July 1978

radio communication

journal of the Radio Society of Great Britain

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Views of the hall and some of the stands

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G3TDZ 2m FM TRANSCEIVER

(March 1978 Rad Com)
Most parts available as follows;

Filter CFR455E/F, **£11.85**; Heat Clips, **30p**; 35pF Ceramic Trimmers, **40p**; 10pF Foil Trimmers, **19p**; 22pF Foil Trimmers, **19p**; 60pF Foil Trimmers, **26p**; BA102 Diodes, **29p**; 2N918 Transistor, **40p**; 40673 FET, **67p**; 2N3866 Transistor, **86p**; BLY33/40290 Transistor, **£1.60**; BC303 Transistor, **30p**; TBA120/SN76660 IC, **85p**; DIL 741 IC, **43p**; LM 3900, **87p**; FX 111-5 Ferrite Beads, **3p**.

Other semiconductors as per our price list (S.A.E. please)

G3TDZ Add on Power Amplifier

(Published in 'RadCom' June 1978)
For use with the G3TDZ "Black Box"
FM Transceiver, TR2200 and other 1–2 Watt output FM equipments.
Our Kit is complete with all components, mounting hardware—even the wire for the coils and includes a reprint of the 'RadCom' article and an aluminium case.
Complete Kit VAT included **£12.85**
S.0239 sockets available separately @ **51p** each
BNC screw sockets available separately @ **62p** each

G3PLX RTTY VIDEO DISPLAY UNIT

(April 1977 Rad Com)
Complete Kit (excluding modulator, keyboard and P.S.U.), **£77.15**
Set of printed circuit boards **£14.85.** Set of i.c.s. including programmed 74188s, **£56.15**; 2513, **£8.50**; AY5-1013, **£6.25**; 2102-1, **£2.85**; SN74188, **£3.40** each or ready programmed **£8.20** per pair. 7MHz Xtal, **£3.25.**
Flashing cursor kit **£7.70.**
Diode Matrix kit **£11.50.**
Suitable mains P.S.U. Transformer £2.75.
Catronics UHF Modulator, £15.00.

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

MULTIMODE 1600 TRANSCEIVER

(Oct/Nov 1977 Rad Com)
Special price for complete kit, £210.00.
Receive only kit also available, £186.00.
PCB, **£12.90**; QC1246AX, **£31.50**; Less carrier xtals, **£27.50**; CW Filter, **£25.30**; FM Filter, **£27.00**; 8545kHz xtal, **£3.00**; 400ns delay line, **£1.70**; MD108, **£7.65**; RS12V Relay, **£2.25**; Toroid **30p.**
MiniKit 1 (containing all the above) **£147.00.**
MiniKit 2 (semiconductors) **£54.50** or **£29.85** (receive only).
MiniKit 3 (R's and C's) **£19.55.**

NEW LOW PRICE FOR 40 WATT P.A. KIT—NOW WITH FULL GUARANTEE ON TRANSISTOR

Our 40W PA kit for FM/CW now comes complete with an attractive metal case and at the reduced price of **£18.30 inc VAT, full guarantee on the transistor, EVEN IF IT HAS BEEN SOLDERED,** PA Transistors 2N6084 are available separately at the very competitive price of £9.86+79p VAT=**£10.65** You are wasting money if you buy these elsewhere because:
* Our prices are lower
* Our Kit transistors are fully guaranteed
* We know our products because we build, test and use them.

VHF PRESCALER ICs

Motorola **MC12013P** low input signal, with TTL output, complete with circuit and data. Another product which we know because we use it. Price £9.95+VAT=**£10.75.**
Suitable PCB for above: **50p.**

THE NEW PLESSEY 'RADIO COMMUNICATIONS HANDBOOK'

A superb reference book on the use of Plessey i.c.s. for transmitters, receivers, High Speed Dividers and Frequency Synthesisers, includes an improved G3ZVC type T/R module using 1600 series i.c.s. **£1.95.**

JAYBEAM VHF AERIALS

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

FOR 4m BAND:		
4 ele. Yagi		£12.65
FOR 2m BAND:		
C5/2M.	5dB Colinear	£30.90
5Y/2	5 ele. Yagi	£7.70
8Y/2	8 ele. Yagi	£10.00
10Y/2	10 ele. Yagi	£21.30
PBM14/2	14 ele. para-beam	£31.15
5XY/2	5 ele cross Yagi	£15.95
8XY/2	8 ele. cross Yagi	£19.90
10XY/2	10 ele. cross Yagi	£26.30
Q4/2	4 ele. Quad	£16.30
Q6/2	6 ele. Quad	£21.70
D5/2	5 over 5 slot	£13.60
D8/2	8 over 8 slot	£18.20
UGP/2	Unipole	£7.00
HO/2	Mobile "Halo"	£3.25
HM/2	Halo & Mast	£3.85
TAS	⅝ wave whip	£13.05
FOR 70 cms. BAND:		
D8/70	8 over 8 slot	£15.45
PBM18/70	18 ele. para-beam	£18.55
MBM48	48 ele. multibeam	£21.65
MBM88	88 ele. multibeam	£28.96
12XY/70	12 ele cross Yagi	£29.70
PHASING HARNESSES:		
PMH/2C	2m circular	£5.05
PMH2/2M	2m Stacking	£6.80
PMH2/70	70cm. stacking	£5.90
MASTS and ROTATORS, etc:		
SPM	16' Portable mast	£9.95
PME	4' extension	£1.60
SYMK	Vertical mount	£3.80
AR40	Rotator	£53.45
5 way cable		yd. 22p

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

All prices include VAT but please add minimum of 30p for post and packing. New enlarged Data—Catalogue now available at 45p+large 15p S.A.E.

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PAUL
G3VJF

ICOM FOR QUALITY

SIMPLY THE BEST!

available ex-stock and delivery is free.

IC-202

£169 inc. VAT

◀IC-202

IC202 The 2m SSB/CW portable which is clean enough to use as a prime mover to drive a linear. The VXO gives continuous coverage over the ranges 144·0-144·2 and 144·2–144·4. The coverage can be extended with extra crystals switchable from the front panel. This is the ideal set to buy if you are thinking of sampling the delights and advantages of SSB on 2m as it gives full coverage of the SSB and CW portions of the band with easy, continuous tuning.
Available ex stock, delivered free for **£169 inc VAT.**

IC-215 ▶

IC-215 By far the best 2m FM portable on the market—with more power (3W) than most and batteries some 4 times as big thus giving a reasonable period of operating use. Add to this the superb, clear modulation for which ICOM are so famous and a good receiver, plus a solid, reliable construction and you have really good value for money.
Total channel capacity = 15
Channels fitted = 9(S20, S22, R3, R4, R5, R6, R7, R8, R9)

Available ex-stock at **£159 inc Vat and delivery.**

IC-215

£159 inc. VAT and delivery

◀IC-240

THE BEST VALUE FOR MONEY IN SYNTHESIZED RIGS

IC-240 Think of the features you would instal in a mobile to provide a combination of optimum usefulness AND SAFETY. You will probably come up with the following requirements:

1 Easy channel selection with minimum knob twiddling—yet with all the normal FM channels available.
2 A fully automatic tone burst which operates only in repeat mode with NO buttons to press either on the front or on the back of the set.
3 Instant reverse repeat at the flick of a switch without any re-tuning or memory programming.
4 A very sensitive receiver with a spurious response performance far better than the average and a very clean transmitter with excellent clear, crisp modulation. (We measured a sensitivity of 0·1µv pd for 10dB sinad).
5 A reasonable price—but (more important) a quick, reliable after sales service.

COMPARE THIS LIST WITH PREVIOUS ADS FOR VARIOUS TRANSCEIVERS AND YOU WILL SEE THAT THE 240 WINS EVERY TIME:

IC-240 alone £198 inc. VAT

SUPERSCAN £77.63 inc. VAT Fitting £6.00 extra IC-240 with superscan £275

WE NOW STOCK THE J-BEAM RANGE OF ANTENNAS AT HERNE BAY

AGENTS (PHONE FIRST—All evenings only except Norfolk and Burnley)
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THANET FOR SERVICE

DAVE G4ELP

WITH THE TECHNICAL KNOWLEDGE AND EQUIPMENT TO SERVICE THEM PROPERLY BOTH BEFORE AND AFTER SALES

IC-211E ▼ £549 inc VAT

Giving you FM/CW/USB/LSB, all produced from the amazing ICOM synthesizer and patent LSI chip. Frequency read out is to the nearest 100Hz and it is amazingly stable and accurate. You can use the two frequency stores as separate VFOs or for any repeater shift required. The tone burst is automatic, of course, and reverse repeat is available at the flick of a switch. Add a keypad (we will give you the circuit to make your own or you will be able to buy one shortly) and find a new facility which is quite impossible with old-fashioned rigs. The original waiting list has now been dealt with and you can now have one from stock.

IC-245E £396 inc VAT ▲

This truly amazing little box gets you mobile on FM, USB or (if you really think it a good idea) CW! The synthesizer is the same as the IC-211E and can be tuned to the nearest 100Hz, again with amazing accuracy. Of course such a versatile little box will often be used as a base station and facilities such as keypad operation can be added. They are now ex-stock!

IC-701 £999 inc VAT

◄ The popular "SLIM JIM" SJ2

144–146MHz—High efficiency 2 metre omni-directional vertical

An omni-directional 2 metre aerial developed by T & T from a design by F. C. Judd (G2BCX). Derived from the "J" the SJ2 is a free space aerial with *better than 50% greater efficiency than conventional ground plane types due to the very low angle radiation field.* The aerial is slim and compact (58 inches long) and as there are no radials it is unobtrusive and has low wind resistance. Supplied complete with mast clamp. **£15.50** inc. VAT (carriage £1.00).

The HF rig to beat them all, **HERE THIS MONTH.** ★ All solid state including the finals ★ 100W RF output Continuous Duty on All Bands. All Modes ★ All bands 1·8–30MHz ★ USB, LSB, CW, CW (narrow), RTTY ★ Double balanced Schottky Diode mixer used in both Tx and Rx ★ Fully synthesized with Digital readout to 100Hz and two stores to enable split frequency operation ★ ICOM's unique bandpass tune ★ VOX, Semi-break-in CW, RIT, AGC, Noise Blanker ★ Built-in RF speech processor ★ Extremely compact ★ All filters built in ★ 12V or mains operation ★ Electret desk mic. NO EXTRAS TO BUY.

INTRODUCING A NEW RANGE OF MICROPHONES BY LESON. For the time being available only from Herne Bay.
All these are suitable for ICOM transceivers and have a PTT switch and a frequency response 300–2500Hz. They are NOT fitted with a plug.

MODEL	TYPE	BUILT-IN AMPLIFIER	IMPEDANCE	PRICE (inc VAT)
TW232	Ceramic Desk mic with PTT, Lock sw and gain cont. Silver grey finish	Compression amp 0–30dB var.	<4·5K	£25.00
DH-218	Moving coil dynamic. Hand held	NONE	500Ω	£4.99
DH-233	Moving coil dynamic. Hand held	Pre-amp 0–15dB var.	<3·5K	£9.00
CH-229	Ceramic noise cancelling. Hand held	Compression amp 0–35dB var.	<5K	£15.00

Post and packing **50p** in all cases. Gain controls are external in all cases

DURING THE EVENINGS AND AT WEEKENDS WHEN CALLS ARE CHEAP, WHY NOT USE OUR ANSAFONE TO RECORD YOUR REQUESTS FOR DATA, ETC. (02273) 63850

FOUR MORE GOODIES FROM ICOM

(1) IC-402 £288 inc

A 70cm VERSION OF THE FAMOUS IC-202

IC-402: Utilizing a tunable second oscillator, the **IC-402** provides the stability and band spread needed for SSB operation on 430. Crystals are provided for two of the four bands which can be selected from the twenty six 200kHz segments between 430 and 435·2. Listen to the signals from OSCAR VIII, mode "J", with the superb 0·5uv receiver on either lower or upper sideband.

(2) IC-202S £216 inc

THE IC-202 WITH LOWER S/B ALSO

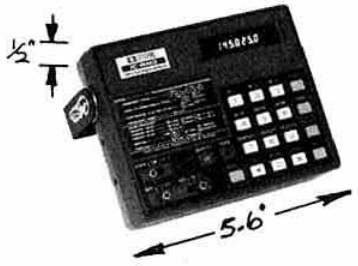
Specifications:	IC-202S	IC-402
Opp. Sideband Suppression:	Better than 40dB/1kHz	Better than 40dB/1kHz
Spurious Radiation:	Better than −60dB	Better than −60dB
Microphone Impedance:	600 ohms	600ohms
Receiver Type:	Single Superheterodyne	Double Superheterodyne
Intermediate Frequencies:	10·7MHz	57·6–57·8MHz, 1st I.F. 10·74MHz, 2nd I.F.
Receiver Sensitivity:	0·5uv at 10dB SINAD	0·5uv at 10dB SINAD
Spurious Sensitivity:	Better than −60dB	Better than −60dB
Selectivity:	±1·2kHz or better at −6dB ±2·4kHz or better at −60dB	±1·2kHz or better at −6dB ±2·4kHz or better at −60dB
Audio Output:	More than 1W	More than 1W
Audio Output Impedance:	8 ohms	8 ohms

(3) IC-RM3 £99 inc

COMPUTERISED REMOTE CONTROLLER

The remote controller you have all been waiting for to add to your IC-211E, IC-245E and IC-701 to provide facilities which are just not possible with competitors' rigs. YOU CAN:

- ★ KEY IN any frequency within the operating range of the rig concerned (it even organises the band changing in the IC-701).
- ★ Store the frequency away in any one of FOUR memories for instant retrieval.
- ★ Step up or down the band in variable steps.
- ★ Scan continuously up or down the band in variable steps.
- ★ Operate forward or reverse duplex from the keypad.
- ★ Have remote readout of frequency in case you want to hide your rig in a cupboard!



(4) IC-280E £279 inc

THE ULTIMATE IN 2m FM SYNTHESIZED RIGS

For the man who wants all the channels in 2m from 144–146 complete with digital readout of frequency ICOM have produced the IC-280E which has a few interesting extras not provided by the opposition. Such as:

- ★ THREE memories programmable from the front panel (thus giving you four easy-to-switch-to channels without taking your eyes off the road).
- ★ 25kHz per step to avoid winding for hours!
- ★ Normal and reverse repeat without using up memory space.
- ★ AND (wait for it!) A FRONT PANEL WHICH CAN BE REMOVED FROM THE RIG AND MOUNTED, COMPLETE WITH ALL CONTROLS, METERS AND DISPLAYS, ELSEWHERE IN THE CAR!!!
- ★ Plus of course the high-quality performance, crisp clear transmission and very hot receiver for which ICOM are so famous as leaders in the quality VHF mobile field.

ICOM..... Simply the Best

FROM YOUR UK DISTRIBUTOR **THANET ELECTRONICS** HERNE BAY KENT

the systems approach!

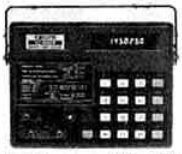
Designed for the connoisseur, the ICOM IC-701 HF transceiver brings the latest digital technology to Amateur Radio. Study a few more of the vast list of features offered with the IC-701 . . .

TWO VFO'S BUILT-IN
The second VFO, which is an optional tack-on with most other transceivers, is an integral feature in every **IC-701**. Now you can work those Yanks on 40 and 80 metres!

OPTICALLY COUPLED VFO
A VFO with **no** variable capacitors! Made under arrangement with Collins Radio, the **IC-701** maximises digital readout with positively no time lag or backlash in display stability, even when using 100Hz steps. The **IC-701**'s free wheeling dial is instantly co-ordinated with the high speed, computer controlled six digit readout using an optical chopper. There is absolutely **NO** mechanical connection between the smooth bearing mounted flywheel knob and the two dual-tracking VFOs.

COMPUTER COMPATIBLE INTERFACE
External microprocessor control from a PIA interface is possible via the 24-pin accessory socket on the rear panel of the **IC-701**. The **IC-701** can even be interconnected with the companion 2 metre **IC-211** to track frequencies for Oscar work.

REMOTE CONTROL FACILITY
The **IC-701** can be remotely controlled via the new optional **RM-3** computerised remote controller. This unit includes scan, duplex, memory and tone functions plus a touch-tone pad with digital readout. You can select frequencies and automatically change bands with this CPU controlled accessory.



CONTINUOUS OPERATION
The **IC-701** features continuous operation with a full 200w pep or 200w CW input on **all bands** and **all modes**. No need to worry about timing key-down operations as the **IC-701** is designed to handle the maximum power continuously! If the heat sink starts to warm-up a built-in fan automatically switches on. If a temperature danger point should ever be reached the fan doubles its speed and the digital display flashes to tell you to quit transmitting!

NO TUNING NECESSARY
Just select the required band and frequency and start transmitting!

ALL SOLID STATE
While the others are still fooling around with valves, **ICOM** have produced a solid-state HF transceiver including protected transistors in the final.

CROSS MODULATION MINIMISED
Cross modulation – a fact of life with some rigs – is minimised with the double balanced Schottky diode mixer used for both transmit and receive.

SMALL ENOUGH FOR MOBILE
The **IC-701** is extremely compact with dimensions 111 by 241 by 311mm (HWL) and weighs only 7·3kg. No more need to struggle with heavy rigs impossible to mount under-dash!

FULL METERING
The front panel meter includes swr, power, ALC, compression and collector voltage/current measurement.

DESKTOP MICROPHONE AS STANDARD
A high-quality condenser electret desk microphone is included as standard equipment with your new **ICOM IC-701**.

VARIABLE POWER OUTPUT
In CW and RTTY modes power output can be continuously varied from zero to maximum 200 watts input. SSB output can easily be adjusted for novice use.

IDEAL FOR THE CW AND RTTY BUFF
The **IC-701** includes narrow CW filter as standard plus semi-break-in and sidetone facilities. The **IC-701** has switching to select either narrow or wide RTTY shift rates.

THANET TECHNICAL BACK-UP
Your new **IC-701** from THANET comes complete with the THANET one year warranty plus technical and spares support. THANET staff have been factory briefed on the service and alignment procedures.

PLUS–

- ★ **Separate front-end RF stages using dual gate MOSFETs for each band, providing optimum performance.**
- ★ **Diode matrix to define band edge parameters.**
- ★ **Operation on all bands 1·8 thru 30MHz including WWV.**
- ★ **Modes include USB, LSB, CW, CW-N (narrow), RTTY.**
- ★ **Unique ICOM bandpass tuning.**
- ★ **VOX, Semibreak in CW, RIT, AGC, effective noise blanker.**
- ★ **Built-in speech processor using advanced circuitry.**
- ★ **All filters built-in.**
- ★ **Automatic front panel light dimming to suit ambient light conditions.**
- ★ **Separate VCOs for each band to reduce spurious and birdies.**
- ★ **Receive triple conversion.**
- ★ **Built-in DC power supply, external AC PSU with speaker.**
- ★ **Full line of matching accessories to come.**
- ★ **Internal speaker.**

COMPARE THE IC-701 WITH THE OTHERS!

Complete with AC PSU as shown £999 inc VAT
IC-701 alone £837 inc VAT

THE ULTIMATE! IC-701 state of the art
THANET ELECTRONICS for ICOM

WATERS & STANTON

TELEPHONE HOCKLEY (03 704) 6835 (2 LINES)

FDK MULTI-800D

★ 25 Watts FM
★ Automatic tuning
★ Non-volatile memory
★ New mic up/down freq control

AMAZING VALUE £249 inc VAT

REMOTE "HEAD UP" DISPLAY £16

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

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

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

FDK 70cms MULTI-UII

★ Fitted 6 repeaters and 4 simplex
★ Automatic tone-burst
★ 12 watts output
★ Receiver RF pre-amp
★ Receiver IRT control
★ 4 channel autoscan

Fitted 6 repeaters + 4 simplex £259
Fitted choice of 2 channels £225

70cms is fast becoming a most exciting band for mobile operation with more and more repeaters coming on the air. Many enjoyable QSO's are being had on 70cms now; completely QRM free and S9 plus. And more and more people are finding that the U-11 with its 12 watts output (typical), receives pre-amps for the hottest front-end around and auto-scan is the ideal choice. Not surprising therefore that more and more people are saying "I'm using a U-11 here".

FDK QUARTZ-16

STILL AT OLD PRICE! (Limited period) £149.75 inc VAT

If ever you needed an excuse to purchase a 2-metre rig for the car here it is. We've managed to negotiate a special deal with our factory in Japan. The result? . . . £149's worth of engineering that even amazes the most critical purchaser for its sheer value and performance. If you still need convincing then thumb through some of the past couple of years' advertising to see when a 2-metre FM rig could be bought for less than £150! The latest factory fresh shipment has just arrived so here's your chance to make the biggest saving of 1978! And here's a prediction too: many of you will look back at this advertisement in a few months' time and be glad you purchased your rig at such an incredibly low price—just a few will regret they hesitated and found the price had risen!

So what do you get for £149·75?—12 watts FM, 25 channel capability (SO, S20, R3, R4, R5, R6, R7 fitted) 2 priority channels, true S and R channel readout, channels fitted indicator light. Automatic protection circuit, microphone, quick release mobile mount, DC power lead, hardware etc., a 12 months' guarantee and free delivery. (Channels S21/22/23 available at £7.50 extra inc. VAT)

FDK TM 56B VHF MONITOR

The TM56 is one of our most popular models, combining great performance with modest price. The TM56B has the basic receiver design of our mobiles and includes its own 230 volt AC supply, plus external 12v DC input. 12 fixed channel positions are included, plus 4 autoscan positions. Any one of the Autoscan channels can be cancelled. Price includes 10 channels, R3, R4, R5, R6, R7, S0, S20, S21, S22 and S23, necessary leads etc, and 12 month guarantee. At £95 it is unbeatable! 10 channel marine version £113 inc. VAT

ELECTRONICS

TELEX 897406

FAST MAIL ORDER SERVICE

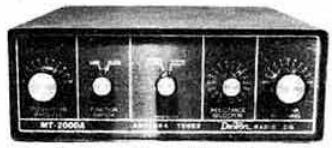
FDK

DenTron RADIO (USA) . . . SUPERIOR DESIGN & QUALITY

DenTron MLA 2500
160–10m 2kW PEP
£695 inc. VAT & delivery
IN STOCK NOW!

LESS THAN ONE CUBIC FOOT!

- ★ 1kW DC continuous
- ★ ALC circuit
- ★ 3 speed cooling
- ★ Military specifications
- ★ 234v/117v AC
- ★ 2 of EIMAC 8875 tubes
- ★ R.F. PEP Wattmeter
- ★ Size 5½" × 14" × 14"
- ★ Weight 47lb
- ★ Ideal for SSTV/RTTY
- ★ 3rd order down 30dB +
- ★ 40 watts drive for 1kW



DenTron MT 2000A 3kW ONLY £175 inc VAT

- ★ Continuous tuning 1.8 to 30mHz – No gaps!
- ★ Handles 3Kw PEP – any aerial any reactance.
- ★ Matches long wires, 75–600 ohm balanced feed or unbalanced coax
- ★ Front panel by-pass switching for straight through coax feed
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- ★ Large 6000 volt ceramic tuning capacitors
- ★ Low profile styling 5½" × 14" × 14" – weight 16lbs.

SOUTH EASTERN STOCKISTS

YAESU

FT227R
MOBILE
ALL CHANNELS
144–146
£214.00 inc. delivery

FRG7
THE BEST GENERAL COVERAGE RECEIVER AVAILABLE
£184.50 inc. delivery

FT901
160–10M
AM, FM, SSB, CW
FT901D £781.00
FT901DM £905.00
inc. V.A.T.

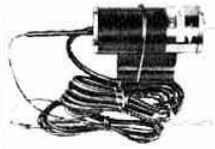
FT101E
160–10M
260 WATTS P.E.P.
Price inc. 24hr delivery
£545.00 inc. V.A.T.

FDK

HOLD IT! PALM II

You are looking at FDK's new hand-held FM 1 watt output transceiver. And when we say hand-held we really do mean it. This will sit comfortably in the palm of your hand or slips into your jacket pocket. Measuring only 152 × 67 × 46mm it really is compact. Offering a choice of up to 6 channels and switchable tx ± 600KHz shift the Palm II needs only one crystal per channel. And whilst other manufacturers charge extra for ni-cads and helical whips FDK provide these as standard. The price and delivery dates are yet to be finalised but a 7p stamp will bring you advance details.

STOP PRESS! SPECIAL DISCOUNT!
MICROWAVE MODULES 500MHz FREQUENCY COUNTERS at a very special price! These are brand new with 12 months guarantee. At list price of **£85** they are a bargain. At our price of **£65** inc. V.A.T. You had better get your cheque book or credit card out pretty quickly.



