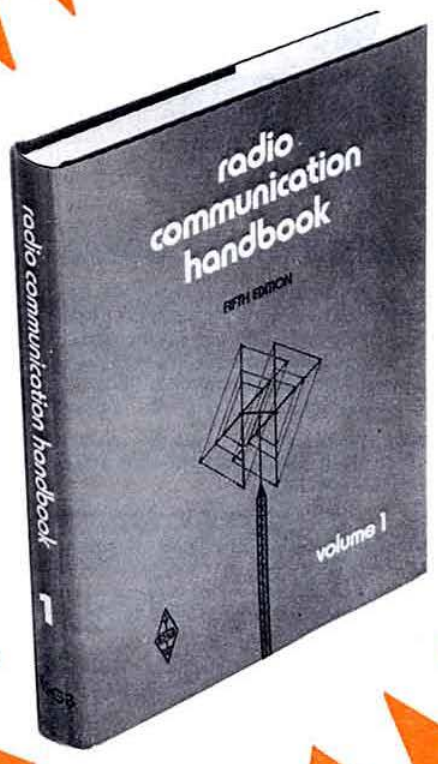
November 1976

radio communication

journal of the Radio Society of Great Britain

OUT NEXT MONTH!



ORDER NOW

RADIO COMMUNICATION HANDBOOK

5th edition

VOLUME 1

CHAPTER TITLES

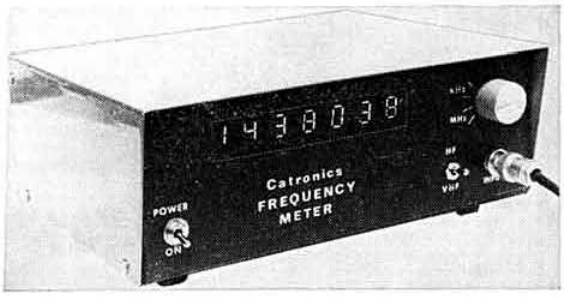
1. Principles
2. Electronic tubes and valves
3. Semiconductors
4. HF receivers
5. VHF and uhf receivers
6. HF transmitters
7. VHF and uhf transmitters
8. Keying and break-in
9. Modulation systems
10. RTTY

Price £7.50, plus 81p postage, packing and VAT.

Obtainable from
RSGB Publications (Sales)

NEW FROM Catronics

200MHz D.F.M.



VHF DIGITAL FREQUENCY METER—Model DFM 5
The updated version of the Catronics Frequency Meter with extended frequency range to 200MHz with a restyled cabinet and front panel. Size 8¼" × 7" × 3" (approx.).

- ★ Full 7 digit 0·35" amber display.
- ★ I.C. memory giving a "non-blinking" display.
- ★ Automatic suppressed zeros on 3 leading digits to reduce power consumption.
- ★ TTL and ECL i.c.s used to give good reliability.
- ★ 10MHz master oscillator for high accuracy.
- ★ 12V (—ve earth) dc input and 210-260V mains psu fitted.

Price: £135.00 (incl. VAT. (Add £1.50 for insured post)

VHF and UHF PRESCALERS

The range now includes 3 Prescaler Modules:

500MHz ÷ 100 Model FS5000. This top of the range model enables the range of most HF Digital Frequency Meters to be extended up to 500MHz. By dividing the input signal frequency by a factor of 100, the output is sufficiently low in frequency to drive standard TTL logic circuitry even when measuring frequencies in the 70cm band. PCB size is approx. 3¼" × 2". **Price: £28.50.**

500MHz ÷ 10 Model FS500. Similar specification and size to model FS5000 but having a frequency division ratio of 10. **Price: £27.00.** The above models require 5·5V supply. An **"on-board" regulator** for use on 9-15V supply can be supplied for additional **£2.00.**

150MHz ÷ 10 Model FS150. VHF Prescaler for use up to 150MHz with switchable ÷1 preamp mode for use down to audio frequencies. Still the most popular Prescaler available at the low price of **£23.00. Note:** Catronics Prescalers will work into **all** the popular DFMs including those by Heathkit, RCS, Yaesu, etc. and the G3XGP design—in fact we haven't found one into which it won't work yet!

CRYSTAL CALIBRATOR

Catronics model M6 giving outputs at 1MHz, 200kHz, 100kHz, 50kHz and 25kHz at the flick of a switch, with harmonics audible up to 2m. band. 6 volt supply. Complete PCB module, accurately set to frequency and switch assembly—**£8.90.** Also available—kit of parts for regulator for operation on 9 to 20 volt supplies, **£1.60. Complete Boxed Unit with battery, £14.50 (+50p post).**

AMATEUR RADIO BULK BUYING GROUP

45W on 2M for £17.50

A Kit for building a 45 watt r.f. power amplifier for boosting the output of 10-watt F.M. mobile transmitters. Automatic solid-state T/R switching is incorporated. Design as published in September 1976 edition of "Electronics Today International". **Complete kit—£17.50.** Copy of magazine—**30p plus** 15p post.

CRYSTAL and CERAMIC FILTERS

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

Model	Application	6dB BW	Stopband	Supplied	Price
XF-9A	SSB TX	2·5kHz	45dB	2 × Xtals	**£25.35**
XF-9B	SSB RX/TX	2·4kHz	100dB	2 × Xtals	**£34.20**
XF-9E	FM	12kHz	90dB	None	**£31.80**
XF-9M	CW	500Hz	90dB	1 × Xtal	**£24.05**
S.E.I and Y.T.K.					
QC1246AX	SSB RX/TX	2·4kHz	100dB	2 × Xtals	**£29.40**
YF-90F	SSB RX/TX	2·4kHz	70dB	2 × Xtals	**£18.00**
MURATA					
CFR455H	AM RX	6kHz	55dB	—	**£10.30**
CFS455H	AM RX	6kHz	70dB	—	**£13.30**

PLESSEY SL600, etc. I.C.s

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

Full data sheets on all SL600 Devices are included in our Data Catalogue (SAE plus 30p)

MICROWAVE MODULES LTD.

Large stocks of the following available for immediate delivery:
2m Converters with 28-30MHz O/P, **£18.00.** Local oscillator output version for transverter use, **£19.80. 2-4MHz and 4-6MHz** O/P also in stock **£18.00.** 2m Mosfet **Preamplifier** giving 18dB gain, **£11.70. 70cm units:** Converters with 144-146MHz O/P, **£19.80** and 28-30MHz O/P **£19.80.** Varactor Tripler with 14W max O/P **£27.00.**

SSB Transverter for operation with 28-30MHz equipment. 10W O/P on 70cm, **£94.50. 144MHz** input, **£126.00. 2m Transverter** also available, **£85.50.**

We are also agents for **JAYBEAM AND MINIBEAM AERIALS.** Write for free Price List (SAE please). **All prices include VAT at current rates.** Please note that our minimum UK post & packing charge, except where indicated is 20p. Export orders welcome—write for export price list.

Cheques and P.O.s should be crossed and made payable to "Amateur Radio Bulk Buying Group" or "Catronics Ltd".

DEPT. 601, COMMUNICATIONS HOUSE, 20 WALLINGTON SQUARE, WALLINGTON, SURREY, SM6 8RG.
Tel: 01-669 6700 Open 9am to 6pm Mon.-Fri., 9am to 1pm Sat. Closed for lunch 12.45 to 1.45.

ISSN 0033-7803

radio communication

November 1976 Volume 52 No 11

CONTENTS

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	3·6	G2MI, Bromley, Kent (SE England)
1000	3·6	G8ML, Cheltenham (SW England)
	144·5	GM3UAG, Ellon, Aberdeenshire (NNW)
	144·5	G8GGK, Croydon, Surrey (NE)
1015	3·6	GI3GAL, Belfast (N Ireland)
	144·5	GI3TLT, Bangor, Co Down (N)
1030	3·6	G2CVV, Derby (N Midlands)
	144·5	G4DCH, Burnham-on-Sea (NW)
	144·5	GM3UAG, Ellon, Aberdeenshire (SW)
	144·5	G3PWJ, Brierley Hill (NW)
1045	144·5	G8CDP, Middlesbrough (NW)
	144·5	G8GGK, Croydon, Surrey (SW)
	144·5	G8BHQ, Stockport (NNW)
1100	3·6	G5VO, Bridlington (NE England)
1115	3·6	G3LEQ, Knutsford (NW England)
1130	3·6	GM3EHI, Bellshill, Lanarkshire (S Scotland)
1200	3·6	GM3HGA, Aberdeen (NE Scotland)

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

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

ABC
MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

19,106 copies per issue average circulation in 1975

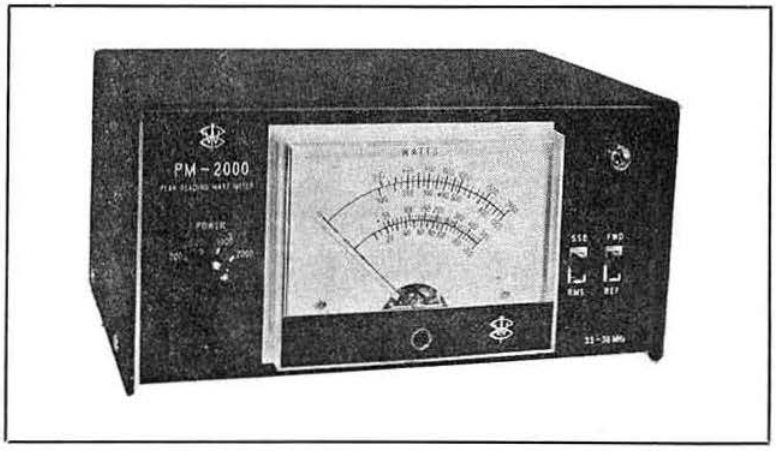
Contributions and all correspondence concerning the **content** of *Radio Communication* should be addressed to: The Editor, *Radio Communication*, 35 Doughty Street, London WC1N 2AE. Tel 01-837 8688. (**Circulation** queries should be addressed to: The Subscriptions Department, RSGB).

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

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

Electronics (UK) ltd

SSB OPERATORS REJOICE! . . . at last . . . it's unique . . . it's our PM-2000 . . . a true PEAK READING WATTMETER



- ★ Measures accurately
- ★ Peak envelope power on SSB
- ★ RMS watts on AM/CW
- ★ S.W.R.

GONE ARE THE DAYS OF OSCILLOSCOPES, CALCULATIONS OR EMBARRASSMENT WHEN THE HOME OFFICE MAN ASKS WHAT POWER YOU RUN!

INTRODUCTORY PRICE £48.60 (incl. VAT)

The PM-2000 is a precision built in-line wattmeter providing P.E.P. and R.M.S. power indication.

This new design (Pat. applied for) employs a flat frequency response directional coupler which enables forward and reflected power also to be measured from 3·5-30MHz.

With a SSB Transmitter the output power occurs only sporadically during voice transmission and has no direct relationship between the peak and average power. The ratio of peak to average power varies widely with voices of different characteristics.

The power contained in the signal at the maximum peak is the basic transmitter rating and is the peak envelope power (usually called p.e.p.) This makes the peak reading wattmeter essential for SSB.

General power meters indicate average or R.M.S. values and are calibrated using a continuous sine-wave signal which a voice modulated signal definitely is not. Such a power meter is meaningless in terms of "p.e.p."

The PM-2000 indicates accurately the p.e.p. which is four times the single-tone level.

SPECIFICATION:

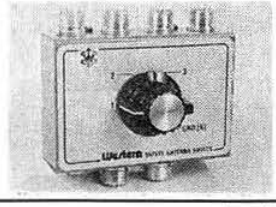
Power range:	0–200, 500, 1000 and 2kW
Impedance:	50 ohms
Frequency range:	3·5–30MHz
Measuring Accuracy:	7%
Power source (SSB only):	100/117/234VAC

Overseas enquiries invited

YET ANOTHER 'Western' PRODUCT WITH QUALITY UP AND PRICE DOWN

NEW 5-WAY ANTENNA SWITCH MODEL ASW-1

- ★ **Handles 1·2kW**
- ★ **Earths antennas not in use**
- ★ **Fitted Yaesu-style knob**
- ★ **Mounting holes for wall or equipment, £8.55 (inc. VAT/P & P)**



NEW WESTERN PRODUCTS INCLUDE:

TRAPPED DIPOLES:

BALUNS:

INSULATORS:

AND MORE ITEMS ARE ON THE WAY.

OVERSEAS TRADE ENQUIRIES INVITED

Western Electronics (UK) ltd

HEAD OFFICE (ALL Mail/Enquiries)

FAIRFIELD ESTATE
LOUTH, LINCS, LN11 0JH (Tel. Louth (0507) 4955/6)

Agents: LES LYSKE, GI3CDF, NEWTOWNARDS (0247) 812449; ALAN CAMERON, GM3OGJ (Temporarily Closed); BILL DOE, G3XRY, BODMIN 4695; DAVID SMITH, G4DAX, WATFORD 42619.

SHOWROOMS AT:
LOUTH. Open Mon.-Fri.: 9-1pm, 2-5 Sat. by appointment.
1 WEST PARK ROAD, SOUTHAMPTON. (0703) Tel. 27464.
Open Tue.-Fri. 9.30-1, 2-5.30, Sat. 9-4.
27 CHURCHGATE, LEICESTER. Tel. 53662.
Open Mon.-Sat. 9-6. Closed Thur.

Western

WHETHER YOU WISH TO . . .

Elevate . . . with the TELESCOPIC TILT-OVER WESTOWER

BUYING A TELESCOPIC STEEL TOWER?

. . . then here are a few facts which you should consider:

Firstly, the head load (horizontal load due to wind) which will be placed on the top of the tower should be determined and the manufacturer of your antenna can tell you what the head load will be at a particular wind speed, e.g. 100lbs (45kg) at 75 mph. This means that when the wind is blowing at 75 mph you would need a HORIZONTAL pull of 45kg to restrain the antenna. The actual weight of the antenna is usually a factor of much less importance and is ignored. If you wish to have an installation which is rated at 100 mph—then the wind load on the antenna will be much greater than 100lbs, 176lbs in fact. Obviously, a stronger tower would be required to take this additional load.

But then there is the second consideration. At what wind speed would you like the structure to be safe? No doubt the answer you have in mind is "about 150 mph". That way, it will never fall down! However, economics must come into the picture and the costs go up very considerably in achieving strength.

There is a British Standard Code of Practice (CP3, Ch. 5, Pt. 2), which relates to the "Wind Loading on Structures" and they recommend Basic Windspeeds of about 85 mph for the London Area to as high as 110 mph for Edinburgh and 120 mph for the North of N. Ireland. This "Basic Windspeed" is the maximum gust speed likely to be expected on the average only once in 50 years at 10m above ground in open level country. An average figure for England is therefore 100 mph. Commercial installations are designed to this standard and we recommend a minimum design speed of 75 mph for an amateur installation. Most towers currently advertised in this magazine carry the stated headload at 60 mph ONLY. This is why they blow down with no aerial on or when only partly raised! Oh! Yes, we could mis-lead you into thinking that the WESTOWER is considerably stronger by saying, "withstands winds of up to 145 mph". So it may be with no aerial on! But what good is that? Remember THAT "WESTERN" QUALITY IS YOUR SATISFACTION. So, if you want a good sound installation, you'll be wise to deal with "WESTERN", we'll be pleased to advise! Because of our considerable experience in this field we have now designed and manufactured our superior quality product AND—IT COSTS LESS! *QUALITY UP* and *PRICE DOWN*—that can't be bad! All towers come complete with winches, ropes, head unit to take the rotor and full erection details.

- **Designed by Chartered Engineers to BS CP3, Ch.5, Pt.2**
- **Constructed of High Quality Special Alloy Steel**
- **Fabricated using the Latest Electronically Controlled Techniques**

HERE'S HOW THE "WESTOWER" COMPARES

	"WESTOWER"			Brand X			Brand Y		
HEIGHT	MODEL	PRICE	HEAD LOAD	MODEL	PRICE	HEAD LOAD	MODEL	PRICE	HEAD LOAD
40'	2S/FP	£189	275lbs	A	£203	185lbs	A	£250*	50lbs
60'	3S/FP	£230	175lbs	B	£246	125lbs	B	£280*	50lbs
80'	4S/FP	£345	100lbs	C	£366	60lbs	(* Carriage extra)		

(Prices include carriage) *(Headloads taken from manufacturers' current literature)*

From this you will see that a 60' "Westower" is 40% stronger and costs less

Then there is the **"Westower" Heavy Duty** which takes its full headload at 100 mph.

WESTOWER . . . the stronger one!

Rotate . . . with EMOTO ROTORS

DOES YOUR ANTENNA TURN IN THE WIND?
DOES YOUR CONTROL UNIT 'CUT-OUT' AFTER ONLY A FEW REVOLUTIONS?
. . . then step-up to a RELIABLE EMOTO ROTOR.

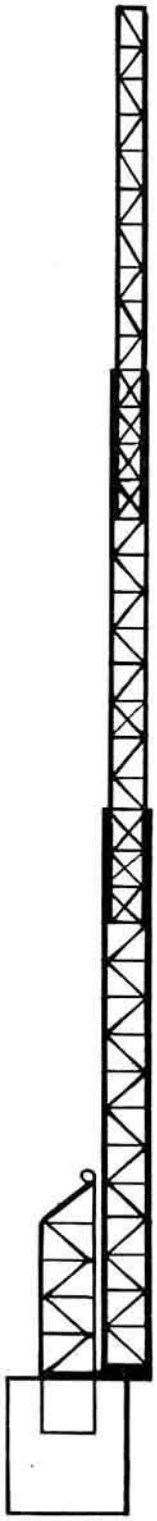
We have been in the business long enough to know your requirements for a first class antenna rotor, and we have gone "over-board" for the EMOTO range! There are many brands of antenna rotors, some of them completely unsuitable for the majority of amateur applications, and for this reason we do not stock them.

Most likely your present antenna rotor will turn your antenna but it just will not hold it stationary under strong wind conditions; i.e. YOUR ROTOR LACKS SUFFICIENT BRAKE TORQUE, the ability to hold the antenna still whilst a gale is blowing. **HERE IS WHERE THE EMOTO SCORES.**

Take a close look at the comparison figures above. Then compare the prices of all the rotors and you will have to agree that the EMOTO 102 LBX and EMOTO 1100 MXX are the best value. AND THEY DO NOT 'CUT-OUT' AFTER ONLY ONE OR TWO REVOLUTIONS, THEY KEEP ON GOING!

Finally, EMOTO ANTENNA CO. is not a new company. They have been making rotors for many years. Have no fears about this being a new and untried product!

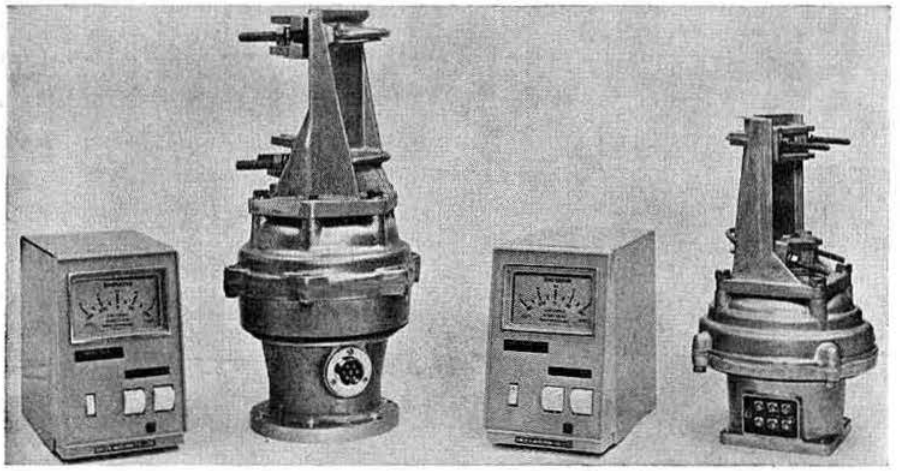
Having obtained samples (all rotors are individually tested by EMOTO before despatch) and had them tested by an independent authority, SOUTHAMPTON UNIVERSITY, we are now confident to recommend them as THE FINEST ROTORS AVAILABLE. The 1100 MXX received the following comment from the University: "Very rigid, NO SLACK, WELL MADE, GOOD DESIGN". NEED WE SAY MORE! AT LAST WE HAVE A ROTOR THAT SELLS ITSELF!



Electronics (UK) ltd

EMOTO FEATURES

- ★ SUPERIOR BRAKING TORQUE
- ★ CONSTANT BEAM INDICATION
- ★ BETTER REMOTE OPERATION
- ★ LESS POWER LOSS THAN LOW VOLTAGE TYPES
- ★ ROBUST DESIGN
- ★ STAINLESS STEEL HARDWARE



COMPARISON OF ROTOR BRAKE TORQUE FIGURES (kg. cm.)

CDE

Model	Torque
AR30	575
AR40	920
CD44	1,152
HAM2	4,025

EMOTO

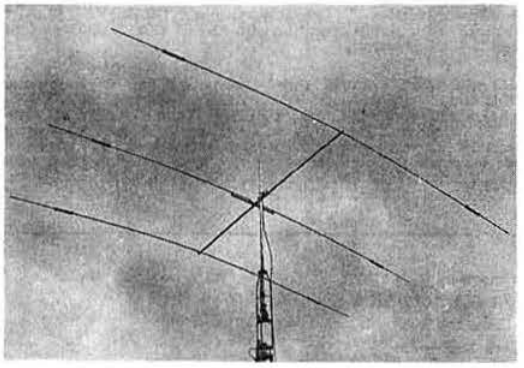
Model	Torque
102LBX	1,500
1100MXX	10,000

PRICES (inc. VAT)

102LBX	£61.38
1100MXX	£129.38
1215	£14.63
MB300	£10.13

OR **Radiate . . .** with WESTERN ANTENNAS

THE FIRST OF A PENETRATING RANGE OF ANTENNAS



THE 'WESTERN' PENETRATOR

DX-33 for 10-15-20m

(Illustrated left) £73.15 (inc. VAT & carr.)

- ★ 3 elements on each band
- ★ Heavy duty 2kW rated
- ★ Gain up to 8dB
- ★ Broadband operation
- ★ Stainless steel hardware
- ★ SWR less than 1·3:1

YET ANOTHER 'WESTERN' PRODUCT WITH QUALITY UP AND SAVE £££'s

Western Electronics (UK) ltd

HEAD OFFICE (ALL Mail/Enquiries)

FAIRFIELD ESTATE
LOUTH, LINCS, LN11 0JH (Tel. Louth (0507) 4955/6)

Agents: LES LYSKE, GI3CDF, NEWTOWNARDS (0247) 812449; ALAN CAMERON, GM3OGJ (Temporarily Closed); BILL DOE, G3XRY, BODMIN 4695; DAVID SMITH, G4DAX, WATFORD 42619.

SHOWROOMS AT:
LOUTH. Open Mon.-Fri.: 9-1pm, 2-5 Sat. by appointment.
1 WEST PARK ROAD, SOUTHAMPTON. (8703) Tel. 27464.
Open Tue.-Fri. 9.30-1, 2-5.30, Sat. 9-4.
27 CHURCHGATE, LEICESTER. Tel. 58662.
Open Mon.-Sat. 9-6. Closed Thur.

5 Band SSB/CW Transceiver TS520

The Transceiver with everything

The TS520 System
TRIO have now completed the first stage of the total system concept for amateur radio equipment. With the TS520 and its associated accessories, the amateur radio operator can assemble a station to suit any or all requirements for his hobby enjoyment. All modes and all bands, fixed and mobile/portable are provided by the TS520 system.

SSB/CW Transceiver TS-520
A real "compact"; powerful, rugged and reliable. It has everything which otherwise is available only as an accessory at extra cost; built-in power supply for fixed-station use, transistorized DC/AC power converter for mobile operation, loudspeaker, fixed-channel provisions, VOX control, etc. All these are the TS-520's special features in short format:

Versatile Transmit- and Receive Operations—USB, LSB and CW on all radio amateur bands from 80m. to 10m., and—with the aid of the 2m.-Transverter TV-502—also on the VHF-band from 144 to 146MHz, as well as fixed frequency operation on four channels. The TS-520 also allows reception of WWV stations on 10MHz for dial calibration. By adding the External VFO-520 (optional) the TS-520 demonstrates utmost versatility: independent RX- and TX operation with different frequencies transceive operation with slightly variable RX frequency by means of the built-in RT circuit (Receiver Incremental Tuning) plus fixed channel operation totalling nine different combinations.

Advanced Circuitry—With the exception of the transmitter driver and final stage which are equipped with blower-cooled vacuum valves of type 12BY7A and 2 × S2001 the TS-520 is fully transistorized. The semiconductor complement consists of 44 transistors, 18 FETs, 1 IC and 84 diodes. The reliability and stability of this circuit has been substantiated by numerous contests and during rugged mobile operation.

Outstanding Receive and Transmit Performance—The transmitter section of the TS-520 features separate driver, plate and final tuning, a 2-stage ALC circuit for local and DX operation, thus assuring undistorted clearly legible TX signals even after hours of continuous operation. Provisions for linear amplifiers, such as ALC input, antenna relay switching output, etc., are available and ready for use. Dual-gate MOSFETs are employed in all critical receiver circuits to improve the input sensitivity, cross-modulation response and spurious rejection. An 8-pole SSB crystal filter in the IF amplifier provides exceptional selectivity and stability. An optional 500Hz CW filter is available as an accessory and can be installed at any time. The switch-selectable time constant of the AGC assures perfect reception of SSB and CW signals.

Precision-type VFO—a feature of all TRIO receivers, transmitters and receivers also contributes to the supreme performance of the TS-520. The VFO is fully encapsulated and is controlled by a meshedgear dial drive (reduction ratio 4 : 1). Dial accuracy is better than ± 1 kHz, frequency drift will not exceed ± 100Hz per hour. Dial calibration is accomplished by means of a built-in 25kHz crystal marker oscillator.

Built-in Power Supplies—for fixed station use with 120/240 VAC 50-60Hz line voltage or for mobile operation with 12-13·8 VDC by means of the built-in DC/AC converter.

Loaded with Extra Features: threshold-type RF gain control; semi-break-in circuit with sidetone; VOX/PTT/MOX-control; RIT; TUNE switch; LED function indicators for RIT, VFO and FIX channel operation; WWV receive pushbutton; 4-position fixed channel selector switch; built-in 25kHz crystal marker oscillator; two-stage AGC; multi-function meter; terminals for optional accessories such as: 2m.-Transverter TV-502, External VFO-520, External Speaker SP-520, linear amplifier, headphone, microphone and key.

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

TS520 £384 VAT Exc.

TRIO

The 2m First Family

Where quality is a prime requirement

Regardless of where you are: in your QTH, on the road, on vacation, on a hike: you will always find a QSO on the 2m band with TRIO VHF equipment. And no matter on which transmit and receive frequencies other 2m stations are operating, with TRIO equipment you can always join in, because you'll be qrv on all international fixed-frequency channels—either in simplex or via repeaters.

TRIO 2m equipment is designed for versatility and can be combined to provide station systems for mobile or fixed-station use, operating on line voltage, 12 VDC car batteries or conventional dry cells—just as you like. Take a close look at the two transceivers: the TR-2200GX is from a proven line—the TR2200 and the TR-2200G two of the most popular and best-selling 2m rigs on the world market. Like its predecessors, the

2m FM Portable Transceiver TR-2200GX

is a striking example of advanced technology, optimum performance, solid construction and unmatched reliability. In addition it offers plenty of features, 2m radio operators have been asking for:

2 watts RF output power—choice of fixed channel operation or continuous tuning through the entire 2m band by merely adding the External VFO-30G. Plus: 12 RX and TX channels (S20, S22 and R7 factory-equipped with crystals) to be fitted with crystals of your own choice; receiver and transmitter section with improved semi-conductor complement and higher power (TX input now 4 watts, RX input sensitivity now 0·4μV for 20dB S N : N); IF shape factor 2 : 1; improved squelch action; detachable telescopic antenna; built-in 1,750Hz generator, plus many others.

The TR-2200GX can operate on the following power sources; standard 1·5 volt penlight cells, rechargeable NiCad batteries (optional), 12V DC car battery or Power Supply Unit PS-5. Standard accessories: PTT microphone with hanger, carrying bag with shoulder strap, charger for NC batteries, battery holders, etc. A special mobile mount MB-1A is now available for easy and safe installation of the TR-2200GX in your car.

2m FM Mobile Transceiver TR-7200G

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

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

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

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

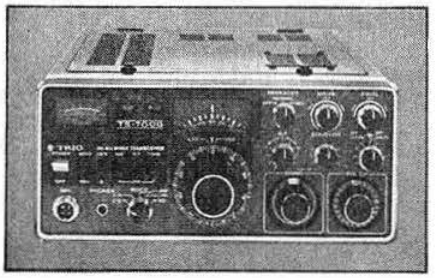
The TR7200G comes to you complete with mobile mounting bracket, stand off feet for fixed station use, microphone, microphone bracket, cable manual and fitted S20, 21, 22, R6 and 7.

Extra channels available at £10 inc VAT for 3 channels, £20 inc. VAT for 6.

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

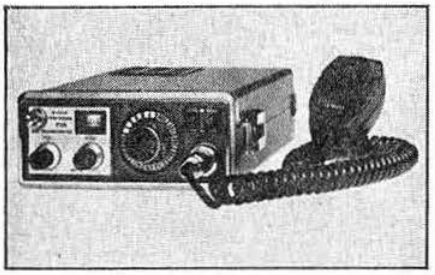
TRIO

LOWE ELECTRONICS



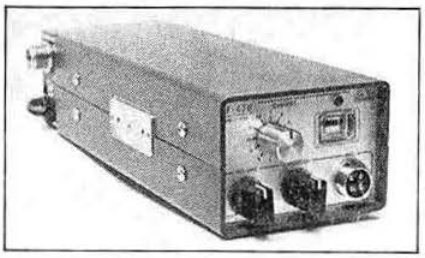
TS700G 447·75 inc VAT

The standard by which all others are judged. Full 2 metre coverage, VFO or crystal controlled. All modes AM, FM, USB, LSB, and C.W. Mains or battey operation. Normal and reverse repeater facilities. Trio exclusive tuning fork access tone generator. Plus, of course, Trio quality and reliability backed by Lowe Electronics service. It you haven't seen it yet, go to one of our branches and be prepared to be impressed.
15 Watts output. 0·25 microvolt sensitivity. European standard FM selectivity. This rig has all others beaten.



TR3200G £171 inc VAT

The newest FM handy transceiver from the TRIO range. Superb performance for the 70cm. operator, 12 channel capability in the range 432-436MHz with three channels fitted (SU8, SU18, SU20). Transmitter output switched 2W/400mW and incorporating the TRIO exclusive 1750hz tuning fork access tone generator. ¼-wave detachable antenna for high gain performance on both transmit and receive.
Supplied complete with all accessories as the TR2200G and with the new miniature handy microphone.



KF 430

* SMALL SIZE only 240 × 85 × 60mm.
* LIGHT WEIGHT only 1·2 Kg.
* FREQ. RANGE 433-346MHz.
* POWER O/P. 10W or 3W switched.
* SENSITIVITY 0·4μV for 20dB q'tng.
* AF. B/Width. 500-3000Hz.

These brief details cannot convey the sheer quality of construction of the KF430. The entire receiver front end is housed in its own fully screened enclosure, as is the transmitter output section. Multiple tuned circuits ensure a clean output signal at all power levels. All crystals are fitted with individual trimmers for spot on accuracy. The receiver selectivity is to current UK and European standards and an automatic tone burst is fitted.
The KF430 comes with 9 channels fitted to cover all simplex and repeater channels in current use. A matching microphone and mobile mount are included.

70cm FM

is now on the increase as more and more repeaters are licensed by the Home Office in preference to those on 2 metres.
70cm operation has some advantages when compared to 2 metres, for example, the scattering of the 70cm signal due to many multiple reflections can result in a much more even coverage of built-up locations even in road tunnels where the 2 metre signal vanishes.

Relatively short operating radii mean that there is less likelihood of co-channel interference which occurs on 2 metres. (Cries of "which repeater have I opened, KR or HH?")

What we all need is a compact 70cm FM rig with good performance that will not take up too much room in the car. We think that the KF430 fits the bill.
See it soon, it's a little smasher.
KF430. THE rig for 70cm FM.

FS1007P on offer at £125

The home station FM transceiver with everything. ★ Mains or 12 volt operation ★ 16 channel scanning ★ channel skipping facility ★ priority channel with front panel crystal sockets ★ manual or auto scan ★ switched high/low power ★ switched wide/narrow deviation ★ S meter ★ RF output meter ★ centre zero tuning meter ★ RF fine tuning control ★ built in SWR bridge ★ built in digital clock with alarm and auto switch on ★ built in loudspeaker ★ 10 watt TX ★ 0·3 microvolt sensitivity ★ superb styling and finish ★

HEAD OFFICE **119 Cavendish Road, Matlock, Derbyshire. Tel. 2817 or 2430 9 a.m. to 9 p.m.**

BRANCH OFFICES Communications House, 20 Wallington Square, Wallington, Surrey. Tel. 01-669 6700
Soho House, 362-4 Soho Road, Handsworth, Birmingham. Tel. 021-554 0708
27 Cookridge Street, Leeds. Tel. 0532 452657

AGENTS Alan GW3YSA. 35 Pen-Y-Waun, Efail Isaf, Nr. Pontypridd. Tel. Newton Llantwit 3809

EVENINGS AND WEEKENDS John G3JYG. 16 Harvard Road, Ringmer, Lewes, Sussex. Tel. Ringmer 812071
Sim GM3SAN. 19 Ellismuir Road, Baillieston, Nr. Glasgow. Tel. 041-771 0364

OPENING HOURS: 9-5.30 TUESDAY TO SATURDAY INCLUSIVE

SEND 30p IN STAMPS FOR FULL CATALOGUE & PRICE LISTS

Electronic Developments — new location

Our new factory is now operational and from here we will be able to supply you with our current range of high quality equipment. Please give us a ring or write to the address below with any queries you may have relating to your own particular application.

THE MAGNUM TRANSVERTER EDT 144/28: EDT 70/28: EDT 50/28

Our Transverter is fully YAESU compatible and may be operated with most other HF transceivers. Drive required at 28MHz up to 500mW. Power Input up to 200 watts (50% efficient). Each Transverter is aligned using our SPECTRUM ANALYSER to obtain an extremely clean output spectrum. Microwave Modules receive converters are fitted to all our Transverters.

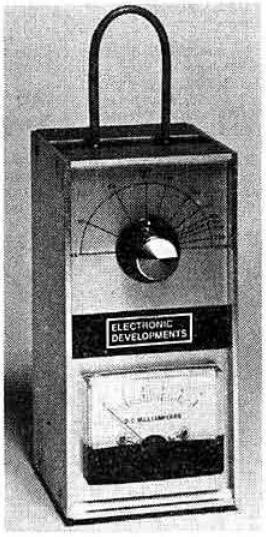
PRICE £112.50 inc VAT

THE MAGNUM LINEAR/PREAMP EDL 144

This Linear Amplifier has been developed by us to fill the need for a high power add-on unit for use with low power transceivers. The unit also contains a low-noise receive preamplifier which is equipped with an RF gain control. Mains operated. Drive requirement: 5-20 watts. CW and SSB, 5 watts maximum AM & FM. P.A. 50% Efficient. R.F. switched so no modification to transceiver is necessary.

PRICE £112.50 inc VAT

WAVEMETER 65 – 230MHz



General coverage VHF Absorption Wavemeter. Its high sensitivity makes it ideal for checking spurious outputs as well as the transmitted frequency.

PRICE £16.00 inc VAT

YOUR ORDERS, ENQUIRIES AND TECHNICAL QUERIES WILL BE DEALT WITH BOTH PERSONALLY AND QUICKLY

70CM LINEAR EDL 432

This 432MHz Linear is operated in grounded grid configuration and exhibits a gain of typically 10dB. With a drive input of 5 watts its output power is in the order of 50 watts which is more than adequate for OSCAR 7. Power requirements are 6·3V AC and H.T. 400-1000V D.C. Fitted with BNC Connectors.

PRICE £50.50 inc VAT

POLAR ELECTRONIC DEVELOPMENTS LTD

DOMVILLE ROAD, LIVERPOOL, L13 4AT. Tel. 051-220 6666

South Midlands

ESTABLISHED 1958—OVER 18

DIGITAL 11 now with SCANNER

The Digital 11 offers complete 5kHz step coverage across 2 meters and now with the Scanner 33, 25kHz channels from 145MHz upwards covered in around 10 seconds. It offers full lock and lockout on all channels. The scanner stops on a required channel for 10 seconds, then unless locked moves on. The bright digital readout comes from 6 seven segment LEDs.

Selectable 10 or 1 watt output for simplex or duplex (up and down shifts), across 144-146 (rx to 149MHz) from a tiny 6½" × 2" × 7½". Easily underdash mounted with the supplied mounting bracket, or slipped in place of the broadcast wireless.

For strong handling, and low noise the R.F. mixer, first I.F. (16·9MHz) second mixer (and LO) are all FET's. The front end is tuned by varicaps by the DC output of the P.L.L. with superb selectivity provided by a 15 pole (±8kHz at −6dB ±15kHz at −70dB). Ceramic filter. LED lamps indicate if the P.L.L. is unlocked or the squelch open. The V.C.O. is directly modulated (for exceedingly linear deviation). Unitary 6 circuit block construction (for seviceability and screening). Selective calling socket (mic/LS/PTT etc) on rear panel.

THE MULTI U11 A NEW DIMENSION IN 70 cms F.M.

A unique combination of frequency control by either external VFO, 23 switchable or 4 instantly selectable auto scanning channels.

Both the Tx deviation and the Rx bandwidth are switchable accommodating 50 or 25kHz spacing.

The main dial is channel numbered (e.g. 16 = 433·4, 20 = 433·5 etc.) and is illustrated only when a channel is crystalled up. Two R.F. stages in the receiver provide great sensitivity (0·5µV for 30dB NQ). The use of a band bass first IF (CF 45 MHz) gives high image immunity and low channel crystal drift. Further conversions to 10·7 and 455 prevent IF image whilst providing good pass and skirt selectivity. The transmitter of switchable 10/1W output draws only 2·5 or 1·3A (0·6 or 0·3A Rx) and has a netting of new crystal facility.

Other features include, diode RF switching, R.I.T., "on the air" lamp, PO meter, S meter, AFP reverse polarity protection etc.

With any 8 channels from:
SU (0, 8, 12, 16, 18, 20) and RU (0, 2, 4, 6, 10, 14)

INTRODUCTORY PRICE ONLY £200 + VAT (Ex-stock)

KP202

WITH KCP2 CHARGER

The handheld KP202 with its 2W of RF and ½W of audio, immunity to image and IF breakthrough, offers performance to rival all walkie-talkies and many mobile 10W sets. The KP202 is supplied with telescopic whip, leather handle/whip case and F type plug. Accessories include automatic (R channels only) crystal tone burst (£10.00), flexi stubby antenna (£5.75), leather case (£4.75), base charger KCP2 (£10.25), set of 10 ni cads (£8.50), F to UHF adapters (£1.45), F plugs, spare whips, spare hods etc.

SIX CHANNELS FITTED S20 and S22 and any 4 of: S0, S21, S23, S24, R3, R5, R6, R7, *only* £104.75 (plus VAT)

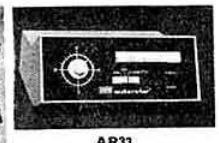
NEW FROM SMC—AMPERE & KLM SOLID STATE LINEARS (VHF & UHF)

SSB/CW/FM, 12V DC 10W drive, RF sensing with manual override—"microstripline techniques".

NEW HIGH POWER MODEL
PA144/160/BL 160W output .. .. **£155 + VAT**

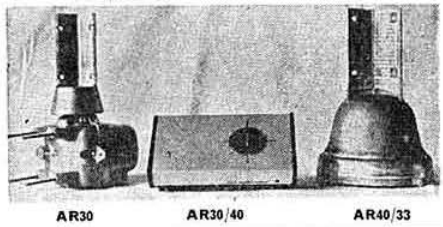
For 144 and 432MHz, RF sensing excellent bias arrangements
12V (13·8 VDC), 10W drive
13 × 5·8 × 20cm (prices + 12½% VAT)
APB82A, 145MHz, 80W output .. **£88.89**
APB57A, 432MHz, 45W output .. **£88.89**

CD44/HAM II



AR33

CDE



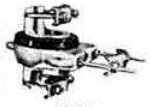
AR30 **AR30/40** **AR40/33**

ROTATORS

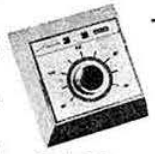
Ex-Stock in Totton for fast delivery. VAT: Rotators 12½%. Cable and deliv. 18%. Carriage (BRS or post) FREE. Securicor delivery **£1** extra (mainland). All rotators supplied complete with appropriate control box and instr.

CDE ROTORS	
A R30 light VHF/UHF	£37.50
A R40 VHF and light HF	£43.50
A R33 de-luxe AR40	£49.75
CD44 medium duty	£89.00
Ham 11 heavy duty	£119.00
STOLLE ROTORS	
2010/220 automatic	£41.25
BEARINGS	
CD562 CDE	£4.25
RZ100 Stolle (ballrace)	£10.00
MOUNTING KIT	
AK121 CDE to Versatower	£3.60
CABLE	
5 core AR30/40/33/2010 per yd	£0.20
8 core CD44/Ham 11 per yd	£0.32

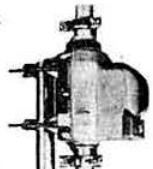
STOLLE



RZ100



Control Box



2010/220

CDE

PLEASE CHECK LATEST PRICES BEFORE ORDERING

PLEASE NOTE—THESE PRICES *DO NOT* INCLUDE VAT (12½% or 8%)

Terms: Cash with order, or credit card holders just 'phone in for, if possible, same day despatch. Immediate H.P. available for card owners for amounts up to £225.00. Holders of current U.K. callsigns (where references have been provided) can be speedily cleared, or normal H.P. at competitive rates is available.

Access

BARCLAYCARD

Communications Ltd

YEARS OF PROFESSIONAL EXPERIENCE

YAESU MUSEN

2-YEAR GUARANTEE
24-HOUR SECURICOR SERVICE

FTV(6)50B

FTV VHF TRANSVERTERS (2 & 4 Metres)

FTV250 Ex-Stock
The FTV-250 styled to match the FT-101, etc. sensitive receiver converter with good image rejection and RF gain control on front panel. 10W. P.I.P. (A31 and A1) 4W. (A3 and F3) metered; power output, and drive level (3V RMS at 29 MHz) 12 lbs., 11¼" × 8½" × 6".

FTV (6)50B Ex-Stock
The FTV650B now styled to match the FT-101, etc. Modified to 70 MHz. 50W. P.I.P. (A31 and A1) 10W (A3 and F3) metered:—cathode current power out and drive level (3V. RMS an 29MHz). 9 lbs., 11¼" × 8¼" × 6".

FTV250

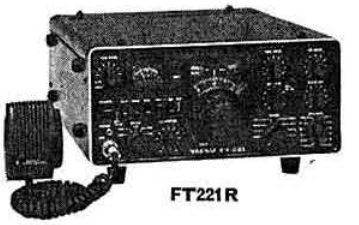
THE FRG7, GENERAL COVERAGE RECEIVER Ex-Stock

The FRG7 is a general coverage solid state receiver with specifications unparalleled in its price range. It uses a Barlow Wadley Triple-mix, drift cancelling loop for continuous, spin-tuned inclusive coverage of ·5 to 30MHz with calibration accuracy better than 5kHz. Frequency selection is accomplished by setting the RF (pre-selector and range switch), dialling up the required number of megahertz, then tuning the VFO knob as normal.

The receiver is sensitive (0·5μV for 10dB, S + N/N (SSB)) and stable (within 500Hz for any 30 minutes after warm up) with A.M., SSB and CW modes catered for. A 3 position audio filter, RF attenuator, dial lamp conservation switch, recorder and phone sockets are fitted. It is mains powered, but should the supply fail, or portable operation be required. 8 dry cells are automatically switched in.

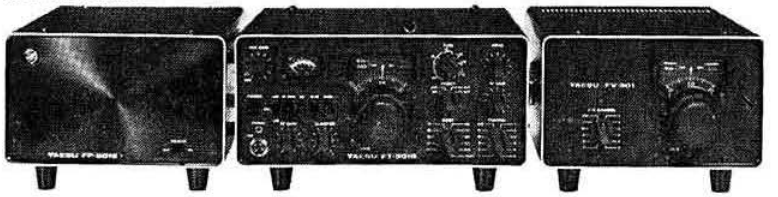
THE NEW FT221R, COMPLETE 2M STATION Ex-Stock

The FT221R. The multimode USB, LSB, A.M., F.M., CW, (with semi-break-in and side tone), 2m transceiver offering the choice of: phase locked VFO or 44 crystal channels, simplex or repeater (600Hz up and down shifts), with unique 'double push' auto tone burst, mains or 12V (3A) operation, excellent selectivity, SSB 2·4kHz (1·7: S.F.) or FM 12kHz. Front panel adjustable VOX and mic gain, a calibrator (1MHz ÷ 10), 1kHz readout and linearity, sensitive squelch, clarifier with IRT and IRT with ITT (makes F.S.K. easy), switchable "S" and centre zero tuning meter, noise blanker, serviceable plug in boards all contained in 11¼" (14") × 5" × 11¼", 22lb, rigid package. Remember only the FT221R gives you full 4MHz coverage and optional auxillary shift for repeaters. Why?—432—434MHz and a 1·6MHz shift for SSB, CW, FM SIMPLEX, FM REPEATER on 70cm with the new MMT432/144.



FT221R

The FT-301D 200W. PIP, with digital readout (to 100Hz). SSB (2·4kHz), AM (kHz), CW and FSK (600 Hz). Passband IF tuning (rejection), 3 position AGC, optional mains PSU with, if required, a 12/24 digital clock and a programmable CW identifier.



The FT-301S 10W. output, employs a pre-mix VFO and single signal conversion to 9MHz IF using MOSFETS in the RF and mixer stages followed directly by a roofing filter for sensitivity coupled with dynamic range. SSB (2·4kHz SF 1·7 : 1) and CW (600Hz SF 2·1).

The New FT-301 transceiver range (with options installed) offers:— Full solid state, 12v. DC working, external matching mains power supplies with speaker, and an external VFO are available. Plug in board construction. 160-10m. operation in 500kHz segments, MSF and CB receive, RF speech processor, noise blanker, front panel controlled VOX (with MOX) and P.P.T. semi break-in keying with side tone clarifier with separate ON/OFF switch, 11"×5"×13¼", 25kHz crystal calibrator, internal VFO or 11 crystal per band (or external VFO with same facility) 3W. audio to internal or external speaker.

SOUTH MIDLANDS COMMUNICATIONS LTD

Head Office, Main Showrooms and all Mail Order enquiries to Totton
OSBORNE ROAD, TOTTON
SOUTHAMPTON SO4 4DN
Hours of business: 9-5.30; 9-12.30 Saturday

Cable: Aerial Southampton
Telex: 477351 SMCOMM G
Tel: Totton (04216) 4939 & 2785

Northern Branch: **The Chambers No 3 The Parade, North Lane, Headingley Leeds Tel. (0532) 78 2326 Hours of business: 9-5 Tues-Sat 9-8 p.m. Thursday.**

AGENTS (evenings) (ALL QTHR)
Brian Kennedy G3ZUL Droitwich (09057) 4510 Peter Avill G3TPX, Darton (022 678) 2517. Ian McKechnie GM8DOX Bridge of Allan (078683) 3223. Howarth Jones GW3TMP, Pontybodkin (035 287) 846. Mervyn Anderson GI3WWY, N.I. Tandragee (0762) 840656.

SOUTH MIDLANDS COMMUNICATIONS

YAESU

S.M.C. SINGLE STOP SOURCE FOR:

VERSATOWERS Telescopic (20′ sections) with full tilting facility allowing for easy antenna maintenance and alterations. The relatively low unit weight and superior design of ground post allows easy and cheap installation often without resorting to concrete. →

ALI MASTS

TELESCOPIC LIGHTWEIGHT

1·5, 2 or 3m: Quick Lock Sections
13 versions, 6 to 21m from stock
Rigging extra. Carriage £1 VAT 8%
6 × 3m **£42.50** 4 × 3m **£28.50**
7 × 2m **£38.75** 7 × 3m **£55.75**

HAMTOWERS

SELF SUPPORTING

Galvanised lattice 10′ sections
Freestanding with climbing steps.
Carriage £3.50 ex stock VAT 8%
30′ c/w base grillage **£164.60**
40′ c/w base grillage P.O.A.

TELOMASTS

TELESCOPIC GALVANISED

10′ Telescopic galv. steel mast with guy rings, etc., or c/w full rigging.
Carriage £2 ex stock VAT 8%
30′ **£22.85** or **£41.75** c/w rigging
40′ **£29.75** or **£53.75** c/w rigging
50′ **£37.95** or **£69.96** c/w rigging

TELETOWERS

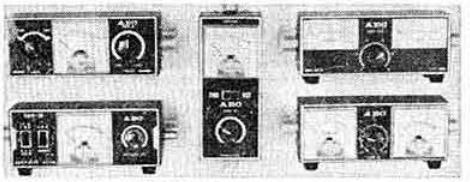
TELESCOPIC GALVANISED

Carriage and rigging (RK) extra
42′ **£121.00** (RK **£28**)
57′ **£174.00** (RK **£28**)
79′ **£224.50** (RK **£48**)
101′ **£303.50** (RK **£76**)

COAX RELAYS

12 VDC, 50ohm, Silver plate.
Ex-Stock. P & P 30p. VAT 8% only.

		Power Crosstalk @ 5000MHz		
CX120	50W	35dB	Cable entry ..	**£8.50**
CX230	300W	40dB	BNC sockets ..	**£18.25**
CX600N	600W	40dB	N sockets ..	**£21.75**



COAX SLIDE SWITCHES

Up to: 1kW, 1.5HGz, 0.3dB loss, 1.2 : VSWR.
50dB isolation, 50 ohm 'N' or 'PL' fittings available.

EX-STOCK (P & P 30p) VAT 8% only
TWS 120 1 in 2 out Nickle SO239 .. .. .. **£4.90**
TWS 150G 1 in 5 out Gold SO239 .. .. .. **£10.45**

AEC METERS

SWR, Power, (Pr), Field Strength (F.S.) (P & P 40p, VAT 8% only)
Unless stated: SWR (± 10%), 1.5 to 160MHz, 50/75Ω.

SWR10 (TLH)	single meter horizontal type	**£8.15**
SWR (BLH)	50Ω F.S., Pr 10 & 100W FSD (±10%)	**£9.90**
SWR40 (Centre)	Single meter Vert. type with F.S.	**£7.80**
SWR50A (TRH)	SWR (± 5%) 3.5MHz up, Pr to 1kW (± 20%) ..	**£9.60**
SWR50 (BRH)	as SWR50A (300μA) but 100μA meters	**£11.20**

HY GAIN HF RANGE (Car. £1.00-£2.00) VAT 12½%

BN86 1:1 ferrite Balun ..	**£12.00**	TH2MKIII 10-20m 2 ele ..	**£94.00**
103BA 10m 3 element ..	**£43.50**	TH3JNR 10-20m 3 ele ..	**£96.00**
153BA 15m 3 element ..	**£54.50**	TH3MKIII 10-20m 3 ele ..	**£137.00**
203BA 20m 4 element ..	**£103.40**	TH6DXX 10-20m 6 ele total	**£164.50**
402BA 40m 2 element ..	**£146.00**	HY QUAD 10-20m 2 ele ..	**£151.80**
18V 10-80 Load Vert. ..	**£24.50**	DB1015A 10-15m 3 ele ..	**£99.00**
12AVQ 10-20m Trap Vert. ..	**£33.50**	LA1 Lightning arrestor gas	**£20.30**
14AVQ 10-40m Trap Vert. ..	**£47.50**	LA2 Lightning arrestor spark	**£3.30**
18AVT/WB 10-80m Vert. ..	**£64.40**	HY TOWER 10-80m Vert. ..	**£162.80**

BANTEX VHF WHIPS (Carriage 90p) VAT 12½%

70¼ ¼ .70MHz fibreglass ..	**£4.00**	B5U ⅝λ432MHz	**£5.00**
144¼ ¼ .145MHz FG or SS ..	**£3.50**	UCL 432MHz Mid loaded ..	**£8.00**
B55/8145MHz	**£6.35**	TLM Trunk lip mount ..	**£5.25**
BGA FG ½ 2m fibreglass ..	**£8.75**	MB Magnetic Base	**£8.50**
BAG SS ½ 2m stainless steel	**£8.50**	Standard base unwanted deduct	**£0.50**

ROPES (Carriage extra) VAT 8%

3mm HT steel ..	.. yd. **£0.13**	X150 Rustproof 150m ..	**£10.85**
5mm HT steel ..	.. yd. **£0.20**	7 × 81g Galvanised 100′ ..	**£2.20**

AERIAL INSULATORS (Post extra) VAT 12½%

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

AERIAL WIRE (Carriage extra) VAT 8%

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

COAX PLUGS (p & p extra) VAT 8%

PL259	Standard UHF plug	**£0.48**	SO 239	Socket 2 hole ..	**£0.37**
PL259	P.T.F.E. UHF plug	**£0.55**		"T" adaptor ..	**£1.20**
UG175U	Reducers	**£0.12**		Right angle adaptor	**£0.90**
258	Back to back ..	**£0.80**		Phone plug/SO239	**£0.55**

CABLES RF FEEDERS (Carriage extra) VAT 8%

RG8/U 50 ohm Heavy ..	yd. **35p**	UR39 75 ohm Medium ..	yd. **24p**
UR57 75 ohm Heavy ..	yd. **36p**	T3278 75 ohm Distribution ..	yd. **20p**
74 ohm Flat twin	yd. **8p**	UR43 50 ohm Solid Cent. ..	yd. **15p**
300 ohm Ribbon	yd. **9p**	UR76 50 ohm Strand Cent. ..	yd. **15p**

CUSHCRAFT VHF OMNI (Carriage 95p) VAT 12½%

RINGO RANGERS ARX 6dB gain (over ¼λ), ultra low angle radiation, excellent 50 ohm match, uses 3 × ¼λ in phase and 1/8λ stub. 145MHz version approx 9′ 6″ (&1½lb), 432MHz approx 3′ 6″ (illustrated centre left).

ARX2 Ringo Ranger 145MHz	**£21.50**	ARX450 Ringo Ranger 432MHz	**£21.50**
AR2 3dB Ringo Vert	**£12.75**	ABW144 2m Big Wheel ..	**£14.50**
AR25 QRO AR2	**£15.00**	ABW12S ABW harness ..	**£7.30**
CX1000 29MHz Ringo ..	**£25.75**	ASQ1 2m Squalo	**£11.75**

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

D5/2m 5 over 5 slot feed ..	**£9.90**	PBM14/2m 14 ele Para ..	**£21.00**
D8/2m 8 over 8 slot feed ..	**£13.40**	D8/70 8 over 8 slot feed ..	**£11.30**
5XY/2m 5 element crossed ..	**£10.30**	PBM18/70 18 ele Para ..	**£13.75**
8XY/2m 8 element crossed ..	**£12.90**	MBM48/70 46 ele Multi ..	**£15.20**
10XY/2m 01 element cross ..	**£17.75**	MBM88/70 88 ele Multi ..	**£20.35**
5Y/2m 5 element yagi ..	**£5.40**	12XY/70 12 ele crossed ..	**£20.90**
8Y/2m 8 element yagi ..	**£7.00**	4Y/4m element yagi	**£8.50**
10Y/2m 10 ele long yagi ..	**£13.80**	PMH2/70 2 way harness ..	**£4.15**
14Y/2m 14 ele long yagi ..	**£17.85**	PHM2/4m 2 way harness ..	**£6.60**
Q4/2m 4 element quad ..	**£10.50**	PMH2/C Circ. phasing ..	**£3.60**
Q6/2m 6 element quad ..	**£14.00**	PMH2/2m 2 way harness ..	**£4.95**
PBM10/2m 10 ele Para ..	**£16.40**	JBL 15/592" Joint sleeve ..	**£3.37**

SMC TRAPPED DIPOLES (Post 45p.) VAT 12½%

S 500W P.I.P. 14SWG ..	**£19.60**	P 500W P.I.P. Cu/Terylene	
HP 1K P.I.P. 14 SWG ..	**£21.75**	braid c/w 75′ feeder, etc. ..	**£21.75**

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

TA33 3 ele 200W R.M.S. ..	**£64.00**	TA32 2 ele 300W A.M. ..	**£44.00**
Mustang 3 ele 2kW P.I.P. ..	**£82.50**	Mustang 2 ele 1kW A.M. ..	**£66.00**

GEM QUAD FIBREGLASS QUAD (Carriage £2.00) VAT 12½%

GQ2E 2 element ..	**£95.00**	GQ4E 4 element ..	**£198.00**
GQ3E 3 element ..	**£147.00**	CK1Q 1 ele Conv. kit ..	**£55.00**

G WHIP HF MOBILE (Carriage 90p) VAT 12½%

Tribander 10-20m (+ LF)	**£14.61**	LF40, 80 or 160	**£4.87**
Multimobile	**£18.06**	MM40, 80 or 160	**£4.87**
Flexiwhip 10m (+ FF)	**£12.42**	FF15, 20, 40, 80 or 160 ..	**£5.04**
Basemount ½" hole mount	**£2.20**	Telescopic whip for coils	**£1.50**

SOUTH MIDLANDS COMMUNICATIONS LTD

Head Office, Main Showrooms and all Mail Order enquiries to Totton.

OSBORNE ROAD, TOTTON
SOUTHAMPTON SO4 4DN

Hours of business: 9-5.30; 9-12.30 Saturday

Cables: Aerial Southampton
Telex: 477351 SMCOMM G
Tel: Totton (04216) 4930 & 2785

Northern Branch: The Chambers
No 3 The Parade, North Lane,
Headingley Leeds Tel. (0532)
78 2326. Hours of business: 9-5
Tues-Sat, 9-8p.m. Thursday.

AGENTS (evenings) (ALL QTHR)
Brian Kennedy G3ZUL Droitwich (09057) 4510
Peter Avill G3TPX, Darton (022 678) 2517. **Ian McKechnie GM8DOX** Bridge of Allan (078683) 3223. **Howarth Jones GW3TMP,** Pontybodkin (035 287) 846. **Mervyn Anderson GI3WWY,** N.I. Trandagee (0762) 840656.

