Group, G3VMW/P with 923 points from 141 contacts. Details of the equipment used by Glenrothes and Northern is given in the Open and Restricted sections of this report. These are fantastic scores compared to the levels achieved in recent NFD contests.

21MHz
The groups that used the band gave very conflicting reports on conditions, with some making a large number of contacts and others finding it difficult to work very much at all. As on the other bands, a large number of Europeans were worked, but there were also openings to the USA. Conditions on the band were getting back to normal towards the end of the contest, enabling a number of entrants to achieve a very fast QSO rate with the USA during the final hour.

The band leaders were the Guernsey Group, GU3HFN/P, who were overall third in the Restricted Section. They made 726 points from 240 contacts. In second place, the Swansea Group, GW5ZL/P, who were third in the Open Section, had 214 QSOs for a score of 667. Channel, the joint leaders in the Open Section, were third with 652 points.

14MHz
There was general disappointment that last year's superb conditions were not repeated this year. There were some openings to the USA and a few contacts with VE, ZL and VK, but otherwise it was all Europe. With the poor conditions, the number of contacts was naturally down on last year, but, even so, last year's winner of the Frank Hoosen Trophy, the Telford Group, G8AX/P, who only operated on 14MHz, managed a repeat performance. Operating in the Open Section to obtain the advantage of beam and multiple antennas, they made a score of 1,627. The rig was an FT-101E manned by G8AX, G3UKV and G4AUY.

There was also a repeat performance from Hereford ARS who were again in second place. They used a TS-520 and a quad for a score of 1,350 in the Open Section, with 14MHz as their only band. G3HVK, G3WRA and G4CNY added the manpower.

7MHz
Many stations on this band lost a considerable number of points due to log inaccuracies. The most frequent cause of penalization was unmarked duplicate contacts, and there were frequent examples of errors in callsigns received. Conditions were generally good, with plenty of European portables at all times and some shorter skip during the day allowing inter-G working. There was not much dx activity during the night, although a number of stations worked ZS6ME/P. With the increase in sunspot activity resulting in high absorption levels during the day, this band has taken over some of the load previously carried by 3·5MHz, and this was reflected by the high activity and QRM—points mentioned in many logs.

The band leaders are Verulam ARC, G3VER/P, whose 1,016 points came from 381 contacts. Their single-band entry in the Open Section was operated by G3JKB, G4BOU, G4DJX and G4DUS. Equipment was an FT101EE, a delta loop and a dipole. In second place was another single-band Open Section entry, Salisbury R&ES, G3FKF/P, who made 278 contacts. They used an FT101 with two V-dipoles at right angles. Operators were G2FIX, G3JXD, G3ZNH and G5YN. Third place on this band was taken by the 7MHz section of the Guildford & D ARC multi-band entry. Their 228 QSOs were made using a Vespa Mk1 and a trap dipole.

3·5MHz
Ninety stations used the band to make NFD points, and some expressed their feelings about the poor conditions that prevailed during the daylight hours. In spite of the conditions, the two leading stations managed to return record scores of over 1,000 points, gained from an average 18 contacts per hour over the 24h period. This also included a break of over an hour for both stations, who had to cease operating on Sunday afternoon because of heavy QRN.

Shefford and D RS, G3FJE/P, operated by G4BWP, G4DRS and G4GIR, emerged as band leaders with 1,058 points, after a close battle with Harlow and D RS, G6UT/P, who finished with 1,025 points. The battle was won and lost on log keeping, as only a few points separated the two main contestants at the start of checking. Addiscombe "A", G4ALE/P, were third. Perhaps the reason for the two leaders doing so well, in such adverse conditions, was that they were the only occupants of the band for most of the contest and were thus able to pick off newcomers almost immediately. Over 30 per cent of the entrants used half-wave dipoles, with the 265ft wire being the next most popular.

The disappointment felt by most users of the band is expressed by Bracknell in their comment: "To put it mildly, conditions YUK!".

1·8MHz
Conditions on the band were considerably worse than last year, with static being the main problem. The winning total, made by Sutton & Cheam, was some 50 points lower than 1977, although more groups used the band this year (81, compared with 65 in 1977).

G2DMR, used an FT-101E to a full-wave c/f to make the winning score. They were on the band from 2100-0100 and their 74 QSOs were keyed by G3LCH and G3DCZ.

Very few European contacts were made by the contestants and these were with HB and OK stations. Logs were poor, and there were a number of unmarked duplicates in the logs. Opinions were divided as to the value of the band and they ranged from "Useless", "Well worth the time spent", "Band should be omitted until next sunspot minimum", "Bonus of three times score please", "No bonus necessary", "Worst 160m conditions in memory", to "Static like gunfire, we sank without trace".

Check logs
The HF Contests Committee thanks G3IFF/P, G3KTA/P, G3KRC, GI5UR, OK1FD, OK2SWD, OK3CAU, SM0BDS, SP6GOR, UK2BAS, UK3PAC, VK6PG and ZS6MI/P for their most useful logs. Certificates are awarded to the stations in each continent which provided the most contest points to UK entrants. This year certificates go to OK3CAU, VK6PG and ZS6MEP.

Comments from competitors
(Rules)
"Time has come to change the scoring system"—*Blackpool, Bracknell & 11 others.*
"Would have been better under old rules"—*East Notts, Clifton.*
"Change date of NFD until after school exams"—*Guildford, Govt Comms ARC.*
"Change start and finish times to 1600gmt"—*Grimsby and 11 others.*
"Clubs should be required to give four months' notice if they intend to operate within 10 miles of another club's HQ"—*Guildford.*
"Rules excellent, leave well alone"—*Croydon and 23 other groups.*
(Conditions)
"Conditions good"—*Stockport.*
"If this is a sunspot maximum, give us a minimum any time"—*Medway.*
"We have heard rumours that conditions have been worse, but we don't know when"—*Teesside.*
"Rubbish"—*Sunderland.*
"Open all the time, we should have done better"—*Garendon School.*
"Could hear the northern stations working Europeans on 10, but here in the south they were unworkable for a lot of the time"—*Croydon.*
(Weather)
"The only loud signals we heard were static"—*Worcester (during a rainstorm).*
"Thunder so loud, we could not hear the signals in the phones"—*Cannock Chase.*
"Arcs at atu and keyers running amok"—*Bracknell.*
"ATU damaged by flashover"—*Crystal Palace.*
"Had to close when storm hit us"—*Leyland Hundred "A", Colchester, Chingford.*
"Nearby lightning strike but we continued"—*Wirral.*
"We risked operating through thunderstorm. Someone knocked the earth spike in another six inches"—*Stockport.*
"Electric storms and flooding put us off the air"—*Liverpool.*
"Discharged static by frequent shaking of antenna poles"—*Telford.*
"Worst weather ever. Rain and wind damaged tent and equipment—and that was our "A" station finished"—*Edgware.*
"Wonderful weather, it didn't seem the same without the mud"—*Sutton & Cheam.*
"Excellent weather for a change; but, oh, the static"—*Croydon.*
"Tent collapsed under weight of water, and lightning struck golfers sheltering on our site"—*East Barnet (Headlines in local paper).*

G3FZL/P reading the GB2RS news bulletin on 144MHz from the Crystal Palace & DRC NFD site at Wrotham. It is believed that this is the first time a bulletin has been read from a portable site. Photo: *G4AVV*

"Damp feet again" — *Torbay.*
"Hurricane in last hour, but we survived" — *Northern.*
(Equipment)
"Generator used three gallons of fuel and 1½ gallons of oil, next year we will use an oil rig as our site" — *Garendon School.*
"Generator and spare developed a bad attack of the Murphys" — *Croydon.*
"Generator failed" — *Cray Valley/Crystal Palace.*
"Main generator stopped, but had a spare" — *Channel.*
"Panic stations when gene threw a rod before start. After many phone calls and much motoring managed to trace a spare at other end of county. Got parts and rebuilt gene with minutes to spare" — *Vange.*
"After eight years our trusty HW-100 failed us" — *Cornish.*
"The beam gave us problems" — *Swansea.*
"Electrolytic in psu blew up, and that was the end of our "B" station" — *Edgware.*
"Rig was so hot we had to tune up wearing gloves" — *The.....CC (anon by request).*
(And finally)
We think the following two quotations accurately sum up the spirit of NFD 1978: "Dogged by rig, rotator and generator failures, we still enjoyed the contest and will be there next year. We hope the gremlins will go elsewhere for a change" — *Cray Valley and Crystal Palace.*
"When lightning struck nearby, we ran for our lives as the quad came down. With 60ft high conductors and the prevailing weather, it was more like a Hammer horror film, than NFD" — *North London CW Club.*

Comments from the HF Contests Committee
The committee was sad to note that the standard of log keeping seems to get worse with every NFD. This year almost every competitor lost points through inaccuracies or because of unmarked duplicate contacts. Some of the errors were probably due to mistakes when the logs were copied into the separate bands, but others were clearly the result of incorrect log entries at the time of the contest. Duplicate contacts are the norm for NFD and no penalty is imposed if such QSOs are so marked in the logs. Unmarked duplicates cause extra work for the checking team and are penalized by a substantial deduction of points. This year a log containing 10 unmarked duplicates would have lost around 100 points, or twice this number if the contacts were on a bonus band! It is worthwhile for groups to spend extra time when re-writing the logs to check each contact against the station check log, or to make out a new list of stations worked and use this as a means of ensuring that all duplicates are clearly marked. From the state of some of the logs, the committee wonders if they used a check log during the contest!

The checking this year necessitated a line-by-line check of over 100 logs amounting to nearly 50,000 contacts. Additionally, because of the tie situation in the Open Section and on 28MHz, some logs were rechecked and then passed to other members of the committee for a separate scrutiny.

A number of groups complained about the number of log sheets that were sent out to entrants. It is very hard to decide on the exact number that should be issued, as some groups use a lot while the majority do not use all that are sent. The committee will always accept photo-copied log blanks and HQ will provide extra sheets on receipt of a large sae. All logs this year were received within the due time, including a re-submission from one group who failed to pre-pay the correct postage and had their entry refused. A 7p stamp is only good for a few log sheets, so please ensure that sufficient stamps are used on all contest entries.

Several entrants have asked about inspections and why they seem to get a visit on every NFD. The list of stations is selected at random and is dependent on the availability of inspectors in any particular area. There is no significance in repeat visits, other than in cases where a member of the committee is an operator or is responsible for a station. These groups are always inspected as a matter of routine. This year 27 stations were inspected and the committee thanks all those who made the visits on behalf of the Society.

While the majority of entrants seem satisfied with the rules, there are two matters which the committee will review when the 1979 rules are considered. One relates to the start and finish times, and the other to the scoring system. Many groups have asked if the 1600–1600gmt period could be used and others have suggested 1500–1500. More information is needed and the committee would like to hear from groups about this. If entrants have any views they should write to G3KKQ, QTHR, before the end of October 1978. There are proposals that the scoring system could be simplified to two sets of points. One set of points for a contact with a fixed station anywhere in the world, and another score for a contact with a portable station, say three and six points respectively etc, the bonus points for 1·8 and 28MHz to remain.

In conclusion
For several years the NFD report has mentioned the discussions that were taking place between the Region 1 IARU societies to find a common set of rules for the several Field Day contests. At the recent conference in Hungary, this matter was considered in some detail and it is now clear that it is unlikely that any harmonization of rules will be possible for the cw event, other than the dates of the contest which are confirmed as the first or second weekend of June dependent on the date of the European Whitsun holiday. This decision will come as a relief to those groups who are satisfied with the present two sections and the other rules.

The committee was horrified at the risks taken by some groups this year who continued to operate during nearby thunderstorms. Exposed sites, high antennas directly connected to station equipment, and body contact via headphones can be lethal in the event of a direct strike, or even a near miss. Charged rain and static build-up on unearthed equipment can cause severe shocks and nasty burns, as the charge can reach several thousand volts or more. Arcing at the atu is a sure sign that the build-up is in the danger region, and groups should heed this and take particular care. While we fully understand that groups do not like to lose operating time by closing down and taking cover (cars are usually safe), *death is so permanent!* Please be careful (end of sermon).

This year the arrangements for organizing and judging the contest were in the hands of G3KKQ, BRS20249 and G6LX. They were assisted by G3MXJ, who wrote the 7MHz summary, and the President of the RSGB who provided helpful advice. G6LX, who is deputy chairman of the HFCC, was in charge of the checking team and also wrote the 28, 21MHz band reports and this report. BRS20249 did the tabulations and co-ordinated the finalization of the results, as well as writing the band reports for 14 and 1·8MHz. G3KKQ handled the entry procedures, the logs and cover sheets and the rules. He also wrote the 3·5MHz report.

In the past the preferred date for publication of the results has been September, but to meet the *Radio Communication* deadline the NFD team has been required to spend many hours of their time working virtually non-stop for several weeks. Every year the amount of time needed for the contest increases, and this year a total of over 400 man hours was required (given on a volunteer unpaid basis). It is clear to the committee that more time is needed and, while we regret that groups may be disappointed with a later publication date, October will be the preferred date for future NFD results.

Next year, the Whit holiday falls on the first weekend in June, so NFD will be held on the second weekend, June 10–11. We hope to see you all and that conditions will be first class with good weather and no thunderstorms!

contest news

May 1978 432MHz/1,296MHz/2,304MHz Open Contest results

Conditions flat, entry disappointing and an abundance of adverse comment. The committee will be persevering with this event next year when it does not clash with Alexandra Palace. In the meantime we look forward to receiving constructive comment at microwave and vhf meetings.

Certificates go to G3NNG, G4BPO/P, G3XDY/P and G4EEE/P.

G5HD.

432MHz SECTION

Posn	Callsign	Points	QRA	Best dx	Km
1	G3NNG	16,870	ZL23	DG3ZU	554
2	G4BPO/P	15,468	AM67	G8JXN/P	390
3	G3UBX/P	10,372	YM49	PA0EZ	507
4	G4CQR	9,374	ZL49	PA0EZ	382
5	G8JXN/P	7,989	YK31	PA0EZ	650
6	G3WOH	7,300	YN47	G8JXN/P	319
7	G4ALE/P	6,212	ZL60	G4DSC	341
8	G3ZSS/P	5,429	ZN71	ON6UG/A	445
9	G8BH	4,887	YM40	ON6UG/A	432
10	G3WKF/P	4,650	XK56	G4FXW	400
11	G3OUL	4,138	YN46	G4ALE/P	308
12	G3IGQ	4,116	ZL68	PA0EZ	410
13	G5UM	2,583	ZM35	G3AUS	265
14	G8GXE/P	1,943	ZL26	G8JXN/P	245
15	G8GMC	1,882	YM40	G8GP	188
16	G8IDZ/P	1,873	ZK34	G4BPO/P	256
17	G4FRE	1,507	ZM33	ON6UG/A	397
18	G8AZU	1,491	ZL48	G8JXN/P	360
19	G3UUP/A	765	ZL49	ON6UG/A	245
20	G8ABI/A	398	ZL39	G3NNG	80
21	G8LZP	230	YL10	G8BHH	75
22	G5DF	225	ZO51	G3HCW	95

1,296MHz SECTION

Posn	Callsign	Points	QRA	Best dx	Km
1	G3XDY/P	1,980	AM67	PA0NYM/P	322
2	G4ALE/P	1,499	ZL60	G4BYV	175
3	G8GP	961	ZL50	G4BYV	155
4	G3WXC/P	543	ZK34	G3JXN	135
5	G3IGQ	442	ZL68	G3WFM	58
6	G8BHH	281	YM40	G3KMS	114
7	G8ABI/A	160	ZL39	G3IGQ	42
8	G8AZU	152	ZL48	G3GRO	35

2,304MHz SECTION

1	G4EEE/P	119	ZL53	G3WXC/P	86
2	G8ADC	98	ZL18	G4ALE/P	74
3	G3WXC/P	86	ZK34	G4EEE/P	86
4	G4ALE/P	72	ZL60	G8ADC	74

144MHz CW Contest rules

2000-0100gmt 4-5 November 1978

All entries and checklogs to: VHF Contests Committee, c/o Mr G. M. C. Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23 3BN.

The following general rules, published in the January 1978 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5a, 6b, 7a, 8, 9a, 10a, 11-22.

DF Qualifying Event Coventry results

Twenty-three teams assembled at the start of this event at Chesterton village, approximately six miles SE of Warwick.

Transmitter "A", operated by G4DSF, was located on a spoil heap at Depper Hill two miles NE of the start. Most competitors decided to go for station "A" first due to the very high signal strength at the start. Some competitors were even convinced that the station was located in the immediate vicinity of the start.

Transmitter "B", operated by G4CFG, was located in the hollow trunk of a fallen tree at the top of Edge Hill, approximately seven miles SE of the start. The antenna followed a long meandering path to the bottom of the hill and had the desired effect of luring the competitors to the bottom of the hill only to find they had to climb up again to the transmitter.

A total of 50 people, including competitors, navigators and organizers sat down to a chicken-in-the-basket tea at Gaydon, where a licensed bar allowed a sampling of the local brew.

Posn	Name	Club	Time of arrival Station "A"	Station "B"
1	C. Plummer	Mid-Thames	1429	1450
2	A. Simmons	Mid-Thames	1436½	1500
3	B. Bristow	Mid-Thames	1447	1504
4	P. Tyler	Mid-Thames	1436	1509
5	M. Hawkins	Chelmsford	1430½	1511
6	R. Parsons	Burton	1427½	1511½
7	D. Newman	Rugby	1440	1514
8	C. Wells	Mid-Thames	1524	1440
9	D. Holland	S Manchester	1524½	1435
10	J. Vickers	Stratford	1459	1526
11	T. Gage	Mid-Thames	1452	1527
12	P. Lisle	Mid-Thames	1447½	1527½
13	A. Butcher	Chelmsford	1435	1532
14	W. North	Mid-Thames	1430	1533
15	B. Mahoney	Rugby	1512	1533
	P. Yates	Salisbury	1533½	1433½
	P. McNiel	Hereford	1512½	1533½
18	G. Walker	Rugby	1534	1450
19	J. Drakely	Slade	1541	1430
20	C. Merry	Dartford Heath	1450	1543
21	P. Homer	Dartford Heath	1532½	1601
22	I. Butson	Chelmsford	1429½	1613
23	P. Williams	Slade	1517½	–

A. Simmons and R. Parsons qualify for the National Final.

DF Qualifying Event Rugby results

Twenty-one teams assembled in the pleasant surrroundings of Bucknell Woods for the start of this event. Excellent signals were heard from both transmitters, which were situated within the boundaries of the new city of Milton Keynes and less than two miles apart. The Ordnance Survey map showed little of the complex road system in the area between them.

Transmitter "A" was near Downs Barn, and a car could be driven to within a few feet of the antenna but no sign of this route appeared on the map. The transmitter was deep in a hedge, and proved difficult to find. Transmitter "B" was near Bleak Hall; once again the map was of little use. This transmitter was also deep in a hedge and was "teed" to the antenna which traversed the full length of the hedge and a large portion of a nearby wood, which received considerable attention during the contest.

Paul Tyler was the first to find both transmitters, at 1553bst, despite the fact that it took him a considerable time to locate transmitter "A". After the contest, 50 people sat down to tea, and the usual post mortem, at the *Sow and Pigs*, Poundon.

Posn	Name	Club	Time of arrival Station "A"	Station "B"
1	P. Tyler	Mid-Thames	1553	1444
2	M. Hawkins	Chelmsford	1559	1517
3	I. Butson	Chelmsford	1500	1519
4	G. Whenham	Coventry	1527	1610
5	B. Bristow	Mid-Thames	1611	1516
6	B. Poole	Mid-Thames	1534	1613
7	P. P. McNeil	Hereford	1614	1517
	P. Homer	Dartford Heath	1615	1515
8	M. North	Mid-Thames	1535	1615
	A. Simmons	Mid-Thames	1535½	1615
11	P. Yates	Salisbury	1615½	1520
12	T. Gage	Mid-Thames	1541½	1616
13	P. Williams	Slade	1624	1517
	E. Mollart	Mid-Thames	1532½	1624
15	A. Butcher	Chelmsford	1629	1604

Six competitors found one station only.

P. Tyler and M. Hawkins qualify for the National Final in September.

10th BARTG VHF/UHF RTTY Contest rules

When. 1800-2300gmt Saturday 9 and 0700-1200gmt Sunday 17 September 1978.

Who. Licensed amateur radio stations within Zones 14 and 15 who are permitted to use rtty as a mode of opHation. Portable operation is allowed but must be from one location for the whole period of the contest. Contest logs from swls will also be very welcome.

Bands. 144 and 432MHz. Crossband contacts will not be valid.

Stations. Stations may not be contacted more than once on any one band during the entire period of the contest, but an additional contact may be attempted with the same station if the other band is used. Contacts by means of satellite or repeater will not count for points.

Messages. These will consist of the following:

1. Time of start of contact, in gmt, and to consist of a full four-figure group. The use of the expression "Same" or "Same as yours" will not be permitted.