MM202G MICROPHONE

- ★ High quality condenser mic.
- ★ Boom weighs 5 grams
- ★ Tx/Rx switch clips on gear lever
- ★ Matches most transceivers
- ★ Makes for safer driving
- ★ Matches 600–50K ohms

PRICE £19.95

SPECIALS

Shure 444 microphones – last few at old price	**£25.50** (£1.00)
Shure 526T microphones – last few at old price	**£31.00** (£1.00)
Jaybeam KR400 rotators – superb value at only	**£95.00** (£1.50)
Jaybeam 9502A rotators – another super valve rotator	**£45.00** (£1.00)
Multi-2700 MkII almost new and serviced by us	**£375.00** (n/c)
Good clean Liner II's checked and serviced by us	**£115.00** (n/c)
HP3A TVI filters (high pass) slightly marked list £2.95	**£1.75** (n/c)

Ferrite rings for TVI or AFI as used by Home Office **30p** (30p any quantity))

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

BARCLAYCARD VISA

ALL PRICES INCLUDE VAT — CARRIAGE CHARGES IN BRACKETS

AGENTS—G3OQT Bredhurst Electronics, The Street, Thakenham, Nr. Pulborough W. Sussex. Tel. 07983-3056
G3XTX J.R. Electronics, 196 Collier Row Lane, Romford, Essex. Tel. Romford (0708) 68956.
GM3GRX Eric Simpson, 6 Drossle Road, Falkirk, Stirlingshire. Tel. 0324 24428

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

Access

FRG-7 DIGITAL £180

LEE ELECTRONICS LTD

ESTABLISHED FOR MORE THAN TWO DECADES

01-723 5521 400 EDGWARE ROAD, PADDINGTON, W2 Telex: 298765

OPEN MONDAY TO SATURDAY

LONDON'S LARGEST STOCKISTS OF YAESU ● ANTENNA SPECIALISTS ● STANDARD ● ICOM ● BANTEX ● JAYBEAM ● REVCO ● QM70 ● ATLAS ● ETC

FRG-7—DIGITAL DISPLAY

Yes. The world famous FRG-7 is now available with digital read-out fitted by Lee Electronics in place of kHz dial .. .. .. Special Price £202+VAT

For customers who already own FRG-7's we can supply the digital read-out complete with installation instructions .. .. £37.00+VAT

FRG-7 Digital £202 .. .. .. FRG-7 with analogue dial £164.00

FRG-7 Perspex cover as illustrated £3.50 All plus 12½% VAT

YAESU MUSEN PRICES (ALL AVAILABLE FOR IMMEDIATE DELIVERY)

FT901DM Digital trans	£802.00	FV301 VFO for FT301	£75.05	FT101EX Transceiver	£440.00	YO100 Moniter Scope	£145.00
FT901D/DE Digital trans	£695.00	FR101S Receiver	£372.50	FT221R 2M all mode	£357.00	FC301 Ant Tuner	£97.50
FT301 trans 1·8-30Mhz 12V DC 100W	£490.00	FR101D Delux Receiver	£465.00	FT227R 10W 2M 400 Ch Digital Mobile	£191.00	YC500J 500Mhz counter	£151.00
FT301D Digital FT301	£585.00	FR101SD Digital S	£453.50	FT7 HF 10W Mobile	£305.00	YC500S 500Mhz counter	£213.00
FP301 PSU/Speaker	£90.00	FR101DD Digital D	£541.00	FL101 Lin/Amp for FT7	£114.50	YC500E 500Mhz counter	£275.00
FP301D PSU/SP/Clock/ IDEN	£144.50	FL101 1·8-30 MHz Tx	£386.50	FP4 PSU for FT7	£29.50	YP150 Power Meter	£48.50
		FT101E Transceiver	£485.00	FL2100B Linear 1·2kW	£295.00	QTR24 World Clock	£14.75
		FT101EE Transceiver	£469.00			FRG7000 Receiver	£306.00

ALL +VAT 12½% EXCEPT MONITOR SCOPE, CLOCK, COUNTER, WATTMETER, + 8%

MICROWAVE MODULES DESPATCHED TO ANY PART OF THE WORLD POST FREE

MMT144/28 Transverter	£79	**FREQUENCY COUNTERS**		**CONVERTERS**		ATV435/51 converter	£24
MMT432/28 Transverter	£97	MMD 050/50MHz counter	£62	MMC70, 4m converter	£18	MMC1296 converter 28 or 144MHz IF	£2
MMT432/285 with Oscar shift	£119	MMD 050/500MHz counter	£79	MMC70/LO, 4m converter	£20	All 2m converters can be supplied with IF outputs of 2–4–12–14–18–28MHz 70cm models with IF outputs of 28–14–18– or 144MHz.	
MMT432/144 Transverter	£133	Divide by 10 prescaler, 500p	£25	MMC144, 2m converter	£18		
MMT432/144R with 1·6MHz shift	£151	**VARACTORS**		MMC144/LO 2m converter	£20		
MMP12/3 Power supply 12V, 3A stabilized	£50	MMV 1296, 23cm varactor	£33	MMC432, 70cm converter	£24		

ALL MICROWAVE MODELS SUBJECT TO VAT IN UK 8% ON FREQUENCY COUNTERS, ALL OTHER MODELS 12½%

A.S.P. MOBILE AND BASE STATION ANTENNAS

Asp201 ¼w 2m mobile	£3.50	Asp393 ¼w 3dB 2m mobile	£17	Asp E462 70cm 3dB mobile	£7.23
Asp2009 ⅝ 3dB 2m mobile	£6.95	Asp no hole boot mount	£3.70	Asp E667 70cm 5dB mobile	£16.90
Asp629 ½w 3dB 2m mobile	£7.60	Asp magnetic mount	£8.95	Asp A659 UK 70cm 5dB, base antenna	£19.00
Asp677 ⅝ 3dB 2m mobile	£13.50	Asp cutter clip less cable	£3.85		

Post & Package, £1.00

Special offer A.S.P. A680 U.K. 6dB 144/148MHz Co-linear Power handling 350W. Length approx. 12ft. List £51 special offer £41.50 PLUS VAT 8%

ICOM RANGE		**ICOM ACCESSORIES**		**F.D.K. RANGE**		**STANDARD RANGE**	
IC215 2m 8ch	£139	Extals S21 or S22	£4.50 pr.	Multi UI (UII) 70cm mobile	£221	C146 2M Hand held with carry case, tone burst, S20 and S22	£119.95
IC215 2m 10ch (fitted 6 repeaters plus 4 simplex)	£144	ER Case 202/215	£6.67	Multi 11·2m mobile	£184	New Mobile Master 2W input 10W output	£39.50
IC202 2m SSB	£152	Mobile Bracket 202/215	£10.23	Multi 2700 Fm/ssb. Tx/rx	£435	Base Master	£19.50
IC22A 10W mobile	£145	Helical Antenna £3.25, p & p 25p		**HELICAL ANTENNAS**		Mobile adaptor	£4.95
IC240 10W mobile	£159.10	**KYOCUTO DIGITAL MODEL 2015**		2m with 13 BNC	£4.20 each	Helical antenna	£5.50
IC245E 10W FM/SSB	£352	10W mobile 400ch Tx/rx	£245	2m with ph 259	£4.20 each	Small charger	£5.25
IC211E 10W FM/SSB	£470			2m for IC215, Trio 2200 Gx, standard C146A	£3.25	C8600 10W Mobile	£115.00
All transceivers +12½% VAT		**J-BEAM ANTENNAS** ALL MODELS IN STOCK		All + post 25p. + 12½% VAT.		C830S Marine H/Held	£145.00

SPECIAL OFFER. Constant current Ni-Cad chargers. Adjustable charge rate for AA or C type Ni-Cads. Ideal for C202/215, C146A, Trio, etc. Price £8.35 + 8% VAT. p & p 50p.

QM70 40W Linear Amplifier £46.20 +VAT 12½%

SEND 25p FOR CATALOGUE AND PRICE LIST OF OUR FULL RANGE

ALPHA W63 2m 10W Mobile with scanning channels. Fitted 9 channels £139.95 +VAT 12½%

YAESU FT227R WITH LEE ELECTRONICS AUTO-SCAN

YES WE CAN NOW SUPPLY THE FT227R WITH AUTO-SCAN FACILITIES, DESIGNED AND MANUFACTURED EXCLUSIVELY FOR US—NOTE THESE STAR-FEATURES:

- ★ Scans 40 channels
- ★ 2 speed scan rate
- ★ Locks out unwanted channels
- ★ Automatic tone burst for repeater operation
- ★ Reverse repeater facility
- ★ Scans between 145–146MHz in 25kc/s steps
- ★ Scanning facility

Controlled by switch fitted to microphone *(not illustrated)*

PRICE £231 PLUS VAT

YAESU

proudly announces a new synthesised 2m FM transceiver FT-227R

The world-famous Yaesu state-of-the-art technique has brought computer theory into VHF communications.

What are the frequency splits for repeaters? Don't worry! Yaesu has computerized it. In addition to a conventional ±600kHz split, any transmitter offset frequency is memorised with a touch of a push-button.

What was my last frequency channel? Don't check! A touch of a push-button will bring you back to the memorized channel instantly.

Why only one knob to select a channel out of 800 channels? Yaesu utilises a "OPTICAL COUPLING" system to select each channel in 10kHz steps and the channel may be offset 5kHz higher with a touch of a push-button. Thus 800 fully synthesized channels are provided with one knob and no rotary switches to get oxidized and noisy.

Why wait? the FT-227R is on your dealer's shelf now.

Many, many other features such as automatic encoder-decoder for tone guarded squelch (TGS) (optional). Tone burst accessed repeater operation, automatic final protection, busy channel indicator, high-low output selection, diecast front panel, and famous Yaesu quality throughout!

And all at a most attractive price. See your dealer today for an informative catalogue.

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

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

YAESU
proudly announces
1980's RADIO TODAY:
The FT-901DM HF Transceiver

The Ham's dream—to have the best—is now reality.

Advanced receiver features include rejection tuning, dual-filter variable-bandwidth IF passband tuning, and audio peak frequency tuning for sharp CW reception. Unparalleled receiver selectivity is yours.

Built-in Curtis 8043 IC Keyer! Provides reliable operation and superb immunity from RF interference.

Famous Yaesu quality workmanship throughout. Toroidal output circuitry and RF negative feedback for maximum reliability and purity of emissions. Rugged GE 6146B final tubes.

Memory circuitry allows you to store a frequency, then recall it with the push of a button for control of transmit, receive, or transceive frequency. Digital plus analog frequency readout. PLL frequency derivation.

VOX, calibrator, noise blanker, RF speech processor, and 20dB attenuator are all built in, not expensive accessories.

Modern computer-type plug-in circuit boards for quick servicing and clean layout.

The FT-901DM will be available soon. See your dealer for a colour brochure on the FT-901DM and other Yaesu products.

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

South Midlands Communications Ltd,
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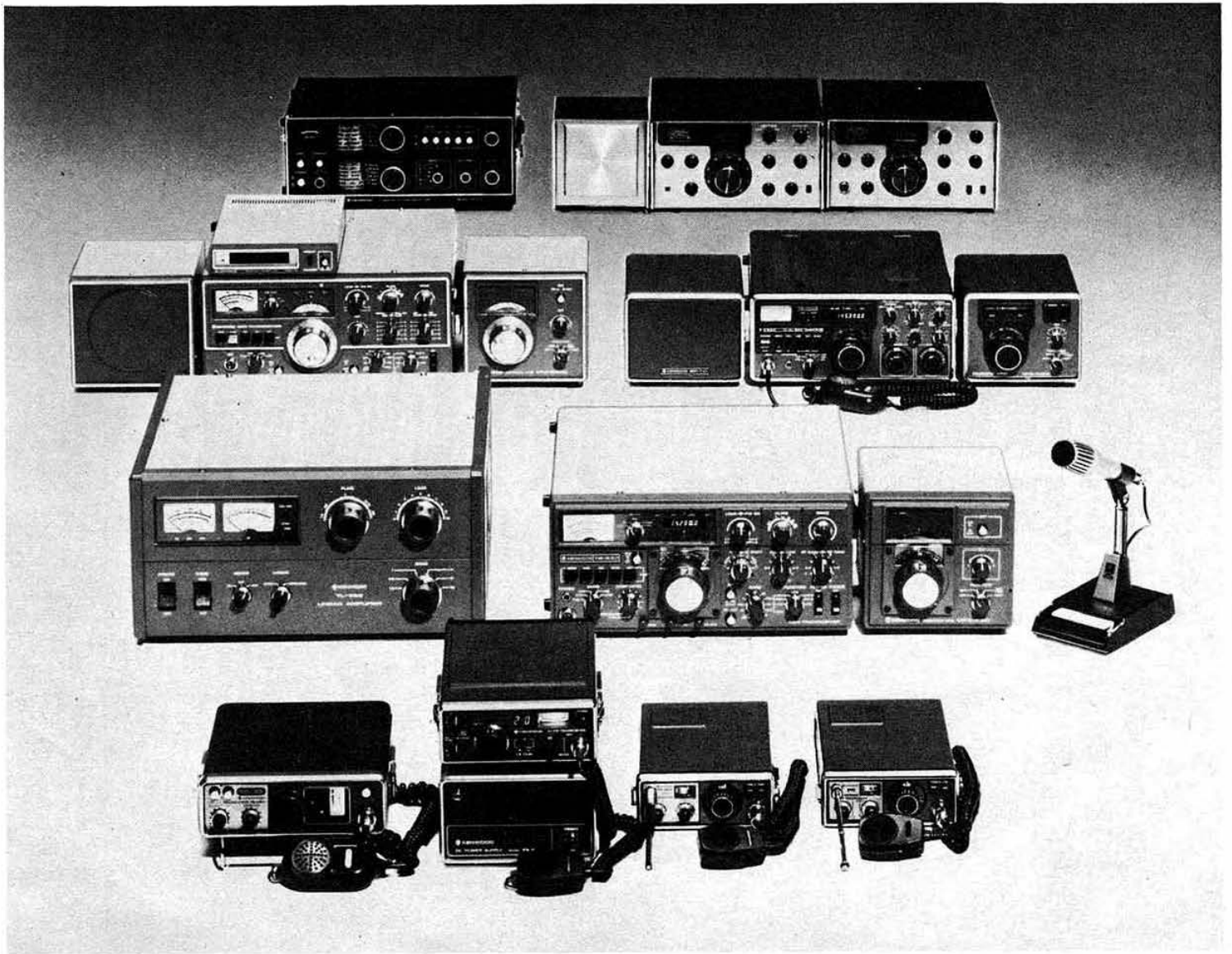
Totton, Near Southampton,
Hampshire SO4 4DN



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

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

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

R300 All Band Receiver

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

R599D – T599S

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

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

TS520S All Band Transceiver

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

TS700S

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

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

TS820

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

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

TR8300

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

TR7500

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

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

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

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

And finally to the two electronic handbags:—

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

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

and the TR3200

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

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

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

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

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

Western

VALUE FOR MONEY
FROM
Western
. . . OF COURSE

FT101E
THE WORLD'S NUMBER ONE TRANSCEIVER TRIED AND TESTED WORLD-WIDE

Value and performance in one compact thirty pound package. Effective RF speech processor to realise the extra "talk power" to cut through the pile-ups without the need for a linear. All solid-state except for driver and final valves. Plug-in modules for ease of servicing—on the rare occasions it needs it! 12 volt dc or ac mains operation built in. Just add antenna and volts to be on the air—all bands 160 to 10 metres.
Accessories available—CW filter; matching speaker; remote VFO.

Western PRICES – FT101E INC. VAT **£517.50**

SP101B Speaker	£18.00
FV101B VFO	£82.12
FL2100B Linear	£313.87

YOUR LAST CHANCE at THIS PRICE!

FT221R

All-mode operation—SSB (USB, LSB), CW, AM, FM. All solid-state reliability with plug-in modules. Rugged 70-watt dissipation, PA transistor for stability and reliability. VHF local oscillator (133–137MHz VCO) in PLL system minimises spurious responses.
12 volt dc or ac mains operation built in.
Full 4MHz (144–148) coverage with 600kHz repeater shift and access tone generator.

Western PRICE INC. VAT **£392.63**

YAESU PRICES FROM **Western** —SEE HOW WE COMPARE!

FRG-7	0·5–30MHz GENERAL COVERAGE RECEIVER	The only logical choice . . . . . hundreds of SWLs can't be wrong!	£178.87 INC VAT
FT-227R	2m SYNTHESISED FM TRANSCEIVER	Direct frequency readout; auto tone-burst PLUS reverse repeater option—ONLY from WESTERN	£201.37 INC VAT
FC-301	ALL-BAND ANTENNA MATCHING UNIT	160–10M; 500W PEP; 50 ohms in; built-in antenna switch and SWR/PWR meter	£100.12 INC VAT

. . . ALSO THE NEW FT225R at £506.25 and FT225RD at £540.00

SEND 15p IN STAMPS FOR LATEST YAESU MUSEN EQUIPMENT CATALOGUE

Electronics (UK) Ltd

ANTENNAS! SUMMER CLEARANCE OFFERS!

Limited stocks of some items—First come, first served!

Asahi	AS-103, 3-element 10m beam	£37.06
Asahi	AS-21, 3-element 15m beam	£38.81
Hy-Gain	402BA, 2-element 40m beam	£150.00
Hy-Gain	203BA, 3-element 20m beam	£111.00
Hy-Gain	204BA, 4-element 20m beam	£135.00
Hy-Gain	153BA, 3-element 15m beam	£62.00
Hy-Gain	TH3 Jr, 3-el tribander (600W pep)	£108.00
Hy-Gain	TH2 Mk3 2-el tribander (2kW pep)	£105
Hy-Gain	18V, 80-10m vertical	£27.00
Hy-Gain	12RMQ, roof-mounting kit with radials for 10/15/20m	£14.50
Hy-Gain	14RMQ, roof-mounting kit with radials for 40/20/15/10m	£17.50
Hy-Gain	Lightning arrestors Type LA-1—panel fixing	£17.50
	Type LA-2—in-line	£3.05
Wilson	M615, 6-el, 15m beam	£88.00
Wilson	M620, 6-el, 20m beam	£212.00
Wilson	DB32, 3-el, 20/2-el 15 duo-band	£74.75
Wilson	DB62, 6-el, 20/2-el 40 duo-band	£345.00
Wilson	DB67, 7-el, 20/6-el 15 duo-band	£340
Wilson	DB76, 7-el, 15/6-el 10 duo-band	£150
Newtronics	"Hustler" for HF Mobile . . .	
BM-1	Bumper mount with ball	£9.75
MO-2	Mast	£12.95
RM-80	80m resonator	£13.95
RM-40	40m resonator	£13.15
RM-20	20m resonator	£10.50
RM-15	15m resonator	£9.65
RM-10	10m resonator	£8.85
C-32	Ball mount	£4.75
QD-1	Quick-disconnect	£9.65
SSM-3	Heavy-duty base spring	£9.75
RSS-2	Resonator spring	£4.00
Newtronics	G6-144A, 2m base station colinear	£49.00

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See Catalogue Page 19

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See Catalogue Page 18

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See Catalogue Page 3

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The national society representing all UK radio amateurs

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

GENERAL MANAGER AND SECRETARY
D. A. Evans, G3OUF

EDITOR
A. W. Hutchinson

ANNUAL SUBSCRIPTION RATES

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

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

OAPs with 15 years' membership: £4.50. Affiliated societies: £6.50 (including *Radio Communication)*; **£3.25** (excluding *Radio Communication).*

RSGB NEWS BULLETIN SERVICE

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

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

SCHEDULE

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

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

AN OPEN LETTER FROM THE PRESIDENT

Over the last few months, I have become increasingly involved with repeaters, and both their virtues and vices have been most forcibly brought to my attention. It would seem to be an appropriate time to try and put down some of the views expressed in the hope that this will clear up some of the obviously confused thinking on this topic.

1. The Society sees repeaters as a perfectly valid amateur activity which should receive no more or no less than its fair amount of attention from the Society's organization.
2. The Society regards repeaters as an RSGB service provided on its behalf by individual groups in the same way as beacons. The Society holds the licences and therefore is responsible for technically vetting the equipment and seeing that technical standards are maintained.
3. As regards the relationship between repeater operating and other aspects of amateur radio:
   (a) The design and construction of amateur repeaters presents some quite tough technical problems which represent a significant challenge. As examples, one could quote the sophisticated control circuitry and the narrow input/output spacings used which appear to be well in advance of those used professionally. It is perhaps a matter of regret that these techniques have not been better publicised, both inside and outside amateur radio.
   (b) There are, at this time, 70–80 repeaters in being or proposed. If we assume that 10 people are technically involved with each, then this suggests a total of up to 1,000 directly concerned. This is a sizeable number by any standard.
   (c) It is perhaps worth stating again that 144 and 432MHz repeaters are seen primarily as aids to mobile-mobile working, with some use by those stations with very poor locations. They have never been seen as a means of achieving dx.
   (d) Experimental repeaters at frequencies above 500MHz would be a significant advance over existing professional practice, and could become a valuable incentive to populating the higher frequencies.
   (e) Repeaters are widely seen as a threat to what some regard as "real" amateur radio; that is, dx operating. A mild expression of this view is that repeaters increase the range of low power stations and decrease the range of high power stations. There would seem to be a number of questions arising from this.

   While the *percentage* of operators on 144MHz working dx has obviously declined, have the *actual* numbers declined? If so, would not this have happened anyway, since the pioneering days of simple dx working by tropo are long over? Is it not possible that repeaters are attracting into the hobby those who would otherwise not come in? Certainly it is the experience in Germany and the USA that many have been drawn into amateur radio from citizens band by its higher technical standards and better discipline.

   This begs the question: Are we doing enough to bring the attention of "repeater-only" operators to the wider aspects of amateur radio? Also, are we applying different standards to repeater operating? Most of the operating via repeaters seems to be of a fairly high standard. Some clearly is not. But is this situation any different from that at lower frequencies? It seems that if one sets out to find examples of poor operating practice, then one will find them on all bands and all modes.
4. Some believe that a conspiracy exists for repeaters to take over the whole of the 144MHz band and thereby to kill off dx working. There seems to be no foundation for this view for the following reasons:
   (a) There is no reason why even large numbers of repeaters (which are not envisaged anyway) could not be fitted into the existing channels on 145-146MHz.
   (b) The trend may even be in the opposite direction. It is a recent IARU recommendation not to use R8 and R9 for new repeaters, and to encourage the transfer of existing repeaters from these frequencies in order to reduce congestion within the Oscar sub-band.
   (c) It is also an IARU recommendation, reaffirmed in Hungary, not to operate repeaters below 145MHz.
   (d) The IARU conference also encourages the use of additional channels S10-S19, as well as the use of 12·5kHz spacing, to provide extra simplex channels if the national society regards these as necessary. The objective is, of course, to reduce this type of operating at frequencies below 145MHz.
5. A major source of ill-feeling associated with repeaters arises from the deliberate interference with the normal operation of GB3LO. While every amateur despises this activity, there is a real danger that those who proclaim their unhappiness with repeaters because of their long-term bad effects (whether or not this view is valid) may, perhaps unwittingly, be supporting the jammers.
6. The most serious jamming occurs on one repeater, GB3LO. The other 50 or more are relatively free from troubles. From limited listening to GB3LO, one is most impressed by the responsible way in which the vast majority of users respond to the sometimes gross provocation by the jammers.
7. While the jamming is clearly a bad advertisement for amateur radio, and not just repeaters, it is important to keep matters in perspective and to recognize that, fortunately, few members of the general public will normally be able to hear it.
8. The successful prosecution of jammers seems rather more difficult than it first appears, partly because of deficiencies in the Wireless Telegraphy Act. It is one thing to produce evidence that would satisfy a group of technically qualified people such as amateurs, but another quite different thing to produce evidence that will be acceptable by courts which are composed of laymen. Obviously, evidence obtained by professionals who are not directly involved with amateur radio would carry much greater weight, and this is one reason why the Society regards it mainly the responsibility of the regulatory authorities to initiate legal proceedings. It is, of course, the Society's duty to help in any way it can.
9. Council has asked its representatives to bring to its attention any cases where there is written evidence that members of the Society have brought amateur radio into disrepute. Council, of course, has the power to expel members, but, rightly, this is not a process undertaken lightly.
10. One's overall feeling is that of regret that repeaters, in themselves a quite restricted part of amateur radio, should generate so many problems which divert attention from the more positive aspects of repeaters in particular and amateur radio in general. One hopes that all amateurs will recognize the dangers and will work towards minimizing the negative aspects of the present situation.

Dain Evans, G3RPE
President

RSGB NATIONAL MOBILE RALLY

Woburn Abbey, Bedfordshire
(Coach Park Site)

Sunday 6 August 1978
From 10am

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

Bring-and-buy this year will be charged at **£1 per table per hour**, which will enable members to sell direct. Tables will be offered on a first-come first-served basis.

The RSGB makes no charge for entrance to the rally but all vistors must pay for entrance to Woburn Park, in which the rally takes place, at **50p** per car irrespective of the number of passengers.

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

How to get there:

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

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

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

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

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

Usual **talk-in** facilities will be in operation by Dunstable Downs RC on 1·8, 70, 144 and 432MHz.

QTC
amateur radio news

RSGB QSL Bureau

G2MI continues to receive QSL cards from many members for processing. These have to be redirected and this wastes a great deal of time and money.

Please note that the RSGB QSL Bureau address is: E.G. Allen, G3DRN, 30 Bodnant Gardens, London SW20 0UD.

QSL Bureau-G3YAA–G3ZZZ

Please note that the sub-manager for the above callsign series is now Mr I. Batley, BRS39896, 3 Folldon Avenue, Fulwell, Sunderland, Tyne & Wear.

Certificates

Charles Emary, G5GH, the honorary hf awards manager, reports that during the past year the following certificates have been issued: IARU Region 1 award, 641; Worked British Commonwealth, 223; British Commonwealth Radio Transmission Award, 58; British Commonwealth Radio Reception Award, 15; DX Listeners Century Award, 38 and the Commonwealth DX Certificate, 7—a total of 982 awards. In addition, 50 Worked All Continents applications have been approved for issue by IARU HQ, and a large number of queries from members have been answered.

A grateful thank you from the Society to Charles and his xyl for the work that they have carried out.

"The Radio Amateurs' Examination Manual"

Candidates for the RAE will be aware that the December 1978 examination will be the last using the present format and syllabus, and that with the May 1979 examination a new format and syllabus will come into operation.

The 7th edition of the *Manual* currently on sale may be used to prepare for the December 1978 examination but not the May 1979 and successive examinations. An 8th edition is in preparation for publication in the autumn of this year, and this will take into account the new RAE format and syllabus. It may thus be used to prepare for the May 1979 and successive examinations (but not the December 1978 examination).

As both editions will be on sale later this year, members are requested to ensure that the edition they order is suitable for the examination they intend to take. Only orders for the 7th edition can be accepted at the moment; further information on the availability of the 8th edition will be given in a later issue of *Radio Communication*.

"An experimental self-tutor for morse code using the SN74S387 prom"

The author of this article, published in the January 1978 issue of *Radio Communication*, advises prospective constructors that enquiries for the rom programmed to his specification should be addressed to Texas Instruments Ltd, Supplies Division MS21P, Menton Lane, Bedford, and marked "for the attention of Mr Keith Morgan".

The rom, programmed to specification ZHY001, is available at £6 per device, all inclusive. A printed circuit board is available from G4EIJ, QTHR, at £2.90, all inclusive.

Visit of HS1WR

A recent most welcome visitor to RSGB HQ was Colonel Kamchai Chotikul, HS1WR, the president of the Radio Amateur Society of Thailand. He was accompanied by his wife, HS1YL, and two of his children. He was received by the President, Dr Dain Evans, G3RPE; the general manager, David Evans, G3OUF; and also by Tom Douglas, G3BA, who has special links with Thailand.

One of the objects of the visit was to present to the RSGB the plaque shown in the photograph. The inscription reads:

This plaque is awarded by the
RADIO SOCIETY OF THAILAND
to the
RADIO SOCIETY OF GREAT BRITAIN
in recognition of their outstanding efforts
in promoting amateur radio throughout the world
Bangkok, March 15th 1978

Kamchai Chotikul	Eduardo Campos-Tortosa
HS1WR	HS1ALP
President RAST	Secretary

A. A. Campbell Swinton biography

Mr I. Mowatt and Mr G. Cooper, of the Dept of Humanities, Glasgow College of Technology, Cowcaddens Road, Glasgow G4 0BA, are gathering material for a biography of the Scottish electrical engineer and broadcasting pioneer A. A. Campbell Swinton (1863–1930), and would be grateful for any information to which readers might have access.

CB

The following is part of an editorial that appeared in the March 1978 issue of *Electronics Australia:*

"Before cb radio was legalized last year, we heard a great deal about its potential benefits for Australian society. There was much talk of its value as a communications medium in emergencies such as road accidents, bush fires and floods, and of its use by citizens to alert the police to suspected crimes in progress.

"I have no doubt that cb radio does have these potential benefits for society and that since legalization they have even been realized from time to time. However, what has become more obvious is cb's potential in less desirable directions.

"Listen on the cb channels in almost any of our larger cities and you'll discover what I mean. You'll hear everything from schoolkids swapping dirty yarns and planning gang escapades, to prostitutes touting for business. And in the daily papers stories on the abuse of cb are becoming quite frequent. It seems possible that cb may even have played a key role in a recent murder.

"In short, cb radio is becoming notorious. So much so that there is a growing backlash, and many people are seriously suggesting that the authorities should reverse last year's decision and try to suppress cb altogether."

Keep it simple

The Technical & Publications Committee is aware of the feeling in some quarters that more simple construction projects and educational series for the beginner should be published in *Radio Communication*. It is apparent, too, that the increasing sophistication of amateur radio demands, in turn, longer and more technical articles if these are to have any value for the enthusiast, but it is acknowledged that these may have only minimal interest for the newcomer.

The committee agrees that the present balance is not entirely satisfactory and would welcome the submission of more material of an introductory nature. Particularly sought are straightforward construction projects which have been proved by duplication in clubs, and for which complete step-by-step construction details are available. Any offers?

Stolen equipment

At Reading on 19 May from the QTH of G4DJB: Ken KP202 serial PT13474, complete with nicads, helical and telescopic whips and leather carrying case; Racal synthesized 0–30MHz transceiver, not a production model, six-switch frequency selection 10MHz–100MHz, complete with 12V nicad pack and light-blue Nato-style handset, size 3 by 9 by 13in, weight 15lb, colour olive green and black, "Racal" on front panel. Information to G4DJB, QTHR or to DC Pengelly, Reading CID, tel Reading 585111.

Also on 19 May, from car stolen in Maidstone and found in London: IC22A chassis 8911, Pye Motophone, $\lambda/4$ 432MHz and $5\lambda/8$ ASP guttermount antennas, tools and other items. Owner's name, address and callsign: J. King, G4EMC, 11 Forstal Road, Aylesford, Maidstone, Kent, inside IC22A. Information to G4EMC or West Malling police.

Microprocessors

Mr N. R. Huntley, G4CDU, 212 St Stephen's Road, Saltash, Cornwall PL12 4NL, would like to correspond with amateurs who are using microcomputer/processor control of their station equipment (rtty/cw) especially those using CBM Pet, or any other system, with a view to the exchange of software and ideas.

Lincoln Short Wave Club get-together

The recently re-formed Lincoln Short Wave Club has arranged a get-together at RAF Swinderby, on the A46, Lincoln–Newark road, on 23 July. HF station, S22 talk-in and other activities (excluding trade stands). All interested persons are cordially invited to attend and make the acquaintance of local amateurs.

WARC 1979

by R. F. STEVENS, G2BVN

The Radio Regulatory Department of the Home Office has recently issued a 22-page A4-size booklet entitled *Preparation for the World Administrative Radio Conference 1979*. The purpose of this booklet can best be described by quoting from the Foreword.