From YAESU — The Outstanding New GOLD LINE FT-301D

YAESU

ALL SOLID STATE
200W PIP
DIGITAL READOUT TRANSCEIVER

■ 6-Digit Readout ■ All Modes—SSB/CW/A.M./FSK ■ 160 thru 10 Meters ■ TX & RX Clarifier ■ RF Sampled Feedback ■ 3-Position AGC ■ Rejection Tuning (If Pass band tuning) ■ Built-in DC Power Supply ■ Optional AC Power Supply & Speaker Unit with 12 or 24 Hr. Digital Clock ■ Noise Blanker ■ RF Speech Processor ■ Computer Type Plug-In Module Construction ■ Size: 11 in (w) × 5 in (h) × 13½ in (d) ■ Light Weight: 22 lb.

The Model FT-301D is a precision-built, all solid-state, compact high performance transceiver of advanced design.

Fully solid-state using many ICs and FETs for reliability and a band tuning system with preset pass band tuning, combined with a wide-band amplifier that eliminates final amplifier tuning for band changes.

Also available as an option is an automatic (programmable) CW identifier.

Whether you judge it on price, performance or operational features, the FT-301D comes out a winner!

OUR AGENTS

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

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

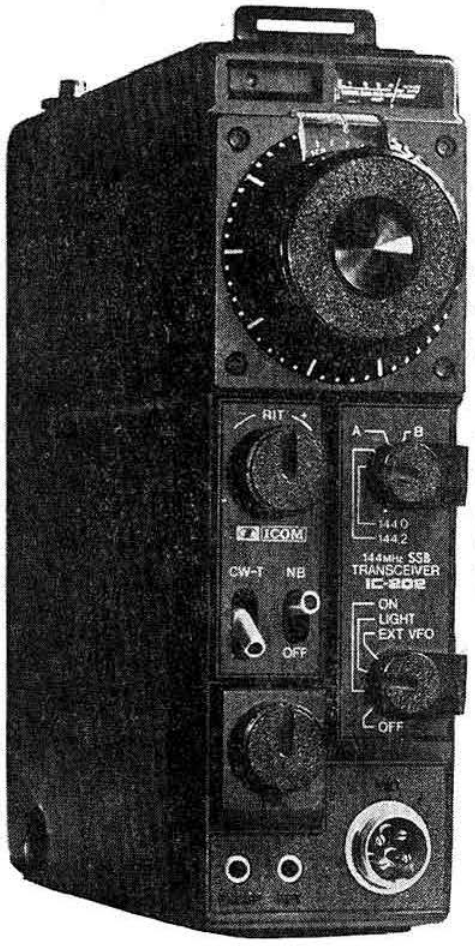
Western Electronics (UK) Ltd.,
Fairfield Estate,
Louth,
Lincolnshire LN11 0JH.

PAUL
G 3VJF

ICOM

DAVE
G4ELP

THE MOST POPULAR LITTLE SSB RIG ON THE MARKET



ICOM IC-202 £161.10 INC.VAT

(£33.10 deposit)

The IC-202 is a 2 metre SSB/CW transceiver designed to be operable anywhere, like most portables, but with big station features such as a very effective noise blanker, RIT, S & RF meter, and a full 3 watts output. Two built-in crystals in the stable VXO allow operation between 144·0 and 144·4MHz. If you wish to expand the range of the IC-202, Icom have also provided 2 spare crystal sockets for your convenience. With a slight retuning of the IC-202, and installation of a special crystal, you may also work through Oscar.

The aluminium diecast frame provides a very strong yet light housing for the 2 circuit boards and the aluminium sides snap off easily if service is ever necessary or to change the batteries.

The IC-202 operates on 9 inexpensive C cell batteries, or an external 13·8V DC source. We recommend the IC-3PS which not only provides power for the IC-202, but also doubles as a stand and holder for the IC-20L 10 watt linear amplifier.

You can use the built-in whip antenna for portable use or another antenna connects to the external antenna connector on the back of the IC-202.

We feel sure that you will have years of lasting enjoyment from an IC-202, manufactured by the leader in communication equipment: Inoue Communication Equipment Corporation. The signal is as clean as you would expect from ICOM equipment—It won't get you into repeaters unintentionally!

FEATURES:

- ★ Power Indicator LED
- ★ S and RF meter
- ★ Dial calibrated in 10kHz increments with a total coverage of 200kHz. The operating frequency is read by adding the frequency shown on the dial to that shown on the crystal switch.
- ★ RIT. Independently swings the receiver frequency by ±3kHz.
- ★ CW or SSB
- ★ Noise Blanker
- ★ 4 position crystal switch
- ★ Built-in speaker with socket for external speaker if required
- ★ External VFO socket.
- ★ Whip antenna and socket for external antenna
- ★ External 13·6V DC input or internal batteries

ACCESSORIES SUPPLIED:

Microphone
Microphone Case
Shoulder Strap
Power Supply Plug
Earphone
9 Dry Cells type C
Comprehensive English Handbook

OPTIONAL EXTRAS:

9 × Ni-Cad Batteries **£18.00** + £1 p & p.

Charger, **£12.00** + 50p p & p.

We will be pleased to demonstrate ICOM at our new premises

YOUR SOLE AUTHORISED UK IMPORTER FOR ICOM

THANET ELECTRONICS

143 RECULVER ROAD, BELTINGE, HERNE BAY, KENT

Phone 02273 63859 (2 lines)

Direct Ansafone line (evenings) 64283

BARCLAYCARD

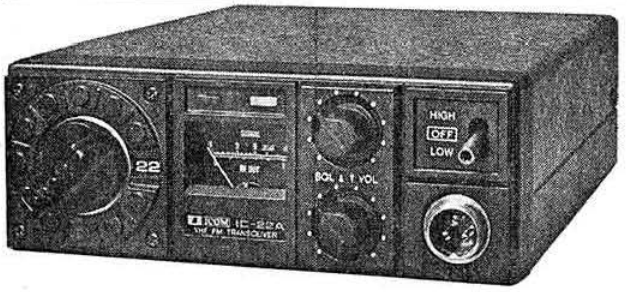
Access

PAUL G3VJF

ICOM

DAVE G4ELP

We are pleased to introduce a new member of the THANET team here at Herne Bay. He is Phil., G4CZU, who is a keen operator on both HF and VHF and an ICOM enthusiast. Should Phil answer your phone call he will be as pleased as we are to help with your enquiry.



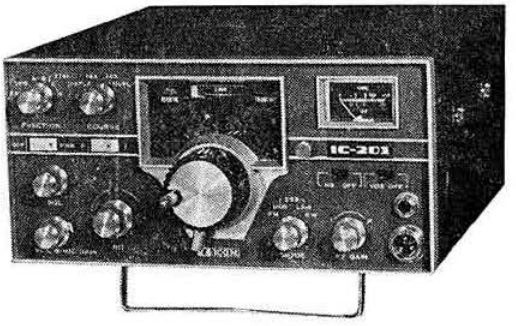
IT'S SMALLER THAN IT LOOKS!

Many people have pointed out that the photo of the IC-22A does not do it justice and that it is in fact smaller than it looks. The actual size is 2⅝" high × 6½" wide × 8½" deep. It comes fitted with no less than ELEVEN channels—Six simplex and all Five UK repeater channels and an automatic tone burst. Still the best value in the UK.

ICOM IC-201

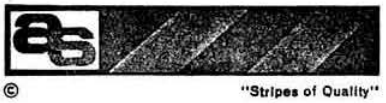
£396.00 inc. VAT (£80.00 deposit)

The luxury multi-mode rig which was described in full in our advertisement in January when it was also reviewed in *Radio Communication*. It provides full 2 metre coverage on FM, SSB and CW using its ultra stable VFO. Full facilities for repeater and reverse repeater use at the flick of a switch, built in automatic tone burst, full break-in facilities on CW and VOX are but a few of the excellent facilities found on the increasingly popular IC-201. Send for further details or leave a message on our ansafone during the evening.



ICOM IC-215

This excellent little 3 Watt portable will be available for sale in December. The price will be competitive with others in its class and we will be offering an introductory batch with lots of crystals fitted at a special price. The normal complement of crystals will be 2 Channels in order to keep the price as low as possible.



© "Stripes of Quality"

See page 806

AND REVCO ANTENNAS

ICOM IC-225

With crystal controlled tone burst and reverse repeat switch **£250** inc. VAT (£50 Deposit)

With switched factory fitted R/C tone burst **£225** inc. VAT (£45 Deposit)

FOR 70cms!!

ICOM IC-30A

NOT THE CHEAPEST—BUT THE CHOICE OF THE MAN WHO WANTS A BIT OF QUALITY.

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

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

HP TERMS NOW AVAILABLE

PRICES INCLUDE VAT AND DELIVERY EXCEPT WHERE STATED

BARCLAYCARD

YOUR SOLE AUTHORISED UK IMPORTER FOR ICOM

THANET ELECTRONICS

34 Cliff Avenue, Herne Bay, Kent (02273 63859)

Access

THE ULTIMATE!!

THE NEW MMT432/144 DOUBLE CONVERSION 432MHZ LINEAR TRANSVERTER

We at MICROWAVE MODULES LIMITED have been aware for some time now that a great demand exists for a linear transverter, capable of converting 144MHz signals up to 432MHz.
After extensive research and development involving various techniques, we have successfully produced a transverter which offers the owner of any 144MHz transceiver a relatively inexpensive route to 432MHz operation.
This new product features low distortion transmit mixers and a low noise receive converter incorporating a gold metallised 1·5dB noise figure device, yielding a true overall system noise figure of better than 3·0dB.
The incorporation of a 10 watt RF termination network and an RF VOX transmit/receive switching system enables complete transceive operation through a single socket on the transverter, thus reducing the interconnection necessary between the transverter and the associated 144MHz transceiver. A spurious-free output spectrum is achieved by down-converting the 144MHz signal to 28MHz before the second conversion up to 432MHz.
The conservative 10 watts developed by the linear transmit section is switched by an internal PIN diode aerial changeover relay, which has a through-loss in the transmit or receive mode of less than 0·2dB. The inclusion of these high technology features makes the unit ideal for all modes of transmission at 432MHz, particularly where a high degree of linearity, stability and sensitivity are of prime importance.

SPECIFICATION

Frequency range:	432–434MHz	Second oscillator:	116MHz
Input modes:	SSB, FM, AM or CW	Receive converter gain: (Through transceive port)	10dB
Input frequency range:	144–146MHz	Receive converter gain: (Through independent port)	25dB
First IF	28MHz	Receive converter noise figure:	Better than 3·0dB
DC power requirements:	12 volts nominal	Power connector:	5 pin DIN
Current consumption:	2·2 Amps peak	RF input/output connectors:	50 ohm BNC
Power output:	10 watts continuous rating	Size:	187 × 120 × 53mm.
Drive requirements at 144MHz	10 watts (or 300mW if used without RF alternator)	Weight:	900 g.
Relative 404MHz output:	—65dB	Price:	£126 inc. VAT
Other spurious outputs:	—65dB		
First oscillator:	101MHz		

N.B. Transmit/receive switching is achieved by an internal RF VOX sensing network.
Any further information on this product and others from our extensive range may be obtained by contacting our sales department, who will be only too pleased to help.

MICROWAVE MODULES LIMITED

BROOKFIELD DRIVE, AINTREE, LIVERPOOL L9 7AN

TEL.: 051-523 4011

Waters & Stanton Electronics

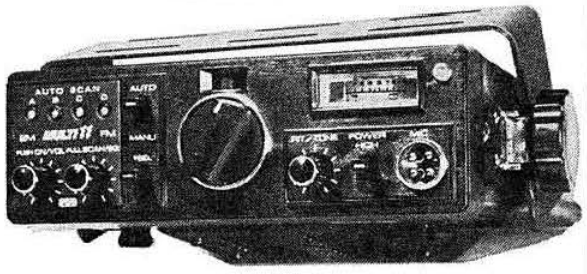
A NEW GENERATION IN VHF/UHF TRANSCEIVERS

2-WAY CHANNEL SCAN

PLUS 23 FIXED CHANNELS

FDK **2 metres Multi-II**

Ex-stock



Fitted 7 channels and toneburst. £199 incl. VAT or immediate credit with deposit of £40.

FDK **70 cms Multi-UII**

Ex-stock

Fitted all UK repeater channels plus 433.20 and 433.50. £229.50 incl. VAT (tone burst fitted)

FDK **OPTIMUM PERFORMANCE AT SENSIBLE PRICES**

The new FDK models are already being acclaimed as a new generation of fm mobile/fixed station transceivers. Take for example the receiver front-end employing 2 stages of rf amplification together with helical filters to provide the finest front-end available. Consider the use of both ceramic and crystal filters in the receiver I.F. chain to ensure QRM free QSO's. Listen to the excellent transmitted audio that stands head and shoulders above others, or simply enjoy the freedom and safety that the auto channel-scan facility brings. Already voted top fm rigs in Japan, the FDK 2m and 70cm transceivers have a lot more to offer you and remember that on 70cm IRT is absolutely essential—another standard feature on all FDK models—send SAE today for full details of today's top performers.

DID YOU KNOW? . . .

that on 70cms there are now more repeaters than on 2 metres! And what's more there are a lot more to come. But please remember, on 70cms IRT is essential—100Hz at 12MHz=3·6kHz at 70cms—whilst your new FDK transceiver will be on frequency the other fellows xyz rig may not be!

FDK ACCESSORIES

De-Luxe AC psu . . .	£63.50
VFO (incl. 600kHz shift)	£89.00
Sound box	£10.50

MULTI-2700 **ANOTHER FIRST!** **ALL MODE 2 METRE RIG**

Available exclusively from Waters & Stanton Electronics (delivery in November)

MAIL ORDER & HEAD OFFICE: HOCKLEY AUDIO, 31 SPA ROAD, HOCKLEY. ESSEX. TEL. 03-704 6835 (2 lines)

ALL PRICES INCLUDE VAT — CARRIAGE AT COST

AGENTS—G3XTX J.R. Electronics, 198 Collier Row Lane, Romford, Essex. Tel. Romford (0708) 68956.
G3OQT Bredhurst Electronics, Willowbrook, School Lane, Bunbury, Cheshire. Tel. Bunbury (0829) 260708
GM3GRX Eric Simpson, 6 Drossie Road, Falkirk, Stirlingshire. Tel. 0324-24428

BARCLAYCARD — Access

MONDAY TO SATURDAY 9 A.M. TO 5.30 P.M. EARLY CLOSING WEDNESDAY

SOLID STATE MODULES

63 WOODHEAD ROAD, SOLID, LOCKWOOD, HUDDERSFIELD, HD4 6ER

Telephone 0484-23991

BUY WITH CONFIDENCE FROM UK's LONGEST ESTABLISHED VHF/UHF MANUFACTURER. OUR EQUIPMENT IS NOW USED IN OVER 100 COUNTRIES WORLD WIDE.

NEW! TWIN EUROPAS, NOW AVAILABLE IN UK

These two all solid state transverters for 2 metres and 70cms developed for the export market are now available to the UK amateur.

The Europa S.S. is the solid state 2 metre model.
The Europa 70 for use on 70cms.

Both give 10 watts output using the latest type of SOE transistors, rated to withstand infinite load mismatches.

Noise figure on 2 metres is 2dB, on 70cm. I.F. 28-30MHz.

Size of each is 8¼" × 2½" front panel, 6" deep. The case is a very attractive "wrap round" style and the METER indicates P.A. collector current to keep a check on correct operation.

They contain a rectifier and smoothing circuit so that you can feed them with 12V AC at 2 amps peak. DC may also be fed in, of course.

Prices: Europa S.S. 2 metres	£80.00 + VAT =	90.00
Europa 70 70cms	£85.00 + VAT =	95.60
12V 2 amp transformer	£4.00 + VAT =	4.50
Complete boxed Power Supply Type CPS1	£7.00 + VAT =	7.87

NEW FOR HF

A wideband pre-amplifier circuit 1-30MHz. Gain is 15dB. Noise figure 1dB. Input and output impedance 50ohms. Supply 12V (9-15V) 25mA, —ve earth. The answer to all of you who have asked for an HF pre-amplifier. They use the latest wideband techniques and a UHF power transmitting transistor to give a high immunity to overload. Two models: the PA10 is a printed circuit board version, size one cubic inch. Price: **£5.00 + VAT = £5.62.**

The Sentinel HF pre-amplifier contains a change over relay included in the box, size 2½" × 3" × 1½" for placing in a transceiver aerial lead. The relay changes over for transmitting, and to switch the pre-amplifier out of circuit. Price: **£9.00 + VAT = £10.12.**

NEW FOR EVERYONE?
THE SSM "IAMBIC" AUTOMATIC MORSE KEYER

Uses the latest C MOS technology. It can be used with a twin paddle key for squeeze operation. Its self completing dots, dot memory, dashes and spaces are all digitally derived from a single IC timebase to ensure correct ratios.

The keyer has sidetone which can be switched OFF. 9V battery operation and reed relay keyed output.

SSM Iambic Automatic Keyer, Price: **£30.00 + VAT = £33.75.**

A beautifully engineered twin paddle key to compliment our keyer also available. Price: **£10.00 + VAT = £11.25.**

EUROPA B

Our high power transverter (2 metre or 4 metre) is more in demand than ever and remains in full production. Price: **£97.00 + VAT = £109.15.** See previous adverts for more data.

SSM Z MATCH 80-10 METRES

2KW at 50ohms—now a very popular unit. Price: **£24.89 + VAT = £28.00.**

CONVERTERS for 70cms, 2 metres, 4 metres

Sentinel 2 metres converters, IFs, 2-4MHz, 4-6MHz, 28-30MHz, Price; **£18.00 incl. VAT.**

Sentinel X 2 metre converters with power supply, IFs, 2-4MHz, 4-6MHz, 28-30MHz. Price **£22.00 incl. VAT.**

Sentinel 2 metre converter kit IF 28-30MHz. Price: **£11.50 incl. VAT.**

Sentinel MF. Price: **£20.00 incl. VAT.**

SM70 70cms converter IF 144-146MHz. Price: **£18.00 incl. VAT. NEW** 70cm—28-30MHz converter. Noise figure—3dB. Gain—30dB. Price: **£18.00 incl. VAT.**

SENTINEL LOW NOISE FET PRE-AMPLIFIER

- ★ This pre-amplifier uses a selected low noise FET to provide the ultimate in sensitivity and selectivity.
- ★ Isolated supply lines, complete with any equipment.
- ★ Low noise figure—1dB. High gain—18dB.
- ★ Size: 1½" × 2½" × 3". Price: **£8.72 incl. VAT.** Ex-stock.

VHF AND UHF PRE-AMPLIFIERS

We have sold thousands of our pre-amplifiers. Hundreds of you have commented on the improved reception and no one has said that he hasn't found an improvement. Where else can you get such value in these pages?

PA3 DUAL GATE MOSFET PRE-AMP

- ★ Small about 1 cubic inch printed circuit board pre-amp. Now incorporated in thousands of transceivers.
- ★ Low noise figure—2dB. Gain—18dB. Price: **£6.27 incl. VAT.** supplied with fitting instructions.

SM71 70cm PRE-AMPLIFIER

Selected FETs give a noise figure of —3.5dB and a gain of 18dB. Price: **£10.00 incl. VAT.** Ex stock.

12 months guarantee on all units. We offer same day COD (£50 limit)

ACCESS **BARCLAYCARD** **H.P. or C.W.O.**

Just phone your credit card number for same-day service.

If you require more detailed information or help, we are a telephone call or a letter away, so do not hesitate to ask.

YOU CAN CALL IN ANYTIME TO INSPECT OR COLLECT EQUIPMENT: PAUL, G3MXG.

AMATEUR ELECTRONICS UK

YOUR FIRST CHOICE FOR YAESU MUSEN!

SSB/FM/CW/AM

AND THE LATEST

FT-221R

2 METRE TRANSCEIVER

YAESU

MAIN AGENT

SOLE UK AGENT FOR SWAN ELECTRONICS

The 700 CX SWAN'S 700 Watter

MAIN AGENT FOR

ATLAS RADIO INC.

Sensational ATLAS-210/215X

WHEN YOU BUY YAESU, SWAN OR ATLAS FROM AMATEUR ELECTRONICS UK YOU HAVE THE CERTAIN KNOWLEDGE THAT YOU ARE PURCHASING YOUR EQUIPMENT FROM A FACTORY APPOINTED MAIN AGENT WITH EXTENSIVE STOCKS OF MAIN ITEMS, ACCESSORIES AND SPARES. EVERY SALE IS BACKED UP BY A FIRST CLASS SERVICE DEPARTMENT AND WARRANTY SERVICE IS SECURICOR COLLECTED AND RETURNED! NO COMPANY HAS BETTER CONNECTIONS WITH THE FACTORIES.

A COUPLE OF STAMPS (NO ENVELOPE) BRINGS THE FT-221R, SWAN OR ATLAS LEAFLET. A POSTAL ORDER OR STAMPS FOR 25 PENCE BRINGS THE LATEST YAESU MUSEN MAIN CATALOGUE TOGETHER WITH OUR CREDIT VOUCHER VALUE £1 FOR USE AGAINST YOUR FUTURE YAESU PURCHASE.

BRANCH: AMATEUR ELECTRONICS UK—COASTAL, CLIFTONVILLE, KENT. KEN McINNES, G3FTE, THANET (0843) 29127

AGENT: WALES & WEST—ROSS CLARE, GW3NWS, CAERLEON 422232

G3FIK

508-514 ALUM ROCK ROAD

BIRMINGHAM 8

021-327 1497

Telex 337045 6313

RADIO SOCIETY OF GREAT BRITAIN

35 Doughty Street, London WC1N 2AE

Telephone 01-837 8688

Founded 1913 — Member society, International
Incorporated 1926 — Amateur Radio Union

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

The national society representing all UK radio amateurs

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

Annual membership rates: UK—£8 (including VAT); Unlicensed members under 18 years of age, £3. Overseas—£7.50.

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

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

EDITOR — A. W. Hutchinson

CURRENT COMMENT

CITIZENS' BAND

The RSGB is aware of the numerous items that have appeared on this subject in various journals both as correspondence and as feature articles. It is apparent that much of this material has been generated by those who will profit financially from the introduction of the facility rather than by potential users.

The Society is often asked to state its policy on a citizens' band. It is somewhat difficult to offer an informed opinion on a matter concerning which nothing definite is known. Understandably, no guide lines are available from the administration regarding the various possibilities, and it is in this context that the following statement is made.

The matter of a citizens' band is under continual consideration by the Society's Telecommunications Liaison Committee, and the Council approves its present views which are:

1. The RSGB exists to safeguard the interests of its members and of the amateur service in the UK. The amateur service is a defined service in the Radio Regulations (Geneva 1976) and is accorded worldwide status in the same way as the professional services. A citizens' band facility exists only where a national administration is prepared to set aside spectrum space for this use.
2. While the RSGB may have no direct interest in a citizens' band facility by its present articles of association, it must, in the interests of its members, take heed of developments likely to affect the amateur service.
3. The major consideration affecting the introduction of any new facility is the ability of the administration to exercise complete and effective control. Anything less is not acceptable.
4. The RSGB is not opposed to the introduction of a short-range personal communications facility provided that its location in the spectrum and the equipment used are suitable. The 27MHz band as used in the USA and some European countries is probably one of the most unsuitable frequency bands that could be envisaged. There are three main reasons:
   (*a*) its proximity to the amateur 28MHz band and the consequent availability of high-power equipment together with the ease of illegal operation in this band;
   (*b*) the existence of long-distance propagation during part of the sunspot cycle, and
   (*c*) the interference to television receivers, particularly those operating in Band 1.
   Having regard to equipment now available it would appear that a vhf or uhf fm service with power limitation, crystal control and type-approved apparatus could be suitable.
5. Location of a citizens' band within an existing amateur service allocation is not acceptable to the RSGB. Further, if this facility is eventually allowed it ought to be located in a part of the spectrum remote from any amateur allocation to prevent illegal operation in an amateur band such as is now experienced in the USA.

QTC
amateur radio news

GB2RS and club news
Some months ago, as part of changes to the format of the GB2RS service, it was decided to discontinue the inclusion of routine items dealing with forthcoming events in club programmes. The intention was, and is, to devote this air time to news items of more general interest to members in the country as a whole. It was also hoped that this would encourage the clubs concerned to make more use of the space allocated in the "Club News" feature in *Radio Communication* for this purpose.

Items concerning club events which are still eligible for inclusion are listed below:

(*a*) News of new clubs being formed (or old clubs being disbanded).
(*b*) News of changes in venue, day and time of regular meetings.
(*c*) Details of meetings where these are of *regional* interest or are a change or correction to the published programme.

Further details on the submission of news items to GB2RS appear on the title page of *Radio Communication* each month.

GB2RS 144MHz broadcasts
It has been suggested that the mode of the broadcasts on 144MHz should be changed to fm (F3). Members having any firm feelings on this matter are asked to please indicate *in favour* or *not in favour* on a postcard addressed to the Telecoms Liaison Officer at Society headquarters.

Region 5 area representatives
Peter Chilcott, G4BBA, would like area representatives for Bedfordshire and Northamptonshire to help administer Region 5. Any member wishing to fill these positions should contact G4BBA or RSGB headquarters.

Zambian prefix
On the occasion of the 12th anniversary of the independence of the Republic of Zambia, radio amateurs of this administration will be authorized to use "12" after the prefix 9J (9J12 . . .) from 23 to 26 October 1976. This is the text of an official ITU announcement.

New callsign series
The ITU has allocated the callsign series S7A to S7Z to the Republic of the Seychelles as from its accession to independence.

Post Office morse tests
The following is the text of a letter received from the Home Office: "A recent cost analysis of the Post Office Morse Tests has shown once again that the fees paid do not cover the cost of the tests. The Home Office is required by the Treasury to set fees in order to recover the full cost of this service, and expenditure is exceeding income by over 100% at the present time. There has been no increase in the fee since 1972 and we are therefore obliged to impose an increase to £4 as from 1 January 1977 and regret that a further increase during 1977 cannot be ruled out."

RSGB PRESIDENT, 1977
At its meeting on 7 September, the Council of the RSGB unanimously elected Lord Wallace of Coslany to be the Society's President during 1977.

Lord Wallace has long been interested in amateur radio, and he spoke of this when he opened the RSGB Radio Communication Exhibition at Alexandra Palace at the end of July. During his many years in Parliament he has done much to further amateur radio matters in official circles.

Oscar command station
The Oscar command station is located at the University of Surrey at Guildford and stations in the surrounding area may hear wideband signals on the 144MHz band during the periods of the Oscar 6 passes. The duration of the command signals is kept to a minimum and it is hoped that no inconvenience is caused to other users of the band.

New ITU members
It has been announced by the ITU that the government of the Republic of Surinam has acceded to the International Telecommunication Convention (1973) and with effect from 15 July 1976 becomes the 149th member state of the ITU.

It is understood that the ITU will shortly announce that it has admitted to membership Sao Thomé-Principe and Guinea-Bissau, both independent African republics. In accordance with United Nations principles these countries will have one vote at ITU conferences as will the UK, USA and USSR.

New US magazine
Ham Radio has announced a new magazine aimed at the beginner to amateur radio to be known as *Ham Radio Horizons*. The editor-in-chief will be Jim Fisk, W1DTY, already well known to *HRM* readers, with Tom McMullen, W1SL, as managing editor. The first issue of 96 pages is scheduled to appear in early January 1977 but, as yet, there is no indication of the subscription rate.

Facts and figures
The Home Office advises that the following numbers of amateur licences were in force at 30 September 1976:

Class A	16,083	Class B/M	2,523
Class B	6,270	Class F/M	23
Class A/M	4,254	Television	315

The callsign record received from the Home Office dated 17 September 1976 gives the latest callsigns issued in the G4 and G8 series as G4FIM and G8LVG respectively.

Phase 2 uhf repeaters
All groups intending to submit a proposal for a Phase 2 uhf repeater are reminded that completed proposals must reach RSGB headquarters by 7 December 1976.

Subscriptions to the DARC journal "CQ-DL"

New rates for subscriptions to *CQ-DL* have been announced by DARC. The annual rate for surface delivery is DM21, or by air mail to Europe DM40. For remittances through a non-German bank a further DM3 should be added. Subscriptions for 1977 should be sent to arrive at the following address by 1 December 1976: DARC, Auslandsbezeg CQ-DL, PO Box 1155, D-3507 Baunatal 1, Fed Rep of Germany.

Election of 1977 RSGB Council

Ballot forms for this election are being distributed to members of the Society with this issue of *Radio Communication*. Only corporate members are allowed to vote.

Personal details of the candidates

ORDINARY ELECTION

P. Balestrini, TEng (CEI), MITE, MInstAM, G3BPT
Licensed 1948. Council member since 1974. Active all bands, mainly interested in vhf. Chairman, Raynet Committee; member, Exhibition & Mobile Committee, and Telecommunications Liaison Committee. Profession: assistant telecommunications manager, Port of London Authority.

J. Bazley, G3HCT
Actively engaged in RSGB committee work since 1970. Council member 1971–2. Chairman, HF Contests Committee; member of Finance & Staff Committee and of IARU Working Group. First licensed 1948. Active on all bands 1·8 to 146MHz. Main interests operating cw and ssb on hf bands. President of FOC. Particularly interested in efficient working of RSGB and provision of effective service to members. Profession: managing director of small family business.

R. Bellerby, BSc, Grad Cert Ed, FBIS, G3ZYE (ex G8DTO)
Member of RSGB since 1965, and of RSARS and RNARS. Past-secretary, Thornton Cleveleys ARS; hon editor, Mid-Sussex ARS newsletter. RAE class instructor. Active all bands 1·8 to 144MHz, fixed, /P and /M. Particularly interested in education and publicity aspects of RSGB. Profession: principal, College of Further Education.

T. Darn, G3FGY
RSGB member for 29 years. Region 4 representative for eight years. Previously county representative for six years and RAEN county controller. Chairman, Derby & D ARS. Organizer, Derby Rally and ARRA Leicester exhibitions. Thirty years in radio and electrical trade as management executive, secretary/treasurer of Radio Retailers Association. Member of RAFARS over 25 years. Profession: in charge of resources centre, SE Derbyshire College, and part-time lecturer.

D. Hoult, G4OO
Licensed 1938. Active all bands using cw, ssb and fm. Chairman of Spalding & D ARS and of Wireless Preservation Society. Editor, *Spalding Radio News*. Member of RAOTA, CQWA, Tops CW Club, G-QRP Club, ISWL, CHC, ARMS and ARNS, and associate member of ARRL, OTC and RCC. Profession: local government officer.

C. A. Jones, G8FGD
No particulars supplied.

C. H. Parsons, GW8NP
Joined RSGB 1934. Served as county representative and then regional representative (with short break), 1946–69. Council member since 1970. RSGB President, 1975. Chairman, Finance & Staff Committee. Twice chairman, Membership & Representation Committee. Retired university staff member.

D. A. G. Pedder, MSc(Eng), PhD, CEng, MIEE, G3LFX
Joined RSGB 1954. Licensed 1956. Committee member, and presently acting treasurer, Kingston & D ARS since 1974. Interests: hf operation, circuit techniques and equipment design. Profession: lecturer, electronics and power electronics; industrial consultant, power electronics and control.

R. F. Stevens, G2BVN
Licensed 1937; member 1940; elected to Council 1962; President 1966. Telecommunications Liaison Officer and Chairman of Technical & Publications Committee. Member of Finance & Staff Committee and of IARU Working Group. Member of editorial panel of *Radio Communication*. Secretary of IARU Region 1 since 1969. Active 3·5 to 432MHz. Profession: surveyor.

ZONE B ELECTION

J. Anthony, G3KQF
Member of RSGB since 1956. Past town representative for three years. Committee member for 16 years, and past chairman for two years. Derby & D ARS. Active all bands. Main interests vhf/uhf. Profession: senior technical officer (electronics), Derbyshire Education Department.

R. W. Fisher, G3PWJ
Member of RSGB since 1956. Licensed 1961. Regional representative for Region 3 1966–73. Council member, Zone B, since 1973. Member of Membership & Representation Committee. Particular interests: vhf and repeaters. Member of Worcester & DARC and of GB3MH Repeater Group. Profession: electronics service engineer.

ZONE G ELECTION

A. M. Allen, GM3ZBE
Member since first licensed as GM8BYG in 1968. Area representative for Aberdeen and Deeside. GB2RS newsreader. Mainly active on vhf/uhf and also interested in cw dx on 3·5 and 1·8MHz.

F. D. Hall, GM8BZX
Past area representative for Tayside, and present regional representative for Region 12. Beaconkeeper of GB3ANG. Member of RAFARS, Kingsway Technical College ARS, and International Police Association RC. Actively engaged in planning last two Scottish VHF Conventions. Mainly active on 144MHz and interested in all modes. Active dx worker and dx award collector. Profession: police officer.

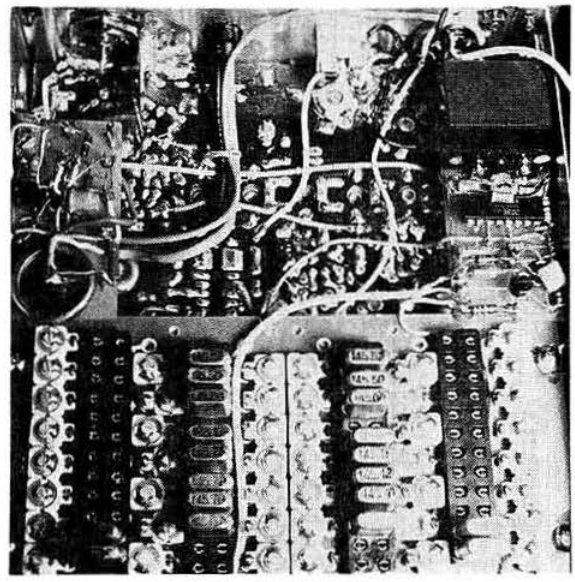
Toneburst and time-out indicator for the IC22A

by W. F. BLANCHARD, G3JKV*

IF very much repeater working is envisaged, it is essential to have an accurate and dependable toneburst system unless one is prepared to be frequently cut off after only a few words, and a time-out indicator is quite useful even when the 55s have been obtained. Most of the newer IC22s already have a crystal-controlled toneburst, but many of the older ones either have none at all, or have one that is rather sensitive to temperature changes. Few of them have a time-out indicator. The electronic design of the units to be presented here is very simple and could be used for any transceiver—the layout is not critical and can be adapted to fit whatever space is available, but specific details will be given only for the IC22A.

Few things cause more discussion among repeater operators than the toneburst. Fundamentally, there are only three requisites for a good toneburst unit—it has to produce a tone at 1,750Hz, plus or minus 15Hz, lasting for about 400ms, deviating the carrier about 3kHz. But it also has to be able to do this over a wide temperature range if the necessity for re-trimming it every few months is to be avoided. The interior temperature of a car can range from −10°C on a cold winter morning to 40°C when it has been standing out in the sun on a summer's day; toneburst units developed in the equable 20°C warmth of the average shack may not like this variation very much. One commercial unit using an RC oscillator circuit showed a drift of over 100Hz when the temperature was varied in this way, and easily explained why GB3LO was not accepting it whenever the temperature fell slightly. Another fault of this particular unit was that it took a little time to actually start oscillating at all when it was cold, and a further short period to build up to maximum amplitude, so the effective duration of the burst was only about 150ms—too short to be accepted.

The only way of getting an accurate burst at all temperatures without either spending a lot of money on milspec components or building a unit too big to go in a rig, is to use



Interior view of the IC22A

crystal or tuning-fork control. Crystals to oscillate directly at 1,750Hz are not available, so if this method is chosen some higher frequency must be used and divided down to regain the right frequency. IC dividers are available in many different configurations, but probably the most useful is the cmos CD4020 AE. This is a 14-stage binary divider that can divide any frequency up to 7MHz by anything from 2^4 to 2^{14}, or by 2 itself. Being cmos, it has a very high input impedance, so matching an oscillator to it is no problem (as it sometimes is with standard ttl). It can operate from any power supply up to 15V, with a power consumption in the microwatt range, and it has a buffered reset line which allows the use of simple reset circuitry. By no means least, it is also quite cheap, selling for under £1.

The division ratios available allow the use of crystals up to 7MHz. For instance, 1,750Hz × 2^{12} (4,096) = 7,168kHz. Or, 1,750Hz × 2^{11} (2,048) = 3,584kHz. If a frequency tolerance of 10Hz is allowed on the final frequency (to be on the safe side, the full 15Hz is not used), any crystals from 7,127 to 7,209, or from 3,563·5 to 3,604·5kHz could be used. The only point to watch is the size of the crystal holder. Clearly, the old 10X crystals are going to be too big, and so might be the 10XJs, but the FT241 and FT243s should be

* The Trundle, Tower Hill, Dorking, Surrey.

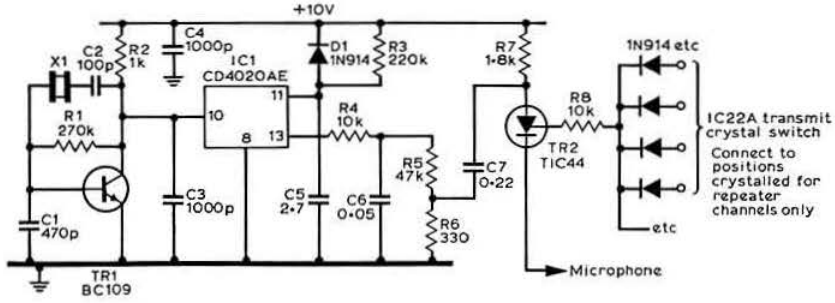


Fig 1. Toneburst circuit diagram

Table 1. FT241 crystals suitable for toneburst use

	Channel number	Marked	Frequency fundamental	Toneburst
54th harmonic series:	41	24·1	446·296	1,743·3
	42	24·2	448·148	1,750·6
	43	24·3	450·000	1,757·8
72nd harmonic series:	321	32·1	445·833	1,741·5
	322	32·2	447·222	1,746·9
	323	32·3	448·611	1,752·4
	324	32·4	450·000	1,757·8

small enough. In this unit an FT241 was used. At one time any surplus shop worthy of the name would have had many thousands of these on offer, but there must still be quite a few lying about in junk boxes. Several channels are usable (Table 1). Division by 2^8 (256) is used, since the fundamental frequency is about 448kHz. (There is no danger of a permanent heterodyne in the receiver since, of course, the oscillator only operates when the transmitter is on.) Channel 323 produces a tone at 1,752·4, marginally nearer the correct frequency than channel 322 at 1,747Hz, but Channel 42 is closest of all, although from the rarer 54th harmonic series. There is little point in attempting to get any nearer, although if readers have used these crystals before and know how to make them shift frequency, it is not particularly difficult to get them exactly on frequency. One of the difficulties in using these now very old crystals is that sometimes it is difficult to make them oscillate in a single transistor circuit, but the circuit given works well over the full temperature range; oscillation starting instantaneously at all temperatures over a range of power voltages. If higher frequency or modern crystals are to be used, the circuit may need modification, probably in the direction of reducing all the capacitances.

Output is taken to pin 10 on the CD4020, no buffering being necessary, and the divided-down tone at about 1,750Hz appears at pin 13. Pin 11 is the reset line, and is used to cut off the tone after the necessary 400ms by allowing C5 to be charged up via R3. The internal double buffering on this line allows a clean snap action to the switch-off. D1 allows C5 to discharge rapidly when the power is removed so that the correct burst duration is achieved no matter how quickly the transmitter is switched on again.

The output from pin 13 is a square wave which is changed to a triangular waveform by C6, R4. The voltage level is adjusted by voltage divider R5, R6 to obtain the correct level for 3kHz deviation, since the output level is about 10V and the correct level for this deviation is only about 100mV. The right way to set this up, if access to a deviation meter can be had, is to set the microphone gain and deviation (R62 and R67 in the IC22A) to obtain 3–4kHz deviation at normal voice levels. There is a jumper lead going to either P1 or P2 on the main pcb which sets the maximum deviation to either 5 or 15kHz. Provided it is plugged into P2 it will be virtually impossible to exceed 5kHz deviation anyway, and the deviation control R67 can be set at maximum, with the microphone gain at half to three-quarter maximum. The values given for R5, R6 will then be found to be nearly correct, with R6 being altered if any adjustment is necessary.

Power for the unit is obtained from the emitter of TR22, the voltage stabilizer for the transmitter audio and oscillator stages, which is only switched on when the transmitter is activated. Hence the toneburst oscillator is running throughout the duration of the transmission, but the divider operates only for 400ms.

A final refinement is to arrange for the toneburst to operate only when a repeater channel is in use. If connected up as so far described, it will operate on all channels, and some operators find the bleep a little annoying on simplex channels. The only logic indication of which channel is in use comes from the channel select switch itself which, apart from the oscillator rf, has the base bias voltage of the oscillator transistor on it. This dc voltage can be used to switch a gate transistor on and off depending on which channel is in use, and thus to allow the tone to get through or not. Because unused crystals are shorted to ground, diodes D2 to D6 are connected to the switch positions corresponding to the repeater channels, anodes to switch and cathodes commoned. A UJT, TR2, is switched by this voltage and thus the tone only appears on the microphone lead on the repeater channels.

Mechanically, the unit is built on a piece of fibreglass board $1\frac{1}{8}$ by $2\frac{3}{4}$in which fits into the IC22A underneath the main pcb, as shown in the photograph. There are only two places in the IC22A where additional boards can go—underneath, and on each side of the speaker. This toneburst board occupies one, the time-out board the other. Both are bolted to the side chassis walls by using small pieces of aluminium angle and 8BA nuts and bolts. The bolts need not be countersunk—the chassis case is sufficiently offset from the walls to cope with ordinary cheese or half-round heads.

Some IC22s have a small press-switch on the front panel labelled CALL, which is not connected to anything. It can be used to provide a longer toneburst (eg for some Continental repeaters) by connecting one side to ground and the other to pin 11 on the CD4020, so that as long as it is held down the tone will continue (plus another 400ms after it is let go). If a capacitor of about 33μF instead of a direct wire is used to connect the switch to ground, an automatic 5s burst will be obtained, provided the switch is held down at least that long.

Theoretically there is nothing to prevent the time-out indication being obtained by further dividing down the 448kHz oscillator to one pulse per 55s. It could be done in two further ICs to obtain either 46·8s or 56·16s, at the expense of finding some other way of switching the toneburst off after 400ms rather than using the reset line, and would certainly be very accurate and stable. But neither of these qualities is really needed, and it is cheaper to do it by using the usual NE555 timer in a totally separate circuit.

The circuit used is a standard monostable or pulse generator

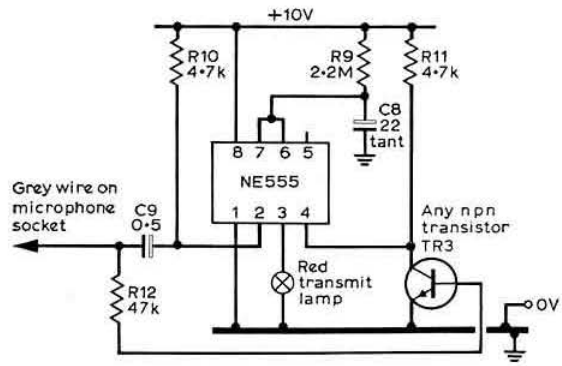


Fig 2. Time-out indicator circuit diagram

Components list

R1	270kΩ	C1	470pF
R2	1kΩ	C2	100pF
R3	220kΩ	C3, 4	1,000pF
R4	10kΩ	C5	2·7μF
R5	47kΩ	C6	0·05μF
R6	330kΩ	C7	0·22μF
R7	1·8kΩ	C8	22μF tantalum
R8	10kΩ	C9	0·5μF
R9	22MΩ	X1	FT241 CH323 (448·611kHz)
R10	4·7kΩ	TR1	BC109
R11	4·7kΩ	TR2	TIC44
R12	4·7kΩ	TR3	Any npn transistor
		IC1	CD4020AE
		D1	IN914 or any silicon diode

and is shown in Fig 2. The only components which affect the time delay are R9 and C5, and since the time involved is fairly long, the capacitor should have low leakage—preferably a tantalum type. Various combinations of R and C are usable, provided a limit of 3·3MΩ for R9 is not exceeded. The formula for on-time is T = 1·1 RC, R in megohms, C in microfarads, provided the leakage of C is negligible. The values given provide a time of 54s, but if a slightly shorter time is preferred reduce R9 slightly.

Output at pin 3 goes high while timing is in progress, falling to zero after 55s in this case. This pin can drive quite a heavy load, being able to source up to 200mA, and the obvious indicator to use is a light bulb which is lit while the timer is on. To avoid having to drill new holes in the front panel, the red transmit lamp is used, connected directly to pin 3 so that it comes on as normal when the transmit switch is pressed, but instead of staying on for the full duration of the transmission goes out again after 55s, or whatever period is chosen. The back of the small board holding the lamp also holds a 100Ω resistor in series with the lamp—the leads coloured grey and red are the two to look for. The red lead cannot be disconnected because it also feeds the green receive lamp, so the 100Ω resistor has to be taken out to disconnect the red lamp from the main power line. The lamp is still operating within its rating if this resistor is simply discarded, but if long bulb life is important a place should be found for it somewhere on the timer board. After removal of this resistor a wire is taken from the bulb connection left vacant to pin 3 on the NE555, while the other side of the bulb is taken to ground, after the grey wire has been disconnected.

There only remain the arrangements for switching the timer on and off. Simply switching the main power line to it will not do, since even if it triggers itself off—by no means certain—removal of power before it has timed out will leave the timing capacitor partially charged, and if another transmission is made soon afterwards, the timer will not time for the full period. Pin 2 is a trigger input requiring a short negative pulse to zero to activate it, being normally at Vcc. This can be obtained from the grey wire previously connected to the red bulb and now disconnected, which will be found to have about +10V on it while the set is at receive, dropping to zero on transmit. Since only a short zero pulse is required, R10 C6 are needed. To switch the timer off requires that pin 4, the reset line, be grounded. This is achieved by TR1 inverting the positive transition on the same grey wire.

Power for the timer is obtained by running a wire from the red wire on the lamp board to pin 8. This gets rid of some of the transients that occur on car 12V power lines, coming after the unit's power line filter, but it will still be noticed that timing may not be quite precise if major transients occur just as the timer is running up to switch off, such as might occur if the engine stops charging the battery while it is ticking over at traffic lights. This could be eliminated by taking the power through a zener regulator but is hardly worthwhile.

The circuit can easily be accommodated on a piece of board 1 by 2in, bolted on to the opposite sidewall from the toneburst.

The only problem that may be encountered with this circuit is that of capacitor leakage. Even if C9 is a tantalum type, it will need several cycles of charge and discharge before its leakage settles down to its normal very low value of well under 1mA, and until this happens the timing period will vary. This will show up by the period being too long when the timer is first activated each day, but settling down to the correct value after two or three operations. There is nothing much that can be done about this without complicating the circuit. If a dead-accurate timing period is needed every time, the solution would be to do as suggested earlier and continue to count down the toneburst oscillator to the right time. But in practice the first few timing periods being out does not seem to matter, and once it has settled down it will be accurate to better than 1s every time.

Both circuits seem to be rf-proof, and no problems were encountered even when an amplifier providing 100W output was attached to the IC22A.

No originality is claimed for the circuitry, that for the toneburst having appeared at least once before in *Technical Topics*, and the timer being so simple it hardly counts as a circuit anyway! □

CATALOGUE RECEIVED

Heathkit

The latest Heathkit catalogue is now available and contains details of an extensive range of equipment covering audio and hi-fi, vehicle and boat electronics, digital clocks, test equipment and amateur radio kits. New models which may be of particular interest are a shelf clock, deluxe ac voltmeter, several power supplies and a ssb/cw receiver, the HR1680. The catalogue may be obtained free of charge from Heath (Gloucester) Ltd, Bristol Road, Gloucester GL2 6EE or from the London Heathkit Centre, 233 Tottenham Court Road, London W1P 9AE.

INTERFERENCE PROBLEMS

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

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

An economy vhf dip meter

by M. ALLENDEN, G3LTZ*

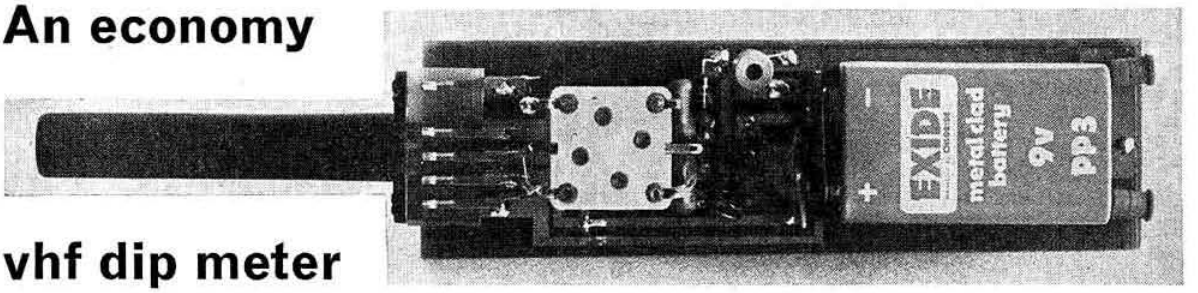


Photo 1. The rear of the dipper with the 90–120MHz coil plugged in. The variable capacitor can be seen below the coil "socket"

A transistor dip oscillator from 0·5MHz to 100MHz is often rather unreliable at the 100MHz end, and there is nothing much one can do except re-arrange the circuitry—with resultant problems at the lower frequency end. Faced with this problem and an irritating blind spot for measuring 144MHz, the author decided to build a vhf dipper, but with the absolute minimum of expense.

The dipper utilized the author's standard multimeter on the lowest microampere range and was built on a piece of double-sided glass pcb. Two plug-in coils gave frequency ranges of 90 to 120MHz and 120 to 160MHz. This was all that was required but the range could obviously be varied. The on-off switching was accomplished by inserting and removing the coils.

The circuit (Fig 1)

The oscillator uses a 2N3819 fet, and by employing a two-gang 25pF tuning capacitor taps on the coil are avoided. The gate dc return includes a 25kΩ potentiometer, the wiper of which goes to the negative terminal of the external meter, which is pre-set to give about half-scale reading.

The rfc is fairly critical, and with the type described the meter reading is reasonably constant over the tuning range. A falling reading as the band is swept can mask a dip, which is an infuriating failing of most GDOs over some part of their range.

Construction

This is the main feature of the dipper since the circuitry is quite standard. The pcb, which is the body of the unit, has the usual etched lands on one side, but the components are soldered directly to the face of the lands and no drilling is required other than to fix the tuning capacitor.

To make the board, cut a piece of double-sided glass pcb to 4·8 by 1·4in and smooth the edges with fine sandpaper. Next, drill and countersink the holes to take the tuning capacitor; the actual sizes of the fixing holes depend upon the capacitor used. The original version uses a small Japanese (Fuji Vc Co) solid-dielectric variable 20mm square and 15mm deep which has two sections 150 + 25pF and 150 + 25pF ganged, of which only the 25pF parts are used. The single hole at the bottom is then drilled.

Clean both sides of the board with steel wool and cover them with white Fablon or Contact and trim the edges with a sharp blade. On one side lightly mark out and rule with a pencil the position of the lands shown in Fig 2. Next, with a ruler guide and a sharp blade cut the adhesive covering with firm strokes and peel it from where the copper is to be etched away. The sheet of covering on the reverse side should now have a 0·1in strip removed from the top edge, as indicated in Fig 2, to expose the small amount of copper to be etched away. Use ferric chloride in the usual manner and when fully etched peel the adhesive covering from both sides and clean the copper again with steel wool. Spray the side having the lands with Holts Damp Start and allow 15min for it to dry—this operation is not essential but the lacquer has the property of preventing oxidation and can be soldered through without fouling the solder joint.

Solder a small link wire through the single hole at the bottom of the board; solder both sides and trim off surplus protruding solder. Using countersunk screws, fix the variable capacitor in position—if the original JA screws are not available, run an 8BA plug tap through, but take care not to foul the capacitor blades. Fix the components to the lands by flush mounting with small solder blobs. The two meter sockets can be whatever are available, the original uses two test sockets from an old computer board and just fits the probes of the author's multimeter.

The pcb clips to take the coil base were taken from a strip of Carr Fasteners type J20 20-way edge connectors, but they

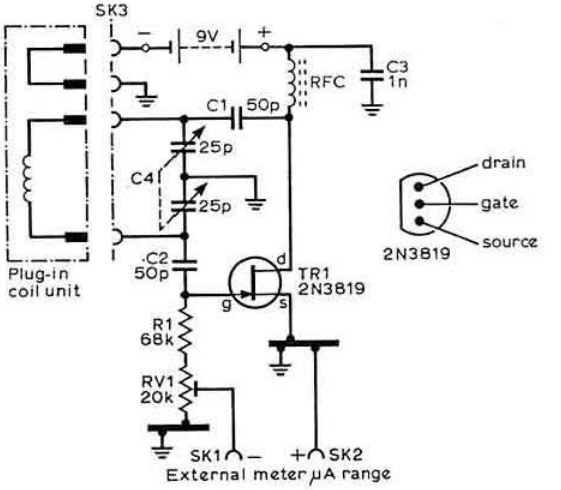


Fig 1. Circuit diagram

*3 Westhill Close, Highworth, Swindon, Wilts SN6 7BY.

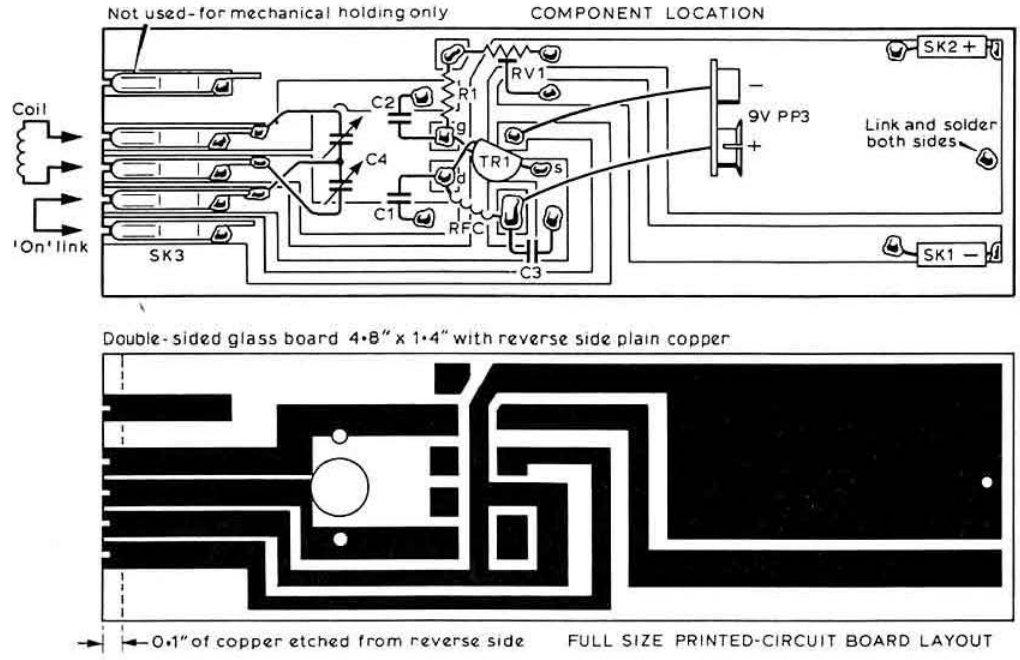


Fig 2. Layout and pcb

could be formed from small strips of spring brass. The clips are taken off the strip by bending up the small tab which overlaps the entry edge of the connector. A short projecting tag goes through the tag strip and this is cut off so that the clip sits flush on the dipper board. A small notch is filed at each 0·15in location (Fig 2) to take the bent-over tab. Fix the individual socket tags into the notch, get them straight and solder them to the lands at the back ends where the piece was originally cut off the pin. This arrangement should now provide an edge connector to take the coil.

At this stage the plain copper side of the dipper board can be covered with a piece of black Fablon or Contact, and a scale made from a piece of thin card 1·35 by 1·8in covered with white Fablon or Contact. A $\frac{3}{8}$in diameter hole is cut in the centre of the scale which is then fixed around the projecting shaft of the capacitor. A short extension shaft is now required for the variable capacitor and this can be made from a $\frac{1}{2}$in piece of brass or aluminium rod or tube. This is drilled to take a small piece of screw fitted into the capacitor tapped hole. Araldite applied to both parts allows them to be mated in line, the resulting joint being strong enough to take a knob with a thin disc of acetate sheet fixed under its skirt (Photo 2). Finally the battery is fixed in position using a double-sided adhesive Scotch tab. It will be necessary to change the battery and the adhesive tab about once a year.

The coils are the next items and these are mounted on 2ml disposable plastic hypodermic syringes. Used syringes without needles are usually freely obtainable from surgeries if the intended use is explained, or they can be bought from chemists. Styrene and nylon types are available and the former, which are crystal clear, are the ones to obtain as they cement better than the nylon ones. Photo 3 shows the component parts and the assembly, but Fig 3 includes a full-sized pc bottom or pin part for the coil. Cut out two "T" shapes as shown from single-sided pcb and after cleaning cover that copper side with Fablon or Contact and cut away to expose the copper for etching. The "T" should just slide into the outer case of the syringe. Cut off the nozzle part of

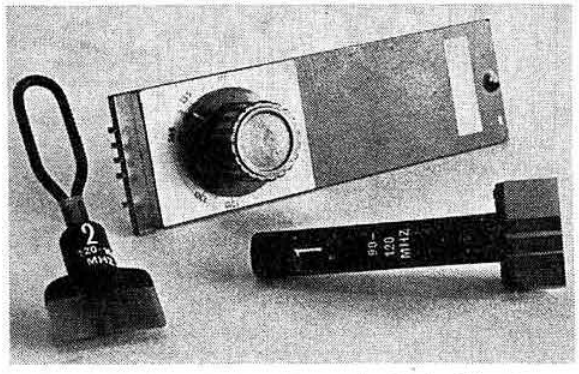


Photo 2. The two plug-in coils and the front of the dipper

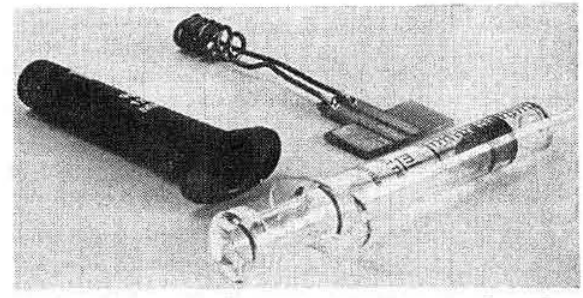


Photo 3. Coil construction: an original hypodermic syringe together with the finished body and the pc "T" piece and coil prior to final assembly

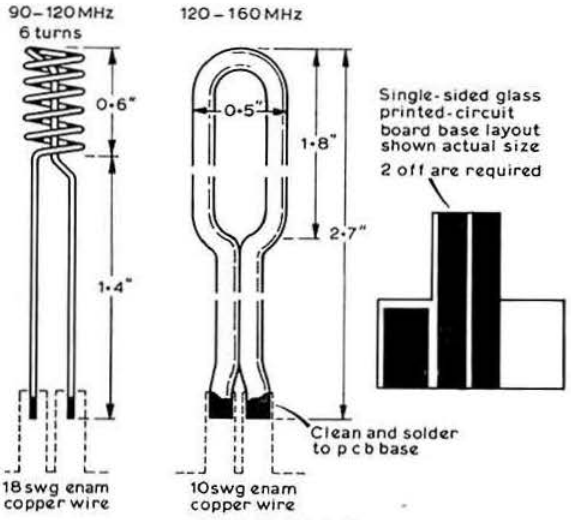


Fig 3. Coil details

the syringe and file it flat. The coil is made of enamelled copper wire, the two ends of which are soldered to the centre lands of the "T" printed circuit.