Contests calendar

9–10 September	European DX (WAE) (Phone) (Rules in July issue)
10 September	RSGB Region 1 VHF (Rules in August issue)
16–17 September	Scandinavian Activity (CW) (Rules in August issue)
17 September	DF Final, Basingstoke
23–24 September	Scandinavian Activity (Phone) (Rules in August issue)
30 September–1 October	YL/OM (Rules in September issue)
October–November	432MHz Cumulative (Rules in August issue)
7–8 October	432/1,296/2,304MHz (Rules in August issue)
7–8 October	VK/ZL Oceania (Phone and RTTY) (Rules in September issue)
14–15 October	21/28MHz SSB (Rules in May issue)
14–15 October	VK/ZL Oceania (CW) (Rules in September issue)
21–22 October	7MHz SSB (Rules in June issue)
22 October	70MHz Fixed (Rules in August issue)
28–29 October	CQ WW DX (Phone) (Rules in September issue)
4–5 November	7MHz CW (Rules in June issue)
4–5 November	144MHz CW (Rules in September issue)
10–11 November	European DX (WAE) (RTTY) (Rules in July issue)
11–12 November	2nd 1·8MHz
25–26 November	CQ WW DX (CW) (Rules in September issue)
3 December	144MHz Fixed

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2. RST report. Normal three-figure system.
3. Message number. This will consist of a three-figure number starting at 001 for the first contact made, and numbers will continue in a consecutive manner irrespective of the band used. Numbers will continue in sequence throughout the total period of the contest.
4. QTH Locator (Normal five-symbol locator) or QTH given either as a town or as a bearing and distance in kilometres from a town. The town must be capable of identification on a normal tourist map.

Points. All two-way rtty contacts will score in accordance with the distance chart below. Contacts on 432MHz carry a multiplier of x 2, ie double points. There is no multiplier for 144MHz.

Distance.

0–50km scores 1 point	250–300km scores 11 points
50–100km scores 3 points	300–350km scores 13 points
100–150km scores 5 points	350–400km scores 15 points
150–200km scores 7 points	400–450km scores 17 points
200–250km scores 9 points	and pro rata.

Scoring. If both bands are used, the two scores will be added.
Note. Proof of contact may be requested in cases where the station worked does not appear on any other contest logs received.
Final results will be tabulated in two categories:
1. Western Europe. 2. UK stations only.

Additional notes
1. In order to achieve maximum compatability and to implement the IARU recommendation, a speed of 45·5Bd should be used.
2. To avoid confusion and congestion around the recognized rtty calling frequencies, and to make more effective use of the bands, the use of vfo operation by participating stations is encouraged.
3. Stations who are crystal controlled are recommended to announce this fact when calling CQ.

Logs. Use one log per band. Logs to contain the following: Date—Time of start of contact—RST report sent—Message number sent—Time received—Callsign of station worked—His RST and message number (These may be combined, eg 599001)—QTH locator or QTH received—Estimated distance and points claimed. It will be helpful to include your own QTH locator or QTH at the top of each log sheet.

All logs must be received by Saturday 14 October 1978 to qualify.

Send logs to: BARTG VHF/UHF Contest, c/o Alan Butcher, G3FSN, 70 Hughenden Avenue, High Wycombe, HP13 5SN.

BARTG 1978 Spring Contest results

This was a most successful contest, with overseas stations again predominating. In the single-operator section there were 110 entries, of which UK stations were placed: 31, G3RED; 40, G3RDG; 45, G2PB; 61, GW3IGG; 62, G4EEV; 82, G8LT; 86, GI4AHP; 90, G4FLM; 92, G3HJC; and 99, G4EDR. Of the 13 multi-operator stations, G3ZRS, G3UUP, G3IIR and G3FJE came 5, 6, 11 and 14 respectively. The only UK entrant among the 14 listener entries was Barry Niendorf, BRS391310, who came second.

sstv scene

P. Burnett, G4BLL*

News of this year's Dayton Convention (the sstv forum of the world?) has at last percolated through to the backwoods, and thanks are due to G3WW for forwarding a copy of the *78 Hamvention Program Book* sent to him by Bob Zimmerman, W8ZM. The programme of lectures covered practically every aspect of amateur radio, including the following sstv exotica:
(1) "Integration of sstv pictures in real time" by Dr George Steber, WB9LVI. This lecture outlined an approach to digital picture processing as an alternative to the well-known method of line and pixel averaging;
(2) "Microprocessor control of sstv" by Dr Robert Sudding, W0LMD; and
(3) "Single memory compatible sstv colour system" by Mike Tallent, W6MXV. This is an alternative to the two-memory system proposed by Dr Don Miller, W9NTP, and employs a 750Hz sub-carrier with quadrature modulation of the colour information. Black and white is transmitted in the usual 1,500–2,300Hz bandwidth and is, therefore, compatible with existing sstv equipment. Colour display is a matter of providing the correct demodulating circuitry.

At the present time, however, it would appear that the W9NTP two-memory system is leading the field as, although a second memory bank is required in the scan converter for display (and of course a colour monitor), the transmit side is easier. Alternate slow-scan frames are transmitted with first a cyan and then a magenta filter placed in front of a black and white camera lens—the colour information is not encoded. A minor practical drawback is that for faithful colour reproduction international agreement will probably be required on the exact shade and density of the filters used, otherwise there will be variations in the display—which would probably go unnoticed unless one was already aware of the exact colour content of the original picture being transmitted.

Dr Don Miller, W9NTP, and his xyl spent two weeks in England from 23 July to 5 August, meeting British sstv enthusiasts with the purpose of discussing and demonstrating (on film) his colour process and proposed medium scan movement experiments. The writer and G3UEU had the pleasure of meeting Don at the QTH of G3LEE, and had the opportunity of viewing the film and slides, which clearly demonstrated the quality of his two-colour system. Blue, which is the least significant of the three primary colours, is not transmitted but is inserted at the receiving end as a fixed bias. The resultant pictures are very acceptable to the eye.

Various formats for the movement were discussed, and the results of experiments demonstrated on film were very exciting. The parameters proposed by Don are as follows:

Field rate—	5 fields/s
Frame rate—	2·5 frames/s
Lines per field—	64
Lines per frame—	128
Line frequency—	317·5Hz
Horizontal sync pulse—	0·5ms
Vertical sync pulse—	5ms
Maximum video frequency—	20·320Hz
Maximum rf bandwidth—	36kHz
RF carrier frequency—	29·150MHz

He is very receptive to all suggestions for possible alternative approaches which may simplify the procedure. Don's aim is to develop a close co-operation with interested British amateurs, who should try to join the Saturday evening (1800gmt) 14MHz sstv net for information exchange. It will be noted from the above figures that the previously reported use of vestigial sideband has been dropped on technical grounds. Don proposes to set up a beacon on 29·150MHz which should be operative sometime in October and which will transmit a grey scale. Anyone receiving the transmission and wishing to copy "movement" can trigger Don's equipment remotely by transmitting a 1,750Hz tone. Remember, ordinary analogue P7 tube monitors, suitably modified, can be used to display these pictures.

W9NTP's film will be shown at the 1978 BATC Convention to be held at Conway Hall, Red Lion Square, London WC1, on Saturday 9 September (11am to 5pm). Even if one only has a passing interest in the future of sstv, this film is essential viewing—do not miss it.

Apologies are offered for the fact that perhaps there is not much of interest this month for the newcomer to sstv. However, it is hoped that

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* 12 Standroyd Drive, Colne, Lancs BB8 7BG

the beginner and established operator will find the chapter on sstv, in the forthcoming RSGB *Amateur Radio Operating Manual*, of interest. It deals with the practical and down-to-earth aspects of setting-up and operating an sstv station, and covers some of the equipment currently available—both commercial and homebrew designs.

One snippet of information for the sstv operator and country chaser: G3UEU reports that AC5D, Bhutan, is operative on the hf bands, particularly 21·340MHz, and can be heard late in the evening (local time). *SSTV scene* would be interested to hear from anyone working him. G3WW worked W3CJI for his 1,067th two-way sstv station.

Finally, a friendly reminder to all sstv enthusiasts—the purpose of this column is to reflect readers' interests and activities, please "pop your head out of the hole" occasionally and let other people know what **you** are doing in sstv. Looking forward to hearing from you. □

raynet

S.W. Law, G3PAZ *

As in past summers, this year has provided groups with many opportunities for exercises, both inter-group and with user services. True, these are hopefully in ideal weather conditions, which removes one factor and permits concentration on polishing up any weak points which may become apparent. On the other hand, thanks to the expansion of our permitted activities by the Home Office, many of our groups have found their work-load considerably increased by the proliferation of summer shows of one type or another and the consequent requests for assistance from the user services. Obviously, with crowds numbering many thousands, the minor casualty list alone can require a surprisingly large message capacity; thus testing the ability of the participating group members to the utmost.

We receive a number of group reports, all of which show that our members rise to the occasion with enthusiasm, and in many cases receive written appreciation of their good work from the user services concerned. To mention a few groups who have been occupied in the last months we have: Cheshire, Spalding, N Herts, Blackpool and Fylde, and, of course, those stalwarts Norfolk and NE Suffolk. Others who will be active in September are Avon and SE Hants. No doubt there are many others to be reported, but the above will serve to demonstrate that there is no lack of activity on the Raynet front.

This leads us to the difficulties that some groups find in complying with their obligations due to shortage of members. It can make very hard work of a long incident if no reliefs are available, and it is on this account that some groups are urgently searching for new members. May we then appeal for new members to apply, for example, to the N and S Hertfordshire group via liaison officer G8MXF (N Herts) or to Herts group controller G3OJI, QTHR. Another busy up-and-coming group is Torbay (G3PQH); Devon sector controller G3UIQ would welcome applications, as would Plymouth (G4EWZ). Information as to the nearest controller to any prospective member is readily available on application to any member of the Raynet Committee (please enclose an sae for reply) or to the hon registrations officer. Already the 2,000 membership of Raynet is proving inadequate for the amount of work available to provide full coverage of the UK, so all applications for membership are welcome. Should you wish to form a group in your area (as yet not covered) we shall be only too pleased to tell you how this may be done.

Talkthrough

The problem of providing talkthrough facilities is still under discussion with the authorities, although several groups have been exploring the technical problems involved. (Remember, we are not talking of the use of repeaters in this context.) Of course, this has been in use for years by the police forces in the UK, but will be a new departure from accepted practice for amateurs if and when it is granted.

True, we do show the way sometimes, as exemplified by the demonstration, given by the Southampton group to the police, of a radio tv link from an incident site many years ago. We now read that the Lincolnshire police experimented with this in 1974, but we heard nothing of the outcome. We wonder if some suitably-equipped group might try tv links again sometime? Time will show. In all fairness, of course, the police have used closed-circuit tv for a long time past, and one must agree that their computer-vdu system is among the fastest and most advanced in the country. But the amateur is catching up, and a voluntary service such as Raynet should be using the skills available to keep up with the times in order to provide the kind of service that we aim for.

*130 Alexandra Road, Croydon, Surrey CR0 6EW

Tim Thirst, G4CTT, in action at the Royal Norfolk Show, where Raynet provided emergency communications. Photo: *Eastern Daily Press*

Raynet Committee

The Raynet Committee met at RSGB HQ on 12 August to handle the usual business and to discuss the outcome of the RSGB National Mobile Rally at Woburn Abbey. Reports on the meeting will appear later. □

Special event stations

The following special callsigns will be on the air during September, in addition to those published previously:

9 September	**GB3ATC**	Winchmore Hill, London N21
9 September	**GB3SAC**	Cobham, Surrey
9 September	**GB3CSC**	Crawfordsburn, Co Down
17 September	**GB3PMR**	Peterborough
21–24 September	**GB3HFA**	Cleethorpes
23 September	**GB3BSS**	Basingstoke, Hants

Severn Valley Railway Gala Weekend, 9–10 September

The British Railways ARS will be operating a special event station from Bewdley, Worcs, to celebrate the Severn Valley Railway Gala Weekend. Main operation will be on 14MHz, between 14·250 and 14·350, from 0001 on 9 September until 2359 on 10 September.

Mobile rallies calendar

17 September—Peterborough R&ES Mobile Rally, Walton School, Mountsteven Avenue, Peterborough. Details from G3EEL, QTHR, tel 65423/62881.

24 September—Harlow & DARS Mobile Rally, Netteswell Comprehensive School, Harlow. Details from G8FRG, 232 Pennymead, Harlow, tel 0279 32486.

1 October—Great Lumley Mobile Rally, Community Centre, Great Lumley, Tyne & Wear. Trade stands, etc. Details from G8JLQ, QTHR.

Looking ahead

17 September—IOW "get-together", Alverstone Manor. Details from G3KPO.

24 September—Welsh Amateur Radio Convention, Oakdale Community College, Blackwood, Gwent. Details from GW3KYA.

2-4 November—ARRA Exhibition, Granby Halls, Leicester.

2 December—RSGB AGM, IEE, Savoy Place, London.

Note: Saturday afternoon meeting.

club news

RSGB affiliated societies and clubs, and RSGB groups, are invited to submit items for inclusion in "Club News" to their regional representatives (not direct to the editor).

Items of news and dates of forthcoming events should reach RRs by 22 September for the November issue.

Club secretaries are QTHR unless otherwise stated.

REGION 1—RR W. M. Furness, G3SMM, 16 Coniston Avenue, Sale, Cheshire M33 3GT.

Ainsdale (AARC)—Thursdays fortnightly; 7, 21 September, 5, 19 October. Ainsdale Scout Headquarters. For details please contact G2CUZ.

Blackburn (East Lancs ARC)—First Thursday in each month, 7.30pm. YMCA, Blackburn. Sec G4DGR.

Blackpool (B&DARS)—First Monday in each month. Phone G5ND (Blackpool 64508) for details of venue.

Bolton (B&DARS)—New QTH! The society now meets at the Horwich Leisure Centre, Victoria Road, Horwich, Bolton. Main meetings on first Wednesday in each month, with informal meetings on third Wednesdays, 8pm. Hon sec G4FSN.

Bolton (Edbro Radio Club)—New club! Details from the sec c/o Edbro Ltd, Lever Street, Bolton.

Bury (BRS)—Main meeting second Tuesday in each month; 12 September ("HF antenna systems" tape lecture), 13 October (Construction competition and taped lecture), 8pm. Mosses Community Centre, Cecil Street, Bury. Club rig on the air, cw classes and constructional projects. RAE course, in conjunction with Bury Technical College, starting in September. Hon sec E. Thirkell, G4FQE, tel Rochdale 32730.

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

Chester (C&DARS)—Tuesdays, 8pm, except for first Tuesday in the month. YMCA Chester. Further details from the ASR. G3PYU.

Douglas (IoMARS)—Mondays fortnightly. "Keppel Hotel". Cregny-Baa, Nr Onchan. Sec GD4FWQ, tel Douglas 22295.

Eccles (E&DARC)—Tuesdays, 8.30pm. "White Swan", Worsley Road, Swinton. Sec G4AEQ.

Lancaster University (UoLARS)—Wednesdays, 8pm. Furness College. Visitors are welcome, as are skeds on hf and 2m—club callsigns are G8DOU and G3ZBY. There are RAE and morse test classes. Enquiries to John Morris, G4ANB, Dept of Physics.

Leyland (LHARG)—Second Monday in each month, 7.30pm. "Rose & Crown", Ulnes Walton, Leyland. Details from G3XII.

Liverpool (L&DARS)—Tuesdays, 8pm. Conservative Association Rooms, Church Road, Wavertree. Sec G4EST.

Liverpool (North Liverpool RC)—For details of meetings please contact R. Porter, G3VXK, 11 Cranmore Avenue, Crosby, Liverpool L23 0QD; tel 051-928 1610.

Liverpool University (UoLARS)—Meetings each lunchtime. Visitors from the Polytechnic and other colleges most welcome. Club shack, Reilly Building. Club active on top to two, G3OUL/G8JUL. Sec Geoff Plucknett, G4FKA, UoL, Guild of Undergraduates, 2 Bedford Street North, Liverpool L7 7BD.

Manchester (M&DARS)—Wednesdays, 7.30pm. 203 Droylsden Road, Newton Heath. Club call G3HOX is active on hf and vhf. Sec G8IYX.

Manchester (South Manchester RC)—8 September ("Simple digital frequency meter" by C. McKenzie, G8LQO), 15 September ("Watts a Db?", some "sound" information by R. V. Heaton, G3JIS), 22 September (Visit to Granada TV), 29 September (Surplus equipment sale), 6 October (Discussion evening and shack operation), 13 October ("144MHz fm transceiver" by Glen Holt, G8NOF), 20 October ("The radio amateurs workshop" discussion introduced by G3VIW), 27 October ("Amateur radio on a limited budget", experience of club members), 8pm. Sale Moor Community Centre. The club has set up its shack and is now operating from this address. Monday evening informal meetings are now being resumed. Further details on club activities from the sec, W.L. Seddon, G3VIW, tel 061-973 3355.

Manchester University (MUARS)—Interested parties should contact G4AOS, QTHR.

Manchester (UMISTRS)—Every weekday, 12.15pm, and Wednesdays, 8pm. Morse classes held each lunchtime. The bar, UMIST Union. Prospective members please contact R. Napper, G4FXU, UMIST RS, c/o UMIST Union, PO Box 88, Sackville Street, Manchester, G3CXX/G8FOT is alive and active on all bands top to ten and two.

North Western Repeater Group—Informal meetings on the third Thursday in each month, 8pm. "Globe Club", Willows Lane, Accrington, Lancs. Details from sec G3RXH.

Ormskirk (OARC)—New club. Wednesdays at members' QTHs. For details contact G3SZV or sec G4GCB. Alternatively listen 145·000MHz fm/a.m. Wednesdays 1930–2030. Club interests: vhf/uhf, hf, rtty, contests, atv.

Preston (PARS)—Thursdays fortnightly commencing 12 January, 8pm. "Windsor Castle" (private room), St Paul's Square, Preston. Hon sec George Loades, G3PVD.

Salford (Dial House RS)—Wednesdays, 5.30–9.30pm. Dial House, 21 Chapel Street, Salford, Lancs. Net channel 145·25MHz fm—the club station G3WDH monitors this frequency every club night for any other station. Details from sec G8JCM, c/o M38 at above address.

Stockport (SRS)—Second and fourth Wednesdays in each month; 13 September (Visit from Lowe Electronics), 27 September (CAA films), 11 October ("Airways" by G3VSA), 25 October (Visit from RR), 8pm. Blossoms Hotel, Buxton Road, Stockport. New members and visitors always welcome.

Thornton Cleveleys (TCARS)—First and third Wednesdays in each month, 8pm; morse practice from 7.30pm. St John Ambulance Hall, Fleetwood Road North (next to "Gardner's Arms"), Thornton. Details from sec G8MKQ.

UK FM Group (Western)—Informal meeting first Thursday in each month, 8.30pm. "Legh Arms", Knutsford. Sec G3LEQ, tel Knutsford 4040. The AGM of the UKFMGW will take place at 7.30pm on Monday 18 September 1978 at the Wirral Mercury Motor Inn, Backford Cross, near Chester. Members are invited to attend.

Warrington (W&DARS)—Tuesdays, 7.45pm. Grappenhall Community Centre, Bellhouse Lane, Grappenhall, Warrington. Sec G3MMD, tel Lymm 3533.

Wigan (Douglas Valley ARS)—This recently formed club meets on the first and third Thursdays in each month. Shevington Conservative Club, Shevington, Wigan. Details from G8KKP, tel Wigan 56318.

Winsford (Mid-Cheshire ARC)—Wednesdays. RAE class 7pm to 8pm. Morse class every third Wednesday. Technical Activities Centre, rear of Verdin Building, Verdin Comprehensive School, Grange Lane, Winsford. Net nights 1·8MHz Monday, 8pm; 144MHz (fm) Tuesdays. Hon sec G3JWK.

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

Two clubs in the region have recently become affiliated to the RSGB. These are the Macclesfield and District Radio Society, c/o 1 Sevenoaks Close, Macclesfield, and the Wirral and District Amateur Radio Club, c/o 8 Brancote Gardens, Bromborough, Wirral.

A lecture on WARC 1979 is planned for Sunday 22 October, 3pm, at the Grappenhall Community Centre, Bell House Lane, Grappenhall, Warrington. Please keep an eye on *Radio Communication* for details.

REGION 2—RR D. S. Smith, "Red Roof", Goathland, Whitby, North Yorks YO22 5AN.

Barnsley (B&DARS)—Fourth Friday in each month, 7.30pm. "King George Hotel", Peel Street, Barnsley. Sec G3LRP.

Bradford (UBURS)—Meetings will recommence in September, Thursdays, 7.30pm. N10 Main Building. Freshers coming in October should note that the club net frequency is now 145·275MHz (S11). Details from G8GOV, 30 Moorfield Drive, Baildon, Shipley, West Yorks. All welcome.

Denby Dale (DD&DARS)—Wednesdays, 7.30pm. Pie Hall, Denby Dale. Sec G3FQH. Visitors always welcome.

Goole (G&DARS)—Fridays, 7.30pm (during school term only). Goole Grammar School. Details from chairman G3VBI.

Halifax (Northern Heights ARS)—7.45pm. "Peat Pitts Inn", Ogden, Halifax (four miles north of Halifax town hall). Sec G3MDW.

Harrogate (Harrogate & Knaresborough RS)—First Monday in each month, 7pm. College of Adult Education, Victoria Avenue, Harrogate. Sec J. Douglas, 15 Parnal Ash Drive, Harrogate HG2 0JA.

Hornsea (HARS)—Wednesdays, 8pm. Rear of "Victoria Hotel", Hornsea (facing Hornsea Mere). Sec G4CHH. Visitors always welcome.