"In January 1977 the Home Secretary invited comments from interested bodies and members of the public on the proposals which they considered the United Kingdom should make for the World Administrative Radio Conference to be held in 1979 under the auspices of the International Telecommunication Union. Responses to the Home Secretary's invitation and to a related approach made directly to 104 organizations and individuals believed to be actively concerned in this subject produced 91 contributions. Some of these have been discussed in a series of meetings with various contributors. Others have been the subject of correspondence. But all have now been considered. This report gives the background to the conference and outlines the position reached in the United Kingdom preparations, following the period of public consultation. It describes the International Telecommunication Union and its methods of working, shows the significance of the international table of frequency allocations, tells of the work that has gone into the preparation of tentative United Kingdom proposals for the conference and outlines these proposals at their present stage of development, relating them to the foreseen long-term demands on the frequency spectrum and showing the extent to which they match the contributions received during the consultations. The general background to the conference and to the consultations is incorporated in the main text; the more detailed proposals for specific parts of the radio frequency spectrum are discussed in Annex 1; a glossary of specialized terms is given in Annex 2; and recent Administrative Radio Conferences are listed in Annex 3."

Members will naturally be most interested in those parts of the booklet which concern the amateur service. As the subject of frequency allocation is dealt with by considering bands of frequencies, rather than services, it will be necessary to provide extracts from the text. While these are correct in themselves, it is obviously preferable to read them in the context of the section in which they appear.

1,605–4,000kHz

The main requirement for revision of the frequency allocations in this part of the spectrum stems from the needs of the Maritime Mobile Service. The text, after describing the problems involved, continues: "overcoming these difficulties is therefore the major requirement at this part of the spectrum, but in addition radio amateurs have asked that some of their shared frequencies between 1,605 and 4,000kHz be made exclusive . . . It does not seem possible to meet the amateur requirement in full, although some exclusive allocations are envisaged."

4,000–30,000kHz

The booklet points out that because of long-range propagation, the allocation of the hf bands has had to be very nearly standard throughout the world, and goes on to say: "the main problem to be resolved is the need to find extra spectrum for the broadcasting, maritime, mobile and amateur services. Radio amateurs have asked for an extension to one of their existing bands and an addition of several fairly wide new bands."

The report then says: "The narrow radio astronomy requirements have been allowed for, and so have parts of the amateur service requirement for new bands, although not to the extent asked for because of the bandwidth sought and the position in the spectrum."

The content of para 4.8 of the report has a particular significance and is quoted in full: "It should be mentioned that should the proposed reductions in fixed service requirements not be realized at the 1979 WARC, the extra provision proposed for other services may not be realized in full. This will depend partly on the reaction of those developing countries whose use of the hf bands for fixed services is still vital, particularly in the bands below about 10MHz."

30–108MHz

In Region 1 there is no internationally allocated amateur service band in this part of the frequency spectrum. The 70MHz allocation in the UK is the subject of national, not international, regulations. The report ends the consideration of this part of the spectrum by saying: "Radio amateurs and industrial, scientific and medical (ISM) interests have also asked for extra provisions in the existing television Band 1. Until the future of Band 1 is clearer it is not possible to say whether these needs can be satisfied."

108–470MHz

This section contains the present amateur 144 and 432MHz bands, and the only comment made is in para 6.6 of the report.

"Radio amateurs have asked that their present use of bands in this part of the spectrum be retained. Comments have also been received asking that provisions for the navigation-satellite systems at 150MHz and 400MHz, and meteorological aids at 403–406MHz, should remain. There are no proposals to change any of the relevant provisions."

960–2,700MHz

The contents of para 8·4 of the report are relevant and say: "Radio amateurs and industrial, scientific and medical (ISM) interests have asked to retain their existing allocations in this part of the spectrum; amateurs have also asked for an amateur-satellite sub-band to be provided. It is thought possible to retain the ISM provision and the existing amateur allocations, and also to provide the extra amateur-satellite requirement."

2,700–10,500MHz

It is said that the main requirement in this part of the spectrum is to meet the growth in the needs of the fixed-satellite service. Amateur service requirements are acknowledged in para 9.5, which reads: "Radio amateurs have asked for their present assignments to be retained. In view of the needs of competing services, it is not possible to keep all the existing amateur allocations but, as mentioned, provision is being made for an amateur-satellite requirement at 10GHz."

38–275GHz

The last section of the report deals with the spectrum between 38 and 275GHz, and states that allocations are being envisaged for the amateur and amateur-satellite services.

Conclusion

The report is concise and informative and provides a valuable guide to the attitude of the UK administration concerning spectrum allocation. The proposals go a long way to meeting the future requirements of the amateur service and are certainly far more liberal than in many countries in Region 1. A letter from the Home Office accompanying the report mentions that detailed proposals will be published later, possibly in the spring of 1979. □

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oscar news

Satellite DXCC

Congratulations to W2BXA, who recently made the journey to ARRL HQ to claim the first-ever DXCC achieved by contacts through satellite transponders. G3IOR reports contacts with 104 countries by the same mode but has yet to gather in the QSLs.

Orbital predictions for Oscar 8

Date July	Orbit No	Time of equ xg	Long W
1	1637J	01 14 37	65·20
2	1650J	03 36 86	40·71
3	1664A	00 08 50	42·02
4	1678A	00 14 03	43·34
5	1692AX	00 19 16	44·66
6	1706A	00 24 30	45·97
7	1720A	00 29 43	47·29
8	1734J	00 34 56	48·61
9	1748J	00 40 09	49·92
10	1762A	00 45 23	51·24
11	1776A	00 50 36	52·55
12	1790AX	00 55 49	53·87
13	1804A	01 01 02	55·19
14	1818A	01 06 15	56·50
15	1832J	01 11 29	57·82
16	1846J	01 16 42	59·13
17	1860A	01 21 55	60·45
18	1874A	01 27 08	61·77
19	1888AX	01 32 21	63·08
20	1902A	01 37 34	64·40
21	1916A	01 42 47	65·71
22	1929J	00 04 47	41·22
23	1943J	00 10 00	42·53
24	1957A	00 15 13	43·85
25	1971A	00 20 26	45·17
26	1985AX	00 25 39	46·48
27	1999A	00 30 52	47·80
28	2013A	00 36 05	49·11
29	2017J	00 41 18	50·43
30	2041J	00 46 31	51·74
31	2055A	00 51 44	53·06

The orbital characteristics of Oscar 8 may not yet have finally stabilized, and latest figures for orbital period and longitude increment are 103·231836min and 25·808701°W respectively.

The help of Dr Peter Croghan of the University of E Anglia, also G3IOR and G3MQD, in the preparation of the predictions is gratefully acknowledged.

Oscar 8 calendars

There has been some delay in production but it is hoped that the calendars will be available in the UK at the beginning of July. Enquiries should be directed to the secretary of AMSAT-UK, Ron Broadbent, G3AAJ, 94 Herongate Road, London E12.

Oscar 8 orbital data

Many satellite users will be familiar with the computerized read-out produced by N5KR (WB5CBC) for Oscars 6 and 7. A new listing for Oscar 8 is now available. This consists of a print-out generated for the user's QTH and showing time after equatorial crossing, azimuth angle, elevation angle and range, all at intervals of one minute. The table is printed for every possible equatorial crossing at increments of 1°. The only external information needed to make use of the print-out is a suitable reference orbit.

The information required for a print-out to be prepared is name and mailing address and location for which the print-out is desired. If the location has less than 10,000 population, please include latitude and longitude or carefully describe location. The cost of generating and mailing the print-out is $3·50 by 4th class mail, world-wide, or $5 by air mail, world-wide. Requests, accompanied by the appropriate remittance, should be sent to W. Johnston, N5KR, 1808 Pomona Drive, Las Cruces, New Mexico 88001, USA.

Print-outs for Oscar 7 are still available from N5KR in the same way as the new Oscar 8 listing. □

IARU Region 1 Conference

by D. S. EVANS, G3RPE;

I. F. WHITE, G3SEK,

and

R. F. STEVENS, G2BVN

Noel Eaton, VE3CJ, speaking at the opening plenary meeting. Seated (l to r): Mr Richard E. Butler, deputy secretary-general of the ITU, and Mr Deszo Horn, Deputy Minister of Telecommunications of the Hungarian People's Republic. Standing behind is an interpreter

THE eleventh triennial conference of the Region 1 division of the IARU was held between 24 and 28 April at Miskolc-Tapolca, in northern Hungary. Previous conferences were held in Paris (1950), Lausanne (1953), Stresa (1956), Bad Godesburg (1958), Folkestone (1960), Malmo (1963), Opatija (1966), Brussels (1969), Scheveningen (1972) and Warsaw (1975).

Thirty-six of the 46 member societies of the division were represented by delegates or by proxy. Those participating were:

ARA	(Algeria)	PZK	(Poland)
ARAI	(Ivory Coast)	RAAG	(Greece)
ARI	(Italy)	REF	(France)
ARM	(Monaco)	RKDDR	(German DR)
BFRA	(Bulgaria)	RL	(Luxembourg)
CARS	(Cyprus)	RSF	(USSR)
CRCC	(Czechoslovakia)	RSGB	(UK)
DARC	(FR of Germany)	RSK	(Kenya)
EDR	(Denmark)	RSR	(Rhodesia)
FRR	(Romania)	RSZ	(Zambia)
IARC	(Israel)	SLARS	(Sierra Leone)
IRA	(Iceland)	SRAL	(Finland)
IRTS	(Ireland)	SRJ	(Yugoslavia)
LRAA	(Liberia)	SSA	(Sweden)
MRASZ	(Hungary)	UBA	(Belgium)
NARS	(Nigeria)	URE	(Spain)
NRRL	(Norway)	USKA	(Switzerland)
OVSV	(Austria)	VERON	(Netherlands)

Also present were Mr Noel Eaton, VE3CJ, president of the IARU; Mr Bruce Johnson, WA6IDN, of IARU headquarters; Mr C. J. Thomas, G3PSM, IARUMS co-ordinator; and Mr A. Taylor, G3DME, co-ordinator of the International Beacon Project.

The conference took place in the Hotel Juno, a modern hotel located in rural surroundings. The host society was the Hungarian national organization, Magyar Radioamator Szovetseg. Delegates arriving in Miskolc were surprised and flattered to find more than 500 flags, all bearing the IARU emblem, decorating the streets of the city. In addition, reciprocal licences had been made freely available by the Hungarian PTT, and a number of those coming by car used the /M facilities. The stations HA9IARU and HG9IARU were operational from the hotel and were in constant use. Many of the delegates arriving at Budapest airport enjoyed the hospitality of the Malev club station HA5AIR, whose quad was a feature of the skyline.

The appreciation of Region 1 is conveyed to Western Electronics (UK) Ltd and the Yaesu Musen Company, who made available an FT221 and arranged for the despatch of this and other equipment to the Hungarian Radio Amateur Society for use during the conference.

Opening ceremony

The chairman of the Region 1 Executive Committee (PA0LOU) welcomed guests and delegates and introduced the Deputy Minister of Telecommunications of the Hungarian People's Republic, Mr Dezso Horn. The deputy minister extended greetings to the conference participants and expressed pleasure that a conference on the eve of WARC 79 should have been held in Hungary. The Hungarian Radio Amateur Society celebrates its 50th anniversary in 1978 and it was fitting that it should be the host society to a Region 1 conference. Mr Horn spoke of the support of the administration for amateur radio activities in Hungary, and of his wish that radio amateurs should participate not only in technical development but also contribute to the future in a spirit of peace and understanding.

The chairman then introduced Mr Richard E. Butler, deputy secretary-general of the International Telecommunication Union. In formally opening the conference, Mr Butler said the choice of venue was particularly appropriate, being situated in a country which is doing so much to encourage radio amateurs and to provide means for practical training and help. He then went on to speak of the importance and effect of the World Administrative Radio Conference to be held in September 1979. Preparations for this conference were taking place all over the world within national administrations and by participation in the work of the CCIR. Mr Butler recalled the definition of the amateur service in the Radio Regulations and pointed out the importance of the aspect of self-training. He said, "This is, of course, a fundamental aspect in telecommunication development seen with its capital intensive and manpower orientations in order to produce efficient services at the lowest practical costs. It is a corner-stone of the ITU technical co-operation programme in favour of developing countries; indeed, more than two-thirds of such expenditure is devoted to projects concerned with telecommunication training. The existence of a strong national radio amateur society can be an invaluable help in such objectives."

Mr Noel B. Eaton, VE3CJ, president of the IARU, responded to Mr Butler, and expressed the gratitude of the amateur service for the co-operation that it had received over a period of many years from the ITU. VE3CJ drew attention to the many ways in which amateur radio had received encouragement and advice from Mr Butler. Congratulations to the Hungarian Radio Amateur Society on its 50th anniversary were coupled with his best wishes for the future.

The chairman then read a message from Per-Anders Kinnman, SM5ZD, the past-chairman of the Region 1 division, and also a telegram from Michael Owen, VK3KI, a director of the IARU Region 3 Association. Two presentations were then made by the RSGB: Mr R. J. Hughes, leader of the RSGB delegation, presented the chairman with a gavel for use at Region 1 meetings, and Dr D. S. Evans, President of the RSGB, presented two callsign plaques for the use of the conference stations.

First plenary meeting

In opening the meeting, PA0LOU drew attention to the importance of the conference as being the last triennial meeting before WARC 79. It was important that the co-operation between national societies enjoyed during these conferences should also extend to the period between now and September 1979.

The first meeting concluded with the election of the chairmen for the committees of the conference, these being:

Committee A—Administrative and operational—Mr L. v. d. Nadort, PA0LOU;

Committee B—VHF/UHF/SHF—Ir. C. van Dijk, PA0QC;

Committee C—Credentials and finance—Mr J. B. Wolff, LX1JW.

The following were elected to Committee C: Messrs Y. Baron, F6EPT; M. Danon, YU1AU; Dr A. Gschwindt, HA5WH; Dr E. Hertier, HB9DX, and Mr P. Lessig, DK3LP.

Work of the conference

The first call for papers for the conference was made in May 1977. Between then and the despatch of documents to delegates on 3 March 1978, 106 papers were prepared for distribution by the Region 1 secretariat. The papers ranged in size from only two or three paragraphs to six or eight pages. In addition, a further 20 papers were prepared during the period of the conference, and these accounted for a further 10,000 sheets of paper.

The papers for consideration had previously been grouped in the agendas of the three committees. Committees A and B each met on 24, 25 and 26 April, and Committee C met on the evening of 24 April. The final plenary meeting, which considered the recommendations of the three committees, was held on the final day of the conference, Friday 28 April. Four working groups were set up from Committee A to consider: (a) hf band plans, contests and allied matters; (b) amateur radio direction finding; (c) indoor radio telegraphy championships, and (d) aid to developing countries. G3MXJ acted as convenor for group (a).

Committee A

This committee, Administrative and Operational, dealt broadly with all operating matters affecting frequencies below 30MHz and with general administrative questions. With PA0LOU as chairman and G2BVN as secretary, the committee considered more than 30 agenda items supported by papers originated by member societies. RSGB delegates participating in the work of this committee were Messrs R. J. Hughes, G3GVV; E. J. Allaway, G3FKM; D. J. Andrews, G3MXJ, and J. Bazley, G3HCT.

WARC 79

This was by far the most important item on the agenda of Committee A, and the whole of an extended working day was devoted to discussion on this subject. More than two-thirds of the total of over 120 conference delegates were present to take part in what proved to be a valuable working session. During the 1975 Warsaw Conference a document (WA 55) had been approved which it was agreed should form the basis of submisssons to administrations concerning amateur service allocations below 30MHz. Although in a small number of cases national considerations had forced some small alterations to the original plan, the document was still valid and continued to form the basis for requests from national societies to their administrations. Prior to the conference a number of societies had made written reports concerning WARC preparations. In addition to these the delegate of each society present made a verbal summary of the position in that country. In this way a great deal of up-to-date and worthwhile information was obtained.

The RSGB introduced a document for discussion which dealt with the Warsaw Conference recommendations and how these might require some amendment in the light of present-day knowledge concerning spectrum allocation. In addition, the paper advocated the establishment of back-up positions which should be known to national societies but which, of course, should not be published. During the discussion many different national view points were heard but there was a surprisingly large measure of agreement between the societies present. It

The entrance to the Hotel Juno suitably decorated for the occasion

seemed clear that the amateur radio service could expect a large measure of support from the administrations of Eastern Europe.

The future of the 7MHz band occupied a great deal of debating time. From reactions obtained during the past year it was clear that the broadcasting service would be seeking frequencies down to 7·1MHz, and that amateur service expansion above this point was likely to be denied. It was noted that the broadcasting services in a number of major countries are making claims of up to 100 per cent more than its present allocations. Included in these organizations is the BBC. It was considered that expansion down to 6·9MHz was possible, the spectrum between 6·9 and 7MHz being now allocated to the fixed service. This matter will be the subject of concerted action by all national societies with their administrations.

The request for amateur exclusive segments in the 1·8MHz and 3·5MHz bands appeared to have considerable support, and the position concerning these allocations is hopeful. The request for new amateur bands at 10·1MHz, 18·1MHz and 24MHz produced reactions varying between extremely doubtful and a ready acceptance. With the intolerable interference on 7MHz, which is supposedly an amateur exclusive allocation, it was decided that priority should be given to the establishment of an amateur band at 10MHz. While it is quite impossible to forecast the decisions of a conference, it was reported that a number of administrations are prepared to support allocations at 10, 18 and 24MHz, although the bandwidth might well be less than originally requested.

It was pointed out by Mr Butler that the ITU will request formal proposals from administrations for WARC during September 1978. Written proposals will have to be submitted by administrations by January 1979 if they are to be circulated before WARC. This statement underlines the urgency with which any remaining frequency allocation problems must be tackled.

During his address at the opening of the conference, Mr Butler had drawn attention to the work of the CCIR, which will be preparing documents which could be used as the technical bases for WARC 79. National societies were urged to submit appropriate papers to the CCIR via their national administrations. Two titles suggested were "Preferred bands for the amateur service" and "Sharing criteria in amateur service". There was a long discussion concerning possible changes to Article 41 of the Radio Regulations. This deals with several aspects of the amateur service and it was unanimously agreed that the Region 1 policy should be one of no change to the present terms of Article 41.

As a part of the back-up effort for WARC preparation, the IARU Monitoring System collates and publishes a tremendous amount of information coming from all three ITU regions. The IARUMS activity was considered to be essential, and Colin Thomas, G3PSM, the international co-ordinator, was sincerely thanked for the work which he undertakes on behalf of Region 1.

Support for the amateur service at WARC 79 is provided in a different manner by the International Beacon Project, of which Alan Taylor, G3DME, is the co-ordinator. Under his guidance the number of beacon stations operating in the 28MHz band has increased, and further expansion is planned. In addition to providing propagation indicators for those using this band, the beacons can form the bases of study programmes and provide a factual method of comparison between predicted and actual conditions. All national societies were recommended to institute study programmes using the 28MHz beacons. G3DME was accorded a hearty vote of thanks for his work in connection with the IBP.

Aid to developing countries

A working group was set up to consider how best Region 1 assistance to developing countries could be increased. A permanent working group which is to be set up will be concerned with: (1) the co-ordination and planning of the work concerned with aid to developing countries; (2) helping with development production of technical material and education materials for developing countries; and (3) collecting and exchanging ideas on possible missions to the developing countries. There will be liaison with Regions 2 and 3 and IARU headquarters, and the financial support necessary will be administered through Region 1 by a new Fund 4. The convenor of the working group will be the Yugoslav national society, SRJ. Donations to Fund 4 were made during the conference by VERON (Netherlands) and REF (France).

It was reported that the Region 1 Executive Committee

and IARU headquarters had jointly agreed to meet the costs of an amateur radio training course which will take place in October 1978 in Sri Lanka. The Niedersachsen district of DARC (West Germany) will be providing the instructors for this course, which will take place in Colombo under the sponsorship of the Sri Lanka government. It was agreed that participation by the IARU in activities of this type could be most helpful to the future of the amateur service.

Telecom 79

Telecom 79, which will undoubtedly be the world's largest telecommunications exhibition of the decade, will take place in Geneva at the time that WARC 79 opens. Space for the exhibition has already been fully allocated and all the major telecommunication manufacturing nations will be represented, many of them in large national pavilions. After an unsuccessful initial application for cost-free space for an IARU stand, this has now been granted by the personal intervention of the secretary-general of the ITU, Monsieur M. Mili. This welcome concession will enable the IARU to be represented and to maintain contact with the delegates and others who will be attending WARC 79. The radio club of the CERN organization at Geneva will again be responsible for constructing the stand, the financial support for which will be provided by the IARU.

During the week preceding the opening of WARC 79 there will be a technical forum extending over a period of several days, and the ITU has given the IARU an opportunity to make a suitable presentation on the afternoon of Saturday 22 September 1979. This will be a valuable opportunity for the amateur service to reach delegates and engineers who will be in Geneva for the exhibition and the conference. This activity will be undertaken jointly by Region 1 and IARU headquarters.

It has been suggested that this could be the occasion for a meeting of radio amateurs from all over the world to participate in the technical session and any other events which could be organized.

Committee B

According to the agenda, Committee B met at Miskolc-Tapolca for only 14 hours. In fact, the meetings started over breakfast, continued through lunch and dinner, and lasted way into the night. There is even a vague and disturbing memory of a report-drafting session before breakfast. What did the committee talk about? Band plans and beacons, satellites and sporadic-E, repeaters and rtty, microwaves and meteors, contests and conferences, and much more besides.

Running through the entire conference was a single inescapable theme: "Will we have any bands to work on after the World Administrative Radio Conference (WARC) in 1979?" The answer is: "Yes, we hope so"; for all national societies are closing ranks and doing their best not only to secure our existing bands—preferably on an exclusive basis rather than shared as some are at present—but also to seek new bands in common with amateurs in other regions. The response from national authorities about vhf/uhf allocations has varied from country to country, and the RSGB has fared better than many in establishing good relations with the Home Office frequency planners. In the end though, the decisions will rest neither with RSGB nor even with the Home Office, but with the balance of national votes cast at WARC 79. The amateur service is doing its best to influence voting in our favour by diplomacy and lobbying at high international levels. Meanwhile the best the rest of us can do is to show that we are making good and responsible use of the frequencies we already have.

Band plans

Although only minor changes in the band plans for 144MHz, 432MHz and 1·3GHz were adopted, the basic principles were reaffirmed and are worth restating lest we

RSGB/IARU 144-146MHz BAND PLAN

(May 1978)

	144·000		
CW only		144·000-010	Moonbounce
		144·050	CW calling
		144·100-110	Random cw m-s (5min)
		144/145-150	Random cw m-s (1min)
	144·150		
SSB and CW		144·200-210	Random ssb m-s (1min)
		144·300	SSB calling
		144·500	SSTV calling
	144·500		
All modes		144·600 ±	RTTY working (fsk)
		144·600	RTTY calling
		144·700	FAX calling
		144·750	ATV calling/talkback
		144·800	Raynet
		144·825	Raynet
		144·850	Raynet
		144·875	Raynet
	144·85		
Beacons only	144·99		Note: no channelization below 145MHz

Repeater input	145·000	R0	
	145·025	R1	
	145·050	R2	
	145·075	R3	
	145·100	R4	
	145·125	R5	
	145·150	R6	
	145·175	R7	
	(145·200	R8)	Simplex, used by Raynet
	(145·225	R9)	
Simplex channels	145·250	S10	
	145·275	S11	
	145·300	S12	RTTY local working (fm-afsk)
	145·325	S13	
	145·350	S14	
	145·375	S15	
	145·400	S16	
	145·425	S17	
	145·450	S18	
	145·475	S19	
	145·500	S20	Mobile calling channel
	145·525	S21	
	145·550	S22	
	145·575	S23	
Repeater output	145·600	R0	
	145·625	R1	
	145·650	R2	
	145·675	R3	
	145·700	R4	
	145·725	R5	
	145·750	R6	
	145·775	R7	
	(145·800	R8)	Simplex, used by Raynet
	(145·825	R9)	
Satellite service	145·850		R8 and R9 to be phased-out and allocated to satellites
	146·000		

*After beacons have moved

lose sight of them. The only way to accommodate all the different interests which have legitimate claims to frequency space on the vhf/uhf bands is to allocate a separate part of the band to each. This is exactly the same principle as was used in the international planning of the whole frequency spectrum, and which brought about amateur bands in the first place. Throughout all the discussions on band planning, 144MHz was used as a model for the other two bands, so that many of the following remarks apply equally well to 432MHz and 1·3GHz.

The band plans recognize that the vhf/uhf bands must accommodate two different and largely incompatible styles of operating. The lower ends of the bands are used in much the same way as the hf bands, mainly on ssb and cw, vfo-controlled on any appropriate frequency, and always with an eye to the possibility of working dx. Above 145MHz and 433MHz, operation owes more to commercial radiotelephone practice, trading the dx potential of vfo/cw/ssb for the convenience of channelized fm; a fair deal for those who are interested only in short-range strong-signal communication.

However, these two operating styles do not mix—their fundamental aims are different and, whenever the two meet, they seem to conflict. The original Region 1 band plans recognized this fact, and there was unanimous agreement that the two styles of operating should be kept on opposite sides of 145MHz or 433MHz. The RSGB supports this policy. It is simple enough in practice: just use the part of the band appropriate to whatever you are doing, and let others do the same. We all know that band plans are voluntary, so it proves nothing if someone tries to remind us by operating fm in the cw/ssb section, or ssb among the fm channels.

Another important principle of band planning, reaffirmed at the conference, is that problems of overcrowding in one section of the band should not be solved by taking over sections allocated to some other interest, which has just the same rights to band space. This principle applies equally to all, and the RSGB will defend the frequencies of groups who themselves support and abide by the band plans.

However, the two major interest groups—"dxers" and "fmers"—are not the only ones with claims on our vhf/uhf bands. The amateur satellite service is in a particularly difficult position, being restricted not only by our own band plans but also by the Radio Regulations which allow downlinks only on 144–146MHz and 435–438MHz. There are satellite allocations below 30MHz but none above 438MHz until 24GHz. At WARC 79 we hope to gain allocations on 1·3GHz and other microwave bands, where the amateur satellite service can spread out in comfort; but until then all the pressure will fall on the region just below 146MHz. So as a temporary measure (we hope) until after WARC, the committee agreed to phase out repeater channels R8 and R9. This will not be a problem in the UK for this situation was foreseen and the channels were never allocated.

Rtty, sstv, fax, data, a.m. and a variety of other modes find their home in the "all-modes" part of the band between 144·5(432·5)MHz and the beacons. Because some of the techniques are experimental, they benefit from being in the non-channelized part of the band. As a "special case" the channels around 144·85MHz will continue to be used in the UK for official Raynet purposes only.

The beacon sub-bands are centred around 144·9(432·9)MHz. Despite their empty appearance to the casual ear, these sub-bands are full of weak or transient signals which can be obliterated over wide areas even by low-power "local" working. Please—everybody—leave the beacon sub-bands clear.

RSGB/IARU 432-440MHz BAND PLAN

(May 1978)

	432·000	432·000-010	Moonbounce
		432·050	CW calling
CW only			
	432·150	432·125-175	Oscar 7B uplink
CW and SSB		432·200	SSB calling
		432·300	SSTV calling
	432·500		
		432·600±	RTTY working (fsk)
All modes		432·600	RTTY calling
		432·700	FAX calling
	432·80		
		Note: No channelization below 433MHz	
Beacons only	432·99		
	433·000	RB0	
	433·025	RB1	
	433·050	RB2	
	433·075	RB3	
	433·100	RB4	
	433·125	RB5	
Repeater output (UK only)	433·150	RB6	
	433·175	RB7	
	433·200	RB/SU8	Simplex, used by Raynet
	433·225	RB9	
	433·250	RB10	
	433·275	RB11	
	433·300	SU12	RTTY local working (fm-afsk)
	433·325	RB13	
	433·350	RB14	
	433·375	SU15	
	433·400	SU16	
Simplex channels	433·425	SU17	
	433·450	SU18	
	433·475	SU19	
	433·500	SU20	Fixed/mobile calling channel
	434·600	RB0	
	434·625	RB1	
	434·650	RB2	
	434·675	RB3	
Repeater Input (UK only)	434·700	RB4	
	434·725	RB5	
	434·750	RB6	
	434·775	RB7	
	(434·800	RB8)	
	434·825	RB9	
	434·850	RB10	
	434·875	RB11	
	(434·900	RB12)	
	434·925	RB13	
	434·950	RB14	
Satellite service	435·000 to 438·000		

ATV transmissions should take place in the sub-band 434-440MHz on frequencies chosen to avoid interference with other band users, especially the amateur satellite service on 435-438MHz.