The assembled coil and pcb should now slide into the hypodermic case as the plunger originally did—some bending will usually facilitate this operation. When the unit is finally calibrated and it is certain that the coil needs no more trimming, the outside of the case can be sprayed with car touch-up paint. When dry, coat the inside edges of the "T" with epoxy, slide into position and allow to cure.

The foregoing specifically applies to the 90–120MHz coil; as can be seen from Photo 2 the 120–160MHz coil is a single turn loop with just the bottom part of the hypodermic case used.

The coils can now be inserted into the home-made edge connector on the dipper main board, the lettering on the coils indicating the correct way round; reversing the coil breaks the 9V supply and it becomes a wavemeter. Some more sophistication could be applied to this part of the design, such as alignment rails, but no trouble has been experienced from this.

Calibration

Calibration is very simple if a vhf frequency meter can be borrowed; place the input lead close to the dipper and, while swinging its dial, mark the frequency points with a pencil. Failing the frequency meter, various points can be found by using a 2m receiver and a broadcast fm receiver using the fundamental (f1) and 2nd channel, ie f1 on receiver dial plus 2 × 10·7MHz. This means that 90 and 100MHz can be read direct, while 110 and 120MHz can be read at 88·6 and 98·6MHz respectively—the second channel on the 2m receiver depends of course upon the i.f. of the converter.

After the calibration points have been made, they can be inked in or lettered, using Letraset; the knob will have to be removed to do this, and after re-fitting check a frequency to ensure it is in the correct position.

Components list

R1	68kΩ ¼W carbon
RV1	20kΩ potentiometer Spectrol Model 62-1-1 or RS 184–524
C1, C2	50pF ceramic
C3	1,000pF ceramic H1-K
C4	2-gang 25/150pF two-section solid dielectric (Fuji Vc) or similar—see text (Henry Radio)
TR1	2N 3819 RS 293–713
RFC	4 turns 28swg enamel ferrite bead RS 238–283
SK1, 2	PC mounting sockets—Vero horiz jack Pt No 105-0753-001 or similar
SK3	Made from pins taken from edge connector—Carr Fastener type J20 or 0·1in strips of brass
Battery clip	Top from old PP3
Battery	PP3 9V

Conclusion

This little project could be improved upon. More pins could be added for the coils to utilize the unused sections of the variable capacitor; a case could be made from a "U" channel of aluminium, and a bigger dial fitted. However, the section of 90 to 160MHz has, in practice, been found to cover the main needs.

As for cost, even in this inflationary era, the battery was the biggest single item!

Acknowledgement

The author extends his thanks to Bob Weston for the photographs which illustrate this article. □

NEW PRODUCT

432MHz transceiver

A new fm 432MHz transceiver, the *Multi-U11*, from FDK is now available. In addition to 23 channels for normal operation the unit has provision for automatic scanning of four channels. A two-stage crystal filter, wide-narrow band selection by switching, high or low transmitter output and an rit facility are among the features of this equipment. The rit adjustment should be invaluable when the transmitting station is not exactly on frequency. The switchable power output is either approx 1W or 10W. These and several other new features are contained within a size only slightly greater than the normal car broadcast receiver. A unit has been provided for review and this will appear in the near future.

Further enquiries to Waters & Stanton Electronics, 31 Spa Road, Hockley, Essex. Tel Hockley 6835.

INTERFERENCE

The principles agreed between the RSGB and the Post Office—and published in the May 1975 issue of *Radio Communication*—on the investigation of cases of interference continue to be the basis of agreement with the Directorate of Radio Technology of the Home Office.

Members are advised that instructions to close down while a case is dealt with are to be given *in writing* by the authorized officer and are operative from the day on which the instructions are first received, notwithstanding that they are given verbally. Members are asked to advise the Society if written confirmation is not forthcoming, so that the matter may be taken up on their behalf.

LEARNING ABOUT LOGIC by P.J.Horwood, G3FRB*

Part 6. PLL frequency synthesizer (2)

WE have come a long way since Part 1 and the description of gates. This article adds more detail to the requirements of a frequency synthesizer and illustrates some of the techniques necessary in a practical design.

The dc amplifier and filter

Fig 42 shows a dc amplifier and filter added to the basic phase-locked loop. The amplifier is needed to increase the gain inside the loop, and improves the discrimination of the system. This may be compared to other feedback loops, eg the age system of a receiver. In that case the greater the gain between the age-controlled stage and the point where the signal is detected to form the age control voltage, the smaller will be the change in signal output for a given change in signal input. Typically, a high-grade receiver's audio output will change by as little as 1dB for a change of as much as 100dB input. That represents about 20 per cent increase in output power for 100,000 times increase in signal voltage. In the case of a synthesizer one is aiming at a frequency stability within one or two hertz.

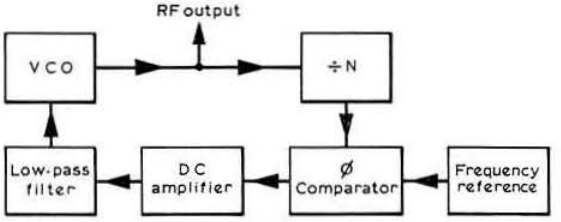


Fig 42.

The dc amplifier is required to amplify the square-wave output of the phase-comparator, which is integrated by the low-pass filter to form the varicap control voltage. As described in Part 5 the filter must have a cut-off frequency lower than the output frequency of the phase-comparator. While it is not intended to detail filter design here, the filter must not introduce significant phase-shift, for the comparator detects phase-shift to correct frequency, and since phase is the integral of frequency there is an unavoidable 90° phase-shift in the system. If the loop filter introduced another 90° shift the total would be 180°, changing the negative feedback to positive feedback, the result being instability or self-oscillation. The inbuilt 90° phase-shift of the system causes the loop gain to fall by 6dB per octave; this sets limits to the frequency range within which it will remain in lock.

Capture range and holding range

Capture range is defined as the maximum frequency difference between the unlocked vco and the desired locked frequency over which the system will pull into lock. For example, on switching on suppose a vco initially oscillated on 40MHz, the dc output of the comparator alters the capacity of the varicap so that the vco shifts to 50MHz and the system locks. The capture range would be 10MHz. In practice the range would be limited by the bandwidth of the filter, and measures need to be taken to ensure that the vco is always within capture range despite relatively large changes in frequency which the vco may be required to make. Methods of doing so will be dealt with later.

Holding range is the maximum frequency range over which the system will correct vco error without lock being lost. Because the system is already in lock, the filter bandwidth is not a limiting factor. As has previously been explained, the filter is essential to remove the alternating component which would otherwise frequency modulate the vco. Furthermore the filter cut-off frequency is related to the reference frequency Fr. which also determines the size of the increments of frequency over which the synthesizer will change.

The filter design is always a compromise between the acceptable frequency modulation of the vco and the width of the capture range. It is possible, however, to use electronic switching of the bandwidth to reduce it by several hundred times after lock has been achieved. Fig 43 shows one possible method.

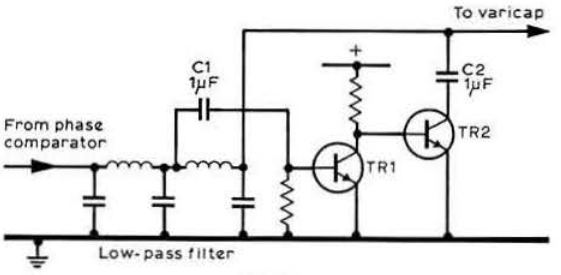


Fig 43.

When the system is out of lock there is present at the phase-comparator output a relatively low frequency signal produced by the vco sweeping about the lock frequency. This signal is tapped off the filter where the high-frequency output of the comparator is much attenuated, and via C1 causes TR1 to saturate. The collector of TR1 goes low, taking the base of TR2 with it, cutting it off. When lock occurs the low-frequency signal disappears, TR1 is now undriven and therefore cut off, and the collector goes high, taking TR2 base with it and TR2 saturates, effectively connecting C2 in parallel with the filter output. Since C2 is large, the passband is much reduced and the vco is rendered less susceptible to spurious fm or jitter due to noise.

Preservation of capture range

A frequency synthesizer for the hf range is likely to require switching in 10MHz, 1MHz, 100kHz, 10kHz, 1kHz, and perhaps even smaller increments. For the purposes of explanation let us consider the three largest increments. When any one or a combination of them is altered the variable divider ratio will be so changed that the vco is likely to be outside the capture range. In the case of a 10MHz

* 14 Main Road, Hextable, Swanley, Kent.

change the vco coil may be switched by an additional wafer on the appropriate switch, thus shifting the vco to a new frequency inside the capture range. For smaller changes, eg 1MHz, an additional wafer on the 1MHz switch may be used to change the fixed capacitance in parallel with the vco coil, with the same result. Even smaller changes may be caused by switching a dc voltage to an additional varicap diode in the oscillatory circuit. This diode is outside the phase-locked loop; in other words it does not receive dc from the phase comparator and filter. Fig 44 illustrates all three methods.

Conclusion

The complete phase-locked-loop frequency synthesizer is a complex device; it has taken six articles to outline its operation and to give details of the problems and solutions involved in a practical design. Particularly in the last two articles much time has been spent on matters which are more analogue than digital, but the author hopes he has effectively shown how in modern communications digital techniques are closely married to analogue functions.

One reader has commented that he sees little point in understanding how groups of flip-flops can be made to divide by 10 when ICs such as the SN7490 can do it on one chip.

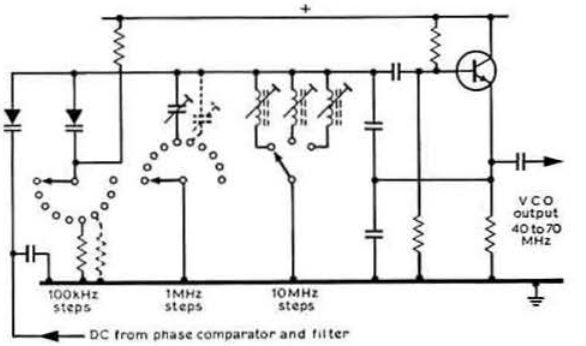


Fig 44.

He has a point; no doubt a complete synthesizer will be available on an lsi chip sooner rather than later (and for those who may be tempted to say that complete phase-locked-loops *are* already available, that is not quite the same thing). But surely there is a limit to the black box approach; must many amateurs resign themselves to being perpetual appliance operators? □

A survey of Class A amateur licences

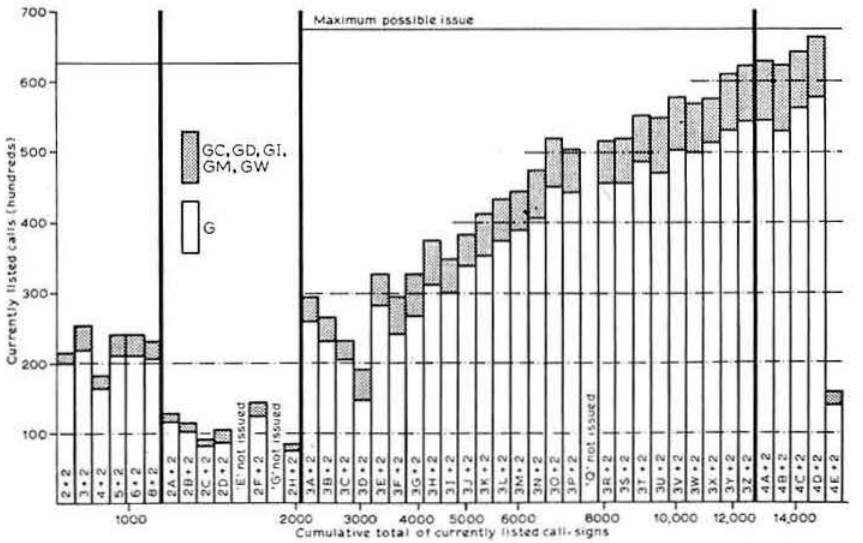
by A. O. SUTTON, G3MAJY*

THE histogram shows the distribution of some 15,000 Class A amateur licences from the earliest issue to G4EFZ (*RSGB Amateur Radio Call Book, 1976 Edition*). Pre-war calls from G2AA to G8ZK are shown in the first section—not necessarily in the order of issue—and number 1,375. Some 40 years after they were issued their ranks are sadly depleted; slightly less than a third now remain, not all of which are active. It is interesting to note that the letter "E" was never issued in this series, either as a first or second letter in the callsign. Perhaps the GPO thought that a possible G5EE, particularly on cw, might be a bit much! GC, GD, GI, GM and GW account for about 11 per cent of the total.

Next follow the pre-war artificial aerial licences—the G2 + 3 series, in which the letters "E" and "G" were not used; the former from both positions and the latter from the first letter position only. Comparatively few of this series remain listed—only about 20 per cent, inclusive of GM, GD, GW, etc; no doubt due to the second world war.

Possibly, too, some of these were allowed to lapse and helped to swell the post-war G3 + 3 boom, depicted in the third and largest section. Some 10,900 of these callsigns remain listed. This was also undoubtedly due to the war and its great demand for radio people of all sorts, with consequent training given to many who might otherwise never have had any interest in radio communication, amateur or otherwise. The author wonders, too, how many were hooked by that classic of its day *The RSGB Amateur Radio Handbook*, which sold for 2/6d! It was almost a textbook for the services in general. However, the immediate post-war era is now some 30 years back, and time has made inroads into the early G3As, Bs, etc. Indeed it is only from the issue of G3Js that the number of calls still issued equal about 50 per cent of the

Continued on p827



* "Westlands", Promenade, Leven, Fife KY8 4PH.

EQUIPMENT REVIEWS

The Heathkit HW-8 low-power cw transceiver

by R. F. STEVENS, G2BVN

THE predecessor of this equipment, the HW-7, was reviewed in the March 1973 issue of *Radio Communication* and since that time the practice of QRP has flourished. Designs have become more sophisticated and an increasing number of operators are willing to accept the challenge of working dx with a built-in handicap when compared with a nearby high-power station. However, given a good aerial system, patience and some operating skill, the results can be very satisfying.

Design features

The first enquiry will probably concern the differences between the HW-7 and the HW-8. Additional coverage in the shape of the 3·5MHz band has been provided, this is 3·5 to 3·75MHz. Band switching is now accomplished with the aid of diodes which are to be found in the low-level rf and dc sections of the equipment. The use of diodes helps to reduce wiring lengths with consequent beneficial effects. On the receiving side an rf stage has been added; this is a fet type MPF105. A double-balanced ic detector is provided, together with an active audio filter of the RC type having switchable selectivity. An rf gain control has been added in the form of a 1,000Ω divider at the aerial input; this is an asset when there are strong local signals present on adjacent frequencies. Audio output is to a headphone jack. The HW-7 review contained some adverse comments concerning receiving performance and obviously Heath engineers have devoted some thought to this aspect.

In the HW-7 the final frequency was obtained from a vfo operating on either 3·5 or 7MHz followed by a buffer and a tripler/doubler; a combination which gave rise to comments concerning a chirpy cw note. The HW-8 employs a heterodyne system with the vfo covering 8,645 to 8,895kHz, the output of which is mixed with the output of one of the four crystal-controlled oscillators; in the case of 3·5MHz this is 12·395-MHz. Combinations for the other bands are shown in the block diagram. The output transistor is a 2N4427 which provided a measured power output of not less than 2W on each band. Protection to the output device is given by a zener diode preventing excessive collector voltage in the event of accidental no-load operation. The aerial changeover relay forms an integral part of the equipment and there is an adjustable delay circuit for break-in working. As with the HW-7 there is also a sidetone oscillator.

The mechanical arrangement of the HW-8 follows that of its predecessor and cabinet dimensions are identical. The front panel appearance is also similar, the noticeable change being the replacement of the former vertical scale meter by one of normal type.

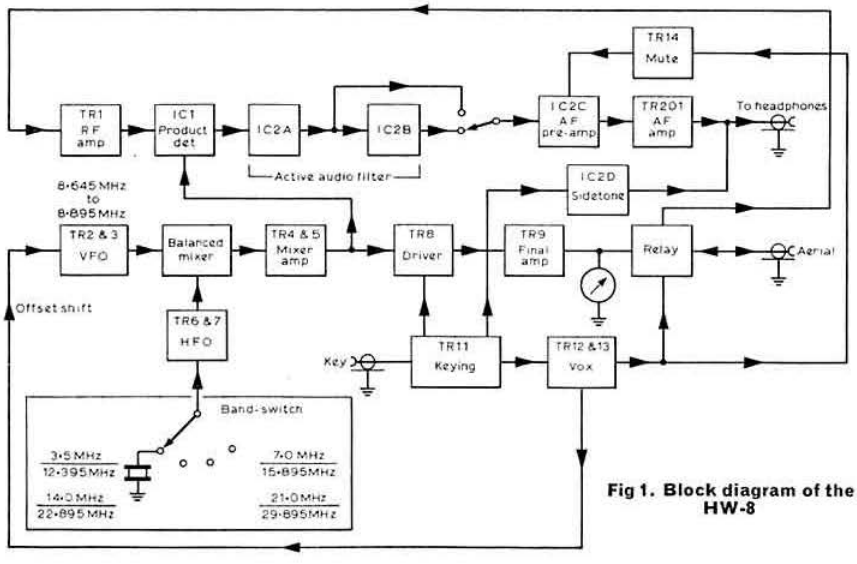


Fig 1. Block diagram of the HW-8

Assembly

The cabinet and panels are of heavy-gauge aluminium finished in the usual Heath style. Most of the constructional work is concerned with a single circuit board. The time taken for building and alignment amounted to 16 hours. Heath manuals continue to be examples for others to follow and the HW-8 manual is no exception. The pull-out diagrams and circuit are clear and informative.

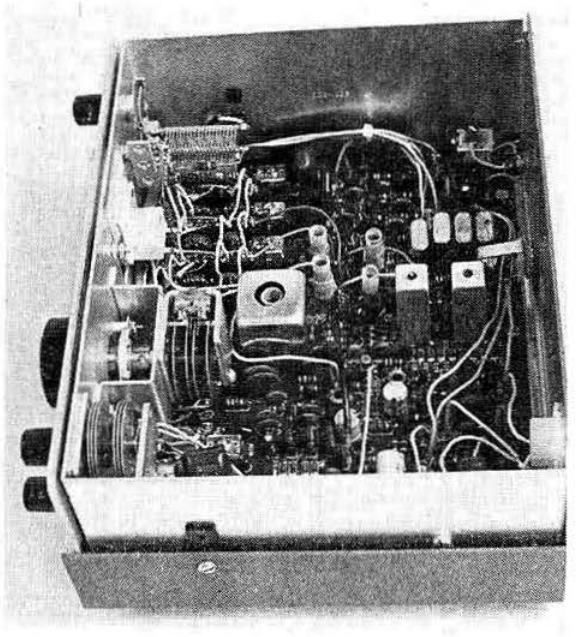
Technical details

Frequency coverage: 3·5 to 3·75; 7·0 to 7·25; 14·0 to 14·25 and 21·0 to 21·25MHz.
Spurious and harmonic levels: at least 35dB down.
Receiver sensitivity: 0·2μV provides a readable signal.
Selectivity: wide—750Hz at 6dB down; narrow—375Hz at 6dB down
Power requirements: 13·4V dc nominal; 90mA receive; 430mA transmit
Dimensions: 23·5cm wide by 21·6cm deep by 10·8cm high.
Weight: 1·8kg.
Price: kit HW-8, £108.19. AC mains power supply, kit HWA-7·1 £13.95.
Manufacturer: Heath (Gloucester) Ltd, Gloucester, GL2 6EE.

Operation

On test the vfo drifted 15Hz low in 10min, and in a further 15min moved a further 10Hz low frequency. The note was checked for chirp and emerged T9X. On the transmit side there were no apparent problems.

The receiver performance bears little relationship to that of its predecessor. The only microphony noticed was a trace on 14MHz. The addition of the rf stage obviously has a beneficial effect and it was only on 7MHz after dark that the strong broadcast signals became more of an unwanted nuisance than normally. The rf gain control functions smoothly and the audio filter is a pleasure to use. Basically an RC device, the NARROW position brings out the wanted signal, and although the skirt of the selectivity curve is probably quite broad the filter is, in the opinion of the reviewer, one of the outstanding features of the HW-8. The regenerative preselector is easier to adjust than in the HW-7 and the audio output is adequate for headphones. No hum was encountered at the highest audio level although it had been reported that this problem might be encountered in the absence of a satisfactory mains supply earth.



Internal view showing the circuit board assembly

Using the HW-8 to energize a triband beam, WA3 and CX were worked with only moderate difficulty at a time of peak occupancy. No super dx but an indication of the potential of this equipment. A European station seemed highly suspicious of the reviewer's cw when given the power of 2W.

Conclusion

The HW-8 is a piece of equipment that will either have considerable interest for an operator or else it will not be given the courtesy of a second look. QRP operation is a facet of amateur radio activity which probably appeals to a relatively small number. If it interests you then the HW-8 must be worth a closer investigation. The manufacturer has eliminated the points that were the subject of criticism in the previous model and has added features designed to improve performance. Construction from a kit provides the user with a basic knowledge of what is going on behind the panel and can materially help at a later date should fault finding be necessary. □

Yaesu Musen FTV450B 70MHz transverter

by T. G. GILES, G4CDY

The FTV450B is a modified version of the FTV650B 50MHz transverter and is intended for the British 70MHz band. It is manufactured in Japan by the Yaesu Musen Co Ltd for use with their FT101, FL101/FR101 and FT201 series, but with suitable leads it could be used with any other 28MHz equipment. The FTV450B for review was supplied by South Midland Communications Ltd and the current price is £120 which includes valves, leads and a spare PL259 plug, but excludes VAT.

One feature of the unit which will please people with Yaesu Musen equipment is that when the transverter is switched off it is automatically bypassed, the pa heaters are energized and normal hf operation is possible. The transverter is housed in a two-tone grey steel cabinet with the familiar rounded corners. It is designed to stand alongside the FT101-type equipment and has the same sized feet and front panel and similar type of knobs, and together the units would produce a neat hf/vhf station.

General description

Like the FT101, the transverter is a hybrid unit using semiconductors for the converter and low-power transmitter stages and valves for the pa and driver. An unusual feature is the use of an MC1496G integrated circuit double-balanced mixer for the transmitter conversion. The driver is the ubiquitous 12BY7A and the pa is a single S2001/6146B from which alc is applied back to the main transmitter. There is a pi-tank network to match the pa into 50Ω unbalanced loads. The converter uses a dual-gate mosfet for the rf amplifier and a junction fet for the mixer. There is a variable attenuator in the aerial circuit which can be controlled by a knob on the front panel marked ATT.

The 50MHz band is 4MHz wide, so there is a band switch and tuning control both marked for frequencies around

Technical data (FTV650B figures)

Transmitter	
Input frequency	28-28·7MHz
Input voltage	3V rms
Input impedance	1kΩ
PA input	50W p.e.p.
Output impedance	50Ω unbalanced
Spurious radiation	Less than —50dB
Receiver	
Sensitivity	0·5μV @ s/n 10 for ssb 1μV @ s/n 10 for a.m.
Spurious responses	50dB or better
Internal spurious	1μV or better

Power requirements
12·6V 2A ac, 150V 5mA, 300V 50mA, 600V 150mA, —100V 10mA.

50MHz. Unfortunately there are no markings for the British version and as there are no separate instructions one is left to guess the correct positions. In practice, operation is very easy; the band switch is inoperative and the tuning control peaks in the middle of its range. A three-position switch allows the meter to be switched between power output, pa cathode current and 28MHz exciter level. The latter range is most important because it is very easy to overdrive the ic mixer, and the handbook recommends that the meter needle stays in the green portion of the scale on speech peaks.

Measurements

For these tests the FTV450B was powered by an FT101 using the leads supplied. The transverter was tuned for maximum output and, with the input level at the top of the green portion on the drive meter, a power output (single tone) of 27W was obtained into a 50Ω load. When driven with a two-tone signal from a generator to the same input level, the intermodulation products in the output were —33dB relative to each tone. The harmonics were better than —60dB but there were a pair of symmetrical spurii close to the desired signal at —56dB. The spacing of these spurii varied with the input frequency, being coincident with the output at exactly 70MHz. These signals are probably fifth order mixer products which are the inevitable result of using 28MHz input and a 42MHz local oscillator.

The desired signal is obtained by adding 42 and 28MHz to give 70MHz; unfortunately three times 42MHz minus twice 28MHz also gives 70MHz. In practice, these unwanted signals would not cause any serious problems except to very local stations, and the ic balanced mixer probably gives a lower level of these spurii than conventional transverters with transistor or valve mixers.

The converter sensitivity when measured in conjunction with the FT101 was a very good 0·1μV (emf) for a 10dB signal + noise-to-noise ratio. I.F. breakthrough and image response were more than 80dB down on the wanted signal. The only significant spurious response was the half-image at 56MHz which was 54dB down. The converter had a gain of 20dB which means that if the attenuator on the FT101 was switched in, the S-meter calibration remains correct. The 42MHz crystal in the unit was 2kHz high in frequency but this error can be removed by adjusting the FT101 scale with the aid of a suitable crystal calibrator.

Conclusions

The unit was tried out from the reviewer's QTH, and all reports received were very complimentary, the speech quality being the same as on the basic FT101. It was also tested from a site on the South Downs during the recent 70MHz portable contest; despite the presence of several high-power stations on adjacent hills there were no signs of any signal-handling problems in the receiver.

The only criticism the reviewer has of the unit is that it is necessary to keep the microphone gain on the FT101 below "1" on the scale in order to prevent the transverter from being overloaded. This would probably lead to a degradation of the sideband and carrier suppression of the transmission. However, it could easily be overcome by fitting a simple attenuator between the low-power 28MHz output of the FT101 and the input of the transverter. □

oscar news

Satellite terminology

It is apparent that a misunderstanding of the terminology could lead to an abuse of the Oscar 6 transponder schedule, ie stations employing "ascending" orbits on "descending" days and vice versa. Some operators are of the opinion that when Oscar is rising from their horizon it is ascending and when it is sinking to their horizon it is descending. In order to arrive at the correct interpretation the earth has to be seen as north at the top and south at the base. When Oscar is leaving south and going north it is *ascending*. When it passes the northern-most point at 80° north and commences going

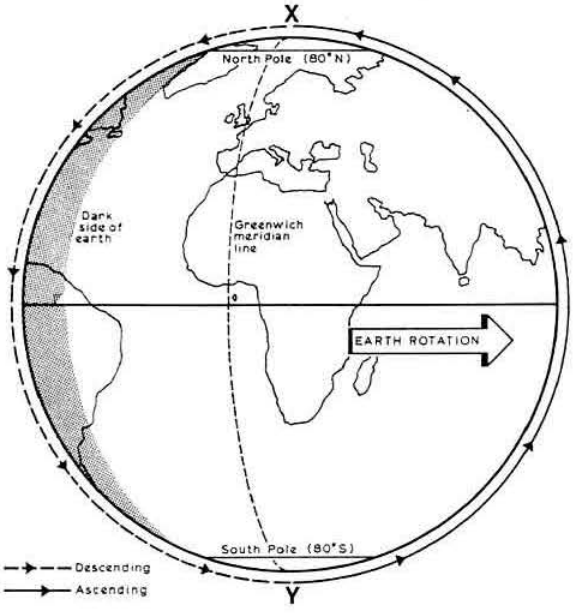


Fig 1. A typical orbital pass showing the changeover point from ascending to descending orbit and vice-versa

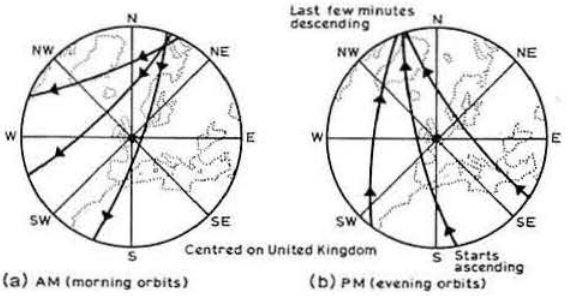


Fig 2. (*a*) This shows morning orbits which are all descending. Late morning and early afternoon orbits start by ascending while coming up to the polar area. (*b*) Early afternoon orbits start by ascending to the pole then change to descending on leaving the polar area. All late evening orbits are ascending

south, it is *descending*. At 80° south it commences the ascending orbit again. Thus all morning orbits are descending for Europe while early afternoon orbits, skirting the pole, start in the ascending node in the northeast, change at the 80° north line nearest to the pole and leave descending to North America. Late evening orbits are ascending all the way to stations in the UK. Reference to the diagrams should clarify the position.

Oscar 6 is normally available for European users of ascending orbits on Monday, Thursday and Saturday. From time to time the state of the battery permits descending orbits on Sundays to be used. If in doubt please check the position by reference to the GB2RS News Bulletin or one of the AMSAT nets on 3,780kHz or 144·280MHz. Oscar 6 has far exceeded its planned life and this is due to the monitoring of the battery state and subsequent action, when required, by the ground command stations. Due to random switching characteristics which have been noted from time to time, the Oscar 6 transponder may be heard live at times other than those mentioned above. If this is the case please do not attempt to use the satellite. Only by rigidly adhering to the operating schedule can the life of Oscar 6 be prolonged still further.

Satellite news broadcasts

News bulletins will be transmitted during the following Oscar 6 orbits on 29,450kHz ± 5kHz downlink using A3j. The bulletin transmitting station is HG5BME at Budapest Technical University.

17 November: orbit Nos 18,528, 18,534
1 December: orbit Nos 18,879, 18,885
15 December: orbit Nos 19,054, 19,060.

Oscar orbital calendar

In co-operation with AMSAT, W6PAJ has published an improved AMSAT Oscar orbital data calendar containing all orbits for 1977 for both Oscars 6 and 7. The calendar includes information on the operating schedules, frequencies and telemetry decoding equations for both spacecraft. The calendar is available postpaid for $5 or 30IRCs, $3 to AMSAT members, and free to AMSAT life members. Overseas orders will be airmailed. Orders and payments should be sent to: S. Reymann, W6PAJ, PO Box 374, San Dimas, California 91773, USA. Please include a gummed self-addressed label with your order. Proceeds from the calendar benefit AMSAT.

Higher stability VFOs

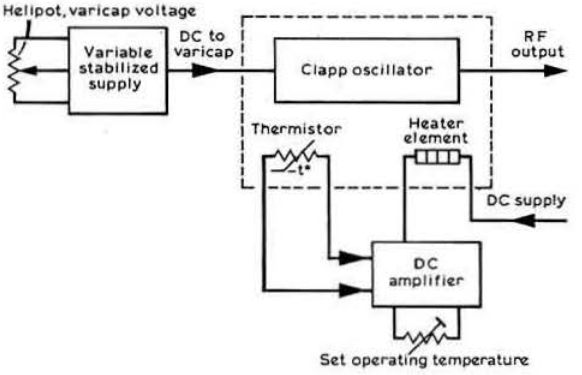
by P. J. HORWOOD, G3FRB

Considerable misunderstanding seems to exist about the frequency stability of a vfo circuit. None of the various circuits which have appeared in recent years is significantly endowed with superior stability *per se*; a vfo design must satisfy the following factors:

1. Good supply voltage stability.
2. Good electrical stability of all components.
3. Good mechanical stability, particularly of coils and variable capacitors.
4. Good isolation of the effects of active components from those determining frequency.
5. Good temperature stability of all components.

It is not difficult to satisfy the requirements of the first four factors, but little effort seems to be made in amateur designs to deal with the fifth.

Why not build the whole thing in a temperature controlled oven? It might be possible to get it in one of the small octal-based ovens, but it would certainly be possible in the type designed for six or more crystals. The pcb carrying the crystal sockets should be removed and replaced with a rigid plate carrying the whole vfo. Instead of using a variable capacitor, with its attendant difficulties of shaft drive through the case of the oven, it could be replaced with a varicap driven from a high-stability variable dc supply.



The Clapp circuit is as good as any, and offers quite good isolation of L and C from the transistor. To achieve even better temperature stability the oven should be converted to proportional control by removing the thermostat and replacing it with a thermistor connected to an external bridge and dc amplifier. The bridge would allow adjustment of the operating temperature to be only just above ambient, rather than the usual 75°C of the thermostat.

The sketch shows how it might be done, anyone care to try?

Class A licence survey

Continued from p823

possible total. For obvious reasons the letter "Q" as the first of the three was not used. Those parts of the UK outside "G", shown shaded, number about 13 per cent of the total.

Last but not least come the G4 + 3s, shown here to the "E" series although more have now been issued. What will amateur radio be like when they have moved to the first section of the graph? □

technical topics

Pat Hawker, G3VA

THIS month's notes are being written at a time when the purchasing power of the £ is at a point that a few short years ago would have seemed incredible. The Prime Minister has said that "the cosy world has gone . . . there can be no consumer boom on borrowed money . . . we have been paying ourselves with confetti money more than we produce . . . wealth must be created before it is distributed." One does not have to be a politician or even to favour any of our political philosophies to recognize that if these sentiments are followed through to their logical conclusion then we may be forced, like it or not, to *build* more of the amateur radio equipment we want to use. It would be ironical if after seeing the virtual disappearance of British amateur radio equipment we should find an equal famine of the "black boxes" from overseas. Actually we might even find it is better fun!

Simple frequency counter

The Americans have an expression "keep it simple, stupid" (otherwise known as "kiss") to represent an attitude towards electronic design that sometimes everyone, including our North American friends, seems to be in danger of forgetting. Often the simple unit will do what is required and present few problems, even if in adopting this approach we sacrifice some of the frills and gewgaws and precision of higher-cost systems.

A design for a frequency counter that really keeps to essentials-only has been published in *Electronics* (16 September 1976, p121) by Lloyd F. Botwoy. Apart from the 7-segment led display devices and the associated combined decade-counter and 7-segment decoders (CD4026) there is only a single CD4047 multivibrator and just five discrete components: Fig 1. Yet it is claimed that such a counter can provide an accuracy of the order of 100Hz at 5MHz.

The counter has in effect $n + 1$ devices for an n digit display; there are no display latches, extra logic for generating a count-reset pulse or current-limiting resistors. With a simple adjustable RC multivibrator as the "clock" it is necessary to calibrate the instrument against known frequencies, and long-term stability will clearly be much less than with a good crystal oscillator and frequency divider chain (such a system could possibly be substituted for the 100Hz multivibrator if required).

The multivibrator is set to provide a succession of 10ms cycles, so that the unit counts the input pulses in one period and then displays the total for the next period. This represents a sufficiently high repetition rate to avoid flicker (the principle can be extended to provide a frequency resolution of 10Hz by using 100ms periodicity but this results in objectionable flicker).

The CD4047 forms the multivibrator: when Q (terminal 10) is "low" the clock inputs of the CD4026 counter/decoders are "enabled" and the counters count with the display outputs "disabled". When Q goes "high" the clock inputs are "disabled" and the count displayed. At the end of each 10ms display period the counters are reset by the positive pulse which results from differentiating the rising output of $\bar{Q}$ by C2 R2 with the alternating negative pulses clamped to earth by D1.

With a periodicity of 10ms the least significant digit of the display must always indicate increments of 0·1kHz, since 100pulses/s × 10ms equals one pulse.

The cmos devices allow supply voltage to be anywhere from 3 to 15V; the higher the voltage the greater the range of input voltages, the faster the counting, the brighter, but more current-consuming, the display. The cmos devices and 7-segment led displays are widely offered by component suppliers in the UK.

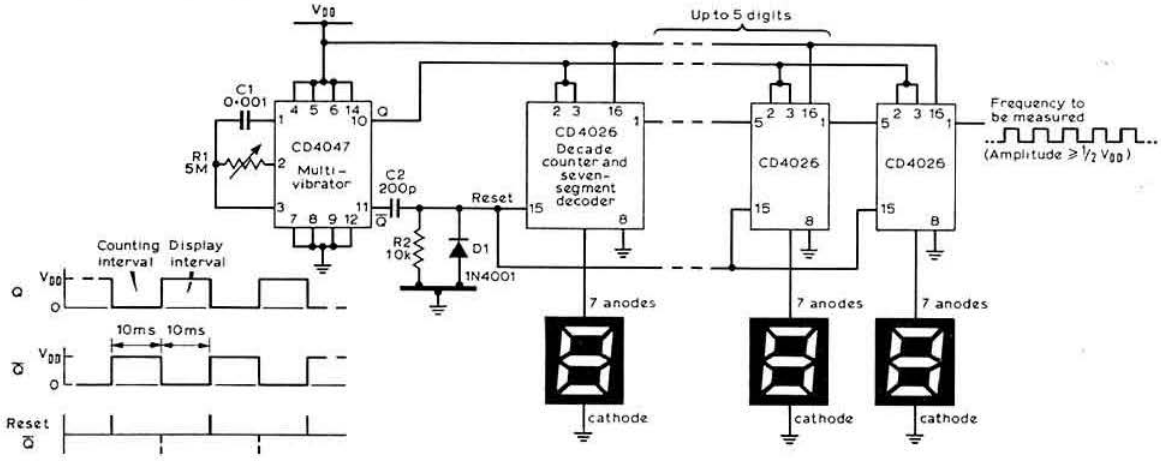


Fig 1. Simple digital frequency counter using minimum of components. The frequency is measured by counting the pulses in a 10ms interval and then displaying it during the next 10ms period. The multivibrator determines the counting intervals and also provides the reset signals to erase the counters, and has to be set up against signals of known frequency. The cmos integrated circuits are RCA or equivalent types. In the original design the common-cathode 7-segment led displays are listed as FND357 or equivalent (*Electronics*)

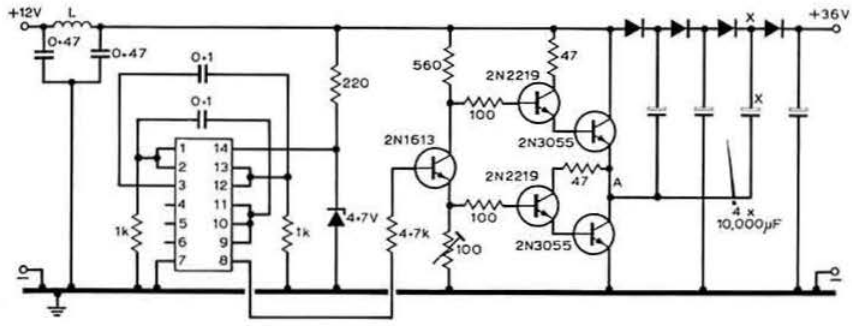


Fig 2. Transformerless dc-dc inverter providing about 36V from 12V car batteries. L is 35 turns, 2mm diameter enamelled copper on toroid core for reduction of rf interference (*Electron*)

36V with no transformer

In *TT* (June 1976) a design by F1VR provided a means by which mobile operators could obtain an 18 to 23V supply line from 12V car batteries without using an inverter transformer. In *Electron* (August 1976) A. H. J. Claessen, PA0CLA shows how a similar technique can be used to provide up to 36V at up to about 1·5A: Fig 2.

This unit has an SN7400 as a multivibrator running at about 8kHz and driving a series-balanced amplifier comprising 2N1613 driver/phase-splitter and a pair of 2N2219/2N3055 Darlington stages in push-pull. The four diodes are used in a voltage multiplying arrangement. Without load, the unit draws some 80mA from a 12-14V supply and output voltage is about 38V dropping to around 36V on load, or rather less if a voltage regulating arrangement is used.

CW ladder crystal filter

The description of the ladder filters investigated by J. Pochet, F6BQP, (*TT* September) has prompted Hans-Joachim Brandt, DJ1ZB, to send along some further information on this type of filter, as provided in a 1975 book *Kurzwellen Emfänger* (Short-wave receivers) by Detlef Lechner, DM2ATD, published in the GDR. This includes a cw filter based on four 8,794kHz crystals developed by DM2DTO: Fig 3. This has a much lower impedance (50Ω) than the ssb filters of F6BQP. The characteristics are −1dB bandwidth rather more than 250Hz; −3dB bandwidth about 400Hz; −60dB bandwidth 2·2kHz; and ultimate rejection of more than 80dB: in short a very useful cw filter.

DJ1ZB comments: "The only real difference to the F6BQP ssb filters is the very simple relationship of the capacitor values: the two outer capacitors have a reactance equal to the nominal input impedance; the inner capacitors are all double this value. In his German text, DM2ATD states that it may be necessary to pull all crystals to the same resonant frequency by using series capacitors in order to obtain optimum filter response."

DJ1ZB says that although he has no personal experience yet of building crystal ladder filters, he hopes to rectify this shortly, feeling that this approach provides a simple way of constructing useful filters for amateur purposes.

I have also learned of interesting experimental work that J. A. Hardcastle, G3JIR, has been carrying out for some time on ssb filters with excellent results: it is hoped that a two-part article on his work will appear shortly in *Radio Communication.*

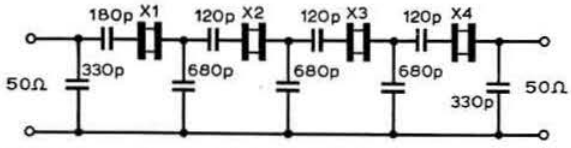


Fig 3. Four-section crystal ladder filter for cw reception using 8·8MHz crystals. Described in a book by DM2ATD on information supplied by DM2DTO and brought to notice by DJ1ZB

More on G3LHZ ip quad

In the September issue of *Radio Communication,* Mike Underhill, G3LHZ, presented a full description of his interesting ip quad element (ie *i*ndependent *p*olarized or *i*solated *p*ort) which was developed from the Tsukiji "centre-line-driven loop antenna" (cldla). As a result of publication several additional points have emerged and G3LHZ feels these will be of interest to anyone contemplating experimenting with this aerial, which is suitable for linear or circular polarization.

In fact within a week of the article appearing, Dennis Walker, G3OLM, had built and demonstrated to the UK FM Group a miniature 3·6GHz model. This led to the discovery that the ip quad element can be used also as a reflector by increasing its size by five per cent over the basic $\lambda/3$ sides normally used for narrow-band operation of the driven element and by short-circuiting the feed points.

G3LHZ considers this to be rather surprising since the measured reactance given in the original Tsukiji paper on the cldla indicates that this did not become inductive at any time; normally it might be expected that a reflector, in order to function correctly, would have to show an inductive reactance. Possibly, he feels, the current in the ip quad reflector element *does* lag sufficiently in phase, even though the effect is not observable at the feedpoint. The practical importance of this discovery is significant and further experimental and theoretical work is clearly needed.

Secondly, G3LHZ has found an alternative form of the ip quad element, possessing the same basic properties, yet rather easier to construct (particularly at hf). This form (Fig 4) can be considered as a "diamond" or "diagonal" ip quad element with the feed lines forming diagonals, and he tentatively proposes this form be called a *d*ip quad element. Here again the size of the active loops adds up to 1 λ: for example $\lambda/(2+\sqrt{2}) + \lambda/(2+\sqrt{2}) + \lambda/(\sqrt{2}+1) = 1\lambda$. In fact the 1λ dimensions appears to be the important common feature of all such structures. A few preliminary experiments by G3LHZ on 144MHz indicate that this modified structure gives a slightly lower impedance across its terminals than the original ip quad (perhaps about 0·8

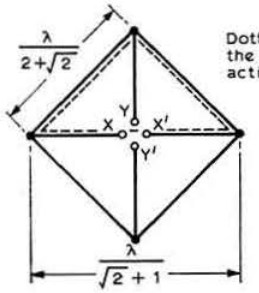


Fig 4. Modified form of ip quad element developed by G3LHZ and termed a dip quad

times). A *dip* quad element would clearly be easy to implement using the wire and bamboo approach commonly employed at hf. The bamboo spreaders can have the feed lines, XX′ and YY′ taped along them. Another advantage is that the overall element size is reduced from 0·333λ to 0·293λ per side; a 12 per cent reduction bringing the structure to only 17 per cent larger than a conventional quad-driven element.

Thirdly, either the original ip quad of the *dip* quad can be rotated by 45° and both input ports fed together: Fig 5. This still gives the choice of horizontal or vertical polarization at the cost of extra (relay?) switching at the feed points. The impedance as "seen" is almost halved and G3LHZ found this to be getting too low to be matched directly, through a 4 : 1 impedance balun into a 50Ω line when the element was used as the driven element of a multi-element quad. However, when used on its own with a 4 : 1 balun as described in the September article a good 50Ω match was easy to achieve.

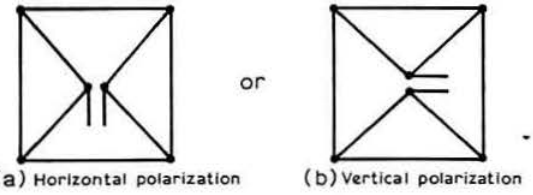


Fig 5. Showing how either ip quad or dip quad elements can be rotated through 45° and both input ports fed together. This provides choice of horizontal or vertical polarization (as in original element) if switching at the feed points is used

Fourthly, John Roberts, G8FDJ, has made a 22-element, 432MHz version of the G3LHZ 144MHz design and is using it in a circularly-polarized mode fed with 4W of rf to work through Oscar 7, reporting very good results and a very marked improvement over an 8-over-8 conventional stacked Yagi array.

Fifthly, both G8FDJ and G3LHZ have found from their experiments how important it is to decouple the aerial from its supporting structure. This cannot be overstressed. Many amateurs have found how disappointing results can be when using any vertically-polarized beam mounted on a metal mast. Metal masts have even more disastrous effects on circularly-polarized aerials. Not only is the beam pattern distorted but the circularity of polarization is lost (this is recognized as a real problem in vhf/fm broadcasting practice and much has been said and written about this in the USA). G3LHZ believes that the only practical solution for amateurs is to use a *non-conducting* mast and to position the feeders very carefully. It also helps, he finds, to use λ/4 baluns on the outside of the feeders or to coil these to act as chokes at the operating frequency.

Narrow-band television

Those of us who transmit only by code or speech often have a keen admiration of the small band of amateurs who aim at a full exchange of good quality "visual images"—particularly where they rival the broadcasters in coping with high-resolution, moving images. There is unfortunately a major snag that has become more and more of a disadvantage since the loss of so much of the old 420MHz band and, more recently, with the setting up of uhf repeaters. These events have rather limited the scope for transmitting 625-line television plus sound with its requirement for an 8MHz channel—and even this poses the requirement for vestigial sideband transmission and the associated difficult vsb shaping filters.

Fortunately there are various techniques which allow an acceptable picture to be transmitted in considerably narrower channels—just as a top limit of 3·5kHz can be applied to speech transmission. For example there is the IARU-recommended German system with the vision signal requiring about 1MHz bandwidth, and with sound transmitted by means of narrow-band frequency modulation of the vision carrier: this system, developed by DC6MR, is often known as Schmalband amateur television, or satv.

From across the Atlantic come details of an ingenious narrow-band system currently being developed professionally by the American General Electric Company. This is called "Sampledot" and is claimed to permit the compression of bandwidth by a factor up to 10 times—at least when applied to the American 525-line, 60-field (30 frames/s) system—and to provide pictures that are virtually of broadcast standard when viewed at normal distances from the screen of the receiver. Even higher compression ratios can be achieved with the help of electronic memories, although this would make the system too costly for most amateurs.

The basic Sampledot system, without memories, can provide about 600-line horizontal resolution with an information bandwidth reduced to about 750kHz. The system is described in some detail by Robert F. Stone in *IEEE Transactions on Broadcasting*, Vol BC-22, No 2, June 1976, and a short summary will be found in *Television*, September 1976. Here we can attempt little more than to bring the system to the attention of amateur tv enthusiasts as an idea which could conceivably do much to overcome some of the current problems of tv transmission on the 432MHz band.

The more complex system, using electronic memory and long-persistence picture tubes, can provide a limited picture

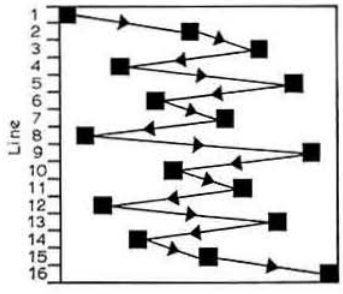


Fig 6. A typical Sampledot pseudo-random sampling code sequence based on a 16 × 16 picture element segment

facility with an information bandwidth of only 15kHz, offering the prospect that the signal could be recorded on a good-quality audio tape recorder or the possibility of experimental transmissions on frequencies as low as the 28MHz band.

Basically, Sampledot depends on reducing the number of complete pictures from 30 frames/s right down to 3·75 or even 1·875 frames/s. Normally such a reduction in picture fields would result in serious flicker and movement blur when transmitting moving images. It is here that the cleverness of the Sampledot system comes in. It is based on the work of Dr S. Deutsch who in 1968 demonstrated that it is possible to scan a scene in a pseudo-random fashion in such a way that full advantage is taken of certain useful characteristics of human vision; for example, that the eye does not notice flicker if this occurs only in *small areas*. There is thus a comparison with modern colour systems which take full advantage of the fact that the eye does not require sharp definition of colour.

Sampledot divides the complete picture into a number of relatively small segments (comprising, say, 16 by 16 or 8 by 16 picture elements) and then on each fast scan transmits information on only a single picture element ("pixel"), the pixel changing in each fast scan until the complete picture has been built up. In other words, one transmits only three per cent or less of the picture in each fast scan, instead of 50 per cent, and with 8 or 16 fast scans required for each complete frame.

At the receiving end the same pseudo-random sampling code sequence is re-created by digital logic circuits and used to reassemble the picture. The code sequence is chosen carefully to avoid various forms of patterning that tend to occur when the pixels are transmitted to a fixed pattern. In effect, what one is doing is to up-date each segment of the picture by one pixel for each fast line-scan.

It is claimed that a picture sent in this way provides real-time, live-motion television with no observable flicker and virtually a broadcast-standard picture, yet with up to 10:1 bandwidth compression, with relatively few complications apart from the fairly straightforward digital electronics used to achieve the pseudo-random scan sequences.

Sampledot is of course not the first tv bandwidth compression scheme to have been put forward, but most of the other ideas have tended either to degrade the picture (particularly moving pictures) or to have involved very complex electronics or the use of special storage display tubes. It would seem from this paper by R. F. Stone that here at last is a reasonably practical system—although, as he points out, the enormous existing investment by the public in television sets means that there is virtually no chance that it will ever be used for normal tv broadcasting (though it could have applications within broadcasting); but it would seem very promising for various special applications—and these could possibly include experimental amateur television.

Versatile 7490 digital divider

The 7490 ttl device has become extremely well known as a decade divider for such applications as crystal calibrators; for example to provide harmonic-rich 100kHz pulses from 1MHz crystals, or 10kHz from 100kHz. Less well known is the fact that a 7490 ic can equally well be used to divide any pulse train by *any* whole number from 2 to 10. In other words, by variation of the connections, the 7490 can be used as a divide-by-*n* device. Where it is required to count down by a

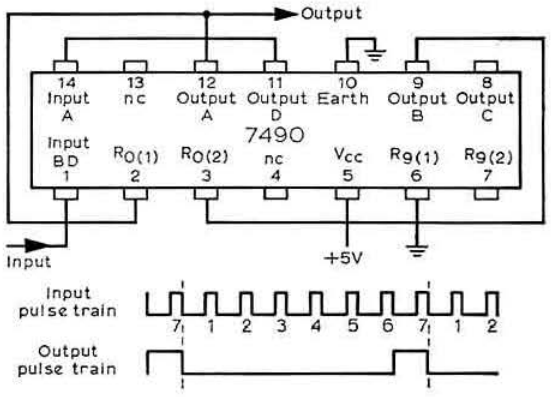


Fig 7. Showing connections of a 7490 ttl decade-counter ic when used in a divide-by-seven circuit. The corresponding connections for divide-by-n operation, where n is any integer between 2 and 10, are given in the associated table

factor of more than 10, more than one 7490 can be used, provided that the required divisor has factors that are all less than 10.

In *Electronics*, 8 July, 1976, T. Durgavich and D. Abrams list the pin connections for operating the 7490 in any divisor from 2 to 10:

Divisor	Input pin No	Output pin No	External connections
2	14	12	Pin 2 or 3 low
3	1	8	Pin 8 to 2; 9 to 3
4	1	8	Pin 11 to 2 and 3
5	1	11	Pin 2 or 3 low
6	14	8	Pin 12 to 1; 9 to 2; 8 to 3
7	1	12	Pin 11 to 14; 12 to 2; 9 to 3
8	14	8	Pin 12 to 1 and 2; 11 to 2 and 3
9	14	11	Pin 12 to 1 and 2; 11 to 3
10	14	11	Pin 12 to 1; 2 or 3 low

As an example, Fig 7 shows a 7490 ttl decade-counter used to produce one output pulse for every seven input pulses. Because the divide-by-two stage follows the divide-by-five stage, the seventh count is a non-bcd code and can be detected by the internal two-input NAND gate to reset the counter.

Mother earth—supergain or attenuator?

One of the fascinating aspects of amateur hf aerials is the difference between what we expect before we put them up and what we actually achieve. Those theoretical radiation patterns —even those based on model aerial ranges—never seem quite to tie up with the stations we actually work or do not work. There are several reasons for this (including radiation from what we fondly call transmission lines) and one prime cause is the effect of the environment—buildings, trees (with their particular ability to absorb vertically-polarized signals), wire fences, metal drain pipes and guttering, and of course the real earth below. Hands up those amateurs in typical urban areas who still believe that a vertical monopole aerial has extremely good low-angle radiation: yet such statements introduce almost every article ever written on vertically-polarized systems for amateurs. With poorly-conducting ground the amount of low-angle radiation is very small indeed unless extreme steps are taken to instal effective earth radials or earth mats.

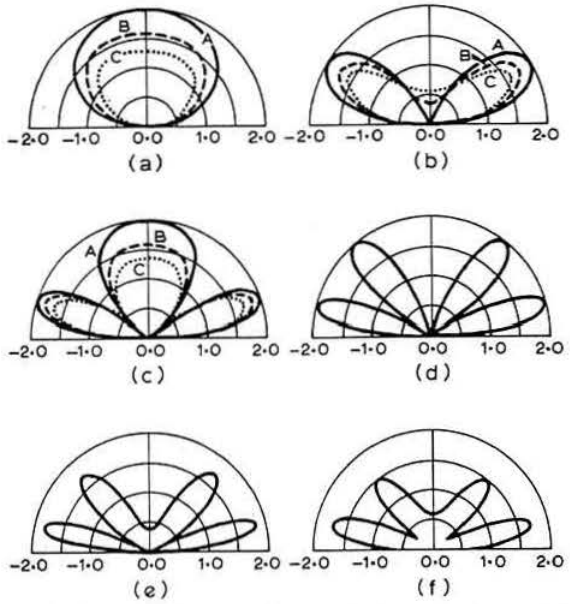


Fig 8. Computer diagrams showing effects on low horizontal aerials of different ground conductivities. (a) Height one-quarter wavelength, curve *a* perfect ground, curve *b* moist ground, curve *c* arid ground. (b) Height one-half wavelength, curves as for (a). (c) Height three-quarter wavelength, curves as for (a). (d) Height one-wavelength, perfect ground. (e) Height one-wavelength, moist ground. (f) Height one-wavelength, arid ground. Note how the lobes representing power gain tend to reduce over poor ground and the nulls begin to fill in. All diagrams represent vertical radiation patterns

One of the few attempts to present pattern factors for horizontally-polarized aerials over real earth is that by Hardy Landskov, W7KAR (*QST*, November 1975, pp19-21), though he also draws attention to a professional source of information: Ma and Waters, *ESSA Technical Report, ERL 104-ITS 74*, "Power gains for antennas over lossy plane ground", April 1969, from Supt of Documents, Washington DC, 20402, USA, 65c. W7KAR provides many pattern factors, based on computer analyses, as well as a table that summarizes the results. He concludes that:

(1) Low heights should be avoided with all horizontal aerials, because their gain suffers badly at elevations under one wavelength above ground.

(2) Aerials located one wavelength or more above ground have gains within a few tenths of a decibel of the perfect-earth case, *regardless of soil conditions.*

(3) High-angle radiation (above 45°) suffers as much as 3dB for aerials over poor earth, regardless of aerial height. This is an important consideration on 3·5 and 1·8MHz where few aerials exceed or even reach a quarter-wave above earth.

GAIN OF ½λ DIPOLE AS FUNCTION OF HEIGHT AND GROUND PARAMETERS, USING LOWEST LOBE

Height λ	Approx gain, dB/isotropic			Direction of gain, above horizontal		
	A	B	C	A	B	C
¼	8·14	6·28	5·14	90°	90°	90°
½	8·14	7·16	6·60	30°	29°	29°
1	8·14	7·64	7·30	15°	14·5°	14·5°
2	8·14	7·90	7·72	7·5°	7°	7°
4	8·14	8·03	7·94	3·75°	3·5°	3·5°

A—perfect ground; B—moist soil; C—dry soil

These are perhaps rather idealistic conclusions, since, as we have noted on other occasions, the low horizontal dipole may be very useful in practice. The fact that gain may fall by only 3dB in coming down (as W7KAR shows) from 4λ to ¼λ above ground shows that the low dipole can be used effectively, if it has to be, on short- and medium-distance paths.

W7KAR's diagrams (for example those in Fig 8) indicate well that the main effect of a poor earth on low aerials is to blur the theoretical vertical radiation pattern, reducing the lobes and partly filling in the nulls.

Simple overtone oscillator

A simple overtone oscillator that requires no trimming or tuning is clearly useful for such applications as vhf/uhf converters. The arrangement shown in Fig 9 is claimed by G. Tomassetti, I4BER (*QST*, June 1976), to meet such requirements, using a dual-gate mosfet as the active device. As shown it should be suitable for overtone oscillation in the low vhf range, and it is also possible to modify it slightly so that it oscillates on the fundamental frequency at hf. Where the fundamental is required the value of RFC1 is raised to about 100μH or replaced by a 1,000Ω resistor.