Members of York ARS operating exhibition station GB2GYS at the Great Yorkshire Show on 11–13 July. On this shift were SWL Michael Cowling, G8HRE and G3WVO (secretary of the York ARS). Photo: *G8NOT*

Hull (H&DARS)—New venue. Fridays, 8pm. Community Centre, Fountain Road, Hull. Hon sec G3WYW.
Hull (HUR&ES)—Fridays, 1pm. Room 313B, Union Building, All amateurs invited. Enquiries to G4FVP.
Leeds (White Rose RS)—Wednesdays, 7pm. (Lectures start 8pm). The Moortown Rugby Football Club, Moss Valley, Alwoodley, Leeds 17. Sec G4DZI.
Leeds (LUUARS)—Tuesdays, 8pm. Union Annexe (second floor), Woodhouse Lane. All new students welcome. Sec G4CNG, QTHR, or at "E" block, Lupton Flats, Alma Road, Leeds 6, during term.
Otley (OR&ES)—Tuesdays, 8pm. 14 Back of Court House Street, Otley. Sec G8DFZ.
Scarborough (SARS)—New night, Mondays, 7.30pm. Scarborough Technical College, Scalby Road, Scarborough. Sec G3RTN. Visitors always welcome.
Sheffield (ARS)—Third Monday in each month, 8pm. "Sheaf House Hotel".
Wakefield (W&DARS)—7.30pm. Ines Road School, Wakefield. Sec G3WWF.
York (YARS)—Fridays (except third in each month), 7.30pm. 17 November (Annual dinner). United Services Club, 61 Micklegate, York. Further details from hon sec G3WVO. Visitors most welcome.

Clubs or groups in the region which have not received a letter from RR2, inviting them to a meeting on Saturday 16 September, should contact him as soon as possible. Tel: Goathland 333.

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

Birmingham (Midland ARS)—12 September, 3 October (Construction and club station), 7pm. Brasshouse Centre. off Broad Street, Birmingham. 19 September ("World tour" by John Swinnerton, G2YS), 17 October (AGM), 8pm. Room 110, University of Aston, Gosta Green, Birmingham. Sec G8BHE.
Birmingham (Slade RS)—Alternate Fridays, commencing 15 September, 8pm. The Committee Room, Church House, Erdington, Birmingham. Sec G4FGF.
Birmingham (South Birmingham RS)—Thursdays (HF night on the air), Fridays (Construction and morse classes), 7.30pm. 4 October ("Live colour tv" by G5KS), 1 November (AGM), 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G4GZI (G8KPA, QTHR).
Birmingham (University of Birmingham ARS)—Tuesdays during term, RAE and morse classes fortnightly, 7pm. Students' Union (above stage). New members welcome at "Freshers' Conference". Sec G8HTH. Club stations G3IUB and G8IUB.
Bromsgrove (B&DARC)—13 October ("RTTY" by Brian Jones, G8ASO), 21, 22 October (JOTA), 10 November (Tape and slide lecture), 8pm. Avoncroft Art Centre, Bromsgrove. Sec G4GBE.
Burton-on-Trent (BonT&DARS)—Wednesdays, 8pm. Stapenhill Institute, Main Street, Stapenhill, Burton-on-Trent. Sec G3ACR.
Cannock Chase (CCARS)—First Thursday in each month (Business meeting), other Thursdays (HF and vhf club stations, natternights, morse classes, talks etc), 8.30pm. "Acorn", Mill Street, Cannock. Sec G8MWE. Visitors welcome.
Coventry (CARS)—15 September (Night on the air), 22 September (Mini lecture by club member), 29 September (Night on the air), 6 October (AGM), 13 October (Talk by G3RIR, provisional), 20 October (Preparations for JOTA), 21, 22 October (JOTA), 27 October (VHF night on the air), 3 November (Sausage and mash supper), 8pm. Baden Powell House, 121 St Nicholas Street, Radford, Coventry. Sec Dave Parker, G8OMB, 41 Brookdale Road, Nuneaton CV10 0BL. Visitors welcome.
Coventry Technical College (CTCARS)—Mondays and Thursdays, 7pm. Winfray Annexe of the college. Sec G8ISJ.
Coventry (University of Warwick ARS)—Wednesdays during term, 7pm. Cryfield Farm, University of Warwick. Talk-in on S20, or contact G4BXI or G4DCW, Hurst Flat 40, Cryfield Village, University of Warwick.
Dudley (DARC)—12, 26 September (No meeting), 30 September (Annual dinner), 10, 24 October, 7.45pm. Central Library, Dudley. Sec Norman Rock, 28 Conway Close, High Acres, Kingswinford, Brierley Hill DY6 8PT.
Hereford (HARS)—First and third Fridays in each month, 8pm. Civil Defence HQ, Gaol Street, Hereford. Sec G4CNY.
Lichfield (Chad RC)—Alternate Wednesdays, commencing 13 September, 8pm. The Naval Club, Burton Old Road, Lichfield. Sec G4ESK.
Lichfield (LARS)—First Monday and third Tuesday in each month, 8pm. "Swan" (bar), Lichfield. Sec Ted Bowen, RS33003, tel Ibstock (0530) 60396.

A few of the members of Burton upon Trent & DRS photographed recently in their clubroom: G8KSM, G8OZP, G8NPW, G3ACR (secretary), G3VVW (treasurer), G4EWK, G4CLN and Cyril Hartshorne (chairman)

Mid-Warwickshire (MWARS)—First and third Mondays in each month, 8pm. 61 Emscote Road, Warwick. Sec G8CXL.
Redditch (RRC)—Second and fourth Thursdays in each month, 8pm. WRVS Centre, Salop Road, Redditch. Sec G3EVT.
Rugby (RATS)—Wednesdays, 7.30pm. Cricket pavilion entrance to B Building, Rugby Radio Station, A5 trunk road, Hillmorton, Rugby. Sec G4ECO.
Shrewsbury (Salop ARS)—7 September (Natternight), 9 September (Demonstration station at Walford Farm Institute), 10 September (Telford rally); then Thursdays; 7.30pm. "Albert Hotel", Smithfield Road, Shrewsbury. Sec G3VZG. New members welcome.
Solihull (SARS)—19 September, 17 October (AGM), 7.30pm. The Manor House, High Street, Solihull. Sec G4AEJ.
Stoke-on-Trent (North Staffs ARS)—First and third Mondays in each month (Lectures, etc), other Mondays (Natternights, Raynet and club station G4BEM), 7.30pm. Harold Clowes Community Centre, off Dawlish Road, Bentilee, Stoke-on-Trent. Sec S. Capper, G8ORU, 24 Tregew Place, Silverdale, Newcastle, Staffs ST5 6PG. New members welcome.
Stoke-on-Trent (SonTARS)—Thursdays, 7.30pm. 2a Racecourse Road, Oakhill, Stoke-on-Trent. Sec G4CWN.
Stourbridge (StARS)—Informals on the first Tuesday in each month, 9.30pm. "Bird in Hand" public house, Hagley Road, Oldswinford, Stourbridge. 18 September, 16 October, 7.45pm. Longlands School, Brook Street, Stourbridge. Sec G4IP.
Stratford-upon-Avon (SuponA&DARC)—Every third Friday, commencing 15 September, 7.30pm. The Clubroom, Swimming Pool, Bridgefoot, Stratford. Sec G4EXR, tel Stratford 5638, weekends only. New members welcome.
Sutton Coldfield (SCRS)—11 September (Twiddle evening, test gear available), 25 September (Natternight), 9 October ("Oscar" by Haydn Bate, G8AMD), 21, 22 October (JOTA), 23 October (Home-built gear competition), 7.30pm. Central Youth HQ, Clifton Road, Sutton Coldfield. Sec G8KRW.
Tamworth (TARS)—Second and fourth Mondays in each month. Indoor Sports Centre, Corporation Street, Tamworth. Sec G4EUF. New members welcome.
Telford (T&DARS)—6 September (Natternight), 13 September ("My days as a tv engineer" by mystery speaker), 20 September (Club project, working prototypes), 27 September ("Lasers" by David Harris, G8INA), 4, 11, 18, 25 October, 1 November, 7.30pm. Phoenix Centre, Webb Crescent, Dawley. Sec G8MXS, tel Much Wenlock 357. Visitors welcome.
Walsall (WARC)—13 September ("144MHz" by Ken Boucher, G8KML), 27 September ("Wolverhampton repeater" by Mark Gould, G8IXI), 11 October (Surplus sale), 25 October (Natternight), 8 November ("Interference" by Alf Matthews, G3UNM, and Ben Follows, G4FJU), 8pm. Forest Community Centre, Forest School, Hawbush Road, Leamore, Walsall. Sec G8KML.
Willenhall (W&DARS)—Alternate Wednesdays, commencing 13 September. Little London Community Centre, Bloxwich Road South, Willenhall. Sec M. P. Batchelor, 19 Newlands Close, Willenhall, West Midlands WV13 2DQ. New members welcome.
Wolverhampton (WARS)—11 September (Natternight), 18 September (UHF night on the air), 2 October (AGM). 9, 16, 30 October, 6 November, 8pm. Neachells Cottage, Danescourt Road, Stockwell End, Tettenhall, Wolverhampton WV9 9PH. Sec G8EDG.
Worcester (W&DARC)—25 September (AGM), 2 October, 6 November, 8pm. "Old Pheasant", New Street, Worcester. Acting sec G3TQD.

REGION 4—RR T. Darn, G3FGY, 20 Mount Pleasant, Ripley, Derbys DE5 3DX.

Derby (D&DARS)—Wednesdays, 7.30pm. 6 September (Junk sale), 13 September, (RSGB tape/slide lecture), 20 September (Return visit of Mr H. Nuttall, Derbyshire churches), 28 September (New members night), 4 October (Bring and buy sale), 11 October (Social natter night), 18 October (Night on the air), 25 October ("Low power transmitters" by G3RJV). Morse classes Tuesdays and Fridays, 7pm, when arranged. 119 Green Lane, Derby.
Derby (NHARG)—Fridays, 7.30pm. Nunsfield House, Boulton Lane, Alvaston, Derby.
Grimsby (GARC)—First and third Thursdays in each month, 8pm. Alexandra Club, Cleethorpes.
Leicester (LRS)—Mondays, 7.30pm. Club House, Gilross Estate Cottage, off Groby Road, Leicester
Leicester (LPARS)—Mondays, Wednesdays, Thursdays and Fridays, lunchtime during term. Leicester Polytechnic. Sec R. Newstead, G3CWI, 24 Richmond Road, Leicester.
Lincoln (LSWC)—Lincoln Short Wave Club has been re-formed. Second and fourth Wednesdays in each month. Lincoln Corporation Social Club, Waterside South, Lincoln. Further information from G3VRD.
Mansfield (MARS)—First Friday in each month, 7.30pm. "New Inn", Westgate, Mansfield.
Matlock (Derwent Valley ARS)—First Monday in each month, 7.30pm. "The Royal Oak", Tansley, Nr Matlock. Guest speakers each month.
Melton Mowbray (MMARS)—Monthly, 7.30pm. St John Ambulance Hall, Ashfordby Hill, Melton Mowbray.
Nottingham (ARCON)—Thursdays, 7.30pm. 14 September ("WARC 79" by G3FKM and G3HCT), other September meetings, (Forum, "432MHz transceiver" by G8FWH, and activity night), October meetings (Forum, "Safe erection of portable masts" by G3TVY, and activity night, etc). Sherwood Community Centre, Mansfield Road, Nottingham.
Nottingham (Trent Polytechnic RS)—New Club! Wednesdays. Newton Building, Room 105. Further information from the chairman, Paul Robinson, via Students' Union, Trent Polytechnic.
Nottingham University (NURC)—Tuesdays. Contact R. Dixon, G4BVY, c/o Students' Union, Nottingham University.
Scunthorpe (SARC)—Tuesdays, 7.30pm. The Hobbies Centre, Franklyn Crescent, Scunthorpe.

Leicestershire Raynet Group meets monthly at the County Hall, Glenfield. Further details from G8CAC.

REGION 5—RR R. E. G. Kendall, G8BNE, 19 Willow Green, Needingworth, St Ives, Cambridge.

Following information is latest received.

Bedford (B&DARC)—Wednesdays, 8pm. Ravensden. Sec G4FFC.
Cambridge (C&DARC)—Fridays, 7.30pm. Air Training HQ, Newmarket Road. Sec G4BAO.
Cambridge (CUWS)—Tuesdays fortnightly during full term. Details from sec G8KTJ, Queens' College.
Corby (CARG)—Fridays, 7.30pm. Hightrees Scout Centre, The Nook, Corby. Sec G8MLA.
Dunstable (DDRC)—Fridays, 8pm. Chews House, 77 High Street South. Sec G3HJF.
March (M&DRAS)—Tuesdays, 7.30pm. 2 Grays Lane. Sec G8GNE.
Northampton (NRC)—Thursdays, 8pm. Kingsthorpe Community Centre, Thornton Park, Kingsthorpe. Sec G8LHR.
Peterborough (GPARC)—Thursdays, 7.30pm. Southfields Junior School. Sec G4FDF.
Peterborough (PR&ES)—Third Friday in each month, 7.30pm. Scout Hut, Occupation Road. Sec G3EEL.
Shefford (S&DARS)—Thursdays, 8pm. Church Hall. Sec G8HHO.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HP13 7EA.

Banbury (BARS)—First Friday in each month, 7.30pm. The General Foods Sports and Social Club, Spriceball Park, Banbury, Sec S. L. Terry, G8OCT, tel Banbury 4769.
Bracknell (BARC)—Mondays, 8pm. Coopers Hill Centre (adjacent to station). For meeting details please contact sec D. Williams, G4CVN, tel Windsor 56096.
Burnham Beeches (BBRC)—First Monday in each month, 8pm. Hedgerley Scout HQ. Sec Peter Flynn, tel Farnham Common 2609.
Harwell (Atomic Energy Research Establishment RC)—Fridays, lunchtime. The Shack, AERE Harwell, Didcot, Berks. For further meeting details contact sec G8DVK.
High Wycombe (Chiltern ARC)—Last Wednesday in each month. Castle Street, High Wycombe. For further details contact sec G4FRL, tel Kingston Blount 52006.
Maidenhead (M&DARS)—For meeting details please contact G3ZLQ, tel Bourne End 21684.
Milton Keynes (MKARS)—11 September (Annual construction contest — trophy), 22 October, (Annual club contest — trophy). For further details of these events contact G3PZA, tel Shenley Church End 310.
Newbury (N&DARS)—Second Tuesday in each month. Newbury Technical College. Details from sec G8LTD, tel Newbury 46078.
Oxford (O&DARS)—First Monday in each month, 7.30pm. Civil Service Sports Club, Marston Road, Sec G4BHR.
Oxford University (OURS)—Please contact sec M. Evans, G8LTE, Worcester College, Oxford, for meeting details.
Reading (RARC)—Details from sec Chris Young, G4CCC.

REGION 7—RR D. A. G. Pedder, G3LFX, 97 Elgar Avenue, Tolworth, Surbiton, Surrey KT5 9JS.

Following information is latest received.

Addiscombe (AARC)—Tuesdays, 9.15pm. "Spreadeagle", Portland Road, South Norwood. Sec G3SJX.
Ashford (Echelford ARS)—Second Monday and last Thursday in each month, 7.30 for 8pm. The Hall, St Martin's Court, Kingston Crescent, Ashford, Middx. Sec G3TDR, tel Staines 56513.
Bexley Heath (North Kent RS)—Second and fourth Thursdays in each month, 8pm, St Mary's Institute, 2 North Cray Road, Bexley. Sec G3VFD.
Coulsdon (CATS)—First Thursday in each month, 7.30 for 8pm. 10th Purley Scout Hall, Chipstead Valley Road (opposite Rickman Hill). Third Monday in each month, 7.30 for 8pm. 1st Purley Scout Hall, Purley Park Road, Purley. Sec G8KDQ.
Cray Valley (CVRS)—First and third Thursdays in each month, 8pm. Christchurch Centre, High Street, Eltham, London SE9. Sec G4FUG.
Croydon (Surrey Radio Contact Club)—First and third Wednesdays in each month, 7.30 for 8pm. TS "Terra Nova", 34 The Waldrons, Croydon. Sec G4FFY.
Crystal Palace (CP&DRS)—Third Saturday in each month, 8pm. Emmanuel Church Hall, Barry Road, London SE22. Sec G3FZL, tel 01-699 6940.
Guildford (G&DRS)—Second and fourth Fridays in each month. Model Engineers HQ, Stoke Park, Guildford. Sec G4BHQ, tel Guildford 76375.
Guildford (University of Surrey E&ARS)—Informal meetings, lunchtimes during term. Lower Bar, Union House, G&AHK is active on vhf, and G31GQ on hf. Skeds and QSOs always welcome. Sec G8MIO, tel Guildford 71281.
Kingston (K&DARS)—Second Wednesday in each month, 8.15pm. Berrylands Scouts and Guides HQ, Stirling Walk, Raeburn Avenue, Surbiton. Sec G4APG, tel 01-399 8113.
New Cross (Clifton ARS)—Fridays, 8pm. 225 New Cross Road, London SE14. Details from R. A. Hinton, 42 Sutcliffe Road, Welling.
Redhill (Reigate ATS)—First Tuesday in each month (Natternight), 8pm. "Marquis of Granby", Hooley Lane, Redhill. Third Tuesday in each month, 8pm. Constitutional Centre, Warwick Road, Redhill. Sec G3XSZ.
Sutton and Cheam (S&CRS)—Meetings at Sutton College of Liberal Arts and at Ray's Social Club. Details from sec G2DMR.
Thames Ditton (Thames Valley ARTS)—First Tuesday in each month. Giggs Hill Green Library, Giggs Hill Road, Thames Ditton. Sec G3ZNW.
Wimbledon (W&DRS)—Second and last Fridays in each month, 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon SW19. Sec G3XTC, tel 01-644 3698.

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

Brighton (B&DRS)—8pm prompt. Catholic Church Hall, Bristol Road, Brighton. Details from N. Hewitt, G8JFT.
Burgess Hill (Mid-Sussex ARS)—7.45pm. Marle Place, Burgess Hill. Details of future events from G3PEQ.
Canterbury (East Kent RS)—Details of future events from sec G8GHH.
Chichester (C&DARC)—First Tuesday and third Thursday in each month. Lancastrian Boys School. Details from G4ETU, tel 0243 88069.
Crawley (CARC)—Second and fourth Wednesdays in each month, except December. Details from G3MGL, tel 0293 20986.
Dartford (DHDFC)—Second Friday in each month. Scout House, Broomfield, Dartford. Details from Jeanette Maggs, 25 Leybridge Court, Eltham Road, Lee, London SE12.
Dover (South East Kent YMCA ARC)—Wednesdays. Details from G8KEN.
Eastbourne (Southdown ARS)—4 September ("Repeaters" by Sussex Repeater Group, headed by Chris Goadby, G8HVV), 30 September–1 October (SARS visit to Radio Club de Normandie, F5KAR, at Rouen), 2 October (Junk sale). Further details from G8CVV, or pro G3LFZ.
Hastings (HERC)/(ITT(H)S&AC)—Details of future events of both units from G8DNO.
Horsham (HARC)—First Thursday in each month. Parish Rooms, The Causeway, Horsham. Details of future events from A. C. Wandsworth, G3NPF.
Kent Repeater Group—Details of membership from G3XDV, 5 Lambs Walk, Whitstable, Kent.
Maidstone (MYMCAARS)—Fridays, 7.30pm. RAE and morse tuition each week. Y Sports Centre, Melrose Close, Maidstone. Details of future events from hon sec G. Pennie, G4GAV, tel Maidstone 30892.
Medway (MARTS)—Details of events and venue from G4EVY.
Sussex Repeater Group—Information from G8HVV.
Tunbridge Wells (West Kent ARS)—1 September ("Current ics and their application in communications" by G8CDD), 15 September (144MHz foxhunt; assemble in car park behind Marks & Spencer), 29 September (Open evening: film, talk, display of equipment for all pockets, demonstrations and opportunity to arrange visits to shacks). Adult Education Centre, Monson Road, Tunbridge Wells. Informal meetings on Tuesdays following the Fridays. Drill Hall, Victoria Road. Details from Brian Castle, G4DYF.
Worthing (W&DARC)—Tuesdays, 8pm. Adult Education Centre, Union Place, Worthing. Details from G8MSQ.

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

Camborne (Cornish RAC)—First Thursday in each month; 7 September (Talk by G4EWQ), 5 October ("Oscar" by G3AET), 2 November (To be arranged), 7.30pm. SWEB Clubroom, Pool, Camborne. Cornish net each weekday 10am on 3·715MHz and on Sundays 11am on 3·682MHz. Full details from G3VGO, tel Devoran 864255. Visitors always welcome at club meetings.
Exeter (EARS)—Second Monday in each month, 7.30pm. Community Centre, St Davids Hill, Exeter. Details from G3HMY.
Newquay (N&DARS)—Alternate Wednesdays, 7.45pm. Treviglas School, Newquay. Details from G8GOR, tel Newquay 4168.
North Devon (NDRC)—13 September ("The steel industry" by G4CG), 27 September (Teleprinter demonstration), 11 October ("SWL activities" by J. D. Leigh), 25 October (Demonstration of 144MHz station using GB3WW and GB3BC). 13 September and 11 October at Barnstaple, other meetings at Bideford. Full details from G4CG.
Plymouth (PRC)—Alternate Mondays, 7.30pm. TAVR Building, Lambhay Hill, The Hoe, Plymouth. Full details from new sec Len England, 62 Fullerton Road, Milehouse, Plymouth, tel 58841.
Saltash (S&DARC)—First and third Fridays in each month, 7.30pm. Burraton Toc-H Hall, Saltash. Full details from G4GTG, tel Plymouth 771135.
Torbay (TARS)—Fridays, and special meeting on last Saturday in each month; 30 September ("Slow scan" by G4FCN), 28 October ("Rocks and minerals" by G3PQH), 7.30pm. Bath Lane (rear of 94 Belgrave Road), Torquay. Torbay net weekdays 3·756—3·764MHz, Mondays to Fridays 10.30am, Saturdays 9.30am. Full details from G3UIQ, tel Newton Abbot 3025. Visitors to Devon most welcome at meetings.