Other recommendations of Committee B

1. 145MHz fm channels

In order to ease congestion on the existing fm-only channels (S20-23) the committee recommended that more use should be made of channels S10, 11 and 13-19 which are at present designated "all-mode" in the Region 1 plan.

This is already happening in the UK, so in the RSGB plan shown here S10-23 are all called "simplex channels", and can be expected to fill up with fm traffic in the next few years (apart from S12 which is local rtty).

Despite the use of all available 25kHz channels above 145MHz, congestion will eventually call for more channels. The answer must lie within the existing fm section of the band, and will be to follow the commercial vhf-fm users to a 12·5kHz channel spacing. This decision was taken after long debate, and in full knowledge of the disadvantages, notably to owners of synthesized equipment. However, the other alternatives are worse. If one accepts that a new channel system must not abandon existing channels, then 12·5kHz is almost the only choice. The Dutch have several thousand Class D stations on a small number of simplex channels, and they will probably lead the way to 12·5kHz.

Few changes in equipment should be necessary, except that transmitter deviations may have to come down to what they ought to be in any case! The new channels, when they come, will be numbered as follows: S20 (145·500MHz), S20X (145·5125MHz) and so on. No decision has yet been taken about when formally to introduce the "X" channels in the UK, although groups seeking quiet channels may soon start to investigate their use.

2. Beacons

In response to requests from several countries, beacons are to be moved out of the cw end of 144MHz to the sub-band around 144·9MHz. The move will be gradual, and frequencies will be allocated by G3COJ, the Region 1 vhf/uhf beacon co-ordinator.

There is a good possibility of a 144MHz beacon in Iceland.

3. Contests

Commencing in 1979, in vhf/uhf contests organized by Region 1 (September 144MHz, October uhf, November cw) the division of classes will be as follows:

(a) stations operated by a single person, with no assistance during the contest, using privately-owned equipment and antennas, and operated from any location;

(b) all other stations.

The RSGB VHF Contests Committee will decide whether to adopt this classification in RSGB events.

Yet again a majority of countries could not be persuaded to adopt the RSGB radial scoring system.

4. Satellites

The conference adopted the recommendations of AMSAT-UK on downlink frequency planning and the use of reasonable erp, adding that the information should perhaps be republished annually for the benefit of new users. Each national society was urged to write to persistent breakers of these codes of practice, be they members or not.

5. Meteor scatter

Slightly revised operating procedures were drawn up by a working group, and these will be published shortly. It was agreed that random ms working should spread about 10kHz hf of the existing spot frequencies during showers, frequency to be determined on some geographical basis; unfortunately the exact basis could not be agreed at the meeting. After the beacons have moved, a new sub-band for 1min cw will be introduced on 144·140-144·150MHz.

6. Sporadic-E

A working group under SM5AGM has set out to create an international telephone warning net for sporadic-E openings. Details of the complementary organization in the UK should soon appear in *4-2-70*. F8SH, the Region 1 E*s* co-ordinator, is extremely anxious to hear all news of E*s* contacts.

7. QTH locator

It was agreed that if a locator system can be found that is simple, logical, easy to use, easy to encode in calculators, and covers the world, then it should be adopted; otherwise the established system should be retained.

Microwaves

From a microwaves point of view, the conference marked a significant step forward in that for the first time it was necessary to organize a special session to deal with microwaves. After preliminary discussions it became clear that it would be better to devote one of the Committee B meetings exclusively to microwaves rather than attempt to run a parallel committee or organize an additional meeting. It is perhaps of interest that at the beginning of this microwave session, the chairman of Committee B (PA0QC) invited those who did not wish to become involved with microwave matters to leave. Much to at least one person's surprise, the expected mass exodus did not materialize, and all but a few of the 40 delegates present remained to participate. G3RPE was then invited to chair the meeting.

The first point raised was the definition of "microwaves". Despite efforts to ensure that other opinions were put forward, it was the strongly expressed view of the meeting that microwaves began at 1GHz. Several delegates noted that the microwaves philosophy was heavily involved with technical and experimental practicalities, as opposed to being mainly concerned with operating, and was therefore better geared to cope with 1·3GHz in the many countries where this band was not highly developed. As it turned out, there were no major points raised regarding this band.

In discussing the 15 or 20 papers which had a microwave interest, it was obvious that many of the countries represented were looking for a lead in this part of the spectrum, and the RSGB certainly played its part in supplying this. One of the simpler recommendations was that bands be described in terms of gigahertz rather than wavelength. The meeting readily accepted this—and immediately began to use them!

A paper recommending activity days, put forward by OVSV, provided an opportunity for the RSGB to describe its successful 10GHz cumulative contests. This topic prompted one of the Polish delegates to demonstrate a fine example of lateral thinking. His experience was that when conditions were good, then the eastern countries could hear all the dx being worked but failed miserably in trying to join in. He therefore proposed "non-activity" periods under these conditions so that way-out stations could get a look-in. The writer of this part of the report is still wondering about that one.

One of the more important discussions centred on possible microwave radiation hazards. On this topic, an RSGB paper reviewed its previous recommendations as

Conference comments

The principles of operation of the Amateur Radio Observation Service established by the RSGB were endorsed by the conference and a recommendation was made to all societies that similar organizations should be set up.

The only alteration to the Region 1 hf band plan is that the segment 28·2–28·3MHz will be allocated permanently for the use of beacons.

All societies are again urged to specify contest-free segments in their contest rules. Work will continue towards the harmonization of contest rules and log sheets.

The EMC Working Group will be reorganized, with SP9ZD acting as convenor.

New rules for the Indoor Radio Telegraphy Championships were agreed.

New rules for the Amateur Radio Direction Finding Championships were agreed. The Polish national society, PZK, will act as the host for the 1979 championships.

A code of practice to prevent the abuse of present and future satellites was agreed and will be published in the journals of Region 1 societies.

Previously submitted standards for amateur facsimile working were agreed, with minor alterations, and details will be published in national journals.

A paper submitted by VERON (Netherlands) recommended that steps should be taken to achieve worldwide uniformity in the measurement of signal strength (6dB = one "S" point). The paper was accepted and will be published in national journals and brought to the attention of equipment manufacturers.

It was reported by the IARUMS that out of a total of 30,790 intruders noted in the hf bands, in the first five months of 1977, 15,958 originated in the USSR.

A proposal to adopt channelized working in a segment of the 28MHz band was rejected.

All societies were asked to contribute to the weekly news bulletins radiated on Wednesdays by HG5BME through the Oscar 7 satellite.

Societies were urged to minimize the number of contests.

A questionnaire will be circulated to all societies so that information concerning citizens band activities may be collated.

It was recommended that reciprocal callsigns should be issued by administrations in the format "country of operation" followed by "operator's home call"; eg HA9/G3RPE.

A proposal for exclusive segments of the hf and vhf bands for rtty operation was rejected, but all societies are asked to publicise the recommended segments for rtty operation.

regards general operating practices. It also looked at potential hazards associated with cardiac pacemakers, the setting-off of detonators by rf pick-up, and the ignition of inflammable material by rf discharges. None of these seems to be a significant risk in an amateur context. The discussion proved useful in pointing out that while it was necessary to recognize that hazards existed, they could in practice be handled without difficulty. What was most important was that amateurs should have sufficient knowledge to prevent those less knowledgeable from getting a grossly exaggerated view of the risks involved, which seems all too likely to occur.

A major topic was that of band planning. One felt that the large-scale thinking required to deal with the planning of five bands at a time (with another five in mind) came as a surprise to some delegates—and not unwelcome after the rather claustrophobic atmosphere of vhf planning. Although it was recognized to be a mistake to over-plan, which could inhibit the development of new philosophies and techniques, at the same time under-planning could also handicap the exploitation of these bands. Planning ideas followed well-established lines, such as narrow-band segments based on harmonics of 1,152MHz, moving on to accept the ideas of beacons and working frequencies being on harmonics of 1,152·00MHz and 1,152·10MHz respectively, along the lines suggested by an earlier *Radio Communication* article (May 1977, p370). Although existing pulse allocations were apparently not being used at present, the view of the meeting was to try to retain them because of the potentially rapid growth of wide-band techniques in the foreseeable future.

Planning of the 10GHz allocation proved rather complicated because of the large number of factors involved, including strong demands from several countries for the band plans to cope with duplex working of various sorts. The spacings preferred were 30MHz for wide- and narrow-band operation, 100MHz for wide-band speech, and 144MHz for narrow-band operating; and 175MHz was suggested as a suitable i.f. for tv working. After burning the midnight oil yet again, a small working party produced a provisional plan which is being prepared for publication.

As was said by several people after this session, perhaps the most important result was that for the first time microwaves became "real". Merely talking in a matter-of-fact way of how to cope with current problems, and when (not if!) some amateur activity above 24GHz was going to be generated, brought microwaves into their present time-scale rather than the future. If this was all that had been achieved, which it certainly was not, then it would still have been a successful conference.

Committee C

The Credentials and Finance Committee was set up to scrutinise the credentials of the delegates and observers to the conference and to make recommendations concerning the finances of the Region 1 division. This committee had a restricted membership of five persons, elected at the opening plenary, plus the chairman, secretary and treasurer of the Executive Committee. The committee met under the chairmanship of Mr J. B. Wolff, LX1JW, with G2BVN as secretary.

The treasurer of Region 1, K. W. Strom, SM6CPI, introduced the annual report for 1977, together with the budget for the current and ensuing financial year.

The chairman of Region 1 informed the committee of the decision of the Executive Committee to increase the annual contribution per licensed member to 1.50 Swiss francs as from 1 January 1979. The power to do this had been given by the Warsaw Conference in 1975 but, until now, it had not been necessary to make the increase. It

was anticipated that after WARC 79 a small reduction in the contribution might be possible, or at least that there would be no further increase for some considerable time. The purpose of the increased contribution is to provide funds for the present increased activity which will last until the beginning of 1980. The treasurer reported that the finances of the Region 1 division were in good shape and that the balance held in the three funds with the Swiss Credit Bank amounted to 177,219 Swiss francs. However, it was clear that the cost of maintaining observers at WARC 79, and other activities necessary for the amateur service on this occasion, would heavily deplete the funds now available.

In addition to providing for the running expenses of the division, the 1978 budget included amounts in respect of the following: IARU Monitoring System; AMSAT; International Beacon Project; 4U1ITU; Direction Finding Championships; Telecoms 79 and publications.

Next conference

The delegation of ARM (Monaco) offered the services of their society as the host for the 1981 Conference, and, as a number of societies had approached the RSGB and asked if it would be prepared to act as the host society, the society also offered its services in the UK. By a vote of 17 to 16 with 3 abstentions the conference accepted the offer of Monaco.

Postcript

Before the conference, some 60,000 pieces of paper were produced and distributed by Region 1. During the conference a further 10,000 sheets were prepared for the 130 delegates. It should not pass without mention that the UK provided the conference secretarial staff, without whom the event could not have functioned. Thanks go to Audrey Jefcoate, and Heather and Paul Allin for their long hours of volunteer work.

The work of the conference is far from ended, for there must now be distribution of all the documents to the societies who could not attend; and, in addition, a comprehensive report will be prepared incorporating all the recommendations and supporting material. This will provide a reference document up to the period of the next conference. The conference is seen as a beginning and not as an end. To echo the words of the chairman, PA0LOU, "Now is the time for the delegates to return to their national societies and translate into action the recommendations and thoughts of the meeting".

A frequency translator for the RA117

by G. R. THOMAS, G4AWJ*

WHEN the author received an unexpected Racal RA117 receiver, it was not long before he realized its superiority to the receiver section of his FT200. Running separates for a while was enjoyable, but he soon started to think of also using the RA117 as the transmitter vfo.

The RA117 second vfo covers a range of 1MHz, corresponding to 4·6MHz output at 0kHz on the film dial, down to 3·6MHz at 1,000kHz on the film dial; this output being available on a bnc socket at the rear of the receiver. This output had, therefore, to be translated to a coverage of 5 to 5·5MHz respectively to drive the transmitter section of the FT200. Criteria, as usual, being stability and adequate drive over the required frequency range.

The author had previously devised an oscillator for his dfm, and it had proved extremely stable. As it would oscillate on the same values on any crystal from 1 to 27MHz, this was used for the mixer oscillators. The required crystals were 9·1 and 9·6MHz, series tuned to allow coverage of all the amateur bands, and were derived as follows.

The film dial frequency being 0 to 500kHz for 7, 14, 21 and 28MHz, and 500 to 1,000kHz for 3·5MHz, this

Components list

R1–10, 12, 16	1kΩ	R15	4·7kΩ
R11, 14	180Ω	R17	330Ω
R13	27kΩ		
C1, 2	3 to 30pF	C9	470pF
C3, 4	15nF	C10	130pF
C5	60pF	C11	200pF
C6, 8	30pF	C12	100nF
C7	0·01pF		
IC1, 2	SN7400	ZD1, 2	5·1V zener
IC3	SN7413	X1	9·1MHz
IC4	SL641C	X2	9·6MHz
T1	BCY71		
L1, 2, 3	Cores Type T-50-2 (TMP Electronic Supplies)		

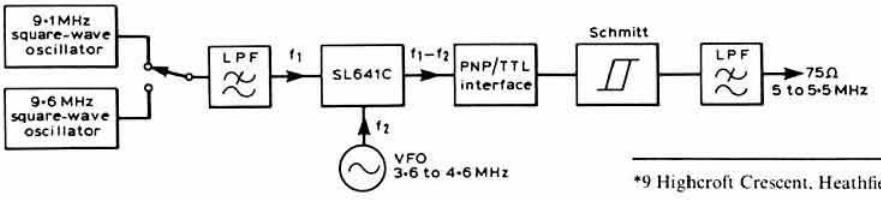

Fig. 1. Block diagram

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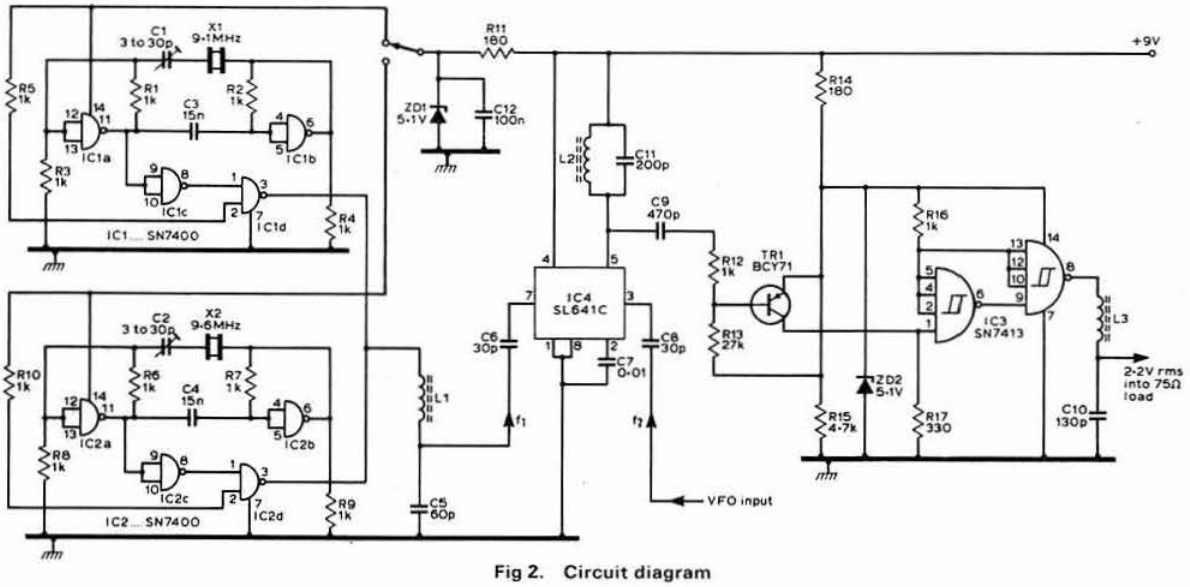

Fig 2. Circuit diagram

equates to a vfo output of 4·6 to 4·1MHz and 4·1 to 3·6MHz respectively. For 7, 14, 21 and 28MHz, the RA117 vfo of 4·6 to 4·1MHz had to be translated to a frequency range of 5 to 5·5MHz as follows:

	RA117 dial	
	500kHz	**0kHz**
RA117 vfo output	4·1MHz	4·6MHz
Required drive frequency	5·5MHz	5·0MHz
Required crystal frequency	9·6MHz	9·6MHz

For 3·5MHz the RA117 vfo of 4·1 to 3·6MHz had again to be translated to a frequency range of 5 to 5·5MHz as follows:

	RA117 dial	
	1,000kHz	**500kHz**
RA117 vfo output	3·6MHz	4·1MHz
Required drive frequency	5·5MHz	5·0MHz
Required crystal frequency	9·1MHz	9·1MHz

In the interests of stability the author decided to make two separate oscillators and switch the 9V to operate them, Z1 being decoupled to prevent noise into the mixer. Fig 1 shows the required stages, and Fig 2 shows the full circuit of the frequency translator.

As can be seen, the required oscillator is brought into operation by selection of the 9V which is zenered down to the required 5·1V, each oscillator being isolated by the fourth nand gate of the SN7400. This gives excellent isolation with no loading of the operating oscillator.

Oscillator output is a square wave, so the output of each is passed through a lowpass filter (L1) designed for the centre difference frequency of the two oscillators, ie 9·35MHz. This prevents harmonics and rounds off the square wave into a sine wave for application to the SL641 mixer. L1 is wound on a powdered iron core which gives high permeability and stability with high Q. Filling with 26swg enamel-covered wire gives an inductance of 6μH, and putting this into the formula:

$$C = \frac{0{\cdot}1592^2}{f^2 L}$$

gives the value of C as 60pF.

The chosen mixer is a Plessey SL641C, which gives the difference frequency and has a current output so that a tuned circuit is possible for better discrimination. The tuned circuit L2 is wound with 26swg ⅛in from full, and this gives an inductance of 5μH which is tuned for the centre of the difference frequency range, ie 5·25MHz.

Tuning the range from 5 to 5·5MHz resulted in a large output at the centre frequency with drop-off at the band edges. Damping the circuit resulted in a flatter response but with still too much drop-off at band edges.

It was decided to use a Schmitt trigger on the output, with a normal ttl interface transistor circuit coupled to the mixer output. The result was excellent, with enough drive at the band edges fully to drive the Schmitt. As the output was now a square wave, a further lowpass filter was used to give a sine-wave output. This resulted in a low impedance output of 6V peak-to-peak constant amplitude over the required frequency range. The 1pf output core L3 is wound with 26swg wire ⅛in from full and gives 4μH inductance.

Nine volts are obtained from the FT200; drive is more than adequate, and stability is excellent. The linear relay contacts in the FT200 operate the relay in the RA117, which has to be modified to keep the ht on the vfo when going to transmit. Construction is on Veroboard mounted in a small diecast box. Any other frequency may be derived by changing the oscillator frequencies. However, this means the lowpass filter and tuned circuit values would have to be re-calculated. □

A simple bias circuit for solid-state linear power amplifiers

by J. F. WILSON, MSc, G3UUT*

THE author recently constructed a 100W linear power amplifier for 70MHz using a pair of BLY90 transistors in parallel, following the design by G3XBY and G3WOS in *Radio Communication* February 1977 [1]. However, the bias circuit in the above design seemed rather complex and a simpler circuit which performed the same functions was found. This is based on a bias circuit published by Mullard Ltd for linear operation of high power rf transistors [2] and is shown below in Fig 1.

The circuit is basically a feedback amplifier which provides an output voltage equal to the base-emitter voltage of TR1 plus the small voltage drop across R3 and RV1. This voltage, when applied to the base(s) of the pa transistor(s), is sufficient to produce the required quiescent current. As TR2 is an emitter follower, the output impedance of the circuit is low and the bias voltage remains constant despite the large variations in base current of the pa transistors which occur in ssb operation. (The base current of the 70MHz pa is around 1A at 100W output, and any variation in bias voltage between zero and full power output can increase intermodulation products.)

Components list

C1,4	0·1μF polyester	R1	120Ω ¼W
C2,3,5,6,7	1nF ceramic	R2	470Ω ¼W
C8	100μF electrolytic	R3	12Ω ¼W
RV1	100Ω ¼W preset pot	R4	12Ω 6W wirewound
ZD1	9V 400mW zener diode	R5	10Ω ¼W
TR1,2	Tab mounted npn power transistor capable of carrying 2A, Texas TIP31 or Motorola MJE521 etc		

The transistors used in Fig 1 were general purpose silicon npn 2A tab-mounted power devices. A lower power device could be used for TR1, but it is useful to be able to bolt it down to the pa transistor heatsink, a facility not available with small signal devices. TR2 must be capable of taking the base current required by the pa and should be bolted to an appropriate heatsink. Layout of the circuit is not critical although it is recommended that ceramic capacitors C2,C3 and C5,C6 are placed as close as possible to TR1 and TR2 respectively to prevent rf feedback problems.

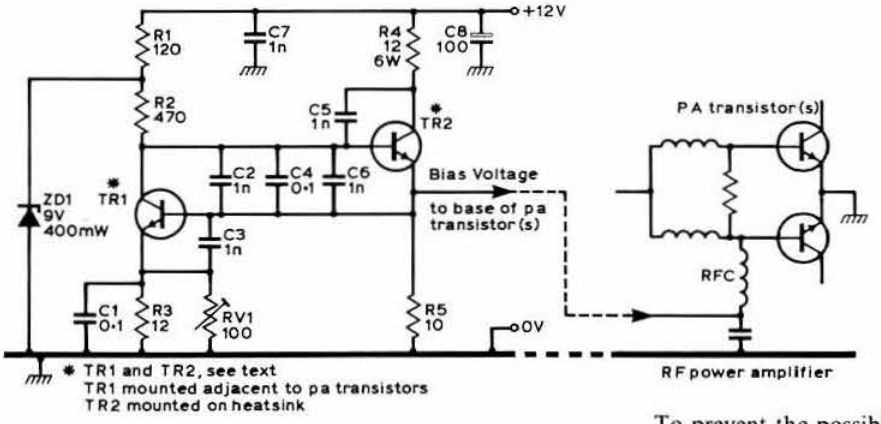

Fig 1. Simple bias circuit for 100W 70MHz linear pa

Transistor TR1 is mounted as near as possible to the pa transistors, on their heatsink, to ensure that the quiescent current of the pa stays constant over a wide range of temperature. Zener diode ZD1 helps to maintain the bias voltage constant under conditions of fluctuating supply voltage and may be omitted where reasonably stable or stabilized power supplies are used. Resistor R4 is provided to limit the maximum output current that can be drawn from the circuit, and thus helps to protect the pa transistors.

To prevent the possibility of the linear pa generating noise when in the receive mode, and to keep the pa cool, it is desirable to remove the bias from it when receiving. This can be done simply by removing the 12V supply from the bias circuit or, where this is inconvenient, the collector of TR1 may be directly grounded during receive, thus reducing the output bias voltage to zero.

To avoid expensive disasters, the circuit should be tested on its own before connecting to the linear pa. It should be possible to achieve an output bias voltage range of 0·55 to around 0·9V by adjusting RV1. When connecting the circuit to the linear pa, RV1 should be set to minimum resistance and the collector current of the pa should be monitored. RV1 is then adjusted for the required quiescent current (usually 50-100mA), but if this

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cannot be achieved the value of R3 can be increased slightly.

This bias circuit has proved very reliable in practice, and the 70MHz pa with which it was built has been used by the author for contest operation for over a year, in hot and cold conditions, with excellent results. The circuit is also suitable for use in hf band amplifiers, and the components, particularly R4, can be adjusted for amplifiers of different power levels although the values given above should be suitable for transistor linear amplifiers in the 10–100W range.

References

[1] "A 70MHz transistorized transmit/receive converter" by D. F. Harvey, G3XBY, and C. S. Gare, G3WOS. *Radio Communication* February 1977.

[2] *Data sheet for BLW60 transistor.* Mullard Ltd, Mullard House, Torrington Place, London WC1E 7HD.

Acknowledgements

The author wishes to thank Mullard Ltd for permission to use their circuit as the basis for this article, and Pye Telecommunications Ltd for the use of test equipment. □

Modfication to the channelized 144MHz fm transmitter-receiver

by N. G. HYDE, CEng, MRAeS, MIERE, G2AIH*

IN the description of this equipment that appeared in the May issue of *Radio Communication*, a modification to increase the channel capacity was mentioned. This involves a new receiver local oscillator board, the circuit of which is shown in Fig 1.

The modified circuit is similar in principle to that shown in the original Fig 3. Eight crystal positions are now fitted to accommodate (right to left on the circuit diagram) two repeater channels, four simplex channels and two repeater input frequency channels. Connections to the CHANNEL switch Sla remain the same.

To reduce the self-capacitance in the oscillator base circuit (TR3), the original 1N914 switching diodes are replaced by Type 1N916. To further reduce this capacitance, the diodes are reverse-biased by connecting the cathodes to the 12V supply line through resistors R41 to R48. This results in a reverse potential of approximately 11V across each of the inoperative diodes, ie the difference between the 12V supply and the voltage drop across R9.

To accommodate the different circuit conditions, some changes are made in component values. The value of each of the fixed tuning capacitors C9 to C14 has been reduced to 22pF; TR3 base bias has been changed slightly by reducing R10 to 22kΩ and increasing R12 to 1·2kΩ. Two decoupling capacitors C28b and C28c are added to the 12V rail feeding the diode bias resistors.

A set of drawings showing pcb track layouts and component locations (23 drawings) are available from the author for 75p plus a large sae. □

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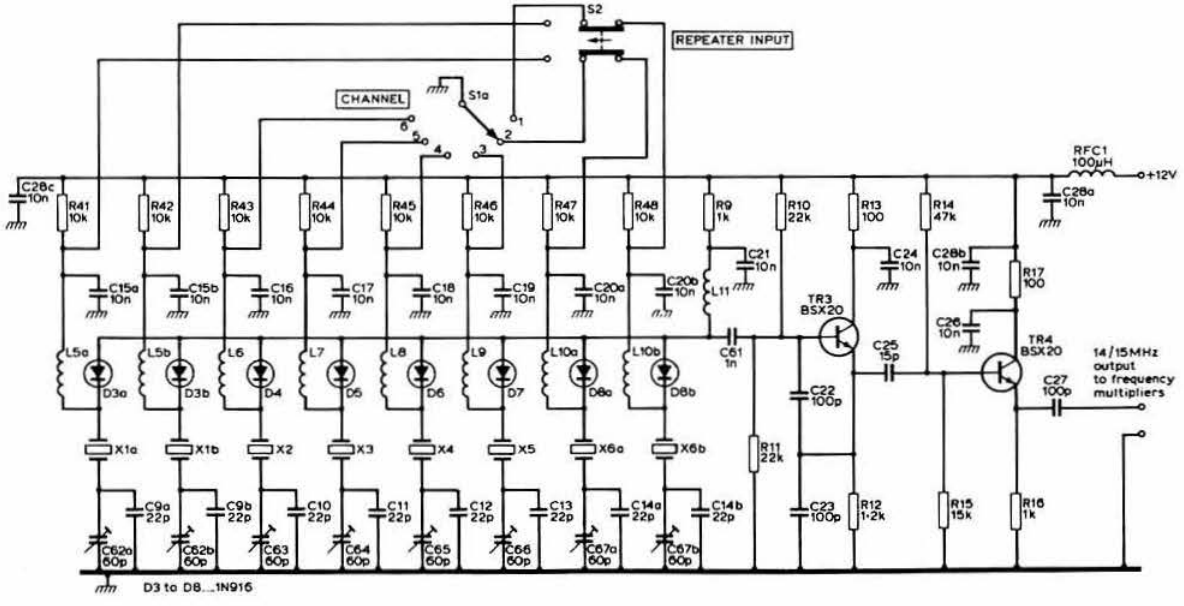


Fig 1. Modified receiver local oscillator circuit

An all-band uhf tvi filter

by D. F. RICHARDSON, G4GED*

THE filter to be described has been used very successfully in curing breakthrough on uhf tv receivers, which has been a considerable problem at the author's QTH due to the proximity of neighbouring houses. Most of the previously published designs for uhf-pass and braidbreaker filters were tried before this was developed, but none was successful. The filter is a six-section, capacitor-coupled, uhf high-pass device, its six resonators being printed on a pcb, which makes construction easy and repeatability very good.