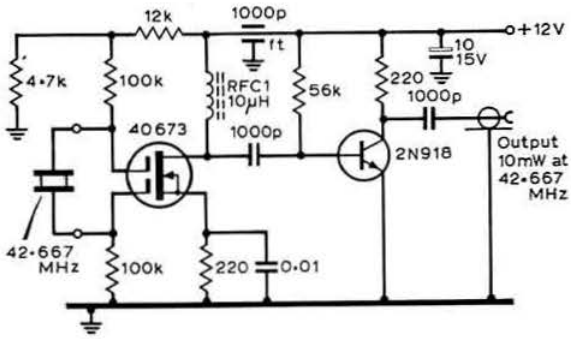


Fig 9. I4BER's simple vhf overtone crystal oscillator which does not require trimming or tuning. Can also be modified to provide output on the fundamental crystal frequency by increasing value of RFC1 to about 100μH or replacing it by 1000Ω resistor. Application requiring 42·667MHz was 27 × 42·667 = 1152MHz; 1152 + 144 = 1,296MHz.

Pacemakers and radiation hazards

An article "Avoidance of radiation hazards from microwave antennas" by D. A. Shinn in *The Marconi Review*, 2nd quarter, 1976, draws attention to the additional hazard of high rf fields to anyone fitted with an electronic cardiac pacemaker. He writes: "For example, if a person fitted with a pacemaker stands on the ground a few hundred metres in front of an ordinary surveillance radar, the pacemaker may miss a beat as the radar scans past". He notes that the susceptibility of some pacemakers may be as low as 0·2W/m² at 450MHz, although most modern units have a threshold around 240W/m², a vast improvement.

There are, of course, well-established biological, ignition and detonation hazards presented by high intensity rf fields, and D. A. Shinn notes that when estimating possible fields it should be recognized that at points near the ground or other reflecting surfaces the field strength may sometimes be increased by up to 6dB above the calculated direct-wave signal. □

RSGB AREA REPRESENTATIVES

Region 1

K. Birch, G2FOS, 19 Lloyd Drive, Greasby, Upton, Wirral, Cheshire.
J. M. Horrocks, G8GTP, 17 Wood Grove, Whitefield, Manchester M25 7ST.
A. B. Langfield, G8IOA, 201 St Mary's Road, Moston, Manchester M10 0BN.
R. J. B. Morgan, GD3KGC, Plot 19, Howe Road, Onchan, Douglas, IoM.

Region 2

J. W. Thompson, G3WQM, 80 Albion Avenue, off Beckfield Lane, Boroughbridge Road, York.
Ms C. Wade, G4CUY, 74 Cow Close Road, Leeds LS12 5PD.

Region 3

W. F. Mienerts-Hahn, G3UOL, 91 The Chesils, Styvechale, Coventry, Warks CV3 5BE.

Region 4

M. Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ.

Region 5

L. Critchley, G3EEL, 36 Waterloo Road, Peterborough, Northants.

Region 6

P. Erkiert, G4BKS, 3 Hartwell End, Southcourt, Aylesbury, Bucks.
C. F. Young, G4CCC, 18 Wincroft Road, Caversham, Reading, Berks.

Region 7

G. Cluer, G4AVV, 24 Patterson Road, Upper Norwood, London SE19 2NT.
D. N. Jones, G8IMX, 9 Elsenwood Drive, Camberley, Surrey GU15 2AY.

Region 8

M. Dennison, G3XDV, 5 Lambs Walk, Whitstable, Kent.
P. F. Jobson, G3HLF, 41 The Avenue, Gravesend, Kent.
M. A. Lawrence, G8DNO, 18 Briers Avenue, St Leonards on Sea, Sussex TN34 2NN.

Region 9

R. G. Hughes, G4CG, Grinnis, Highwall, Sticklepath, Barnstaple, Devon.
M. C. Locke, G3NKE, Hillside, Keholland, Camborne, Cornwall.
L. H. Webber, G3GDW, 43 Lime Tree Walk, Newton Abbot. Devon.

Region 10

T. J. Brooke, GW3GHC, Pentire, Castleton, Cardiff CF3 8UR.
J. S. Hammond, GW3JBH, The School House, Llangwm, Usk, Gwent.

Region 11

R. Stubbs, BRS14793, Rosaire, 81 Dyserth Road, Rhyl, Clwyd LL18 4DT.

Region 12

A. M. Allan, GM3ZBE, Tullock-Ard, Westhill of Crimond, Keithhall, Inverurie, Aberdeenshire.
M. W. Bannerman, GM3ZXE, 16 South Street, Newtyle, Angus.
R. A. Dixon, GM3ZDH, PO Radio Station House, Newton Road, Wick, Caithness.

Region 13

F. Benson, GM8EKF, 53 Warriston Drive, Edinburgh EH3 5NA.
D. W. Dalrymple, GM3OLK, 27 Hazel Place, Leslie, Fife.

Region 14

A. M. Cameron, GM3OGJ, 15 Greycoran, Sauchie, Clackmannanshire FK10 3EN.
D. M. Plumridge, GM3KMG, 7 Waterside Gardens, Hamilton, Lanarkshire.

Region 15

M. Anderson, GI3WWY, 32 Knockview Drive, Tandragee, Craigavon, Co Armagh, N Ireland.
J. T. Barnes, GI3USS, 95 Crawfordsburn Road, Bangor, Co Down BT19 1BJ.
H. M. Irvine, GI3TLT, Fernrock-Ballyrie, Bangor, Co Down.
I. J. Kyle, GI8AYZ, Hillside, Galgorm Gardens, Old Galgorm Road, Ballymena, Co Antrim.

Region 16

K. A. Thompson, G3YNV, 14 Norfolk Road, Maldon, Essex.

Region 17

F. B. Le Cocq, BRS34159, Les Cailloux, Green Road, St Clement, Jersey, CI.
J. R. Compton, G4COM, Aysgarth, Beech Corner, Durley Brook Road, Durley, Southampton, Hants.
M. Connah, G8IMF, 135 Sevenfields, Highworth, Swindon, Wilts SN6 7NQ.
J. E. Martin, GC3YIZ, Bonne Chance, Marais Lane, Vale, Guernsey, CI.
P. J. Sterry, G3CBU, Ashley, Orchard Road, Basingstoke, Hants.

Region 18

E. F. Shield, G8GVN, 14 Wellwood Street, Amble, Morpeth, Northumberland.

Region 19

S. R. Allen, G4CYR, Rosswan, Dimmocks Lane, Sarratt, Rickmansworth, Herts.
W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3.
A. J. Mason, G3PSP, 62 Coldharbour Lane, Bushey, Watford, Herts.

Region 20

P. Grimshaw, G8KME, 55 Combe Street Lane, Yeovil, Somerset BA21 3PD.
E. A. Perkins, G3MA, 40 Carlton Road, Gloucester.
J. Thorn, G3PQE, 43 Hill Road, Weston-super-Mare, Avon.

COMPOSITION OF RSGB REGIONS

Region 1

Cheshire, Cumbria, Greater Manchester, Isle of Man, Lancashire, Merseyside.

Region 2

All that part of Humberside north of River Humber, North Yorkshire, South Yorkshire, West Yorkshire.

Region 3

Hereford and Worcester, Salop, Staffordshire, Warwickshire, West Midlands.

Region 4

Derbyshire, all that part of Humberside south of River Humber, Leicestershire, Lincolnshire, Nottinghamshire.

Region 5

Bedfordshire, Cambridgeshire, Northamptonshire.

Region 6

Berkshire, Buckinghamshire, Oxfordshire.

Region 7

Greater London south of River Thames, Surrey including that part of London north of the Thames administered by Surrey.

Region 8

Kent, East Sussex, West Sussex.

Region 9

Cornwall, Devon.

Region 10

Dyfed, Gwent, Mid Glamorgan, Powys, South Glamorgan, West Glamorgan.

Region 11

Clwyd, Gwynedd.

Region 12

Grampian, Highland, Island Authorities, Tayside.

Region 13

Borders, Fife, Lothian.

Region 14

Central, Dumfries and Galloway, Strathclyde.

Region 15

Northern Ireland.

Region 16

Essex, Norfolk, Suffolk.

Region 17

Isle of Wight, Channel Islands, Dorset, Hampshire, Wiltshire.

Region 18

Cleveland, Durham, Northumberland, Tyne and Wear.

Region 19

Greater London north of River Thames, Hertfordshire.

Region 20

Avon, Gloucester, Somerset.

4-2-70

Martin Dann, G3NHE*

Although Martin Dann expressed a wish to hand over the compilation of Four-two-seventy *last month he has kindly undertaken it for two more months because the short notice he gave did not allow sufficient time to select and appoint another contributor. We are grateful for his co-operation.*—Ed.

Four metres

Mention of inter-UK distance records on 70MHz brought response from Nigel Hoult, G4CIK, whose call was being used when the expedition worked G3AUS from Islay over a path of 360 miles; the contact which sparked off the thought. Nigel himself cites several contacts which better this QRB, notably one about 480 miles between G3JVL and GM3UAG by meteor-scatter, reported in the February 1970 *FMD* column.

The best 70MHz inter-UK contact reported so far though, is that between G3TCT, while he was in Guildford, and GM3JAZ/P on Orkney. The contact took place on 8 July 1968 and the distance works out at 560 miles. G3TCT remembers that this contact was by E*s* propagation and was characterized by violent fading, from S9 to noise-level in a fraction of a second. He listened at the same time (1808gmt) the following evening and heard GM3JAZ/P calling ZB2VHF for what would have been a world record, but unfortunately no contact resulted.

Not quite as far, but certainly worth comment, is the contact made during VHF NFD 1976 by the Lothian Radio Society, signing GM4BYF/P from Lowther Hill. They worked GC4ASO/P at a QRB of 410 miles, and later worked GC3VPF/P at only a little less.

When G4FJI of Derby received his licence he was ready to go on 70MHz, one of the few G4F- - operators yet to be heard on this band. He finds activity in the area good, particularly during the "going to work" and "going home" time nets that form on 70·26MHz every day during the week.

"The moving finger writes . . ."

Attempts have been made at various times in this column to collate information about distance records established in the vhf/uhf spectrum. They have met with little success, almost certainly because some of those who established such records were reticent about coming forward with a claim.

An item on the agenda of the European vhf managers' conference at Amsterdam at the beginning of October was "Registration of vhf/uhf/shf records", a subject which came in for discussion at the September meeting of the RSGB VHF Committee. Coincidentally, one member of the committee, on arriving home after the meeting, found a letter waiting for him from Harold Meerza, BRS34348, touching on the same subject. Harold wrote:

"I have it on the authority of G3LQR that the contact made on 23cm between GD2HDZ and HB9AMH/P may well be a European record for this band over a QRB of some 1,130km. It would be interesting to see an up-to-date list of the greatest distances covered by two-way contacts from the British Isles on each of the vhf/uhf/shf bands."

It would indeed; and the purpose of the present note is to ask operators once again to come up with the needful information. Any who during the great lifts of the past summer feel that by working, say, 9H1 they may have established a UK record on 144MHz are asked to turn in the information to the secretary of the VHF Committee (G5UM) giving date, time, path distance in kilometres and frequency band. Armed with this data the committee, together with IARU Region 1 vhf managers, hope to compile an accurate list of current records on the bands above 30MHz.

"The moving finger writes . . ." yes, but after that it moves on and duly indites further records as these are established. It cannot do so unless members are diligent in telling it!

FM channel

The Dover repeater, GB3KR, continues to function well, despite the very severe QRM imposed by the unprecedented lift conditions which prevailed over Western Europe for so long this summer. One or two minor modifications have been made to the control circuitry and to the receiver, which should improve the future operation of this repeater.

Following a suggestion from G3MDO, a cure was found for the "rusty bolt" effect reported in the September *4-2-70*. The solution was the strapping together of the steel guy wires at the ground end. A slight squelch drift which had been aggravated by the heatwave has also been cured.

Users of the 432MHz Margate repeater, GB3EK, are finding the carrier-operated, no time-out conditions very relaxing and simple to use after the hustle and bustle of GB3KR on 144MHz. Despite the lower level of activity on 432MHz, a surprising number of stations have been heard working through GB3EK, which is in use for several hours each day.

Repeater comment

GD2HDZ (Laxey) fully endorses the views of our correspondent in the September column concerning the tendency towards "repeater madness". He cannot, however, share the opinion that there will be a disenchantment with the use of repeaters. Arthur's fear is that their use will escalate to an extent that will mean the virtual extinction of other modes on 144MHz (and possibly 432MHz) as has already happened in the USA, judging by the American journals.

GD2HDZ admits that he qualifies as a serious "anti" as far as repeaters are concerned. He feels that the undoubted technical knowledge and ability of the constructors of these devices would have been more usefully employed if directed into other channels, and he adds his view that the encouragement of the proliferation of repeaters is pandering to the commercial interests of the "black box" purveyors.

Beacons are not repeaters

The above headline may smack rather of stating the obvious, but there is a reason for it: from time-to-time over-enthusiastic repeater users quite seriously put forward the suggestion that beacons should be turned into repeaters. What prompts their thinking along these lines is the fact that most of the vhf repeaters provide a considerable coverage that *could* be the envy of mobile operators who wish their local repeater might do the same.

* 49 Windermere Court, North Anston, Sheffield S31 7GJ.

This is to confuse the distinct functions of the two services. Essentially, an RSGB beacon is designed to give as nearly as possible national coverage, whereas a repeater's primary purpose is to "help" mobile signals over local obstructions that would otherwise preclude communication.

Incidentally, for each device, repeater or beacon, to be of continuing value it must give as near 100 per cent reliability as the state of the electronic art allows. The Society's regional representatives are well placed to assess the current state of their local beacons and repeaters, and at the last meeting of the VHF Committee it was agreed that they should be urged to monitor them and report any deficiencies to headquarters at once, if and when these occur—which happily is rarely.

Expeditions

G4ASR will be operating portable from the eastern edge of the Lizard peninsular in Cornwall (XK75j or XK75e) between 25 October and 19 November. His activity will include the 432MHz cumulatives in this period, and the 144MHz cw contest on 6/7 November. By the time this is read his spell will be half over, but G4ARS/P will be looking for contacts over the weekend 13/14 November on 144, 432 and 1,296MHz, 1pm-1am and 8am-4pm. Frequencies used will be 144·25-144·27MHz cw/ssb, and 1,296-1,297MHz cw/a.m.

Contest comment

Opinion seems fairly uniform about the poor conditions for the October UHF/SHF Contest which took place on a particularly wet, miserable and portable-deterring weekend. In the event it was a pity that conditions were so poor, for as far as one could tell, activity was quite good. The G3PMH/A team, for example, passed the 100 mark well before the end, and their 1·3GHz station, G4BEL/A, was doing correspondingly well considering the conditions.

Harold Meerza, BRS34348 (Chatham), felt that conditions improved marginally after lunch on the Sunday and confirms that activity was good. He remarks that interest seemed to be sustained right to the end of the contest. Best dx logged by Harold was PA0MS/P tying with G3KMS in Bolton, both at 320km.

Awards

A number of awards on the microwave front are reported by the vhf awards manager, imparting an unusual interest to this month's claims—three of them being "first evers".

To G4BYV goes the first of the 1·3GHz certificates for an initial contact made beyond 600km. John Tye of East Dereham, Norfolk, handsomely exceeded this QRB by working SK over a distance of 883km. On the same band, Harold Meerza of Chatham, BRS34348, achieves yet another landmark in vhf/uhf listening by successfully claiming award No 1 for receiving DC9XG (EN37f) over a distance greater than 600km. Congratulations to Harold for his excellent work in this field—he should be an inspiration to other vhf/uhf listeners.

On the next band up, 2·3GHz, the requirement is for a first contact beyond a distance of 500km. This has now been achieved by that microwave pioneer, G3LQR of East Suffolk: Simon's contact was with OZ9OR, and earns him award No 1 for 2·3GHz.

On the more "traditional" bands the following awards have been issued:

Supreme: No 15 to G3BW of Whitehaven. Bill Hodgson earned this by achieving three "Seniors", from a site somewhat remote from the main centres of vhf activity (although the numbers of Scottish stations worked on 4m would be the envy of members further south). Many of the longer haul contacts which brought the 4m Senior to G3BW were made under weak signal conditions on the key; significantly, no fewer than 32 of the 60 counties netted for the award were worked on the A1 mode.

70MHz Transmitting: No 123 to G3CO; No 124 to G4BYP.

70MHz Senior Transmitting: No 31 to G4BYP, and No 32 to G3BW.

144MHz Transmitting: No 489 to G4DRD; No 490 to G3JVJ and No 491 to G8KGF. The last award is worth comment in that Martyn Baker was able to spend very little time operating between his terms at King Alfred's College, Winchester. Power used was just 10W to an 8-el from a mediocre QTH at Bicester.

144MHz Senior Transmitting: No 99 to G4DWZ (ex G8IKO); the magic "100" goes to G3CO to add to his 70MHz award mentioned above; Nos 101 and 102 were earned by Yorkshiremen G4DSC and G3JFO respectively.

432MHz Transmitting: No 116 to G3HCW, No 117 to G8HBQ and No 118 to G3OHC.

10GHz Microwave Award: Certificate No 22 goes to G8BDJ/P who, operating from Truleigh Hill in West Sussex, raised F0AKD/P (better known as G3JHM) on the Normandy coast over a distance of 174km.

FMD claims from fixed sites

The present rules for FMD certificates require claims in respect of fixed station operation to be made from one location only. This, it is felt, may penalize members whose jobs require them to move house fairly frequently, and in consequence they have to start collecting cards all over again for each new QTH. It is therefore proposed that with effect from 1 January claims will be valid if made in respect of any permanent home sites.

Miscellany

The A1 mode will get through when all else fails; but not all users, especially the holders of new Class A callsigns, seem to realize that "Monday night is cw activity night", although it has been mentioned here many times. From 8pm onwards is the time to dig out the weak dx at the bottom end of 144MHz.

Further to fixed time operation, those who lament the lack of activity on 432MHz should monitor 433·2MHz, especially around 2030gmt any weekday evening. Even more important, they should put out plenty of CQ calls. They will find the increasing number of users of handheld equipment are quite prepared to orientate their rigs into the horizontal plane if the man at the other end has a horizontally-polarized beam.

Some puzzlement was apparent when the call G8LM appeared during the September 144MHz Open Contest, several operators asking for the third letter of the callsign. This venerable callsign has been resuscitated to stand for *L*eicestershire *M*etrewave Contest Group. □

GM8FFX to take over

Commencing with the January 1977 issue the compiler of vhf news and views will be Graham Knight, GM8FFX. All items for the January issue should be addressed to him at PO Box 49, Aberdeen, and arrive by 4 December.

microwaves

Dain Evans, G3RPE *

Microwave round table

The IBA Engineering Headquarters at Crawley Court has been booked on 21 November for another round table. Crawley Court is five miles NW of Winchester and about a mile off the A272 road, and people start gathering from about 10am onwards. No formal lecture programme has been planned, the intention being to have a post-mortem on 1976 and to look ahead to 1977. It hardly needs spelling out that the next year or two will be critical years if what we are actually seen to do with our allocations is going to influence our position at WARC 1979.

10GHz world record

More details of the record-breaking 521km (324 miles) contact from Cornwall to Scotland made on 14 August, reported September. Both sets of equipment used low-power Gunn oscillators. The transmitter used by G4BRS generated 10mW and fed a dish 2½ft in diameter, while GM3OXX (not OXP) used 10mW to a 2ft dish. Signals were exchanged directly on 10GHz without the use of any talk-back at a lower frequency —these operators in particular regard talk-back as more of a hindrance than a help. In fact, GM3OXX happily copied the G4BRS signals during the pre-schedule tune-up. Starting at 1600, the formal contact was completed by 1610, but tests were continued for a further 3h. During this time the signal strength measured by G4BRS with an attenuator at i.f. increased from about 10dB above noise eventually to about 45dB above noise. Calculations based on the equipment parameters suggest that these levels at worst correspond to free-space and at best to a perfect duct. The contact was repeated the following day.

By way of background, this successful contact was the ninth attempt over this particular path, lest it sounds too easy. It was arranged literally at midnight the evening before, both parties had to travel 100 or 200 miles to reach the sites, and both stations this time were operated single-handed. As to the next step; while equipment even this small can work still greater distances with effective ducts, there is a real problem in trying to do this on the west coast—Ireland tends to get in the way. However, there are no such problems on the east coast, and indeed it now seems that all the countries bordering the North Sea are potentially workable using super-refraction on this and other microwave bands. Oh for some beacons!

Operating news

Having just been about to write on the complete lack of news on 1·3 and 2·3GHz, a letter arrived from G4BYV in Norfolk giving details of probably his last fling before the weather returned to normal. During a time when the DB0IZ beacon on 1,296MHz has been S9 and radar QRM from the east has been very high, he worked SK6AB at 883km on 15 August to give himself a Microwave Award and them their first G contact on 1,296MHz. The Swedes' equipment sounds impressive: 75-100W of rf from two 7289s, with a receiver using MCF901s in the front end to give a claimed 2·5dB noise factor. They hope to build a 1·5m dish to complete this equipment. Later they also worked G4BEL and G3LQR. During this period G4BYV also worked GM3ZBE at S9.

On 10GHz, GM3DXJ and GM3OXX/P near Ballantrae on the Ayrshire coast worked GI3OLK/P at Larne on 28 August to make the first GI-GM contacts on this band. This appears to bring the total number of countries worked up to 12: G-F, G-GC, G-GD, G-GM, G-GW, G-ON and G-PAO; GD-GI, GD-GW, GD-GM, GI-GM and GM-GW. The remaining "easy" contacts are GI to G, GW and EI, and EI to G, GW, GM and GD, and GC-F. All of these are there almost for the taking. Not quite there just for the taking are the contacts from England to Germany at about 520km, to Denmark at 560km, to Spain at 770km and to Sweden at 870km, and what may prove to be a rather tricky one, GC-GW.

G3PFR in Warrington reports that he and G8JYD are keen to get going on 10GHz and are anxious to contact any other enthusiasts, potential or active, in the Liverpool/Manchester area.

GM3DXJ writes to say that things are beginning to move towards establishing the proposed beacon GB3CMS. This is intended to be installed at Findon, 9km south of Aberdeen, with GM8FFX as beaconkeeper. The aerial will be a horn with a 120° beam directed so as to cover all countries bordering the North Sea when propagation conditions permit. The transmitter will use a 200mW Gunn oscillator. At present its frequency has yet to be fixed, but there is a case for making it near 10,368MHz so that the Germans can take full advantage of it—their allocation is only 10,250-10,500MHz.

Feedback

The request in the August column for a reference to information on positioning input and output taps directly on to lines in interdigital filters brought forth an international response. The reference is a letter by M. Dishal in *IEEE Trans M.T.T.*, Vol 13, Sept 1965, which also contains comments on aligning procedures. Also recommended were *Microwave filters, Impedance matching networks and Coupling structures* by Mathaei, Young and Jones, McGraw-Hill, 1964; *ITT Reference data for radio engineers*, 5th edition; and *Tabellenbuch Mikrowellenbandpässe*, by G. Pfitzenmaer, Siemens AG, which gives tabulated data for these filters. Many useful comments were also sent in and these, together with the basic design information, will be written up as soon as possible. Thanks must go to DL3WR, F0KS/PA0YJ, G8AXU, ex-G8CEG, G3SEK and SP2DX.

G8FGD notes that design information for the flyswatter aerial system mentioned in a recent column is given in the ITT handbook referred to above. It includes data for both planar and curved reflectors. G3JVL and G3RPE have also looked at this configuration which seems to be worth further investigation. It looks as though there is an article in the pipeline on this topic. G8FGD also referred to the use of passive reflectors in other systems, and the use of back-to-back aerials which may be quite practical at the higher microwave frequencies (also mentioned by G4ALN). All this comes from a growing interest in operating this equipment from domestic sites. Finally, mention must be made of the actual use by G8ADP of the proverbial copper tubing as used in plumbing to carry his 10GHz signals. □

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

swl news

Bob Treacher, BRS32525 *

A suggestion was put forward in the last *SWL News* to run an all-time countries table. From comments received over the last few weeks it seems as though it may be a worthwhile venture and one which would command some support. It is therefore proposed to publish a table of all-time high scores in the next *SWL News* if at least 10 entries are received. The starting score is 500. The table will be run on the same lines as the current yearly table. Simply provide your scribe with all-time figures for each of the six bands, 10–160m, stating whether ssb or cw or mixed. The table will then be published every four months.

Listener activity

It seems that radio societies are now more keen to provide the swl with more contest activity and promote more interest in their events by so doing. The Cray Valley RS was the first to sponsor a 100 per cent swl contest and this is still thriving, now being in its eighth year. The Farnborough & D RS is to run an activity day aimed at sponsoring the Blackwater Valley Award. Details appear under "Special event stations."

A reminder that logs for the Cray Valley Listeners Contest should be postmarked no later than 1 November to Roger Smith whose address was given in the September issue of *Radio Communication*.

SWL travels

Neville, BRS17567, has returned from his four-week trip to the USA. At Boston airport he and his wife were given a fine send-off by WA1KYW, W1QCO and W1JFG. During his absence Neville received QSL verifications from 3D2KG, C21NI, BV2B and HK0AA, which brought up the 290 confirmed.

An interesting letter from G2CKM who also seems to have signed ZE2JO during March 1947 and September 1949. Miles has also signed UQ2JO and VQ4MNS. In August G2CKM had a visitor's licence while on holiday in the Italian Alps to sign /I2. No room could be found for an FT200, so a direct conversion receiver (J. Young, *Radio Communication* February 1975) and 30ft of 22g wire were packed instead. Gs were not plentiful but Ws and a ZL were heard during evening hours among the tremendous mid-European QRM on ssb at the top end of 3·5MHz.

It is very interesting for our younger members to note that such results can be achieved at a small cost, and the above-mentioned article may well be of much interest to many of the younger element who read these pages.

The remainder of the mail

A number of new correspondents to report this time. Austin C. Geer, BRS35586, has been building radios since 1920, even before 2LO started, using old loose couplers, making capacitors and using zincite and bornite crystals. Austin has also built single-valve radios such as the Armstrong super-regen, Fflewelling super-regen, the Mullard Master 3 and the Everyman Four. Having built all these and been interested in the hobby for many years, he is now thinking of trying to pass the RAE. He has recently purchased the new Yaesu FRG-7 and has heard some good dx, particularly on 14MHz.

Ken Steele, BRS36883, has been monitoring 3·5MHz of late, listening for the GB stations which have been on the air for commemorative reasons. As a result of certain problems which have been experienced, it is understood that not as many societies as usual were lucky enough to obtain their special licences this summer.

Another newcomer is Martyn Allison, A8398, who runs an FR101 from an 18AVT/WB and inverted-V. Martyn used to have a 4-el quad but a crow apparently had an argument with it and the quad came off second best!

Philip Shaw, A8960, is also a first-timer to these pages. A Trio JR310 graces Philip's shack and an 80ft long wire is in use as the antenna. Philip is in the throes of improving his antenna system with dipoles and hopes that this will improve the dx to be heard and the QSL return rate.

One of our most consistent reporters, Dave, A8312, actually has nothing new to report on the 1·8MHz scene. Conditions have been quite poor and only PT2FRU, KV4FZ and W2DEO have been heard at reasonable strengths. However, ZB2CJ is now confirmed for country No 29 on 1·8MHz. Dave was looking forward to the new dx season on 3·5MHz; A9XBD, ZL2BT and VS6DO have quenched his initial thirst for the rare dx this band is bound to offer between now and February 1977. Dave relates his /P holiday activities with a 1·8MHz only receiver and 200ft of wire supported by a kite! Unfortunately this could only be rigged for use during daylight hours when only a few local GWs were to be heard. With the many contests in the offing, and the dxpeditions that go with them, Dave is looking forward to a very hectic but worthwhile period within the next two to three months.

1976 HF Countries Table

Station	10m	15m	20m	40m	80m	160m	Total	Mode
BRS35608	69	144	200	161	106	36	716	cw
BRS17567	68	152	222	100	130	10	682	ssb
A8883	50	142	216	82	118	0	608	ssb
A8890	66	124	187	87	94	24	582	ssb/cw
A8849	63	122	180	75	93	12	545	ssb
A8312	28	113	159	71	106	24	501	ssb/cw
BRS35943	3	101	166	81	125	3	479	ssb
BRS32286	55	112	148	47	92	0	454	ssb
BRS33823	29	82	147	59	92	17	426	ssb/cw
BRS35454	14	99	164	61	79	7	424	ssb
A8841	24	69	180	19	40	0	332	ssb
A8808	34	75	97	30	51	4	291	ssb
A9172	10	54	134	48	38	3	287	ssb
A9191	37	59	128	33	30	0	287	ssb
BRS36208	21	68	115	35	41	1	281	ssb/cw
A9123	14	65	99	28	55	9	270	ssb/a.m.
A8961	6	54	128	27	44	9	268	ssb
A9199	18	17	35	12	3	1	86	ssb
A8960	3	16	41	5	12	0	77	ssb

73

Time and space have won again. In closing I would like to acknowledge correspondence from As 8890, 8808 and 9199 and BRS36208, and trust that this feature will continue to receive this gratifying support. Because of a change in publishing arrangements, *SWL News* will appear again next month and thereafter at two-monthly intervals as before. Copy for the February 1977 issue should reach your scribe no later than 29 December 1976. □

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

the month on the air

John Allaway, G3FKM *

READERS of this column will be sorry to learn that *DX News Sheet*, edited by Geoff Watts of Norwich, has, at least for the time being, ceased production. The very quality and success of the bulletin has resulted in considerable strain for its author, and temporary cessation became essential. Your scribe is certain that all dxers would like to join him in thanking Geoff for the great help which his work has been to all those interested in the hf bands and what is happening on them.

Lack of news and the generally low activity due to poor conditions, plus the writer's absence on a visit to the Far East, have made this rather a small *MOTA*. However, it is hoped that the December column may be longer.

WA9UES (R. L. Fansler, Route 3, Fairfield, Ill, 62837; USA) is trying to contact the holder of the callsign VS9AJM who operated from Aden in October 1967. Help would be appreciated.

News from overseas

A group of South African amateurs, members of the Highveld branch of SARL, operated a portable station during NFD using the callsign ZS6NFD/P (see photograph). This year's effort was more successful than that of 1975, and a 6-el quad at 30ft helped with most of the almost 200 contacts made. A 7MHz vertical and 21MHz Yagi were also used. The transmitter was a TS520. The group applaud the new higher-power rule applicable to UK stations—this resulted in contacts with 48 this year in contrast with only 13 in 1975. Contacts with Germany were 75 and 59 respectively. They remark that the most outstanding British signals appeared to come from Scotland.

South African NFD station ZS6NFD/P. Left to right: ZS6ME, ZS6OM, ZS6AKE, ZS6SM, Wayne (jnr op of ZS6BLI), ZS6BLI and ZS6APO

Professor Cristea Radu, YO7NA, is a reader of *Radio Communication* and has written to ask for his best wishes to be passed on to the 300 or so friends he has made over the air in Britain. From 1962 to 1973 he was on cw only, but is now very active on ssb and looking for contacts to help him improve his English.

Peter Reed, G4BVH, arrived on Masirah Is on 20 September and will stay until 20 March 1977. He has the call A4XVK; is using an FT101 and FR101 and dipoles, and favours cw working—usually 25kHz above band edges. QSLs should be sent via RSGB or to the address in "QTH Corner".

Andy Matheson, G3ZYP, is now 5B4DN and expects to remain in Cyprus until April 1979. He also has the callsign ZC4AM for use from the sovereign base areas. Operating times are mostly from 1300 on weekdays, and frequencies around 14,280, 21,280 and 28,580kHz. Transmitter is an FT101, and dipoles and a ground plane form the aerial system. Some 3·5MHz and cw operation will take place later.

DX news

A bulletin from the YASME Foundation says that Iris and Lloyd Colvin, W6DOD and W6KG respectively, have returned to California via Australia, W Samoa, American Samoa and Hawaii after a one-and-a-half-year YASME expedition. They operated as VR1Z, VR8B, 3D2KG, C21NI, FK0KG and YJ8KG (all QSLs via YASME, PO Box 2025, Castro Valley, Cal, 94546, USA). Iris recently applied for a two-letter call and was allocated her first choice—W6QL. This call was previously held by Jim Wells, who was a famous dxer. Iris and Lloyd hope to resume their world-wide expedition to some different parts of the world in a few months.

A severe typhoon in Taiwan during August resulted in the destruction of BV2B's 204BA beam. Spare parts have to be obtained from the USA and it may be some time before the beam is reinstalled. In the meantime the BV2B signal may be radiated through a dipole.

West Coast DX Bulletin reports that QSL cards for the recent HK0AA activity from Serrana Bank and Bajo Nuevo have started to be received. It also says that YN1DW still has logs and QSLs for the period 25 December 1975 to 30 January 1976, and anyone in need should apply to W5USM (see "QTH Corner").

Turkish stations in addition to those listed last month include TA2BK, who is often to be found on 14MHz cw, or on ssb 14,195 to 14,205kHz between 0600 and 1000. TA2MM and TA2SA have also been worked on 14MHz ssb.

Locations of some of the USSR stations which have been on the air during the DOSAAF-50 operation are as follows: R1SKW (Leningrad), R3FC (Gorky), R3MSK (Moscow), R3ODR (Smolensk), R5TV (Kharkov—celebrating first USSR sstv operation), R6ER (Erevan), R6TB (Tiflis), R8SM (Samarakand), R8TA (Tashkent), R9NO (Novosibirsk), R0BAM (Baikal-Amur), R0KR (Krasnoyarsk), R0WL (Vladivostock), 4J8F (Khorog, Oblast 042), 4J0IAP (Severnaya Zemlya = UW0IX), 4K1R (Molodezhnaya Base, Antarctica—ITU zone 69).

It appears that the Northern California DX Foundation feels that it would be rather a waste of time sponsoring any expeditionary activities at the present time, and their efforts are being saved for a time when the sunspot numbers show some increase.

Barbados will use the 8P7 prefix during October and

*10 Knightlow Road, Birmingham B17 8QB.

QTH Corner

A4XVK	P. Reed, 73 Dudley Rd, Brighton, Sussex.
AH3FG	E. S. Wasosky, Box 15562, Montour, Pa, 15244, USA.
C31MS	via EA3MS, Jose Serres F, Ramon Y Cajal 11, Tarrasa, Barna, Spain.
D2AAI	J. C. Chaves, Box 43, Gabela, Angola.
D6AA	H. Laugaudin, BP 289, Moroni, State of Comoros.
DJ0UP/VP2S	V. Havran, D-6083, Walldorf, Coutandinstr. 33, W Germany.
DL7PD/VP2S	W. H. R. Divé, D-6070 Langen i H, Bahnstr. 101-103, W Germany.
EP2VW	via K4DAS, A. H. Wessel, 6321 NW 1st Ct, Miami, 33150, USA.
HM9A	KARL QSL Bureau, Central Box 162, Seoul, Korea.
HZ1TA	(UK QSOs) via G3RSI, 111 Longlands Way, Heatherside, Camberley, Surrey.
TA2BK	via DJ0UJ, B. Kacan, Landwehrstr 16, 8000 Muenchen, W Germany.
TA2MM	via DJ0RR, E. Schoenmann, Barthelstr 83, 5000 Koeln 30, W Germany.
TA2SA	via DJ0ZG. S. Arkat, Krummerstr 60, 1000 Berlin 12, W Germany.
VP8HZ / VP8NX	via GM3ITN, L. Hamilton, Halls Lane, Hardgate, Clydebank, Glasgow.
YN1DW	Bill Smith, Route 2—Box 288-I, McKinney, Texas, 75069. USA.
4S7DA	via W3HNK, Box 14, Norwood, Pa, 19074, USA.
4S7JK	via DL7JK, K. D. Schitthelm, Am Goldbergfeld 5, 8018 Hesselfurt, P/Grafing, W Germany.
5B4DN	c/o G3ZYP via G2MI, or PO Box 219, Limassol, Cyprus.
9X5RK / 9X5SM	via ON4ER, D. Bossuyt, 20-A Avelgemstr, B-8562 Otegem, WV, Belgium.

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

November, and a special activity day will be held on 30 November. Those working a minimum of five stations on the island during this period may send a log extract plus $1 (or eight IRCs) to Box 814E Bridgetown, Barbados, for a special award.

Richard Limebear, G3RWL, reports that he will be closing his QSL file for his operations as VP2AGA (16/12/70 to 24/1/71), 8P6DR (7/3/71 to 20/9/73), and ZF1WL (1/10/73 to 4/10/73) at the end of December. Applications received after that time will not be answered. Please QSL to 60 Willow Rd, Enfield, Middlesex.

This year's Hong Kong activity day will take place between 0800 13 November and 0800 14 November. As many VS6s as possible hope to be on the air and QSLs are promised.

DJ0UP and DL7PD were expecting to be active from St. Vincent for a period of three weeks starting on 21 October. They were to use their own callsigns /VP2S. Preferred frequencies of operation were given as 1,820kHz (with + or − 4kHz QSX), 3,505kHz, 7,005kHz, 14,025kHz, 21,025kHz and 28,025kHz on cw, and 3,780–3,800kHz, 3,600–3,650kHz, 7,070–7,080kHz, 14,190kHz, 14,300kHz, 21,300–21,350kHz, and 28,550kHz. It is planned to operate from another West Indian island—preferably Dominica—but possibly Grenada. QSLs go to DARC or to the addresses in "QTH Corner".

Contests

It appears that there were some errors in the results of the **1975 CQ WW DX Contest (cw section)** as originally sent out by W1WY. The G2LB trophy for European top score on 14MHz was won by YZ0SRJ, not OH2QV.

Results of the **1975 CQ 160 Contest** list the following UK entrants:

	Points		Points		Points
G3SZA	80,937	G4BUE	19,008	G6UW	7,005
GD4BEG	69,454	GM4ASY	14,421	G2DMR	6,071
GM3YOR/P	53,865	G3YMC	9,996	**GW3GWX**	1,260
G3KMI	35,770	G4BXT	8,789	G4ALG	1,180
GM3IGW/A	27,725	G3SVW/A	8,381	G4BWP	1,022
G4EOK	20,763				

G3SZA was world fourth (top was KV4FZ with 176,936 points), GD4BEG world sixth, and GM3YOR/P world 17th.

Apologies to **GB3MCG** (the Maidenhead Contest Group) whose callsign should have appeared in bold type in the listing of the CQ WW DX Contest (phone) results. They achieved top UK score in this category and receive a certificate.

The All Austria Contest

1900 20 November to 0600 21 November.

1·8MHz cw only. Call "CQ OE" and exchange RS/T and QSO number (starting from 001). The exchange must be confirmed by repeating the exchange-code. Each complete contact counts one point. A multiplier of two is gained for each different Austrian Bundesland (OE1–OE9) worked, and one for each different prefix. Listeners may enter and log date, time, frequency, callsign, given and received codes—this is the same as should be logged by transmitting entrants. Listeners may only log three consecutive contacts by any one station, which may only be logged again after five more log entries have been made. Logs should include a station description and statement that it was operated in accordance with licensing regulations and contest rules. Entries must be postmarked no later than 15 December and sent to: Salzburg des OeVSV, "AOEC 1976", c/o Ing Wolfgang Latzenhofer, OE2LOL, Pfeifferhofstrasse 7, A-5020 Salzburg, Austria.

Results of the **1975 OK DX Contest** have been received. UK entrants listed were as follows: (All band) **G3SXW** (23,154 points), G3ESF (14,560), **GW4DOO** (6,084), GW3INW (5,187), and GW3SLA (392). (14MHz) **G3TXF** (6,714) and G6NK (672). G3TXF was world fourth on 14MHz.

VERON has supplied results of the **1976 PACC Contest**. In the transmitting section **GM3MZV** (6,942 points), GM3KLA (6,789), **GI3JEX** (3,480), **G3VTT** (2,100), GM4DZX (1,674), **GW4DOO** (1,320), GM5AXY (540), GW3SAL and G3WMM (both 513) and G3TSZ/M (312). Listeners who sent in logs were **BRS15822** (1,960), A8890 (1,752), A9172 (630), A8088 (260), and (GW) **A8964** (180). Certificate winners are listed in bold type.

Awards

The Icelandic Radio Amateur's Award

For contacts with stations of Icelandic citizens operating from Iceland. There is no date limit, and QSL cards or certified photocopies must be submitted together with a list of complete log entries. The number of points required varies with the applicant's ITU zone, but British Isles stations require 100. Points values depend on band and mode and are as follows: 3·5MHz: (cw) 8, (rtty and sstv) 6, (ssb) 4. 7MHz: 6, 5 and 4 respectively; 14MHz: 3, 2 and 1; 21MHz: 4, 3, and 2. 28MHz: 6, 5 and 3; and 144MHz: 96 regardless of mode. Contacts with novices (indicated by their three-letter suffix ending in N) count 32 points on 3·5MHz, 24 on 7MHz, and 16 on 21MHz. Contacts via Oscar count 16 points. Each station may be contacted once per band on each mode. Applications should be accompanied by 14 IRCs and sent to: IRA Awards Manager, Postbox 1058, 101 Reykjavik, Iceland.

The WAGI Certificate

European applicants require 10 confirmed contacts—two from each of the following counties of Northern Ireland: Co Antrim, Co Armagh, Co Derry, Co Down, and two from either Co Tyrone or Co Fermanagh. Any band/mode may be used, and band or mode endorsements will be made if

requested. QSLs for contacts on or after 1 January 1959 are valid. The cost to UK applicants is £1, and the sponsor (the Northern Ireland RSGB Group) is Mr L. M. Lyske, "Erinbrook", 204 Belfast Road, Newtownards, N Ireland.

The Fatima Award

For contacts with stations in the Leiria district of Portugal. Those with CT1FAT count two points, and with CT1s BY, CS, DG, EV, JD, KB, MO, MP, OE, QN, RO, SM, UC, XQ and ZP one point. European applicants need four points. Contacts must be made between 0001 12 May and 2359 13 October each year. Any bands or modes may be used and the certificate is available to listeners. Send certified list of QSLs plus five IRCs to: Diploma Fatima, PO Box 148, Leiria, Portugal.

Blackwater Valley Award

The Farnborough & District ARS is holding a special activity day on 14 November to help those working for this award. The Farnborough net will be active from 1000 to 1200 and from 1430 to 1630 around 3,730kHz. Club stations G3XCH and G4DKN will act as control. Full details of the award may be obtained from G8ATK, QTHR.

Band reports

The change to autumnal conditions has been particularly noticeable on the lower frequency bands, and signals have been reported from ZL on 1·8MHz. The interference emanating from the Soviet Union has continued to cause severe difficulties at times on 14MHz, not only in Britain but all over the world.

Many thanks to the following for sending in logs from which this section has been compiled: G4RZ, GM3CFS; G3s KSH, RMF, UOL, G4s BYB, DSE and DXE; BRS-17567, and As 8312, 8713 and 8961.

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

1·8MHz. 0000 *W2DEO*. **0400** *W1HGT*. **0500** *W2RAA*, *W3CDZ*. **0600** *WA8JUN*, *ZL3GQ*. **2200** *UW3PAW*. **2300** *KV4FZ*.

3·5MHz. 0500 VP1MPW, VP2DQ. **0600** VP2VBG, ZL1-ZL4. **1800** ZL2BT. **1900** JH0BQU. **2000** A9XBD. **2100** JA6BSM, 6W8FP. **2200** A4XGR, VE2ZN/SU, WA6EGL/VQ9 (Chagos), VS6DO, 5Z4HZ. **2300** FG7AR/FS7, *UK9FER*, VE, ZS5LB, 9G1JX, 9G1NP.

7MHz. 0600 CP7GM, FK8AI, HK2DP, VK2, VK3, VK7, VP2GKZ, VP9BY/P, *W4*, *W6*, ZL1-ZL4. **0700** 6W8AAD. **2100** *JA*.

14MHz. 0700 VK, *VR1AA*, *ZL*, *9G1JX* (QSL to DL7SI). **0800** HL9VA, JA, K4II/AH3, KL7, VR1AF, VS6BL. **0900** KL7, *4L0BAM*. **1000** A9XV, KX6BU. **1100** C6ABC (QSL to WB4YHN), *VK4*, VR4DX, *ZL*. **1200** VS6DO. **1400** *CR9AJ*, *4J0IAP*, 9N1MM. **1500** A7XK, W6/W7. **1600** *JT1AO*, KH6OR, *KL7HCN*, *W7BE* (Utah), WA6EGL/VQ9, *9M6MA*. **1700** 4S7CF. **1800** KL7IAK, ST2SA. **1900** D4CBS, PY0AW. **2000** TD76GI, VP8, W6/W7, ZL4BX, 6W8FP. **2100** *W7CJB* (Mont), ZL. **2300** VP1PTL.

21MHz. 0700 ZS3. **0800** *JA*, VU2DK, 9Q5SW. **0900** CR9AJ. **1000** JA. **1100** CR9AJ, VQ9HCS, VS6DO. **1300** DU6VFC, KC4AAC, LU, TU, 5N2AAJ, 5B4ES. **1400** HM1HO, TJ1BB. **1500** A9XBD, D2ALB, WB8EWH/VQ9, 9G1KH. **1600** LU, PY, W0, 5T5ZR, 8O5AB. **1700** TR8WR, VP8ON, 5U7AG. **1800** EL, LU, PY, 9J2. **1900** CX, VP8PI, ZD7SD. **2000** CX.

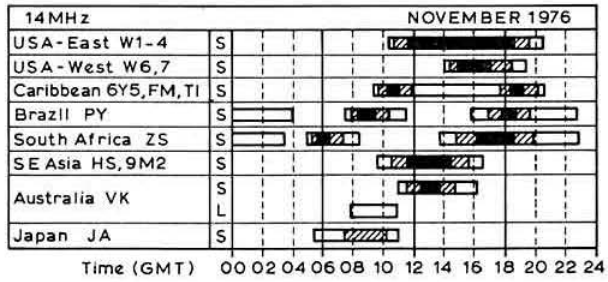
Propagation predictions

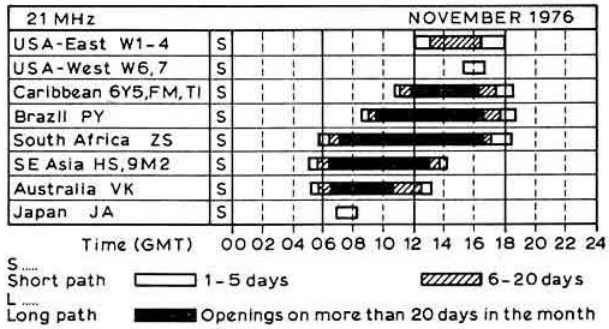
During November the highest level of F2 MUFs is reached and conditions should be at their best, but the approaching winter season means shorter days so that the hf bands close early. Because of the present low sunspot activity there will be little dx on **28MHz.** On **21MHz,** traffic with North America and Japan may perhaps be possible; all other continents will certainly be heard.

In contrast to 21MHz, all continents will be heard on **14MHz.** Seasonal conditions favour traffic via the indirect path on this band, especially with South America and East Asia before noon and western North America during the afternoon. On favourable days traffic with KH6 will be possible between 1630 and 1730gmt.

As 14MHz closes early, **7MHz** will become more important for dx after 2000gmt. The seasonal decline in static on both 7 and **3·5MHz** permits dx traffic on these bands when the larger part of the path lies in darkness; this is more important for 3·5 than 7MHz. During the latter half of the night, 3·5MHz will now and again be interrupted by the dead zone.

The provisional sunspot numbers for August and September 1976 from the Swiss Federal Observatory were 16·9 and 13·4 respectively, with the first half of each month showing the greater amount of solar activity. The predicted smoothed sunspot numbers for December 1976 and January, February and March 1977 are 7, 6, 5 and 5 respectively.





28MHz. 0800 *UK9AAN*. **1400** VU2GDG, ZS. **1500** ZE, ZS, 4Z4AO. **1600** CT, ZE. **1700** D2AFW, PY, 9G1LZ, *9L1CD*. **1800** TU2FH, ZP9. **1900** EA8, LU. Europeans between 1000 and 1700.

Many thanks to all correspondents, and especially to the authors of the following for information obtained from their publications: The *Ex-G Radio Club Bulletin* (**W3HQO**), *DX News Sheet* (**Geoff Watts**), the *29 DX Club Bulletin* (**VK6RV**), *Long Skip* (**VE1AL/3**), the *West Coast DX Bulletin* (**WA6AUD**), *DX'press* (**PA0TO**), and *CQ Magazine* (**W1WY**).

Please send all items for **December** issue **to reach G3FKM** no later than **3 November** and for **January** by **4 December.**

HF PROPAGATION STUDY

Predicted HPFs (MHz × 10) for November 1976

GMT =	00	02	04	06	08	10	12	14	16	18	20	22	24
Aden	145	141	131	244	318	340	336	328	233	158	149	145	145
Ascension	154	149	148	125	284	336	337	336	315	238	168	158	154
Bahrain	139	136	135	243	314	338	329	211	195	149	140	139	139
Bangkok	124	117	119	215	288	309	275	218	167	117	120	121	124
Barbados	138	121	129	122	129	234	312	317	309	271	171	134	138
Bermuda	114	108	108	108	108	164	277	303	298	265	169	129	114
Bogota	126	115	121	121	120	150	308	315	309	271	172	131	126
Buenos Aires	148	141	143	131	191	280	314	328	313	263	168	147	148
Cape Town	150	148	147	155	298	342	336	333	312	194	163	159	150
Colombo	112	133	135	246	310	333	319	286	197	143	135	135	112
Cyprus	130	128	126	201	288	317	313	303	213	138	133	129	130
Dakar	154	149	148	125	284	336	338	336	315	238	168	158	154
Denver	110	110	103	105	105	103	110	205	260	213	152	122	110
Fairbanks	134	125	119	111	122	134	134	139	145	154	129	128	134
Falklands	149	144	144	131	228	266	295	323	313	253	168	149	149
Gibraltar	93	91	91	82	167	215	221	221	205	134	102	93	93
Hong Kong	106	106	106	187	263	249	173	157	145	111	106	106	106
Honolulu	129	119	112	111	116	138	124	122	117	166	129	122	129
Iceland	79	79	79	79	87	171	194	191	166	122	91	79	79
Jamaica	114	108	111	111	111	143	289	305	301	262	169	129	114
Lagos	154	152	147	114	304	340	338	337	314	206	167	158	154
Las Palmas	133	126	128	116	216	290	303	301	282	209	147	131	133
Lima	140	129	134	128	136	180	317	322	312	271	171	138	140
Los Angeles	122	111	111	105	108	108	107	157	247	201	150	128	122
Malta	108	107	105	108	225	263	262	258	209	126	115	107	108
Mauritius	148	145	143	238	314	337	337	329	253	161	153	150	148
Mexico	111	103	102	103	102	136	164	277	279	238	166	125	111
Moscow	93	89	89	115	211	248	243	219	164	98	94	89	93
Nairobi	149	147	133	225	315	340	337	335	285	168	157	150	149
New Delhi	130	126	128	241	300	321	275	188	159	126	129	131	130
New York	110	108	108	110	108	111	220	279	280	242	164	125	110
Osaka	111	110	108	125	219	152	138	131	131	116	108	108	111
Perth	135	133	134	246	309	332	309	267	195	141	135	135	135
Rio de Janeiro	150	144	144	131	211	315	332	326	313	258	168	149	150
Salisbury	152	149	141	206	313	342	338	336	304	176	162	155	152
Seychelles	144	129	143	241	309	326	335	328	239	162	152	145	144
Singapore	130	126	128	241	300	321	299	255	173	126	129	117	130
Suva(s)	130	119	114	111	153	206	227	208	144	135	122	122	130
Suva(l)	158	149	147	112	251	238	215	209	162	213	166	161	158
Sydney(s)	106	106	106	187	263	282	263	216	145	111	106	106	106
Sydney(l)	141	133	135	128	150	206	171	157	144	166	169	140	141
Teheran	135	133	135	246	309	333	317	279	186	143	135	135	135
Vancouver	128	125	114	111	111	121	120	133	181	167	135	128	128
Wellington(s)	114	111	107	111	208	251	242	201	140	122	108	112	114
Wellington(l)	152	141	148	133	202	171	158	150	157	183	167	155	152

Japan Amateur Radio League 50th anniversary celebrations

The President of RSGB, Dr E. J. Allaway, G3FKM, was privileged to be a guest of the Japan Amateur Radio League during its 50th anniversary celebrations which took place between 23 and 27 September.

The functions officially commenced with an opening ceremony at Chinsan-so in Tokyo during the afternoon of the 23rd. This was attended by many directors and officials of JARL, and during its course G3FKM made a short speech in which he conveyed the congratulations and best wishes of RSGB. In the evening of the same day a party was held at the same location, and this was graced by the presence of HIH Prince Masahito Hitachi and HIH Princess Hanako Hitachi.

On the following day an international forum was held at the Sasakawa Hall in Tokyo. At this each overseas guest was invited to give a brief account of amateur radio affairs in his home country. After a press conference, official visits were made to JARL headquarters and to "CQ" Publishing Co. In the evening a celebration dinner was held at Chinsan-so and contact made with many JARL personalities.

Saturday was occupied by a tour of the very beautiful area around Mt Fuji en-route for an overnight stop at the Fuji-View Hotel on Lake Kawaguchi.

On Sunday the highlight was the opening of the All Japan Hamvention at Green Park, Asagiri Heights, in Fujinomiya City, Shizuoka Prefecture. This very impressive official ceremony was attended by HIH Prince Yoshihito Mikasa. The hamvention was a joint venture by JARL, "CQ" Publishing Co, 30 local radio clubs and many individual volunteers, and more than 5,000 amateurs attended. Later in the day the overseas visitors continued their journey to Kyoto by "bullet train", and the official celebrations finished after sightseeing and a delightful Japanese lunch on the 27th.

The overseas visitors also included Mr R. L. Baldwin, W1RU (general manager of ARRL, and secretary of IARU); Mr Michael Owen, VK3KI (IARU liaison officer of WIA and a director of Region 3 Association); Mr Tom Clarkson, ZL2AZ (Overseas liaison officer of NZART and a director of IARU Region 3 Association); Mr John Sweeney, VS6GG (hon secretary, HKARTS); Mr Ernest Amarasinghe, 4S7EA (Vice-president, Radio Society of Sri Lanka); Col Kamchai Choticul, HS1WR (President, Radio Amateur Society of Thailand); Mr Lee Hea-Su, HM1BO (Director, Korean Amateur Radio League); Mr Bae Won-Kun, HM1FM (Secretary, Korean Amateur Radio League); M Jacques Mahoux, F6CAG (Member, REF); Herr Karl Boymanns, DJ2NH, and Herr Siegfried Nootz, DL6CG (both representing DARC).

The meetings provided an opportunity for a number of matters of international concern to the amateur radio service to be discussed, and President Shozo Hara, JA1AN, and all those officials of the JARL who were concerned in the organization of the event are to be heartily congratulated on the very great success of their celebrations, which were obviously the fruit of many months of hard work and preparation.

G3FKM would like to express his personal thanks to Mr Hara and his family for their kindness during his visit, and also to the many officers of JARL (including interpreters Misses Asako Tanaka, Minaka Takeoka and Junko Kiso; and Naoki Akiyama, JH1VRQ) who all helped to make the celebration so memorable. □

Special event stations

G3XCH, G4DKN, 14 November
These stations will be operational from 1000–1200 and 1430–1630gmt, on 3,730kHz plus or minus QRM, to promote the Blackwater Valley Award. Details and applications for the award from awards manager G8ATK, QTHR.

G3XZV/A, G8ICF/A, 20-26 November
These stations will be operational during the Golden Jubilee of Watson House, a British Gas research station located at Fulham. It is mainly concerned with research and development associated with the commercial use of gas. G3XZV/A will operate on 80, 20 and 15m ssb and G8ICF/A on 2m ssb. QSOs and skeds are sought with amateurs around the world associated with the gas industry. Special commemorative QSL cards will be sent. Details from G3XZV, QTHR.

Scottish VHF Convention

This year's Scottish VHF Convention, organized by Dundee Kingsway Technical College, was held on 25 September at Dundee University. The RSGB was represented by the general manager, George Jessop, G6JP; the chairman of the VHF Committee, Tom Douglas, G3BA; and the Scottish zonal manager, Sandy Smith, GM3AEL.

Tom Douglas brought the members up to date on current vhf/uhf matters and developments, and he was ably supported by members of the Central Scotland and West of Scotland fm repeater groups who presented their case for a system of uhf repeaters within Scotland.

The Glenrothes Group, winners of 1976 National Field Day, represented by GM3OLK and GM3YOR, spoke of their methods of operating in competitions, the antenna systems used, and how they intend to win future competitions. Many questions were put to the speakers and they were congratulated on their success in bringing the NFD Trophy back to Scotland.

George Jessop presenting the Scottish NFD Trophy to the Glenrothes Group

George Jessop described, among other things, the new amateur licence shortly to be issued, and the data processor now installed at Doughty Street. He did an excellent job, and few questions were asked on a subject which was expected to create heated discussion.

During the convention some members took the opportunity to visit the Dundee Mills Observatory for an illustrated talk by the curator on "The Science of Astronomy" and "Recent Space Exploration". Those attending the convention could also visit the University weather tracking station which now enjoys international status.

The trade was represented by Lowe Electronics, Electronic Developments, Ian's Shack (Thanet and SMC) and the RSGB bookstall. Junk stalls were operated by Kingsway Technical College Radio Club, Glenrothes Radio Club and GM3BQA. Facilities were available for measurement of power, frequency and deviation, by Tayside Police Radio Department, under GM4API.

The convention ended at 6pm, and was followed at 8pm by a dinner at the Invercarse Hotel. The evening was enjoyed by 129 people, including many SWLs, and speeches were kept to a minimum. The day ended shortly after 11pm with a sing-song.

Looking ahead

3 December—RSGB AGM, Royal Society of Arts, John Adam Street, London WC2.

1977

22 January—RSGB Presidential Installation.
24 April—NRSA Convention, Belle Vue, Manchester.
6-8 May—RSGB International Radio Communication Exhibition and Convention, Alexandra Palace, London.
17-18 September—NW Amateur Radio Convention, University of Lancaster.

raynet

S.W. Law, G3PAZ *

The Raynet Committee met on 10 September and dealt with a large amount of business. The annual award of the Raynet Trophy was discussed at length and it was finally decided to depart from the customary group selection by presenting the trophy to the honorary registrations secretary, Mrs L. A. Crane, as a token of appreciation of the unremitting voluntary work which she has carried out on behalf of Raynet. It is hoped to make the presentation at the RSGB AGM and we are sure that those Raynet members in attendance will evince their approval in the appropriate manner.