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

Barry (BCoERS)—Thursdays, 8pm. Barry Rugby Football Club, Reservoir Road, Barry. Details from sec S. N. Lloyd Hughes, GW8NVN, 1 Min y Mor, Barry.
Blackwood (BARS)—Fridays; 15 September ("The privileged ones" by GW3KYA, tape/slide lecture), 29 September (AGM), 7pm. Oakdale Community Centre, Oakdale, Blackwood, Gwent. Details from GW4BLE, 10 Llanthewy Road, Newport, Gwent.
Bridgend (Glamorgan VHF/UHF Group)—Second Wednesdays in each month, 7.30pm. NCB Social Club, Tondu, Bridgend. Details from sec GW4BDV.
Cardiff (CRSGB)—Second Monday in each month; 11 September (Surplus sale), 9 October (AGM and constructors' contest), 7.30pm. Pantmawr Inn, Pantmawr Estate, Cardiff. Details from GW3VOW.
Merthyr (Hoover ARS)—Mondays, 7.30pm. Hoover Social Club, Pentrebach, Merthyr. Details from GW3RNC.
Newport (NARC)—Mondays, 7pm. Adult Education Settlement, Brynglas Road, Newport. RAE classes start 11 September at above address. Details from GW8MER.
Pembroke (PRSGBG)—Last Friday in each month, 7.30pm. Defensible Barracks, Pembroke Dock, Dyfed. Details from sec GW3XJQ.
Pontypool (PRSGBG)—Tuesdays, 7pm. Education Settlement, Park Hill Road, Pontypool. Details from GW3JBH.
Port Talbot (British Steel Corporation ARS)—Thursdays, 7.30pm. BSC Sports and Social Club, Margam. Details from GW4ESV.
Rhondda (RARS)—Every other Thursday, 7.20pm. Transport Employees' Club, Porth. Details from GW3PHH.
Sully (S&DSWC)—Mondays fortnightly, 7pm. Sully Bowls and Social Club, 58 South Road, Sully, Cardiff. Details from David Hughes, 13 Nailsea Court, Sully.

Swansea (SARC)—Tuesdays fortnightly, 8pm. West Cross Hotel, West Cross, Swansea. Details from sec GW8CMA.
Swansea (University College of Swansea RS)—Mondays, 7.30pm. Room 801, Applied Science Building. Details from sec J. Morris, 1 Hadland Terrace, West Cross, Swansea, tel 68675.

REGION 11—RR *(Post vacant)*
Following information is latest received.
Rhyl (R&DARC)—Club reopened! Third Thursday in each month. Other Thursdays (On the air on 144·00 at 2000A). Ambulance Station, Rhyl.
Conway Valley (CVARC)—Second Thursday in each month, 7.45pm. The Quarry Offices, Llanddulas.
Bangor (UNCWARS)—Thursdays, 7.30pm. Small lecture theatre, School of Engineering Science, Dean Street, Bangor.

REGION 12—RR F. Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR.
Aberdeen (ARS)—Fridays, 7.30pm. 80 Guild Street, Aberdeen (next to "Station Hotel" immediately adjacent to railway station). Programme details from sec GM4BKV.
Dundee (Kingsway Technical College ARC)—Wednesdays, 6.30pm. Dundee Technical College. New members and visitors will be welcome when meetings resume in September. Sec GM4FLP.
Elgin (Moray Firth ARS)—Wednesdays. Elgin Technical College. Details from sec GM8OVN.
Grampian Repeater Group—Information from sec GM8HGD.
Invergordon (Easter Ross RC)—Every second Tuesday. 100 High Street, Invergordon. Practical nights every second Wednesday for those with own projects or who wish to work on club projects. Details from GM4DKL.
Inverness (Technical College ARC)—Every second Wednesday, 6.45pm. Room C30. Sec W. Lee, 36 Old Mill Road, Inverness.
Lerwick (ARC)—Wednesday evenings. Annsbrae House. Sec GM3HTH.
Perth (P&DARG)—Wednesdays, 7pm. Perth Technical College. Sec GM4DQJ.

REGION 13—RR A. B. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH.
Following information is latest received.
Berwick upon Tweed (Border ARS)—First and third Fridays in each month, 7.30pm. Roxburgh Hotel, Berwick upon Tweed. Details from sec GM8IIO.
Dunfermline (DARS)—Second Wednesday in each month, 7.30pm. CCTV Studio, Pittencrieff School, Maitland Street, Dunfermline. Details from sec GM3MGX, tel Limekilns 313.
Edinburgh (E&DARC)—Tuesdays, 7.30pm. City Observatory, Calton Hill, Edinburgh. Details from sec GM8MJV, tel 031-663 2033.
Edinburgh (Heriot Watt University ARC)—Wednesdays, 2pm. Aerial Laboratory, Top Floor, Mountbatten Building, 31-35 Grassmarket, Edinburgh.
Edinburgh (Leith Nautical College ARC)—First and third Thursdays in each month, 7.30pm. Leith Nautical College, 24 Milton Road East, Edinburgh 15.
Edinburgh (Lothians RS)—Second and fourth Thursdays in each month, 7.30pm. Adult Education Centre, Riddles Court, High Street, Edinburgh. Details from sec GM4BYF, tel 031-447 3201.
Glenrothes (G&DARC)—Third Sunday and every Wednesday in each month, 7.30pm. Old Nursery School Building, Provosts Land, Douglas Road, Leslie, Fife. Details from GM4BRM, 31 Church Street, Glenrothes, or GM3YOR, tel Kirkcaldy 200335.

It is also believed that clubs meet at St Andrews University and Ferranti (Edinburgh), but no details are available.

REGION 14—RR I. L. McKechnie, GM8DOX, 42 Newton Crescent, Dunblane, Perthshire.
Following information is latest received.
Ayr (AARG)—Every second Sunday evening commencing 8 January. Community Centre, 24 Wellington Street, Ayr. Details and calendar from sec GM3THI.
Helensburgh (HARC)—First and third Wednesdays in each month, 7.30pm. Clyde Street School, Helensburgh. Further details from GM4FEO.
Glasgow (West of Scotland ARC)—Fridays, 7.30pm. Robertson Street, Glasgow. Meetings opened by GM3EDZ. Details of events from sec GM8NBG on receipt of a 9p stamp.
Greenock (G&DARC)—Tuesdays and Fridays, 7.30pm. 22 Inverkip Street, Greenock. Details from sec GM3LYI.
Motherwell (Mid-Lanark ARS)—Wrangholm Hall Community Centre, Jerviston Street, Motherwell. Details from sec GM4FKD.
Stevenson (Ardeer RCARS)—Thursdays, 7.30pm. Ardeer Recreation Club, Stevenson, Ayrshire. Details from GM3USL.
Stirlingshire (SARG)—New group! Starting up initially to put a 70cm repeater on the air. Anyone welcome to join including members of the diminished Falkirk & District RC, to enlarge club activities. Details from sec GM3POK, or GM4CXF.

Offer of the use of premises, comprising lecture room, committee room and shared use of a workshop, on any day except Thursday and Saturday. Any interested parties please contact ASTRA Ltd, 49 Almada Street, Hamilton. (Opposite Bell College and court building.)

All secretaries please note that RR14 has an Ansaphone available for their use. Tel Dunblane (0786) 822212.

REGION 15—RR I. J. Kyle, GI8AYZ, Hillside, Galgorm Gardens, Old Galgorm Road, Ballymena, Co Antrim, Ireland BT42 1BA.
Following information is latest received.
Ballymena (BRC)—Tuesdays, 8pm (RAE and morse classes). 86 Old Cullybackey Road, Ballymena. Fridays (club night); Sundays, 3pm. (special projects). Sec GI8LSF.
Bangor (QUoBRC)—First Friday in each month, 8pm. Sec GI4AAM. New members and visitors especially welcome.
Belfast (QUoBRC)—Tuesdays during term, 8pm. Queen's University, 37 Fitzwilliam Street, Belfast.
Belfast (CoBYMCARC)—Tuesdays, 7pm; Saturdays, 2.30pm. Fourth Floor, YMCA, 12 Wellington Place, Belfast. Sec GI8MQR. New members very welcome.
Belfast (BRSGBG)—Third Wednesday in each month, 8pm. 20 September (AGM). 90 Belmont Road, Belfast. Details from GI8FOK. Everyone welcome to this lively group.
Carrickfergus (CYMCARC)—Second Tuesday in each month, 8pm. Carrickfergus YMCA, Lancastrian Street, Carrickfergus. Sec GI4FUE. New members welcome.
Dromore (Lagan Valley ARS)—New group! First Monday and third Tuesday in each month, 7.30pm. Scout Hall, Mossvale Road, Dromore. Sec GI8JPG. New members welcome.
Mid-Ulster (MURSGBG)—First Sunday in each month. QTH of GI8JPQ.
North Ulster (NURSGBG)—For details contact GI3UHL, or via GI3FFF.

REGION 16—RR M. S. Appleby, G3ZNU, 45 Cedar Avenue, Kesgrave, Ipswich, Suffolk.
Bury St Edmunds—Second Monday in each month, 7.30pm. Details from J. Munro, 29 Angel Hill, Bury St Edmunds.
Chelmsford (CARS)—First Tuesday in each month, 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details from R. Brocks, 30 Rowan Drive, Heybridge, Maldon.
Colchester (CRA)—Wednesdays, 7.30pm. 114 Ipswich Road, Colchester (Above Candor Motors). Details from G3YAI.
Great Yarmouth (GYRS)—Last Thursday in each month. 67 Southdown Road, Great Yarmouth. Details from G3NHU.
Harlow (H&DRS)—Tuesdays, 8pm. Mark Hall Barn, First Avenue, Harlow. Details from G3WUX.
Ipswich (IRC)—Wednesdays fortnightly; 13, 27 September, 11, 25 October, 7.30pm. Ranelagh Road School, Ipswich. Sec G4GVW, 37 Lancing Avenue, Ipswich.
Loughton (L&DRS)—Loughton Hall, Rectory Lane, Loughton. Details of meetings from G8DZH, tel 01-508 3434.
Lowestoft (L&DARC)—Fridays, 7.30pm. Morse class every Tuesday. YMCA, Park Road, Lowestoft.
Martlesham (MRS)—First Wednesday in each month; 6 September, 4 October (Subjects to be announced), 7.30pm. Details from M. Appleby, G3ZNU, PO Research Centre, Martlesham, Ipswich.

Norwich (Norfolk ARC)—Wednesdays.
Norwich (U of East Anglia R&EC)—Details from G3IOR.
Southend (S&DRS)—Fortnightly, 8pm. Church Hall, Sir Walter Rayleigh Drive, Essex. Contact sec G3YOA.
Stowmarket (SDARS)—First Monday in each month. Red Cross Hall, Stowmarket Railway Station. For details contact sec G8MYE.
Vange (VARS)—Thursdays, 8pm. Youth Hall, Barstable Tenants' Community Association, Long Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon SS14 1TE.

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

Basingstoke (BARC)—Third Wednesday in each month, 7.30pm. Chineham House, Popley Way, Basingstoke.
Basingstoke (UK FM Group Southern)—First Wednesday in each month. Chineham House, Popley, Basingstoke. Details from sec Mrs J. Payne, tel Aldershot 26108.
Bournemouth (Wessex ARG)—First and third Fridays in each month; 15 September ("RTTY" by A. Brown, G3NUN), 6 October (AGM), 20 October (Dr D. Evans, RSGB President), 7.30pm. "The Dolphin Hotel", (Club Room), Holdenhurst Road, Bournemouth. Sec G. Cole, G4EMN, tel Bournemouth 20027.

G2DX and G6CJ in conversation at a recent meeting of the Wessex ARG, at which another old-timer, G2MI, gave a talk

Chippenham (C&DARC)—Tuesdays, 7.30pm. Sheldon School, Hardenhuish Lane, Chippenham. Sec G8BXG.
Fareham (F&DARC)—Wednesdays, 7.30pm. Porchester Community Centre, Room 9. Sec D. Thompson, tel Fareham 2799.
Farnborough (F&DRS)—Second and fourth Wednesdays in each month, 7.30pm. Railway Enthusiasts' Club, Access Road, off Hawley Lane, Farnborough. Sec G3TMQ, 103 Hawley Lane, Farnborough.
Guernsey (GARS)—Tuesdays and Fridays, 8pm. Details from sec GU8ITE, PO Box 100, St Peter Port, Guernsey.
Horndean (H&DARC)—Second Thursday in each month, 7.30pm. Merchiston Hall, Horndean. Net Sundays, 6.30pm. 21·40MHz. Sec G4CHQ.
Jersey (JARS)—Sundays, 10.30am, and Fridays, 8pm. Le Hocq Tower, St Clement, Jersey. Sec Mary McTaggart, 19 Parade Road, St Helier.
Poole (PARS)—Last Friday in each month, 7.30pm. Poole Technical College. Sec J. Worth, G3ZKA.
Portsdown Hill Repeater Group—Activity night on GB3PH (RB2), Mondays, 1930gmt. All stations welcome to the net. Details from G8GNB.
Portsmouth (P&DRC)—Wednesdays, 7.30pm. Portsmouth Community Centre, Malins Road, Buckland, Portsmouth. Sec G3CNO.
Salisbury (SR&ES)—Tuesdays, 7.30pm. Salisbury Activity Centre, Wilton Road. Sec G3FIX.
Southampton University (SUARC)—Tuesday evenings. Also informal meetings every lunchtime in the clubroom, Old Union Building. Sec D. Price, Chemistry Dept.
Southampton (SRSGBG)—First Monday in each month, Lanchester Building, Southampton University; Wednesdays, the clubroom, Kent Road; both at 7.30pm. AR G4COM.
South Dorset (SDRS)—7.30pm. Lecture Hall, South Dorset Technical College, Newstead Road, Weymouth. Details from sec G3ZGP.
Swindon (SD&ARC)—Alternate Wednesdays, 7.45pm. Clubroom above "Coldharbour" public house, Blunsdon, just north of Swindon. Sec G8KWC.
Winchester (WARC)—First Friday and third Thursday in each month, 7.30pm. "Crown Hotel". Sec Chris Jackson, BRS39944, 69 Buriton Road, Harestock, Winchester.

REGION 18—RR W. Ricalton, G4ADD, 4 South Road, Longhorsley, Morpeth, Northumberland.

Durham (DUARS)—Alternate Wednesdays during term; commencing 11 October (Lecture "VLF propagation"), then fortnightly 1 November (Junk sale, bring/buy anything). Physics Dept, Durham University. Details from G3ZJY or G4FOP, or A. Jarrett, G4FRZ, Van Mildert College, Durham. External members especially welcome.
Easington (EAR&EC)—Tuesdays and Thursdays, 7.30pm. Easington Village Workmen's Club. RAE and morse tuition if required (the club has a good RAE pass record). ATV can be received on 625 lines. The club is now equipped with an hf transceiver as well as other gear. Sec G4COI.
Great Lumley (GLAR&EC)—Alternate Wednesdays, 7.30pm. Great Lumley Community Centre. Sec G8JLQ. Assistance with RAE and morse if required.
Hartlepool (HRC)—Mondays, 7.30pm. Methodist Church Hall, Grange Road. Sec G3NWU.
Middlesbrough (Post Office ARC)—All amateurs welcome, but first contact sec G8CDP.
Middlesbrough (Teesside Repeater Group)—Last Tuesday in each month, 7.30pm. 196 Marton Road, Middlesbrough, Cleveland. All amateurs and swls invited but first contact sec G8MBK.
Morpeth (Northumbria RC)—Now meets Thursdays. British Legion premises, Gambois, near Blyth. Sec G4AVO.
Newcastle upon Tyne (Tyne & Wear Repeater Group)—First Wednesday in each month. Arts Common Room, University of Newcastle. Open to all amateurs and swls. Sec G4DOB, tel Newcastle 744444.
Northumbria (NRC)—Informal meetings Thursdays. "Queens Head", Morpeth. Coach trip arranged to ARRA Exhibition, Leicester, (Friday), seats available. For further details contact hon sec G8GVN.
South Shields (SS&DRS)—Fridays, 7.30pm. Trinity House. Old and new members welcome. Sec G8BQF, 67 Lauderdale Avenue.
Tyneside (TRS)—Mondays, 8pm, The Community Centre, Vine Street, Wallsend. Sec Alex Frazer, 35 Percy Street, Tynemouth.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ.

Barking (BR&ES)—Mondays (Constructional), Wednesdays (CCTV), Thursdays (Informal night). Morse classes Tuesdays, 7.30pm. 5 October (Talk by Lowe Electronics), 23 November (Demonstration of equipment by Gould-Electronics). Sec N. Dowsett, 44 St Ann's, Barking, Essex.
Chingford (Silverthorn RC)—Fridays, 7.30pm. Friday Hill House, Simmonds Lane, Chingford E4. Sec G4AJA, tel 01-529-2282. All visitors welcome.
Chiswick (Acton, Brentford and Chiswick RC)—19 September ("WARC" discussion), 17 October ("AMSAT-UK" by G3AAJ). Chiswick Trades and Social Club, 66 High Road, Chiswick W4.
Ealing (E&DARS)—Tuesdays, 8pm. Northfields Community Centre, Northfields Road, W13. Sec G8KPN, tel 01-997 5949. All welcome.
East London (ELRSGBG)—Third Sunday in each month, 3pm. 17 September (Business meeting and talk by well-known amateur), 15 October ("SWR and that burning smell" by G3RZP). Wanstead House, The Green, Wanstead E11. Hon sec G4CJQ, hon chairman G3AMF, tel 01-989 9224. Full 1978-9 programme can be obtained from sec on receipt of a stamped addressed envelope.
Edgware (E&DRS)—Second and fourth Thursdays in each month, 8pm. Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Programme includes regular morse code practice classes. Sec G3MNO, tel 01-907 1237.
Harrow Weald (RSH)—8 September ("Clean up your spectrum" talk), 15 September (Junk sale), 22 September (ATC), 29 September (Construction contest), 6 October (Informal), 12 October (Film show), 20 October (Talk), 27 October ("AMSAT-UK" by G3AAJ), 3 November (RTTY). Harrow Arts Centre, High Road, Harrow Weald (bar available). Hon sec G4AUF, tel 01-868 5002.

Members of the Southgate RC committee at the wedding of David Butler, G4ASR, and his xyl, Marion. Left to right: (rear) G4BLX, G4DFB, groom and bride, G4BPR and G4AEZ; (front) G3RWL and G3ZVW. Photo: *Ann White*

Havering (H&DARC)—20 September (Informal), 13, 27 September (Formal), 4, 18 October (Informal), 11, 25 October (Formal). Informals at Fairkytes Art Centre, Billet Lane. Formals at British Legion, 54 Western Road, Romford, Essex. Full details from hon sec, G8MKN, tel Romford 47339.

Holloway (Grafton RS)—Holloway Institute, Archway Annexe, Highgate Hill, London N19. Sec G3ZKE.

Ilford (IRSGBG)—All meetings are informal. 50 Mortlake Road, Ilford, Essex. Sec G3LRE, tel 01-500 7196.

Northolt (British Airways European Division ARS)—First Monday in each month. Trident Club, Western Avenue, Northolt, Middlesex. This club is open to non-BA employees by invitation. Contact G3TLG for details. Civil Aviation Sunday net 1100 - 1200gmt on 3·68MHz, listen for G3NAF or G3BEA.

Shelburne (SRC)—Wednesdays and Thursdays, 7pm. Shelburne Youth Centre, Hornsey Road, London N4.

Southgate (SRC)—Second Thursday in each month, 7.45pm. September ("PCB home construction" by Mega Electronics), October ("Oscilloscopes" by Tektronics Ltd). Scout Hut, Wilson Street, Winchmore Hill Green N21. PRO I.R. Selby, G4DRI.

South Kensington (Baden Powell House Scout ARS)—Third Tuesday in each month, 8pm. Baden Powell House, Queensgate, South Kensington.

Stevenage (S&DARS)—First and third Thursdays in each month. 7 September ("How I got started" by G8KMG), 21 September ("Microprocessors" by G8LWC), 5 October (432MHz rtty repeater GB3PT), Wednesday 11 October ("Moonbounce" by G3LTF), 19 October (Junk sale), 2 November ("Weather satellites" by G8LOK). Morse practice, 7.30pm, main meeting 8.15pm. Staff Canteen, British Aerospace (HS), Gunnels Wood Road, Stevenage. Hon sec T. Tugwell, G8KMV, tel 0438 54689.