The filter has a very sharp lf cut-off and a high degree of attenuation below television Band 4—of the order of 80 to 100dB. Also, the expected fall-off in performance around 900MHz results in useful attenuation above Band 5. Although it has so far only been "live" tested for 144 and 432MHz ssb breakthrough, a glance at the specification below shows that the filter should give even greater protection on all bands from 1·8 to 28MHz and a useful amount at 1·3GHz. Fig 2 shows the overall performance from 0 to 1,000MHz, and Fig 3 is a close-up of the attenuation around the lf cut-off frequency. To stop hf breakthrough it may be necessary to include a simple braid-breaker (ferrite-ring) in series with the uhf filter to prevent any outer-cable rf pick-up reaching the tv chassis.

Bandpass insertion loss	470-850MHz (Bands 4 and 5)	<3dB
Out of band attenuation	0-300MHz	>80dB
	432MHz	≥55dB
	1296MHz	≥25dB
Input and output impedances		nominal 75

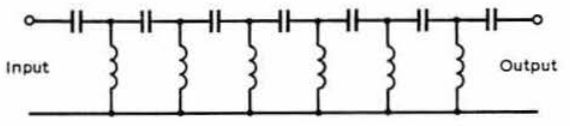


Fig 1. Six-section high-pass filter

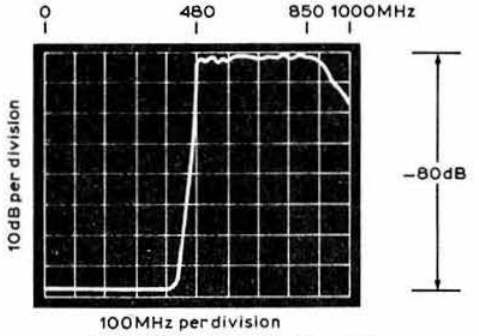


Fig 2. Performance 0-1,000MHz

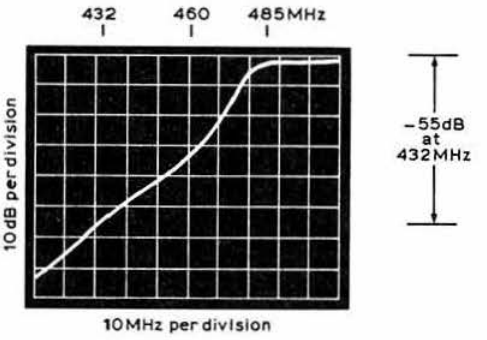


Fig 3. Performance around lf cut-off frequency

Fig 4 shows the circuit diagram, and Fig 5 the pcb actual size. The pcb is single-sided copper laminate glassfibre or srbp, and for good repeatability of the design this should be copied as accurately as possible. The dimensions of the resonators are most important as they set the lf cut-off frequency, and should be 27mm ±1mm long, and 3mm ±0·5mm wide. To put construction into perspective, all the author's pcbs (and there are four filters in "active service" at the moment) were made "on the kitchen table" with nothing more elaborate than a Dalo pen for marking.

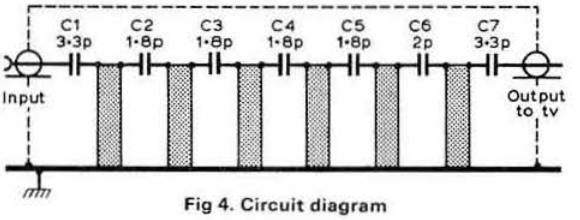


Fig 4. Circuit diagram

PCB note

The author lives in an area where the lowest tv channel is Ch23≈485MHz. Therefore, in order to give the greatest attenuation at 432MHz, the filter was optimized to have an lf cut-off at 480MHz. For use in Ch21 areas, merely lengthen the lines by reducing the ground plane by 3mm. This will place the lf cut-off at ≈465MHz, and the attenuation at 432MHz will still be between 40 and 50dB. The other out-of-band attenuation is not significantly affected. Fig 6 shows the pcb before mounting in the box, construction of which is illustrated in Fig 7.

Step by step construction

(1) Make the pcb, drill the four mounting holes (6BA) and solder on the coupling capacitors with ¼in leads as shown in Fig 6.

Capacitors

C1, C7	3·3pF	Miniature ceramic plate, tolerance ±0·25pF, ie Mullard C333 type, widely available. Soldered to pcb with leads cut to ¼in ±$\frac{1}{16}$in.
C2,3,4,5	1·8pF	
C6	2pF	Tubular "dog bone" ceramic, tolerance ±0·25pF (Erie) soldered with ⅛in, or shorter, leads.

*30 Westbury Avenue, Southall, Middlesex UB1 2UY

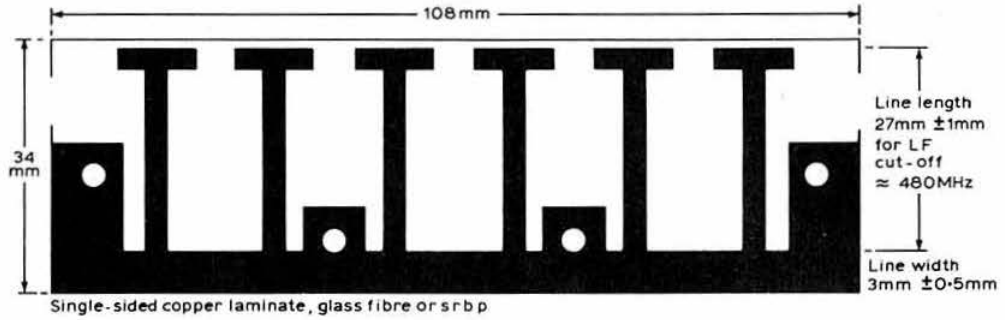


Fig 5. The pcb actual size

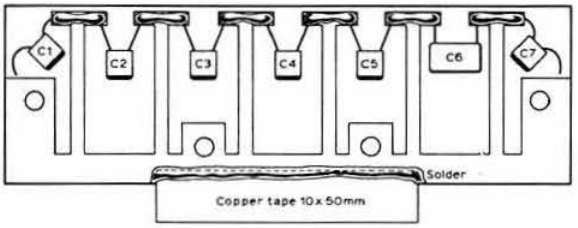


Fig 6. The pcb before mounting in box

(2) Make the box and lid.
(3) Lay the pcb on the base, *copper side up*, centralize and drill through the mounting holes.
(4) Remove the pcb and insert one $\frac{3}{8}$in 6BA bolt through each hole in the base plate, from the outside, and put two full nuts on each bolt from the inside. Tighten these up. This should provide a nominal 5mm clearance between pcb and chassis.

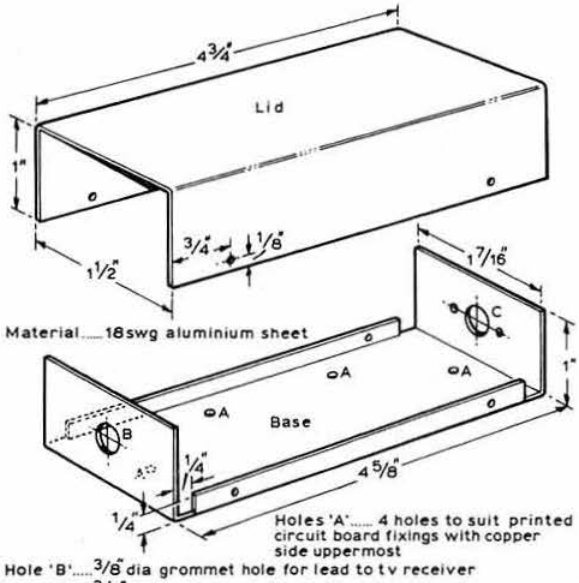


Fig 7. Box constructional details

(5) Lay the pcb, *copper side up*, over what are now four studs (the bolts) and fix each with a 6BA nut.
(6) Solder a piece of thick copper tape or braid about 10 by 50mm to the earth plane of the pcb, and bend it over the edge of the chassis so that, when the lid is put on, the tape is well trapped between the two. This ensures a good all-round earth *and is essential.*
(7) Mount a coaxial socket on one end of chassis and solder-in the input capacitor direct from the pin to the first inductor line.
(8) For the output to the television receiver, make up a short length of coaxial lead about 3 or 4in long with a coaxial plug at one end. Push the other end through a grommet in the end of the chassis, solder the braid to the earth plane, trim the inner conductor very short and solder the output capacitor direct from here to the final inductor line.
Finally screw on the lid with self-tapping screws before testing. □

NEW PRODUCT

Polar vswr bridge

A bridge designed for use with high power transmitters is now available from Polar Electronic Developments Ltd. The instrument is built round a double-sided glass fibre pcb with a printed stripline of an impedance of 50Ω. The forward and reflected power measurement is accomplished by a loosely coupled printed line with diodes at each end and with a centre-mounted cermet trimmer to enable precise calibration to be achieved. The vswr is read directly on a moving coil meter mounted on the front panel with sensitivity control and forward/reflected switch adjacent.

The technical details are: impedance 50Ω; minimum power necessary to achieve full-scale deflection 5W @ 432MHz, 10W @ 144MHz; input/output connectors, N type; maximum power levels 500W @ 432MHz, 1kW @ 144MHz; insertion loss less than 0·5dB; frequency range 5 to 500MHz. Dimensions are 6 by 3 by 3in.

The cost of this instrument is £44.90 (incl VAT). Further information can be obtained from Polar Electronic Developments, Domville Road, Liverpool L13 4AT; tel 051-220 6666. □

RADIO COMMUNICATIONS and the ITU

To mark the theme of this year's World Telecommunication Day, "Radiocommunications", the International Telecommunication Union has prepared a series of articles, the first of which appears below.

Pioneers of radio

The story of radio is a long one with many landmarks. It is also, like that of most scientific discoveries, an international one with scientists from many countries each making their contribution towards this wonderful technique which today has so many applications and to which we owe so much. This article highlights the contributions of just a few pioneers of radio; there were others who might also have been mentioned but space does not allow us to describe their contributions here.

The story began, perhaps, with **Joseph Henry** (1797–1878), an American physicist, who discovered in 1842 that electrical discharges were oscillating. A gigantic step forward was that due to **James Clerk Maxwell** (1831–1879), a Scottish physicist and one of the great mathematical geniuses of the 19th century. His treatise on "Electricity and Magnetism" was first read as a paper to the Royal Society in 1864, and published in fully developed form in 1873. It has been called "one of the most splendid monuments ever raised by the genius of a single individual". By purely mathematical reasoning, Maxwell showed that all electrical and magnetic phenomena could be reduced to stresses and motions in a medium, which he called the ether. Today we know that this "imponderable electrical medium" does not exist in reality, any more than the equator of the geographer or the average man of the statistician. Yet the concept of an ether helped greatly, and allowed Maxwell to put forward his theory that the velocity of electric waves in air should be equal to that of the velocity of light waves, both being the same kind of waves, merely differing in wavelength. This we know today to be an elemental truth, yet to Maxwell must go the honour of having first shown it to us in pure mathematical form.

In 1857 **Feddersen** demonstrated that if an electrical capacitor is discharged into a conductor, oscillations are set up which give rise to intermittent spark phenomena. Twenty-one years later, in 1878, **David Edward Hughes** (1831–1900), an Anglo-American physicist, made another important discovery in the pre-history of radio and its essential components; he found that a loose contact in a circuit containing a battery and a telephone receiver (invented by Bell in 1876) would give rise to sounds in the receiver which corresponded to those that had impinged upon the diaphragm of the mouthpiece. Hughes "microphone" consisted of a carbon rod resting in grooves of two carbon blocks; from it developed many of the early carbon microphones of both telephone and radio. In 1883, **George Francis Fitzgerald** (1851–1901), an Irish physicist, suggested a method by which electromagnetic waves might be produced by the discharge of a capacitor.

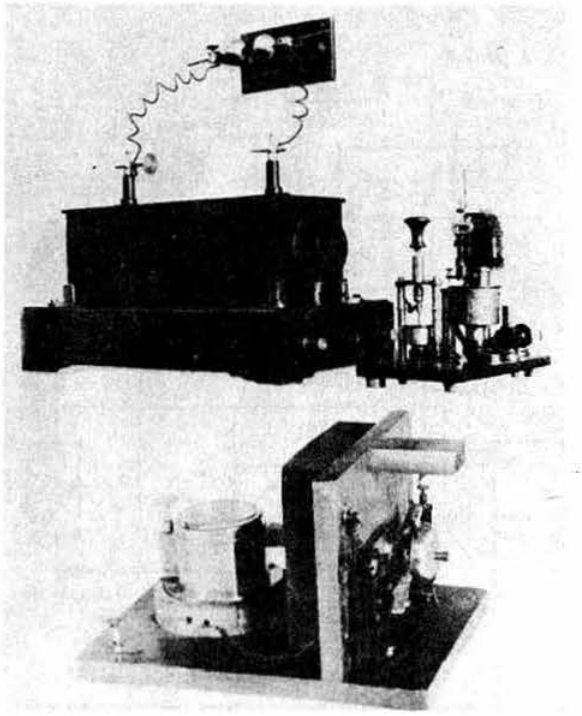
Next we must turn to **Heinrich Rudolph Hertz** (1857–1894), the famous German physicist, who was the first to create, detect and measure electromagnetic waves, and thereby experimentally confirmed Maxwell's theory of "ether" waves. In his experiments he showed that these waves were capable of reflection, refraction, polarization, diffraction and interference. They corresponded precisely in their behaviour to waves of light. Hertz produced his waves, soon to be called by others "Hertzian waves", from the sparks of an induction coil, and in order to study some of their properties he employed a zinc mirror. He described one of his experiments, in 1888–1889, as follows:

"The height of the (parabolic) mirror was thus 2m, the width of its aperture 1·2m and its depth 0·7m. The primary oscillator was fixed in the middle of the focal line. The wires which conducted the discharge were led through the mirror; the induction coil and the cells were accordingly placed behind the mirror so as to be out of the way. If we now investigate the neighbourhood of the oscillator with our conductors, we find that there is no action behind the mirror or at either side of it; but in the direction of the optical axis of the mirror the sparks can be perceived up to a distance of 5–6m."

The half-wavelength of this experiment was about 30cm.

But Hertz's experiments were half a century in advance of his time, and belong to the field we now call microwave optics. Many repeated them and extended them, typical among them being **Edouard Sarasin** (1843–1917) and **Lucine de la Rive** (1834–1924) at Geneva, **Antonio Giorgio Garbasso** (1871–1933) and **Emil Aschkinass** (1873–1909) at Berlin, **Jagadis Chunder Bose** (1858–1937) at Calcutta and **Augusto Righi** (1850–1920) at Bologna. We shall see later that only Righi had an indirect influence on the technology of radio, as a young Italian by the name of Guglielmo Marconi was stimulated by his books and lectures.

The next most important event was a lecture given to the Royal Institution in London by **Oliver Joseph Lodge** (1851–1940) on 1 June 1894; it was called "The work of Hertz and some of his successors", was widely reported at the time, and was to have far-reaching consequences. Lodge, Professor of Physics at the University of Liverpool, had himself worked extensively in the field of electromagnetic waves and was the first to comment on the phenomenon of resonance or tuning. In 1898 he took out a patent on an adjustable inductance coil in the antenna circuit of a wireless transmitter or receiver, or in both, in order to tune one with the other. This patent won him a high place in the history of wireless. His sharply tuned resonance circuits were a substantial



Top, Alexandra Popoff's first radio receiver (1895). Below, Popoff's so-called Kronstadt transmitter (1900). (Photo: *Administration of the USSR*)

advance over Hertz's relatively primitive arrangements, but Lodge himself, like Hertz, with heavy academic commitments, had not the time to develop his ideas on wireless telegraphy and never made an attempt to transmit any intelligent signals with electromagnetic waves.

Alexander Stepanovitch Popoff (1859–1906) was one of the many who read Lodge's lecture and was inspired by it. In 1895 Popoff was lecturer in physics at the Russian Imperial Navy's Torpedo School at Kronstadt near St Petersburg. He experimented with Branly coherers (see below), set up a receiver with a protruding wire in 1895, and read a paper about it. "On the relation of metallic powders to electric oscillations", at the meeting of the Russian Physico-Chemical Society on 25 April (7 May, new calendar) 1895. By means of this equipment, Popoff could register electrical disturbances, including atmospheric ones; and in July of the same year a similar instrument with an ink recorder was installed at the Meteorological Observatory of the Institute of Forestry at St Petersburg.

A more complete description of his experiments appeared in January, 1896, and on 12 March (24 March, new calendar) of the same year he gave a further demonstration before the same society.

Guglielmo Marconi (1874–1937), at the age of 20 in 1894, was well acquainted with the work of Hertz, Branly, Lodge and Righi. He began experimenting in the spring of 1895 on his father's estate at the Villa Grifone, near Pontecchio, Bologna. The idea had occurred to him that Hertzian waves might be the basis for a means of communication, signalling with them the dots and dashes of the morse alphabet. Once he had convinced his father of the practical nature of his ambition, he received from him all the financial support he needed.

In his first experiments, he used an ordinary spark induction coil and home-made coherers of the Branly type (see below). To turn the discharge on and off, he placed a telegraph key in the primary circuit of the induction coil, and thus produced short or long trains of sparks. He could soon detect these dots and dashes all across the room, and in the summer of 1895 he moved out into the garden. In order to increase the performance and range of his transmitter, he followed previous experiments by others: he attached to one end of his transmitter circuit an elevated metallic object, the antenna, and to the other end a metal plate buried in the ground. He could now signal across the whole garden, and he soon found that there was a direct relationship between the height of the antenna and the distance of transmission.

Marconi made important improvements in the components of his system, particularly in the design of his coherers. He also put a relay in series with it, which actuated the tapper of his coherers, and worked a telegraphic printing instrument to record the received signals.

Here is perhaps the best place in our story to pay tribute to **Edouard Branly** (1844–1940) a great French physicist, officially described in France as "Inventeur de la Télégraphie Electrique sans Fil". His great contribution was the discovery of the coherer, that small fragile glass tube, looking like a thermometer, but filled with metal powder. He demonstrated it before the French Academy of Science, to which he was later elected, in 1891.

Branly found that electromagnetic waves, produced as much as 25m away from it, caused the individual metal particles in his coherer, first iron and later nickel and silver, to cohere and thus allow the passage of a current through them. A galvanometer was the instrument he used to show this effect; Marconi improved this greatly by using a telegraph printer. But the metal particles had to be separated again, and therefore an electric tapper, a tiny hammer precisely like that used in any electrical bell, was added to the coherer. When it struck the glass tube it decohered the particles again, and thus stopped the current flow from the batteries.

Each successive impulse reaching Marconi's antenna produced the same phenomena in the coherer; first the coherence of the particles, then their decoherence, and hence the recording of the dots and dashes. Marconi used tightly-fitting silver plugs in his glass tube, which he evacuated and sealed, and thus the coherer became the first of many sensitive devices to receive wireless telegraphy. Before Marconi left Italy, to continue his work in England, he had reached a transmission distance of the order of 1km.

Such then is the story of the many inventors of wireless telegraphy, working with each other's equipment, adding new ideas and new improvements to them. It was a patient, persistent and often discouraging inquiry into natural laws and in these initial stages it was indeed only animated by the love of knowledge. □

technical topics

Pat Hawker, G3VA

MY own interest in amateur radio was aroused and nourished in the mid-thirties by *Television and Short-wave Magazine* (the hf section of which was skilfully edited by Ken Jowers, G5ZJ) and by picking up at Radiolympia a copy of *A Guide to Amateur Radio*. In those days the *Guide* was the **only** British book entirely devoted to amateur radio and served both as a "handbook" for licensed amateurs and as an introductory guide for newcomers. In recent years, with so many other publications available, this has become less true, and there is a general tendency to forget about the *Guide* once the coveted licence has been obtained.

Having just spent a good deal of time in helping to produce the latest (17th) edition—completely re-set and expanded—I genuinely feel that this 120-page book would prove reasonable value for money to a far wider category of readers than solely those who have freshly come to the hobby. It is in fact a potted handbook and, for example, I know of no other source of brief information on almost 220 of the most popular pieces of factory and ex-service equipment to form a unique guide for anyone who reads "Members Ads". (It certainly took a good deal of digging to bring together the information!) In fact the technical chapters are designed to help people find their way round current equipment, even if (like me) they came into the game when virtually the only semiconductors had whiskers (cat) on them. And, conversely, today it is also a case of explaining valve circuits to those brought up on the silicon revolution.

I have no wish to appear in the guise of a book salesman, but if readers of this column do get a chance to look through the new edition and check for themselves, they should not pass over the opportunity in the belief that it is not intended for anyone who has already taken the RAE.

NRO aid to frequency checking

Dugald S. McDougall, W9IV, writes from Illinois to draw attention to what he describes as "a remarkably useful item of test equipment". This new aid is based directly on the fet negative-resistance oscillator (Fig 1(a)) originally described in *Electronics* (*TT* January 1976, pp42-3) as a general purpose rf/af/modulated-rf signal source. He writes:

"The idea for the device was born after I became the proud owner of a frequency counter. It was directly stimulated by the need, encountered during the construction of some vhf equipment, for a number of tank circuits resonating at various frequencies between 50MHz and 450MHz.

"The test device is simply the *TT* circuit but with alligator (crocodile) clips provided for convenient connection to the particular tank circuit which is to be measured. One simply clips on the circuit, which at once begins to oscillate at the frequency of the tank circuit. This frequency can then be read directly from the counter."

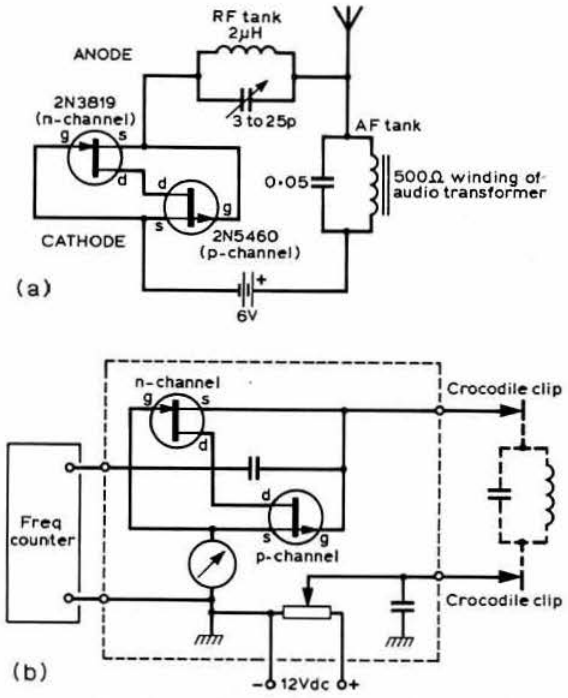


Fig 1. (a) Negative-resistance oscillator using complementary fet devices as a flexible signal-source as described in January 1976. (b) The W9IV NRO gimmick for measuring resonant frequencies of tank circuits in conjunction with a frequency counter

W9IV adds one note of caution. The potentiometer must be used to permit accurate control of the fet voltage, and the current indicator is also essential to enable the user to set the voltage to a value about half-way between maximum current and zero (on the negative resistance side of the peak, of course).

Fig 1(b) shows the W9IV unit; although he does not indicate any component values these should not prove unduly critical and should be roughly optimized to the range of frequencies of interest. The unit is constructed in a minibox.

Since the basis of this useful device is a two-terminal oscillator that does not unduly load the tank circuit being tested, it occurs to me that a Franklin fet oscillator could be used in place of the negative resistance arrangement since this might eliminate the need for potentiometer and meter. The W9IV suggestion seems a most useful way of enabling a digital frequency counter to be used to measure the frequency of a passive tuned circuit!

Loose-locked synthesizer

In *The Radio and Electronic Engineer*, Vol 48, No 3, March 1978, pp127-132, ir L. K. Regenbogen, of Delft University of Technology, describes a form of digital synthesizer using a voltage-controlled oscillator that

seems to meet a number of important requirements for an hf synthesizer suitable for amateur equipment. The synthesizer is such that, it is claimed, it is now possible to convert a simple local oscillator already built into a receiver into a frequency synthesizer by adding a few integrated circuits. To quote ir Regenbogen:

"All direct synthesizing techniques are too complex and too bulky to be used in an hf receiver. Phase-locked loops with a frequency divider in the feedback loop are too slow and have too much sideband noise when built to provide the required resolution (listed as 1Hz). The rather simple voltage-controlled *LC* oscillator is lacking long-term stability, but scores high when compared to the other requirements, especially on spectral purity."

(To be fair I should mention that recently I was able to examine a new Philips microprocessor-based hf receiver which did achieve 1Hz resolution using special pll techniques, but at a price intended for the professional market—*G3VA*)

The Dutch writer continues: "The rate multiplier, which consists solely of digital circuits, meets our requirements in all aspects but one. The Fourier spectrum of the output signal from such a device is a vast number of closely spaced lines, so it has very bad spectral purity. We succeeded in combining the simple voltage-controlled oscillator and the digital rate multiplier, without incorporating their shortcomings. Most manufacturers of digital ics have a decimal rate multiplier like, for instance, the ttl compatible SN74167. This consists of four JK-type flip-flops, forming a decade counter with a 1245 code. By making suitable combinations of the flip-flop outputs and gating them with the inputs it is possible to select any number from 0 to 9 out of 10 input pulses. Although the counter is working in the 1245 code, the rate selection is in the normal 1248 bcd code using four lines." An outline is shown in Fig 2.

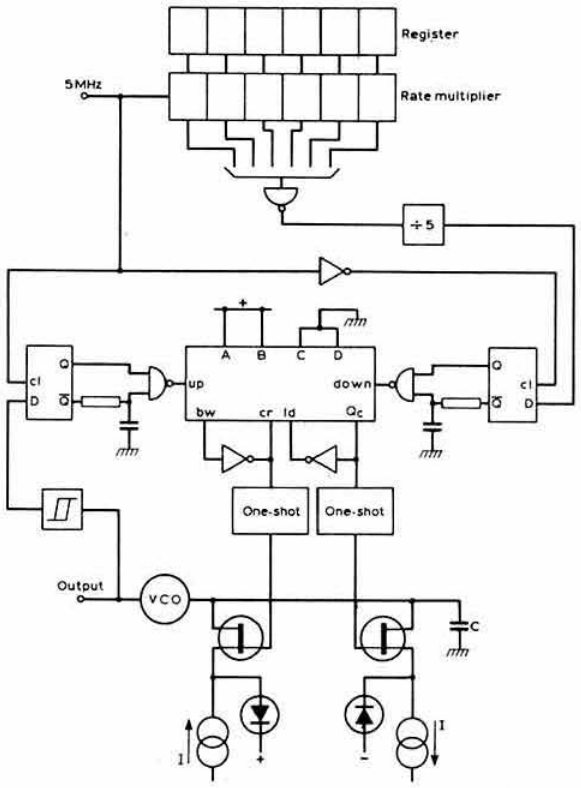


Fig 2. Block outline of the Regenbogen loose-locked oscillator used for an hf synthesizer added to an existing receiver

In effect, the Dutch *synthesizer* appears to have a number of features in common with our old friend, the huff and puff *stabilizer*, particularly the good spectral purity characteristics. Like the huff and puff, the oscillator is only *loosely* locked to the required frequency rather than by means of the phase-locked loop used in most synthesizers. Despite the loose locking, it is claimed that the vco is within 10Hz of its final frequency in less than 300ms, fast and accurate enough for most normal applications including, of course, ssb. The paper also outlines an even higher speed version using a slightly more complex arrangement.

It is appreciated that the notes given here will be useful only to those already having good knowledge of digital techniques, but the companion paper, showing the conversion of an existing receiver, is still "to be published".

The conclusions of this present paper are, however, worth quoting in full:

"It has been shown that the use of a loose-locked oscillator makes it possible to have digital frequency control in hf receivers without resorting to complex circuitry. The stability and the resolution of the controlled oscillator are good enough for nearly all applications. Of course there are points for further research. The frequency step per correction pulse could be made as close as possible to the frequency error. This would bring tuning speed to extremely high values and would, furthermore, reduce the unwanted frequency modulation. The use of rate multipliers with an optimally spaced output would also reduce the frequency modulation or simplify the frequency comparator."