As to publicity, those who listen to Radio London will have been delighted by the amateur radio feature on 16 October when the well-known and competent Sylvia Margolis interviewed our members G3BPT and G3GJW. Any letters on this broadcast will be welcomed by the station or by the Raynet Committee. This is not the only occasion that Raynet has appeared as a subject on the bc band, not only on local radio but also on the overseas service, proving that we do a job that is of universal concern wherever the radio amateur offers his (or her) skill for the benefit of the community. The local and national press are also prepared to provide space for newsworthy items as they have in the past. Controllers please note.

The proposals for the London Raynet grouping are still going forward and the tentative set-up is: NE–G8EAY and G8GGU; NW–G8GBT; N London–G3ZKE; SE–G4AVV; SW–G3ZZY. This covers the proposed five sectors which we have previously mentioned for the GLC area. The complete scheme is, of course, subject to the final approval of the Raynet Committee which also has the onerous task of finding a suitable overall co-ordinator for this large conurbation. Members and those interested in the SW sector please note that the prospective controller G3ZZY is not QTHR, and the address is 87 Hamilton Avenue, Surbiton KT6 7PS, to which all enquiries should be sent for the SW area group formation. We must emphasize that the GLC scheme is not finalized, and constructive suggestions are welcome. A copy of the proposed map of the districts involved may be obtained on request (with an sae) to G3GJW or G4AVV.

A newly-nominated controller who is also not QTHR is G3HNM for Taunton. The address is P. Parker, 30b Radlet Close, Taunton TA2 8BD. The Herts group has been revived, with controller G3OJI, and we understand G8JUQ is to look after the S Herts section. A meeting of the former SE Herts group was held in July in the Bishop's Stortford area to discuss the re-formation; G3LWM offered his help and the outcome appears to have been a success.

The redoubtable Norfolk group set up what is probably a record for operational public service hours in a month. At the Ingham Festival (29/31 May) and the Royal Norfolk Show (30 June) 11 and 31 members respectively performed a total of 518 hours. User services were BRCS and St John AB. Naturally we expect a spate of letters from groups with competitive figures.

Other reports of group formation are from Portsmouth, Ironbridge (Salop), Southport and Guernsey (CI), together with group reports too numerous to list in which summer fires were often a feature.

If all controllers will send in reports of activities at frequent intervals, the committee will compile a newsletter to be distributed to controllers only; possibly by December 1976. Data please to Mr E. R. L. Bassett, 57 Upper St Helen's Road, Hedge End, Southampton, Hants, enclosing an sae for newsletter when compiled.

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

Mobile rallies calendar

3 April	White Rose Rally, Lawnswood School, Leeds.
17 April	North Midlands Mobile Rally, Drayton Manor Park.
12 June	Longleat Mobile Rally. Details nearer the date.
19 June	Royal Naval ARS Mobile Rally, HMS *Mercury*. Organizer: M. Puttick, G3LIK, 21 Sandyfield Crescent, Cowplain, Portsmouth, Hants PO8 8SQ.
17 July	Cornish RAC Mobile Rally, Truro Rugby Club Ground. Details from G3NKE, QTHR.
7 August	RSGB National Mobile Rally, Woburn Abbey.

your opinion

The Editor
Radio Communication
Sir—I must confess a feeling of guilt after reading the remarks raised by Mr MacBrayne in your July issue concerning the lack of response by many members to the efforts of those dedicated persons who by their own choice pound out slow morse transmissions every week. I am one of those who has been on the receiving end for the past 12 months, and after obtaining the coveted pass certificate for the May RAE I was also successful in the morse test.

My sincere thanks are due to G3RAF, GI3SXG and G4BNA, to whom I have paid diligent attention (when QRM from other Gs has permitted) over the past year, and without whose assistance I could not have taken the morse test so soon.

It is my considered opinion also that attention should be drawn to the efforts of those other Gs who, taking "material in the raw", fashion it within the space of a few months into material suitable for the RAE. In particular to G8BCG who did such a wonderful job with our bunch during last winter.

We newcomers owe a tremendous debt to these dedicated Gs—without them amateur radio could fade somewhat, and as soon as my licence is to hand I trust I will be allowed to join the band of slow morse key bashers for the benefit of the new intake.

A. Newton, BRS36224

The Editor
Radio Communication
Sir—May I canvass support for a return to one-day vhf/uhf portable contests. I feel that there may be many operators such as myself who cannot support a two-day portable contest because of other commitments and who do not belong to a group large enough to provide the number of people required to man a station for two days.

I do not suggest that every contest should be one-day, and would not want to alter Field Day. However, I do believe there is room for a one-day portable contest other than QRP. Single operators or small groups would then have the opportunity to participate throughout and not made, as now, to take all the gear home and return the next day. A contest from 0900 to 1600gmt would be ideal.

J. G. Johnston, G3PHJ

The Editor
Radio Communication
Sir—Reading the Interference Survey has confirmed an opinion long held by certain amateurs about the Home Office statistics understating the problem. If the Post Office, whose responsibility it is to collect the vital information, is not being called in sufficiently often, it is in our own interests to alert them to every possible complaint.

At the first hint of trouble, therefore, it seems sensible to tell the complainant to contact the local area general manager of the telephone service, whose engineers make the enquiries. The address and telephone number are in the front pages of the local directory, or ask at any main Post Office for Form A6328. Do the same yourself —you are an interested party.

The investigation is not a thing to be feared, it is much more likely to be in our favour by proving fault at the other end, and an official finding like this is a powerful ally. The PO as a matter of course takes it up direct with the manufacturer and pursues it to a final conclusion.

G. Openshaw, G2BTO

The Editor
Radio Communication
Sir—There are many yl operators in Britain who are joining the American YLRL, which is, I think, part of the ARRL. The YLRL organizes yl contests, both phone and cw, and I believe they have newsletters and arrange for QSOs between members.

I suggest that as so many British yls are willing to join the American society, perhaps there is a need for a British yl organization within the RSGB. If this is not possible perhaps the RSGB could arrange a yl contest.

Would any interested yl operators contact me as soon as possible.

Mrs B. A. Lambert, G4EKX,
34 Halley Park, Hailsham,
East Sussex BN27 2NW

The Editor
Radio Communication
Sir—The bad example set by the use (and misuse) of the 27MHz citizens' band in the USA and elsewhere makes it mandatory that the UK does not fall into the same traps and pitfalls as others.

The alternative suggestion of vhf fm "which should avoid many of the problems of the American Citizens' Band" is not, I submit, the panacea. Regular users of vhf (and I have been one for the past 15 years) will know that, although less prone to cause interference than other modes, fm can still wreak havoc in many kinds of equipment, domestic and professional. They will also be well aware of the effects of "tropo" and high-gain beams, both of which compound the effects.

Far from being in a strong position to exploit the "boom", British industry is in a weak position. One only has to look at the multiplicity of Japanese "black boxes" to see that with very few changes to crystal frequencies etc such equipment could be on any proposed vhf fm citizens' band in quantity in days.

To suggest compulsory membership of RSGB as an adjunct to a citizens' band might well swell the coffers of our Society but, I fear, would do little to control misuse or potential interference.

While not dismissing the possible pros of a citizens' band, please let the Society continue with its present sensible approach to the question and seek a really sensible and practical solution.

M. W. Dixon, G3PFR

obituaries

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

Mr A. W. Smith, GM3AEL, RSGB Council member
"Sandy" Smith died on 2 October. One of the Society's best liked and respected members, he was well-known throughout Scotland. He had been a member of Council, representing Zone G, since 1971, and had announced his intention of retiring from this office at the end of the year in order to spend more time on the air. He was ever diligent in putting forward the views and protecting the interests of Zone G members, and travelled all over Scotland in order to maintain contact with them.

He was also a past-president of the Aberdeen ARS, of which he was a member for more than 20 years.

Scotland in particular and the Society in general is the poorer by Sandy's death.

Mr W. B. Bowers, G3MGG
Bill Bowers died recently. He was a well-known veteran of the early 2m days.

Mr A. S. Burden, G3IIZ
A. S. Burden died on 30 August. He was active on 40 and 80m in the Ashford and Dover area until a few years ago.

The Society has also been informed of the deaths of:
Mr C. C. F. Duwe, G6TN, and **Mr C. Washtell, G3CJY.**

Contests calendar

12, 20, 28 November	432MHz Cumulative (Rules in September issue)
6-7 November	144MHz CW (Rules in September issue)
6-7 November	7MHz CW (Rules in September issue)
13-14 November	Second 1·8MHz (Rules in October issue)
5 December	144MHz Fixed (Rules in November issue)

1977

9 January	Affiliated Societies
12/13 February	1st 1·8MHz
12/13 March	Commonwealth
17 April	Low Power
1 May	Queen's Jubilee CW
22 May	Queen's Jubilee Phone
11/12 May	HF NFD
25/26 June	Summer 1·8MHz
17 July	3·5MHz FD
3/4 September	SSB FD
8/9 October	21/28MHz
15/16 October	7MHz CW
5/6 November	7MHz Phone
12/13 November	2nd 1·8MHz

contest news

Affiliated Societies Team Contest 1977

Following the sweeping changes made for the 1976 event the rules will remain substantially the same for 1977. They will be published in full next month but now is the time to plan the team and tactics for the only club contest in which the skill of the second-string operators determines the result.

Get sufficient RSGB log sheets now—before the Christmas postal delays, and book the time and place: Sunday 9 January 1977, 1300–1700gmt, 3·5MHz cw.

National Field Day 1976

The following overseas check logs were received too late for inclusion with the NFD results published in September; the HF Contests Committee acknowledges their receipt with thanks: UA9SAX (120 points), UK4PAA (108), UB5WCW (62), UA4QK (30), UA3MCJ (16), UK4LAC (8), UK5AAA (8), UA3TAM (0).

European Field Day 1976

The leaders in this year's HF CW FD were as follows:

DARC: (points total not given as scoring based on multiplier system).

Class A—1 op, 25W input

Posn	Callsign	QSOs
1	OK1MDK/P	388
2	DJ1ZB/P	159
3	DJ9EG/P	127
4	DJ7ST/P	140
5	DK5AN/P	120

13 entries.

Class B—multi-op, 25W input

Posn	Callsign	QSOs
1	DL0SN/P	362
2	DL2EO/P	291
3	DL7AV/P	324
4	DL0CS/P	349
5	DK0LH/P	331

18 entries.

Class C—multi-op, 200W input

Posn	Callsign	QSOs
1	DK2XZ/P	715
2	DL0JR/P	523
3	DL0AA/P	501
4	DL0MZ/P	454
5	DL8YR/P	473

65 entries.

Class D—multi-op, more than 200W

Posn	Callsign	QSOs
1	DL0RZ/P	641
2	DL0WO/P	682
3	DL0SF/P	602
4	DL0TB/P	519
5	DL0KL/P	534

33 entries.

USKA: (points total not given as scoring different to RSGB NFD).

Class A—2 ops, 10W output

Posn	Callsign	QSOs
1	HB9CM/P	177
2	HB9IK/P	167

Class C—multi-op, 200W input

Posn	Callsign	QSOs
1	HB9Z/P	406
2	HB9FB/P	435
3	HB9C/P	411
4	HB9AVQ/P	396
5	HB9TN/P	343

13 entries.

Class D—multi-op, more than 200W

Posn	Callsign	QSOs
1	HB9AN/P	599
2	HB9F/P	661

5 entries.

RSGB HF Contests Championship 1975–6 results

Posn	Callsign	1	2	3	4	5	6	Total
1	G3MXJ	70			50	60	90	270
2	G4BUE	40	60		30	40	60	230
3	G3VMW		30		60	50		140
4	G3FXB				35		100	135
5	G6CJ		40				80	120
6	G3ORH		50		40	10		100
7	G2QT	0	5	40			50	95
8	G3TOE	15		50				65
9	G3SXW		25				20	45
	G3YMC		0		15	30		45
11	G3TXF	0	10	25		0		35
12	G4ALG			30		0		30
13	GM3YOR	0			25	0		25
14	G3KSH	0	0	20	0		0	20
15	G4APL	10		5				15

Contests

1 21/28MHz Telephony 1975.
2 7MHz CW 1975.
3 7MHz Telephony 1975.
4 Second 1·8MHz 1975.
5 First 1·8MHz 1976.
6 Commonwealth Contest 1976.

Awards

The G2QT trophy to D. J. Andrews, G3MXJ. Runner-up certificate to C. J. Page, G4BUE.

RSGB HF Contests Championship 1976–7 rules

The championship has been extended for this year to include additional contests, bringing the total to 10.

1. RSGB hf contest general rules do not apply.
2. No entries for the championship are required.
3. The championship will be decided on the basis of RSGB hf single-operator contests held between 1 October 1976 and 31 July 1977.
4. Points will be awarded to the leading 10 UK stations in the results tables published in *Radio Communication* as follows:

Contest	Position									
	1	2	3	4	5	6	7	8	9	10
21/28MHz Telephony	80	70	60	50	40	30	20	15	10	5
7MHz CW	70	60	50	40	30	25	20	15	10	5
7MHz Telephony	70	60	50	40	30	25	20	15	10	5
2nd 1·8MHz	40	35	30	25	20	15	10	5	0	0
1st 1·8MHz	40	35	30	25	20	15	10	5	0	0
Commonwealth Contest	100	90	80	70	60	50	40	30	20	10
Low Power Contest	30	25	20	15	10	0	0	0	0	0
Jubilee CW	60	50	40	35	30	25	20	15	10	5
Jubilee Telephony	60	50	40	35	30	25	20	15	10	5
Summer 1·8MHz	40	35	30	25	20	15	10	5	0	0

5. Points gained by stations using the same callsign entering two or more of the 10 individual contests will be totalled and a table published in *Radio Communication*.
6. Club stations. To be eligible for inclusion, a club station must be operated by the same single operator during each contest. In the event of a club station meriting an award, the award will be made to the operator concerned and not to the club.
7. Awards. The winner will receive the G2QT Trophy. A certificate will be awarded to the runner-up.

December 144MHz Fixed Contest rules

0900-1700gmt 5 December

All entries and checklogs to: VHF Contests Committee, c/o W. J. McClintock, "Maple Leaf", Great Braxted, Witham, Essex CM1 3DH.

The following general rules, published in the January 1976 issue of *Radio Communication*, will apply: 1, 2, 3, 4c, 5a, 6a, 7a, 8a, 9a, 10a, 11–22.

August 1976 Open 70MHz Contest results

The VHF Contests Committee was pleased to see the total number of entries for this contest; all call areas in Zone 14 which are allocated the band were worked. It seems a record number of GMs were active. For the first time the VHF Manager's Trophy goes across the border to the South of Scotland VHF/UHF Contest Group (GM4DMZ) operating from a site 14km west of Scares.

The receiving side of most systems consisted of a fet as an rf stage, and the transmit converter was homebrew with a 640A in the final, driven by an hf band exciter. Two stations, G5HD and G5UM, operated using A1 only. Only one log was received for the listeners' section. This was from BRS15822, with 211 points, who will receive a certificate along with the leaders and runners-up of the fixed and portable transmitting sections.

G4CUT

PORTABLE SECTION

Posn	Callsign	Points	QSOs	QRA	Pwr	Ant	ASL	Best dx	Km
1	GM4DMZ	1,208	88	XO26	50	8E	450	GC3WMR	600
2	G3JYP	1,045	91	YO29	50	6E	2,300	GC3WMR	575
3	G3WCS	946	91	YO59	40	6E	2,190	GC3WMR	556
4	GW3WRA	927	109	YL05	50	5E	2,600	GM3ZBE	605
5	GW4ABR	794	86	YM32	50	8E	1,800	GM4ALG	465
6	GC3WMR	715	61	YJ60	40	6E	450	GM4DMZ	600
7	GW4ASR	656	82	YL25	25	6E	1,600	GM3YOR	500
8	G4ATV	654	92	ZM71	50	6Q	1,000	GM3ZBE	585
9	G3PFM	650	92	YK09	50	5Q	845	GM3YOR	596
10	G4BPO	638	76	AM66	50	8E	200	GM4ALG	575
11	G4ADV	569	47	XK46	15	2X4	700	G3JYP	485
12	G3LCH	522	64	AL66	50	5E	625	GM4ALG	665
13	G3FJE	512	86	ZM79	50	2X4	250	GM3YOR	490
14	GC3HFN	510	46	YJ47	50	4E	180	G3JYP	287
15	G4BWH	467	72	AL61	50	9E	700	GM3YOR	592
16	G4ALE	436	68	ZK08	20	4S	626	GM4DMZ	505
17	GM3YOR	410	38	YO64	40	4E	900	G3PFM	596
18	G4AKG	409	75	ZL60	20	4E	600	GM4DMZ	480
19	G3GQC	402	65	ZN64	25	9E	750	GM4ALG	420
20	G5HD	366	32	YK21	20	4E	1,950	G3JYP	467
21	G2ASF	301	47	ZM63	10	2X4	650	GM4DMZ	373
22	GM4ALG	258	22	YQ08	50	4E	1,435	G3YPK	620
23	G3PGN/M	25	11	AL22	6	CL	350	G3ZAM	105

FIXED SECTION

Posn	Callsign	Points	QSOs	QRA	Pwr	Ant	ASL	Best dx	Km
1	GD2HDZ	573	51	XO68	50	4E	320	G3LCH	495
2	G4AGE	481	70	ZN64	50	4E	550	GC3WMR	435
3	G3RSI	448	78	ZL57	25	4S	400	GM4DMZ	455
4	G3VPK	445	57	AL14	30	9E	250	GM4ALG	560
5	G3NEO	443	53	ZN54	30	5E	380	GC3WMR	450
6	G3XBY	415	65	ZM52	50	5E	350	GM3YOR	435
7	G5RP	350	51	ZL34	50	4E	300	GM4DMZ	420
8	G3LVP	341	49	AL33	50	4S	230	GM4DMZ	—
9	G3RWM	319	49	ZM32	50	4E	300	GM3YOR	434
10	G3XCS	296	30	XK49	25	4E	210	G3JYP	490
11	G3FIJ	246	32	AL05	45	4E	150	GM4DMZ	485
12	G3TAL	207	29	ZK14	20	4E	110	GM4DMZ	590
13	G4AEZ	206	36	ZL30	30	4E	130	GM4DMZ	535
14	G4APA	185	29	ZL47	40	4E	200	GM4DMZ	460
15	G3HBG	162	23	ZL60	30	4E	400	GM4DMZ	525
	G3XSK	162	20	AM49	50	4E	25	GW4ABR	370
17	G4CQZ	160	38	ZL19	50	XD	250	G3JYP	336
18	G4AUF	120	32	ZL39	40	4E	150	G3JYP	370
19	G3ZLQ	87	15	ZL37	6	4E	80	G4ADV	310

Check logs acknowledged from G5UM/P, G3RJX/P, and G4AEO.

Oxford DF Qualifying Event results

The previous qualifying round run by Oxford two years ago was "helped" by possibly the worst weather ever encountered on a df competition. This year the sun shone throughout the day of what was intended to be a difficult contest for the 15 competitors.

The two transmitters were located in the opposite top corners of the map, with the start near the map centre. Transmitter A, G3UJO/P, was actually on the corner grid lines and put in a good signal to the start. Transmitter B, G3NCM/P, was heard by only a few competitors (the earth clip came off!) so an approximate bearing was given.

A dummy transmitter near transmitter A caused anguish to some competitors after a gruelling session of tortuous road navigation. Transmitter B was a considerable distance from A and due credit must be given the winner for getting into its vicinity so quickly. However, the "funny" aerial in a copse near the mouth of a disused railway tunnel did not help, its peculiar lobes and non-sensing attributes forcing competitors into eyeball searching. As there were no new qualifiers by 1600 an extension until 1700 was announced, by which time the object had been achieved.

Congratulations to the winners and to the two new qualifiers; commiserations to the others. Thanks to Mrs Peck for presenting the prizes, to Mrs Mollart and her band of helpers for another excellent tea, and to the clerk of the weather for an enjoyable afternoon.

Posn	Name	Club	Time of arrival Station A	Station B
1	T. Gage	Oxford	1424	1530
2	B. Bristow	Oxford	1540	1437
3	I. Butson	Chelmsford	1440	1618
4	D. Newman	Slade	1445	1619
5	G. Foster	Stratford	1429	1619½
6	W. North	Chiltern	1445	1622
	B. Mahony	Rugby	1622	1504½
8	P. Tyler	Oxford	1623	1435
9	A. Simmonds	Oxford	1630	1511
10	G. Whenham	Coventry	1659½	1559
11	C. Plummer	Coventry	1439	—
12	P. Woollett	Dartford Heath	—	1511½

Three competitors failed to find either transmitter.
Subject to confirmation, D. Newman and G. Foster qualify for the National Final.

Slade DF Qualifying Event results

Even the best prepared plans can go wrong and this event was no exception. Due to the dry weather conditions and a lack of cover, Station A, G3SRS/P, was concealed in a small haystack 14 miles NE of the start near Studley: those lucky enough to approach the site from a northerly direction could see the aerial rising from a near-empty field. Station B, G3UMK/P, was eventually hidden on the edge of Kemsey Common some five miles west of the start. It was not until 12.15pm that the organizer realized that Station B was not in position, the crew having broken down some two miles short of their destination. After some high-speed motoring and aerial erecting, Station B was on the air at 1320½ only 30s late. In the meantime Arthur Butcher, G3KPJ, was acting as starter, relaying the 2m link message to the rest of the competitors.

Eventually 19 competitors left the start at 1.35pm, just 5min later than usual, all with good bearings and convinced it would be all over by 3.30pm. Twelve teams had found both stations by the end of the event.

Our thanks to all who attended; the transmitting crews G3VFV, G3UMK and xyl, and Arthur Butcher whose help was most welcome.

Posn	Name	Club	Time of arrival Station A	Station B
1	M. P. Hawkins	Chelmsford	1526	1417½
2	E. L. Mollart	Oxford	1530	1417
3	A. Simmons	Oxford	1538	1417½
4	G. A. Whenham	Coventry	1544	1443
5	D. Holland	S Manchester	1550	1435
6	W. J. North	Chiltern	1455½	1552
7	D. E. Newman	Slade	1553	1437
8	T. C. Gage	Oxford	1557	1427
9	J. R. Vickers	Stratford on Avon	1558	1438
10	B. Bristow	Oxford	1512	1613
11	I. R. Butson	Chelmsford	1455	1614
12	P. M. Lisle	Cambs University	1529	1629½
13	C. D. Plummer	Coventry		1436
14	P. M. Williams	Slade		1437
15	B. P. Mohoney	Rugby	1513	
16	A. W. Butcher	Chelmsford	1527	
17	J. McBurney	S Manchester	1527½	
18	I. Lamb	Slade		1535
19	P. J. Tyler	Oxford		1603

Subject to confirmation, Peter Lisle qualifies for the National Final.

Salisbury DF Qualifying Event results

Eleven teams assembled at the start near Salisbury racecourse, and good signals were received from both transmitters. Station A operated by G2FIX was hidden along the old overgrown Ridge-Way on the Wilts/Dorset border 10 miles SW of the start. Although there was an easy approach, most competitors took the more difficult way, and it was startling to see two competitors drive in from the eastern side—thought to be impassable.

Station B operated by G4AJD and G3JXD was 11 miles NE of the start on the old disused Old Sarum/Silchester Roman Road.

Special thanks are due to G4AJD's xyl and daughter for arranging such a fine tea at the Wilton Scout Hut.

The contest was organized by G2FIX and again ably supervised by G5YN, Sir Evan Nepean.

Posn	Name	Club	Time of arrival Station A	Station B
1	B. J. Mahony	RATS	1430	1536
2	D. E. Newman	Slade	1430½	1551
3	W. J. North	Chiltern ARC	1437	1551½
4	P. J. Woollett	Dartford Heath	1434	1559
5	G. Foster	Stratford upon Avon	1435	1618
6	G. Whenham	Coventry ARS	1618	1448
7	A. W. Butcher	Chelmsford	1618½	1427
8	A. Simmons	Oxford	1621	1448½
9	C. D. Plummer	Coventry	1621½	1450
10	J. R. Champion	Oxford	1528	—
11	T. Gage	Oxford	1530	—

Subject to confirmation, P. J. Woollett and A. Simmons qualify for the Final.

Verulam ARC Transmitting and Receiving Contest 1976

Section 1. 2m 0900 to 1300gmt Sunday 28 November.
Section 2. 160m 0900 to 1300gmt Sunday 12 December.

Contacts. To consist of an exchange of reports, serial numbers beginning at 001 and name of county (new county boundaries) or country (if outside UK); using any permitted mode. Contacts via repeaters will not count for points.

Entry. The contest is open to all licensed operators and SWLs. Portable, mobile and fixed stations may take part.

Scoring. 1 point per contact. 10 points per contact with G3VER, the Verulam Club station. The total score in each section of the contest is to be multiplied by the number of UK counties worked in that section. Countries outside the UK count as additional counties. Only one contact with a specific station in each section of the contest will count for points.

Logs. Logs must include the following information: date; time; callsign; RS(T) and serial number sent; RS(T), serial numbers and county received; points claimed. Any convenient logsheet containing the above information may be used. The location of the entrant's station, if different to his normal address, must be stated.

SWL entries. Scoring, etc, will be as for the transmitting section but the following differences should be noted.

Only contacts made by stations taking part in the transmitting sections of the contest will count for points. Logs must include: date, time; callsign of station heard; report (RS(T)) by SWL on station heard; report, serial number and county sent by station heard; callsign of station being worked; points claimed. A particular station must only appear once in the "Station heard" column.

Awards. Specially endorsed certificates will be awarded to the winners, second, third and fourth placemen of each section in both the transmitting and SWL classes. Certificates for all entrants are available provided an sae of minimum size 9 by 6½in is included with the entry.

Separate logs for each section of the contest should be sent to J. P. Read, G4BOU, 15 Garrard Way, Wheathampstead, Herts, (tel 2908) postmarked not later than 20 December 1976. Telephone enquiries after 6pm.

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 November for the January issue.

REGION 1—RR B. O'Brien, G2AMV, Tanglewood, 8 Anthony's Way, Heswall, Wirral, Merseyside L60 0BP.

Ainsdale (AARC)—4, 18 Nov, 2, 16, 30 Dec. 8.15pm. Ainsdale Scout Headquarters. Further details from G2CUZ.

Blackburn (East Lancs ARC)—4 Nov (Home-constructed equipment night with prizes for junior and senior classes), 2 Dec (AGM). 7.30pm. YMCA, Blackburn. Visitors are welcome. Sec G4CGT.

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

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

Bury (BRS)—Main meeting on the second Tuesday in each month. RAE classes and morse instruction every Tuesday as well as an informal meeting of club members. Mosses Community Centre, Cecil Street, Bury. Sec John Clifford, G4BVE, 10 Arley Avenue, Bury, tel 061-764 3466.

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

Chester (C&DARS)—Tuesdays, 8pm, except first Tuesday in month. YMCA, Chester. G3PYU has been appointed affiliated society representative. Full details from GW8DMR.

Douglas IoM (IoM ARS)—Mondays fortnightly, Highlander Inn, Crosby. Visitors welcome. Sec GD2HDZ, tel Laxey 465.

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 University (UoLARS)—Meetings at lunchtimes in the radio shack, Old Students' Union. Now active on all bands up to 432MHz. Any prospective members are welcome and information can be obtained from the chairman or the sec, to whom enquiries should be addressed c/o The Students' Union, 2 Bedford Street North, Liverpool 7.

Manchester (M&DARS)—Wednesdays, 7.30pm. 203 Droylesden Road, Newton Heath, Manchester 10. Sec G8IYX.

Manchester (South Manchester RC)—5 Nov (Discussion night), 12 Nov (Annual dinner at Bowden Hotel, tickets—seniors £3.50, juniors £2), 19 Nov ("Rx using Plessey ICs" by R. Myers, G8LUL), 26 Nov ("RSGB Intruder Watch and IARU Monitoring System" by C. J. Thomas, G3PSM), 3 Dec ("Developments in digital circuits" by J. Selwood, G8KGM), 10 Dec ("Diversions" by S. Aspinall, G3VSA), 17 Dec (Christmas party), 24 and 31 Dec (No meetings). 8pm. Sale Moor Community Centre, Norris Road, Sale. Informally at the club shack, Greeba, Shady Lane, Baguley, Manchester 23, on Mondays from about 8pm. Sec G3VIW.

Manchester University (MUARS—G3VUM). Interested parties should contact G4AOS, QTHR.

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

North Western Repeater Group—Third Thursday of each month, 8pm. "Grey Mare", Blackburn. Meetings open to all interested. Full details from G8HQW.

Preston (PARS)—4, 18 Nov, 2, 16, 30 Dec. Morse practice 7.30pm, main meeting 8pm. "Windsor Castle" (private room), St Paul's Square, Preston. Sec G8KTM.

Salford (Dial House RS)—Wednesdays, 5.30-9.30pm. Dial House, W45, 55 Portland Street, Manchester M60 1BA. Net channel 145·25MHz a.m.—most members are now mobile on this channel, and the club station G3WDH now monitors this frequency every club night for calls from any other station. Sec G8JCN.

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

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

UK FM Group (Western)—18 Nov (Informal meeting at Legh Arms, Chelford Road, Knutsford. Visitors welcome), 16 Dec (Christmas party—venue to be announced, or contact sec G3LEQ nearer the date).

Warrington (W&DARS)—9 Nov (Junk sale), 16 Nov ("Digital voltmeters" by C. Horrabin, G3SBI), 23, 30 Nov ("Rx alignments" by A. Choraffa, G3PKW), 7 Dec ("VHF long haul" by Bill Sparks, G8FBX), 14 Dec ("Synthesizers" by N. Campbell), 21 Dec (Construction contest award presentation). 7.45pm. Grappenhall Community Centre, Bellhouse Lane, Grappenhall. Sec J. Weaver, c/o Grappenhall Community Centre.

Wigan (W&DARS)—First and third Wednesdays of each month. Poolstock Cricket Club, Keats Avenue, Poolstock. Sec A. Cunliffe, G4EII, 50 Langholm Road, Garswood, Wigan.

Winsford (Mid-Cheshire ARC)—Wednesdays. Technical Activities Centre, rear of Verdin Buildings, Verdin Comprehensive School, Grange Lane, Winsford. RAE class 7pm to 8pm. Morse class every third Wednesday. Net nights 160m Mondays, 8pm, 2m (fm) Tuesdays, 8pm. Sec G8HAV.

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

Liverpool Luncheon Club—members wishing to attend should contact G3VQT or G2AMV.

The 1977 North West Amateur Radio Convention will be held on 17-18 September 1977. Its format will be similar to that used with great success for the first two conventions. Further details will become available early next year. Enquiries to J. R. Morris, Dept of Physics, University of Lancaster.

Belle Vue Convention, Manchester 1977—the date has been fixed for 24 April.

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

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

Denby Dale (DD&DARS)—10 Nov (Film show), 8 Dec (Christmas meeting). 7.30pm. Pie Hall, Denby Dale. Visitors always welcome. Hon sec G3FQH.

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

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

Hull (H&DARS)—Fridays, 7.30pm. Dorchester Hotel, Beverley Road, Hull. Hon sec G8IED.

Leeds (White Rose RS)—Wednesdays, 7.30pm (lectures start 8pm). Club night details are being arranged. Two special stations will soon be on the air—GB2LC, celebrating 350 years of the Leeds Charter, and GB2LS, in connection with JOTA. Hon sec G4DZI.

University of Leeds (LUUARS)—Tuesdays, 8pm. Union Annexe (second floor), Woodhouse Lane. All new students welcome. G3LUU is active on the hf bands, and it is hoped to obtain G8LUU for the uhf and vhf bands before term starts. Hon sec G4CNG, QTHR or at "E" block, Lupton Flats, Alma Road, Leeds 6 during term.

Otley (Radio & Electronics Society)—"The Three Horseshoes", Bridge Street, Otley. Hon sec J. H. Marchbank, 116 Brooklands Lane, Menston, Ilkley, West Yorks LS29 6PJ.

Scarborough (SARS)—Fridays, 7.30pm. Scarborough Technical College, Corby Road, Scarborough. Hon sec Charles Whitaker, 1 Ryefield Close, Eastfield, Scarborough YO11 3DN.

Sheffield (SU&PRS)—Thursdays during term, 5.30pm. "The Phoenix", Charles Street. Details from A. Marvin, G8CZO, 74 Kirkstone Road, Sheffield S6 2PP.

York (YARS)—2 Dec (Visit to York University Physics Dept). Fridays, 7.30pm (except for the third Friday in the month). Visitors always welcome. Hon sec G3WVO.

The Region 2 RR sends Christmas greetings to all and special thanks to club secretaries for their help in 1976.

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

Birmingham (Midland ARS)—2 Nov, 7 Dec. 7pm. Brasshouse Centre, off Broad Street, Birmingham. 23 Nov (Surplus sale), 14 Dec (Christmas social). 8pm. Room 110, University of Aston, Gosta Green, Birmingham. G3ZKQ.

Birmingham (Slade R&SS)—12, 26 Nov, 10 Dec, 7 Jan. 8pm. The Committee Room, Church House, Erdington, Birmingham. G8GRC.

Birmingham (South Birmingham RS)—3 Nov (AGM), 1 Dec (Christmas social and presentation of awards), 5 Jan. 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. G8BHE.

Birmingham (Birmingham University RS)—Every Tuesday during term, 7.30pm. Students' Union. G3IUB. Sec G4CKK.

Bromsgrove (B&DARC)—12 Nov (Constructors' competition), 10 Dec (Cheese and wine party). 8pm. Avoncroft Art Centre, Bromsgrove. G8JTK.

Coventry (CARS)—5 Nov (Sausage and mash supper), 12 November (Night on the air), 19 Nov (Criss-cross quiz), 26 Nov (Night on the air), 3 Dec (Members' slide show), 10 Dec (Night on the air), 17 Dec (Annual dinner), 24 Dec (No meeting). 8pm. Baden Powell House, St Nicholas Street, Radford, Coventry. G8DMI.

Coventry Technical College (CTCARS)—Mondays, 7pm. Morse classes and rtty included in club activities. Winfray Annexe of the College. G8ISJ.

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

Hereford (HARS)—First and third Fridays in each month. Civil Defence HQ, Gaol Street, Hereford. G4CNY.

Lichfield (LARS)—First Monday and third Tuesday in each month, 8pm. Swan Hotel. Tuesday meetings are natter-nites. Sunday net noon, 21·150MHz. G3RTY.

Lichfield (Chad RC)—Fortnightly, commencing 4 Nov. Swan Hotel. G4ESK/G8FBL.

Mid-Warwickshire (MWARS)—First and third Mondays in each month. 8pm. 61 Emscote Road, Warwick. G8CXL.

Redditch (RRC)—Second and fourth Thursdays in each month. 8pm. The Old People's Centre, Park Road, Redditch. G3EVT.

Solihull (SARS)—16 Nov ("Repeaters" by G3BA and G8AMD), 21 Dec. 7.30pm. The Manor House, High Street, Solihull. G4AXW.

Stoke-on-Trent (S-on-TARS)—Thursdays, 7.30pm. 2A Racecourse Road, Oakhill, Stoke-on-Trent. G4CWN.

Stoke-on-Trent (North Staffs ARS)—Mondays, 7.30pm. Lectures, natter-nites, hf and vhf stations. Harold Clowes Community Centre, Bentilee, Stoke-on-Trent. G8KVM.

Stourbridge (S&DARS)—Informals on the first Tuesday in each month, 9pm. "Shrubbery Cottage" public house, Heath Lane, Stourbridge. 15 Nov (Surplus sale), 6 Dec (Annual dinner), 20 Dec. 7.45pm. Longlands School, Brook Street, Stourbridge. G4CLX.

Sutton Coldfield (SCRS)—Second and last Mondays in each month, 7.30pm. Central Youth HQ, Clifton Road, Sutton Coldfield. Sec Norman Sanderson, 130 Willmott Road, Sutton Coldfield B75 5NW.

Telford (T&DARS)—3 Nov (Natter-nite and night on the air), 10 Nov (Surplus sale), 17 Nov (Members' slides and films), 24 Nov (Equipment demonstration), 1 Dec (Natter-nite and night on the air), 8 Dec ("Microprocessors" by G8FSV), 15, 22 Dec (Social evening), 29 Dec, 5 Jan (Natter-nite and night on the air). 7.30pm. Phoenix Centre, Webb Crescent, Dawley. G4AXZ.

Willenhall (W&DARS)—Alternate Wednesdays. Morse classes available at the end of each meeting. "The Three Crowns", Stafford Street, Willenhall. G3YHN, XYL.

Wolverhampton (WARS)—8 Nov (Natter-nite), 15 Nov (Members' slides and films), 29 Nov (Natter-nite), 6 Dec (Surplus sale), 13 Dec (Natter-nite), 20 Dec (Visit to Anchor Inn), 3 Jan. 8pm. Neachells Cottage, Danescourt Road, Stockwell End, Tettenhall, Wolverhampton WV9 9PH. G8BSR.

Worcester (W&DARC)—20 Nov, 6, 18 Dec, 3 Jan. 8pm. The Old Pheasant, New Street, Worcester. G4DXE.

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

Derby (D&DARS)—10 Nov (Technical topics), 17 Nov (Film show), 24 Nov ("Components" by John Birkett), 1 Dec (Surplus sale), 8 Dec (Constructors' contest), 15 Dec (Film or video show), 22 Dec (Christmas party), 29 Dec (All our yesterdays). 7.30pm. Societies Clubroom, 119 Green Lane, Derby. G2CVV.

Derby (NHCAARG)—5 Nov (No meeting), 12 Nov (AGM), 19 Nov (Junk sale), 26 Nov (Technical film show), 3 Dec ("Motor vehicle suppression" by Ian Cage, G4CTZ), 10 Dec ("A light story" by Ian Brown, G3TVU), 17 Dec (The year in retrospect), 24 Dec (No meeting), 31 Dec (Night on the air). 7.30pm. Nunsfield House Community Centre, Boulton Lane, Alvaston, Derby. G4CTZ.

Leicester (LRS)—15 Nov ("Amateur satellite reception" by G3CWI), 29 Nov (Open forum—"Should there be a Citizens Band in the UK?") 6 Dec ("Attempts at uhf", talk and discussion by G8BMF). Mondays, 7.30pm. Slow morse practice when requested from 8-8.30pm. Clubroom, Gilroes Estate Cottage, Groby Road, Leicester. G3ZGS.

Melton Mowbray (MMARS)—19 Nov ("RTTY" by G3UXF), 17 Dec ("Raynet", by G8CAC and friends). 7.30 for 8pm. St John's Ambulance Hall, Asfordby Hill, Melton Mowbray. G3NVK.

Nottingham (ARCoN)—11 Nov ("Making receivers in a Japanese POW camp" by Tom Douglas, G3BA), 18 Nov (Activity night), 25 Nov ("Vintage radio" by G4DVW), 2 Dec (Forum), 9 Dec (Social evening), 16 Dec (Activity night), 23 Dec (Brains trust), 30 Dec (Activity night). Clubroom, Woodthorpe House, Mansfield Road, Nottingham. G4EKW.

Matlock—An inaugural meeting was held on 20 September when 18 prospective members attended, and it is hoped to have a club started by November. It was pleasing to note that eight of those present wished to become RSGB members. Details from G8GIY.

Mansfield (MARS)—First Friday in each month. New Inn, Westgate, Mansfield. G3XWZ.

Scunthorpe (SARC)—9 Nov ("Working out distance from QRA locators" by G3MSB), 16 Nov (Construction contest), 23 Nov (AGM), 30 Nov ("ATV on air" by G8HUA). RAE classes on Thursdays. The Shack, Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe.

A meeting of the East Midlands Amateur Radio Clubs was held at Loughborough in September. A winter club contest was organized for January and a major lecture for March. The next meeting will be at Derby & District ARS HQ in January.

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

Bedford (B&DARC)—Thursdays, 8pm. United Services Club, The Broadway. Sec G8FMG.

Cambridge (C&DARC)—Fridays, 7.30pm. Corporation Yard, Victoria Road. Sec is now John Worsnop, G4BAO.

Cambridge University (CUWS)—Tuesdays during term. Sec G4EAG, St Catherine's College.

Corby (CTCARG)—Mondays, 7.30pm. Corby Technical College. Clubhouse and GB3CI in college grounds.

Dunstable (DDRC)—Fridays, 8pm. Chews House, 77 High Street South. Sec G3WXS.

March (M&DRAS)—Tuesdays, 7.30pm. 2 Grays Lane. Sec G8GNE.

Northampton (NRC)—25 Nov (Astronomy lecture), 20 Dec (Christmas special). Thursdays, 8pm. Spencer Dallington Community Centre, Tintern Avenue. Sec G8GHZ.

Peterborough (GPARC)—26 Nov ("Introduction to microwaves" by Dain Evans, G3RPE. An open lecture, all interested persons invited), 16 Dec (Christmas special). 7.30pm. Southfields Infants School, Stanground. Details from G4BBA, tel 65213.

Peterborough (PR&ES)—Third Friday in each month, 7.30pm. Scout Hut, Occupation Road. Sec G3EEL.

Shefford (S&DARS)—Thursdays, 8pm. Church Hall. Sec G3TAZ.

Any member interested in being an area representative for Bedfordshire or Northamptonshire should read the notice in *QTC*.

REGION 6—RR D. C. Andrews, G4CWB, 63 Bulmershe Rd, Reading, Berks.

Banbury (BARS)—Fridays, 7.30pm. 43 North Bar, Banbury. New members and visitors welcome. Details from sec G3LTN, tel Banbury 710623.

Bracknell (BARC)—15 Nov (To be announced), 9 Dec (Christmas dinner), 17 Jan (AGM). Alternate Mondays morse evenings. 8pm. Cooper's Hill Centre, near railway station. Visitors welcome. Sec G3YMC.

Burnham Beeches (BBRC)—First Monday in each month, 8pm. Hedgerley Scout HQ. Further details from sec, tel Farnham Common 2609.

Maidenhead (M&DARC)—First Thursday and third Tuesday in each month, 7.30pm. British Red Cross Hall, The Crescent, Maidenhead. Sec G4ALG.

Milton Keynes (MK&DRS)—Second Monday in each month, 8pm. Lovatt Hall, Silver Street, Newport Pagnell. Details from sec G8JYW, YMCA, 4 Cheyne Walk, Northampton.
Newbury (N&DARS)—First Monday in each month, 7.30pm. Newbury College of Further Education, Oxford Road, Newbury. Everyone most welcome. Sec G4EFE, tel 0635 45747.
Oxford (O&DARS)—Second and fourth Wednesdays in each month, 7.30pm. Civil Service Sports Club, Marston Road, Oxford. Visitors welcome. Sec G8PX.
Reading (RARC)—First and third Tuesdays in each month, 8pm. "White Horse", Emmer Green, Caversham, Reading. Details from sec G4CCC.

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

Addiscombe (AARC)—Tuesdays, 9pm. "Spread Eagle", Portland Road, South Norwood. Sec G4CZB.
Ashford, Middlesex (Echelford ARS)—8 Nov ("RSGB current affairs" and "Scheme of representation in RSGB affairs" by D. Andrews, G3MXJ, zonal manager IARU zone C), 25 Nov (Talk and demonstration by Burns Electronics), 6 Dec ("VHF repeaters" by Mike Hughes), 30 Dec (Social evening, Link Hotel, Ashford). 7.30 for 8pm. St Martin's Court, Kingston Crescent, Ashford. 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 G4ARQ.
Coulsdon (CATS)—First Thursday in each month, 8pm. 10th Purley Scout Headquarters (opposite Rickman Hill), Chipstead Valley Road, Coulsdon. Third Monday in each month, 8pm. 1st Purley Scout Headquarters, Purley Park Road, Purley. Sec G8KMJ, tel 01-657 2548.
Cray Valley (CVRS)—4 Nov (Talk and demonstration on rtty by C. Whitmarsh, G8CIU), 18 Nov (Business meeting followed by natter-nite), 2 Dec (Quiz visit by Coulsdon ATS), 16, 30 Dec (Natter-nites). 8pm. Eltham United Reformed Church Hall, 1 Court Road, London SE9. Sec G3YWO.
Croydon (Surrey Radio Contact Club)—17 Nov ("Progressive morse" by G3EUE), 1 Dec ("Understanding and using simple ics" by Mike Hughes), 15 Dec (Party). 7.30 for 8pm. "The Ship Inn", 47 High Street, Croydon. Sec G3FWR, tel 01-657 3258.
Crystal Palace (CP&DRC)—20 Nov ("Telephones", part 2), 18 Dec (Junk sale). 8pm. Emmanuel Church Hall, Barry Road, London SE22. Sec G4AVV, tel 01-653 4340.
Guildford (G&DRS)—Second and fourth Fridays in each month. Model Engineers HQ, Stoke Park, Guildford. Sec G4BHQ, tel Guildford 76375.
Kingston (K&DARS)—10 Nov (AGM and prizegiving), 8 Dec (Junk sale). 8pm. Tolworth Scout Hut, Stirling Walk, Raeburn Avenue, Surbiton. PRO G8HUW.
New Cross (Clifton ARS)—Fridays, 8pm. 225 New Cross Road, London SE14. Details from R. A. Hinton, 58 Camilla Road, Bermondsey, London SE16.
Reigate (RATS)—23 Nov ("Single-conversion receivers" by R. Hewes, G3TDR), 7 Dec (Natter-nite), 21 Dec (Annual constructional contest). 8.30pm. "Marquis of Granby", Hooley Lane, Redhill. Third Tuesday in each month (lecture night), 8pm. Constitutional Centre, Warwick Road, Redhill. Sec G3XSZ, tel Reigate 43130.
Sutton & Cheam (SCRS)—18 Nov, 16 Dec (being arranged). 7.30pm. Sutton College of Liberal Arts, Cheam Road, Sutton. Sec G4BOX.
Thames Ditton (Thames Valley ARTS)—7 Dec ("Experiences with G6CJ stereocode"). 8pm. The Conference Room, 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 01-664 3698.

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

Burgess Hill (Mid-Sussex ARS)—7.45pm. Marle Place, Burgess Hill.
Canterbury (East Kent RS)—4 Nov (Lecture by G3LCK), 2 Dec (Cheese and wine). Room 2, Westgate Hall, Canterbury. Details from G8GHH.
Crawley (CARC)—United Reform Church Hall, Ifield, Crawley. Details from G3MGL.
Dartford (DHDFC)—Details of future events from hon sec G4CVC.
Dover (South-East Kent YMCAARC)—10 Nov (Project night, G8KEN), 17 Nov ("Constructional methods for the beginner" by F. Knight), 24 Nov (HF evening, morse practice and projects), 1 Dec ("Use of oscilloscopes" by G8ECX), 8 Dec (Project night and morse), 15-22 Dec (Open evenings). Details from G8KSD.
Eastbourne (Southdown ARS)—6 Dec (AGM). PRO G3LFZ.
Horsham (HARC)—First Wednesday in each month. Civil Defence HQ, Moons Lane, Brighton Road, Horsham. Details from G3NPF.
Kent Repeater Group—Details of the group from G3XDV, 5 Lambs Walk, Whitstable.
Maidstone (MYMCAARS)—First and third Fridays devoted to the beginner. "Y" Sports Centre, Loose, Maidstone.
Medway (MARTS)—Fridays, 7.30pm. Aurora Hotel, Gillingham. Details from G8APB.
Ramsgate (Kent Coast ARC)—11 Nov ("RSGB matters" by RR G3MDO). Details from hon sec G4DTA.
Tunbridge Wells (West Kent ARS)—6-7 Nov (144 and 7·0 cw), 12 Nov (DF contest), 26 Nov ("Passive components" by G3KHS—to confirm), 10 Dec (Christmas party). Details from G8LMV.
Worthing (W&DARC)—Adult Education Centre, Union Place, Worthing. Details from G3LQI.

Will all club secretaries please ensure that information reaches G3MDO on or before the date given at the beginning of *Club News*.

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

Camborne (Cornish RAC)—4 Nov (Sale of surplus equipment), 2 Dec (Social evening and quiz), 6 Jan ("Visiting the USA" by G3UCQ). 7.30pm. SWEB Clubroom, Pool, Camborne. Cornish net every Sunday at 1000gmt on 3·685MHz. Visitors most welcome. Full details from G3NKE, tel Camborne 2419.
Exeter (EARS)—The club is still in existence but has lost its meeting place. Details from Jack Bawden, 232 Exwick Road, Exeter EX4 2BA.
Newquay (N&DARS)—Alternate Wednesdays, 7.45pm. Treviglas School, Newquay. Details from G8GOR, tel Newquay 4168.
North Devon (NDRC)—Second Wednesday in each month at QTH of G4CG, fourth Wednesday at QTH of G2FKO. Details from G4CG.
Plymouth (PRC)—First and third Tuesdays in each month, 7.30pm. Virginia House, Bretonside, Plymouth. Visitors most welcome. G4EJO.
Saltash (S&DARC)—First and third Fridays in each month, 7.30pm. Burraton Toc-H Hall, Saltash. Sec G4DHA, tel Saltash 3219.
Torbay (TARS)—27 Nov ("RF speech processing" by K. Bradley, G4BZE), 11 Dec (Christmas party). Fridays, with special meeting on the last Saturday in each month, 7.30pm. Rear of 94 Belgrave Road, Torquay. Torbay net weekdays at 0930gmt on 3·758MHz Visitors always welcome. G3UIQ.

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 GW3VBP.
Blackwood (BARS)—Fridays, 7pm. Oakdale Community Centre, Oakdale, Nr Blackwood. Details from sec GW3KYA.
Bridgend (Glamorgan VHF/UHF Group)—Second Wednesday in each month, 7.30pm. NCB Social Club, Tondu, nr Bridgend. Details from sec GW8HEZ.
Cardiff (CRSGBG)—13 Dec ("Fabrication of printed circuits using photo-etch techniques" by D. M. Thomas, GW3RWX). Second Monday in each month, 7.30pm. The Pantmawr Inn, Pantmawr Estate, Cardiff. Details from sec GW3VOW.
Merthyr (Hoover ARS)—Mondays, 7.30pm. Hoover Social Club, Pentrebach, Merthyr. Details from sec GW8HHY, QTHR.
Newport (NARC)—Mondays, 7pm. Adult Education Centre, Brynglas Road, Newport, Gwent. Details from sec GW3YKZ.
Pembroke (PRSGBG)—Last Friday in each month, 7.30pm. Defensible Barracks, Pembroke Dock, Dyfed. Details from sec GW3XJQ.
Pontypool (PRSGBG)—Tuesdays, 7pm. Educational Settlement, Park Hill Road, Pontypool. Details from GW3JBH.
Port Talbot (British Steel Corporation ARS)—10 Dec (Christmas buffet/dance, all clubs invited. Tickets £1.25 from sec). Thursdays, 7.30pm. BSC Sports and Social Club, Margam. Details from GW4ESV, tel Port Talbot 6712.
Rhondda (RARS)—Every other Thursday, 7.20pm. Transport Employee's Club, Porth. Details from GW3PHH.

Sully (S&DSWC)—Tuesdays, 7pm. Sully Bowls & Social Club, 58 South Road, Sully. Details from GW8JHF.
Swansea (SARC)—Tuesdays fortnightly, 7.30pm. The Commercial Inn, Killay. Details from sec GW4AYJ.

REGION 11—RR P. H. Hudson, GW3IEQ, "Silhill", Dinas Dinlle, Caernarvon LL54 5TW.

Bangor (UCNWARS)—Thursdays, 7.30pm. Small lecture theatre, School of Engineering Science.
Conway Valley (CVARC)—11 Nov (Quiz to be set by GW3GRY; the Rhyl club have been invited to participate), 9 Dec (Annual junk sale), 13 Jan (Hot pot supper, "Dulas Arms", Llandulas). The Quaries, Llandulas, Colwyn Bay.
Rhyl (R&DARC)—Second Tuesday in each month. Lecture room, Ambulance Station, Coast Road, Rhyl. Newcomers and visitors welcome.

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

Aberdeen (ARS)—Friday evenings. Clubrooms, rear of 91 Crown Street, Aberdeen. Sec GM4BKV.
Dundee (Kingsway Technical College ARC)—Wednesdays, 6.30pm. Kingsway Technical College. A full winter programme is being prepared. Sec Robert Officer, 23 Sherbrook Place, Dundee.
Inverness (Queens Own Cameron Highlanders Memorial Youth Club, Radio Section)—No information available. Sec W. M. Begg, 68 Tomnahurich Street, Inverness.
Lerwick (RC)—Wednesday evenings. Annsbrae House, Lerwick. Sec GM3HTH.
Moray Firth (MFARS)—Wednesdays, 7.30pm. Elgin Technical School. The club is being reorganized and becoming more active. Full programme information from sec GM8LHV.

GLENROTHES OPEN NIGHT

The Glenrothes & DARC will be holding its third annual "Open night" in the Laurel Bank Hotel, Markinch, Fife, on Wednesday 17 November 1976, beginning at 7.30pm. Refreshments will be served at a small charge.

All amateurs and SWLs are invited, and those intending to come are asked to advise GM3YOR so that catering arrangements can be made.

REGION 13—RR Rev S. J. Smith, GM4DNM, St Ninian's, 6 Derran Drive, Cardenden, Fife KY5 0JG.

Berwick (BARS)—Last Sunday in each month, 7pm. Tweed View Hotel. Further details from GM8IIO.
Dunfermline (DARS)—Second Wednesday in each month, 7pm. CCTV Studios, Pittencrieff School, Maitland Street, Dunfermline. Further details from GM8HEY.
Edinburgh (Lothians RS)—11 Nov (Brains trust), 25 Nov (Talk by GM3OXX), 9 Dec (Film, slide and tape night). Adult Education Centre, Riddle's Court, High Street (November meetings in Cannonball House). Sec GM4BYF.
Edinburgh (Pioneer Club)—Tuesdays, 7.30pm. Church Hall, Ravenscroft Place, Gilmerton. Details from sec GM4DTJ.
Glenrothes (G&DARC)—First Sunday in each month and Wednesdays, 7.30pm. Old Nursery Buildings, Leslie, Fife. Sec GM3YOR.

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

Ardeer (ARCARS)—Thursdays, 7.30pm. Ardeer Recreation Club, Stevenston, Ayrshire. Details from GM8BOM.
Ayr (AARS)—28 Nov (Test gear), 12 Dec (CCTV), 23 Jan (Air TC). Every second Sunday evening. Community Leisure Centre, 24 Wellington Square, Ayr. Details from GM3THI.
Falkirk (F&DARC)—Temperance Caft, Lint Riggs, Falkirk. Details from GM3OQI.
Glasgow (West of Scotland ARS)—Fridays, 7.30pm. 22 Robertson Street, Glasgow. Programme and other details from G. Milne, GM4BLO.
Greenock (G&DARC)—Tuesdays and Fridays, 7.30pm. 22 Inverkip Street, Greenock. Details from GM3LYI.
Motherwell (Mid-Lanark ARS)—Fridays, with alternate meetings informal. Morse classes every other Friday. Wrangholm Hall Community Centre, Jerviston Street, Motherwell. Details from GM8HBY.

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

Ballymena (BRC)—Tuesdays, 8pm. 86 Old Cullybackey Road, Ballymena. RAE and morse classes. Fridays, club night; Sundays, special projects, 3pm.
Bangor (B&DARS)—5 Nov (Annual surplus equipment sale, Good Templars' Hall, Hamilton Road, Bangor, 8pm). First Friday in each month, 8pm. Redcliff Hotel, Seacliff Road, Bangor. Hon sec D. Steele, GI4EMS, 59 Donaghadee Road, Millisle, Co Down.
Belfast (QUoBRC)—Tuesdays, 8pm. Queen's University Radio Club, 37 Fitzwilliam Street, Belfast. All welcome.
Belfast (CoBYMCARC)—The club is active on the air from 7.30pm on Tuesdays and 2.30pm on Saturdays. Meetings at same times. 7 Brunswick Street, Belfast. Hon sec D. Kane.
Belfast (BRSGBG)—Third Wednesday in each month, 8pm. 90 Belmont Road, Belfast. Interesting winter programme arranged. Visitors most welcome. Further details from GI8FOK.
Carrickfergus (CYMCARC)—Last Monday in each month, 8pm. Carrickfergus YMCA. New members very welcome to this newly formed club. Hon sec GI8KZU, c/o Carlton House, Lancastrian Street, Carrickfergus, Co Antrim.
Mid-Ulster RSGB Group—First Sunday in each month, 3pm. At QTH of GI4BAC. Hon sec M. Anderson, GI3WWY, 32 Knockview Drive, Tandragee, Craigavon, Co Armagh.
North Ulster (NURSGBG)—For particulars of change of venue and other details contact GI8AYZ.

REGION 16—RR R. E. G. Kendall, G8BNE, "Wesley", Ranworth Road, Hemblington Corner, Blofield, Norwich NR13 4PJ.