St Albans (Verulam ARC)—Fourth Thursday in each month, 8pm. 28 September ("Construction of 144/70MHz transverters" by G3LXP), 26 October ("Vintage wireless equipment" by Tony Constable of BVW Society). Market Hall, St Albans. Informal meetings at RAF Association HQ, Victoria Street, St Albans. Hon sec, Brian Pickford, G4DUS.

South West Herts UHF Group—Details of activities and building funding from Peter Marcham, G3YXZ, or Brian Greenoway, G3THQ. No meetings held.

UK FM Group London—Second Tuesday in each month, 8pm. Grove Park Hotel, Chiswick W3. Hon sec R. Street, G3TJA.

West Drayton (LT District Line ARC)—Details from sec G8MXX.

Wormley (Cheshunt & DRC)—Wednesdays, 8pm. 6 September (Natter and cw practice), 13 September ("Spectrum analysis" by G8ATB), 20 September (Natter), 27 September (Junk sale), 4 October (Natter), 11 October ("Signals and noise" by G4DCP), 25 October ("10GHz progress" by G3OJI). Church Room, Church Lane, Wormley, Herts. Hon sec G3OJI, QTHR.

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

Bridgwater (HPSSARS)—First and third Fridays in each month (October–April), or first Friday (May–September); 6 October ("Antennas",RSGB tape lecture), 3 November ("Some thoughts on propagation", RSGB tape lecture), 1 December ("Oscar 7", RSGB tape lecture), 7.30pm. ATC HQ, Rope Walk (next to the bus station), Bridgwater. Hon sec G4ETN.

Bristol (BARC)—Tuesdays, 7.30pm. The University Settlement, Barton Hill, Bristol 5. Sec G8GFZ.

Bristol (BRSGBG)—30 October (Tour of Bristol University), 27 November ("Construction techniques" by G4EHE and G8FNR), 7-9.30pm. 'Small Lecture Theatre, Queens Buildings, University Walk, Clifton, Bristol 8. Hon sec G4FRG.

Bristol (North Bristol ARC)—Fridays, 7pm. RAE instruction Wednesdays, 7pm. Lockleaze Community Association, Romney Avenue, Lockleaze, Bristol BS7. Hon sec G2BSU.

Bristol (Shirehampton ARC)—Fridays, 7pm. Twyford House, Shirehampton. Sec G8KUM. HF and vhf station all modes, occasional lectures and films. RAE and morse classes in progress. New members welcome.

Cheltenham (CARA)— First Thursday and third Friday in each month; 7 September (Lord Wallace of Coslany), 15 September ("Direction finding" by Eric Mollart), 8pm. "The Old Bakery", Chester Walk, Cheltenham. Sec G3JJG.

Gloucester (GARS)—First and third Thursdays in each month, 7.30pm. Chequers Bridge Centre, Painswich Road, Gloucester. Hon sec G3MA.

Weston-super-Mare (WsMARS)—Second Monday in each month (except August),7.30pm. Lewis Block,Worle Comprehensive School, Redwing Drive, off Mead Vale, Weston-super-Mare. Hon sec Irvin Barr-Sim, "The Old Dairy", Eastertown, Lympsham, Somerset.

Yate (Y&DARC)—First Saturday in each month, 8pm. G3RQN QTH. All welcome, including swls. Local chat channel S24, 145·6MHz, 2100 Wednesday and Saturday. Further info from G8LGC.

Yeovil (YARS)—7 September ("Recruiting new members" by G3MYM), 14 September ("Antenna circus" by G6CJ), 28 September ("Receiver design competition" by G3MYM), 5 October ("The case for QRP" by G3KSK), 12 October ("WARC 79" by G5HD, RR17). Hut 101 Houndstone camp (three miles west of Yeovil off A3088). Hon sec G3NOF. Info at main gate, S20 fm talk in, club net 10.30am Sundays, 3·660MHz.

members' ads

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB. They must be submitted on the Members' Ads order form printed in alternate issues of *Radio Communication*, or on a postcard similarly laid out. Each **must** be accompanied by a **recent** *Radio Communication* mailing label addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque for 75p (stamps not accepted). They will not be acknowledged. Those not clearly worded or punctuated will be returned. No correspondence concerning this service can be entered into.

The closing date for each issue is the 1st of the preceding month, but no guarantee of inclusion in a specific issue can be given. Valid advertisements not published in the issue following receipt will be held over until the next issue.

Trade or business advertisements, even from members, will not be accepted for Members' Ads but should be submitted as classified or display advertisements in the usual way. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions or for the quality of goods offered for sale. Advertisements may be edited or abbreviated as necessary.

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS.

Do not post to RSGB HQ or Advertising Representative

FOR SALE

Complete hf station comprising: KW2000B, £200; KW1000 linear, £120; Comdel speech processor, £25; vswr meter, KW, £5; low pass filter/antenna switch box, £1; Shure desk mic, £7; rf ammeter, £2; TH3-Jr with balun, heavy duty motor, £60; A. P. Haynes, 8 Watling Street, Radlett.

KW2000E tx/rx, vgc, manual, best offer over £250. G4ECH, QTHR. Tel 01-467 2023.

Cambridge AM10B, modified rx, monitor meter fitted, £15. Eddystone 898 dial, £8. TX/RX case to match dial, £5. Manual for AM10B available. G8BXF, QTHR (Tyneside). Tel 06614 3648.

Collector's item, Eddystone "All the world two", with coil box and coils, in exc cond, offers please. G4JY, QTHR. Tel Kinver 3467.

Yaesu FT301, cw filter, mic, handbook, 200W, 160-10m, FP301 psu, mint, £450 ono. Drake R4C, 250Hz filter, handbook, mint, £350 ono. G3RCE, QTHR. Tel Titchfield 42022.

Comp stn, going QRT: HW101 tx/rx; HP23 (in SB600) ac and HP13 dc psus; HP2103 wattmeter; all with h/books; KW E-Zee match; TTR swr meter; TA33Jr and Tavasu mobile whip and coils; Burns TC101 wavemeter; gdo; many extras and spares; bargain at £375 the lot; no offers. G3TYR, QTHR. Tel Guildford (0483) 39877.

Regency HR2A 2m 10ch fm rig, with xtals, £80 ono. G3AYL, 61 Anchor Road, Bournemouth. Tel Northbourne 6036.

Green Electronics varactor multiplier, type CTR70, 144/432MHz, 18W o/p, £12. Marconi rf power meter/dummy load, type TF1020A, 50/100W, 75Ω, ok 2m, £18. Delivery extra. G8AYY, QTHR.

Ringo Ranger 2m vertical antenna, £19; HY5 preamp, psu, £9.50; Saxon 50W audio power amp, psu, £17.50; all plus postage. G4FYA, QTHR. Tel Fleetwood 4094, after 6pm.

FR50B, 10-80m, exc cond, manual, £70. 22m Pye 625 colour rx, new tube, £75. UHF/VHF colour rx, 22in, £85. 24in video mono monitor, £35. Tel Lowestoft (0502) 740336.

Yaesu FT200B, h/b psu, good cond, 18 months old, £260. G4GAV (Maidstone). Tel 0622 30892.

Antique brass morse key, £25. Hallicrafter Super Sky Rider model SX208, £25. Westinghouse type UN overcurrent relays, £5 ea. Grid dip oscillator and coils, £10. Panoramic adapter type BC103B, £10. A. P. Haynes. 8 Watling Street, Radlett, Herts.

Yaesu Musen FT301D; digital readout 301, with spkr, used only 15 months, open to offers. Husband deceased. Mrs B. Sadler, 81a West End, Street, Somerset. Tel Street 42170.

Multi 2000, 2m, multimode, with fixed channel mod, £200. Pye TVC/1A tv camera, £30. *Wanted:* FT221R. GM8LKL, QTHR. Tel 031-449 2096.

Liner 2, 2m, ssb, mobile mount, mic, £100. Pye compact 70cm tx/rx, nearly new nicads. 433·20 (SU8), £30. 70cm Parabeam, £10. 2m tx/rx, hand-held, rx needs attention on S20, offers. G8KOM, QTHR. Tel Littlewick Green 2453.

Yaesu FTDX401 tx/rx, mint cond, best offer secures. Prefer buyer to inspect and collect. G4FUW, QTHR. Tel Otley 4184.

160W transistor pa, 144-148MHz, 13·8V dc, works fine from car battery; plus Liner 2 and handbooks, £260 cash, or G3ZVC G3ZPB multimode components plus cash. Will not split. G8NOG, QTHR. Tel 062 34 3008.

FLDX400/ FL2000B, fitted fsk, £250. TDMS 5EB/6EB, incl coder and extra rack enclosure, £50. CR150, psu, £35. Europa A, antenna relay, £44. Avo model 8, £38. Advance 1MHz frequency counter, £35. 10:1 Racal scaler, £18. Eimac tetrodes, 4-65A, new, £5 ea. Electrovoice cardioid mic, floor and desk stands, £15. Three range vvm, £9. Main items incl manuals. Carr extra. G8LT, QTHR. Tel 032 732 321.

FL2000B linear; Datong up-converter, psu; PM2000 wattmeter; all as new. *Wanted:* Collins 30LI linear to complete Collins line-up. GM4DNM, QTHR.

Drake R4 rx, professionally overhauled, £200 ono. G3VLX, QTHR. Tel Orpington 26584.

TA33Jr beam, at present dismantled, buyer to collect, £35. GM3OTF, QTHR. Tel Dunragit 247.

TC7 Mk2 Telford, tunable i.f. 28-30MHz, as new, comp with circuit diagram, etc, £30. G5VH, QTHR. Tel Leicester 783197, weekdays after 6pm.

Drake SPR-4 gen cov rx, as new, with 17 xtals, h/book, £285 ono. Elias. Tel Bourne End (06285) 21471.

Clearout: mint Akai 1722L; scruffy but wkg HRO, with seven coils, spkr, psu; Doram cmos keyer; Yaesu YD164; KW spkr; 2m transverter, psu, plus Jaybeam 6/6. Need Trio 9R59DS. Letters only please. G4CYB, QTHR.

IC202, comp with radio spares, nicads, £145; Modular Electronics 25W linear, with 3N204 preamp, £45; FDK psu, 4A at 9V, 10·5V, 12V, 13·5V, 15V, £45; all ono. G8KVM, QTHR. Tel Bernard, 0782 543664, 6-8pm.

TR2200G, plus VB2200 power amp, S20, S22, S24, R3, R7, little used, £110. G4EBG, QTHR. Tel Rawmarsh 4634.

HQ1 minibeam, FRG7, both almost new. QR-666, exc cond. Sensible offers please. G8DFZ, QTHR. Tel. Otley (Yorks) 3083.

FLDX500/ FRDX400, matching spkr, filters, 2m/6m converters, both recently professionally overhauled, £320. Also semi-automatic key, and Eddystone 358 cabinet, offers. G3KSH, QTHR. Tel 0535 34256.

Redifon marine key, cover, filters, mint, £15; large roller coaster, new, boxed, £14; USAF deluxe headphones, low imp, new, in carton, £6.50; all plus postage. Collins 455kHz mech filters, two 4CX250Bs and bases, Bendix TA12C TCS atu, sae details. G3GUU, QTHR.

FT2FB 2m tx/rx, 12ch, fitted 144·48, 144·64, S0, S19-24, R5-R7, 3N204 preamp, £120 ono. Storno CQM 13 tx/rx, high band, all valves, no control box or leads, single channel boot mount, with orig xtals for high band, £10. Tel Arthur, Watford 24752.

Drake R4C T4XC plus power pack 0·25, 1·5kHz extra filters 160m, WWV, 10m extra xtals, £500. G3AZT, QTHR. Tel 0865 390 598.

3cm tx/rx front end incl Gunn tx, varactor tuning and mod, Schottky mixer, ferrite circulator, 17dB horn, makers' test report, £69. Jarvis, "Salewheel House", Ribchester, Preston, Lancs.

"Rad Comm", '74-7 minus five copies; Barlow Wardley rx, fm, handbook; Heathkit sig gen, RF1U; AR20 rotator, cable, 5-el 2m Yagi; dipole for 10, 15, 20; prefer buyers inspect and collect. Garlick, 135 Rookhill Road, Pontefract, Yorks. Tel Pontefract 75821.

Drake SSR-1 rx, as new, with Drake headphones, £115 ono. Prefer buyer collects. Culling, "Clairwood", Kings Road, Dereham, Norfolk NR19 2AG. Tel. Dereham 2790.

DX160 rx, exc cond, £55, carr paid, no offers. *Wanted:* 'scope, Heathkit OS2/10-18 or similar, must be electrically ok; will collect 'scope up to 100 miles; price and cond to G8DXD, QTHR. Tel Worcester (0905) 20135, after 6pm.

Heathkit SB634 stn console. IM-25 fet vom. Collins ARC-2 2-9MHz cw/a.m. tx/rx, plus psu, components and conversion book. Serious offers please. G5BPF, QTHR. Tel Bicester 43624 or Upper Heyford 4519.

NR56 rx, with R6 xtal, £40. Sentinel mf converter, £10. 144MHz solid-state fm tx board, commercial manufacture, 6ch, no xtals, £15. Pye Vanguard manual, £2. Haywood, G8HXE, 191 Somerton Road, Breightmet, Bolton, Lancs. Tel Bolton 384903.

Trio 9R59DS, new valves, £35. Goodmans Axiom 301 spkr, 15Ω, 20W, 12in, £22. T. Collins, 88 Clarendon Road, Luton, Beds.

FRG7, as new, £130. HW7 QRP rig, with HWA 7-1 psu, £35. Belcom psu, 13·5V 2A, £8. Buyers please collect. G4BXY, 372 Gosbrook Road, Caversham, Reading.

4CX250B, psu, 2500V 250mA transformer, swinging choke, variac controlled, metered, stab grid supplies, variable heater volts, cased, Eimac 4CX250B valve, as new, offers. G8FIS, NOT QTHR. Tel York 29864.

Brand-new, house move forces sale: Icom IC215 (15ch), IC202E plus cases, helical whips, nicads and charger. Modular electronics rf amp/rx preamp, Yaesu YC500J frequency counter, Dactron 13·8V^7A psu, swrs, Datong rf clipper, QM70 2m converter, Slim Jim, dummy load. G4BKM, QTHR. Tel Denham 4358.

Datong rfc, mint, £30. Datong UC1, mint, £75. Datong FL1, mint, £40. Europa, with fan and c/o relay, cabled for FT101, £30. G8IRU, QTHR. Tel 044 284 3474, evenings.

Trio 9R59DS rx, with matching spkr, in orig packing case, £50. Datong rf speech clipper board, fitted in die-cast box, £16. G4EII, QTHR.

Trio JR310, n/b filter, £90; Trio 9R59DS, extras, £60; Liner 2, with extras, £115; QM70 28/432 h/power transverter, Heathkit 10-102 'scope, £80; BC221T freq meter, mains psu, £20; all exc cond, offers accepted. G8HVQ, QTHR. Tel Lytchett Minster 622314, after 6pm and w/ends.

Heathkit DX100U, with SB10U adapter, £75. Eddystone EC10 Mk1, fine tuning fitted, Joystick with atu, £85. Tel Lincoln 720414.

Drake R4B, with MS4 spkr, little use, mint, £230 ono. Heathkit V7A valve voltmeter, with rf probe, perfect, £29. LM7 frequency meter, with charts, no psu, £15. Carr extra. G5FH, QTHR. Tel 0425 25974, evenings.

Eddystone S750 rx, comp with S-meter, ls, manual, £50. Class D wavemeter, 240V ac, £10. Philips four-track tape recorder, £15. Several 240V ac psu and 150 miniature valves, sae for list. G8AHE, QTHR. Tel 021-453 5990.

2m 10-el Parabeam, £12 ono. Lucas mw/lw, push-button tune, variable tone, almost new, in orig packing, £20. 21ft aluminium scaffold pole, unused, painted grey, £6. Buyer collects. G4DOV, QTHR. Tel Walsall 27738, after 6pm.

Trio JR-599 custom special, rx all filters, a.m./fm/cw/ssb, little used, immac cond, £165. Trio SP-5DS spkr, £8. Joymatch, £5. Taylor (Purley). Tel 01-668 8617.

FT221R suffix D, orig packing, eight months old, mint cond, £320 ono. Belcom 2m linear, built-in preamp, blower motor, mint cond. ssb, fm, cw, 180W p.e.p., £135 ono. G3AYA, 10 Millers Lane, Stanstead Abbots, Ware, Herts. Tel Ware 870010.

HW100 tx/rx, HP23 psu, manual, recently serviced, £140. HF linear, 95% comp, pair 813s, spares, £30. G4BHE, QTHR. Tel Basingstoke 781468, evenings.

IC202, with four xtal ranges, £140. BIAC, MEL type L595/1, 3cm three-port circulator fourth port DL, £10. G8FGD, QTHR. Tel 0272 562984, weekends only.

Monitorscope, SMC, six months old, £60. Carr as appropriate. G3DNX, QTHR. Tel 061-480 9994.

Drake TR4CW tx/rx, as new, £395. Drake lpf, £10. Two small winches, £5 ea. Six Jaybeam 15in couplers, £3 ea. Drake R4C rx, £325; matching T4XC tx, £325; both as new. GW3CBA, QTHR. Tel Barry 741520.

70cm tripler, QQVO3-20, metered, incl built-in psu, £15. Small pa chassis, QQVO6-40, new, £10. Pye 2516 tv spg, 405/525/625, incl 625 xtal, 19in rack, mounted, £9. G3RHI sstv spg, £15. EMI vision mxr 224, h/b psu and fader panel, £10. G8AXC, QTHR. Tel 0723 85252.

Marconi BD871 camera, channel cables, manual, £17. Spare ccu, comp, £7.50. Fidelity twin-track tape recorder, £9. Grundig TK1 ditto, portable, £7. Marconi valve voltmeter, TF428B/1, £10. Langham Thompson uhf rx, 400-460MHz, manuals, spec sheets, £15. All collect. G8AXC, QTHR. Tel Scarborough 85252.

Pye Ranger on 2m, tunable rx, £5. Ditto for use with ext rx vfo, £4. Solartron CD8142 oscilloscope (10MHz), manual, £48. Dexion trolley for above, £8.50. Pye base rx, xtal 145·8MHz, £10. All buyers arrange collection. G8AXC, QTHR. Tel 0723 85252.

Heath SB104A solid-state tx/rx, with matching SB604 spkr and HP1144 psu, superb cond, owner going TR7, £530 ono. G3RRA, QTHR. Tel 0276 25040.

Moving QTH: 30ft mast, telescopic, comp, three sections, plus many lengths of guy rope and pipes, insulators, cables, components, etc, books, first £100 the lot. Buyer must collect. G3OUX, QTHR. Tel Crawley 23890, after 5pm.

DX100U 160-10m tx, £45; B40 gen cov rx, £35; buyer collects. *Wanted:* 160-10m ssb tx/rx, in top cond. G4ABT, QTHR. Tel 061-485 6091, evenings and weekends.

Yaesu FT2F, fitted S20, 22, 24, R4, R7, 145 and others, two 3N204s in front end, improved demodulator, other mods, £75. G8NOX, 29 Lower Road, Woodchurch, Nr Ashford, Kent. Tel Woodchurch (0233 86) 311.

Trio JR310 10-160m rx, with narrow filter, £75. Modular Electronics 15-2 fm amplifier, ideal for use with 2200GX, only £25. No offers, buyers collect. G8MCS, QTHR. Tel 06286 62832.

Uprated KW2000, psu, £110; EC10 Mk1, £30; AR40 rotator, cable, £35; homebrew 80-10m 350W linear, £35; 25ft lattice tower, £50; Hartley 18A 'scope, £15; 1MHz HC6U xtal, £1; or reasonable offers. G4AJC, 21 Northcroft Road, Ewell, Surrey. Tel 01-393 1876.

BC221T freq meter, built-in mains psu, comp with circuit and orig charts, vgc; Datong FL1 audio filter, as new; offers. G4EMR, QTHR. Tel Portsmouth (0705) 21082.

IC202, fitted 3ch 144·0-144·6MHz, boxed, little used, £145. 10 unused Ever Ready 1·2Ah nicads, £10. Mullard 5-10 amplifiers, serred pair with preamps and spkrs, £20. 650-350 0-350-650 ‡A, 7in cube, 25lbs, £4.50. G3TSO, 81 Eider Avenue, Lyneham, Chippenham, Wilts.

IC202, ssb, portable, six months old, very little used, new cond, all packing, manual, accessories, will deliver up to 50 miles, £135 ono. G8CCI, QTHR. Tel Oxford 880229, evenings.

R216 rx, 19-157MHz, comp with mains psu and service manual, £75. G3VEZ, QTHR. Tel Bournemouth 425044.

Liner 2, PA3 preamp, mic, mobile mount, R112 psu, 2m ‡ whip antenna, £100. G3ZTI. Tel Cheltenham (0242) 21881.

TS700G, cond as new, little used, £380. Buyer collects. GW8MGF, QTHR. Tel Wrexham 56682, 6-9pm.

KW p.e.p. meter, with two-tone oscillator, £15. TE20D rf sig gen, c/w leads, £20. Carr extra. *Wanted:* Datong rfc board, or comp. KW107/E-Zee match or equivalent, for school club. G3MFL, QTHR. Tel 027 583 3269, after 5pm.