As someone who has frequently warned against the drawbacks (for amateur applications) of simplified pll forms of hf synthesizers, one can say only that this latest scheme looks promising. However, there is the possibility that pll techniques may also soon be improved and simplified still further by new ic devices reported to be in the pipe-line.

Copper-clad antenna wire

In the March *TT*, attention was drawn to the use of copper-clad steel wire, of the type used for farm fencing, as an economical source of antenna wire, although it was noted that after several years of exposure such wire tends to become pitted in various spots. This item resulted in a note from Amtest (55 Vauxhall Street, Rainbow Hill, Worcester WR3 8PA; tel Worcester 22704) mentioning that the firm is planning to supply a form of cladded wire to amateurs and swls. This is 20swg copper clad, with steel core and pvc insulation. The firm believes that the pvc will protect the wire from the ravages of weather and should prove superior to farm wire. At about 4p per metre (plus carriage) it is not as cheap as the large coils of farm wire referred to in the March issue, but nevertheless it is more

economical (and presumably stronger) than conventional 20swg copper wire. Amtest welcomes enquiries (with sae).

Immediately after writing the above notes I received a letter from Gordon J. Mitchell, G4AIQ, about a form of wire which *is* intended for agricultural electric fencing and which is sold in the UK under the trade name "Polywire" (made by Wolseley Engineering Company). The current price is about £3 for a 200yd coil. It seems to be a tough three-strand cord in which are threaded three thin strands of wire of uncertain composition.

G4AIQ writes: "I have used it for some years for various antennas and found it very durable, surviving gale conditions even when slung between trees. The construction seems to provide self-capacitance as in multiwire broadbanded antennas. A possible snag with high power might be a built-in rusty bolt effect."

Battery and mains supply

The following idea stems from "Reflecties door PA0SE" (*Electron* No 4, 1978) and is an extension of the well-established method of connecting a stand-by battery to a mains power supply using a couple of diodes to provide automatic switching when there is no output from the mains unit: Fig 3 (a). In the modified arrangement of Fig 3(b) the battery also serves to provide a "reference" voltage in order to stabilize the output of the mains unit by means of a series transistor of suitable rating.

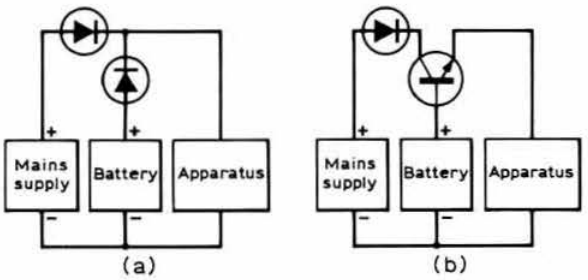


Fig 3. (a) Conventional automatic switching arrangement for stand-by battery supply used in conjunction with a mains supply. (b) Modified arrangement in which the battery also acts as a voltage reference to stabilize the mains supply output

Ceramic cw filter

In *CQ-DL* (May 1977) Hans-Joachim Brandt, DJ1ZB, shows that three low-cost 455kHz ceramic i.f. filters (Murata SFD-455B) can be used as the basis of an effective cw filter: Fig 4. When correctly set up, the filter has a nose bandwidth (−6dB) of approximately 1kHz, a skirt bandwidth (−60dB) of about 4kHz and ultimate rejection better than 80dB, the sort of characteristics normally associated with a high-cost crystal cw filter. To overcome the tolerance in resonant frequencies found in these ceramic units, six 25pF (max) trimmers are used. Bandwidth is determined largely by the values of the coupling capacitors between the sections (8·2pF) and between the separate ceramic units (27pF). The usual care must be taken to minimize leak of signals around the filter.

Protecting outdoor metal-work

Many amateurs use metal masts and mounting accessories of the type intended for tv and vhf/fm broadcast reception. The better firms ensure that such metal-work is sturdily made and reasonably well protected against the effects or corrosive atmospheres (see *TT* April) although occasionally an amateur may load up his mast to an extent not envisaged by the makers, sometimes with unfortunate results.

Recently I have been involved in revising a code of practice for broadcast receiving antennas, and it is fascinating to discover how much there is to learn about what is good (and bad) practice in this field, and what precautions are necessary to ensure that outdoor metal-work will stand up, for example, to a "12-hour salt spray test".

In this connection some useful information was prepared a couple of years ago by the firm L. Shelley Ltd, of Halesowen, who make many of these accessories, such as chimney brackets, wall mounting brackets, U, V and J bolts, clamps etc on behalf of the main antenna firms. To quote from information on brackets:

"Metal: it is essential that low carbon steel is used to enable good quality welding; high yield steels cause embrittlement, especially after galvanizing; some angle in that category is known as rail angle or bedstead angle.

"Welding: good quality arc welding is vital; either rod or carbon dioxide; the latter is advisable as it eliminates scale completely, which is beneficial for the production of a clean surface for the finishing.

"Finishing: hot dip galvanizing is by far the best rust preventative, and when painted after installation can last many years, even under the worst condition of acids from chimneys and industrial pollution. Galvanizing alone can be very good even after 15 years. Next is zinc plating, which has a very limited life on its own but which can be extended by painting; phosphating comes into the same category, and if properly carried out on a prepared surface can be slightly better than zinc plating.

"Painting: this is a difficult finish to perfect and has to be done on a very well prepared surface and stoved. If done in this way it can be better than zinc plating, but good preparation is absolutely vital. Painting on scaly or rusty surfaces is useless.

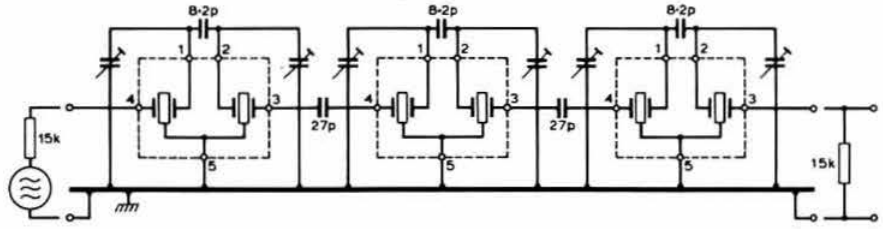


Fig 4. DJ1ZB's 455kHz cw filter using three Murata SFD-455B ceramic filters

"Coated metals, used for pressed steel brackets, can provide another very adequate finish.

"In general, the size of a bracket fitted to a chimney must be in proportion to the diameter and length of the mast and the size of the array to be fitted, and the condition of the brickwork or cement rendering is important. For light arrays on a good structure, 30 or 40mm either side is ample, but on a poor structure it is advisable to use wider bearing brackets on all installations."

Compact quad-loop for 14 and 21 MHz

Over 10 years ago W6WAW described in *73* a single quad-type loop antenna for 14 and 21MHz which he had built and put up in less than two hours (see *ART*). Although it gave only a modest gain over a dipole, it had proved capable of good dx performance and could be made rotatable more readily than a dipole element. However, the W6WAW, like a full-size quad, requires a bamboo framework capable of supporting the 18ft square loop.

In *CQ* (March 1978) Harry K. Bourne, ZL1OI (and presumably former G2AH), shows how the "linear loading" technique that has been advocated for compact quad antennas by G3IMX, G6XN and G3YDX (see for example "Practical design for a capacity hat loaded 14MHz mini-quad" *Radio Communication* October 1976, pp755-6) can be equally useful in the single element form. This allows the side length for 14MHz readily to be reduced to under 14ft while also providing a support for a full-size 21MHz loop: see Fig 5.

The feedpoint impedance for a full-size single loop is roughly 120Ω and, although a 70Ω feeder would possibly prove satisfactory, ZL1OI uses 70Ω λ/4 transmission line transformers to provide a good match to 50Ω coaxial cable, the joints being made in a weather-proof junction box.

He states that the antenna will also work on 28MHz but for low-angle radiation he recommends the use of a third (full-size) loop if one wants to make regular use of this band.

The 14MHz loop can be trimmed by adjusting the capacity-loading wires. This can be done with the antenna about 10ft high, provided a small allowance is made for an *increase* in resonant frequency when the antenna is raised to full height.

Beanz meanz QSOz

The coaxial or sleeve dipole has a long history as an effective form of dipole radiator, and I have been meaning for some time to include in *TT* an idea from H. R. Skelhorn (G6SOG/T, G8BPU) for a simple-to-make, vertically-polarized, omni-directional 144MHz antenna for working to mobiles directly, or via repeaters, using

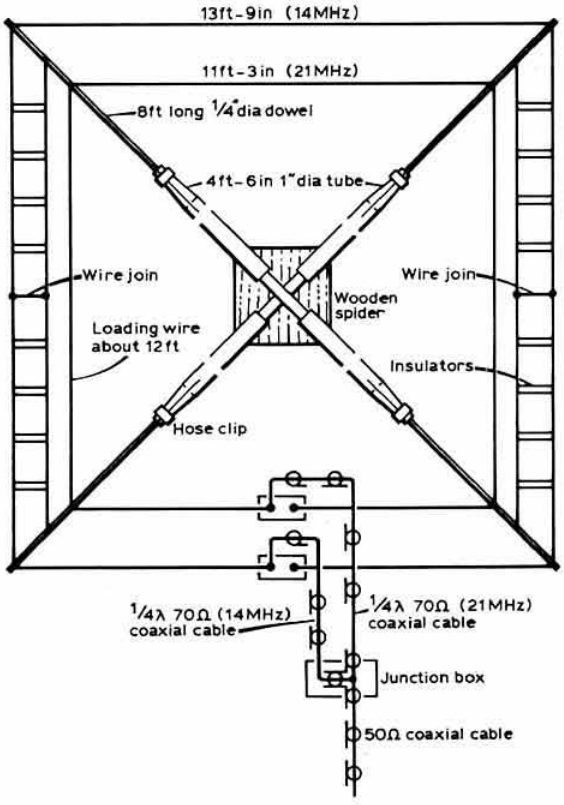


Fig 5. ZL1OI's compact 14/21MHz quad-loop antenna using linear loading of the 14MHz loop

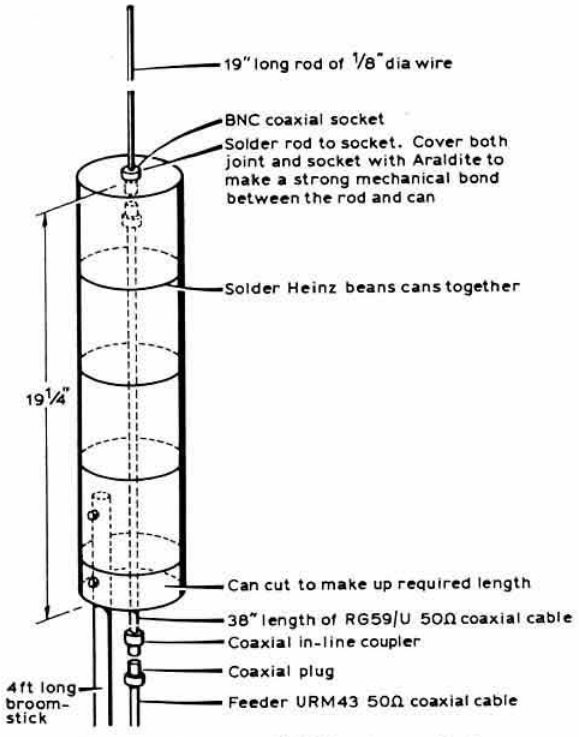


Fig 6. G8BPU's bean-can 144MHz sleeve dipole antenna mounted at 25ft brings in GB3MP (55 miles) at 59+ and has an swr of about 1·1:1 on transmission

baked-bean tins. The diagram (Fig 6) gives all the necessary constructional information, but for the benefit of overseas readers "Araldite" is an epoxy-resin adhesive.

Not many years ago there was a spate of "beer can" verticals (hf antennas made by soldering together large numbers of cans) but evidently the staple diet of amateurs has, in the intervening years, become somewhat more sober!

Soldering aluminium is no go!

From time to time (eg *TT* March 1978, p221) tips have been given on how to solder to aluminium. In fact many different techniques and special fluxes have been developed for this purpose; for example ultra-sonic soldering irons. However, in *QST* (March 1978) Harold J. Reed, a professor emeritus of metallurgy, shatters our illusions by making it clear that the real problem is not that of making a good bond to aluminium but of making one that will last. He writes:

"There are dozens of ways of getting a good initial bond; some simple, some complex, but no inventor has solved the corrosion problem that causes failure of the bond.

"Aluminium is an extremely active metal and were it not for a self-repairing, protective oxide coating, the metal and its alloys could not be used for any commercial purpose. When aluminium is bonded to a metal or alloy (eg a solder) of considerably lower activity, the protective oxide film either cannot form or is imperfect. The aluminium, therefore, becomes strongly anodic to the solder and is converted at the interface to corrosion products having little or no strength, and the bond fails. This may take a few hours, weeks or months, depending on the system and environment, but you can be sure that failure will occur sooner or later. There may be little or no visual evidence of the corrosion because it is confined to the very narrow zone that comprises the interface.

"Obviously somebody should invent a solder whose activity is the same, or nearly the same, as that of aluminium and its commercial alloys. So far no one has done that. There is no point in developing new fluxes, the culprit is the solder. I don't envy anyone the task of finding an alloy that will meet the chemical and electrochemical requirements as well as those for a solder."

Direct-conversion with harmonic detector

TT (April, July 1977) and *ART6* draw attention to the advocacy, by the Russian amateur RA3AAE, of the harmonic anti-parallel diode form of product detector for direct conversion receivers. Dick Rollema, PA0SE, (*Electron* No 5, 1977) reprints the circuit diagram (Fig 7) of a simple 3·5MHz cw receiver using this approach and originally described by YU2HL in *Radioamater*, September 1977.

This has a Clapp-type oscillator tuning 1,750-1,800kHz in order to provide cw reception between 3,500 and 3,600kHz. A BF173 af preamplifier is followed by an ic af amplifier which includes an af filter (1,000Hz) in the feedback loop.

No information is given on a suitable equivalent for the IL237 device, but it would seem likely that an op-amp or similar high-gain device could be used with appropriate changes to the pin numbers.

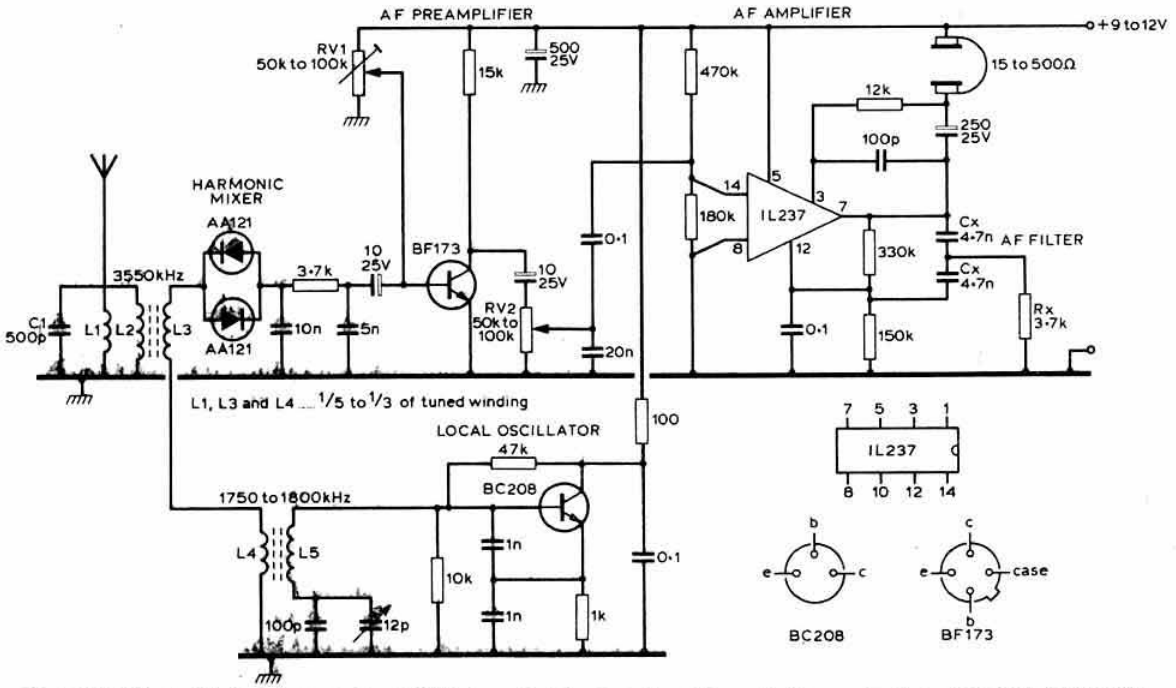


Fig 7. YU2HL's simple direct conversion 3·5MHz cw receiver using the anti-parallel harmonic mixer described by RA3AAE

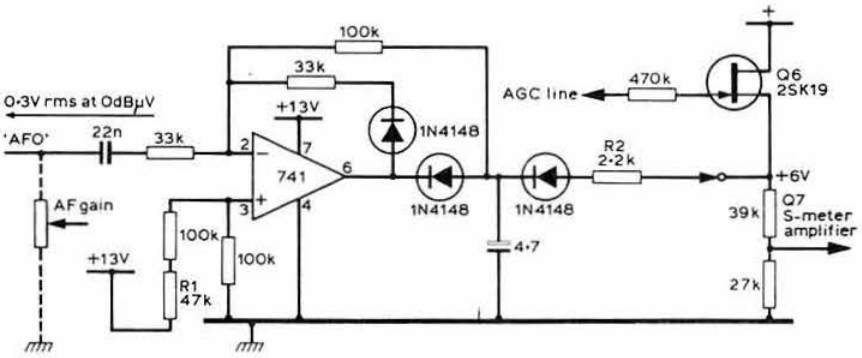


Fig 8. LA8AK's improved S-meter circuit for 144MHz operation. To adjust, choose R1 for zero deflection with no receiver signal input. Then choose R2 to increase deflection by two S-units at −6dBμV, ie S-meter reading of ½S-unit without connection of this unit

S-meter for 144MHz receivers

During 1976, Jan Martin Noeding, LA8AK/G5BFV, using 144MHz ssb, discovered that "S-units" for vhf tend to be rather different from those for hf. At hf a practical "S0" represents −6dBμV, but on 144MHz S0 really means 0dB snr (s:n ratio) or 3dB (s+n)/n, S1 6dB snr, S2 12dB snr, and so on. But the agc usually begins to take effect only at around 20dB snr, and this means that if the S-meter reading is derived solely from the agc line it does not make too much sense. One needs an arrangement so that not only is the meter reading around S2 to S3 before agc starts, but also one that does not influence the agc action but only the S-meter.

The circuit arrangement shown in Fig 8 was developed for the Trio TR7010, but practically the same connections would apply to a TS700, and the general scheme might be widely applied.

The setting up procedure is as follows:

(i) Choose R1 for zero deflection with no signal input to the receiver.

(ii) Connect a white-noise source at the antenna input of the receiver, adjust the noise level for ½S-unit reading, and select R2 so that, when it is soldered in, the meter reads S2 to S3.

Earlier LA8AK had tried to calibrate his receiver but had found it far too sensitive to varying signals. Now the S0 meter sensitivity has been reduced and zero-adjusted.

LA8AK feels that it does not make too much sense when, as is quite usual, a 10W output gives an S0 reading, and 80W output S7. He feels most S-meter circuits are too sensitive, although reasonable readings should be possible by readjustment.

Carrier insertion and the SL641c

John A. Young, GM4DQD, uses an hf transceiver based on the one described by David Bowman, G3LUB, in *Wireless World*, June to September 1972, but with a number of modifications to take account of a rather different layout. One modification was the replacement of

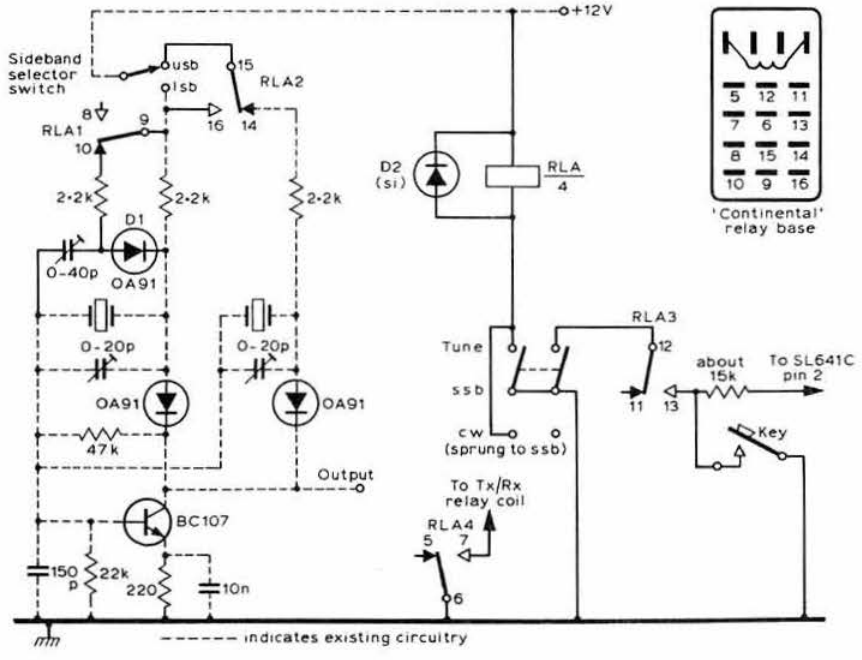


Fig 9. Modification to carrier oscillator to provide tune-up and cw signal using carrier insertion and SL641c for G3LUB-type or similar hf transceiver as used by GM4DQD

the conventional two-diode balanced modulator with balance control by a Plessey SL641c double-balanced modulator ic (this was to eliminate the need for the balance control which would not have fitted the revised layout). A modified phase-shift tone oscillator was used for cw operation but did not prove satisfactory, partly due to its sluggish keying and partly because it was affected by rf pick-up. The original G3LUB design seems to have made no provision for cw operation.

As a result GM4DQD eventually decided to eliminate the tone-generator and to resort to carrier insertion for cw working by unbalancing the SL641 and by pulling the lower sideband crystal frequency into the 9MHz filter passband. The modification has proved very simple and could probably be applied to many types of carrier oscillator. Control is by means of a 3-position sub-miniature double-pole toggle switch with spring return to off position from one side only. A relay is used because the carrier oscillator and double-balanced modulator are inconveniently placed for manual switching, and because GM4DQD was unable to find a suitable 4-pole 3-position toggle switch. The relay is a 4-changeover 12V Continental-type unit obtainable from RS Components Ltd, or from many other sources of new or surplus components. The modified carrier oscillator is shown in Fig 9 and indicates the basic simplicity of the modification.

Signal reports indicate a cleanly-keyed transmission. The technique for using the SL641c in this manner has not been publicised and could be applied to other equipments.

IC voltage regulators

A few years ago it was noted in *TT* that one of the problems when using voltage stabilizers, particularly with battery supplies, is the appreciable loss of voltage and power involved in conventional series regulators. This problem, of course, extends to the popular ic regulators which require an appreciable voltage drop to function correctly, particularly where fold-back current limiting is incorporated. In *TT* (February 1975) the Baxandall arrangement was described as one way of overcoming this problem. This circuit will work with an input voltage only some 0·2V above the stabilized output voltage, making possible, for example, a vfo voltage rail of, say, 10V when used with batteries that discharge to around 11V. The Baxandall circuit continues to represent a very effective system for discrete-component regulators.

However, Jan Martin Neodling, LA8AK/G5BFV, has found an alternative arrangement which can provide an equivalent improvement with ic voltage regulators. With these devices the minimum voltage difference between the input and output voltage is of the order of several volts. For example, the MC7812 (μA7812) V_{in}—V_{out} is approximately 2V; for the μA723 it is about 3V. Further, where more power is required it is necessary to use a boost transistor, and this adds at least an extra volt to the V_{in}—V_{out} figure.

LA8AK has found that this problem can be overcome by the arrangement shown in Fig 10. In this case, V_{in}—V_{out} is determined only by VCE (saturation) of TR1 and the voltage across R1. Since germanium transistors tend to have lower $V_{CE(sat)}$ at higher current drain than silicon types, they are preferable for TR1. TR3 provides a foldback limiting circuit, ie when the unit is overloaded, and the output voltage drops below 5V, the current output decreases to zero. For optimum results R2 × R3 should be approximately equal to R4 × R5.

R11 limits the current through the zener diode to under 25mA. If an external zener diode is connected to pin 10 (pin 9 open) the current drive may be increased to 150mA maximum. Voltage of the zener diode is not critical but it must be higher than the voltage at pins 4 and 5 respectively.

Using this approach it is possible to construct a 12V dc supply using a 12·5V transformer; the critical point is the ripple output from the rectifier so that V_{in} shall always be at least 1·5V higher than V_{out}. A possible solution may be to use a two-diode bridge rectifier, a 25·2V centre-tap transformer and a large reservoir capacitor. □

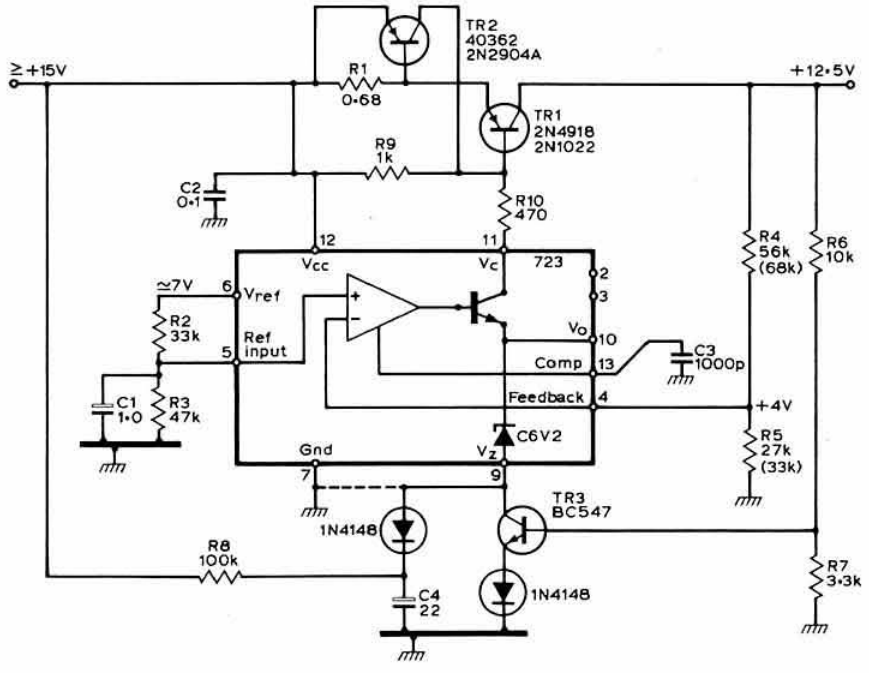


Fig 10. IC voltage regulator with fold-back limiting which reduces loss of voltage, as suggested by LA8AK

swl news

Bob Treacher, BRS32525 *

Aurora study

The RSGB Propagation Studies Committee is keen to study the auroral effects of Radio Sweden in the medium wave band. This is an ideal job for an swl who has a good medium wave receiver and a decent antenna system. The project is to last about three years. Anyone who is interested in finding out more about the project and who is willing to assist the RSGB is invited to write to Mr C.E. Newton, G2FKZ, QTHR.

DX traffic

Due to a solar flare during late April and early May, which caused a near total blackout on the dx bands, reports of real dx are a little sparse this time; although conditions seemed to be slightly better towards the end of May. Robert Small, A8841, seems to have extracted what dx was to be found. ZK2TT provided him with a new one, and other interesting signals heard were from KX6BU, KH6XX, and 5X1AA operating from Entebbe in Uganda. He has also logged VR6TC at 59 plus. The 21MHz band has provided Robert with some good Pacific dx in the shape of ZK1DR, KG6JKS, KH6LG and KX6NX.

Dave Greenhalgh, ARS39965, is unfortunately having rig trouble. Anyone who can provide him with 6BZ6 or 6AV6 valves will do him a big favour, and should write to him at 24 Park Avenue, Poynton, Cheshire SK12 1QY. Until the rig started playing up, Dave was reaping some good dx on 28MHz—HH2MC (via F6CBC) and 9Y4LF, both on ssb, and VR1AR—while 21MHz provided 5W1BK.