Chelmsford (CARS)—First Tuesday in each month, 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details from B. G. Tew, G3WFF, 334 Gloucester Avenue, Chelmsford.
Colchester (CRA)—Wednesdays, 7.30pm. Stanway School, Colchester. Sec T. A. Mills, G3YAI, 75 Lymington Avenue, Clacton-on-Sea.
Great Yarmouth (GYRS)—Last Thursday in each month. 67 Southdown Road, Great Yarmouth. Details from G3NHU.
Harlow (H&DRS)—Tuesdays, 8pm. Mark Hall Barn, First Avenue, Harlow, Essex. Details from G3WUX.
Ipswich (IRC)—Details from J. Gee, G4BAV, 35 Neath Drive, Stoke Park, Ipswich.
Loughton (L&DRS)—Second and fourth Fridays in each month, 8pm. Loughton Hall, near Debden Station. Sec G4CMD.
Lowestoft (L&DARC)—5 Nov (G3NTV), 12 Nov ("The story of Raynet" by G3JMU), 19 Nov (Ragchew), 26 Nov (Junk sale and auction), 3 Dec (Pea and pie supper—names to G3GNK, tel Lowestoft 64387), 10 Dec (G8KOH), 17 Dec (Novelty night-G3GNK). Morse class every Tuesday. 7.30pm. YMCA, Park Road, Lowestoft.
Martlesham (MRS)—Details from G. Murchie, G8AXU, Post Office Research Centre, Martlesham.
Norwich (Norfolk ARC)—Wednesdays, 7.45pm. Crome Community Centre, Telegraph Lane East, Norwich. Details from G4EOL.
Norwich (U of East Anglia R&EC)—Details from P. Gowen, G3IOR.
Stowmarket (S&DARS)—Details from K. J. Bertrard, 35 Curwen Road, Stowmarket.
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)—First Saturday and third Wednesday in each month, 7.30pm. Chineham House, Popley, Basingstoke. Sec G3CBU.
Basingstoke (UKFM Group, Southern)—First Wednesday in each month, 8pm. Chineham House, Popley, Basingstoke. Sec Mrs J. Payne (xyl of G3ZRM), tel Aldershot 26108.
Bournemouth (Wessex ARG)—First Wednesday in each month. 7.30pm. Portman Arms Hotel, Ashley Road, Boscombe. Sec G4EMN, tel Bournemouth 20027.
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)—10 Nov (Surplus equipment sale), 14 Nov (Special event stations G3XCH and G4DKN), 24 Nov (AGM). Second

and fourth Wednesdays in each month, 7.30pm. Railway Enthusiasts' Club, Access Road, off Hawley Lane, Farnborough. Sec G4FEA.
Guernsey (GRES)—Tuesdays, 8pm. The Lodge, La Corbinerie Oberlands, St Martin's, Guernsey.
Horndean (H&DARC)—Second Thursday in each month, 7.30pm. Merchiston Hall, Horndean. Net Sundays 6.30pm. 21·40MHz. Sec G4CHO.
Jersey (JARS)—Sundays, 1030am, and Fridays, 8pm. Le Hocq Tower, St Clement, Jersey. Sec Mary McTaggart, 19 Parade Road, St Helier.
Portsmouth (P&DRC)—Wednesdays, 7.30pm. Portsmouth Community Centre, Malins Road, Buckland, Portsmouth. G3CNO.
Salisbury (SR&ES)—Tuesdays, 7.30pm. Salisbury Activity Centre, Wilton Road. Sec G2FIX.
Southampton University (SUARC)—Tuesday evenings, also informal meetings every lunchtime in the clubroom, Old Union Building. Sec T. Williams, G3YOZ.
Southampton (SRSGBG)—Second Saturday in each month, Lanchester Building, Southampton University; Wednesdays, the clubroom, Kent Road; both at 7.30pm. AR G4COM.
South Dorset (SDRS)—First Tuesday in each month, 7.30pm. Lecture Hall, S Dorset Technical College, Newstead Road, Weymouth. G3YWG.
Swindon (SD&ARC)—Alternate Wednesdays, 7.45pm. Clubroom above Coldharbour Public House, Blunsdon, just north of Swindon. Sec G8KWC.
Winchester (WARC)—First and third Fridays in each month, 7.30pm. Antrim House, St Cross Road, Winchester. G4BKE.

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

Easington (AR&EC)—Tuesdays and Thursdays, 7.30pm. Easington Village Workmen's Club (three minutes from A19). CW practice, 80 and 160m operation. ATV can be received on 625 lines. RAE instruction if required. Sec G3VSS.
Hartlepool (HRC)—Mondays, 7.30pm. Methodist Church Hall, Grange Road. Sec G3NWU, 73 Eamont Gardens, Hartlepool.
Middlesbrough (PORC)—Sec G8CDP, 200 Marton Road, Middlesbrough.
Morpeth (Northumbria RC)—The club now meets on Thursday evenings in the British Legion premises, Gambois, nr Blyth. Sec G4AVO.
Newcastle (Tyne & Wear Repeater Group)—The repeater project is now in its last stage of development. The site has been chosen, and the hardware is ready for installation. The donation to the group of a collinear aerial, by Messrs J. Yu, is much appreciated. Considerable experimental work is going on in finalizing the overall project design. The Home Office has agreed to the site, but want the aerial at 100ft. As this may interfere with other installations already on the mast, it has been suggested to the Home Office that 200ft would be more suitable, and their reply is awaited. The erp has been agreed at 25W. It is hoped to operate the equipment in the "beacon mode" as soon as the licence is received. Meetings are held in The Arts Common Room, University of Newcastle, on alternate Wednesdays. More members from the north-east are welcome. Sec G3URE.
South Shields (SSD&RS)—Fridays, 7.30pm. Trinity House. Old and new members welcome. Sec G8BQF, 67 Lauderdale Avenue, Kings Estate, Wallsend.
Sunderland (SARS)—This club is at present without a headquarters. Contact sec G8BQF.
Tyneside (TRC)—Mondays, 8pm-9.30pm. The Community Centre, Vine Street, Wallsend. Sec F. Addison, 3 Wilton Close, Whitley Bay, Tyne & Wear.

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

Acton, Brentford & Chiswick (ABCRC)—16 Nov (How to get on the air—advice to new licensees), 21 Dec ("The Versatower in operational use" by G3CCD). 7.30pm. Chiswick Trade & Social Club, 66 High Road, Chiswick. Sec G3GEH.
Barking (BR&ES)—Mondays (Constructional), Wednesdays (CCTV techniques), Thursdays (Informal). Morse classes Tuesdays. 7.30pm. Westbury Recreation Centre, Westbury School, Ripple Road, Barking, Essex. Sec G8JEG, tel 01-599 1103.
Cheshunt (CDRC)—Wednesdays, 7pm. Rosedale Sports Centre, Andrews Lane, Cheshunt.
Chingford (Silverthorn RC)—Fridays, 7.30pm. Friday Hill House, Simmonds Lane, Chingford E4. Visitors very welcome. Sec G4AJA, tel 01-529 2282.
Ealing (EDARS)—Tuesdays, 8pm. Northfields Community Centre, Northcroft Road, London W13. Sec R. Blackwell, 4 Colnbrooke Avenue, West Ealing, London W13 8JY.
East London RSGB Group (Wanstead)—21 Nov ("Test equipment and its uses"), 19 Dec (AGM and junk sale). 3pm. Wanstead House, The Green, Wanstead, London E11. Sec G4CJQ, tel 01-524 3169.
Edgware (E&DRS)—11 Nov (Informal), 25 Nov ("Colour tv principles" by G3GC), 9 Dec (Junk sale), 23 Dec (No meeting), 13 Jan (AGM). 8pm. Watling Community Centre, 145 Orange Hill Road, Edgware. Slow cw on first and third Thursdays in each month at 1930gmt on 1,875kHz by G3ASR/A.
Harrow (RSH)—5 Nov (Practical), 12 Nov (Bring and buy), 19 Nov (Construction contest), 26 Nov (Club anniversary dinner). December programme to be announced. 8pm. Harrow Sea Cadet HQ, Woodland Road, Harrow.
Havering (H&DARC)—Wednesdays, 8pm. British Legion Club, Western Road, Romford.
Holloway (Grafton RS)—5 Nov (Open night), 12 Nov ("GB3SN" by Roy Powers), 19 Nov ("The RSGB" by G6JP), 26 Nov ("FM and ssb equipment alignment" by G8FQM), 3 Dec (Natter-nite), 10 Dec ("70cm" by G8FQM), 17 Dec (Christmas party), 18 Dec (G2CJN 2m contest, 2100–2400gmt), 7 Jan (Open night). 7.30pm. Holloway Institute, Archway Annexe, Highgate Hill, London N19 5NS. Sec G3ZKE.
Ilford RSGB Group—Thursdays, 8pm. 50 Mortlake Road, Ilford. Details from D. T. Sapworth, G3YMW.
Northolt (British Airways European Division ARS)—First Monday in each month. Trident Club, Western Avenue, Northolt, Middlesex. This club is open to non-BA employees by invitation. Contact G3OUF, tel Amersham 21573 for details. Civil Aviation Sunday net at 1100-1200gmt on 3·68MHz, listen for G3NAF or G3BEA.
South Kensington (Baden Powell House Scout ARG)—Third Tuesday in each month, 8pm. Baden Powell House, Queensgate, South Kensington.
Southgate (SRC)—11 Nov (G6QM constructors' trophy), 9 Dec (AGM). 8pm. The Green, Winchmore Hill, London N21. Sec G4AEZ, tel 01-366 7166.
St Albans (Verulam ARC)—25 Nov ("Receiver measurement techniques" by Marconi Instruments), 23 Dec (AGM and film show). 7.30pm. Market Hall, St Albans. Informal meetings on the second Tuesday in each month at RAF Association HQ, Victoria Street, St Albans.
Stevenage (S&DARS)—First and third Thursdays in each month, 8pm. Hawker Siddeley Dynamics Ltd, Gunnels Wood Road. Sec Paul Tewkesbury, 267 York Road.
UK FM Group (London)—Second Tuesday in each month, 7.30 for 8pm. Grove Park Hotel, Junction Bolton/Spencer Roads, Grove Park, Chiswick.

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

Bath (B&DRG)—Mondays, 8.30pm. Church of the Ascension, Claude Avenue, Oldfield Park, Bath. Further information from John Noden, Flat 4, 30 Paragon, Bath BA1 5LY.
Bristol (BRSGBG)—29 Nov (RR's report by G3GKA), 29 Dec (Potted lectures). 7pm. Becket Hall, St Thomas Street, Bristol 1. Sec G3ULJ.
Bristol (BARC)—Tuesdays 7.30pm. The University Settlement, Barton Hill, Bristol 5. Sec G8HAZ.
Bristol (Shirehampton ARC)—Fridays, 7.30pm. Twyford House, Shirehampton. New members most welcome. G4BWB.
Cheltenham (CRSGBG)—First Thursday in each month, 8pm. The Old Bakery, Chester Walk, Cheltenham. Sec G3KII.
Gloucester (GARS)—First Thursday in each month, 8pm. Oddfellows Club, Barton St, Gloucester. Remaining Thursdays informal club night. G4AYM, The Chequers Bridge Centre, Painswick Road, Gloucester 8. Sec G3MA.
Taunton (T&DARS)—Fridays, 7.30pm. Jelalabad Barracks, The Mount, Taunton. Sec G. Swetman, "Little Copse", Monkton Heathfield, Taunton. Tel West Monkton 298.
Weston-super-Mare (WsMRS)—Second Friday in each month, 7.30pm. Room Lewis M2, Worle School, New Bristol Road, Worle. G3PQE.
Yeovil (YARS)—4 Nov ("Frequency counter" by G3XFW), 18 Nov ("SSTV" by G4CFS), 2 December ("Aerial erection methods" by G3XFW), 16 Dec ("Working Oscar" by G8KME). Thursdays, 7.30pm. Due to possible change of venue contact sec G3NOF.

members' ads

These subsidized flat-rate advertisements are accepted as a service to members of RSGB. They must be submitted on the Members' Ads order form printed in alternate issues of *Radio Communication*, or on a postcard similarly laid out. Each **must** be accompanied by a **recent** *Radio Communication* wrapper addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque for 50p (stamps not accepted). They will not be acknowledged. Those not clearly worded or punctuated will be returned. No correspondence concerning this service can be entered into.

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

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

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

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

FOR SALE

Trio JR310 rx, exc cond, unmod, £70. EA12 Eddystone rx, used six hours only, sensible offers. *Wanted:* FT400, FT200 or similar for disabled amateur. GM3RVL, QTHR. Tel 031-334 7152.

R220 rx, wkg on 70·1MHz. *Wanted:* Trio TX599, must be in exc mech and elect wkg order, with manual and cables. 6m converter for JR599 and split stator capacitors for atu. R. J. Napper, 22 Rydal Drive, Hale Barns, Altrincham, Cheshire.

Siemens communications rx E566, coverage 14kHz–30MHz in 12 switched bands, built-in 100kHz calibrator, magic eye indicator, bfo, very robust. Offers. Buyer collects. G8IKH, QTHR.

BC221, with charts and built-in professional psu, £15. Marconi HU11 fsk demodulator, 2·55kHz centre frequency, auto-tracking ±1kHz, ±30mA output, with handbook, £10. Carr extra. Parsons, G3RBP, "Whistle", Porthcurno, Penzance, Cornwall. Tel St Buryan 477 afternoons.

Trio 2200G, 6ch, nicads, auto toneburst, Flexiwhip, FM15 linear amp and rx, preamp, £140. SSM 2m Europa, £75. Antec 2m ⅝λ whip and window clip, £9. G-whip, 10m Flexiwhip with 80m coil and base, £14. GW4CBR, QTHR.

"Radio Communication", July 1973–June 1976, comp, vgc, offers. Plus carr or collect. Stephenson, 37 Priory Crescent, Bridlington, Yorkshire YO16 5SE.

HRO/MX psu, seven coils and case, 180kHz–30MHz, GC, five spare valves (recently revalved), exc going order, £45 ono. Tel 01-399 2730 3–6pm weekdays.

HRO 5T, five GC coilpacks, psu, manual, £25. RSGB deluxe log book, £1.50. Eddystone 898 dial, new, unused, £6. G3SVL, QTHR. Tel Camberley 64330.

HW100, with ac psu, £95. XF-9B filter, new, £25. Unused DC6HL 001 pcb with few components, £5. JXK 2m converter, 28–30MHz, £2. Telford bandsearcher module, £2.50. Telford TC7, tunable i.f. 28–30MHz, has faulty af stage, £30. G3YAS, QTHR.

Hallicrafters RBX, a.m./fm rx, not wkg, coverage 130–210MHz, £15. Buyer collects. *Wanted:* Microwave Modules 4m converter, i.f. 28·000–28·700MHz. K. M. Brown, 165 Canterbury Road, Morden, Surrey SM4 6QG.

14AVQ aerial, £12.50. 70cm Microwave Modules converter, new, £14. Stabilized mains 12V psu, 1A, £13. Sentinel 2m converter, 4–6MHz i.f., £7.50. Preamp, 2m, £5.50. Trevett, 4 York Road, Broadstone, Dorset. Tel Broadstone 696929.

Heathkit HW17A, a.m./fm, mobile psu, £30. Eddystone EC10, £35. Microwave Modules 2m converter, 4–6MHz i.f., £10. G3ZHC, QTHR. Tel Walsall 26659.

Trio QR666 hf rx, 500kHz xtal marker, under 12 months old, going tx/rx, £100. Buyer examines, collects, or extra per Securicor. Ward, 40 Oole Road, Cleethorpes, Lincs DN35 8LR.

Eddystone 888A rx, vgc, matching S-meter, spkr, £60. Pye Ranger boot mobile with controls, 2m, ready to install, £10. R107 rx plus spare unused rf tuning unit. Offers. R208 rx. Offers. G8FNJ, QTHR. Tel 044-92 3378.

FRDX400 super deluxe 160–10 plus 10+2, new cond, new valves, manual, carton, £130. Grundig TK121 tape recorder and ten tapes, exc cond, £25. G4EOV or G8GKK, QTHR.

VHF sig gen, 95–160MHz, wide bandspread, exc stability, internal hi-grade attenuator and modulator, professionally made for major airline, £25. Buyer collects. G8AKA. Tel Reading 332582 evenings/weekends.

Liner 2, PA3 preamp, Belcom psu, £140. Trio JR599 rx, Custom Special top band to 2m, good cond, £140. Trio 9R59D rx, Codar PR40 preselector, good cond, £55. Lowe Monitor 2m rx, 6ch fitted, £15. Osker power meter, swr, mint, £15. AEC power SWR20 meter, mint, £7. Storno 2m base tx, 7ch toneburst, mic, etc, £40. Frequency counter, 200MHz. Yaesu YC355D, mint, £110. Tel Lunn Hythe 842000 after 7pm.

IC210 vfo 2m fm tx/rx, 18 months old, mint cond, repeater shift, automatic toneburst, xtals for 145·0, R6 and R7, original packing, manual and accessories, £190. Deliver to 50 miles. G8CCI, QTHR. Tel Oxford 880229 evenings, Banbury 3139 weekdays.

Xtals. 10·7015, 48·333, 48·50, 63, 72·2, 72·5, 72·75, £2. PFI xtals on 433·2, £3.50. Converter MMC144/14, £9. QM70 28–432 tx mixer, £17. 144MHz 8W pa, ¼W drive, £6. 3X CD4018 cmos ic, £1.20. G8HCK, QTHR.

Microwave Modules 144/28MHz converter, £12. EMI Mk8 cctv camera, £15. Murphy 17in 405/525/625 monitor, £5. Pye Cambridge AM10D, £10. G8AWM, QTHR. Tel Epsom 28229.

Honda 300W 240V ac, 12V dc generator, £100 or exchange for 2m 12V ssb tx/rx, Liner, Trio, etc. Meeting by arrangement, postal carr too expensive. G3YWS, QTHR. Tel Newark 2413.

TR44 rotator, £50. YD844 Yaesu hand mic, £10. KW low pass filter, £6. Heathkit GDO, GDIU, £10. 7in 7BP7 sstv, crt and scanning coils, £7. Dallmeyer 2in 16mm lens, £12. Vidicon camera tubes, £8. Plumbicons, £15. All ono. GI3MBB, QTHR. Tel Bangor 61946.

Eddystone 850/4 rx, 10–600kHz, two xtal filters plus af filter, good cond. Offers or exchange ham band rx. GM8ESJ, QTHR. Tel 059-288 538 after 6pm.

Icom IC22A, as new, fitted S0, S20, 21, 22, 23, 24, R3, 4, 5, 6, 7, toneburst, comp with mobile mount, £140. G4DEE, QTHR.

FT501 plus FP501, psu, ssb digital tx/rx, as new, very little used, mint cond, has extra xtals to cover full 10m band, £350 ono. SSM mosfet 2m converter, 28–30MHz i.f., £12. Storey, G8LIH, 52 Lingfoot Crescent, Jordanthorpe, Sheffield S8 8DB.

Teleprinting equipment. Creed 54 with cover, £20. Creed 6S5, £5. Teletype 15, £15. ST5 with tone generator, £12. ST6, built but not tested, £25. 40 rolls of paper, £10. 20 rolls of perforating paper, £4. Tools, £4. Carr extra but prefer buyer collects. G4DTL, QTHR. Tel Lincoln 26874.

Storno CQM13C tx/rx, mod for and wkg on 2m, inc mic, power lead, mosfet preamp, £22 ono. 44·7666MHz HC18U xtal (S0 rx), £1.50. White, 1 Smarts Green, Cheshunt, Herts EN7 6BB.

Drake R4B rx, coverage 160–10m, exc cond, with MS4 spkr, manual, £225. Codar AT5 tx, 250/S ac power supply, £30. Heathkit IP18, 1–15V dc, regulated power supply, unused, £15. Prefer buyers inspect and collect. G4CQK, QTHR. Tel Walton-on-Thames 27199.

2m fm AM25TV, comp, fitted preamp and disc. Same without control gear and unmod rx. 2m fm Pye PTC 8117/8227, cw, all leads, spare 6–40 3–20 pas, manuals. Offers. G8KKP, QTHR. Tel Wigan 56318.

475V stabilized supply, Roband type B101, adjustable 420–570V 150mA, pos/neg earth, with 2 × 6·3V 3A htrs, small, rugged, £12. Carr extra. Mic/tel headsets, 200/15Ω, Hosieden BH001, modern design, new, boxed, £6. Post 30p. G3YLO, QTHR. Tel 04427 73717.

Advance Volstat constant voltage transformer, type CVN75A, i/p 150–260V, 50Hz, o/p 240V, rms 75W, £20. Buyer collects Kingston, Surrey area. Tel 01-942 1230.

Liner 2, preamp, accessories, exc cond, £105. Jaybeam 6-el quad, £8. Prefer buyers inspect and collect. G8DEE, QTHR. Tel Cambridge 64251.

BC221AJ with mod, fitted stabilized psu in original wood cabinet, perf, £20. Tradipper GDO TE15, 1·3–280MHz, six coils and earphone, comp moulded container, unused, £15 pair. KW traps and TEE insulator, six hours' use, £5. Postage extra. G5FH, QTHR. Tel 0425 25974.

Sommerkamp (Yaesu) FR100B rx, 10–80m, fitted with 160m, calibrator, 100–400Hz cw filter, exc cond, not transistorized, £95 ono. FP400, £8. Buyer collects. Tel 01-648 5895.

Pye Pocketphones, pair xtaled for 433·2, wkg but require alignment, comp with spare nicads, £20. Plus postage. *Wanted:* Gen on fitting S-meter to Cambridge. G4FAE, 14 Windsor Avenue, Littleover, Derby DE3 7ER.

HW202E, fitted HWA-202-2 and six xtals, £100. Heathkit psu HP23, £30. Europa B, 2m, £60. Yaesu FL400 tx, £120. G3YEP. Tel 0272 40308.

Eddystone 840C, mint cond, £45. Eddystone EC10, mint, £45. Handy. Tel Coventry 22201.

AM10B tx unit, a.m./fm, vxo controlled with xtals. AM10B inverter transformer and modulation transformer. Chokes, 5H each 250mA, 3H each 200mA. Collins 250kHz ssb filter. *Ham Radio* Dec 72–Nov 73. *Wanted:* Faulty AM10 high band rf board. 70cm folded dipole element. G8CXK. Tel 050981 2433.

New valves. 30F5, 50p. 10 for £4. 30FLI, 20P3, 50p. 6BW7, 6FI, 6F24, 6F33, 30FL13, 40p. 6F18, 6F23, ECF80, EF91, PCC189, PCF86, EF95, 30p. 6F29, EF80, EF85, PCC89, 20p. EB91, 10p. Plus postage. *Wanted:* Stamp collection accumulation. G3AAE, QTHR. Tel 01-508 3669.

Property of late G5IV. G2DAF ssb tx, wiring almost completed, all new specified components, filter, cabinet, etc, first £25 secures. HD power packs, 500V and 350V, mains transformers etc. Prefer buyer collects. G4JJ, QTHR. Tel Barnsley 203704.

Technical Associates audio compressor, £15. SWR single meter, £5. BC221 with charts and psu, £15. Carr extra. G4BRF, QTHR. Tel Polperro 349.

Comp Copar station. AT5 plus h/b mains psu and control box, CR70A gen cov rx, PR30 preselector, RQ10X Q-multiplier, xtal mic, ideal for 160 and 80, £45 the lot. G3ZZL, 46b High Street, Hornsey, London N8.

Storno Viscount CQM 39/25, wkg 2m, comp with controls and mic, very clean cond, ideal mobile or base station, zener stabilized, local and tx oscillators, 10W plus, rf out, bargain, £30. *Wanted:* UHF Pye or Storno mobile. G8JNS. Tel 01-733 3995.

Codar CR70A rx, fitted variable bfo, £35. B. Lewis, 10 Filey Road, St Annes-on-Sea, Lancs FY8 3EZ. Tel 722652.

KW2000E, wks checked, spkr, pa, £300. Green Davis linear 80/10, £100. Standard SR146A, 2m fm, £100. Exchange lot. *Wanted:* FLDX400. Twins FT401, FT101B. G4BNH, QTHR. Tel Shipley 57711.

KW Atlanta ssb tx/rx, ac power supply, £150. Solartron scope, £15. Baldwin valve voltmeter, Mk2, £10. H/B transistor tester, £3. All ono. G8CQE, QTHR. Tel 01-656 5285.

Heathkit SB101 tx/rx, HP23B psu, SB600 spkr, £210. SB610 Monitorscope, £55. HDP21A desk mic, £10. HM102 wattmeter/swr, £10. Or comp station, mint cond, £265. Eddystone 940 gen cov rx, £150. Nichols. Tel Bournemouth 24848.

SEI ssb filter, 5·2MHz, £10. A.M. filter, 10·7MHz, £8. 6146B, new, £3. 6in crt and base, £2. 9V 3in tape deck, £3. 3X 8MHz xtals, £2. Selection MC meters, transformers, slow motion drives, new ics, cheap. SAE details. G8DEV, 15 Chapel Fields, Swinford, Leics.

ZY41 beam, 3-el, £35. Space needed for further experiments. Buyer collects. G3PTN, QTHR.

70cm and 144MHz aerials, rotator, preamps, converters, etc. Lots of other gear, inc two Collard studio tape decks, big transformers, meters, QQVO3/10s, QQVO3/20As. G8EWW, QTHR. Tel Bristol 36994.

Liner 2, immac, comp with mic and mounting bracket, £120 ono. G8JGF, QTHR. Tel Ripley 810280.

IC210, £180. FTDX401 with spkr and mic, £250. Europa 2m transverter, fitted aerial, c/o relay, £50. 2m converter 28–30MHz, £12. KW 75Ω dummy load, £5. Jaybeam 2m aerial, £5. All little used. G4EZK (ex-G8HDC), QTHR. Tel 01-472 6073 after 6.30pm.

Mobile station. Tx TW2 with psu, 12V neg earth, rx TW two-mobile, 6V dry battery, £30. BC221, unmod, all charts, £15. Collect or pay carr. G3AMM, QTHR.

9R59DE, £35. Old HRO, nine coils, £15. PCR2 with mains power pack and battery power pack, £14. Hundreds valves, ex-govt, etc. 12 RF24, RF25, RF26, RF27. Offers. Buyer collects or plus carr. Edwards, 5 Howell Drive, Rhyl, Clwyd.

Advance E2. RF sig gen, £10 plus carr. *Wanted:* 3-el beam, 20m or triband. GM3NVU, QTHR. Tel 032-481 3349.

FT101B, 1hr use, £310. BC221, comp ac p/s, charts and spares, £15. TF144G sig gen, £15. G8KNT. Tel 061-439 5426.

Icom IC2F deluxe, S0, S18, S20, S22, R6, R7, updated with mosfet rf stage, improved modulator as per later Icom equipment, £66. Inspect and collect by appointment. G4DCQ, QTHR.

Trio JR599 Custom Special, good cond, little used, £150 ono. Knight. Tel 0604 842401 evenings.

Liner 2, as new and comp in original packing, £130. *Wanted:* Marconi CR150. G8IJT, 12 Primrose Road, Walton on Thames, Surrey.

Heathkit HW7, £30. Junker hand key, £15. Sig gen TE16A, £4. G4DXN, QTHR. Tel Cheltenham 20409.

Codar CR70A rx, brand new, used 1hr, bought more expensive rx, £35. 10 Salamander Close, Westdale Lane, Charlton, Nottingham. Tel 0602 249165.

HQ1 minibeam, had little use, going uhf, £30. G3JNY, QTHR. Tel Garforth 3058.

Liner 2, with mains psu, mobile mount, manual, £110. Constant voltage transformer, 230V, 250W, £10. GW8HDH, QTHR. Tel 0792 22287 after 6pm.

FT221, six months old, with xtal toneburst/timer, £320. CDE AR40 rotator, £30. 10XY Jaybeam, 2m, £11. 70cm 46-el, £10. Pye Westminster W15U, plus xtals for 433·2, RB4, RB14, £70. Kodak Retinette, 1A, £7. G8EII, QTHR. Tel Hitchin 55634.

Comdel speech processor, brand new, unused, £28. Drake Q-multiplier model 2BQ for Drake 2B, £12. *Wanted:* Drake T4XC plus power supply. G2UZ, QTHR.

Teleprinter Creed 7B, in good wkg order with base and silence cover, plus ±80V loop supply and motor supply, clean copy GB2ATG news, £25. 7N/RP, works receive and perforates, some damaged keys, £8 or break spares. G3KRC, QTHR. Tel 01-449 9653.

Frequency agile audio filter, Datong model FL1, mint except for connectors, £40. Riminton, 17 River Mount, Walton on Thames. Tel 20898.

Creed 7B, quick sale, no cover, only £12. New RSGB *RTTY Handbook,* £5. Offers welcome. M. Prince, 175 Spies Lane, Halesowen, Worcs.

3½-digit fully multiplexed display, with counting and control logic, mains power supply (three stabilizer supplies), in case measuring only 5½ by 2¾ by 9in deep, consists two plug together double-sided pcbs, as new, with circuit diagram, £18. G3KRC, QTHR. Tel 01-449 9653.

G2DAF tx, exc example, £45. G2DAF rx, £25. Both good wkg order with psus, would sell together for £65. Kokusai MF455-10CK filter with xtals, £10. G3UXV, 189 Ongar Road, Brentwood, Essex. Tel 0277 221604.

FR101DD digital, plus extra xtals 2 and 4m, boxed, as new, £450. Pye LC10 fm boot, comp, same as FM10B highband, £120. Redifon highband portable, fm on four ship channels, can be converted to 2m, £90. Pye FM10B on 2m, £100. James. Tel 03€2 2437.

Preselector PR40, 1·5–35MHz, £13. MM 2m converter, 2–4MHz i.f., £11. Xtal filter, cw, 600Hz, 9MHz, XF9C for FT501/201, etc, boxed, as new, £14. Prices include postage. Newstead. Tel Leicester 415501.

10ft sailing dinghy, with road trailer and launching trolley, £150 or exchange for mf/hf ssb/m station with mobile psu. G3TJQ, QTHR. Tel 01-679 1089 evenings.

FTDX401, FV401, spares, as new, £290. BC221 regulated psu, perf, £25. Cambridge AM10/144, tunable front-end, £19. BICC lattice mast, 4 by 10ft sections, £28. UHER 4000S portable recorder, psu/charger, battery, leather case, £40. G3JBQ, QTHR. Tel 0296 73422.

Exchange: Olympus Auto-Eye 2 automatic or manual 35mm camera, f2·5 Zuiko, 10 speeds, leather case, Leitz Pradolux f2 8 by 100mm projector and case, with Hunter portable screen 48 by 36in, for KW600 or similar, linear amplifier, must be perf, with manual, or why? G2BTY, QTHR. Tel Devoran 863198.

Liner 2, 144·10–144·33MHz, with preamp, good cond, £110. Belcom psu, £12, or part exchange for Trio TR7200G. Storey, 13 West Crescent, Matlock, Derbys. Tel Matlock 3813.

FTDX401, FV401 vfo, SP401 spkr, £300 lot. Buyer collects. G2ACK, QTHR. Tel 0342 21221.

Western Electronics quad, fair cond, £15. Buyer must collect. G3YNV, QTHR. Tel Maldon 55641.

KW77 rx, late model, good cond, manual, £70. Buyer collects. Pearson, 7 Bridge Street, Titchfield, Fareham, Hants. Tel Titchfield 43410.

Trio JR310 10AZ narrow band filter, £55. Trio 9R59DS with stabilizer, £40. Heathkit Mohican, needs aligning, £15. Pye base high band, 3–20 final, £7. Radiometer, Denmark a.m./fm modulation meter, 3–320MHz, £12. Buyer collects. G8CZH, 33 Southend Crescent, London SE9. Tel 01-237 4581 ext 413.

FT101 Mk1 with fan, 160m, cw filter, £300. SB220, £300. All parts for stereocode unit, £15. Lpf, £5. Ten-tec KR5 keyer, £20. Microwave Modules 2 and 4m converters with LO outputs, £15 each. All ono. G4AOS, QTHR. Tel 061-766 3013.

Yaesu FT2FB 2m tx/rx, fitted 144·48, 144·60, S0, S20, S21, S22, S24, R5, R6, R7, £100. G3UHK, QTHR. Tel 06286 3040.

IC202, fitted four xtals with 13W linear, spotless, £153. Yaesu YC601 digital display for 401 and 101 series, new, £80. G5NN, QTHR. Tel Winslow 2498.

KVG xtal filters, unused, with xtals—XF9B, £28. XF9M, £20. Two BFR90, £1 each. Two MC4044P, 50p each. BAY96, £6. BAY66, £3. Three 2N3632, £1.50 each. QQVO6-40A, £3. G4AJC, 21 Northcroft Road, West Ewell, Surrey. Tel 01-393 1876 evenings.

FL200B, FR100B, 813 Linear 6, 813's Class D wavemeter, spare valves for all, £180. Linear in same type of cabinet as rig to match. Buyer collects any time. G2FPN, QTHR.

Amateur bands rx, Lafayette HA600A, new, accept £45. G8KDW, QTHR. Tel 08277 2348.

TR-4C ac psu, spkr, one year old, mint cond, £425. GI3YDH, QTHR. Tel Belfast 643913.

70cm Pye W15U Westminster boot mount, wkg on 433·2, comp, £80. 70cm ⅝λ mobile whip, £5. Prices inc carr. G3VSJ, QTHR. Tel Hoddesdon 68052 after 6pm weekdays or weekends.

Audio rx bandpass filter, 1W o/p, nine integrated circuits, eight switched positions for 2·5kHz–200kHz and 110–50kHz for cw, readability on a.m., ssb, fm and cw, operates on 9–15V, as new, made by Technical Associates, cost £32 new, now £18. Plus 60p p/p. SAE for reply. Reason for sale—buying a Datong filter. A. E. Card, 8 Penylan Road, Upper Loughor, Nr Swansea, Glamorgan SA4 2QG.

Datong model FL1 frequency agile audio filter, as new, £35. Ashai 80/40 trap vertical, brand new, £20. SSM 4m converter, 28–28·7MHz i.f., brand new, £10. Dexbeam 20–10m beam, comp with matching stub, £12.50. Postage extra. G4DHA, QTHR.

Thumbwheel edge switches, Decade type, ex new equipment, 50p each inc postage. *Wanted:* Storno 600/700 series RT, any band or cond. Adamson, Woodend, Victoria Road, Kingsdown, Deal, Kent CT14 8DY. Tel Deal 3788.

Heathkit HW30 2m tx/rx, less xtal, plus auto trans, £18. Tech TE15 GDO, £13. MFJ ssb filter, £8. P. Barker, 11 Dipton Gardens, Tunstall Estate, Sunderland SR3 1AN. Tel 226883.

KW2000B, with ac psu, spkr, vgc, new pa tubes, £180. G4EBI, 99 St James Road, London SE16 4RA. Tel 01-231 0879 evenings.

FDK Multi 2000 fm/ssb tx/rx, fitted T&T preamp, manual, toneburst. Offers. G8JXW, QTHR. Tel Bedford 59327.

Drake T4XC, R4C, 160–10m, plus 1·5kHz filter, 10/15MHz WWV spectrum, ac psu, mint cond, trial by sked and personal visit, £850. G3SVH, QTHR. Tel 0922 414524.

Versatower SP60, four months old. Hy-gain TH3 SNR beam with BN86 balun, two months old. TR44 rotator, 120ft of RG8U HD coaxial and rotor cable. All as new with original packaging. Offers. Tel Nottingham 54047.

Three Telequipment S32-A oscilloscopes, faulty, £8 each. Airmec modulation meter model 409, £10. Jap swr meter, £4. Old Collaro 3-speed tape recorder, 10in reels, £2. *Radio Communication Handbook,* £2. Callers only. *Wanted:* Aerial rotator. G2BUW, QTHR. Tel Romford 43122.

Exchange my Liner 2, plus cash adjustment, for KW2000A/B, SB101/2, or similar. Valves or any bits for big amplifiers always wanted. Morse, 1 Waterfield Close, Cheltenham, Glos.

Liner 430 70cm ssb tx/rx, £210. Icom IC202 2m ssb tx/rx, £130. Linear amplifier for IC202, 25W o/p, £20. Heathkit HW17A a.m./fm tx, £25. Magic memory knitting machine, £60. Sherratt, 32 Springfield Way, Cranfield, Beds MK43 0JN.

FT201 tx/rx, used rx only, mint, £300. Will consider genuine near offers. Trio LF30 lp filter, £10. 18AVT/WB uncut whip section, £40. All above with instruction manuals. MM 28/2m converter, £15. Prefer buyer inspects/collects or carr at cost. Tel 0273 415291.

KW Valiant tx, 160–10m, KW76 rx, 160–10m, plus solid state psu, good appearance, wkg cond, £45. *Wanted:* KW E-zee match. G3VCA, QTHR. Tel 01-848 8185.

HC25U xtals, suit KP202 (rx 14MHz), S21, S22, R4, R5, R7 (tx 12MHz), S22. In 44MHz rx, S20, S22, suit 2200G. Prefer exchange for S23, S24, R3, to suit 2200G, or why? P. Martin, 16 Chestnut Drive, Broadstairs, Kent.

Exchange KP202, with all accessories, Immac cond, for Trio 2200G and accessories in same cond. All replies answered. T. R. Slack, G4ANW, 16 Chestnut Drive, Broadstairs, Kent.

Trio 9R59DS rx, xtal calibrator, voltage stabilizer, SP5 spkr, vgc, £50. Ferranti clamp-on ammeter, clamps around insulated conductor, measures up to 1,000A (50Hz). Taylor, 3 Highfield Close, Ravenshead, Notts. Tel Blidworth 3808.

Frequency meters. LM14, original call charts, stabilizer, psu, £20. Lavoie 105SM, 375-725MHz, £10. Sig gen, Marconi TF144G with handbook, £18. Valve voltmeter, Marconi TF899A, £8. G8AFU. Tel Guildford 223652.

Little used FT101, £220. As new FR400DX, £150. New 4X150A and base, £7. New 4CX250B and base, £8.50. No chimneys. QV0640A, £3. 3–20A, £2. 3E29, £3. 4m mosfet converter, £6. G3DOV, QTHR. Tel Watton 882076 after 7pm.

IC22A, as new and boxed, 10 tx/rx channels fitted with xtals, ic toneburst, 55s timeout warning tone from loudspkr, mic, mobile mount, plus stand for base station operation. Offers. KW2000B with ac psu, perf, mint cond, little used and boxed, £225. G3XFB, QTHR. Tel Brewood 850033.

Heathkit oscilloscope, 10–102, new, £60. Oscilloscope probe, £4. Mobile power supply, £35. Technical books. Tel Lincoln 65675.

Eddystone GC rx model EC10A2, with marine band, solid state in mint cond, best offer over £170. G4CMN, QTHR.

Pye pocketfone PF5UH, hand-held, xtalled 433·2, comp with ni-cad, £50. Scott. Tel Holsworthy 253550 daytime.

Heathkit GR78 gen cov rx, bandspread, vgc, manual, £60. Swr/fs meter, new, £5. BC221 psu, £15. Buyer collects or carr at cost. G8JQX, QTHR. Tel 01-648 6117.

Multi 2000, vgc, fitted preamp, cmos toneburst with original packing, manuals, etc, £250. Liner 2 with vxo controlled 28·5MHz o/p, £140. U10B wkg 433·2, RB2, RB4, £50. Galaxy V Mk2, £150. *Wanted:* FT101, TR3200, PF1 rx board. G8GHZ, QTHR. Tel Northampton 61794.

Heathkit HW32A, 20m, mic, Eddystone spkr, exc cond, £50. R220 70·26MHz squelch rx, £5. G3PSH, QTHR. Tel Thatcham 62289.

CT82 noise generator, all cables, manual, mint, £25. AM10D high-band narrow filter, mint, £38. Both carr extra. Hammarlund SP400 S-meter, £5. HC/6U 1MHz xtal, brand new, £2. *Wanted:* Siemens Kriegsmarine E52B rx, cond and price. G3GUU, QTHR.

Transverter, near comp, similar Magnum 2, all parts and valves, Microwave Modules converter built in prof cabinet, £45 ono. Woden HT transformer, 500-0-500 each 150mA, 5V each 3A, 3·15-0-3·15 each 4A, choke, £6. Philips EL3302 cassette recorder, little used, £10. G8FIH, QTHR. Tel 0249 812047.

FT101 Mk2, 10-160m, FV101 and SP101, little used, £320 ono. Storno Viscount xtal shaft, fitted S0, S20, R6, R7, PA3 preamp, controls, cables, data, £40 ono. Pye base station, transformer and choke, £4. Sinclair 3000 stereo amp, £20 ono. G8FIH, QTHR. Tel 0249 812047.

Xtal Oven-Marconi Co type F3006-OZ, uses 24V at 2A, temp zs 79·5°C, stable to 0·005°C, uses xtals with B7G bases, ideal for standard frequency sources, £25 ono. J. R. Ward, Corpus Christi College, Cambridge.

Codar AT5 with mains psu, £18. Sentinel MF 2m converter, as new, £15. Sinclair Oxford 100 calculator, £5. Buyer collects. G4DOV, QTHR. Tel Walsall 27738.

Two band minidipole, 40/80 trapped aerial, Waters Stanton, as new, cost £10.35, sell for £6. 4/6JS6, £4.50. Heath r/c bridge C3U, £10. Heath vtvm IM11 with rf probe, £18. G5ND, QTHR. Tel Blackpool 64508.

Liner 2, £110. Scruffy FT2 auto, £85. Marconi rf power meter, 10/25W, 500MHz, 50Ω, £35. G8DGR, 56 Hedgerley, Chinnor, Oxon. Tel 0844 52772.

2m 4-el quad Jaybeam, one month old, exchange 70cm aerial or £9 carr paid. G3TDJ. Tel 0288 3701.

TW communicator, 2m, 12V a.m., £35. Cornishman ssb tx chassis TT21, pa, psu, etc. Offers. Ex-govt Desyn indicator and drive, £7. Ex-govt 70MHz sweep monitor/double beam scope. Offers. G3WTF, 7 Beechwood Grove, Shipley. Tel 0274 51919.

TA audio filter, exc cond, £15. RF field indicator FL30HA, can also be used as a phone monitor, £2.50. Both items with instructions, post paid. G4CKA, 41 Park Mount Drive, Macclesfield, Cheshire. Tel 25154.

Redifon GR286/STR28 marine, vhf, comp with remote control unit RC91 and cable termination box, handbook, £55. Carr extra. Valves, maker's original cartons, Brimar 6146, £2.25. Sylvania 6DQ5, £1.75. Eimac 4CX250B, £5.25. G3JMJ, QTHR. Tel 073-271 3467.

Cambridge Dashmount a.m./fm tx/rx, S20, 145·800, tx 145·000, 145·600, 144·800, £40. AR88LF with discriminator, revalved, spkr, £45. 28–30MHz converter, £5. A510 rx with built-in 12V psu, 2–10MHz, £10. G8JRN, QTHR. Tel 0632 852925.

"CQ Magazine", comp calendar years 1967 to 1971 inclusive, vgc, £2 per year. Buyer to collect Kingston on Thames area. G8DFT. Tel 01-942 1230 after 5pm.

Trio TR2200G, exc cond, original box, fitted S0, S20, S22, R4, R5, R6, R7, automatic toneburst, case, mains psu, nicads, charger, helical whip, £100. Transistorized fm amplifier, 1W in 10W o/p, coaxial relay switching, rf sensing, £18. G8ENI, QTHR. Tel Cheslyn Hay 415374.

KW2000B, mint cond, with ac psu and Shure 444 mic, £200 ono. Bassil, 12 Pewsey Place, Southampton. Tel 772812.

Standard C146A 2m tx/rx, 3ch, nicads, matching mic. Offers. 4CX250Bs, used but OK, £1 each. G4DML, QTHR. Tel 03745 3784.

Sommerkamp FT250, mic, good cond, £220 ono. Liner 2, £98. Telford TC7, £30. Dynatron stereo cassette recorder, £50. Texas stereo amplifier, 20 + 20 wpc, £24. Sentinel converter, 28/30 i.f., £10. 70cm converter, 28/30 i.f., £6. Buyer collects. G3UCS, QTHR. Tel 0562 64393.

Multi-2000, toneburst, preamp, £250. Burndept 5W uhf mobile tx/rx, £50. Wharfedale corner spkr cabinet with crossover, £20. Eight-track cartridge mechanism, £6. Pye tx, 100W, 2m, £30. Ellams duplicator, £8.50. Quantity Mullard valve test cards, 20p each. G3TGF, QTHR.

Trio 2200G, 11ch, nicads, etc, no mods, eight months old, £110 ono. *Wanted:* Storno CQL662 uhf fm mobile. Storno 600 series osc, rf and af modules. G8INL, QTHR.

Murphy TR821/25 12V radio telephone, wkg on 2m, with preamp and xtal oven, £20. RCA ssb L1 radiotelephone, 80–15m, 150W, extl 80m vfo, £40. AR88D, wkg, £20. Pye base Ranger wkg 2m, tx fm, internal mains psu, £10. 1·6-4MHz USB RT tx modules, £20. G3VPE, QTHR. Tel 021-777 1320.

Stolle memomatic rotator, as new, boxed, £20. All components for 300W hf linear, inc psu, £10. Ditto 2m 90W linear, £10. Ditto 2m ssb transverter for FT/101/200, etc, £14. 6GJ5, new, boxed, £3. Resio ribbon mic, £6.50. G2HCV, QTHR. Tel 01-954 2960.

DST100 gen cov rx, 126kHz-30MHz, slow tuning i.f. 2MHz, 100kHz. Offers. *Wanted:* Amateur bands only rx, eg KW77, JR500, FR50B, etc. Mark Surgeon. Tel 01-858 5831 after 6pm.

QM70 144/28 solid state transverter, £35. MM 144/28 converter, £12. Both OK. G4FCN, 2 Causeway Cotts, East Street, Ipplepen, Newton Abbot, Devon.

"Bulletins", "RadComs", half vol 12 through to and incl vol 45, 11 odd copies missing. Offers over £20. G5DW, QTHR. Tel 0458 72732.

Heathkit RG1 rx, 0·6-32MHz, £30. KW Geloso high gain amateur band converter, 10-80m, £20. Sell together or separate, both good wkg cond. Revill, 74 Selworthy Drive, Stafford, Staffs ST17 OPP. Tel Stafford 63387.

Green Davis PGLAI linear, new, unused, tube, £60. Conversion kit TA33Jr to Mustang, as new, £25 or offers. Buyer collects or carr extra. G3NOF, QTHR.

Drake outfit, R4C, T4X, AC4, MS4, rx with 4NB, FL500, FL250, and 160m xtal, just over one year old, beautiful, present cost £1,075 rising, nearest £750 takes. G3RUG. Tel 061-439 7183.

FR50B, calibrator, Lafayette HA500 with manuals. Offers. Seen anytime. Would exchange for EA12 with cash adjustment. W. Evans, 7 Castle Street, Clackmannan FK10 4EJ, Scotland. Tel Alloa 215449.

Eddystone 730/4 gen cov rx, immac cond, with manual, £60. MM 144MHz converter, 28–30MHz i.f. with 116MHz osc o/p, vgc, £10. G2CST. Tel Glossop 61062.

Comp station. FRDX400S rx, fitted all options, FLDX400 tx, both mint, h/b 2m transverter wired to match, £320. Consider splitting or exchange mint TS700, FT221. Liner 2 with all accessories, vgc, £100. Wood, G4CWS/A, 4 Vyrnwy Road, Saltney, Chester.

Heathkit HW32A 20m tx/rx, 200W p.e.p. with mic, manual, but less psu, exc for dx, good cond, £65 ono. McCudden, GM4DLU. Tel Alexandria 56118.

Pye W15 fm 2m Westminster, 10ch, aligned, wkg on 2m, comp with £50 worth of xtals for R6-R7, reverse R6-R7, S0, S20, S21, S22, 144·48, 145·09, £130, or less xtals £80. G3VSJ, QTHR. Tel Hoddesdon 68052 after 6pm or weekends.

FRDX400, comp, all xtals, cw filter, 2m converter, FLDX400 matching tx. Offers. FT101, fitted 160m. G3ZTK, QTHR.

Heathkit HA14 1kW linear amp, with psu, good cond. Offers. Speech processor built from Datong module in sprayed diecast case, £26. G3ZVC tx/rx board, wkg, £45. 75Ω dummy load, £6. Xtal calibrator, 100 and 10kHz to 200MHz, £4. G4BJG, QTHR.

KW2000A, ac psu, manual, £125. Codar Q-multiplier, £5. SWR bridge, £2. FSM/Audio monitor, £2. HQ1 minibeam, two months use, £35. G4BJM, QTHR. Tel 0908 72463.

Trio JR310 rx, 160–10m a.m./ssb/cw, 10AZ narrow mech filter, 25/500kHz led display xtal calibrator, handbook, etc, £70. Liner 2, 144·10–144·33/144·30–144·53MHz, tx mixer mod low spurious, preamp, handbook, etc, £110. G8KHW, QTHR. Tel 01-399 0361.

Honda generator E300E, little used, £65 ono. 931A, £2. 100 assorted B9A, B7G valves, £6 the lot. Several older types, mains transformers, blowers, relays, etc. Nominal offers accepted from callers. G6XN, QTHR. Tel Petersfield 3981.

WANTED

Exciter tune variable capacitor for National NCX3 tx/rx. *For sale:* AR88 rx, fitted with S-meter, £38. Carr extra. Callers welcome. Jeff Davies, 44 Heol Nant, Swiss Valley, Dyfed, South Wales.

Solartron D300 oscilloscope, operating and service manual. Will buy or borrow. *For sale:* Mono Bush mains record player, BSR deck, £9. C. Wilcox, 10 Perrin Avenue, Kidderminster, Worcs. Tel Kidderminster 5146.

432 ssb transverter, 28MHz i/p, solid state, consider h/b. Trio JR310 and 2200, any cond. *For sale:* 26–30MHz 100W mobile linear, ssb/a.m., solid state, rf switched. Offers. Exchange MM432/28 for 432/144. All letters answered. G8KZH, 245 Stourbridge Road, Halesowen B63 3QU.

KW Q-multiplier, cond and price please. G3ZJK, QTHR.

Manual, to buy or copy for radiometer modulation meter type AFM1. G8HNN, QTHR. Or G8DXD, tel Worcs 20135.

FT220, cond unimportant. IC210. Price and details to G4DCQ, QTHR.

Eddystone 770R, cover 2–4m, plus p/x. Brand new GEC Starbeck radio cassette recorder. Wien digital clock. Radio headphones. Harvard stereo volume tone controls, as new. 770R, mint. All letters answered. L. D. Ireland, Carnhell Green, Camborne, Cornwall. Tel Praze 236.

Linear amplifier, KW600, KW1000, SB200, FL2000, FL2100 or similar. G3SZY, QTHR. Tel Stetchworth 366.

Circuit for Marconi AD108D rx, buy or borrow. Gates, 16 High Mill Drive, Scarborough, N Yorks YO12 6RN.

Pair 813s and bases, would consider linear having these valves, alternatively a pair of similar power valves with hardware. G3APV, QTHR. Tel Seascale 449.

Rustrak pen recorders. Advance CVN constant voltage transformers, 117 or 240V. Frequency standards. RCL bridge. Manuals EEC0 880A-881M vlf rxs. Tracor frequency difference meter S27A-B. Metal cased tv monitor. Desk calculator, not less than 10 digit plus two exp. Fletcher, 62 Moorbridge Lane, Stapleford, Notts. Tel 0602 397446.

Handbook for Hallicrafters HT46, circuit diagram would do. Will buy or copy and return. GM4BHA, QTHR.

Hallicrafters Super Skyrider, any information, circuit, handbook, or anything to do with set, will be paid for. Bovingdon, 6 Roberts Lane, Horn Hill, Chalfont St Peter, Bucks.

W1191A wavemeter, circuit diagram and/or instruction manual, xtals for same. Six GJ5 valves, new or used. G3ZLA, 17 High Street, Needham Market, Ipswich, Suffolk IP6 8AL.

Katsumi electronic keyer type EK105D. Cunliffe, G4EII, 50 Langholm Road, Garswood, Wigan, Lancs. Tel Garswood Park 711316.

High band Pye Cambridge, dash mounted, fm or a.m., must be in reasonable cond. Brian Smith, G4ETN, 30 Dorset Road, Bridgwater, Somerset TA6 5PR. Tel 51357.

Genuine RAF leather flying jacket, must be in reasonable cond, state details and price. All letters answered. P. I. Martin, G4AZC, "Oakcroft", Kingston Lane, East Preston, Sussex. Tel 090-62 73145.

HF bands aerial, 12/14AVQ, or KW trap dipole or beam or similar. Low pass filter. DC psu for Yaesu FT200. HF mobile aerial. 4m converter and aerial. Dummy load. HF atu. G4EVZ, QTHR. Tel Romford 45733.

Viceroy Mk4 or similar tx, must be in fb cond and no mods. Dummy load to suit, have no car so must be not too distant for inspection. All letters answered. G3WXT, QTHR.

E-zee match. TZ40 valves. Non-wkg but comp FTDX401. G3FYW, QTHR. Tel Sleights 280.

2m fm tx/rx, HW202, TR7200G, IC22A or similar. Will collect. Doyle, 4 Wricklemarsh Road, London SE3 0NF. Tel 01-856 7478.

Yaesu FT101B or KW2000B/E, state cond and price. Freeman, G4EUN, Malleson Road, Gotherington, Cheltenham. Tel Bishops Cleeve 2393 after 6pm.

Tx/rx, Trio TS520, Yaesu FT201, FT401, etc; accessories, dummy load, swr/power meter, lpf, aerial 14AVQ or 18AVT/WB with instructions, good straight key. Taylor, 3 Highfield Close, Ravenshead, Notts. Tel Blidworth 3808.

HF tx/rx, good or any cond, please give full details. Will pay Securicor. F. J. Crisp, G3GZJ, Rame Barton, Rame, Penryn, Cornwall TR10 9DY.

Joystick vfa, atu 111A (1·6-30MHz), or similar. Berrisford, 4 Blythe Way, Solihull, West Midlands B91 3EY. Tel 021-705 0759.

Hudson FM208 circuit diagram to photocopy, costs met. ITT 10·7MHz xtal filter type 923B. G8FHN, QTHR. Tel Medway 63365.

Heathkit tx, either SB400 or SB401, cond immaterial. John Clarke, G4FFD, Rosebank, Canon Pyon, Hereford. Tel 043-271 374.

JR310 or similar amateur ssb rx. Needham, 76 Wolverton Road, Bournemouth. Tel Bournemouth 301140.

Trio JR310, vfo 5D, can be faulty, I pay shipping. H. Kotowski, Sibeliusgången 32, S-16323 Spånga, Sweden.

Yaesu FL50 with manual. G2ALL, QTHR. Tel Comberton 2354.

Urgently required. 18AVT/WB or similar 80–10m trap vertical, must be in good cond. G4ERD. Tel 01-845 6452 after 5pm.

Eddystone 770R rx, 30MHz, plus portable double beam scope, must be vgc. G3VXZ, QTHR. Tel Maidenhead 27350.

Mint KW2000B, with ac psu, remote vfo, or last item alone. Would travel reasonable distance to inspect. G5VT, QTHR. Tel 0279 53172.

VHF frequency meter, minimum coverage 40–150MHz, prefer cheap but accurate, comp with manual. Details and size to C. Raine, "Broomhill", Edgehead, Pathhead, Midlothian EH37 5RN.

KW Supermatch 109, or E-zee match dummy load and swr meter. G3WVW, QTHR. Tel 01-529 8550.

RSGB SLOW MORSE PRACTICE TRANSMISSIONS

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

Clock time	Callsign	MHz	Mode	Town
Sundays				
0900	G3WNR	145·600 omni-direct	F2/F3	South Shields, T & W
0930	G3LEQ	1·815	A2/A3	Knutsford, Cheshire
		144·250	A1/A3J	
		145·250	F2/F3	
		433·200	F2/F3	
1015	G3CGD	1·875	A1/A3	Cheltenham, Glos
1030	G3NPB	1·875	A1	St Ives, Cornwall
1030	G3LR	1·810	A1	Accrington, Lancs
1030	G4DKK	1·970	A2/A3	Caterham, Surrey
1100	G2FXA	1·900	A1/A3	Stockton-on-Tees
1130	G3BLS	1·920	A1/A3	Osney, Oxford
1200	G3HVI	144·750 omni-direct	A2/A3	Stoke-on-Trent, Staffs
1230	GC4CHY	144·500 to north	A1/A3J	St Peter Port, CI
1500	G4EHW	144·250 to southwest	A1/A3J	Peterborough
1815	G4DVZ	1·915	A1/A3J	Leeds, Yorks
1830	G3NCZ	1·920	A1/A3	Blackburn, Lancs
Mondays				
1800	G3SWR	1·980	A1/A3	Birmingham
1830	G3VBI	1·910	A1/A3	Goole, Yorks
1900	G3ZRZ	1·980	A1/A3	Blackpool, Lancs
1930	G3RAF	1·920	A2	Locking, Avon
		3·550	A2	
		145·475	A2 or F2	
1930	GI3SXG	144·110	A1/A3J	Newtownards, Co Down
2000	G3IBJ	1·910	A1/A3	Southampton, Hants
2000	G3XWZ	1·910	A1/A3J	Mansfield, Notts
2000	GM4ELV	3·570		Arrochar, S/Clyde
2030	G3ASR/A	1·875	A2/A3J	Harrow, Middlesex
2130	G3LQI	145·300	F2/F3	Lancing, Sussex
Tuesdays				
1800	G3SWR	1·940	A1/A3	Birmingham
1830	G4BNA	3·590	A1	Swindon, Wilts
1930	G3RAF	1·920	A2	Locking, Avon
		3·550	A2	
		145·475	A2 or F2	
2000	G4AEU	1·910	A1/A3	Southampton, Hants
2000	G3EFS	1·914	A2/A3	Bromley, Kent
2000	G4EZA	145·200 omni-direct vertical	F2/F3	Colchester, Essex
2045	GM3CRY	3·550	A1/A3J	St Andrews, Fife
2045	G4AEU	145·550 omni-direct vertical	F2/F3	Southampton, Hants
2130	GM3UAG	145·800 to south		Ellon, Aberdeenshire

Clock time	Callsign	MHz	Mode	Town
Wednesdays				
1930	G3RAF	1·920	A2	Locking, Avon
		3·550	A2	
		145·475	A2 or F2	
2000	G8QU	1·970	A1	London N22
2000	G3BPE	1·975	A1/A3	Bexley, Kent
2000	G3SWP	144·200 omni-direct	A2/A3J	Doncaster, Yorks
2000	G4EHW	144·250 to southwest	A1/A3J	Peterborough
2015	G3WVJ	1·845	A1/A3	Staines, Middlesex
2100	G3HVI	144·750 omni-direct	A2/A3	Stoke-on-Trent, Staffs
Thursdays				
1800	G3SWR	1·980	A1/A3	Birmingham
1830	G4BNA	3·590	A1	Swindon, Wilts
1830	G3NC	1·968	A1	Swindon, Wilts
1900	G3YEI	1·850	A1	Fleetwood, Lancs
1900	G3BLS	1·920	A1/A3	Osney, Oxford
1930	G3RAF	1·920	A2	Locking, Avon
		3·550	A2	
		145·475	A2 or F2	
1930 .... (1st and 3rd weeks of month only.)	G3ASR/A	1·875	A2/A3J	Harrow, Middlesex
1930	G3ZRZ	1·980	A1/A3	Blackpool, Lancs
2030	G3KGU	1·915	A1/A3	Theydon Bois, Essex
2130	GM4CAU	145·800 to north		Aberdeen
2130	G3LQI	145·300	F2/F3	Lancing, Sussex
Fridays				
1800	G3SWR	1·940	A1/A3	Birmingham
1900	G3NPB	1·875	A1	St Ives, Cornwall
1900	GC4CHY	144·500 to north	A1/A3J	St Peter Port, CI
1930	G3PQF	144·360 to north-east	F2/F3	Farnborough, Hants
1930	G3RAF	1·920	A2	Locking, Avon
		3·550	A2	
		144·475	A2 or F2	
2000	G4EHW	144·250 to southwest	A1/A3J	Peterborough
Saturdays				
0930	G2FNK	1·930	A1/A3J	Staines, Middlesex
1145	G4DYF	3·590	A1/A3	Sevenoaks, Kent

G3BZU morse proficiency transmissions at 15, 20, 25, 30, 35 and 40wpm are made at 2000 clock time on the first Tuesday of each month on a frequency of 3·520MHz.

antenna specialists

THE CHOICE OF DISCRIMINATING USERS

ASP655

130-174MHz ½w 3dB Gain, DC Grounded, Base Station Ant.
Power Capability 100W.
Termination SO-239.
Complete with mounting brackets for masts up to 1½" O.D.
Available now.
£14.44 plus 75p carriage

ASP659UK.