KW1000 linear, mint cond, plugs, manual, £170 or best offer. Hy-Gain vertical 12AVQ ant, good used cond, £17. G6PO, QTHR. Tel Poulton le Fylde 885893.

TR2200G, nicads, 9ch, £100. AR88LF, £35. DX100U, good, £35. Marconi bridge TF868B, £30. Marconi D/'scope TF1331, £35. Pye PTC351 vhf tx, easy conversion for 2m, 60W, £15. G4CWB. Tel Harrogate 504373.

FRG7, exc cond, £120. KW Viceroy Mk3, incl p/s, manual, circuit, etc, £65. G3GWD, QTHR. Tel 01-650 3163.

Trio JR310, matching spkr, 80-10 rx, handbook, £85. GW4CMW, QTHR. Tel 0437 890209.

Trio JR310 rx, immac, narrow mechanical filter, fm, board, manual, £90 incl Securicor delivery. Also Codar CR70A, preselector, £45, incl carr. Grayham Passmore, 8 Jasons Corner, Stackpole, Pembroke, Dyfed SA71 5DB. Tel Pembroke (Wales) 2096 day, or Lamphey 2183 night.

Microwave Modules converter, 2m, 4-6 i.f., rf preamp, £12 ea. Tradiper gdo, £15. Hickok oscilloscope (heavy), £15. Eddystone 840A, £40 ono. *Wanted:* FR50B and converter for 2m. G8IJC, QTHR. Tel Boston (Lincs) 68590.

Yaesu FR400SDX rx, all options installed, mint cond, orig packing, £175 ono. KW2000A, in vgc, £150 ono. Contact Roger Dixon, G4BVY, QTHR.

Drake R4C, with noise blanker, filters for 1·5, 0·5, 0·25, extra xtals for 160, WWV and 10m, and T4X with MS4 psu, and extra xtals. G3HCT. Tel 05642 2176.

FT101B, late model, good cond, cw filter, not used mobile, £350 ono. G4ANS, QTHR.

SSTV fet. FFS head amp, optics, in modified slide projector, £8. Telequipment WG44 tv pattern gen, £8.50. ATH cr tuning indicator, 3in crt, manual, £6.50. Command rx, 6-9MHz, £6. Manual for Pye Lynx camera, £1.50. Buyers collect. G8AXC, QTHR. Tel Scarborough 85252.

Sony CR7 5090 rx, as new, £100. Codar CR70a rx, with spkr, £30. Geloso G207DR rx, 80 to 10, £30. Eddystone 830/7 rx, perfect cond, £245. R. C. Ebden, 2 Rolleston Close, Petts Wood, Kent. Tel 01-467 5908.

FT200B/FP200B, as new, £260; carr extra. *Wanted:* FT101B, must be mint cond; also G3LLL clipper. G4GQT, 57 Canterbury Avenue, Lancaster LA1 4AU. Tel 0524 2389.

QVO3-100 (813), boxed, new, £4.50; used, £3. CR100, meter, handbook, £30. Creed 40V at 4A regulated psu, £6.50. Weller soldering gun, £4.50. Transformer, 500V fw at 250mA, £4.50. All ono. *Wanted:* KT88s, TT21s. Moss. Tel 01-789 5846.

Mint Viceroy 3, 6146Bs, lp filter, BM3 xtal mic, c/o relay, plus carr, £100. G3OSH. Tel Callington (Cornwall) 3536.

Heathkit HW100 tx/rx, 80-10m, good cond, matching psu, £180. Hudson base stn, on 4m, £10. VHF walkie-talkie tx/rx No 1A, comp with handset, spkr, battery-box and shoulder-bag, bargain at £15. G4CMM, QTHR. Tel 01-857 3639, anytime.

TS820S, digital, remote vfo, SP820, £700 ono; 14AVQ, £30; SB200, 1200W linear, £200; all only few months old. G6IF. Tel 08444 4869, or Windsor 57721 ext 57 daytime.

Yaesu FTDX401 500W tx/rx, mint cond, little used (see log), mic, spare valves, manual, orig packing, £260. 40ft lattice-tower, climbing steps, good cond, £60. G4CXY, QTHR. Tel East Horsley 2154.

KW77 rx, 160-10, exc cond, £75 ono. Sphinx ssb tx, 160-80-40-20, 6146 pa, £55 ono. PF1 Pocketfones, xtalled RB10, £32. EK9X keyer, £8. 10W traps, 160/80, £4. AT40 Western 7MHz traps, £4. S.G. Spencer, G3ILO, 49 Rosebery Road, Dursley, Glos GL11 4PT.

FT101E, 12 months since new but never used, buyer to inspect and collect, £375, no offers please. Tel Danny, 01-560 2092, after 7pm.
Panda tx, 150W, cw/a.m., £40. HRO, comp coils, £40. Eddystone Mk2, £100. ICC2A, channelled R3, R4, R5, R6, R7, S0, S21, S22, S23, S24, 144·48, £150. 2m tx, built by EBI, S0, S21, S22, R7, £30. Lambert, G4BXF, QTHR. Tel 01-504 6157.
Yaesu FT75B, dc psu, many extra xtals, £200. Datong FL1 audio filter, £40. Homebrew cw keyer, using Bauer paddle, £25. GM4AWA, QTHR. Tel Bridge of Earn (0738 81) 2815.
Trio communications rx 9R59DS, spkr, instruction manual, service manual, small xtal calibrator, voltage regulator valve, many new valves, unmodified, orig box, good cond, £45. Eden, 50 Bishops Road, Prestwich, Manchester M25 8AS. Tel 061-773 3040.
Robot 70C sstv monitor, 128/256 lines, with cont loop cassette, £250 ono. Barker, G8OVD, 11 Dipton Gardens, Tunstall Estate, Sunderland SR3 1AN. Tel 226883 (after 16 September).
Trio 2200G, 3ch, nicads, battery charger, automatic toneburst, vgc, £120 ono. Xtals for IC215, popular channels, £4.50 pair. IC210 R7 xtal, £2.50. 1–20W 2m pa, 3N204 preamp, £35. Coaxial, £5. G8KQW, QTHR. Tel 021-453 4748.
FT2FB mobile tx/rx, preamp, R3, R6, 145·00, 144·48, 144·60,144·80, 145·20, £100. Vanguard AM25T, converted 2m, £20. Pye base tx, £10. Xtals: FT243 12MHz × 12 for 2m, HC6U 9MHz for 2m, 75p ea. Postage extra. G8HKC, QTHR.Tel Maldon (Essex) 54080, after 6pm.
QM70 2m transverter, good 2W o/p, £30. AR88 rx, exc cond, fitted product detector, £70 or offers. Class D wavemeter, 240V i/p, £5. G3AGX, QTHR. Tel 0482 822276.
FR101S, full 10m cov, plus dust cover, few hours use, £350 ono. KW Viceroy hf bands ssb/cw/a.m. tx, plus matching psu/control unit, £60 ono. Tel Weymouth 79484.
Mains transformers, 230V pri, various ct secs: 500–0–500 250mA, £4; 350–0–350 100mA, £2.50; 450–0–450 120mA, £2.75; 425–0–425 200mA, £3; many others. Also stab psu, 300V 100mA, £6. G3UFW, QTHR. Tel Romsey 515884.
Pye Bantams, one S20 other S21, no mic, £35 ea. 450MHz ÷:10 prescaler, small case, mains psu, bnc sockets, £20. Prefer buyer collects. *Wanted:* Bird uhf elements; also high power uhf attenuator. G8ANZ, QTHR. Tel Stonehouse (Glos) 4123.
Clearance late G2YP equipment: TS520, £370; TS700G, mint, mic, vox, £395; 2m Ringo Ranger, £12; freq meters, BC221 and Gertsch 20–1,000MHz; capacity meter; power meter; swr bridges; gdo; baluns; ferrites; keys; meters; etc. G3LMH, QTHR. Tel Winchester 881644.
Trio R-300 comms rx, cov 170–410kHz and 525kHz–30MHz, bandspread 10–80m, as new, in orig carton, unwanted present, £185 or offers? T. Jones, 150 Holmwood Road, Enfield, Middx EN3 6QE. Tel Lea Valley 717612.
Yaesu FT221R, as new, vgc, £330 ono. G8MDA, QTHR.
Spkrs: pair Wharfedale Dovedale, joiner-built to spec, 31in by 16¾in by 13in, black vinyl finish, 60W, £65; pair Goodmans Mezzo SL, rms 36W, £50; will demonstrate. Sandell, 19 Mount Park, Carshalton, Surrey. Tel 01-647 8399.
SB104, SB604 kits, unopened, never get home to build them, £465, no hagglers please. Barry, G3RJS, 47 Gerald Road, Stourbridge, West Midlands. Tel Stourbridge 76570.
Lafayette HA800 amateur bands rx, solid-state, battery/mains, bfo, calibrator, manual, with hb atu, £45. Collect or carr extra. G4EOI, QTHR. Tel 01-648 6117.
100W 2m tx, perfect, £35. G8CKA, 27 Hartley Crescent, Southport. Tel Southport 65076.
Trio JN310 rx, exc cond, comp with spkr and manual, £80. Green & Davies 2m tx, a.m., 20W, easily modified fm, with 70cm adapter, 12V psu or mains, £40. G5SN, QTHR. Tel Southend 554846.
Trio 9R59D, handbook, £45. Xtal toneburst, unused, £6. Toneburst xtal, £1.25. Colour tv game, with sound, six games, pistol, £15. Black and white game, £5. Cassette recorder, mains/battery, little used, £6. G4FFJ, QTHR. Tel Newcastle (0632) 815966.
Trio 2200G, S20–24, R5–7, 145·32, nicads, exc cond, all orig accessories and packing, £120. Buyer collects. G8JVF, QTHR. Tel 01-941 0017, evenings and weekends.
Liner 2, with preamp, vgc, £90; or exch for three Cambridges, a.m., dash model, low or high. GU3HKV, QTHR. Tel Guernsey (0481) 47278, 6–7pm.
Rebecca indicators 6E, containing VCR97 EF50s, £5. TR3173 Rebecca tx/rx unit, containing VR65s, etc, plus gearing, £5. Type 78 coaxial relays, 12/24V dc, £3. B44 Mk2 tx/rx, £10. SCR578 dinghy radio, £8. I81A, £4. Plus carr. G3AFN, QTHR. Tel Wormley 2364.
Icom IC201, good cond, £260. Electronic Development 144MHz 100W linear, £100. Datong rf clipper, £30. STE BM14 squeeze keyer, with two independent memories, £75. G4DHA, QTHR. Tel Saltash (075 55) 3219.
KW2000B, ac psu, Shure mic, fitted extra stabilization, £210; KW1000 linear amp, £175; both exc cond with manuals. Liner 2 2m ssb tx/rx, rf preamp, exc cond, manual, £90. G3TKN. Tel Waterlooville 54949.
Kodak Brownie cine projector, standard 8mm, automatic threading; portable screen; cine camera, standard 8mm; £35 lot. Exch gen cov rx. *Wireless world*, '44–'52 comp; 108 *Practical Wireless*, '45–'77; 39 *Short Wave Magazine*, '47–'53; others; £6 lot. Tel 01-997 5157.
DX100U, SB10U, leads, mic, manuals, £55. Lafayette HE30, suit swl, manual, £15. Boot mount Pye Ranger, on 2m £10. Two Pye Reporters, suitable for spares, £2 ea. G4EYZ, QTHR. Tel Berkeley (Glos) 451, daytime only.
JR310, £85. Viscount, 12 xtals, £50. Ian, G8HPF. Tel 01-330 5019.
TR2200G, all accessories, charger, 2ch, £120. Buyer collects. G8KLI, QTHR (Birmingham). Tel 021-427 4678.
Trio TS520, ac/dc, exc cond, 360, KW204, £130. Eddystone 888A, £50. Codar AT5, psu, £25. FRSDX400, exc cond, £165. G4EQL, QTHR. Tel 021-472 1583.
KW2000E, vgc, matching ac psu and spkr unit, Shure 201, £275. G-whip, m/m, 10/20, bm and 80m coil, £20. Prefer buyers inspect and collect. G3RLI, QTHR. Tel 0926 29726.
JR310 rx, well used, many extras, stable and selective, manual, box, £65. Codar preselector, £6. Pair xtals for 1·6kHz filter, £3. Command Q Fiver, £5. Command medium wave, £5. Tel Coventry 22201, after 6pm.
Heathkit HW101, HP23C spkr, four months old, still under guarantee, can be seen or heard anytime, £400 ono. QVO8–100B with base, offers? G3SRZ (Cornwall). Tel Par 3375.
HW7 QRP tx/rx, handbook, as new, £30 ono. G3HSC beginners' morse course, two records, book, £2.50. HR10B 80–10m amateur band rx, 100kHz HRA-10-1 cal, vgc, £55, plus p&p. Unused 6146 valve, £1.50. Used 807 valves, £1 ea. Shaw, 16 Deansfield, Four Spires, Cricklade, Wilts SN6 6BP.
SE600 GTB tx/rx, rit vox, 6146Bs, part solid-state rig, built-in psu, mic, spare valves; also 18AVT/WB ant; both £135, collect. *Wanted:* Atlanta vfo. G3KMH, QTHR.
Liner 2; parts for psu; HMV vhf/uhf tv; Jaybeam 8Y, incl cable; real microscope, not toy; 100s of components; swr meter; Hy-Gain, 18V; semi-automatic camera; any offers considered, cash needed. G8LYH, QTHR. Tel Bob 051-724 1209.
KP202, eight sets xtals, S0, S20, S21, S22, R3, R4, R6, R7, toneburst, helical, nicads, base charger, £90 ono. G8HCK. Tel Leicester 353441.
Transformers, two types: 9V/1·2A + 15V/1A + 180V/60mA, £2; 11·3–0–11·3V/250mA + 11·6–0–11·6V/2A + 170V/50mA, £2.50; both 240V primary. Also GN4 nixie tubes (170/180V), £1 ea. Postage extra all items at cost. GM4DZX, QTHR. Tel 041-959 4455, after 6pm.
TR7500, fm, 80ch, as new, £170. Hallicrafter S53A rx, a.m., ssb, cw, hf bands plus medium, £30 ono. G3NUL, QTHR. Tel Newmarket 730181, evenings.
KW Atlanta tx/rx, ext vfo, £200 ono. Class D wavemeter; Avo electronic multimeter; dc variable power supply; 2m tx/rx, a.m., homebrew; offers. Plus other bits ex late G3XOR. Tel 021-770 3467, or 021-354 1566.
Yaesu FT301S, nine months old, hardly used, as new cond, £350. G8JBK, 170 Heath Road, Orsett Heath, Grays, Essex RM16 3AP. Tel Grays Thurrock 70074.
"Radio Communication", '66–'76 incl, £5 per year. G8FMH, QTHR. Tel Basingstoke 23979. For Basingstoke ARC.
Trio TR7500 2m fm tx/rx, £195. G3UQZ, QTHR. Tel 021-373 8806.
Yaesu FR101D rx, 16 months old, £350. Buyer to collect please. Barker, G4AZT, QTHR. Tel Oxford (0865) 770101, evenings.
KW204, good cond, £100 ono. Spare 6146s, also Trio TS520. YG-3395c, cw eight-pole xtal filter, £18. G4EHZ, 16 Sussex Road, Worthing. Tel Worthing 39612, after 6pm.
Eddystone 840C, good cond, except for small crack in front glass, offers? Buyer collects. *Wanted:* FR50B. N. Coombes, 38 Ashley Road, Taunton, Somerset. Tel 5057.
Pocketfones PF1, xtalled on 433·2, £25. Solid-state Modules 2m a.m. tx, with homebrew modulator and xtals, £20. Advance audio oscillator, bfo type, £5. G4CQS, QTHR. Tel Bromsgrove (0527) 33111.
Collins 75S3, cw filter, auto trans, £280. 32S1 tx, with 516F1 psu, 115V, £320. Prof-built 45ft tower, four-section tiltover, £80. 14AVQ/WB, six months use, £25. All buyers collect. *Wanted:* SB610, YP150, D43. G3MFE. Tel 0604 846203.
Yaesu FLDX400/FRDX400, vgc, £300. G3RUX, QTHR. Tel Exeter 69909.
KW E-Zee match, £25. AEC power/swr meter, £12. 75Ω dummy load, £12. Craven, G4EQI, QTHR (Birmingham). Tel 021-445 1347.
FRG7, as new, still under guarantee. Clive Hale. Tel 01-398 1382, after 6pm.
Unused 50ft Telomast, with rigging kit, £60. Octal HRO, with BS, GC coils, psu, £30. Homebrew HRO, with coils for spares, will separate if necessary, £12. KW swr bridge, £5. KW2000B Q-multiplier, £5. Heathkit RA1 Q-multiplier, £3. Codar AT5, ac psu, £25. T28, not wkg, £5. *Wanted:* KW Vanguard, E-Zee match. Collect or agree carr. G3WVP, QTHR. Tel 01-300 5891.
FDK Multi 2000, £190. Lots of other bits and pieces, ring for details. Smith, G8GAT, QTHR. Tel 0202 709401, or 0202 732863, 6–7pm.

Liner 2, vgc, spare dial lights, mobile mount, PA3 preamp (unfitted), £110 ono. 2m 14-el Parabeam, £15. Large collection high wattage resistors. Buyer to collect or arrange carr. G8JAJ, QTHR. Tel 024-267 2965.

TS700G; EDL200W linear, fitted fan; both exc appearance and wkg order, orig packing and manuals, £430. Can deliver. *Wanted:* FRDX400, all filters, converters. Dixon, G3XXQ. QTHR. Tel Newcastle 746723.

12AVQ antenna, £25. FT200, FP200, mint, £240 ono. Datong speech compressor, £17. Storno Southern base stn, 6ch fm rig, £30. Homebrew 500W linear, £20. Smith, G4GMH. Tel 01-226 1262 ext 247, office hours, or Basildon 413041, evenings or weekends.

VK Blob, with instructions, £8. Marconi audio sig gen, £10. Marconi valve voltmeter, £5. Avo LRC bridge, £2. Transistor GC coilpack, Denco, £10. 160/80m a.m. tx, incl psu and Woden mod tran, £10. Car radio, £3. G3VVS. Tel Radlett 6016.

Drake R4C, cw filter, noise blanker, 160–10, £325 ono. Drake 2A Q-mult, 160–10, £80. Central Electronics 20A, ssb exciter, vfo, 160–10, £70. Datong FL1, £20. Pye uhf rx, £10. G3PBQ, QTHR. Tel 021-373 2282, evenings.

Pye Cambridge AM10B, fitted S0, tx mod, needs slight attention, £18. Sentinel 2m mosfet converter, output 2–4MHz, £10. BC221, mains psu and charts, £12. *Wireless World*, most issues '71–5, offers. G8FRL, QTHR. Tel Cambridge (0223) 64565.

Trio TS700G, mint cond, £330. Heathkit vhf power meter, model 2102, £22. Microwave Modules 144MHz preamp, £6. Brown (Norwich). Tel Thurton 213.

Shack clearance: CR150/6, £40; Creed Deskfaxs, £20 ea; HP45, £35; KW2000CA, £45; 6146s, £1.50 ea; Sony 405 zoom camera, monitor, £60; Schomandl 30MHz synthesizer, £28; Nikon bellows/copier, £45; much more, sae list please. G3PYW, 10 Lodge Road, Maldon, Essex.

R0 and R5 xtals, 45MHz rx, 6MHz tx, HC25U, £6 the four; or swap for S21 and 144·80, same spec; will split. GW3WWN, QTHR.

Satellite 2000 rx, continuous cov 150kHz–30MHz, plus fm band, with amateur bandspread 7/21MHz bfo unit, battery/mains/rechargeable, value £200, offered at £120, carr paid, ono. G3IES, QTHR. Tel Bristol (0272) 500742.

Trio JR60 rx, 550kHz–30MHz, plus 144MHz, 2m section requires attention and new valve, 100kHz xtal calibrator, bfo, Q-multiplier, comp with manual, £30 ono. Carr extra; can deliver Manchester area. Haywood, 191 Somerton Road, Breightmet, Bolton, Lancs. Tel Bolton 384903.

Drake TR4 cw tx/rx, psu, one year old, as new, £460. Also Datong speech compressor, unused, £30. G3AIV. Tel 01-398 7482.

"Radio Communication", '51–'63, '68–'70, '72–5; *SWM*, '52–'60, '62–'75; offers; or exch, why? G3AUZ, QTHR. Tel 3893.

CR100, £20. Hallicrafter Sky Champion, £15. Pye 2m base stn tx, £15. Avo valve tester, £5. Class D wavemeter, £10. Labgear 160-Twin mobile tx, psu, £10. Top band car radio converter, £5. G3POY, QTHR. Tel 0732 883485.

WANTED

OS2 'scope; TCS rx. Stratfull, 37 Boxgrove Gardens, Bognor Regis, Sussex PO21 4BB.

QM70 transverter, 28–144MHz (valve type). Eddystone Edometer gdo. Taylor, 8 Heythrop Drive, Middlesbrough.

Pye Vanguard AM25/T, or Cambridge AM10D/B and F30 base stn, high or low band. Brown, G8CXV, 41 Nabbs Lane, Hucknall, Notts. Tel 06075 32129, evenings.

Mains unit assembly for Avo transistor analyser, or non-wkg instrument for cannibalization. Brackenbury, 5 Castle View Road, Strood, Rochester, Kent ME2 3PP. Tel Medway (0634) 76282.