Bob Ronay, ARS39720, has been busy with both RAE studying and school examinations, so the listening has had to take third place. However, HV3SJ and M1D, two of the rarer European countries, were heard to boost his totals slightly.

Dave Whitaker, BRS25429, who sent in healthy all-time and 1978 table figures, now has a beam, which certainly improves his dx capabilities on the hf bands.

All-time Countries Table

(starting score 500)

Station	(MHz)	28	21	14	7	3·5	1·8	Total	Mode
BRS25429		225	258	299	207	218	31	1,238	ssb/cw
BRS17567		237	271	322	137	221	17	1,205	ssb
BRS32525		209	261	286	190	230	25	1,201	ssb
BRS25901		200	273	309	179	182	17	1,160	ssb/cw
BRS35943		135	227	266	172	203	18	1,021	ssb
BRS38876		74	189	233	150	181	61	888	ssb/cw
BRS35454		128	187	249	106	149	22	841	ssb/cw
BRS34740		115	172	204	119	149	33	792	ssb/cw
BRS32286		96	195	225	75	172	4	767	ssb
A8841		113	187	270	73	120	0	763	ssb/cw
A9191		102	145	192	52	69	0	560	ssb

This table will next appear in the October issue.

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

1978 HF Countries Table

Station	(MHz)	28	21	14	7	3·5	1·8	Total	Mode
BRS17567		163	175	200	41	80	5	664	ssb
BRS25429		134	115	174	71	106	14	614	ssb/cw
BRS35943		127	128	165	74	111	4	609	ssb
BRS29641		123	137	168	73	71	4	576	ssb
A8841		80	110	191	56	81	0	518	ssb/cw
BRS35454		106	109	147	46	66	6	481	ssb/cw
A9140		102	97	107	70	63	20	459	ssb/cw
BRS32286		121	100	116	35	56	0	428	ssb
BRS34740		73	85	99	50	50	7	364	ssb
A9191		99	44	108	37	44	0	362	ssb
ARS39965		82	88	89	33	35	5	332	ssb/cw
BRS40154		46	87	144	14	11	1	303	ssb
A9107		37	50	83	20	44	5	239	ssb
ARS39018		26	57	72	28	42	3	228	ssb/cw
BRS20185		56	38	72	17	41	2	226	ssb
BRS39162		50	63	66	14	25	7	225	ssb
BRS34658		10	42	81	32	55	4	224	ssb
BRS37782		40	48	77	19	32	4	220	ssb
ARS39720		35	58	80	17	20	0	210	ssb
BRS27421		0	0	108	45	39	0	192	ssb
ARS38280		39	46	38	10	1	2	136	ssb
BRS18529		5	19	58	3	28	2	115	ssb

After returning from his holidays in EA6, he is hoping to put the beam through its paces.

One of our other dx-chasers, Neville Spry BRS17567, missed a few "goodies" while on holiday in Ross-on-Wye recently, but on returning he managed to hear VR8O and ZL4LR/A (Campbell Is). Neville took a receiver and a small whip antenna with him on holiday, and reception was quite good although the whip did not perform too well on 28MHz.

First-timers

Three first-timers report this month. John Timms, BRS39099, from London, Ian Marquis, A9140, from Leigh-on-Sea, and Dennis Byers, BRS40154, also from London.

John runs a Koyo Interceptor KTR1662 receiver with a Joymatch antenna system but is interested in purchasing an FRG7 or FR101. He would be pleased if anyone could provide him with a copy of the circuit diagram for the Interceptor. His present address is 25 Portland Rise, Manor House, London N4 2PT. John mentions that he knows Crosbie Rodgers, BRS32286, as his home QTH is in Dumfries.

Ian is 15 and uses an FRG7, which provides good dx for him on all bands. CE0AE, VS5XU and FH8CY are his best dx stations of late, and he also comments on the poor conditions of April and May.

Dennis also uses an FRG7, which has provided him with plenty of good dx—KG6, VQ9, VR6, JX and 5U7. However, he not only dabbles in amateur radio, but is also keen on Kendo (Japanese fencing) and is a 1st Dan black belt at judo. He also appeared on "Mastermind" in 1977 in which he answered questions on Egyptology and came second in his round. Going back to our hobby, Dennis mentions a QSO heard on 14MHz between W2MDQ/MM and G3OTC in which the W2 was asked the name of his power boat; "*Compromise*", came the reply. "Why is it called that?" asked G. "Well, my xyl wanted the *Queen Mary* and all I wanted was a canoe—so we settled for a compromise!"

Letters are also acknowledged from A9191 and BRSs 18529, 27421, 37782, 39018, 39162 and 39965.

Deadline for the **September issue** is **29 July.** News, comments and table scores to be sent to your scribe's home QTH; not to the editor. □

4-2-70

Graham Knight, GM8FFX*

THIS month's *4–2–70* will concentrate on the advanced type of work being done on the three vhf bands. In the last 18 months these pages have carried reports of propagation by aurora, sporadic-E, moonbounce and transequatorial, along with details of contacts made with microprocessors aiding data transmission. Some of these reports have attracted the attention of various non-amateur scientific bodies including universities, observatories and the Department of Scientific and Industrial Research. It is heartening to find that while some of those outside the hobby liken sections of the vhf bands to a citizens'-band style of operation, others are keen to receive and learn from data gathered by amateur vhf experimenters.

Moonbounce

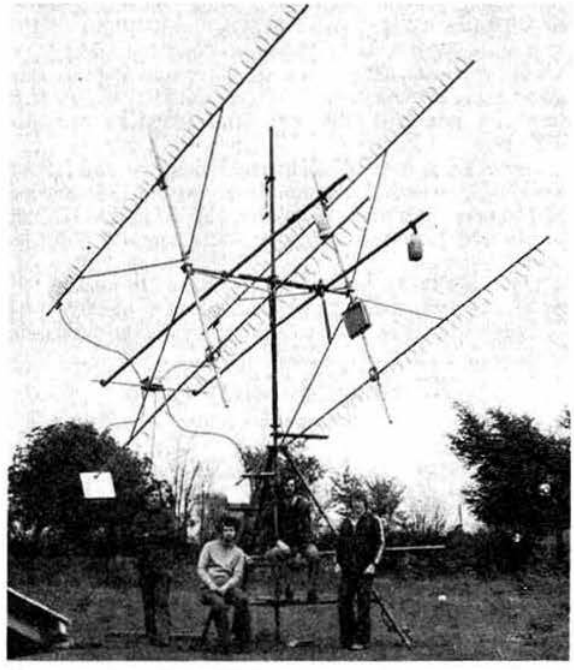
This is a most interesting field for amateur experiments. Peter Blair, G3LTF, at Chelmsford, has led the way for British amateurs for a number of years and had historic contacts last year with stations in all continents on the 432MHz band. In fact, Peter's moonbounce dish antenna and transmit/receive set-up are working so well that eme contacts are being made on an almost weekly basis. His excellent results are a culmination of a great deal of tests, modifications and further tests.

Tests, changes and further tests were the order of the day for the Oxford University Radio Society. Since their reception successes in the April half of the ARRL Moonbounce Competition (reported in *4–2–70*, June) the group—consisting of Julian Gannaway, G3YGF, Chris Lancaster, G8HDR; Hugh Griffiths, G4CNV, and Charlie Suckling, G3WDG—have made many improvements to their moonbounce reception equipment. They were still working on the preamplifiers during the week preceding the May half of the eme contest. The old BFR34A was remeasured for noise figure using the hot-cold resistor technique and revealed a noise figure of 1·6–1·7dB. It was decided to try to improve on this figure, and much midnight oil was burned trying various transistors. They eventually decided on an NE645 which measured 1·3dB nf—a significant improvement over the previous device. The group got the new preamp going properly only one hour before the contest was due to start at midnight.

The group had no time left to erect the usual antenna array of four quad loop Yagi antennas at their favourite portable site. However, using a single quad Yagi and the new preamplifier feeding a Microwave Modules 432/28 transverter they decided to listen all night anyway. Unfortunately the moon was no longer visible as it had clouded over, but the group were able to point the Yagi using a compass with a pendulum type elevation indicator in conjunction with details from a computer program modified for Fortran by Geoff Grayer, G3NAQ. This is one of the programs made available free to moonbounce amateurs by W6PO of the Eimac Corporation, as detailed in *4–2–70* (May 1978). G3YGF and G3WDG held the Yagi in position while G8HDR operated the receiver. Within 3min of switching on, K3NSS was heard—varying between 1 and 8dB above noise yet good solid copy. Before going home, the group checked the receiver sensitivity using ground noise, getting up to 2dB more noise with the antenna pointing at the ground compared to the level when pointing at the sky, thus indicating reasonably good performance of the receiving system.

After getting a few hours sleep the group set up the full antenna system at one of the Oxford University sports grounds and started to listen for the Saturday evening/Sunday morning and Sunday evening stages of the moonbounce contest. Stations copied with the full set-up on 432MHz included DJ9QL, DL9KR, I5MSH, K2UYH, K3NSS, VE7BBG, W1XP, SM5BFK, and our old friend Edgar Mueller, YV5ZZ, of Caracas.

The Oxford group was pleasantly surprised at just how well some of the moonbounce signals were received on the improved set-up. The antenna array is most interesting and is shown in the photograph. It consists of four 25-el loop Yagis in a square configuration with 7ft 6in separating each antenna. The feed arrangement is a four-way power divider network made with air coaxial cable as described in the RSGB *VHF/UHF Manual*, with 5ft of Andrew's FHJ-4 low-loss cable between each antenna and the divider. The new pre-amplifier is mounted at the antenna to ensure minimum feeder loss, and the group was measuring 10dB of solar noise with the new system. The best signal heard during the contest was K3NSS, who



Members of the Oxford University moonbounce team (l to r) G3YGF, G8HDR, G3WDG and G4CNV, with the 4 by 21-el array

*PO Box 49, Aberdeen AB9 8JA

was 15dB above noise with peaks (due to libration fading) at much higher levels. K3NSS could be copied on the 2·5kHz filter and would have been Q5 if he had changed to ssb. The K3NSS signal has been commented on by many moonbounce operators and its outstanding signal in Europe is due to the huge 85ft dish antenna being used in the USA. If only an 85ft dish could be used from Britain!

UKFMGW leads again with mpu control

GB3MA, the RB4 (434·700MHz input, 433·100MHz output) repeater at Affetside, between Bury and Bolton, is the latest unit to come under the mantle of UKFM Group Western. This go-ahead group now has seven operational repeaters and a membership of over 500. It is especially interesting to note that each repeater was designed and built by a completely different team.

The UKFM Group Western is the first group to advise *4–2–70* that it has a microprocessor based control logic on a repeater. Computer expert Mike Cook, G8HBR, explains that the Signetics 2650 microprocessor is used in conjunction with a Texas 2708 memory to control all the repeater systems. Being microprocessor based, the operation of GB3MA can be changed to suit variations in user requirements. The erom (erasable read only memory) can be erased by simply shining an ultra-violet light into a quartz window on the chip itself; the erom is then reprogrammed with the appropriate pulses from a G8HBR operated computer.

The GB3MA repeater serves the Greater Manchester area, and the secretary of the UKFM Group Western, Gordon Adams, G3LEQ, reminds users that state-of-the-art repeaters need financing—remember to renew your subscription.

VHF microprocessor data

Items about vhf operators using microprocessors and visual display units in earlier *4–2–70* pages have brought a large stack of mail from amateurs interested in setting up similar systems. Readers will be interested to read the latest Peter Martinez, G3PLX, developments in this field.

In common with G3YYD and G3RXQ, Peter can only operate on 144MHz rtty via a microprocessor, this is in contrast to some of the stations mentioned in *4–2–70* (May 1978) who use their mpus separately from their existing rtty equipment. G3PLX has recently written a program for morse code which results in a system similar to the recent hardware design which was published in *Wireless World*, but with receive as well. The new equipment has re-awakened Peter's interest in rtty on 144MHz, but he reports that the microprocessor is still not as good as the human ear in picking out cw from QRM.

Another G3PLX use for the microprocessor is in controlling the channel selection synthesizer on his fm gear. Apart from allowing Peter to select channels by just typing "S20" or "R5" the mpu can very quickly scan the channels and produce a print-out of all the occupied ones, which is very useful in selecting a clear channel to move to—this takes only 400ms. The latest addition to this program is an intelligent channel scanner, which will automatically ignore frequencies which become continuously busy, rechecking such channels again when they become free.

On a more scientific side, G3PLX has been experimenting with low-speed data systems with a view to finding ways of improving on conventional rtty. With some theoretical help from G4CUE, Peter has concocted a system using a nine-bit code which is transmitted in a similar way to rtty but at a very precise frequency locked to a frequency standard. This code has the remarkable property that the mpu at the receiving end can actually correct errors by means of some very clever mathematics—this system is called forward error correction. It works very well on the bench, and G3YYD in Watford is getting this program going on his mpu, with a view to some on-air tests with this system. In tests in the shack on simulated weak signals, G3PLX could get an error rate of 1 in 100 characters with a signal 7dB below noise level in my ssb receiver. At this level it takes quite a bit of concentration to even hear the signal in the speaker.

Peter Martinez does not expect this system to be of much use if there is a lot of fading, and so has experimented with another system called reverse error correction. This is used commercially, and if one station gets an error it automatically asks for a repeat and the other station then repeats the affected letter. Reverse error correction requires duplex operation (or very quick break-in) and so, on the face of it, is not very likely to catch on. However, G3PLX has tried it on Oscar 8, about the only amateur system where duplex is possible without having to use widely separated bands. The effect of this system is to convert a QSO which is 50 per cent copy at 60wpm to one of 100 per cent copy at 30wpm, and *pro rata*, ie 10 per cent copy without reverse error correction would give 100 per cent copy at 6wpm, etc. So far, Peter has just exchanged signals with himself, but he would be delighted to hear from anyone else who would be interested in trying out this type of experiment on the vhf bands.

G3PLX agrees with the remarks made by Jack Pennel, G3EFP, in *4–2–70* (May 1978). He, too, thinks that microprocessors will be a valuable aid to any amateur station and that maybe systems such as those described could revolutionize contacts by meteor scatter and moonbounce by taking a lot of the hard work out of sorting the signals out of the noise, as well as the obvious applications in station control, log keeping and frequency selection. Peter's ideas have certainly aroused a great deal of interest in the ms and eme fraternity, and many will be attending the BARTG Convention at Harpenden Public Hall, Harpenden, Herts. on 15 July to see G3PLX demonstrate the systems described in these pages.

Expeditions

By the time this issue arrives, the expedition season will be in full swing. The trip to the Faeroes by the OZ7IS group continues until 27 July, using the callsign OY7O. The site is 500m asl and is in QTH locator WW. The group is running 500W on 144 and 432MHz, with a 14-el Parabeam on 144MHz, and four 21-elements for 432MHz. The group has arranged no skeds in advance but can be contacted on the 14MHz vhf net or on the Scandinavian vhf net on 3·615MHz.

Peter Burden, G3UBX, will be operational from North Yorkshire, starting on 12 August and ending on 1 September. Schedules (and QSL cards) will be available to anyone who has not yet worked the county, but Peter

asks operators to bear in mind that, although the site is excellent to the south, the take-off to the north is poor.

The Glenrothes expedition to Iceland is also in full swing. GM8NCM, GM3OLK and GM3YOR will be in TF until 26 July.

The Oxford University Expedition this year goes to the Mull of Galloway from 19 to 31 August, and then moves to North Wales for the 144MHz Portable Contest on 2 and 3 September. High power will be used on 144MHz and 432MHz, it is also hoped to take 70MHz equipment. Sked request, with sae please, to G4CNV, QTHR.

Sporadic-E warning net

A sporadic-E warning net, similar to the RSGB auroral warning net, has been set up by 15 *Es* operators. They have formed themselves into a ring of six groups: A–G3NSM, G3SEK, G4DGU; B–G3FPK, G3DAH, G3POI, G4BWG; C–G3XDY, G4FSG; D–G4DZU, G4CMV and a branch to GM; E–GW4CQT and a branch to GI3TLT and GI5SJ; F–G3CHN and a branch to northern France.

VHF manager Ian White, G3SEK, suggests that other interested operators may wish to form their own groups and then link with the above arrangement. For further details of this new warning system contact G3SEK or G3NSM.

Pip tones

Now that the Home Office has agreed to the use of end-of-transmission pip tones, a firm called TD Services, of PO Box 27, Ruislip, Middlesex, has produced an add-on module to aid weak signal working. Connected into the microphone lead, the module produces a short tone at the end of transmission on release of the ptt. When copy is poor this will usually enable the receiving station to recognize when the transmission has been passed back. This will be especially useful during ssb meteor scatter and auroral contacts.

The module is very small, only 2 by 2 by ½in, and is suitable for use with most rigs, as a miniature relay has been incorporated to provide isolated closing contacts on transmit. A diagram is enclosed with the unit showing the connections to both three-wire and four-wire microphones. The diagram also shows how to incorporate a switch so that the device is only used in weak signal conditions—if you are already perfect copy there will be no need for the pip tones.

Although there are two preset controls to adjust the frequency and duration of the tone, the unit tested at GM8FFX worked to the duration and frequency specification of 250ms plus or minus 100ms and 800 to 1,000Hz as received from the manufacturer. The unit operates on any voltage between 9 and 15V and takes 15mA current on transmit and less than 1mA on receive. It costs £5.25, including postage.

Auroral reports

There have been 51 auroral events noted at Aberdeen during the first 144 days of 1978, thus keeping up the previously-mentioned average of an aurora every three days since the end of August 1977. The most recent events took place on 3, 4, 5, 10, 11, 12, 13, 14, 19, 23, 24, 25, 29 and 30 April, and on 1, 2, 3, 9, 21, 22 and 23 May.

RSGB auroral co-ordinator Charlie Newton, G2FKZ, was able to see a spot group on the setting sun with the naked eye during the evenings of 29 and 30 April. The area measured 1,200 millionths of the solar disc and was the largest spot group recorded for 10 years. During the resultant auroral openings at the end of April and the beginning of May, contacts were made on all three vhf bands. Mention has already been made in the 70MHz news of the excellent contacts on that band. On 432MHz John Hill, G8HUY, near Cambridge, heard GB3EM go auroral but no contacts were made on the band. Chris Bartram, G4DGU, at Abingdon in Oxfordshire, did manage to get a 432MHz signal all the way up to GM3JFG in Fortrose, who heard signals Q5 and S4; unfortunately, a two-way contact was not possible.

On 144MHz the best contacts were made by GM4COK in Edinburgh; George's outstanding cw signal enabled him to work 19 countries in one evening's operation. Operating with an almost contest-type QSO rate, George worked more than 100 stations every night for the four days at the beginning of May. GM4COK's best dx was

Members present at one of the meetings of the North Western Repeater Group, with the recently constructed repeater for GB3PF

OH5LK (NU37g), OH1FA (LU42h), OH2CX (MU65c), LA4ZC (DW41a), F8OQ—a most unusual contact as he is located in BI56a, OH3TE (MU08a), UR2DZ (MT54h), UR2RMN (LS05c), UR2RGM (MT44g), UR2RQT (MS80e), UP2BFR (LP29b), UP2BBC (LP07j), UR2NW (LT74d), RQ2GES (KQ49a), UQ2GEK (MR20d), OK1MG (HK71a), OK1BMW (HK72b), and OK10A (HK63e). Many southern UK stations were able to participate in these large-scale events. G8KBQ at Bristol, G4ERX at Brentwood, and G3NSM at Oxford were outstanding auroral signals at Aberdeen.

Reports of beam headings during the major events indicate auroras centred around the AT QTH locator squares. An analysis of the beam headings of many of the so-called "weak auroras" which affect northern GM and Scandinavian stations only, indicate that these auroras occurred in QTH locator squares AB, AC and JC, all north of the Arctic Circle but within the critical line-of-sight distance for the auroral curtain from some parts of Scotland. It is regretted that these disturbances are occurring at such a northerly latitude that G stations will be unable to participate, but they have the sporadic-E advantage to console them.

FM operation

A number of letters have been received commenting on the increasing use of the beacon frequencies by fm operators. Gerry Ilbury, G8MMW, writes to say that even in Hampshire fm stations are heard working on 144·150MHz (GB3VHF), 144·905MHz (FX3THF), 144·915MHz (GB3CTC), 144·975MHz (GB3ANG) and in the Oscar section of the band. Gerry presumes this is due to the new range of fm equipment which cover 144 to 146MHz, and he strongly condemns this increasing practice. Serious work on sporadic-E and aurora will be made impossible if fm stations continue to use those sectors of the band which are internationally agreed for specific activities. He makes the very good point that while fm contacts on fm calling frequencies may be annoying to some operators, they can be totally destructive on 144·200MHz.

Another letter on the same subject comes from Angus McKenzie, G3OSS, a respected dx operator and a former pro for the UKFM Group London. Angus remarks on several ssb and cw operators in the south-east of England who have been complaining bitterly about the selfishness of fm amateurs transmitting continually in the beacon band. In particular, one local station was consistently heard over a weekend operating on 144·925MHz, even being joined by many normally respected amateurs on these beacon frequencies. Angus says, "Taking an impassionate democratic view, I feel that some of the fm operators should put their houses in order; fortunately, 99·9 per cent of the ssb and cw operators do not encroach on fm frequencies." G3OSS had particular difficulty in monitoring GB3LER during the recent auroras, due to the frequency being continually jammed by fm sidebands, both during and in-between auroral phases.

On the subject of fm operation, it has been noted with regret that many rallies and events have had fm talk-in stations operating on calling frequencies and on 145MHz. Reference has been made to this on six occasions in the last 18 months, and while some stations are operated in an exemplary manner—like the Echelford-organized talk-in at the "Winning Post"—others are not. In particular, the Alexandra Palace exhibition talk-in should not have been operating on S0, especially for the second year running. As Bill Lamb, GM3EDL says: "It makes me wince to hear announcements on GB2RS of repeater groups, like GB3SN, doing talk-in on S20".

For those who are still unaware, S20 (145·500MHz) is the fm calling frequency and is used to establish QSOs which should then continue on another frequency. S0 (145MHz) is an internationally agreed repeater input frequency widely used on the Continent. British operators are again advised by the VHF Committee that 145MHz should not be used as a simplex frequency. Talk-in operators are advised to use 144·550MHz for fm and 144·280 for ssb.

REAL DX 1978

70MHz aurora	G3SPJ-GI3RXV	570km
70MHz tropo	GM3WOJ-GU3HFN	590km
144MHz tropo	GM8MBP-DF5GX/P	1,300km
144MHz aurora	G3ZIG-UR2RQT	1,800km
144MHz ms	G3POI-SM3BIU	1,550km
144MHz Es	GW4CQT-CN8CC	1,800km
144MHz eme	GW4CQT-K3NSS	4,500km
432MHz tropo	VK6KZ-VK3ZBJ	2,460km
432MHz eme	G3LTF-JA6CZD	13,600km

70MHz news

Hugh Irvine, GI3TLT, in County Down, is back on the band after repairing storm damage to his antennas. Hugh is active every Sunday from mid-day on 70·190MHz ssb and cw and is always looking for new contacts and counties. He has also been active during the recent auroras, working many stations.

Bob Rule, G3LDR, of Newcastle, is in the rare county of Tyne & Wear and recently gave G3OSS his last county confirmation for the Supreme Award. Bob lives in a Channel 5 BBC 405-line television area and this limits his operation to after-tv hours. G3LDR is on every Wednesday night after tv on 70·200MHz and would welcome calls. He also operates portable from Northumberland on Sunday afternoons, usually starting about noon on 70·210MHz. G3LDR also hopes to activate the counties of Durham and Cleveland during the summer.

Mike Gibbings, G3FDW, in Retford, Notts, is experimenting with a V-beam aimed south. Mike is also equipped for crossband 70/50MHz or 70/28MHz with dx stations in mind. Contacts should be possible with stations as far away as South Africa as the solar activity and the maximum usable frequencies increase.

Newcomer to 70MHz, GW4BCD, has been active using ssb and cw working several Midlands and London stations with his 4-el beam antenna. He particularly liked the auroral openings and was rewarded with an ar contact with GI3RXV during his first few days on 70MHz.

Rolf Niefind, DK2ZF, kindly telephoned the *4–2–70* answering machine and asked for a message to be passed to British amateurs that he was looking for crossband contacts during the auroras. DK2ZF heard G3SPJ,

(Continued on p611)

microwaves

Charles Suckling, G3WDG *

10GHz Cumulative Contest

Good weather and lots of activity made the first stage of the 10GHz Cumulative Contest a most enjoyable event. G3JHM reports a good deal of activity on the south coast, and mentions that G3JVL (Hayling Island), with his flyswatter antenna, 6W twt and Plessey GaAs fet preamplifier, made 10 contacts all without two-way talkback! One notable contact was made over the badly obstructed path to G8DEK (Winchester), who was also using a twt transmitter from his home QTH. G3JHM made six contacts, which could easily have been more had he been able to operate for the whole event. There was also some activity in France, although no cross-Channel contacts were made, because the weather was unsuitable for super-refraction. Let us hope that this high level of activity continues throughout the summer.

Alexandra Palace exhibition

Once again, the Microwave Committee organized a stand at the RSGB Amateur Radio Exhibition; all the hard work being done by members of the Havering Radio Club, in particular G4ALN, G8FJG and G8LLB. It was intended that a live demonstration of data transmission from the London 10GHz beacon, GB3LBH, would be given, and much effort was put in during the months before the event to construct the necessary coding and decoding circuitry and visual display unit. On the Thursday prior to the event, all the equipment had been installed and was working well, but due to an unfortunate accident involving a member of the Alexandra Palace staff, the equipment was knocked off the table and badly damaged, and could not be repaired in time.

On the positive side, a lot of people called in at the stand to chat with members of the Microwave Committee, and the writer was most encouraged by the increasing interest in frequencies above 1GHz. The Microwave Committee would like to thank the Havering club for all the work which was done, and also PA0KKZ, who manned the stand for a considerable period while committee members took time off to go round the exhibition!

Dutch "Amateur of the Year"

Readers will be pleased to hear that Kees Kaper, PA0KKZ, has been made Dutch "Amateur of the Year" for his efforts in promoting 10GHz activity. Kees is also well known in this country, both for this work and as a regular visitor to our exhibitions and round tables.

Beacon news

During the recent IARU Region 1 Conference in Hungary, the Italian microwave manager, I4BER, passed on the news that a 10GHz beacon has been operating from a site 100km NE of Bologna for the last year. It employs a 20mW Gunn oscillator, feeding a horn beamed on Bologna with a 14dB gain. Italy now has an official allocation on 10GHz of 10,400–10,500MHz.

One current project is for a 200mW 10GHz beacon I4X which will be sited on Mount Cimone (2,162m), 60km SE of Bologna. This will use an omnidirectional biconical horn antenna having a gain of 15dB, and should be audible in parts of France.

Somewhat closer to home, G8HND reports that the new 1·3GHz beacon for the Isle of Wight is now ready to be installed, and may already be on the air by the time this goes to press. The callsign is GB3IOW, and the frequency will be 1,296·90MHz.

Plans are in hand for another 1·3GHz beacon, to be co-sited with the 432MHz repeater GB3HR, on Bushey Heath. This is being constructed by members of the SW Herts UHF Group, who may be contacted through G3YXZ, QTHR.

1·3GHz Listener Award

A new page was started in the ledger which the vhf awards manager, G5UM, keeps as a record of FMD certificates issued. The page was headed "1·3GHz Listener", and the first entry in it was BRS34348, Harold Meerza, of Chatham. By consistent listening on 1·3GHz during contests and spells of good conditions, Harold collected more than the required 3 plus 20 for this band, a most commendable effort! BRS34348 would like to thank all those who replied with QSL cards.

Expeditions

This year's Oxford University RS expedition will be going to the Mull of Galloway from 19–31 August, then to North Wales from 1 to 5 September. They will be taking a comprehensive set of 10GHz equipment, including a 4ft dish and 10W twt. Requests for skeds, especially over obstructed paths, would be most welcome, and should be sent to G4CNV, QTHR.

Also travelling to Scotland over the summer will be members of the Barry RS, who will be there from 21 July to 2 August with equipment for 1·3, 3·4 and 10GHz. Anyone interested in schedules should contact GW8NBK, QTHR.

Propagation losses over non-optical paths

To many, contacts on the higher microwave bands under normal propagation conditions appear to be possible only over line-of-sight paths. While it is very easy to work over such paths, it is becoming increasingly difficult to find new paths to work, and it is interesting to ask whether modest, but efficient, equipment is capable of contacts over non-optical paths, which are much more common!