425-440MHz 5dB Gain Base station collinear
Power capability 100W
Termination Female 'N' Type connector.
Complete with mounting brackets for masts up to 1½" O.D.
Available now. £15.49 plus 75p carr.

NEW!

HELICALS FOR THE FOLLOWING PORTABLES

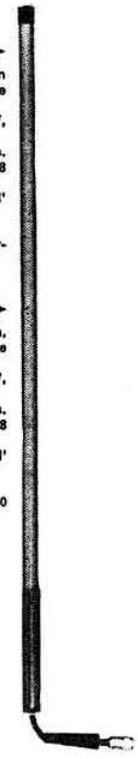
Trio TR2200GX	£3.85
Trio TR3200	£3.35
Icom IC-215	£3.85

(p & p for helicals 40p)

FOR AMATEURS WHO DEMAND THE BEST

ASPA680UK ▶

144-148 MHz 6dB gain DC Grounded Base Station Collinear.
Power capability 350W,
Length: approx. 12'
Weight: approx. 4 lbs.
Rated wind velocity: 118 mph.
Termination: Male 'N' Type Connector.
Available mid July.
£47.25 plus £2.00 carriage.



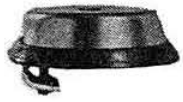
ASPN701UK. ▶

430-440MHz 12dB Gain, DC Grounded, Base Station Collinear.
Power Capability 250W,
Length approx. 18'
Weight approx. 9-5lbs.
Rated wind velocity 128 mph.
Termination Male 'N' Type Connector.
Available now,
£105.00 plus £2.50 carriage.

MOBILE ACCESSORIES

ASP332

Gutter mount suitable for use with ASP629, ASP393 complete with 10' RG-58U cable and PL-259 connector £8.09 plus 50p post and packing.



K-203

No hole boot mount, suitable for ½" hole snap in mount, easily adaptable for other mounts. £3.70 plus 50p post and packing.

ASPR332

Gutter mount suitable for use with ASP677, ASPE667, easily adaptable for use with other antennas. Complete with 10' RG-58U cable and PL-259 connector. £8.09 plus 50p post and packing.

New Magnetic Mount ▶

Shown with ASP629, but also fits ASP393, ASP677 and ASPE667. Complete with 10' RG-58U cable.
£9.19 plus 50p post and packing.

VAT of 12½% to be added to above prices.

Please send SAE for catalogue of complete range.

FOR MOBILE ANTENNAS PLEASE SEE PREVIOUS ISSUES.

© "Stripes of Quality"

We regret to announce that, due to the falling pound, we are compelled to increase the prices of Antenna Specialists by 5% as from 1 November 1976.

AVAILABLE FROM

LONDON
Lee Electronics Ltd. 01-723 5521
Amateur Radio Exchange. 01-567 7681
Terry Barnett, G8BAM. 01-556 9366

KENT
Thanet Electronics. 02273 63859

BEDFORDSHIRE
Alan R. Morris, G4ENS. 0582 414179

AVON
D. G. Smith, G3UUR. 0225 833433
Revon Electrical Services. 0272 669454

YORKSHIRE
The Amateur Radio Shop. 0484 20774
Nick Sheard, G8KLY. 0532 535143

CHESHIRE
Bredhurst Electronics. 0829 260706

SCOTLAND
Ian Mckechnie, GM8DOX. 078683 3223

SOUTH WALES
J. J. Doyle, GW8JEV. 0639 2942

NORTH WALES
Bill Davies, GW8AHI, QTHR

J. YU, 21 Langley Avenue, Surbiton, Surrey KT6 6QN

SOLE DISTRIBUTOR TO THE AMATEUR TRADE

GAREX (G3ZVI)

V.H.F. EQUIPMENT

British is Best! Japanese is popular! We can oblige either way. The British Twomobile as ever was, now joined by its Four metre counterpart. They feature Tx, Rx and PSU for 12V DC input in a single unit 12" × 8" × 4½". Full coverage tunable AM/FM Rx with excellent V.F.O. stability even under mobile conditions. Professional grade sensitivity AND selectivity. Crystal controlled AM/FM Tx. Based on popular R/T components for ease of servicing and ready availability of spares. No price increases yet. **Twomobile £135; Fourmobile £121.50** (inc. VAT).

If you would rather join the Black Box Bandwaggon, we can recommend the **UNIDEN 2030 2m FM mobile Tx/Rx**, all solid state, 10W or 1W switchable Tx with very low spurious level, good Rx sensitivity, toneburst generator, 12 channels. **ONLY £129.38** inc. VAT (1 set xtals fitted, extra xtals £4.50 per set).

Also in stock the **NR56VF-1 2m Rx**, with switched full coverage V.F.O. and 11 xtal controlled channels. **£54.00** (less xtals—£2.41 each).

An s.a.e. brings you full details of any of the above. Credit facilities available and part exchanges welcome.

Reed switch S.P.C.O. 33mm × 5mm dia. (75mm overleads) 10VA rating **40p**
Reed relay coils to match above, 24V (2·5k res.) **25p**
Painton (min. Jones) connectors, chassis mtg. 18 way female **35p**
ditto, 6 way (2 pins at rt. angles) male or female **20p ea. 5 + : 17p**
Cable mtg. 18-way female (complete), **95p**
Valves (tested) EB91, EC91, 6BH6, 6BJ6, 6CB6, EY81. **20p** each
Integrated circuits (new, full spec.)
723 voltage reg. TO5 metal case, 2/37V out at 150mA for 5/40V in **90p**
SN76660 FM quadrature detector **£1.12**
CD4001 AE quad. 2-input NOR gate for tone-burst gen. **40p**
NE555 Timer for tone-burst gen. or time-out indicator **75p**
709 (To5); 741 (DIL8) Op Amps **30p each** (5 + **IC's (any mix) 20% disc)**
Toroidal inverter transformers (with circuits)
Input 12V DC, output 390V 200mA (doubled) **£2.50**
Input 12V DC, output 160/260V 150mA (doubled) (Ranger) **£2.10**
HT choke suitable for 2-3kHz Inverters **60p**
Rectilinear pots multiturn, preset, p.c. mtg. (new)
10, 20, 25,100, 250, 500, 2k, 2·5k, **35p** each, any 5 + : **25p**
Air spaced Trimmers small 20pf, 30pf, large 10pf, 25pf; small 20p with ¼" spindle, **20p** each, any 5 + : **17p.**
Butterfly trimmers large 2 × 17.5pf, 2 × 10pf **80p**
10·7 IFT (valve type) 2½" × ½" square double tuned **25p : 2** for **40p ; 6** for **90p**
Mobile PSU 12V DC input (floating for + or — E) transistor inverter 170, 220 or 380V DC at 180mA, output, fully smoothed chassis section, self-contained, fully wired and tested, with circuit **£5.15**
As above, but partly assembled (as cut out) complete with all components, circuit, finish-it-yourself **£4.30**
BNC 50ohm free sockets (new) **15p** ea; 12 for **£1.30**; 50 for **£4.50**
Neons min. wire end, 6½p each, 10 for **55p**, 100 for **£4.00.**
Resistor Kits. E12 series, 22Ω to 1M, 57 values. 5% carbon film, ¼W or ½W (please state)
Starter pack, 5 each value (285) **£2.40**
Mixed pack, 5 each ¼W ± ½W (570) **£4.65**
Standard pack, 10 each (570) **£4.65**
Giant pack, 25 each (1425) **£11.65**

Replenishments available

PL259 UHF Plugs + reducer **65p** each, 5 + : **55p.**
SO239 UHF Socket panel mtg, **50p** each 5 + : **40p**
Numicators ZM1080 or equiv. **70p** each, 5 + : **63p.**
Nicad Rechargeable cells U7 size, new, **£1.05** each; 4 + : **95p**; 10 + : **88p.**
Mains transformers. multitap primaries
515-450-0-450-515V 240mA, 50V, 50mA, 5V 2A, 6·3V 4A (12 lb) **£6.50**
170-0-170V 90mA, 50V 50mA, 6·3V 3·3A, 5V 2A (5·5 lb) **£2.50**
345-0-345V 150mA, 5V 2A **£3.95**
0-146-232V 160mA, 26·5V 1A, 13·9V 5A, 50V 50mA (10·5 lb) **£3.95**
Auto 0-100-110-150-200-230-240-250, 200VA **£3.25**
HT chokes, 5H 80mA, 4H 240mA, 1H 240mA, 1·25H 350mA, 1·8H 125mA **£1.25**

We are stockists of **REVCO aerials** for V.H.F.—Amateur, glider and P.M.R. band types available.

Authorised distributor for **J. H. Associates Ltd.,** professional quality switches, indicators and special products.

Lists available covering Revco & J. H. products.

Pye p.c. boards and other parts as last month's advert.

Where components are ex-equipment, they are in good conditions, your satisfaction guaranteed. Wherever possible, full supporting data is given. Prices quoted are inclusive of UK post and packing & VAT.

Mail order only. Sole address for orders and enquiries
GAREX ELECTRONICS
7 NORVIC ROAD, MARSWORTH, TRING, HERTS HP23 4LS
PHONE CHEDDINGTON (STD 0296) 668684
6.30pm-9pm AND WEEKENDS ONLY S.a.e. with all enquiries please.

G. W. M. RADIO LTD.

ALL PRICES include VAT and Post/carriage
OSCILLOSCOPES CT346 (CD1014) double beam £65.
WATCHES Quality ex-Ministry. Lemania "Nero" pocket 1/5th second split hand stop-watch, £15. Lemania wrist, stainless steel 1/5th second chronograph, £16.75. Smiths GS (sweep second hand), £9.50. Wrist watches have screw backs and are fully overhauled. Sent by Registered post.
AERIAL insulators 1½" white egg type, 6 for £1. Pyrex 2½", 75p.
TRANSMITTER P.A. units STC T4188, tunes 2.8 to 18Mc/2 manual or 28v motor drive. 13" × 8" × 8. Pair CV2619 (4 × 150) 28V blower cooled. Bases are NOT UHF type. Ideal basis for Linear Amplifier construction, £11.00.
FREQUENCY METERS BC221. Complete charts, no P.S.U. £16.
GENUINE EX-NAVY ships clocks, 8" dial brass case, fully overhauled, £55.
BATTERY CHARGERS. 250 ac input. With information on simple conversion to charge two Ni-Cads at constant current of 25 mA. Two jewelled 30 mA meters, £3.
SEMI-CONDUCTORS. All brand new with information sheets. CA3012. Limiting IF FM amplifier. 2 for £1.50. CA3026 Dual independent Differential Amplifiers, 2 for £1. 2N3623 RF power silicon NPN overlay transistors for high power class C amplifiers (28 volt). Featuring typical output powers of 10 watts at 260 MHz. With data sheet £2.50. 2N1671B Uniunctions, ideal for timers, oscillators and thyristor triggering, 60p BSY95A Logic switch, 10 for 80p. 1N4003 150V 1 amp silicon rectifiers. 10 for 80p. ZTX500 PNP amplifier. 5 for 80p. 74H00 Fast TTL Quad 2 input nand gate, 2 for 80p. BSY38, 350MHz fast switch, 5 for 80p. SJ803-F silicon rectifier, 800 volt 750 mA, 4 for 80p. 333CJ 12 volt HINIL twin gate and quad inverter. 2 for 80p. 41HF40 silicon power diode, 400 volt 40 amp, 75p, 4 for £2.50. BYZ13, 800 volt 20 amp, 85p, 4 for £2.75.
RADIO TELEPHONES. Cambridge boot mounting, Hi or Lo band with control box and cable only, £25. Vanguard units only single channel valve Lo band, no accessories £11. Rank TR1005 Low consumption (quick heat valves). Low band "P" (approx. 99MHz) Internal speaker and mike, (11" × 9" × 3½") £20. Lo band "P" transistor Vanguards with accessories £25. Pye PF1 Pocketphones for 420MHz. Less batteries and crystals. Clean and complete, untested, £20 pair (one Tx one Rx) or with non-amateur band crystals and fully tested, £25. PF1 car adaptors. Rx plugs in and battery is charged. Output taken to 3 watt amplifier and speaker, £15. PF1 mains chargers for 12 Tx and 12 Rx batteries, £11. Ultra Electronics Mains/12V DC 6 channel Lo band Receivers, solid state, £16.

All receivers and Test Equipment are in working order at time of despatch. Carriage charges are for England and Wales only.
Terms: Cash with order Early closing Wednesday

G. W. M. RADIO LTD. 40-42 PORTLAND ROAD, WORTHING, SUSSEX Telephone 34897

C&C electronics

10 West Park London SE9 4RQ
Telephone 01-852 9397

CRYSTALS

MADE TO ORDER CRYSTALS. 50kHz to 216MHz.

CRYSTALS SUITABLE FOR MOST AMATEUR REQUIREMENTS

Holder styles HC6/U, HC18/U, HC25/U 1·5-21MHz fundamental, 21-105MHz overtone. Delivery approx 4 weeks. Specification 50ppm 0-60° or 30ppm at ambient. (Please state required tolerance and I/P capacity on fundamentals). Prices: 1·5-2·6MHz, **£3.28**; 2·6-105MHz, **£2.75**—5% discount for 5 or more crystals. Special rates for Club bulk purchase schemes including free supply of crystals for U.K. repeaters.

Please note crystals below 4MHz not available in HC18/U or HC25/U at the above prices.

SURPLUS CRYSTALS FOR SALE

HC25/U for 2 metres at **£1.00** per crystal.
6MHz X24 for 144·3, 144·36, 144·6 and 145·4.
18MHz X8 for 144·3.
52MHz + 10·7/3 for 144·3, 144·36, 144·6 and 145·4.
HC6/U for 70cms at **£1.20** per crystal.
8MHz X54 for 433·025, 433·55 and 431·350.
12MHz X36 for 433·025, 433·55, and 431·350.
13MHz X32 for 433·550.
30MHz—10·7/14 for 434·625 and 433·550.
11MHz—10·7/36 for 433·550.

CRYSTALS FOR POPULAR VHF TRANSCEIVERS

Crystals supplied in 4 weeks to any stated frequency or the following VHF transceivers: Heathkit, Icom, Ken, Standard, Trio and Yaesu. Price **£2.36**/crystal. 10·245MHz I.F. Crystals in HC18/U 20ppm—20 to +70 deg. C. Price **£2.20.**

LOW FREQUENCY STANDARDS (8% VAT) 100kHz in HC13/U (same base as HC6/U). Price **£3.00.** 1000kHz in HC6/U. Price **£2.80.**

CRYSTAL SOCKETS HC6/U and HC25/U. Price **16p.**

All prices include postage to UK and Irish addresses. Crystals supplied to any specification for industrial, mobile radio or marine use, etc. State equipment/specification when enquiring. Please send sae with all enquiries.

The above prices are ex VAT. Please add 12½% unless otherwise stated.

STEPHENS-JAMES LTD

47 WARRINGTON ROAD, LEIGH, LANCS WN7 3EA TEL 052-35 76790

Shop Hours 9.30am to 5.30pm Mon. to Sat.
Easy access to the M6, M61, M62, M63
NO PARKING PROBLEMS
All Prices include V.A.T.

YAESU MUSEN

FT101EL Transceiver	POA
FT101EX Transceiver	
FT200B Transceiver	
FT401B Transceiver	
FT221 Transceiver	
FR101S Receiver	
FR101S Digital Receiver	
FR101D Receiver	
FR101D Digital Receiver	
FL2100 Linear Amplifier	
YO-100 Monitorscope	
YC-355D Frequency Counter	
YD844 Desk Microphone	
YD866 Hand Microphone	
FRG7 Receiver	£167.00

DRAKE

R4C Receiver	£423.00
T4X Transmitter	£423.00
TR4C Transceiver	£423.00
AC4 AC Psu	£81.25
MS4 Speaker	£18.90
SSR-1 Receiver	£203.00
SPR-4 Receiver	£487.00
Low Pass Filter	£15.00

DECCA COMMUNICATIONS

KW204 Transmitter	£285.00
KW107 Antenna Match	£77.75
KW109 Antenna Match	£92.00
KW Antenna Switch	£6.75
KW Balun	£6.75
KW 1000 Linear	£247.50
KW202 Receiver	£236.50

BELCOM

Liner 2 Transceiver	£184.50
Liner 430 Transceiver	£290.00
NR-56 Tunable FM Receiver	£54.00
FS1007P Transceiver	£198.00

OMEGA

TE-701 Antenna Noise Bridge 2-30MHz	£23.50
TE-702 Antenna Noise Bridge 2-220MHz	£28.00

ROTATORS

AR30	£42.19
AR40	£48.94
CD44	£100.13
Ham II	£133.38
Emoto 102LBX	£61.87
Emoto 110MXX	£129.37

HY-GAIN

12AVQ 10-15-20m Vertical	£33.30
14AVT 10-40m Vertical	£54.00
18AVT/WB 10-80m Vertical	£65.92
TH3MK/3 Tribander Beam	£140.17
TH6DXX Tribander Beam	£163.30
BN86 Balun	£20.25
Bumper Mount	£6.75

ATLAS

210X Transceiver	£444.00
215X Transceiver	£444.00

SHURE

201 Hand Microphone	£8.85
444 Desk Microphone	£23.00

JAYBEAM ANTENNAS

4m 4 Element	£8.72
2m 5 Element	£5.51
2m 8 Element	£7.20
2m 10 Element	£14.71
PBM14/2m Prabeam	£21.60
2m 5 over 5	£10.12
2m 8 over 8	£13.50
2m Ground Plane	£5.34
2m Crossed Dipole	£7.42
SPM Portable Mast	£7.20
8 Element Crossed 2m	£12.80
5 Element Crossed 2m	£11.20
2m 4 Element Quad	£10.80
2m 6 Element Quad	£14.40
D8/70cms	£12.60
PBM/18/70cms	£13.50
MBM48/70cms Multibeam	£15.60
MBM88/70cms Multibeam	£20.80

PLANET

Planet 2m Linear Amplifier	£112.50
Plane 2m Transverter	£112.50
PS2 Power Unit	£34.00

MICROWAVE MODULES

MMC144 2m Converter	£18.00
MMC/144 LO	£19.80
MMC70	£18.00
MMC/70 LO	£19.80
MMC432	£19.80
MMC1296	£24.30
MMA144 Pre-amp	£11.70
MMA 70	£11.70
MMV432 Triplers	£19.80
MMV 1296	£27.00
MMT432/28	£94.50
MMT144/28	£85.50
MMDO50	£66.00
MMD 500P	£27.00
MMD 050/5000 Frequency Counter	£80.00
MMT432/144	£126.00

UNIDEN

2020 80-10m Transceiver	£495.00
2030 2m Fm Transceiver	£174.37

BANTEX

2m Mobile antennas 7 mounts	POA

HUSTLER

SF-2m 5/5 mobile whip	£9.00
C-32 Ball Mount	£4.20
CGT-144 2m LoLinear with mount	£31.50

G-WHIP MOBILE ANTENNAS

10-15-20m Helical Whip	
Basemount	
Coils for LF Bands each	
Flexiwhip Basic with mount	£11.75
Coils for all bands each	£6.25

OSKERBLOC

UR43 50ohm Co-Ax per metre	16p
UR67 50ohm Co-Ax per metre	45p
300ohm twin feeder	8p
70ohm twin feeder	8p
75ohm low loss co-ax	14p
Single meter SWR Meters	£8.40
Twin meter SWR Meters	£12.60
PL259 Plugs	45p
SO239 Sockets	40p
Cable reducers	14p
Line connectors	75p
Junlers Heavy Duty Morse Keys	£25.24
Baeur Paddle Unit	£8.95
SWL Tuning Unit Mk I 2-30MHz	£17.00
SWL Tuning Unit Mk II 550kcs-30MHz	£25.00

ACCESSORIES

UR43 50ohm Co-Ax per metre	16p
UR67 50ohm Co-Ax per metre	45p
300ohm twin feeder	8p
70ohm twin feeder	8p
75ohm low loss co-ax	14p
Single meter SWR Meters	£8.40
Twin meter SWR Meters	£12.60
PL259 Plugs	45p
SO239 Sockets	40p
Cable reducers	14p
Line connectors	75p
Junlers Heavy Duty Morse Keys	£25.24
Baeur Paddle Unit	£8.95
SWL Tuning Unit Mk I 2-30MHz	£17.00
SWL Tuning Unit Mk II 550kcs-30MHz	£25.00

S.T.E. MILAN

ARAC 102 2 band Receiver	£100.00
Atal 222 144-146MHz AM-FM TX	£126.00
AR10 28-30MHz Receiver Module	£37.50
AT222 144-146 Transmitter Module	£50.00
AD4 FM Discriminator	£5.00
AA1 Audio Module	£4.25
AG10 Tone Generator	£4.50
AT23 10 Channel Crystal Tx Module	£39.00
AT20 10 Channel Crystal Rx Module	£52.00
AL8 Linear Amplifier Module	£27.00
AS15 stabilised 12V dc board	£9.00
AK20 2M FM Transceiver	£174.00

TECHNICAL ASSOCIATES

Audio Compressor	£23.62
Notch Filter	£25.60
Band Pass Filter	£25.60
Crystal Calibrator	£21.37
Preselector	£25.70

SECONDHAND EQUIPMENT (in stock at time of going to press)

KW204 Transmitter	£225.00
Eddystone 730/4 Receiver	£150.00
EC10 Mk 1 Receiver	£68.00
EC10 Mk 2 Receiver	£120.00
Eddystone 750 Receiver	£55.00
KW2000B Receiver	£210.00
KW202 Receiver	£200.00
Hammurland HQ70 Receiver	£90.00

Stamped addressed envelope please with all general enquiries. Postage extra at cost. Deliveries free in some areas.

ACCESS AND BARCLAYCARD FACILITIES

Full after sales service. All equipment air tested and sold from above premises. We do not employ any part-time sales or sell to private individual for re-sale. On the spot HP and credit facilities available. Part exchanges welcome. Instant cash paid for good clean equipment or we will sell your equipment for you at a small commission.

2-METRE CRYSTALS

R3-R7, S0, S20-S24, S14 and 145·8 ex-stock: **£2.25** ea. for fundamentals and 44/45MHz HC25U overtones, **£2.85** ea. for 36 and 44/45MHz Pye types. LESS 10% for 10 or more mixed frequencies. Add 12½% VAT.

Clock, reference and toneburst generator crystals as per previous advertisements. Made to order crystals supplied in 4-5 weeks, SAE for details.

2-Metre crystals surplus to requirements in HC6U: 8·078571, 8·014290, 8·058750, 8·080, 8·085714, and 44·74667, all at **£1.40** ea. VAT inclusive.

INTERFACE QUARTZ DEVICES LTD

29 MARKET STREET, CREWKERNE, SOMERSET
Tel: (045031) 2578, Telex: 46283

R.T. & I. offer the finest selection of first-class new and fully overhauled second-hand communications and electronics equipment in the U.K.

- ***Constantly changing stocks of a vast range of equipment.***
- ***Cash or Hire Purchase terms easily arranged.***
- ***Part exchanges welcomed.***
- ***We are 'spot cash' buyers for almost all electronic equipment.***

Send S.A.E for our latest list of over 50 receivers and many other interesting items.

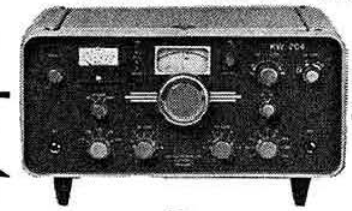
R.T. & I. ELECTRONICS LTD.

Asville Old Hall, Ashville Road, London E.11 ***Tel: 01-539 4986***

PROFESSIONAL PERFORMANCE with KW

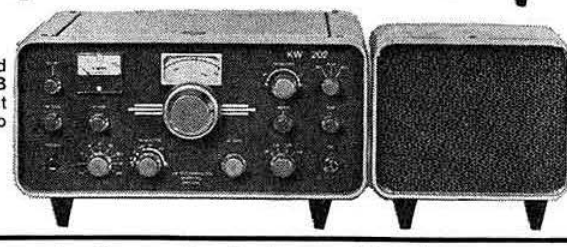
KW 1000 Linear Amplifier
10–80 metres. 120 watts PEP input max. Designed to be 'driven' by KW2000 A/B/E or other units of similar power rating. In-built 2·5 Kv PSU. PA tubes pair T160L. Very quiet in operation.

KW 204 Transmitter
Well known for really good audio quality (SSB) and a favourite with CW enthusiasts. 10–160 metres. Reliable PA tubes (2 × 6146).



KW 202 Receiver
One of the finest Amateur Band Receivers on the market. SSB filter and 'Q' multiplier. Excellent sensitivity and stability. Two speed tuning 10–160 metres.

Write or phone for catalogue.



Other KW Favourites
KW E-Z match ATU; KW 103 SWR/RF Power meter; KW 108 Monitorscope; KW dummy load; KW Traps (the original & best) KW Trap Dipoles; KW 107 & 109 Supermatch Units; KW Antenna Switch; KW Balun Mkl & MkII; Stockists for Hy-Gain beams & verticals. CDR Rotators. Shure Microphones etc. KW Spares are normally stocked for a minimum of five years.

KW

Communications Products
DECCA COMMUNICATIONS LTD
Cramptons Road, Otford, Sevenoaks, Kent. Telephone: Sevenoaks 50911.

** Easy terms on equipment available over 12, 18 or 24 months*

ROGER G8AYN **BRYON G8IWX**

CRAYFORD ELECTRONICS

ANTEC

VHF - UHF AERIALS

144MHz (Carriage on all 2m units **£1.50**. 1–5 items)
For mobile use, all ⅝λ 4dBd gain:

A5-6 hinge or A6-5 2BA screw	£5.90
B2-5 **NEW** HINGE BOOT MOUNT	£8.70
CPW window clip, BNC socket	£8.95
Magnetic mount with 4m UR76	£12.25
For base station use:	
GP58A professional groundplane, N socket	£13.95
Helical flexibles for hand portables:	
FXUHF (PL259) for TR2200G, etc.	£3.85
FXBNC for modified TR2200, etc.	£3.85
FX2200GX for new TR2200GX	£4.00

Post 20p. Others available

432MHz (Carriage on all 70cm units 70p each)
For mobile use, ⅝λ 4dBd gain or colinear 7dBd gain:

A5-10 hinge (‡)	£4.75
A5-12 hinge (colinear)	£8.15
CPU758C (colinear) window clip, BNC socket	£11.20
For base station use, groundplanes:	
GP587 (‡) amateur, BNC socket	£8.85
Helicals for hand portables:	
FXUBNC (or any fitting)	£2.70 + 25p post

70MHz Similar range to that for 2m:
A5-2 hinge ¼λ — £4.05 + 70p carriage (1-5)

N.B. ALL PRICES EXCLUDE VAT • SAE PLEASE FOR FULL LISTS. THE ABOVE IS ONLY A SAMPLE

ACCESS GIRO 33 563 4001 **BARCLAYCARD**

6 LOVELACE CLOSE, WEST KINGSDOWN, KENT
TN15 6DJ *Tel:* **West Kingsdown (047485) 2577**

2200GX USERS

Small replacement microphone inserts which give a smooth voice response. These inserts have the same output level as the original insert and therefore no adjustment to the rig is required. They can also be used as replacements for other inserts with an impedance between 200-500 ohms. **£1.50p** inc. VAT. Post etc **20p.**

PTT MICROPHONES
Small microphone with smooth action PTT switch. These are 50 Kohm impedance with built in matching transformer which can be removed if required to match 200-500 ohm input.
£5.50p incl VAT. Post etc **30p.**

CITY ELECTRONICS G3WCS

262 KENSINGTON
LIVERPOOL.
L7 2RL. TEL 051-264 9924.

PRINTED CIRCUITS and HARDWARE

Readily available supplies of Constructors' hardware, Aluminium sheet and sections. Printed circuit boards, top quality for individual or published designs.
Prompt service. Send 15p for catalogue.

RAMAR CONSTRUCTOR SERVICES
Masons Road, Stratford on Avon, Warwicks. Tel. 4879

FT.101E Mk. 2

We like the new clipper but have suggested addition of capacitor to improve it slightly. S.a.e. and we'll send details of mod., or buy from us and be sure. Credit via Tricity 20% deposit plus interest. Beat rising prices and be sure of service. **Holdings, 39/41 Mincing Lane, Blackburn BB2 2AF. Tel: 59595/6."**

NEW! SAMSON ETM-3C C-MOS KEYER

1μA battery drain—Why switch off?

●Self-completing dots/dashes/spaces. ● Can be used either as normal electronic keyer or as an Iambic-mode squeeze keyer. ● 8-50 wpm. ● Constant 3:1 dash-dot ratio. ● 6 C-MOS ICs and 4 transistors. ● Plug-in PCB. ● Long battery life—typically 1μA drain when idling—Built-in batteryholder for 4 × 1·5V batteries (but will work over 3-10V range). ● PCB has both a reed relay (250V, 0·5A, 25W max) and a switching transistor (300V, 30mA max) —either keying method can be used ● Has the well-known fully-adjustable Samson precision keying lever assembly. ● Operate/Tune button. ● Sidetone oscillator. ● Grey case 4" × 2" × 6". **£54.15**

BUILT FOR DEPENDABLE MARINE & COMMERCIAL SERVICE

JUNKER PRECISION HAND KEY. A superbly engineered straight key used for many years by professionals afloat and ashore. With this key you can't help but send good morse. Free-standing—no screwing down. Front and back contacts—fully-adjustable gaps/tension. Key-click filter. Hinged grey cover. **£25.24.**

BAUER KEYING PADDLE. Single-paddle unit on 1¼" × 2" base for home-built El-bugs. Adjustable gaps/tensions. **£8.95**

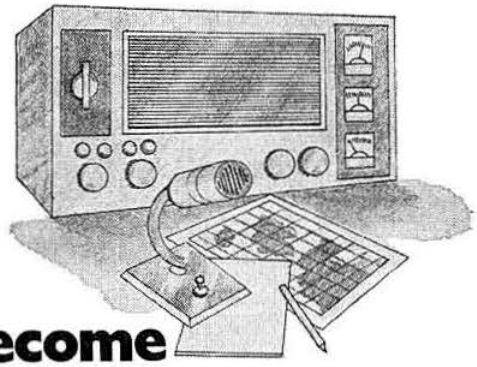
88mH TOROIDS for CW, RTTY, SSTV filters, **90p.** each

90° AUDIO PHASE SHIFT NETWORKS octal based.

All prices postpaid UK and include 12½% VAT. Please send stamp with enquiries.

SPACEMARK LTD.

Thornfield House, Delamer Road, Altrincham, Cheshire. (Tel: 061-928 8458)



Become a radio amateur.

Learn how to become a radio-amateur in contact with the whole world. We give skilled preparation for the G.P.O. licence.

WAA

Free! Brochure, without obligation to: RCK116

BRITISH NATIONAL RADIO & ELECTRONICS SCHOOL

P.O.Box 156, Jersey, Channel Islands.

NAME _____

ADDRESS _____ (Block caps please)

The Antenna that makes all the difference

The sun and its spots are under a cloud, so to speak! Our primary, it is suggested, may be getting irregular in its habits. Shall we in future not be able to rely on periods of good propagation on the HF bands? Will HF activity and interest have to wane? NOT AT ALL!

Good DX, and at lower powers—avoiding generation of spurious products, TVI, etc.—is possible if you install a JOYSTICK VFA (Variable Frequency Antenna). The VFA covers ·5-30MHz without gaps. Acting as an all band ground plane it gives power saving low angle radiation, avoiding scatter losses (who wants to cook the strato-sphere??!!). Vastly improves reception too.

Thousands of testimonials on our files describe the happy transition to the VFA ... for many this means space saving also ... in its minimum configuration the JOY-STICK can simply stand in a corner of the shack!

A PATENTED INVENTION USED BY TRANSMITTING AMATEURS AND SWL'S WORLD WIDE—AND IN GOVERNMENT COMMUNICATION.

SYSTEM 'A' £32·40

250 w p e p OR for the SWL

SYSTEM 'J' £38·60

500 w p e p (improved 'Q' on receive)

PARTRIDGE SUPER PACKAGE

COMPLETE RADIO STATION FOR ANY LOCATION, Comprising: The NEW R.300 RX (with Xtal marker), Headphones, VFA, System "A" all connecting cables. Deliv. Securicor (our risk). **ASSEMBLED IN SECONDS! SAVE £13.87.**

£210·55

OR R.300 ONLY £184.50 INCL DELIV.

BARCLAYCARD

Phone 0843 62535 (or 62839 after office hours)

Access

MARINE RADIO. Owners of small vessels with rigs on trawler bands or amateurs working /MM will benefit with a VFA on the mast. Let us advise you.

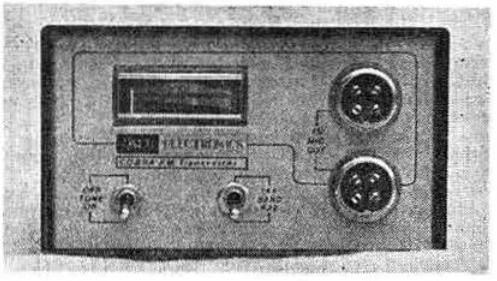
IMPORTANT. All lines offered are correct at time of going to press and prices include VAT and carriage. At present we are enjoying occasional selling peaks when demand exceeds supply for a day or two and we will be able to serve you the better for a quick phone call when we can advise you on your intending purchase and "pencil-in" your order, take your card number, etc. All enquiries or sales by post or telephone receive the personal attention of George A. Partridge, G3CED, inventor of the VFA.

Box 6 PARTRIDGE ELECTRONICS Ltd BROADSTAIRS KENT ENGLAND

G3CED **G3VFA**

QM70 ELECTRONICS — THE PACEMAKERS

The U.K. Company that has pioneered the development, manufacture and world-wide distribution of the 28/432MHz solid state transverter, the 28/144MHz solid state transverter and the 144/432MHz transverter. We were the first with this new concept in amateur radio electronic equipment. Others may imitate but none will surpass. Following on from these outstanding successes we move yet another step ahead, and announce the **COBRA.**



This unit is designed to be used in conjunction with a 2m fm transceiver to allow the operator access to the 70cm band in both simplex and repeater modes. When connected as illustrated below the normal functions of the 2m transceiver are retained and 70cm operation may be achieved by the simple flick of a switch. 70cm received signals are converted down in a linear manner to the 2m band. 2m transmit signal is tripled in frequency to the 70cm band. Because the COBRA has its own built-in audio stages, frequency deviation on 70cm is pre-set from within the COBRA thus avoiding the necessity of any adjustments to the 2m transceiver.

FEATURES:

- ★ Switchable Built in Audio Amplifier and Limiter.
- ★ Tone Burst adjustable in frequency, amplitude and duration.
- ★ All Receive/Transmit Switching accomplished by built-in R.F. Sensing.
- ★ Controls include 2m/70cm Switch; Tone Burst On/Off Switch; illuminated Relative R.F. Power Output Meter. Microphone Input/Output Sockets.
- ★ Reverse Polarity Protected.
- ★ Fused D.C. Line.
- ★ Weight 1 kg.
- ★ Size = 105 × 60 × 230 (all dimensions in mm).
- ★ 12V DC Nominal. (Negative Earth).
- ★ Current Consumption 2m position—Zero.
  70cm ,, Receive 120mA
  70cm ,, Transmit 180mA **£86.00**

OTHER UNITS IN OUR RANGE:

28/144 solid state transverter	£52.00
144PA50 2m solid state linear amplifier	£49.50
28/432 solid state transverter	£86.40
2FM70 2m to 70cm fm transverter	£52.20
28/144 High Power transverter (SCORPION)	£99.90

NEW! Receive converters: 144/28MHz **£18.00,** 432/28MHz **£19.50,** 1296/28MHz **£24.00.** Special feature next month.

Write or phone for full detailed specification literature on all our products. All units fully guaranteed for 12 months; all prices inc. VAT & carr. to U.K. mainland.

QM70 ELECTRONICS LTD, Severnside South, Bewdley, Worcestershire DY12 2DX, England. Tel. Bewdley (0299 400070)

QM70 ELECTRONICS LIMITED

NOW OPEN

NOW OPEN

For the best service **and the best deal**

AMATEUR RADIO EXCHANGE

Access
BARCLAYCARD
By Telephone
SECURICOR DELIVERY

NEW EQUIPMENT

YAESU	ICOM
FT101E	IC-22A
FT221R	IC-201
FT224	IC-202
	IC-225

Also in stock, the Multi U11 UHF Transceiver, the KP202 2m hand-held and Antenna Specialists Products.

SECOND HAND. We invite you to display your surplus equipment for sale on a commission basis. Phone for details.

IC-202

2 NORTHFIELD ROAD, LONDON W13 9SY. Tel: 01-579 5311

Advanced Technology for the Discerning Amateur

UNIVERSAL RF SPEECH CLIPPER

Still unmatched after two highly successful years, the "Datong r.f. Clipper" is used the world over by serious DXers and professionals.

★ Comparable to a linear the Datong r.f. clipper introduces negligible distortion while raising your average radiated power. ★ Gives true *r.f.* clipping. Simply connects in series with microphone. ★ Works with virtually any make of transmitter. ★ Equally effective for FM and AM as well as SSB.
Model RFC (illustrated). Price: **£38.88** plus VAT (12½%).

Also available with Jap 4 pin input connector and complete with matching output lead, inclusive price **£41.90** plus VAT (12½%). Please state pin connections required.
Fully aligned and tested P.C. Module, RFC/M. Price: **£19.50** plus VAT (12½%).

FREQUENCY AGILE AUDIO FILTER — MODEL FLI

Fast becoming a classic, Model FL1 delights and amazes all who hear it in action. This unique product improves any receiver and is installed simply by connecting in series with the receiver's loudspeaker. It offers the following advanced features:

★ A notch filter which *tunes itself* for fully automatic removal of unwanted whistles in phone reception. With Model FL1 in circuit you can ignore tune-up whistles.

★ Fully variable bandwidth tailoring for enhancing phone reception in the presence of interference and sideband splatter.

★ Band pass filtering with fully variable centre frequency and bandwidth (1,000Hz to 25Hz) plus a.f.c., for the kind of CW reception which you would not have believed possible.

Supplied with connectors and full instructions. Ready-made connecting leads also available. Price: **£47.50** plus VAT (12½%).

All Datong products are designed and built to professional standards using high quality components and glass-epoxy printed circuit boards.
FOR DETAILED INDEPENDENT TEST REPORTS OF MODEL FL1, PLEASE SEE RADCOM JUNE 1976 AND SHORT WAVE MAG. JULY 1976.

DATONG ELECTRONICS LTD.

11 MOOR PARK AVENUE, LEEDS LS6 4BT. TEL. 0532-755579

THE UP-CONVERTER—MODEL UC/1

SYNTHEZISER CONTROLLED GENERAL COVERAGE RECEIVING ADAPTOR FOR RECEIVERS TUNING 28-29MHZ AND/OR 144-145 MHZ. GIVES COMPLETE COVERAGE FROM 90kHz TO 30MHz.

Until now if you owned amateur bands-only transceiving or receiving equipment and wanted general coverage reception, you had two alternatives: (1) Spend substantially more than the cost of good amateur bands-only equipment on a general coverage receiver of equivalent performance and accept the expensive duplication of hardware; (2) Put up with inferior performance on general coverage and purchase a "low-cost" general coverage receiver.

The Datong Up-Converter now provides a very attractive third option. By connecting this unit in the aerial lead to your existing equipment you get the following advantages: (1) There is no wasteful duplication; (2) Expensive features of your existing equipment are fully utilised; (3) Performance on other frequencies is as good as you are used to on the amateur bands; (4) You get a two-metre converter "thrown in"; (5) The extra cost is even less than for a "low cost" general coverage receiver.

Quite simply, you get *more performance* for *less money*.

If you own one of the increasingly popular all-mode two-metre transceivers you now have the basis of a high performance semi-synthesised general coverage receiver. What better way for a G8 to sample what the HF bands have to offer (including Morse practice)?

If you later exchange your two-metre transceiver for a HF bands transceiver your Up-Converter will still supply general coverage reception, and in addition will provide a continuation of two-metre reception facilities.

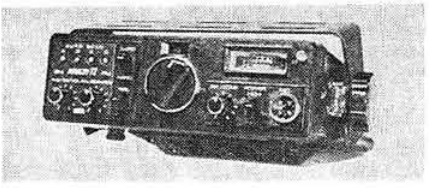
PRICE: £97.50 plus 12½% VAT
AVAILABILITY: November

BREDHURST ELECTRONICS

SENSITIVE YET POWERFUL

2m FM
FDK MULTI 11
£199 inc. VAT

70cm FM
FDK MULTI U11
£229 inc. VAT



The "state of the art" FM transceivers

- Hi/Lo power
- Narrow/wide FM
- RIT
- 4 channel scan
- Deviation test tone
- Add on VOF option
- Netting facility
- TX monitor switch
- S meter
- FM tuning meter
- Built-in pre amp
- 23 switched channels

Fitted all repeater + 2 simplex channels

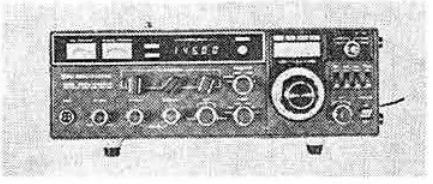
ALSO IN STOCK

- **ASP antennas**
- **antenna mounts**
- **rotators**
- **HF antennas**
- **secondhand gear**
- **Waters and Stanton products**
- **Antenna accessories**
- **Antenna Poles**

ALL MODELS EX STOCK

THE ULTIMATE 2m RIG

FM/CW/SSB/AM + 10m for OSCAR
FDK MULTI 2700
£449 inc. VAT



A complete station in one package

- Dual VFO analogue/digital readout
- Built in 10 metre upconverter for OSCAR
- Speech clipper
- Noise blanker
- AC/DC supplies built in
- Hi/Lo power
- Vox/IRT
- Reverse repeater facility/other repeater shifts

ACCESS PART EXCHANGE HP BARCLAYCARD

Willowbrook, School Lane, Bunbury, Tarporley, Cheshire. Callers by appointment. Tel. Bunbury (0829) 260708 G30QT.

ELECTRONIC TEST ENGINEERS

At M.E.L., part of the Philips Concern, we develop and manufacture sophisticated Electronic Equipment for the British Services and overseas markets.

We are currently recruiting Test Engineers at all levels, but have specific vacancies for the following personnel :–

PROJECT TEST ENGINEERS

to work on 'Clansman' – a new range of tactical radio systems for the British Army and export markets.

We require a Senior Engineer to build up a team of Test Engineers involved in fault-finding on the High Power Clansman System. The successful applicant should have had previous experience of supervision and of working on high voltage radio frequencies.

We are expanding a team of engineers who give technical advice to the various test sections within the Radio Department. Two Engineers are needed to prepare and plan test schedules and associated equipment to finalised stages ensuring production target achievement.

A background in modern medium frequency radio communication is desirable.

SENIOR TEST ENGINEER

to work in our Automatic Telegraph Systems Project Group at Whyteleafe, Surrey, engaged in the production of sophisticated message handling systems for the Royal Navy.

Applicants should have previous experience in MOS and TTL logic systems, power supply and general analogue techniques.

We offer progressive salaries, annual bonus and pension schemes, staff restaurant and shop and at least 22 days annual holiday.
M.E.L. is located in Crawley, an expanding new town in the middle of Sussex, midway between London and Brighton. There is ample opportunity for both house rental and purchase within the area. We will give you generous assistance in your relocation to this attractive part of Sussex.
If interested, please write or telephone for an application form to :-
C. Marks, Personnel Officer, The M.E.L. Equipment Company Limited, Manor Royal, Crawley, Sussex. Telephone Crawley 28787.

M E L

CLASSIFIED ADVERTISEMENTS

Private advertisements **15p** per word, minimum **£2.50.**
Trade advertisements **25p** per word, minimum **£3.00.**
Box number 60p extra to wordage or minimum.
Semi-display (boxed) 1" single column **£10.50.**
1½" single column **£15.50.**
Please write clearly. No responsibility accepted for errors.
Latest date for acceptance—4th of preceding month.
All classified advertisements must be prepaid.

Copy and remittance to:
ADVERTISEMENT SECTION
RADIO SOCIETY OF GREAT BRITAIN
25 DOUGHTY STREET, LONDON WC1N 2AE.

FOR SALE

QUALITY QSL CARDS. Sae for samples by return post. Quick delivery, Compalith Printing Services, 115 Promenade, Cheltenham, Glos GL50 1NW.

TRIO VHF/HF TX/RX, highest tenderers, owner reverting to Yaesu; details, G2DYM, QTHR.

VALVES Genuine RCA 6146B/8298A, £4.65 ea. British 6146, £3.65 ea. Matched pairs, 50p extra. Inclusive, same day posting. A. E. White, G3HCU, QTHR. 0306-730 215.

BARLOW WADLEY XCR30 now available in the South West from Ryland Huntley, 15 Old Bond Street, Bath; Tel: 4332.

G.I. AMATEUR SUPPLIES GI3ZIA for Trcvrs, Rx, Tx, Antennas, Mics, etc. Trade-in's welcome. Large stocks at 10 Church Street, Enniskillen, N. Ireland. Tel: (0365) 2955.

FILTERS 10·7/12·5, £4. CCSI, £6. QQV06-40A, £3.50. QQV03-20A, £2.50. Eimac 4CX250B, £8. 4X250B, £5. Bases, £2. Box RSGB 157.

YAESU FT101B, Never on the air. In original container, £325. Cossor 4100 oscilloscope, upgraded to 4100A spec. by Cossor. Little used £385. Tel: Maidenhead 34362.

R.O.R. PORTABLE 2 element, 2 metre beams. Guaranteed ex-stock, despatched within 48 hours. Raynet Group discount. Still only £8.70 incl. delivery. R.O.R. Services, Kensington Chambers, 89 Merridale Road, Wolverhampton.

VIDEO TAPE. Quantity of new/used 1"/½" video tape and empty spools, also limited supply of cameras, lenses, mono VTRs and monitors. Please write, stating requirements, to 15 Rose Hill Court Parade, Morden, Surrey. 01-669 2611.

PRINTED CIRCUIT BOARDS for the "Practical Polyphase" SSB exciter. Supplied tinned and drilled. Boards as per design in September Radcom. Price £3.00 + 20p postage. Also available, components for this design. Send S.A.E. for lists. G8KBQ, Rear Coach House, 85 Ashley Road, Montpelier, Bristol, Avon.

AR88D LATE EX-G8RC full set spares. Bulletins, mags, etc. wanted, HRO5. G4AK, QTHR. Tel. Blackmore 822910.

TRIO TR7200G, £100; McElvenney, 15 Havelock Square, Sheffield S10 2FQ.

WANTED

WANTED FOR COLLECTION of German WWII military radio equipment: wireless sets, receivers, transmitters, accessories. Details and prices please. Box RSGB 156.

MISCELLANEOUS

PATENTS and **TRADE MARKS**—Booklet on request. Kings Patent Agency Ltd (B. T. King, J. B. King, Reg Pat Agents)—146A Queen Victoria Street, London EC4. Tel: 01-248 6161. Telex: 883805. Established 1886.

SITUATIONS VACANT

WANTED

EXPERIENCED RADIO-TELEPHONE ENGINEERS

to join London's fastest expanding radio-telephone company.

Experience of V.H.F. and U.H.F. required, with knowledge of Pye and G.E.C. equipment for maintenance service engineering and field work.

The successful applicants will be part of a young and enthusiastic team. Good salary according to experience and aptitude. Five day week. Free lunches.

Write or call now with details of past experience to Mike Rawlings or Bill Clarke.

London Communications
(Equipment) Ltd
30 Boundary Road, London, NW8 01·328 5344

PERFORMANCE PLUS RELIABILITY

TONE BURST. 1,750Hz. Stable for reliable trouble free access.. .. .. **£4.25**

FM DETECTOR. 400kHz-1·6MHz. Now 2 types positive earth for Cambridge. Vanguard, EC10, etc. Negative earth for general use, state type and frequency **£5.00**

Full 12 months guarantee on all units, 9-15V. All inclusive p&p etc. SAE Enquiries

LYE COMMUNICATIONS
238 Stamford Road, Brierley Hill, West Midlands DY5 2QE

G5RV-G2DYM ANTI-T.V.I. AERIALS

Custom built by G2DYM (Ex B.B.C.) G5RV aerials under Licence of Louis Varney, C.Eng.M.I.E.E., A.I.L.

G5RV 10-160 metres, 500W **£21,** 1·5KW **£26** c/w 25m Bal-twin 75 Ohm
G2DYM Any Single Band +160m, 500W **£10,** 1·5KW **£15** c/w 25m Bal-twin 75 Ohm
G2DYM Trapped 10-160m, 500W **£15,** 1·5KW **£20** c/w 25m Bal-twin 75 Ohm
G2DYM SWL Dipoles 10, 11, 13, 15, 16, 19, 20, 25, 31, 40, 49 or 80m **£10** each
Shipping or 160m **£15** each, Wide Band 10-160m **£15** all c/w 25m Bal-twin feeder or with Anti-TV Time Base QRM screened Bal-twin feeder 75 Ohm **£5** extra each. Post and Packing **£1** per aerial, VAT 12½% (except export).
Any Tx or Rx type of aerial built to order. Design, advisory and fitting service Details, SAE + 3 6½p stamps. *Satisfaction Guaranteed or money back no argument.*

LAMBDA ANTENNA STUD FARM
WHITEBALL, WELLINGTON, SOM TA21 0LU

INDEX TO ADVERTISERS

SURPLUS COMPONENTS

DISC CERAMIC CAPACITORS 8, 10, 12, 560pF, 1nF, 3n3 @ 1p, 10nF @ 1½p, 20nF @ 2p. **POLYSTYRENE CAPACITORS** 2·7, 5, 6·8, 8·2, 10, 15, 22, 33, 47, 68, 75, 100, 180, 250, 320, 390, 430, 470pF @ 1½p. 820, 1000, 1200, 1500, 1700, 2375, 3900pF @ 2p. **TUBULAR CERAMIC CAPACITORS** 0·4, 0·5, 2, 3·3, 3·9, 4·7, 5·6, 7·5, 8·2, 9·1, 13, 16, 30, 82, 150, 220, 270, 390, 1200, 1500pF @ 1p. **POLYESTER & POLYCARBONATE CAPACITORS** 1n2, 2n2, 400V; 22nF, 250V @ 1½p. 22nF, 160V @ 2p. 22nF, 47nF, 400V; 150nF, 250V; 470nF, 680nF, 100V @ 2½p. 220nF, 250V @ 3p. **FEEDTHROUGH CAPACITORS** 22pF nut fixing @ 2½p. 1000pF solder in (large) @ 1p. **TRIMMERS** tubular ceramic solder in 2pF @ 1½p, Oxley air spaced trimmers 10mm sq. max cap. = 14·5pF @ 5p. **ELECTROLYTIC CAPACITORS** 2·5μF 16V, 4μF 40V, 4μF 64V, 8μF 4V, 32μF 4V, 32μF 6V3, 100μF 4V, 100μF 6V4, 125μF 4V @ 3p, 125μF 16V, 330μF 63V, 400μF 4V, 1000μF 4V @ 4½p. **MONOLITHIC CERAMIC PLATE CAPACITORS** 4·7, 5·6, 18, 22, 33, 39, 68 & 1500pF @ 1½p. **PHILIPS BEEHIVE TRIMMERS** 8pF @ 5p. **DIODES** OA81 10 for 20p.B AX13 10 for 25p. **LEADLESS CERAMIC DISC CAPS** 390pF, 25 for 10p. **JACKSON** C803 50 &1 00pF trimmers pre-set @ 20p. **TRANSISTORS & I.C.s** BC107, BC108, CIL108, BC557 @ 6p, BC109 @ 7p, 2N2369A @ 8p, SN7400 @ 8p, SN74LO4 @ 10p, SN7410 @ 6p, SN76514 @ 25p, 702HC op amp @ 25p, 741 TO99 opamp @ 15p. **MULTI TURN TRIM POTS** 200Ω, 500Ω, 1kΩ, 2kΩ, 5kΩ, 10kΩ, 20kΩ @ 10p. TO5 **TRIM POTS** 250Ω, 500Ω, 1k5Ω, 5kΩ @ 10p.

Orders to D. G. PHILLIPS, 16 BACK LANE, STOCK, INGATESTONE, ESSEX CM4 9DG

Post & packing 10p under £1, 15p over £1. Make cheques, etc., payable to D. G. Phillips.

DON'T MISS FM QSO'S - SCAN THEM!

This basic ready built PCB Module scans up to 10 crystal channels. Use with Diode switched rigs or add your own diode switching or Reed Relays. Autostop. Locks from PTT. Miss Channels if desired. Needs 10-14V supply and switches/indicators. With 20 pin connector. **£11.75** inc p & p. Details sae.

A. L. BAILEY, 5 Erin Way, Burgess Hill, W. Sussex. RH15 9PN.

Please mention
RADIO COMMUNICATION
when replying to advertisements

MEMBERS' AD ORDER FORM

FOR SALE ☐ WANTED ☐ (Tick as appropriate)

- **See Members' Ads page for conditions of acceptance.**
- **Not more than 40 words, including name, address, etc.**
- **Do not forget 50p remittance plus wrapper.**
- **Please write in block capitals, or type.**

Licensed members are asked to use their callsign and QTHR, meaning that their address in the current call book is correct. BRS and A members will, of course, have to provide their name and address.

I enclose cheque/PO for **50p** to cover the cost of this advertisement.

Signed .....

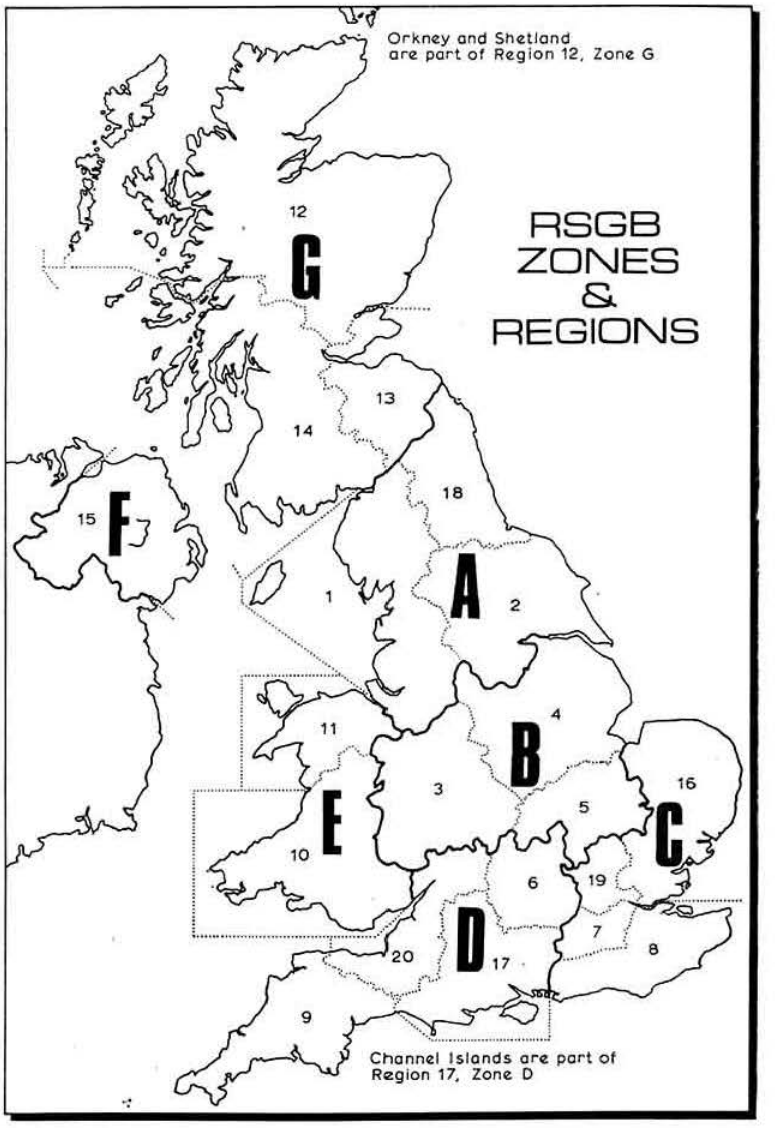
Date .....

RADIO SOCIETY

OF

GREAT BRITAIN

REPORT AND ACCOUNTS FOR THE YEAR ENDED 30 JUNE 1976



Radio Society of Great Britain

35 DOUGHTY STREET, LONDON WC1N 2AE

4 November 1976

NOTICE IS HEREBY GIVEN that the FIFTIETH ANNUAL GENERAL MEETING of the Society will take place at the Royal Society of Arts, John Adam Street, Adelphi, London WC2, at 6.30pm on Friday 3 December 1976 for the transaction of the undermentioned business:

1. To receive and, if approved, confirm the Minutes of the Forty-ninth Annual General Meeting as published in the July 1976 issue of *Radio Communication*.
2. To receive and, if approved, adopt the audited accounts of the Society for the year ended 30 June 1976 and the Financial Report of the Council to the members of the Society for the year ended 30 June 1976.
3. To announce the names of members to serve on the Council for the year 1977, and in the event of Mr C. H. Parsons having been successful in the ballot to have his appointment confirmed by the members as he is over 70 years of age (Date of birth 5 July 1906).
4. To authorize Council to fix the remuneration of the auditors for the ensuing year.
5. To transact any other business which may be properly transacted at an Annual General Meeting.

Any member entitled to attend and vote at the above meeting may appoint a proxy to attend. A proxy need not be a member of the Society.

By Order of the Council
G. R. JESSOP
Secretary

Notes

(*a*) Forms for the appointment of proxies may be obtained from the Secretary upon request.

(*b*) The instrument appointing a proxy shall be deposited at the office of the Society not less than 48 hours before the time appointed for holding the meeting.