Telford TC7 Mk2, tunable i.f., HQ1 minibeam. Details and price. G2DGW, QTHR.

For the Wireless Museum: very old rx, tx, valves, components, books, catalogues, magazines, callbooks, valve tester, Voight, Hartley-Turner, corner spkr, loan of Baird 30-line Televisor. Collection arranged. Details please to curator, G3KPO, QTHR. Tel Shanklin (098 386) 2586.

Cossor CC303 manual, loan or buy, or any other info. G4DNI, 1 Harvey Close, Upper Caldecote, Beds SG18 9BQ.

Versatower, any model, any height, could collect within 300 miles of Gwent. Fair price paid for your ptfe sheet oddments, any gauge/size. Also, any size slab/plate ptfe. Low value vacuum caps, 30–40pF region. GW4BXE, NOT QTHR. Tel 06333 65010.

Correspondence course for swl trying to study for RAE. BRS35070, 29 Lymington Close, London SW16 4QL.

Liner 2; will exch Standard C432 handheld tx/rx, 70cm fm, 2·2W output, 6ch, xtalled SU20, SU16, SU8, RB14, carry case, nicads, ext mic, charger, ext antenna lead, manual, reasonable cond. G8KMS, QTHR.

Circuit diagram for Eddystone 640; also service manual, for copying and immediate return. G4GVN, 95 Towngate Road, Worrall, Sheffield.

FT401 tx/rx, around £250. Good linear KW1000, SB200, etc, £100–150. G4BHE, QTHR. Tel Basingstoke 781468, evenings.

To buy or borrow, manual for Solartron/Hartley CT436 'scope, all costs refunded. G4EKG, c/o D. H. Taylor, 10 Laurel Avenue, Four Pools Estate, Evesham, Worcs. Tel Evesham 48289.

Beg, borrow or photocopy, circuit diagram with component values for FL2100B linear amplifier. G3CHM, QTHR.

KW2000 B or E, with psu, in good cond, G8LCQ, 23 Barn Common, Woodseaves, Staffs. Tel Woodseaves 388.

Vanguard AM25B/V circuit or handbook, buy or borrow for copying. G4BTV, QTHR. Tel Fareham (Hants) (0329) 235164.

Xtals: 6MHz, 9·5MHz, 13·0MHz, 14·0MHz, 15·5MHz, 16MHz; all fundamentals. G3AMF, QTHR. Tel 01-989 9224.

Help! Volunteer group requires Tri-Tower, 40ft. Also dash or boot low band a.m. Cambridges, Pye remote controllers, and hand-held or portable low a.m. equipment. Tel John Cook, Chertsey 61393, evenings.

Collins tx KWS-1, with power pack, manual, leads, for use with 75A-4 rx. GM4AGS, QTHR.

Telford TC7 Mk2, i.f. tunable 28–30MHz, must be in good cond. Info please on valve CV2179–A2134, or equiv. G4BNH, QTHR. Tel Shipley 57711.

Urgent, starting radio club in clubless area. 2m tx gear: top band to ten tx, ssb, a.m., cw, homebrew acceptable, price and cond please, not millionaires. Can you assist! Morgan, 97 Twyford Avenue, Great Wakering, Essex SS3 0EY.

To complete restoration of a B40D: tray converter mounting, ref 5820-99-971-7206, (to locate ssb adapter on to top of rx cabinet), any cond. Derek Sheen, G4CCW, QTHR. Tel 01-651 1410.

KW E-Zee match; Codar T28 rx; 12V dc Codar psu; all must be exc cond. *For Sale:* Microwave Modules 2m converter (MMC 144/28 lo), £14. Joystick vfa antenna, with Joymatch atu, £12. G4GGN (Solihull). Tel 021-705 0759.

National HRO loud spkr. Also output transformer, tapped winding 4,000–16,000Ω primary; and output transformer having 7,000Ω primary only. G2VF, QTHR. Tel Southampton 775064.

Manual for Storno base stn CQM13c–14, buy or borrow. G8NIM, QTHR. Tel 021-779 3118.

TS700G, IC201, etc. Trio JR310. G8LGL, QTHR. Tel Nailsea (02755) 2478.

SB220, in good cond. *For sale:* FR101DD, £450. FL101, £300. G4FUG, QTHR. Tel 01-858 3703.

£90 offered for mint cond Trio TS900, ext vfo (VFO-900). GW3MWH, QTHR.

FTDX400/401, or FLDX400/401, would collect Scotland or Northern England. GM5PJ, QTHR.

Yaesu FV101B vfo. Datong FL1 filter, must be mint. G6XY, 22 Southbank Road, Kenilworth, Warks. Tel Kenilworth 52679.

R107 rx, undamaged, in exc wkg cond. WS No 12 tx, any cond providing transformer ok. Any items for WS Canadian No 52. WS19 Mk3, in exc cond, high power atu, connectors, etc. Taylor, G3UCT, 27 Glen Road, Fleet, Hants. Tel Fleet (02514) 6998.

Heath 23A psu. Manuals for Heath OS1 'scope, Airmec 712 vvm. G3LYU, QTHR. Tel 0533 876459.

Urgent. Xtals, all MHz: 9·5, 11·0, 14·0, 15·5, 16·0, 16·5, 19·0, 20·0, 21·5, 22·0, 23·5, 24·5, 25·0, 26·0, 29·0, 29·5, 32·0, 36·5. G3AMF, QTHR. Tel 01-989 9224.

FT101, or similar rig. G4GMY. Tel Wantage 4943.

Mechanical filter, Kokusai MF455 10k. Bergius. Tel 0546 2738, evenings or weekends.

Urgent: focal plane dish antenna, suitable for 10GHz, approx 2ft dia, with WG16 feed if possible. Also WG16 two-way switch. G3YJH, QTHR. Tel 021-358 3174.

12AVQ or similar vertical antenna; approx 15·075MHz HC6U xtal; vswr bridge. G3YRU, QTHR.

Ext vfo for Standard C828M. G3VYP, QTHR. Tel Yarpole 296.

KW1000 or FL2000/FL2100 linear amplifier. G3ZAY, QTHR. Tel 0223 311714.

3-el beam for hf bands: DX33, Mustang, etc, possibly with mast/s. Also second rx for cw fanatic with tx/rx! Local offers with inspection convenience/delivery facilities preferred. Curnow, G3UKI, 6 Clayford, Dormansland, Surrey. Tel 0342 833243 (home), or 01-730 8371 (office).

Aircraft Radio Museum would like to acquire: antenna type 1, box junction type 7, control unit type 6, for SBA; panel 192 for A1134; R1116; T1083; TR10056; old airborne radio or radar, and manuals. Curator, G3TFC, QTHR. Tel 0203 302668.

Hudson FM20B circuit diagram or manual, for copying; also circuit of Pye 9116 stereo cassette recorder. G8KDO, QTHR.

Yaesu twins FLDX400/FRDXS400, comp with all filters, 2m, 4m converters, must be in perf cond, state price and details. *For sale:* Hallicrafter SX100 Mk2, good cond, £100. Tel Street 45179, after 6pm.

Welsh Amateur Radio Convention

Oakdale Community College
Oakdale, Blackwood, Gwent

10am–5.30pm, 24 September 1978

Trade exhibition	**Exhibition station**
AMSAT-UK	**IBA—"Oracle"**
TV and rtty display	**RSGB bookstall**

LECTURES

- Film of the 1978 Clipperton Island dxpedition.
- ARRL film *Ham's Wide World.*
- "RSGB and WARC 79" by D. S. Evans, G3RPE, President of the RSGB.
- "Telemetry communications from high altitude transatlantic balloons using low power hf" by S. Cherry, G3SJK, of the Appleton Laboratory.

Increased exhibition space this year.

Talk-in from 9am, GW3WTZ/A on S22 and GB3BC/R6.

Overnight accommodation details from R. B. Davies, GW3KYA, 16 Vancouver Drive, Penmain, Blackwood, Gwent NP2 0UQ, tel 225825

Admission 50p, at the door

Scottish Amateur Radio Convention

Aberdeen Beech Ballroom

30 September 1978

- Large trade exhibition and displays by clubs and repeater groups.
- Biggest-ever raffle with £500 worth of prizes—everyone guaranteed to win.
- Lecture subjects include hf, vhf, microwaves and digital techniques.
- In addition, an RSGB forum—your chance to ask questions. The President, general manager, vhf manager, VHF Committee chairman and others will be travelling to Aberdeen.
- A very informal dinner will be held in the evening during which G3RPE will judge and award a trignum of whisky to the winner of the traditional "throw a paper dart at the general manager" competition. Warning to those attending, previous general managers have been known to throw them back!
- Ladies are especially welcome. Pat, G3TEY, enjoyed the last Aberdeen convention so much she is travelling 400 miles to be there again this year. Pat will draw the ladies free raffle—prizes include champagne, perfume and ladies lcd watches.

Full information on the convention from GM8FFX, PO Box 49, Aberdeen.

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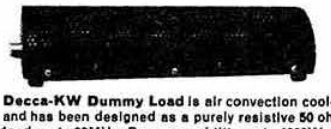

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144·030 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144·4/433·2 ..	a	b	a	b	b	c	b	c	b	b	b	b	b	b
144·480 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144·800 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144·850 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145·000/SO ..	a	a	a	a	a	a	a	a	a	a	a	a	b	b
145·050/R2T	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·075/R3T	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·100/R4T	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·125/R5T	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·150/R6T	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·175/R7T	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·200/R8T	a	a	a	b	b	a	a	a	b	a	a	b	a	b
145·300/S12	b	b	b	b	b	b	b	c	b	b	b	b	b	b
145·350/S14	b	b	c	b	b	c	c	c	b	c	c	b	b	b
145·400/S16	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145·500/S20	a	a	a	a	a	a	a	a	a	a	a	a	a	b
145·525/S21	a	a	a	a	c	a	a	a	b	a	a	b	a	b
145·550/S22	a	a	a	a	c	a	a	a	b	a	a	b	a	b
145·575/S23	a	a	a	a	c	a	a	a	b	a	a	b	a	b
145·600/S24	a	a	a	a	c	a	a	a	b	a	a	b	a	b
145·650/R2R	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·675/R3R	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·700/R4R	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·725/R5R	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·750/R6R	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·775/R7R	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·800/R8R	a	a	a	a	a	a	a	a	b	a	a	b	a	b
145·95 ..	a	b	a	a	b	b	b	b	b	a	b	b	b	b

Prices: (a) £2.36, (b) and (c) £3.20 + VAT (H).
AVAILABILITY: (a) and (c) stock items, normally available by return (we have over 5,000 items in stock), **(b)** Four weeks normally but it is quite possible we could be able to supply from stock. **N.B.** Frequencies as listed above but in alternative holders and/or non-stock loads are available as per code (b).
ORDERING. When ordering please quote (1) Crystal frequency, (2) Holder, (3) Circuit conditions (load in pf). If you cannot give these, please give make and model of equipment and channel or output frequency required and we will advise if we have details.

JAPANESE AND AMERICAN EQUIPMENTS

With the ever increasing popularity of Japanese equipments we have further expanded our range of stock crystals. We can now supply for **YAESU** FT2F, F2F2FT, Ft2 Auto, FT224), most of the **ICOM** range and the **TRIO-KENWOOD** range. We can also supply from stock crystals for the **HEATHKIT** HW202 and HW17A.
YAESU FT221 CRYSTALS NOW IN STOCK, ALL AT **£2.96** + VAT (H). All popular channels—For repeater use advise xtal frequency required as earlier models have different shift xtals to later FT221R. We can also supply the crystal to give NORMAL "tune to RX" working (as FT221R). For 70cm we can supply the 1·6MHz shift xtal for direct use with a **MICROWAVE MODULES** MMT432/144 which we can supply for **£151.00** + VAT (H). **SPECIAL OFFER:** If ordered with transverter 70cm shift crystal FREE!!

CRYSTALS FOR THE NEW BRITISH 70CM CHANNELS

We are stocking the following channels RB0 (434·60/432·00), RB2 (434·66/433·05), RB4 (434·70/433·10), RB6(434·75/433·15), SU8 (433·20), RB10 (434·85/433·25), RB14 (434·95/433·35), SU18 (433·45) and SU20 (433·50)—TX and RX for use with: PYE UHF Westminster (W15U), UHF Cambridge (U10B), Pocketfone (PF1) and STORNO CQL/CQM 662 all at **£2.36** plus VAT (H). For the U450L Base Station we have the TX crystals for all the above channels plus the RX crystals for SU8 at **£2.36** plus VAT (H). The RX crystals for RB2, RB4, RB6, RB10, RB14, SU18 and SU20 for use in the U450L Base Station, together with the TX and RX crystals for the remaining SU channels (SU12·433.30-RTTY, SU16·433·40 and SU22·433·55) for all the above equipments are available at **£3.20** plus VAT (H) delivery as per class (b) 2m items.

4m CRYSTALS FOR 70·26MHz—HC6/U

TX 8·7825MHz and RX 29·7800MHz .. .. at **£2.36** each + VAT (H)
RX 6·7466MHz .. .. at **£2.90** each + VAT (H)

10·245MHz "ALTERNATIVE" I.F. CRYSTALS—£2.36 + VAT (H). For use in Pye and other equipment with 10·7MHz and 455kHz I.F.s to get rid of the "birdy" just above 145·0MHz. In HC6/U, HC18/U and HC25/U.

CRYSTAL SOCKETS—HC6/U, HC13/U and HC25/U (Low loss) 16p each + VAT (H) + **10p** P. & P. per order (P. & P. free if ordered with crystals).

CONVERTER/TRANSVERTER CRYSTALS—HC18/U

All at **£3.00** + VAT (H), 38·6666MHz (144/28), 42MHz (70/28), 58MHz (144/28), 70Mhz (144/4), 71MHz (144/2), 95MHz (342/52), 96MHz (1,296/432 144), 101MHz (432/28), 101·50MHz (434/28), 105·6666Mhz (1,296/28) and 116MHz (144/28).

CRYSTALS SPECIALLY MANUFACTURED FOR AMATEUR USE TO CUSTOMERS REQUIREMENTS

Now supplied to our new Improved amateur specification (temp. tol. ±30ppm 0-60°C, adj. tol. ±30ppm) as follows: in HC6U 1·5MHz **£3.95** + VAT (H) and HC6/U 2·105MHz and HC 18/U and HC25/U 4·105MHz **£3.36** + VAT (H). Delivery usually 4-6 weeks. Please give circuit conditions (L.E. Load in pf etc.) when ordering. Fundamentals (1·5·21MHz) will be supplied to 30pf circuit conditions, and overtones (21·105MHz) to series resonant conditions unless otherwise specified. For details of closer tolerance crystals please send S.A.E.

TEST EQUIPMENT FREQUENCY STANDARD CRYSTALS—

100kHz in HC13/U, **£2.95** + VAT (L).
1MHz and 5MHz in HC6/U and 10MHz and 10·7MHz in HC6/U, HC25/U, **£2.80** + VAT (L).

BURNS ELECTRONICS

We are the Northern Appointed Agents for **BURNS KITS** etc. and can supply many of their products from stock.

MODULAR COMMUNICATIONS SYSTEMS

For the RTTY enthusiast we can recommend and supply the **"MCS"** range of products. This includes terminal units, AFS keyers, magnet drivers for TTL interface, telegraph distortion measuring adaptor, RTTY audio processor, power units, etc, etc. For the CW man we have the **"MCS"** CW filter which give three stages of active filtering. Please send S.A.E. for full details of the **"MCS"** range.

ANZAC MD-108 DOUBLE BALANCED MIXER

5–500Mhz supplied with full details for only **£5·95** plus VAT (L).

CRYSTALS FOR PROFESSIONAL USE

CRYSTALS TO COMMERCIAL SPECIFICATIONS

We can supply crystals to most commercial and MIL specifications, with an express service for that urgent order. Please send S.A.E. for details or telephone between 4.30—7pm and ask for Mr. Norcliffe.

TERMS: CASH WITH ORDER—MAIL ORDER ONLY—S.A.E. WITH ALL ENQUIRIES—PRICES INCLUDE P. & P. (BRITISH ISLES) EXCEPT WHERE STATED—OVERSEAS CHARGED AT COST.

STEPHENS-JAMES LTD G3MCN

47 WARRINGTON ROAD, LEIGH, LANCS WN7 3EA TEL 0942-676790

TRIO

TS820 HF Transceiver	£723.00
DG1 Digital read out option	£136.00
TS520S HF Transceiver	£525.00
TS700S VHF Transceiver	£580.00
TS700G VHF Transceiver	£458.00
TR7500 VHF FM Transceiver	£225.00
TR7200G VHF FM Transceiver	£189.00
TR7010 VHF SSB Transceiver	£189.00
TR2000GX FM Portable Transceiver	£147.00
TR3200 70cm FM Portable Transceiver	£185.00
TR8300 70cm UHF/FM Transceiver	£244.00
PS5 Power Supply Unit	£58.00
SP70 Speaker	£18.00
DM800 G.D.O. Absorption Wavemeter	£51.48
CO1303G Monitorscope	£129.00
All crystals and accessories available.	
AT200 Antenna Tuner	£93.00

YAESU

FRG7 Receiver	£200.00
FRG7000 Receiver	£364.50
YH55 Headphones	£9.85
SP101B Speaker	£19.65

DRAKE

SSR-1 Solid state receiver	£150.00
TV3300 Low Pass Filter	£18.00

STE MILAN

AR10 28-30MHz AM-SSB Receiver module	£39.50
AA1 Audio amplifier for AR10	£4.75
AD4 FM Discriminator	£5.00
AR20 FM Crystal controlled receiver module	£50.00
AT23 FM Crystal controlled transmitter	£50.00
AG10 Tone burst unit	£4.50
AL8 10 watt Linear amplifier	£27.00
ARAC 102 2 band Receiver	£100.00
ARAC 170 70cm and 10m Receiver	£127.00
ASAP Stabilised 2½ amp power unit	£27.50
AB40 40 watt Mobile FM amplifier	£55.00

TEK

NEW RANGE. 10–80 Trapped dipole 2kW PEP. Complete, not a kit **£50.00**

ROTATORS

AR40	£53.44	KPR400	£97.00
CD44	£106.87	AR22R	£48.38
HAM2	£145.12		

G-Whip Mobile antenna range

Tribander helical 10-15-20m	£21.15
LF Coils for tribander	£6.17
Telescopic for coils	£2.70
Basemount standard	£3.82
Basemount swivel type	£5.34
Flexiwhip basic 10m	£14.62
Coils for flexi	£6.17

ALDA 103

New model Solid State Transceiver.
250 watts PEP/250 watts CW with built in CW Monitor.
80-40-20 metres. 6 Pole crystal filter.
Complete with Microphone and Mobile Bracket £399.00

SXR30

New model solid state receiver
550KHz to 30MHz £158.00

MICROWAVE MODULES

Transverters

MMT432/28-S	£133.88
MMT432/144-R	£169.88
MMT144/28	£88.88

Converters

MMC144 any IF	£20.25
MMC144/28 LO	£22.50
MMC70/any IF	£20.25
MMC70/28 LO	£22.50
MMA144 Preamp	£14.63
MMC432 any IF	£27.00
MMC1296 any IF	£28.00

Frequency Counters

MMD050/500	£85.32

JAYBEAM

4Y/4M 4 metre 4 element Beam	£12.55
C5-2M Glass-fibre coliner	£30.93
8Y/2M 8 element Yagi	£10.00
5Y/2M 5 Element Yagi	£7.71
PBM10/2m 10 element Parabeam	£25.35
PBM14/2m 14 element Parabeam	£31.43

Full range of antennas for 144MHz, 70cm available with full range of tubing, clamps, etc. SEND SAE for full details.

BARLOW WADLEY

XCR-30 Rx	£150
XCR-30 FM Rx	£170

MARC

NR56V 2m FM Receiver 12V dc	£54.00

F.D.K.

TM56B VHF Monitor Receiver	£104.50

STATION ACCESSORIES (including postage)

Single Meter SWR Wall Type	£10.25
Single Meter SWR Desk Type	£10.45
Twin Meter Desk Type	£11.45
2 Way heavy duty Antenna switch	£11.95
3 Way Antenna switch	£6.00
6 Way Antenna switch	£17.25
Junkers Morse Key	£35.00
HyMound Morse Key	£9.30
Hansem FS301 through Line Wattmeter	£33.25
HP3A Low Pass Filter	£3.00
Plastic antenna insulators	23p
Nye King 003 Morse Key	£8.75
Standard type Morse Keys	£3.15

HY-GAIN

12AVQ Vertical 10-15-20m	£39.93
14AVQ/WB Vertical 10-15-20-40m	£56.19
18AVT/WB Vertical 10 through 80m	£81.45
Th3MK3 Triband Beam	£167.62
Carriage **£2.00** on antennas	

WESTERN

Alumasts and antennas now in stock.