Radio Society of Great Britain

35 DOUGHTY STREET, LONDON WC1N 2AE

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

COUNCIL

President
E. J. Allaway, MB, ChB, MRCS, LRCP, G3FKM

Immediate Past-President
C. H. Parsons, GW8NP

Honorary Treasurer and Executive Vice-President
J. O. Brown, LLB, FCA, G3DVV

Telecommunications Liaison Officer
R. F. Stevens, G2BVN

Members

D. J. Andrews, G3MXJ
R. J. Baker, G3USB
P. Balestrini, TEng(CIE), MITE, MIAM, G3BPT
D. Byrne, G3KPO
D. S. Evans, G3RPE
R. W. Fisher, G3PWJ
W. J. Green, G3FBA*
W. F. McGonigle, GI3GXP
L. E. Newnham, G6NZ*
J. R. Petty, G4JW (Retired July 1976)
D. M. Pratt, BTech, MIEE, MIERE, G3KEP
W. A. Scarr, MA, FBIS, G2WS
A. W. Smith, GM3AEL (Died 2 October 1976)
R. F. Stevens, G2BVN
G. M. C. Stone, G3FZL
C. J. Thomas, G3PSM
D. M. Thomas, GW3RWX
F. C. Ward, G2CVV*

** Retired on 31 December 1975*

Secretary & General Manager: G. R. Jessop, CEng, MIERE, G6JP

Auditors: Edward Moore & Sons, Chartered Accountants

Bankers: Barclays Bank Ltd

FINANCIAL REPORT OF COUNCIL TO THE MEMBERS OF THE SOCIETY

THE Balance Sheet at 30 June 1976 and the Income and Expenditure Account for the year ended on that date as set out on pages iv to vii are submitted for the approval of members.

The deficiency for last year, ie the year ended 30 June 1975, was approximately £21,000 but because of a subscription adjustment and a VAT refund the final figure came out at approximately £12,000. We have a comparable deficiency of £13,800 for the year ended 30 June 1976 and this is shown in the attached accounts. The deficiency budgetted for was £16,000 and there is therefore some encouragement in finding a lesser figure. It will be at least another 12 months before the Society pulls round from its run of deficiencies. The subscription was raised to £8 from 1 January 1976, but as the accountancy treatment requires that the subscription is apportioned in advance over the year to which it relates a full year has to go by before the higher rates of subscriptions can be credited wholly to the accounts. Therefore the boost to our income figures from the increased sub will not be wholly effective until the year ending 30 June 1978. The accounts presented herewith show the subscription income increasing to approximately £88,000 and for the following year the figure is expected to be £105,000, and although this obviously helps with our expenditure there is always a tendency to be one step behind inflation.

One or two items worth noting are as follows:

Advertising income
As will be seen in the notes to the accounts, advertising income has risen from £25,000 in the accounts for 1975 to £45,000 as shown in the current accounts. It is interesting to compare some of our older figures, eg £11,000 for 1973, with the current figure and this has partly come about through the Society now handling its own advertising. A word of thanks is due here to Mr Colin Lindsay who is in charge of this department.

Sale of books
Sales totalled £59,000 during the year compared with nearly £38,000 in the previous year. The prime cause of the increase is the publication of the *VHF/UHF Manual*. The Society is very dependent on the profit made on the sale of books and the fact that in the last two years we have not had *Radio Communication Handbook* available for sale has probably made the deficiency larger than it would have been. Indeed in the current year we are hoping that with the increased sales of the *VHF/UHF Manual* and the possibility that Volume 1 of the *Radio Communication Handbook* will be available, this should decrease the present budget deficiency of approximately £9,000 to a lesser figure. Members may like to consider whether the correct policy of the Society has been followed when sales are allowed to subsidize members' subscriptions.

Expenses generally
As may be expected, some figures are higher and others less than provided for, but the cost of audit fees requires a comment. The amount put by for last year was £755 but in the event the auditors charged us even more and although a protest was made it appears that this is the Society's largest single increase in expenditure.

"Radio Communication"
Expenditure under this heading is greater than any other item. The income from advertising helps to keep the cost down but the figure budgetted for the year ending 30 June 1977 is £96,000 gross and it is this figure that is really the key to the state of the Society's finances and the amount of the membership fee. If we could reduce the cost of *Radio Communication* and at the same time keep or improve the standard of the present magazine we might be able to take a breather from continuous financial pressure.

Data processing machine
This item is hardly referred to in the accounts, but certain preliminary costs have been included under note (3), and it has not affected our results for the year. The decision to acquire this machine brought forth a considerable number of letters from members and took a lot of Council's time considering its feasibility. We now have the machine and at the time of writing it is still being brought into use but the original rather cautious approach has given way to a positive approval. There is no doubt that this was the right move. When the accounts for next year are presented our processor should be paying for itself.

Lambda Investment Company Limited debentures
A decision has been made to redeem £500 worth of these debentures in December this year by means of an appropriate random method. This company was formed a number of years ago in connection with the purchase of the freehold of 35 Doughty Street, and this was the most convenient way to borrow money from members to enable funds to be found to buy the property. Although the loan was not repayable to the members until 1997 it was always hoped that, should the Society be prosperous enough, members would be repaid at an earlier date. At that time the loan appeared to be absolutely secure with a reasonable rate of interest, but what was not foreseen was the effect of inflation and abnormally high interest rates. The loser all round was the Society member who went out of his way in the first place to help his Society by digging into his own pocket. It is hoped that earlier redemptions will go some way towards compensating the members. If we have sufficient funds we intend to make further redemptions in subsequent years.

RADIO SOCIETY OF GREAT BRITAIN

(COMPANY LIMITED BY GUARANTEE)
AND ITS SUBSIDIARY COMPANY

CONSOLIDATED INCOME AND EXPENDITURE ACCOUNT

for the year ended 30 June 1976

1975 £	1975 £		1976 £	1976 £
		INCOME		
76,165		Subscription income (Note 1)		87,956
10,422		Gross profit on sales of publications		17,590
316		Quoted investment income (gross)		241
415		Bank interest		263
1,890		Surplus on rallies and exhibitions (excluding book sales)		606
89,208		**Total income**		106,656
		EXPENDITURE		
	4,744	Headquarters rates, lighting, heating and cleaning	5,976	
	34,375	Staff remuneration	39,083	
	250	Pension	300	
	6,597	Telephone, postage, printing & stationery	10,481	
	312	Insurance	457	
	632	Repairs and maintenance	569	
	10	Hire of equipment	10	
	1,401	Depreciation of equipment	939	
	719	Bank charges	370	
	755	Audit fees (including under-provision for prior year)	1,465	
	26	Legal and professional fees	—	
	521	Sundry expenses	438	
	763	Bad debts provision	2,126	
	1,141	Debenture interest of Lambda Investment Company Limited (gross)	1,141	
	52,246		63,355	
	50,797	*Radio Communication*—distributed free to members—cost including staff remuneration and after deducting advertising revenue	47,765	
	117	Membership certificates, Awards, Trophies, etc.	687	
	1,862	QSL Bureau, Beacons and Intruder Watch	1,868	
	1,021	Contributions to IARU Region 1	1,695	
	3,640	Cost of general meetings and Council and committee expenses	4,934	
	701	Cost of international conferences	—	
	—	Taxation	224	
110,384		**Total expenditure**		120,528
(21,176)		**DEFICIT FOR THE YEAR**		(13,872)
	3,381	less: Exceptional items—subscription income: credit arising from different method of apportionment		—
8,183	4,802	—transfer from VAT suspense account at 1 July 1974		—
£(12,993)		**DEFICIT (all of which arises in the Society)**		£(13,872)

An exceptional item, being a legacy of £4,292 during the year, has been credited direct to Legacy Fund (Note 8(g)).

RADIO SOCIETY OF GREAT BRITAIN

(COMPANY LIMITED BY GUARANTEE)
AND ITS SUBSIDIARY COMPANY

BALANCE SHEETS 30 JUNE 1976

1975 The Society & Subsidiary £	1975 The Society £		Notes	1976 The Society £	1976 The Society & Subsidiary £
		FIXED ASSETS			
41,675	—	Freehold property at cost	(1) (2)	—	41,675
3,335	—	Sinking Fund Policy, premiums paid, (Surrender value: £3,853)		—	3,752
1,814	1,814	Furniture and equipment, at cost less depreciation	(3)	3,667	3,667
—	26,176	Investment in and loan to subsidiary	(4)	26,986	—
46,824	27,990			30,653	49,094
		NET CURRENT ASSETS			
9,055	9,055	Quoted investments at cost less amount written off (Market value £3,958 [1975: £8,645])	(5)	4,055	4,055
16,346	16,346	Stocks at lower of cost and net realizable value		22,675	22,675
20,445	20,445	Debtors, and payments in advance	(9)	35,622	35,622
7,208	7,208	Bank balances & cash in hand		28,727	29,233
53,054	53,054			91,079	91,585
25,339	24,870	**Less** Creditors & accrued charges	(10)	60,471	61,053
27,715	28,184			30,608	30,532
£74,539	£56,174	**NET ASSETS**		£61,261	£79,626
		Financed by:			
21,064	21,002	**ACCUMULATED FUND** Balance at 1 July 1975		8,009	8,071
(12,993)	(12,993)	Less: Balance brought forward from the Income & Expenditure Account		(13,872)	(13,872)
8,071	8,009			(5,863)	(5,801)
(722)	—	Less preliminary expenses of the subsidiary		—	(722)
7,349	8,009			(5,863)	(6,523)
—	—	**LEGACY FUND**	(8)	4,292	4,292
7,349	8,009			(1,571)	(2,231)
48,165	48,165	**SUBSCRIPTIONS IN ADVANCE**		62,832	62,832
19,025	—	6% **DEBENTURE STOCK** of Subsidiary (Redeemable at par on or before 30 June 1997: Secured on the assets of that Company)		—	19,025
£74,539	£56,174			£61,261	£79,626

(The notes on pages vi and vii form part of these accounts)

E. J. ALLAWAY, *President*

J. O. BROWN, *Treasurer*

NOTES ON THE ACCOUNTS

1. Accounting policies:

   (a) Subscriptions—cash received in respect of subscriptions for the year has been apportioned on a time basis from the actual dates subscriptions were receivable. The summary of subscriptions accounts (including life subscriptions) is as follows:

1974–5 £		1975–6 £
41,292	Subscriptions in advance 1 July 1975	48,165
86,419	Add: Subscriptions received during the year	102,623
127,711		150,788
48,165	Less: Amount carried forward at 30 June 1976 representing the forward commitment to membership services	62,832
£79,546	Amount of subscription income credited to revenue account in the year	£87,956

   (b) Life subscriptions are credited to Income & Expenditure Account over a period of 10 years.

   (c) Depreciation—no depreciation has been provided on the freehold property. Furniture and equipment has been depreciated using a straight-line basis on cost so as to write off the assets over their estimated useful lives.

2. The Council is of the opinion that the present market value of the Society's freehold property (which is held in the subsidiary company) is in the region of £100,000.

3. Furniture and equipment:

Cost 1 July 1975	10,479
Additions during year	2,793
Cost 30 June 1976	13,272
Accumulated depreciation	9,605
Book value as shown in Balance Sheet (Book value 30 June 1975, £1,814)	£3,667

4. The share capital of the subsidiary, Lambda Investment Company Limited (registered in England), is £100 in shares of £1 each and all the shares are held by the Society or its nominees. The debenture stock has been subscribed for or purchased by individual holders in their own right.

5. Investments

		Cost
£4,145	British Transport 4% Guaranteed Stock 1972/77	£4,055

   This investment is charged to Barclays Bank Ltd as security in case the Society requires overdraft facilities.

6. The sales of publications during the year amounted to £59,753 (1975—£37,857), and advertising revenue amounted to £45,250 (1975—£25,506) before deducting commission.

7. At 30 June 1976 there were commitments for capital expenditure of £3,000. In addition the new data processing machine was being acquired by means of a leasing agreement.

8. The Society administers the following prize and memorial funds:

	£	£
(a) **The Pilot Officer Norman Keith Adams Prize Fund**		
At 30 June 1976 the fund amounted to		168
Accumulated income at 30 June 1975 was	35	
Income for the year to 30 June 1976 was	23	
	58	
Less: Cost of prize awarded	10	48
		£216
Which was invested in: 3½% War Loan		200
Cash at bank		16
		£216
(b) **The J. Fraser Shepherd Prize Fund**		
At 30 June 1976 the fund amounted to		300
Accumulated income at 30 June 1975 was	21	
Income for the year to 30 June 1976 was	22	
	43	
Less: Cost of prize awarded	20	23
		£323
Which was invested in: 3½% War Loan		200
6% Debenture Stock Lambda Investment Company Limited		100
Cash in the general funds of the Society		23
		£323

(c) The fund of **The Bevan Swift Memorial** was extinguished during the year: £15 was paid out as a prize during the year.

(d) The subscribed fund of **The J. Clarricoats Memorial** amounted to £75, held in a separate bank account and there was no distribution during the year.

(e) The fund of **The Thomas Memorial** now stands in the books at £1 recording the obligation of the Society to supply miniature cups from its own resources.

(f) The fund of **The L. N. Goldsbrough Memorial** amounted to £50 and is represented by £50 held in the general funds of the Society.

(g) The fund of **The Shirley-Price Legacy** is shown separately in the Balance Sheet at £4,292 which is held in a deposit account.

(h) Further donations totalling £415 during the year have been carried forward at the year end and are now held in a separate deposit account.

9. Debtors and payments in advance include £10,000 paid on account of the cost of publishing the new edition of the *Radio Communication Handbook*. There is an outstanding commitment for a further £14,000 in respect of the publication of Volume 1 of the *Radio Communication Handbook*.

10. Creditors and accrued charges include £2,000 in respect of provisions created in the previous year, £1,000 towards cost of international conferences and £1,000 towards legal costs on behalf of members. After the year end legal costs re interference have been paid at £432.

REPORT OF THE AUDITORS TO THE MEMBERS OF THE RADIO SOCIETY OF GREAT BRITAIN

In our opinion, the accounts set out on pages iv to vii prepared under the historic cost convention give on that basis a true and fair view of the state of the Company's affairs at 30 June 1976 and of the result for the year ended on that date and comply with the Companies Acts 1948 and 1967.

4 Chiswell Street, London EC1Y 4XB.
19 October 1976

EDWARD MOORE & SONS
Chartered Accountants

LAMBDA INVESTMENT COMPANY LIMITED

Report of the directors

The directors have pleasure in submitting their report for the year ended 30 June 1976. The company is a wholly-owned subsidiary of the Radio Society of Great Britain (a company incorporated in England) and was formed to acquire the freehold property, 35 Doughty Street, London WC1, which is the headquarters of the Society. The directors are of the opinion that the market value of the property is in the region of £100,000.

The directors are Messrs L. E. Newnham (Chairman), R. F. Stevens, G. R. Jessop and J. O. Brown (Secretary); the first two named hold one share each as nominees of the Society and Mr Newnham holds £300 Debenture Stock. Mr G. R. Jessop retires by rotation at the Annual General Meeting, and being eligible, offers himself for re-election. The auditors, Messrs Edward Moore & Sons, will continue in office in accordance with Section 159(2) of the Companies Act 1948.

By order of the Board
J. O. Brown
Secretary

19 October 1976

BALANCE SHEET 30 June 1976
and
REVENUE ACCOUNT for the year ended on that date

1975				1976		
£	£	£		£	£	£
			ASSETS			
41,675			Freehold property at cost			41,675
3,335			Sinking Fund Policy, premiums paid (Surrender value £3,853)			3,752
241			Preliminary expenses			241
481			Debenture Issue expenses			481
—			Bank balance			506
45,732						46,655
			LIABILITIES			
	469		Sundry creditors		582	
	26,076		Loan from the Radio Society of Great Britain		26,886	
26,545						27,468
£19,187			**NET ASSETS**			£19,187
			Financed by:			
			Authorized and Issued Capital			
100			100 shares of £1 each fully paid			100
			Revenue Account			
62			Balance at 1 July 1976			62
	1,191		Rent receivable in the year to 30 June 1976		1,246	
		1,141	*Less:* Debenture interest	1,141		
		20	Bank charges	65		
		30	Audit fee	40		
—	1,191				1,246	—
19,025			6% **Debenture Stock** (redeemable at par on or before 30 June 1997—secured on the assets of the Company).			19,025
£19,187						£19,187

L. E. Newnham, J. O. Brown } *Directors*

Report of the auditors to the members of Lambda Investment Company Limited
In our opinion, the accounts set out above prepared under the historic cost convention give on that basis a true and fair view of the state of the Company's affairs at 30 June 1976 and of the result for the year ended on that date and comply with the Companies Acts 1948 and 1967.

4 Chiswell Street, London EC1Y 4XB.
19 October 1976

EDWARD MOORE & SONS
Chartered Accountants

REPORT OF COUNCIL

Some of the activities of the RSGB during the 12 months ended 30 June 1976

COUNCIL

The President, Mr C. H. Parsons, GW8NP, completed his year of office on 31 December 1975, and on 1 January 1976 Dr E. J. Allaway, G3FKM, became the Society's 42nd President.

Dr Allaway was installed as President of the Society at a social function held for the second successive year outside the London area. This took place in the Executive Suite of the Warwickshire County Cricket Ground at Edgbaston, Birmingham, in the presence of 200 members and guests.

Mr J. O. Brown, G3DVV, Honorary Treasurer, was elected Executive Vice-President for the year 1976.

An election was held during November 1975 to fill the three ordinary and one zonal member vacancies on Council. The new members elected were Dr D. S. Evans, G3RPE; Mr G. M. Stone, G3FZL, and Mr C. J. Thomas, G3PSM, as ordinary members, and Mr D. J. Andrews, G3MXJ, as Zone C member.

Council wishes to record its thanks to Mr L. E. Newnham, G6NZ, who served on Council for 23 years, and Mr F. C. Ward, G2CVV, both of whom made significant contributions to the Society's well-being and served as President during their respective periods of service.

Council meetings

Council met on six occasions during the period under review, five of these meetings being held in the council chamber of the Institution of Electronic and Radio Engineers in London. Council wishes to express its thanks to the director of that institution for this assistance. The remaining meeting was held in Birmingham prior to the installation of Dr E. J. Allaway as President.

During the year Council was involved in consideration of the need to modernize the Society's record facilities and method of handling the members' purchase of books and other materials from the Society.

Extensive investigation carried out by HQ staff and the Finance & Staff Committee into the machines available and the economics of services offered by various computer bureaux, together with the potential improvements in efficiency, resulted in the approval by Council of the purchase of a data processor type IBM32, to be delivered and installed during July 1976.

Table 1. Attendance at Council meetings

	14 Jul	15 Sep	24 Nov	23 Jan	23 Mar	20 May
Mr C. H. Parsons, GW8NP	x	–	x	x	x	x
Dr E. J. Allaway, G3FKM	–	x	x	x	x	x
Mr D. J. Andrews, G3MXJ				x	x	x
Mr R. J. Baker, G3USB	–	x	–	x	–	–
Mr P. Balestrini, G3BPT	x	x	x	x	x	–
Mr J. O. Brown, G3DVV	x	x	x	x	x	x
Mr D. Byrne, G3KPO	–	x	x	x	x	–
Dr D. S. Evans, G3RPE				x	x	x
Mr R. W. Fisher, G3PWJ	x	x	x	x	x	x
Mr W. Green, G3FBA	–	x	–			
Mr W. F. McGonigle, GI3GXP	x	x	x	x	x	x
Mr L. E. Newnham, G6NZ	x	x	x			
Mr J. R. Petty, G4JW	x	x	x	–	x	–
Mr D. M. Pratt, G3KEP	–	–	–	x	x	x
Mr W. A. Scarr, G2WS	x	x	x	x	x	x
Mr A. W. Smith, GM3AEL	–	x	–	x	x	x
Mr R. F. Stevens, G2BVN	x	x	x	x	x	x
Mr G. M. Stone, G3FZL				x	x	x
Mr C. J. Thomas, G3PSM				x	x	x
Mr D. M. Thomas, GW3RWX	x	x	x	x	x	x
Mr F. C. Ward, G3CVV	x	x	x			

x = Present
– = Absent

MEMBERSHIP

In a year when the Society felt the full effects of the high level of inflation, which made necessary the considerable increase in subscription rates from £5.50 to £8 on 1 January, it is not surprising that there should have been some reaction. It is, however, gratifying to be able to report that the membership growth has continued and has followed a predictable pattern.

The actual number of new members was maintained at last year's high level, but there was a significant increase in the number of resignations and unfortunately this was accompanied by nearly twice as many deceased members as in the previous year. In spite of these factors the net increase in membership was 86 per cent of last year's record increase, and the total membership stands at an indicated 20,114.

This total is based on the existing records, in which there is an unknown error, but with the data processor coming into operation an accurate total will be available by the time the Annual General Meeting takes place. In the meantime it is thought that a realistic figure is 19,600.

Table 2. Licences and membership

New licences	1973–4	1974–5	1975–6
Class A	369	405	493
Class B	1,223	761	566
Class A/M	213	472	495
Class B/M	307	434	485
Class TV	19	26	24
Total A + B + TV	**1,611**	**1,192**	**1,084**

Membership changes	1973–4	1974–5	1975–6
New members	1,651	2,339	2,347
Resignations	385	234	410
Deceased	95	69	123
Net increase	**1,171**	**2.036**	**1,814**

Table 2 shows the comparative figures for membership and new licences issued for the last three years. It is noteworthy that the proportion of Class A to Class B has increased during this year, that mobile licences have confirmed their demand, and that the ratio of new members to licences issued has been maintained.

It is pleasing to report that among the new members there are some former members who have rejoined. Their support is welcomed.

REPRESENTATION

During this year headquarters introduced a newsletter for regional and area representatives as a means of providing various information and communication on a regular basis

between headquarters and the Society's representatives, particularly those in the provinces.

The first of these was circulated in August, followed by others in November, January, March and April. Of particular interest is the newsletter dealing with the Society as a whole, including headquarters, which has since been reproduced in *Radio Communication* under the title of "Your Society". It is hoped that all members will read this article and so gain a greater knowledge of the organization of the Society and its activities.

How useful and effective these have been is not known but it is thought likely that they may in some measure have been responsible for the satisfying increase in the number of members who have come forward to serve as area representatives, which during the year have increased from 16 to well over 40. This trend is continuing.

Many of these new area representatives are Class B licence holders who are most welcome; they represent the Society of the future. Representatives have come from all over the country, indicating a general increase in interest, and it is worthy of note that Jersey, Guernsey and the Isle of Man each have their own representatives.

RÉSUMÉ OF CONVENTIONS AND REGIONAL MEETINGS

International VHF Convention

The 22nd International VHF Convention was held on 8-9 May 1976 at the attractive new venue of Brunel University, Hillingdon, Middlesex. The President formally opened the convention, which was attended by nearly 1,000 people from all parts of the country and overseas.

The new edition of the *VHF/UHF Manual* was on sale for the first time and proved to be popular.

At the evening dinner there were 216 in attendance, with the President in the chair. Notable guests were Lord and Lady Wallace of Coslany and Past-President Dr J. A. Saxton, CBE.

It had been hoped that this new venue could have become established, but this has proved impossible and the next vhf convention will be on 6-8 May 1977 at Alexandra Palace, together with an hf convention and exhibition.

National Mobile Rally

The National Mobile Rally was held in the grounds of Woburn Abbey, Bedfordshire, on 3 August 1975. On this occasion the weather proved to be fine and hot, a pleasant change from the previous four years.

During this event the trade was canvassed for possible support for the proposed exhibition at Alexandra Palace. Considerable support was indicated and the Mobile & Exhibition Committee proceeded to plan this event in place of the mobile rally in 1976. Although this exhibition did not occur in the year under review, it is felt that it should be recorded as a success. Another larger and more comprehensive event is being arranged for next year as mentioned above.

Region 12

Region 12 again put on the Scottish VHF Convention at the Tree Tops Hotel in Aberdeen on 13 September 1975. The Society's vhf manager and the general manager attended this well-organized and well-supported event.

The small but very useful display of material by suppliers attracted a good deal of attention. The lecture programme was attended by more members than the seating capacity.

A well-arranged dinner followed in the evening when the chair was very ably taken by the organizer, Mr Graham Knight, GM8FFX.

Region 15

In Belfast a large event had been proposed but owing to the present difficulties it was later reduced to a celebration dinner in May at Holywood, near Belfast, at which all the local representatives and guests were present.

The President, Dr E. J. Allaway, and the general manager attended this very successful and pleasant function. They had earlier been entertained and shown some of the recent developments in the province's communication arrangements.

Region 1

An Official Regional Meeting was held at Woodlands Hotel, Timperley, on 28 September 1975. Forty members from various clubs and societies attended.

Region 10

The 2nd Welsh Amateur Radio Convention was held at Oakdale Community Centre, Gwent, on 28 September 1975. This was opened by Mr C. H. Parsons, President. The lectures and trade stands were well-supported by over 200 members and friends.

Telecom 75

This international exhibition, held at the Palais des Expositions, Geneva, on 2-8 October 1975, included a significant amateur radio stand organized by IARU Region 1. The Society's contribution, a 10GHz transmitter/receiver by G3RPE, attracted a considerable amount of professional interest.

Technical lecture

The Society's annual technical lecture was given at the Institution of Electrical Engineers on 4 November 1975. On this occasion the subject was "Amateur radio satellites", and the lecture was given by members of AMSAT UK.

Region 11

For the first time for many years an ORM and mobile rally was held at the Lido, Prestatyn. This successful event was opened by the President, Dr E. J. Allaway, assisted by Mr C. H. Parsons and Mr D. Thomas.

Region 14

The Central Scotland Convention was held at Wrangholm Hall, Motherwell, on 14 March 1976. This event was supported by over 300 visitors. Home-constructed equipment was much in evidence.

IARU Region 2 meeting

This meeting, in Miami, Florida, was held on 11-14 April 1976. The Society was represented by the President, Dr E. J. Allaway, and by Mr R. J. Hughes, both of whom attended without cost to the Society. Region 1 was represented by Louis v d Nadort, PA0LOU, and Roy Stevens, G2BVN.

REPEATERS AND BEACONS

At the start of this year a considerable amount of disquiet with regard to licensing of repeaters existed, and to get this matter under control the Society held a meeting of repeater groups from all parts of the country on 18 October 1975. At this meeting all the various opinions and attitudes were thoroughly aired and as a conclusion it was agreed to form a Repeater Working Group to represent all the interested groups and which would meet regularly at Society headquarters. The group has met regularly at monthly intervals and a regular Repeater Report has been prepared and circulated from HQ to all groups.

One of the first tasks undertaken by this group was an investigation into a plan for uhf repeaters which, after very considerable work, was completed and a report passed to the Telecommunications Liaison Officer for presentation to the Home Office. The report was so well developed and prepared that the Home Office were able to turn the proposals for 22 repeaters into licences in less than four weeks. From the outset the uhf repeaters licence was issued as a single comprehensive repeater licence to the Society, with individual copies for the stations concerned.

Later the vhf repeater licences were similarly combined into a single addendum to the repeater licence, so that now all repeaters are under one licence issued to the Society which, until further additions are made, requires an annual renewal fee of £177.50.

Further proposals for consideration under Phase 2 of the uhf repeater proposals are likely to amount to a further 20-24 stations.

Beacons have also increased in number and frequency during the year and they are best summarized as:

70MHz	GB3SX, GB3SU operational. An additional beacon, GB3CTC, has been requested.
144MHz	GB3ANG, GB3CTC, GB3GI, GB3VHF operational. GB3LER, GB3USW, GB3DM temporarily out of service.
432MHz	GB3SC, GB3EM operational. GB3CTC licence requested. GB3GEC temporarily out of service.
1,296MHz	GB3DD operational. GB3WR, GB3AND licensed, not yet operational.
2,300MHz	GB3LDN licensed, not yet operational.
3,456MHz	GB3UOS licensed, not yet operational.
10GHz	GB3IOW, GB3LBH operational. GB3GEC licensed, not yet operational. GB3ALD licence requested.

It is of interest to note that beacons at the same site but on different bands will in future carry the same callsign as is indicated above by GB3CTC and GB3GEC.

As with repeaters the Home Office is streamlining the licences so that a single beacon licence will be issued to the Society.

When all the current and forecast applications for repeaters and beacons are in force the annual licence fee to the Society will amount to more than £370.

COMMITTEES OF COUNCIL

The composition of the committees of Council for the current calendar year 1976 was approved at the January meeting of Council and details were published in the May issue of *Radio Communication*. As mentioned elsewhere, a new committee—the Repeater Working Group—was set up in September 1975 to prepare the uhf repeater proposals and other related matters.

Council expresses its appreciation to all those members who devote their time and expertise to the various specialist matters; without their assistance many of the Society's activities could not be undertaken.

The membership of the various committees is summarized in Table 3 which shows the numerical strength required to carry on the work. Members are reminded that committee members regularly attending the meetings travel from as far afield as Sheffield, Leeds, Derby, Birmingham, Southampton and many other places. Not one of the Education Committee lives less than 90 miles from London.

During the year Council approved the change of title of the Scientific Studies Committee to the more realistic title of Propagation Studies Committee.

Table 3. Committee membership

Committee	Total No of members	No of corresponding members	No of Council members	HQ staff	Attending members	No of meetings
Education	8	2	1	—	6	6
Educational Visits Scheme	6	1	2	—	5	—
Finance & Staff	9	1	5	1	8	10
HF Contests	9	1	2	—	8	9
IARU Working Group	8	—	4	—	8	5
Interference	7	1	1	—	6	4
Membership & Representation	9	—	7	—	9	4
Mobile & Exhibition	9	—	2	1	9	10
Propagation Studies	14	5	1	—	9	4
Raynet	9	—	1	—	9	6
Repeater Working Group	12	—	1	1	12	8
Technical & Publications	13	3	3	2	10	6
Telecommunications Liaison	12	1	6	1	11	6
VHF	16	3	3	1	13	8
VHF Contests	8	—	—	—	8	10

At a conservative estimate of 2·5 hours per meeting, a total of 2,185 man hours was devoted to committee meetings.

Finance & Staff Committee

At the January 1976 meeting of Council, the committee put forward a resolution that an interim order be placed with IBM for one of their IBM32 data processor machines for delivery in July. Council later confirmed this order. (The case for the purchase of the machine is set out in detail on pages 331–333 of the May 1976 issue of *Radio Communication*.)

While awaiting delivery, alterations were made to the building to accommodate the machine, and management entered into discussions with the manufacturers and programme contractors to devise suitable programmes for the functions which the machine would be required to perform. Concurrently operator training was commenced so that immediate use could be made of the processor on delivery. Although outside the period under review, it should be reported that this was effected in mid-July, and ancillary programmes—such as updated repeater and beacon information—were used as test material. Transfer of the old records to the new machine was then put in hand, and address labels for *Radio Communication* were produced for the October issue. It should be particularly noted that the programme used for labels gives print-outs in the order required by the Post Office to qualify for the 40 per cent postal discount—which will provide most, if not all, of the cost of the machine.

On the accounting side the processor is invaluable. It not only provides a specially designed three-section invoice for each sales transaction, but also gives totals of remaining stock, indicates re-ordering points, discounts applicable to trade orders and, where necessary, VAT.

One of the great advantages of the system is that all key personnel, ie accounts clerks and operators, are located in the room with the equipment. There is a small amount of noise from the cooling fans which it was thought when the initial tests were made at IBM might be a distraction to those working in the room. Fortunately it seems that the acoustic properties absorb this and no inconvenience is experienced.

The committee has given considerable thought to the question of realistic pricing of Society publications. The old system was to total the actual production cost of a book, add an empirical figure which then gave the selling price. Unfortunately hidden overhead costs were not covered by this method and the apparent book profit did not in fact represent a true figure. A formula has now been devised and generally agreed, and this will be the costing basis for future productions.

The cost of books to members was also discussed and it was agreed by the committee that not later than January 1977 all members would be issued with a membership card, upon production of which he or she would be entitled to a discount of 10 per cent.

The question of any possible change in the location of headquarters was discussed on several occasions but no suitable alternative was offered. The fact that the Society owns its headquarters and thereby has available a location offering many advantages at an extremely reasonable cost, is one that still makes any change unlikely.

The committee recommended, and Council accepted, the decision to redeem £500 worth of stock in the Lambda Investment Co, Ltd and to distribute it to holders by drawing from a hat.

This report would not be complete without paying tribute to two people, namely George Jessop, the general manager, and David Evans, assistant general manager. Particularly on the processor project they have worked with such dedication and utter disregard for anything like normal working hours that, without them, the project would never have got off the ground. Unfortunately David returns to his profession of aviation at the end of December and this will constitute a major loss to the Society.

Education Committee

The preparation of the booklet of Radio Amateurs' Examination questions and model answers has been the main task of the Education Committee during the past year. Regular liaison with the City and Guilds advisory committee exists, and the committee continues to handle members' queries about the RAE.

The Society's tape/slide lecture "The World at Their Fingertips" has now been completely revised and is available on loan from the taped lecture library curator. The lecture is primarily intended for schools and young audiences and provides a useful introduction to amateur radio.

In association with the Membership & Representation Committee, a scheme of lectures for the introduction of amateur radio to schools is now in operation, and committee members have given several talks to schools and to groups of teachers. Preparations are currently being made for the lecture "The World of Amateur Radio" to be held at the Science Museum in January 1977. This lecture is given every two years at the invitation of the Science Museum as part of a programme of Christmas holiday lectures for young people.

HF Contests Committee

The HF Contests Committee is responsible to Council for the organization and adjudication of all RSGB Contests held on frequencies below 30MHz. During the period under review the committee met formally on nine occasions, but in addition there were several informal meetings to deal with the detailed rules for NFD and the checking of entries for the larger contests.

The new style Affiliated Societies Contest, which took place in January, met with considerable success and many favourable comments were received. The committee believes that the new format of the event—in which an AFS entry consists of several logs from individual members of the affiliated society—has introduced many members to the delights and pleasures of cw contest operation.

The rules for HF National Field Day were reviewed, and after considerable discussion and analysis of recent NFDs new rules were formulated to reflect current equipment usage and operating conditions. The double-station section was dropped from the contest as support for it had been falling for many years, and two single-station sections were instituted —an Open Section with few limitations and a Restricted Section with restrictions on the number and the type of aerials and equipment. The committee is seeking ways in which the rules for NFD could possibly be harmonized throughout Europe so that the results of NFDs could be incorporated in a unified European table of results.

The past 12 months saw the demise of BERU, but basically the same event appeared as the Commonwealth Contest. Support for this event was not as great as had been hoped for, but this was generally felt to be due to the poor propagation conditions which prevailed during the contest period.

SSB Field Day continued to attract more entries than previously and the popularity of this contest is thus reckoned to be on the increase. In order to add to the enjoyment of this event, the committee has been corresponding with certain European societies with a view to instituting a European SSB Field Day similar to the present HF (CW) NFD.

In all, the committee organized 12 hf contests (of which two were on telephony) during the review period and it constantly monitored the results and comments from entrants in order to determine if improvements in the rules were possible or desirable.

In view of HM Queen Elizabeth's Silver Jubilee in 1977, the committee has been discussing plans for two special contests to celebrate this unique occasion.

Direction finding events have continued under the able guidance of Mr G. T. Peck, BRS15402, who has indicated that he wishes to retire from the post of df organizer at the end of 1976. The committee places on record its sincere and grateful thanks to Mr Peck for his loyalty, enthusiasm and untiring efforts, and it is pleased to announce that Mr M. Hawkins has agreed to take over the df work from January 1977.

IARU Working Group

At the World Administrative Radio Conference, to be held in 1979, every frequency band used by amateurs will come under the closest scrutiny. The International Amateur Radio Union Working Group's prime function is to keep the Council informed on all matters arising from the Society's membership of the IARU. Its second function is to provide information to its members through *Radio Communication*, news bulletins, and talks to clubs.

During the period under review meetings have been held to examine the international progress in the implementation of the frequency requirements agreed at the 1975 Warsaw Conference. Reports from other Region 1 societies have been received and discussed and there has been continuous review of the position for WARC 79.

Recommendations of the Warsaw (1975) Conference have been implemented. Three members of the working group attended the Region 2 Conference at Miami, Florida, at no cost to the Society: the President, Dr E. J. Allaway, G3FKM; the chairman, Mr R. J. Hughes, G3GVV; and Mr R. F. Stevens, G2BVN, secretary of Region 1.

Mr J. Bazley, G3HCT, information officer, arranged for the preparation of a recorded lecture, including talks by the President of IARU, Mr Noel Eaton, VE3CJ; the President, G3FKM; G3GVV and G2BVN. Publicity slips have been distributed via the QSL Bureau.

Interference Committee

Much of the committee's work during this year has centred round the compilation of the results of the Interference Survey. The final report was written by Ian Jackson, G3OHX, and a summary of the principal findings was prepared for publication in the July 1976 issue of *Radio Communication*. The report has been circulated to IARU Region 1 societies and to the RFI Task Group of ARRL. The survey was reprinted, with appropriate modifications, by the Danish society, EDR, and comparative results are awaited.

The number of cases in which the committee's assistance has been sought has declined sharply. It is hoped that following the 1975 "Interference" issue of *Radio Communication* members have been encouraged to try a rational programme of investigation for themselves. Relations with the Home Office and the Post Office engineers have continued to be good, but progress in persuading manufacturers to "build in" higher immunity has been disappointing.

Correspondence with local authorities continues to reveal that planning applications and complaints on council estates are dealt with by local officers who have little or no appreciation of the technical issues involved, while current procedures tend to make them "judge and jury" on the apparent issues presented. The committee is watching this state of affairs, and members having difficulties with their local authority are strongly urged to bring the matter to the notice of the Society.

Membership & Representation Committee

The committee has had the younger member and the newcomer to amateur radio very much in mind in its operations during the year.

Short articles appearing in *Radio Communication* have been designed to show how every member has a place in the overall functioning of the Society, and the news bulletins sent out regularly from headquarters to all RRs have helped to keep members all over the country well-informed of the Society's activities. The enrolment of additional area representatives has helped to forge closer links between the headquarters organization and the membership as a whole.

Recruitment, too, has been directed towards the younger potential member. The Educational Visits Scheme revealed the need for an inexpensive and simple publication available as a first introduction to the hobby and this, as most members will know, has now been produced under the title *Becoming a Radio Amateur*.

For reasons of economy, the committee has only met quarterly during the year, twice in London on the dates of Council meetings and twice in the provinces. Members of the committee welcomed the opportunity of meeting RRs, ARs and officers of local groups and societies at Cheltenham on 8 April and at Nottingham on 24 June. Lively discussions on Society matters took place on these occasions and local representatives expressed their appreciation of the opportunity given them to meet Council members.

Mobile & Exhibition Committee

The committee met regularly during the year and organized the mobile rally at Woburn which was blessed with a fine, hot day—the first for four years! It was a successful day both from trade and members' points of view. The trade was canvassed both at Woburn and Leicester about the proposed National Exhibition at Alexandra Palace, and in view of the favourable reaction it was decided to go ahead with an exhibition.

The committee attended the ARRA Exhibition at Leicester which proved, again, a financial success.

Various members attended rallies held throughout the year and sold RSGB publications.

Propagation Studies Committee

The name of the committee was changed from Scientific Studies Committee to Propagation Studies Committee because the latter provides a truer idea of its work. The main topics are as follows:

HF beacons. The existing beacons on 28MHz are being extended, with Mr A. Taylor, G3DME, continuing to act as co-ordinator and technical adviser. These are all included in the International Beacon Project under the auspices of the IARU.

Ionospheric predictions. An additional, and more detailed, form of predictions have been produced, and now form a regular contribution to *Radio Communication*.

Study topics: (*a*) Auroral studies: a new auroral warning system has been established, data is being received in a satisfactory manner and will be the topic of a future article for publication. G2FKZ is the co-ordinator. (*b*) CCIR Projects: (i) G3LTP continues to act as representative on Study Groups 5 and 6; (ii) monitoring of reception of the Mauritius and Cyprus beacons by G3USF continues, and is providing further information for research and articles for publication; (iii) under the supervision of G8AGN, investigation is to commence on line of sight links, and the influence of terrain on propagation at 3·4GHz.

Raynet Committee

Raynet, repeaters and community service could well be the theme of this year's report of the work of the committee.

Of major importance were the negotiations with the Home Office resulting in their agreement to include county emergency planning officers and their deputies in the list of authorized "user services". This has resulted in a major increase in activity for the existing established groups, while new groups are being formed as recruiting permits.

Early in the year groups based in Norfolk and Suffolk were placed on standby during January when flood tides and gales coincided to produce the worst east coast conditions since the floods in 1953. During this incident repeaters were used to great effect.

Recently Raynet personnel in Staffordshire, West Midlands and Mid-Severn Valley were involved in incidents relating to heath and woodland fires. This operation lasted for a period of 10 days with Raynet personnel on duty generally until midnight but on one occasion from 1820 to 0430. The success of the operation was highly praised both by the emergency planning officers and the fire service. Again communication was maintained via repeaters, in many cases by the use of hand-portable equipment.

Under the Home Office ruling and at the request of BRCS and St John Ambulance, Raynet attended various county shows and festivals during the year. As an example of community service the Norfolk group put in over 500 man-hours during one month while the Norfolk County Show and the Ingham Festival were in progress. During the Birmingham Show an incident occurred where Raynet was instrumental in saving life.

During the year exercises dealing with the various aspects of disaster have been held in conjunction with the user services, with the county emergency planning officers taking a very active interest. Unfortunately this report does not permit a full schedule of these activities, but our thanks are extended to all groups taking part.

The committee records with gratitude the co-operation obtained from all Raynet members, repeater groups and other radio amateurs, both for their assistance during incidents and their forbearance during exercises—a fine example of the amateur spirit, both to themselves and to the community at large.

Throughout the year there has been a welding of common interest in the need for the radio amateur being "seen providing community service"; this is of credit to the Society and all concerned. To those amateurs who feel that a citizens' band is necessary for safety of life, the committee says: join RSGB and Raynet—an existing organization for the common good.

With membership currently over 1,500 we look forward with confidence to 1977 for a continued increase in membership and in greater activity throughout the country.

Technical & Publications Committee

The bulk of the work carried out by this committee is in connection with the publication of *Radio Communication* and technical books. Fifty articles were submitted to the Society for publication and these were read and evaluated by members of the committee with such additional specialist assistance as was necessary. The cost of *Radio Communication* is of continuing concern and much time has been devoted to the study of methods of publication which could lead to improved quality and lesser cost in the foreseeable future. With the acquisition of a data processing machine and the despatch of the journal by bulk post it seems possible that economies and improvements can be made.

Revised editions of the *VHF/UHF Manual* by G3RPE and G6JP and the *Call Book* (A. W. Hutchinson) have been published. Sales of the former have been very satisfactory and the *Call Book* will be out of print before the next edition is published.

Considerable progress has been made with the preparation of the fifth edition of the *Radio Communication Handbook*. This is almost entirely due to the work of Mr R. J. Eckersley, G8LMH, who is now employed full time on editorial work in connection with the society's technical books. Due to the lapse of time involved in the publication of the new edition a considerable amount of additional up-dating work has had to be undertaken.

At the end of the year under review revised editions of the following technical books were in preparation:

Amateur Radio Techniques by G3VA;
Radio Data Reference Book by G4CDY and G6JP;
Test Equipment for the Radio Amateur by G2BUP.

Telecommunications Liaison Committee

During the year under review there has been a continuing and satisfactory liaison with the Home Office. During the earlier part of the year there was much work involved with the development of the vhf and uhf repeater systems. Details of this appear elsewhere in the report. In order to remove anomalies and to lessen administration work the Home Office has been engaged in the preparation of a new licence for stations of the amateur service. There has been full consultation with the Society although a number of requests have not yet been fulfilled.

The preparatory work for WARC 79 is intensifying and a preparatory meeting with the Home Office was held. A position paper (prepared by G3RPE and G2BVN) has been submitted to the administration and this will be followed by a meeting with representatives of other services. Co-ordination of amateur service requirements has been effected through the IARU on a world-wide basis subject to minor national modifications. As an essential part of the preparations for WARC 79, the Intruder Watch, which forms part of the IARU Monitoring System, has extended its activities. G5XB assumed the duties of the Society's Intruder Watch organizer, while G3PSM became Region 1 co-ordinator.

Following a great deal of material in various media concerning a so-called citizens' band, the committee has maintained a continuing review of the position.

After consideration of the membership reaction from a notice in *Radio Communication*, it was decided to set up a monitoring service and initial work in the formation of this has been undertaken by G3KEP and G3MFJ.

Town and country planning matters have been dealt with by Messrs R. W. Price, G4BSO, and C. E. Benson, G3MUX, to whom the Society is grateful for the work that they have undertaken.

In addition to committee meetings, the Society's Telecommunications Liaison Officer has attended meetings at the Home Office and has dealt with a considerable amount of individual correspondence concerning matters coming within the jurisdiction of this committee.

VHF Contests Committee

The committee met 10 times and organized 19 contests, covering all bands from 70MHz to 10GHz. The RSGB provides more such contests for its members than any other national society.

After reducing the total number of contests in 1974-75, the committee has tried to re-establish a balanced programme of events. The programme for 1976 embodies the lessons learned in 1975, and should be repeated with only minor revisions in 1977. Co-ordination of dates of major contests with those on the Continent has paid dividends in dx contacts, especially for eastern stations who are gradually wresting the initiative away from the Welsh portables.

Although ssb is the fastest-scoring mode, cw retains its place on any band when signals are weak or the pace less hectic than on 144MHz; cw-only contests are well supported. After a lapse in autumn, 432MHz contests have found a new life and entries in the spring and summer events were much better than last year. Entries for 70MHz, 1·3GHz and the higher bands are improving slowly.

Adjudicators are receiving fewer reports of poor-quality signals, for many operators are now co-operating with their neighbours to deal with interference problems during the contests. The committee does not believe that power restrictions would be as helpful as some people claim, and even if such measures were enforceable they would discriminate unfairly against remote stations.

VHF Committee

The work of the VHF Committee during the year has been devoted to many diverse problems, both of international as well as national import, requiring close liaison with RSGB officers, other committees and representatives of many European countries. It has not been possible to adopt several of the Warsaw Conference 1975 recommendations in the UK, and the reasons for our non-compliance have had to be carefully prepared and documented by committee members for presentation at the VHF Managers Working Meeting at Baunatal, West Germany, in October 1976.

One of the major tasks which concerned the committee was its involvement with uhf repeater planning through the Repeater Working Group. This group works to HQ but is led by two VHF Committee members who had been closely associated with repeater development. The work of the RWG resulted in a comprehensive uhf repeater plan of professional competence, fully acceptable to the Home Office, and which is now being administered by RSGB HQ. The attentions of the RWG are currently being devoted to formulating a 2m plan for repeaters in this country.

The field of microwaves has seen considerable progress this year, both from a reporting point of view as well as for the dissemination of technical and practical information. The Microwave Sub-committee organized three Microwave Round Tables which were well attended and promoted meaningful discussions. Because of difficulties in making *ad hoc* contacts on the microwave bands, beacons have a special importance in initiating activity as well as stimulating growth of interest, and the eight microwave beacon projects currently in hand have the involvement of this sub-committee. The exchange of information at home and increasingly so abroad through the written and spoken word has been assiduously undertaken by sub-committee members.

Amateur television interests were fully considered by committee members at all stages of the planning of the uhf repeater exercise, and the finalized plan should enable vestigial-sideband broadband tv to be integrated alongside the various communication modes with the minimum of interference to one another.

Two members of the committee have special responsibilities for beacons, and the co-ordination of frequency allocations for high-power beacons in Europe have received particular attention this year as a result of the Warsaw Conference 1975. Within the RSGB beacon service, special efforts have been made to bring the 144MHz and 432MHz beacon frequencies into line with Warsaw recommendations and planning. New beacon proposals have been received and are currently being progressed with the Home Office, several of these being in the microwave region. The co-operation of the many beaconkeepers throughout the UK is gratefully acknowledged.

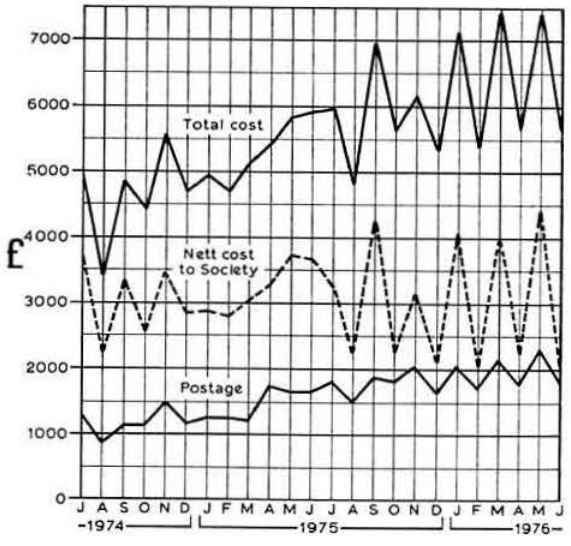
The 22nd International VHF Convention was organized by the committee and was held in May for the first time at Brunel University. The event covered two days, with 14 lecture sessions, a trade exhibition and a dinner and dance. The convention did much to enhance the status of the Society and to educate visitors in the latest techniques of vhf, uhf and microwave operation and engineering. Preparations for next year's convention are already in hand.

The committee usually meets at four-weekly intervals, and members travel long distances to conduct what seems to be an ever-increasing amount of business of far-reaching significance requiring much co-ordination of effort.

"RADIO COMMUNICATION"

During the year the total number of pages of the journal, excluding supplements, was 924 compared with 996 in the previous year. It is regretted that this reduction was necessary for economic reasons.

As can be seen from the graph, the average monthly costs for the year were just under £1,900 for postage and £3,000 for printing and paper.



The comparative totals for the last two years are:

	1974–5	1975–6	Change
No of copies posted	216,215	237,844	+10%
Postage	£16,039	£22,498	+40%
No of copies printed	231,900	248,550	+7%
Total production cost	£59,645	£73,540	+23%
Net production cost	£37,616	£36,047	−4%

The effect of increasing rates for advertising to cover fully its cost has resulted in a four per cent reduction of the net production cost, and the cost to the Society per issue is now directly proportional to the number of pages devoted to Society material.

GB2RS

The weekly news broadcast has continued throughout the year, both on the 3·5 and 144MHz bands, with additional newsreaders in the north-western region.

Consideration has been given to a possible change of frequency from 3·6MHz to 3·65MHz to avoid interference from teleprinter transmisions in certain areas. So far no decision has been made but the matter is under review.

During the year a news broadcast by teleprinter was introduced under the callsign GB2ATG. This is transmitted on the same bands as the regular voice transmissions.

These bulletins have as far as possible been confined to news items. Club news in general has not been included unless announcements relate to items where important changes have to be covered.

The news bulletin schedule has been added to the title page of *Radio Communication* for members' easy reference.

CERTIFICATES

The reports from the certificate managers indicate rather different trends for hf and vhf.

On the hf bands the demand is increasing. The number overall was 1,250 compared with 625 for all categories, with IARU Region 1 (585) and WBC (171) being the most popular.

In the four metres and down region the demand has fallen from 120 to 94 for all classes. It is thought that this reflects the increased use of repeaters as compared with direct personal contacts.

Our awards managers, Mr C. Emary, G5GH, and Mr J. Hum, G5UM, are thanked for their painstaking efforts in checking all the claims for the variety of certificates and in dealing with the considerable mail entailed.

INTRUDER WATCH

Throughout the year an average of 100 intruders have been reported to the authorities each month. The usual broadcasting interference in the 7MHz band has continued, and about 75 per cent of the intruders reported were in the 14MHz band. Some 22 observers are currently assisting with this work.

New equipment to enable resolution of complex waveforms has enabled an increase in the number of intruders identified.

The organization of this service has, during the year, been undertaken by Mr S. A. Cook, G5XB. Mr C. J. Thomas, G3PSM, is now organizer of the international intruder watch service. Both are thanked for their continued work.

QSL BUREAU

Although the dx conditions have been generally poor during the year, the volume of QSL cards has been well maintained; vhf operations have accounted for an increased proportion.

The QSL Manager, Mr A. O. Milne, G2MI, reports that some 40 per cent of the cards sent through the bureau are not collected. This unnecessary expense to the Society and the individual member could be avoided if cards were only sent to those requesting them.

TAPE LECTURE LIBRARY

The tape lecture library of 35 titles has been in continuous demand. During the year some 69 issues have been made and the tape curator, Mr S. W. Coursey, G3JJC, is thanked for meeting all requirements. In spite of the apparent popularity of the existing titles, there is a considerable demand for new titles to supersede some of the earlier recordings.

SLOW MORSE TRANSMISSIONS

During the year there has been a significant fall-off in the number of transmissions made. If this service is to be maintained at a satisfactory service level, many volunteers are needed.

Mr M. A. C. MacBrayne, G3KGU, and his helpers are thanked for their persistence in continuing this often thankless task.

HONORARY OFFICERS AND REPRESENTATIVES ON OUTSIDE BODIES

Council wishes to express its thanks to all those members serving the Society as honorary officers or as representatives on outside bodies. Their efforts assist the Society organization to function effectively.

Honorary officers

Awards manager, hf	C. R. Emary, G5GH
Awards manager, vhf	Jack Hum, G5UM
Intruder Watch organizer	S. A. G. Cook, G5XB
QSL Bureau manager	A. O. Milne, G2MI
Slow morse organizer	M. A. C. MacBrayne, G3KGU
Taped lecture library curator	S. W. Coursey, G3JJC
Trophies manager	P. A. Miles, G3KDB
VHF manager	G. M. C. Stone, G3FZL
IARU Intruder Watch	C. J. Thomas, G3PSM

Representatives on outside bodies

R. G. Flavell, G3LTP	CCIR Study Groups 5 and 6
R. F. Stevens, G2BVN	CCIR UK General Purposes
	BSI TLE 25/1 and 2
	Frequency Advisory Committee
D. A. S. Dryborough, G8HEV	CCIR Study Group 8
	BSI TLE 23/1, 25/3, 25/6
R. S. Roberts, G6NR	BSI TLE 1/5, 1/30, 25/4, 25/6
R. J. Hughes, G3GVV L. E. Newnham, G6NZ W. A. Scarr, G2WS	RAE Advisory Committee
I. Jackson, G3OHX	BREMA Interference sub-committee

PUBLICATIONS OBTAINABLE FROM RSGB

(Prices include postage, packing, and VAT where applicable. For air mail despatch, please ask for price before ordering)

RSGB PUBLICATIONS

Technical books

Amateur Radio Awards	£1.76
Amateur Radio Techniques (5th ed.)	£2.57
Guide to Amateur Radio (16th ed.)	£1.17
Morse Code for Radio Amateurs	47p
NBFM Manual	£1.17
RSGB Amateur Radio Call Book 1977	£2.10
Radio Amateurs' Examination Manual	£1.13
Radio Amateurs' Examination Revision Notes	53p
Radio Communication Handbook 5th ed, Vol 1	£8.31
Radio Data Reference Book (3rd ed.)	£1.35
Service Valve and Semiconductor Equivalents	46p
Teleprinter Handbook	£6.88
Test Equipment for the Radio Amateur	£2.35
TVI Manual	£1.08
VHF/UHF Manual	£5.70
World at their Fingertips (Paperback)	£1.05
" " " " (De-luxe)	£1.63

Log books

Standard Log	£1.03
Receiving Station Log	£1.25
Mobile Mini-Log	83p
De-Luxe Log	£2.60

Maps and charts

Countries List/HF Awards List	23p
Great Circle DX Map (in tube)	99p
Oscar map (in tube)	33p
QTH Locator Map (Western Europe) (in tube)	90p
QTH Locator Map (Western Europe) (on card)	41p
RSGB Amateur Radio Prefixes (World) Map	58p
UHF repeater planning map	34p

Members' sundries

Callsign lapel badge (3 weeks' delivery)	£1.15
Lapel badge (RSGB or RAEN emblem, pin fitting)	45p
Tie (Maroon or Blue)	£1.73
Radio Communication Easi-binder	£2.65
Car window sticker (RSGB or RAEN) (self-adhesive)	23p
Members' headed notepaper (50 sheets) quarto	65p
" " " " octavo	44p
Radio Communication back issues	74p
RSGB Contest log sheets (100)	63p
RSGB teeshirt (large, medium or small)	£1.98

POSTAL TERMS: Cash with order. Stamps and book tokens cannot be accepted. Cheques and postal orders should be crossed and made payable to "Radio Society of Great Britain". Giro A/C No 533 5256.
Please write your name and address clearly on the order, and use the latest price list when making out the remittance.

COUNTER SERVICE
Items listed above are obtainable, less postage and packing, at RSGB Headquarters between 9.15am and 5.15pm, Monday to Friday.

ORDER FROM:

RSGB Publications (Sales),
35 Doughty Street,
London WC1N 2AE
Telephone 01-837 8688

OTHER PUBLICATIONS

American Radio Relay League

Antenna Book (13th ed.)	£3.53
Course in Radio Fundamentals	£2.75
FM and Repeaters for the Radio Amateur	£2.79
Hints and Kinks	£2.25
Radio Amateurs' Handbook 1976 (Paperback)	£5.90
Radio Amateurs' Handbook 1976 (Hardback)	£8.47
Ham Radio Operating Guide	£2.15
Single Sideband for the Radio Amateur	£2.70
Specialized Communication Techniques	£2.72
Understanding Amateur Radio	£3.42
VHF Manual	£3.66

Radio Amateur Callbook Inc

American Callbook (USA listings) 1976	£8.99
American Callbook (DX listings) 1976	£8.47
World Atlas (Amateur radio prefixes)	£1.61

Radio publications Inc

Beam Antenna Handbook	£3.35
Better Short Wave Reception (3rd ed.)	£3.33
Cubical Quad Antennas	£2.74
Simple, Low-cost Wire Antennas	£3.38

"73 Magazine" publication

SSTV Handbook	£3.09

Miscellaneous

RTTY the Easy Way	90p
Radio Amateur Operators Handbook	98p
Radio Valve & Semiconductor Data	£2.48

MORSE INSTRUCTION AIDS

G3HSC Rhythm Method of Morse Tuition—	
Complete Course (two 3-speed lp records and one ep record plus books)	£4.95†
Beginner's Course (one 3-speed lp record and one ep record plus book)	£3.65†
Beginner's lp (0–15 wpm) plus book	£3.05†
Advanced lp (9–42 wpm) plus book	£3.05†
Three-speed simulated PO test 7in ds ep record	£1.00†

† *Overseas orders: add £1.*

MAGAZINE SUBSCRIPTIONS

QST (including ARRL membership) (Per annum)	£6.20
CQ (Per annum)	£6.20
73 (Per annum)	£5.90

Subscriptions for the magazines listed above should be sent to RSGB, 35 Doughty Street, London WC1N 2AE.

Ham Radio (Per annum) (Includes air delivery) £7·50
Subscriptions and changes of address for *Ham Radio Magazine* should be sent to: Ham Radio Magazine (UK), PO Box 63, Harrow, Middlesex HA3 6HS.