30ft Alumast	£139.00
DX-32 Two Element Tribander Beam	£67.50
DX-33 Three Element Tribander Beam	£92.91
DX-34 Four Element Tribander Beam	£121.50

STABILISED POWER SUPPLIES (New Range)

Model 122 0-15V dc 2-5Amp	£13.53
Model 122S 12-6V 2-5Amp	£18.00
Model 125 12V 5Amp	£24.00
Model 153S Dual Meter 0-20V 4Amp	£26.73
Model 156S Twin Meter 0-15V 6Amp	£33.35
Model 1210S Twin Meter 0-20V 10Amp	£75.00

TECHNICAL ASSOCIATES

We are now acting as sole distributors for the full range of Technical

RX Band Pass filter	£29.75
RX Peak and Notch filter	£29.75
Audio Compressor	£28.75
Preselector MK1 with relay	£29.75
Preselector MK2 for SWL	£26.55
Crystal Calibrator	£21.85

These prices include VAT and postage.
New models available later in year.

SAE with all general enquiries please.

SWL TUNING UNITS

MK1 Cover 2-30MHz	£17.50
MK2 Covers 550KHz to 30MHz	£23.50

Designed and manufactured by us. Fifty switchable tunable positions, will match any antenna to your receiver. Now in use in over 40 countries. Price includes VAT and postage on these items.

SECONDHAND EQUIPMENT

Due to the fact that our secondhand equipment stock changes daily and our adverts are in press weeks before publication we are not publishing a list. At this date we have over 30 Transceivers and receivers in stock. A S.A.E. will bring you an up-to-date list or please phone. Good clean equipment wanted and spot cash will be paid. All secondhand equipment carries a three month guarantee.

Shop Hours Mon to Fri 9.30am to 5.30pm
Saturday 9.30am to 5pm
ACCESS and Barclaycard facilities.
HP terms arranged. Part exchanges always welcome. Good clean equipment bought for cash.
Items sold on a commission basis.
We are located on the A574. Turn at the Greyhound Motel on the A580 (East Lancs Road) and we are about ½-mile on right. No parking problems at any time.

PRICES ON IMPORTED GOODS LIABLE TO CHANGE WITHOUT NOTIFICATION.

SAMSON ETM - 3C KEYERS

Professional-grade C-MOS keyers built for dependable Marine & Commercial use world-wide—Backed by Spacemark service.
Only 1μA battery idling current! **ETM-3C, £63.88**

ETM-4C MEMORY KEYER—Has ETM-3C features plus 4 memories each taking approx 22 Morse characters (switchable 4 × 256 or 2 × 512 bits). Erase/rewrite as often as needed. By just pressing a button it sends CQs etc.—once only, or repeatedly, and at any chosen speed.

JUNKER PRECISION HAND KEY. £36.54

BAUER SINGLE-PADDLE KEY UNIT. £11.66

88mH TOROIDS for rtty, cw, sstv, filters. **90p** each

SSB 90° AUDIO PHASE SHIFT NETWORKS. octal based.

All prices postpaid and include 12½% VAT. Please send stamp with all enquiries.

SPACEMARK LTD.

THORNFIELD HOUSE, DELAMER ROAD, ALTRINCHAM, CHESHIRE (Tel: 061-928 8458)

TMP ELECTRONIC SUPPLIES

EVERY YAESU ITEM IN STOCK AND AVAILABLE FOR DEMONSTRATION. COME ALONG AND LOOK AROUND, WE ARE OUT IN THE COUNTRY WITH NO PARKING PROBLEMS. HP FACILITIES, SMC 2-YEAR GUARANTEE, FREE SECURICOR CARRIAGE, PART EXCHANGES WELCOME.

W2AU QUAD SPIDERS. **£25.00**
W2AU BALUNS with built-in lightning arrester. **£12.50**
TOROIDAL BALUN KITS. All band 3-50 H.F. **£4.50**
RF2000 SWR PWR METERS 3-5 to 150MHz 2KW. **£26.00**
NYE VIKING MORSE KEYS. **£8.75**
G-WHIP MOBILE ANTENNA. ..... SAE for Prices
AMIDON TOROIDAL CORES. ..... SAE for Prices

ALL PRICES POST PAID
SECOND-HAND EQUIPMENT. CHANGING STOCK DAILY
BRITANNIA STORES, LEESWOOD, MOLD, CLWYD CH7 4SD
Tel: Pontybodkin 846 (035287)
Open daily 9.30-5.00. Early closing Tues. 1pm. Sat. 2.30pm.

UP-CONVERTER Model UC/1

Synthesiser Controlled General Coverage Receiving Adaptor Plus Two-Metre Converter for Receivers Covering 28-29MHz and/or 144-145MHz

MODEL UC1, combined with your good quality 10- or 2-metre receiver or transceiver, brings you high performance general coverage reception at a remarkably low cost. The same no-compromise performance that you are probably used to on the amateur bands will be achieved on every frequency from 30MHz down to below 90kHz. Model UC1 has received unanimous acclaim from reviewers (Rad. Com. Aug. 1977; Short Wave Mag. Nov. 1977) and is still completely unique.

PRICE £105.00 plus VAT, total **£118.13** (including delivery within UK)

Also available: the ideal companion for any general coverage receiver, a miniature general coverage active antenna, Model AD170 (this is also useful for Band 1 DX TV). Data on Models UC1, AD170 and also Models FL1 and RFC are available free on request.

- Gives complete no-gap coverage from 90kHz to 30MHz, in 30 switched 1MHz bands.
- Also operates as a 2-metre converter with receivers covering 28-30MHz.
- Two separate outputs are provided as standard, one for 144-145MHz and the other for 28-29MHz receivers.
- No receiver modifications are required. Model UC1 simply connects in series with the aerial feeder.
- Overall performance is virtually as good as that of the main receiver.
- Straightforward digital switch selection of the desired 1MHz band segment eliminates critical adjustments.
- Built-in aerial attenuator.
- Frequency synthesiser locked to 5MHz crystal ensures excellent frequency stability.

DATONG ELECTRONICS LIMITED

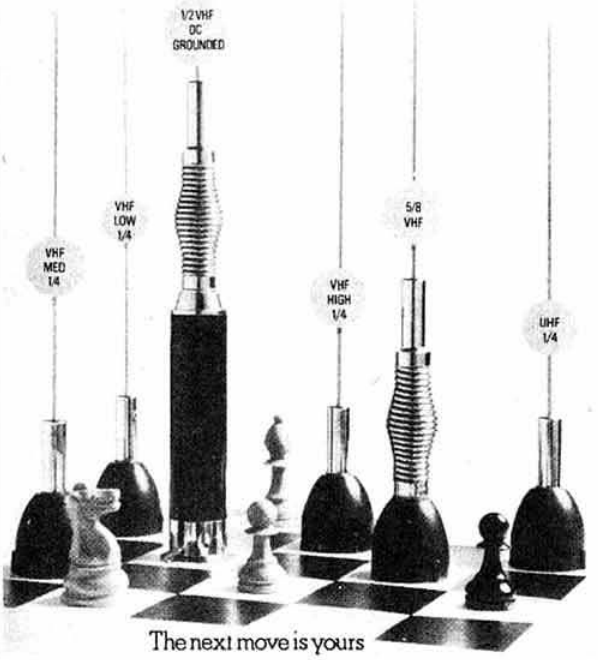
Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE Tel: Pudsey (0532) 552461.

SOUTH MIDLANDS COMMUNICATIONS LTD

presents

ASCOT ANTENNAS

for mobile



This is a complete range of mobile antennae and accessories developed and manufactured in the United Kingdom.

All antennae are extremely rugged, finished to withstand extremes of weather and feature: fine tapered stainless steel whips, talc-filled polypropylene bases, chrome-plated brass ferrules, heat-treated silver-plated beryllium copper contacts and buffed/polished stainless steel shock springs.

SAMPLE PRICES—ADD CARRIAGE CHARGES AND VAT 12½%

(£1.00 high gain, 50p unity gain)

340	VHF-UHF	¼λ	antenna, base and ferrule	£4.35
341	VHF	¼λ	3dB base and ferrule and spring	£9.75
342	VHF	¼λ	3dB base and ferrule	£7.15
350	VHF	¼λ	3dB DC ground transformer and ferrule	£12.55
351	VHF	¼λ	3dB DC ground transformer, ferr & sprg	£13.85

All antennas are complete—whip, ferrule (spring), (transformer), base, cable mounting

Ascot antennas are available; mail order from SMC HQ in Totton, personal callers to any branch (Leeds, Chesterfield, Woodhall Spa) and agents or reputable amateur radio dealers throughout the kingdom.

SMC

SMC Ltd, Osborne Road, Totton Southampton, Hants SO4 4DN 'Phone: Totton (04216) 7333

Twin Towns Exhibition Radio Link-up

Saturday, 16th—Sunday, 17th September

A colourful exhibition of Lancaster's twin towns, Perpignan, in France, and Rendsburg in Germany will be held at the Lancaster Leisure Park. The Special Call sign GB 3 LC will be used to contact the "twins" in Europe and three other Lancaster cities in California, Massachusetts, Pennsylvania in the U.S.A.

Mobile stations are particularly welcome to join in the 'talk-in' on 80 metres and 2 metres. A special parking area will be reserved for their vehicles.

Admission to this event is free and all the usual Leisure Park amenities will be open, including the mini golf, cafe, tea garden, seconds shop and free parking.

HORNSEA POTTERY LANCASTER

Wyresdale Road, Lancaster LA1 3LA Telephone: 0524 68444

Open all day, every day from 10 a.m.

RENDSBURG

2m 12V 6-CHANNEL TRANSMITTER FOR £25

Board size 140 × 82mm ● Frequency multiplication × 12 ● Crystal sockets HC25/U ● Crystal pulling trimmers available ● Minimum power 1W into 50Ω ● RF bandwidth 1MHz (145-146MHz)

Audio processor input impedance 300Ω ● Pre-emphasis, limiting, de-emphasis and audio filtering circuitry ● Sensitivity 2mV for 3kHz dev ● Max dev 5kHz ● Circuit supplied.

CA3089E	£1.10	CA3018	70p
2N3866	80p	2N4427	70p
2N5591	£7	BLY33	£1.80

Minimum order £1.00. Mail order only P&P 20p

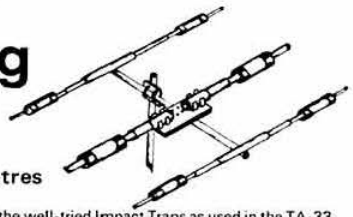
HELLER ELECTRONICS

49 Blossom Waye, Hounslow, Middx TW5 9HB

impact

Mustang Mk2

for 10, 15 & 20 metres



This Antenna incorporates the well-tried Impact Traps as used in the TA-33 Jr. for the Director and Reflector Elements; but the Driven Element is of heavier construction, and uses higher power and larger Traps. All Traps are weather and moisture protected. This process has been tried and tested over a period of several years to ensure maximum performance under differing climatic conditions.

The MOSLEY MUSTANG Mk2 was designed to fulfil the need for a beam capable of handling the maximum legal power ratings of all amateur licences throughout the world. It will therefore, handle comfortably 2kW p.e.p or 1kW on CW and AM. At the same time, it is very compact, light and strong. It has a low wind load. This three-element beam gives outstanding performance on 20, 15 and 10 metres.

FIELD TEST—RESULTS & DATA

Forward Gain	up to 8dB	Wind Load	90lb
Front to Back Ratio	20dB	Turning Radius	15ft
Maximum Element Length	25ft 9½in	Shipping Weight	15kgs
Boom Length	12ft	Boom Diameter	1¼in
Assembled Weight	26lb		

Visual standing wave ratio is less than 1·5-1·0 at resonant frequency

Mustang 3 Elements, 10, 15 and 20 metres **£118.00**

MOSLEY ELECTRONICS LIMITED

Administrative Address only

196 Norwich Road, New Costessey, Norwich NR5 0EX,

(All antennas available ex works, carriage and VAT extra)

Send for HANDBOOK containing full range of Antennas and exclusive technical information, 28 pages **75p**. *Refundable upon purchase of Antennas.*

G. W. M. RADIO LTD.

ALL PRICES include VAT and Post/packing

PYE CAMBRIDGE U10B. UHF 70 Cms, boot mounting with Control Box, Cable and mounting tray. No mike or speaker. Exceptionally clean as these have been used for data transmission only. **£40.**

ULTRA 3A4AC3. Handy portable 3lb weight and covers 68-101Mc/s. 3 channel. Complete with used but good rechargeable batteries. Working order, less crystals. **£45.** A few battery chargers available for quantity orders.

EX-SERVICES Wrist WATCHES. Hamilton, **£15.50,** Smiths, **£9,** and Record, **£9.** Also WALTHAM pocket, **£7.50.** All overhauled and in good order. Sent by Registered post.

ALARM CLOCKS, WEHRLE Commander. Steady/repeat alarm. Large, magnificent and brand new, **£9.50.**

SPEAKERS. Brand new mobile speakers by Lammerhold (type 232/3). Black plastic case, silver coloured grill, swivel bracket and 5 feet lead. Rated at 2 watts 3 ohms, **£4.25.**

POCKETFONES PF1. A further supply of these hand held 430Mc/s TxRx, again we are unable to test because crystals removed by supplier but these are just out of service. With circuits and tuning instructions, **£20** pair (one Tx one Rx) PF1 CAR ADAPTORS. Rx plugs in and battery is charged. Output is taken to a 3 watt amplifier into 3 ohm speaker (no speaker supplied) **£8.**

CALIBRATORS FREQUENCY CT432. 110/250 AC. 12" × 6" × 7½" 100kc/s, 1Mc/s and 10Mc/s outputs from integral crystals. Provision for external crystals in the range 100kc/s to 10Mc/s 4 front panel bases suit most types. RF sources may be fed in and calibrated by beating against desired crystal. Audio output to headphone socket. Clean and working order, **£15.**

OSCILLOSCOPES CD523.S.2 SOLATRON. Clean and working order, **£45.**

R.F. FILTERS, clean up your supply leads, 2·5 amps at 250v AC or 600v DC. A quality item, **£1.25** or 5 for **£4.**

C.R. TUSES for Hartlev 13A scopes. **£15.** FOR CALLERS ONLY

Carriage charges are for England and Wales only.

Terms: Cash with order **Early closing Wednesday**

G. W. M. RADIO LTD.
WORTHING, SUSSEX

40-42 PORTLAND ROAD,
Telephone 34897

CLASSIFIED ADVERTISEMENTS

Private advertisements **15p** per word, minimum **£3.00.**
Trade advertisements **25p** per word, minimum **£5.00.**
Box Number 75p extra to wordage or minimum.
Semi-display 1/12 page (1⅞" × 3") (35 × 76mm) **£21.00.**
1/16 page (⅞" × 3") (22 × 76mm) **£15.00.**
Please write clearly. No responsibility accepted for errors.
Latest date for acceptance—5 weeks before 1st of issue month.

All classified advertisements must be prepaid.
Copy and remittance to: C. C. LINDSAY.
2 Leyburn Gardens, Croydon CR0 5NL. Tel: 01-686 5839.
Members' Ads must be sent to the Editor at Chelmsford.

FOR SALE

QSL CARDS, printed to your own specification on white gloss cards. Send SAE to Caswell Press, 11 Barons Way, Woodhatch, Reigate, Surrey.

QSL CARDS, LOGBOOKS, Samples 9p. Beauprint (G3OYI) Meltham Road, Honley, Huddersfield.

RSGB PUBLICATIONS, Maps, Charts, Sundries, etc. Les Hawkyard, G5HD, 100 Shirley Street, Southampton SO1 4FB. Tel: 773378, 9–5.30 weekdays.

VALVES, new, boxed. 6JM6, 6HF5, 6JS6/C, 6JB6/A, 6KO6, 6146B. Many other types. SAE for list. Wilson, G4AZM, Tel: Bolton 54165.

HB9CV 2m & 70cm BEAMS still only £5.50 inclusive, plus our expanding range of SWL units. SAE details. Mail order only. Amtest, 55 Vauxhall St, Worcester, WR3 8PA.

QSL AND LISTENERS' CARDS. We offer a range of styles and prices on quality cards and at short delivery. SAE for samples. G3VZF, 5 The Close, Radlett, Herts.

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LEATHER CASES FOR SF1 Starphone new unused **£2.75.**

PYE WESTMINSTER POWER LEADS W15 AM/FM etc, wired for positive earth, with in-line fuse holder new unused **£2.50.**

SIX-BANK PUSH BUTTON SWITCHES each bank 6 pco. Self cancelling **£1.00.**

HEWLETT PACKARD PIN DIODES type HP5082-3080 **50p** each or 4 for **£1.50.**

PYE COILS 5mm dia 10mm sq base OK for rewinding as used in all PYE R/Ts. **6p** each 10 for **50p.**

THREE-GANG TUNING CAPACITOR 365 pf per section direct drive **75p** each.

CATHODEON 1·4MHz CRYSTAL FILTER I.O. base, for lower side band SSB, with base connections new unused **£4·00** each, two for **£7·00.**

Disc ceramics 0·01 Mf 2·5Kv working 5p each. 1000 pf 500 vw 10 for **15p.**

WIMA MINIATURE POLYESTER CAPACITORS size only 6mm sq × 2mm thick. PC mount pin spacing 5mm. 100 vw in the following values 1000 pf, 2200 pf, 1500 pf, 10 for **20p** or **3p** each.

CO-AX PLUGS SO239 sockets 4 hole fixing **50p.** 50 ohm BNC right-angle adaptors **50p.** SPECIAL OFFER 75 ohm BNC plugs and single hole sockets **35p** each.

MINIATURE NIXIE TUBES ITT—5853S with left and right hand decimal point size only $\frac{7}{8}$" × $\frac{7}{16}$" nominal working voltage 170 volts DC, new unused 5 for **£2.50p** 10 for **£4.50p.**

DECADE COUNTER PCB made to suit the above nixie tube also takes SN7490, 7475, and 74141 ready drilled etc, **75p** each, set of 5 **£3.40.**

TRIMMER CAPACITORS 10mm dia. ceramic, 2-8pf, 3-10pf, 4-20pf, 10-40pf, all **10p** each.
7mm dia. ceramic, 3-9pf, 7-35pf, all **10p** each.
Tubular ceramic, 1-6pf solder in type, **8p** each; **60p** for 10.
Mullard tubular ceramic 0·8-6·8pf bolt in type, **15p** each. Ceramic miniature compression P.C. mount 10-40pf, **8p** each.
Plastic semi-airspaced 2-25pf 10mm dia. **6p** each; 10 for **50p.**
Oxley airspaced 9mm sq base 1-10pf and 1-15pf, **18p** each; 2-30pf **20p** each.

JACKSON TETFER TRIMMER Cat. No 5640 9mm sq base, **25p** each; also 8mm P.C. mount, **25p** each

PLASTIC SEMI-AIRSPACED TRIMMER as used in PYE Westminsters P.A. stages 10-60pf, **15p** each.

JACKSON BUTTERFLY TRIMMERS 17+ 17PF 1·2mm air gap Cat. No C713, **50p** each.

ELECTRONIQUES TUNING DIALS reduction 6-1 and 36-1, uses epicyclic drive, moulded clear plastic front, size 100mm × 160mm, supplied with two pointers, **£6.50.**

STEREO CAR CASSETTE player amplifier boards with two amp. ICs NEC-uPC 1001 H2, some models with uPC 1025H, requires 12V D.C. 3½W per channel, removed from new equipment by manufacturer, size 120mm × 45mm, supplied with circuit. **£2.25.** each 5 watt version **£3.00** with circuit.

FM RADIO FRONT END TUNER Units 88-108MHz (remove three Cs and it tunes Air Band) and 2m very high quality and stable unit with exceptional sensitivity FET RF amp. NPN mixer and separate osc. AFC. and AGC inputs, works from 9-15V D.C., with circuit; new and unused BARGAIN @ **£3.30** each;

REVCO VHF AERIALS MA200 Magnetic base with ⅝th 144-146MHz coil & whip approx 3db gain **£19.00** p/p £1.00.

REVCO 144-146MHz ⅝th mobile aerial **£8.50** also commercial R/T band 156-172MHz (approx 3db gain both types) **£8.50.**

CRYSTALS OK for 2 Mtrs ie: ×4 + 10·7MHz, 33·5, 33,550, 33,600, 33,675, 33,700, 33,725, 33,750, 33,775, 33,800, all **£1.25** each. All HC6/U.

SECOND CONVERSION CRYSTALS 11·170 HC6/U. 11·155 HC6/U, 10·230 HC6/U & HC18/U, all **£1.75** each. 4,000MHz HC6/U **£2.00.**

BURNDEPT BE448 H.B. F.M. RADIOTELEPHONES single channel 25 watt RF output in good condition working order but mic. leads require slight attention, two only **£95.00** each or the two for **£175.00.**

GEC RC660 H.B. A.M. 10 channel working order **£98.00** one only.

BELTEK 2 mtr FM mobiles 12 channel 10 watts output with low power switch less crystals, no tone burst, or repeater shift, no power lead, good condition two only **£85.00** each.

10·7MHz CRYSTAL suitable for FM discriminator new **£1.25.**

TRANSISTORS, BFY90 **90p,** BF180 **22p,** BF166 **18p,** BF152 **12p,** BF115 **15p,** BF194a **12p,** BF195 **12p,** MPS918 (plastic 2N918) **18p,** CIL108 (BC108) **10p,** ZTX107 **15p,** BSX20 **20p,** 2N3819 **20p,** 2N4381 **20p,** TIS88A **35p,** 3N204 **£1.10,** 2N5947 (SRF1117) **65p.**

1N4148 (1N916) DIODES 3p or 25 for 50p.

THE GABLES, 20 BARBY LANE, HILLMORTON, RUGBY, WARWICKSHIRE

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