There are basically two ways in which a signal may arrive at a distant point over an obstructed path, assuming no help from enhanced propagation conditions. The first is via diffraction, which involves the bending of the waves over obstacles, and the second is via tropospheric scatter, in which signals are scattered from turbulences in the upper atmosphere.

It is possible to calculate theoretically the losses involved with diffraction, and the results obtained form a useful starting point in deciding whether a path is likely to prove workable. Usually, however, the losses are greater than those predicted, as the calculations assume that the obstructions are perfect "knife-edges", which, generally,

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they are not. Also, the presence of trees on the top of an obstructing hill will usually cause some extra attenuation. The figures should therefore be used with caution.

Fig 1 shows the losses involved with knife-edge diffraction, based on two parameters, h and d_1, as defined in the figure. These losses should be added to the line-of-sight loss for the total distance. The data in Fig 1, which are reproduced from information given by G8DEK at a Winchester round table meeting, are for 10GHz only. To use the information for other frequencies, the following correction factors should be added to the losses given: 1·3GHz, −9dB; 2·3GHz, −6dB; 3·4GHz, −5dB; 5·7GHz, −3dB; 24GHz, 4dB.

For example, let us determine the loss at 10GHz of a 70km path involving a hill 100m over the line-of-sight, which is located 30km from one of the stations. In this case, $d_1 = 30$km and $h = 100$m. Looking up this point on the graph shows that it falls between the 25 and 30dB lines, so we can interpolate the obstacle loss as about 28dB. Now, the total loss is the sum of the obstacle loss, ie 28dB, and the line-of-sight loss for 70km (in this case 149dB—see *Microwaves* (May 1978)) ie 177dB.

To give some idea of what sort of equipment would be required to cover this path, let us examine the performance of a typical "good" wideband system:

Transmitter power	100mW (−10dBW)
Transmitting antenna	2ft dish (34dB gain)
Receiving antenna	18in dish (31·5dB gain)
Receiver noise figure	10dB
Receiver bandwidth	250kHz

Following the definitions and graph in *Microwaves* (March 1978), the transmitting eirp is 24dBW, and the effective receiver sensitivity is 172dBW; giving a total path loss capability of 196dB, and implying a reserve of 19dB over this particular path. This is a somewhat small margin bearing in mind that the calculated 177dB path loss is a minimum value. Measurements over a number of paths by G8DEK and others would seem to indicate that the calculations are, on average, 6–15dB too optimistic. Thus, in the example above, there should be just sufficient margin to make a contact possible.

It should be noted that many stations possess equipment similar to, or better than, the above, so it should be possible to make non-optical contacts quite readily, given a quick calculation to explore the possibilities. Of course, it is necessary to plot the path carefully before an attempt, using either the method outlined by G8AGN in the February 1978 issue of *Radio Communication*, or parabolic plotting paper, to determine the parameters d_1 and h. If it should turn out that there is more than one serious obstruction, it is unlikely that signals would be obtained by diffraction, and other means should be sought, eg tropo-scatter (to be discussed later), or reflection off mutually visible objects such as hills or large buildings. □

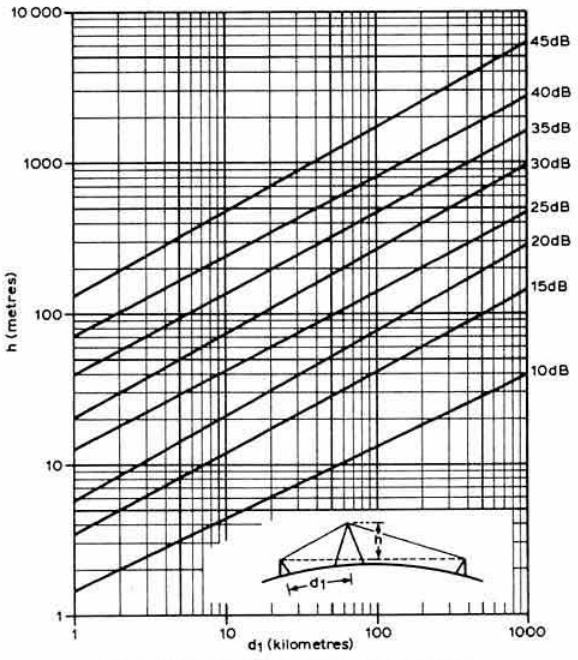


Fig 1. Minimum obstacle loss at 10GHz

4–2–70

(Continued from p609)

GI3RXV and GB3SU via the aurora on 1 May. Rolf listens on 144·120MHz for crossband contacts and will continue to monitor this frequency for crossband tropo contacts during the summer. Last year DK2ZF had crossband contacts from 70 to 432MHz with England. Rolf listens a great deal on 70MHz and monitors 28·750MHz, 144·120MHz and 432·200MHz for crossband replies.

Howard Buckenham, G3PGN, and some of his local stations at Brentwood, find the rtty test transmissions from GB3SX to be very useful. The beacon now has a sequence which sends its QTH locator and other information on rtty. Howard also mentions the outstanding and regular transmissions received from the other "beacon"—Colin Woolf, G3SPJ, in London.

Late news

During an Es opening at 1745gmt on 4 June, G3XCS in Saltash, Cornwall, worked CN8CC in Morocco, exchanging 5 and 9 reports on 144MHz ssb; CN8CC was subsequently contacted by GW4CQT. GW4CQT is now getting close to a Worked All Continents Award on 144MHz. G3XCS heard ZB2VHF on 144·145MHz at S8 during the Es opening, and at the same time GM5CFJ in the Shetland Islands worked OK2LG, OK3TJK, OE3UP and OE3XUA. Earlier in the day at 1100gmt, DB1BP worked five 9H1 stations and several Italian operators. Further auroras occurred on 30 May, 2, 4 and 5 June: G4GUF, GM4COK and GM5CJF were outstanding signals, working many dx stations including LB1N, OH1FA, UC2AAB and OH0AA (JU70d). Sunday 4 June was quite a day to remember with very long distance dx being worked via three separate propagation modes, aurora, tropo and sporadic-E. □

the month on the air

John Allaway, G3FKM *

Top band news

John Dunnington, G3LZQ (formerly ZS6ZE), is in Iran and hoping to have the call EP2JD by now. He confirms that when he was in South Africa he tried very hard to work into the UK on 1·8MHz and received listener cards, but never managed a contact with G3SZA with whom he kept schedules. In the autumn he hopes to be on 1·8MHz from Iran, where he will be for about two years.

G3CWI reports the existence of a dx phone net on 1·8MHz—this consists of W8LRL, K1PBW, PA0HIP, G3SZA, GD4BEG and himself. Richard offers to supply information to any overseas members who are interested in the band—please write to R. Newstead, 24 Richmond Rd, Leicester.

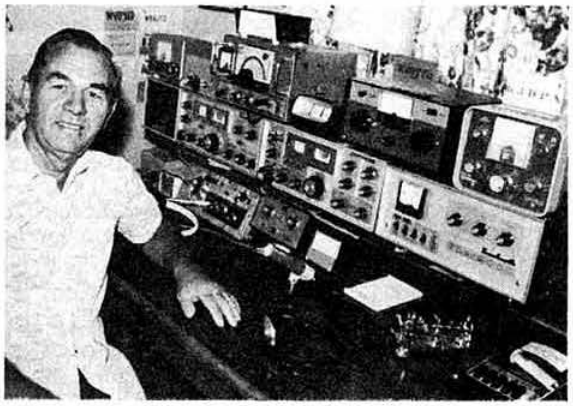
News from overseas

Graham Mott, G8KLB, has recently visited the Arabian Gulf area. He says that a club station—complete with Drake line and beam—has been presented by HM King Hussein to the Amman Training Centre, which has capacity for training 550 young people as teachers. The club callsign is JY6TC, the recreation officer is JY5TAH, and most activity is on 14MHz ssb. In Bahrain he visited Malcolm Prestwood, A9XBC (G3PDH), who is now working through Oscar. It is emphasized that calls to A9XBC via the satellites must be kept very short as access time is very limited; normal contacts are mostly made on 21 and 28MHz cw.

Eric Rogers, 9H4G, was formerly G3HGX and also 9H1DG. He has been living on Gozo Is for seven years and says that there are 12 stations on the island now—their callsigns covering the series 9H4A to 9H4L. Several more will be on the air soon, and the island has its own society—the Gozo Amateur Radio Society—of which Eric is vice-chairman as well as being QSL manager for 9H4.

G4AIR has just returned from the Seychelle Is, where he had the pleasure of visiting S79EP—who is Group Captain Eric Passmore, formerly station commander of RAF Bletchley, and ex-G4IZ. He retired to S79 and was invited to plan the set-up for Radio Seychelles where he is now manager. Dave (G4AIR) reports that he received great hospitality, and both he and his wife Shirley wish to express their gratitude. Eric operates on 14, 21 and 28MHz.

Stephen Lowe, EP2SL, should be on the air from Teheran by now. He will be active on all bands 1·8 to 28MHz using a KW2000B and Hustler 4BTV 7-28MHz trap vertical sited on a copper roof. Contacts with the UK will be particularly welcome and all will be QSLd. Accurate listener reports will also be answered. Please QSL to the address in "QTH Corner". Stephen has supplied the following QSL information for some active EP stations EP2BZ–PO Box 917, Teheran; EP2GT–PO Box 136 Teheran; EP2JJ–PO Box 66-1437 Teheran; EP2LI–via WA4PYF; EP2MS–via W8CXS; EP2NC–via I2YDX; EP2PI–via G8JMC; EP2PY–via G8MUM; EP2SI–via JH1KHK; and EP2TW–via GI3HXV.



Colin Pollard, G3DPX, has managed to acquire the call B6UH for use from this fine station at his home in Costa Mesa, California

Peter Carbutt now holds the callsign 9V1TL and has already worked many UK stations on 14 and 21MHz. He is active almost daily between 1400 and 1600 on cw near the low end of the band. He has an FT101E and 7 and 14MHz dipoles; the former also being used for 21MHz. It seems that only about six of the 30 or so currently licensed 9V1s are active and that the most likely to be heard are 9V1s OK and TG (on cw) and 9V1s NR, QG and SY on ssb.

Rob Frew, ZS6BRG, will soon be back home in Cannock, Staffs, and using his G3SEF call once more. He reports long path contacts on 28MHz with G4AGP, JA8IXM and TG5NW on 26/27 May, and says that other ZSs have made similar QSOs with W6. ZS6BRG contacted 110 countries on 28MHz during the February-May period.

DX News

G3LIK reports that VP8PL is now in S Georgia, but as he is the only radio operator on a two-operator station he is very busy with official communications and not very active on the amateur bands as yet. He will be there until April 1979.

A number of unusual callsigns were to be heard during the period around ITU day (17 May). CJ3ITU was a special Canadian Radio Relay League station. There were three special Japanese stations—8J1ITU, which was located in the Communications Museum in Tokyo; 8J3ITU, which was portable in the third district; and 8J9ITU, which was in Shiroyama Park, Takoka City. The Nauru amateur society station C21AA use the special call

*10 Knightlow Road, Birmingham B17 8QB.

Malcolm Prestwood, A9XBC, Bahrain (*Photo: G8KLB*)

C21ITU, and 4U1ITU became 4U0ITU. A new prefix noted from Chile was XR3AA, which was the RCC station CE3AA in Santiago.

Reports that there would be no more activity from Marion Is seem to have been unduly pessimistic. One of the new group of meteorologists on the island obtained his amateur licence just before leaving South Africa. This operator should be at ZS2MI for two years, but it is not known whether he will try to keep up the regular schedules with the USA which have been taking place at 1700 on Saturdays and Sundays on 21,320kHz.

It seems that contacts made with stations in Nigeria other than 5N2NAS since 1 January 1977 are not valid for DXCC credit. QSLs from VE3TRS/TZ6 and K5CO/5A are being accepted.

YI1BGD continues to be active, but rather less than at first. QSL cards have already been received. YU1NZV made 3,000 contacts during his period at the station, and there are now six Iraqis who are allowed to use the station. Equipment donated by the Yaesu Co (and FT101E and FV101B) is en route, as is an FT560 which has been sent by the N California DX Club. If the gear reaches Baghdad safely there should be a significant improvement in signal, and split-frequency operation should make contacts much easier. Frequencies used to date include 14,210, 14,212, 14,230 and 14,250kHz, and contacts have been made from 0530 onwards.

F6EAY, who was expected to go to Crozet Is, is now on Amsterdam Is. The new operator at Crozet has no antenna at present and it may be some time before he appears on the bands.

5H3FW is DF7GF, and is teaching in Tanzania. He is located in Arusha, 50 miles west of Mt Kilimanjaro. He reports that there are only four other 5h3 stations active.

VR8O is Dave, formerly VR1O. He has been worked on 14 and 21MHz ssb, asks for QSLs direct, and is expected to be on Tuvalu for several years. VR6TC has been putting a good signal into the UK again, but it seems that there has been a pirate using his callsign on 14MHz cw.

Official Bulletin Nr 709 from ARRL says that a temporary 28MHz beacon is operating from North Hollywood. Until 30 September W6IRT will be operating on 28,888kHz using low power cw. Monthly reception reports would be appreciated.

Welcome

The following overseas amateurs joined the Society during April: CT4NH, DB5YD, DJ2RL, DJ2VN, DL4KB, EA5WJ, EI4DD, F2YH, F6EHA, HB9PCW, HB9RZF, HZ1HZ, K4IHP, K6HCP, K6JG, KP4EIX, OZ3SK, SV1JL, SV1JT, VE1ANU, VE3AWP, VP8HA, W4CC, W6AXX and W0WA.

Dxpeditions

Quite a few expeditions to rare locations are being mentioned at the present time. Unconfirmed reports say that Angelo, D4CBS, will be in Sao Thomé for three months commencing in July. His possible S9 callsign is not known.

Recent OJ0BW activity seems to have been from a pirate. However, it is possible that there will be an expedition to Market Reef by a group of Finnish amateurs later in the summer.

West Coast DX Bulletin mentions the fact that there may be another ZM7 operation fron the Tokelau Is later this year. Other possibilities listed include a visit to Mt Athos by SV1AN (which may have already taken place) and one to Revilla Gigedo (XF4) by XE1J later in the year. Fernando de Noronha may receive a visit from PY7ZZ and others during November. This time, emphasis will be on the lower frequencies—1·8, 3·5 and 7MHz.

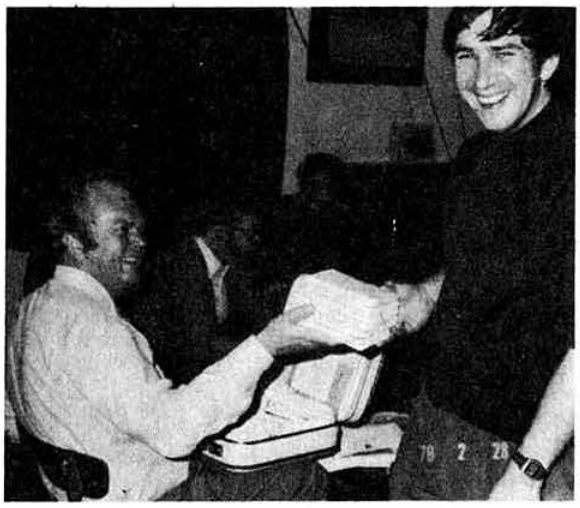
W1BLF and others are planning an expedition to Sable Island sometime this month.

PY1RO hopes to visit St Peter & Paul Rocks and may be there from 21 to 23 July. It may be possible to stay there longer, and it is hoped to operate on all bands 1·8 to 28MHz. Rolf will be accompanied by PY7BXC, and the expedition is being assisted by the N California DX Foundation.

3B8DA duly received the Atlas equipment for his expedition to 3B9 and was due to be 3B9DA for most of June. He will then move on to St Brandon, 3B7, and also possibly to Agalega, 3B6.

Dxpeditions to Guernsey—(continued)

The paragraphs which appeared in May *MOTA* under this heading have been read by Dick Taylor, GU8HT, who has asked for some further explanation to be made. He is concerned because there seems to be a chance that the owner of the guest house may spend a large sum of money in order to attract visitors who are not acquainted with certain problems associated with the venture. The most important seems to be that although the site is in a fairly remote area there are already four amateurs within 500 yards. Guernsey receives its Band 1 television from England via a multi-Yagi receiving array situated within sight of the proposed facilities, and it will be important to realize the potential interference problems which could be generated. There are also households on the west coast which receive signals direct from England, as they cannot receive the Jersey transmissions or the new Guernsey uhf relay. Working into the USA is very easy from GU, and linear amplifiers should not be needed.



Ian Cable, A9XBW (ex MP4BBW etc), chairman of the Amateur Radio Association of Bahrain and QSL bureau manager, handing a typical one-month's accumulation of QSLs to Geoff Smith, A9XBD. In the background are (l to r) John Steele, A9XBK, and Sheriden Street, A9XBE

GU8HT says that to imply that the site is "remote from any built-up area" gives the wrong impression, and that any interference caused could easily rebound on the Guernsey amateurs whose well-known friendship would quickly evaporate!

Operators who would like to use the facility are asked to write direct to the site owner, Mr. G. Brehaut, Mont Val Guest House, Rue du Bordage, St Peters in the Wood, Guernsey, indicating likely interest.

USA Callsigns

W4ZM has kindly provided further information on the changes in the FCC amateur station callsign assignment system previously mentioned in May *MOTA*. It seems that in future no requests for specific callsigns will be granted, an operator may only hold one primary callsign, and no special event licences will be issued. The digit or prefix in newly issued calls will depend on the licensee's bona fide mailing address—when this changes the station will retain its current callsign even if it no longer conforms with the correct one for the area. However, a new callsign will be issued on request. Newly-licensed extra-class operators will receive callsigns in the K-plus-two-letter series until these are used, prefixes will then go to N, W, AA–AG, AI–AK, KA–GK, KI–KK, KM–KO, KQ–KZ, NA–NG, NI–NK, NM–NO, NQ–NZ, WA–WG, WI–WK, WM–WO and WQ–WZ. From AA onwards they will have only one suffix letter. This group will then proceed to AA-AG and AI-AK with two-letter suffices. Similar prefix blocks, with differing numbers of suffix letters, will be used for other classes of operator. RACES stations will use WC prefixes; clubs WK; military recreation (MARS) WM; repeaters WR; and temporary licences will have WT.

Expeditions

The rare TF6 prefix will be activated from Kirkjubaejarklaustur (Iceland) from 20 to 23 July. The location is about 40km SW of Europe's largest glacier in the eastern part of Iceland. The following frequencies will be used: 3,505, 3.790, 7,005, 7,090, 14,005, 14,050, 14,190, 14,205, 21,005, 21,050, 21,250, 28,050 and 28,600kHz—all plus or minus 5kHz. Two stations will operate simultaneously, and working via Oscar is a possibility. Special QSLs have been printed and will be available from the address in "QTH Corner". The operators will include TF3s CW, JB, KX, SB, UA and YH, and TF3-003.

The expedition which Hull University Radio Society intended to make to Eire this month has unfortunately had to be cancelled.

Here and there

G4FTF/A reports that ZS6KU is organizing a one-off net for all amateurs associated with the Prudential Assurance Co Ltd. This is a worldwide net which will run from 0600 to 2400 on 6 August on 14,250kHz. Present and former employees are invited to join in, and a special QSL will be issued. It is hoped to have a station on the air from the company's office in London.

G3WW has now worked 94 countries using sstv since October 1973. He has made two-way sstv contact with over 1,000 different stations, including 125 in the UK, 358 in Europe, and 386 in W/VE. Many additional contacts were made with stations who were able to receive Richard's pictures, but who had no sstv transmitter or because (as in YO and the Soviet Union) sstv transmission is not allowed in their countries.

Congratulations to Ben Stevenson, W2BXA, who, according to *ARRL Official Bulletin Nr 708*, is the first amateur to qualify for Satellite DXCC.

Contests

The Colombian Contest

0001 15 July to 2359 16 July.

All bands 3·5 to 28 MHz, phone and cw. Single-operator single- and multi-band, and multi-operator single-transmitter sections. Exchanges consist of RS/T plus serial QSO number (from 001). Contacts with HK stations count six points, with other American stations three points, and with others two. Multiplier is the sum of DXCC countries worked on each band. Use separate sheets for each band and indicate multipliers. Include summary sheet and usual declaration. Post logs before 30 September to LRCA Concurso Indipendencai, Apartado Postal 584, Bogota, Columbia.

The European DX Contest (WAE)

0000 12 August to 2400 13 August (cw)
0000 9 September to 2400 10 September (phone)
000011 November to 2400 12 November (rrty)

All bands 3·5 to 28 MHz. Single-operator all-band and multi-operator single-transmitter categories. Only 36 hours operation allowed by single operators, and the 12 hours rest may be taken in not more than three periods. Europeans contact non-Europeans and contact counts one point. Exchanges consist of RS/T plus serial number (from 001). Stations may be worked on each band for

Eric Passmore, S79EP, Mahé, Seychelles

credit. The multiplier (for Europeans) is ARRL DXCC countries with the addition of each call area in JA, PY, VE, VO, VK, W/K, ZL, ZS, UA9 and UA0. In addition, the multipliers on 3·5, 7 and 14/21/28MHz may be multiplied by four, three, and two respectively. Final score is total QSO points plus QTC points multiplied by the sum total multipliers from all bands. QTCs are details of previous QSOs with Europeans passed back by non-Europeans and consist of time, callsign and number received. They may only be passed once and not back to the originating station. A maximum of 10 may be passed at any one time, but more may be passed in later contacts (which would not count for QSO points). DARC log sheets and summary sheets are available from WAEDC Committee, Postbox 262, D-895 Kaufbeuren, W Germany. Logs must reach this address by 15 September, 15 October and 1 December respectively. Note that in the rtty section other stations in the same continent may be worked, and countries include those peculiar to the WAE list as well as the DXCC (GM Shetland, Bear Is, Sicily). In compliance with IARU recommendations, DARC suggests no contest acitvity above 3,550, 14,075 21,100 and 28,100kHz in the cw section, and in the sections 3,650–3,750, 14,300–14,350, 21,400–21,450 and 28,700–29,700kHz in the phone contest.

International Shortwave Championship of Romania
1800 5 August to 1800 6 August.
3·5 to 28MHz. Phone and cw—no cross mode. Single-operator single- and multi-band. Multi-operator single- and multi-band sections. Exchange RS/T serial number (from 001). YO stations will also send two letters indicating their county (there are 40). European entrants score six points for contacts with YO and two with other countries. The multiplier is the sum of YO counties and DXCC countries worked on each band. Logs should show date, time, station worked, numbers sent and received, multipliers, points claimed. Enclose signed declaration that rules and regulations were observed, and post logs before 1 September to RARF, PO Box 1395, R-76100 Bucharest 5, Romania. Top foreign entrant will receive an engraved cup. The YO DX Club gives a certificate for contacting/hearing five members (see "Awards").

In the **QRP Winter Contest, GM3OXX/A** was top with 34,833 points. Other UK scores were: G3DNF (16,864), G8PG (5,304), G4GIE (2,475) and G3FMW (2,028). There were 60 entrants. The **QRP Summer Contest** is from 1500 15 July to 1500 16 July; any 15 hours may be operated and up to five bands used (nine hours rest must be in not more than two parts). Full rules from DJ7ST, Hartmut Weber, D-3201 Holle 1, W Germany.

Awards

Special Tivoli Award 1978
This is organized by ARI (Tivoli section) and EDR in aid of UNICEF. A car expedition will leave Tivoli on 24 July and travel via Milan, Basle, Strasbourg, Kassel, Hamburg, Copenhagen, Helsingborg, Copenhagen, Hamburg, Kassel, Nuremburg, Innsbruck and Verona back to Tivoli—reaching there on 14 August. On 14MHz, frequencies to be used will be between 14,180 and 14,220kHz (ssb), 14,080 and 14,100kHz (rtty), 14,000 and 14,100kHz (cw). Callsigns to be used will be I0ONU/. . . and OZ1ONU. To obtain the award, three points must be scored—contacts with the stations when in Copenhagen will count one point, and with the mobile stations enroute and with I0ONU and OZ1ONU two points. Contacts must have been made on different days. Applicants should send a signed copy of the log entry and QSL for one of the contacts, plus $1 or six ircs to: ARI Sezione di Tivoli, STA Award Manager, PO Box 6, 00019 Tivoli (Roma), Italy.

The YO DX Club Award
Available to licensed amateurs and listeners who contact or hear members of the YO DX Club. European applicants need five and others two. No QSLs are required but a certified list of contacts, plus seven ircs should be sent to: FRR (YODXC), PO Box 1395, R-76100 Bucharest 5, Romania. Members include: YO2s ABW, AVP, BA, BB, BN, BS, BU, BV, CD, FP, GL, GZ, IS, KAB, KAC, KAR, QY, RA, VB and VF; YO3s AAJ, AAQ, AC, AVE, BAA, CR, DZ, FF, JF, JU, IW, KAA, KBC, KSD, NN, QK, QO, RD, RF, RG, RK, RO, RX, VN and VZ; YO4s ASG, CS, CT, HW, KAK, KBJ, KCA, WO, WU and XF; YO5s AFJ, AMO, ATV, AUG, AVN, AY, BQ, DS, KAD, KAU, KLA, LC, LD, LP, NB, NU, NZ and UW; YO6s ADM, AW, EX, KAF, KAL, KBA, KBM, LO, UX, XI. YO7s BI, DL, DO, KAJ, NA, NM and VS; YO8s AGZ, CF, DD, FZ, GF, KAE, KAN, KGA, ME, MH, OK, OP and RL; YO9s APJ, ASS, BGV, CN, EM, GP, HH, HI, HT, IA, IF, KAG, KPD, VI and WL; YO0ITU and YR0A.

Canterbury Aero Club Award
To publicise the 50th anniversary of the CAC by means of an award sponsored by NZART. Requirements are to contact any stations (during July 1978) and to make up the words Canterbury Aero Club using the last letter of the callsign. At least one ZL3 must be included—additional ZL3s may be used to fill gaps. Listeners may apply. Send certified list to CAC Award, PO Box 1733, Christchurch, New Zealand, enclosing $1 NZ. Applications must arrive by 1 November. Note that the Christchurch Award may be claimed for no extra cost if five ZL3s in Christchurch are worked.

QTH CORNER

EP2LI	WA4PYF, R.Stange, 2760 Davidson Drive, Lithonia, Ga, 30058, USA.
EP2SL	via G3XCS, 5 Frith Road, Saltash, Cornwall, PL12 6EL.
HH2DX	G. Werner, W4ORT, 1045 LeBrun Drive, Jacksonville, Fla,
HH5TW	32205, USA.
JA QSL Bureau (new)	JARL, 14-2 Sugamo 1-Chome, Toshima-Ku, Toyko 170, Japan.
PY1RO/0	via W1DA, 37 Easy St, Sudbury, Mass, 01776, USA.
VK9JS	via F6CYL, Ann Koloboff, 3 Rue de L'Etang, 78430
VK9YL	Louveciennes, France.
VK9ZM	via VK4ABW, J. H. Wilson, 9 Ladybird St, Kallangur, 4503, Qd, Australia.
VR8O	D. Appleton, c/o Weather Station, Funafuti, Tuvalu.
ex-VS9ADK	D. Morris, 7 Rosslyn Rd, Vicars Cross, Chester, CH3 5HR.
ex-VS9AMW	M. Watling, G3PCW, 15 Fifth Av, Walkerville, Catterick Camp, N Yorks.
VY0CA	via WA4SSU, 2738 Monarch Drive, Ellerwood, Ga, 30049, USA.
ex-XW8AH	W4CGK, W. Wagoner Jr, 4144 Pt Hollow Lane, Fairfax, Va, 22030, USA.
YI1BGD	via YU1NZV, S. Matic, Dimitrija Tucovica 164, Beograd 11050, Yugoslavia.
YI1BGD	(direct) (Op. Majid) Majid Abdul Hameid, Police City, 41-63 Baghdad, Iraq.
ZC4AJ	via G3XEJ, A. J. P. Robinson, 36 Listers Hill, Ilminster, Somerset, TA19 0EL.
ZC4LP	L. E. Palfrey, c/o Civilian Wing, 9 Signal Regt, BFPO 58.
ZK1DR	via WA0WCR, T. R. Lindgren, 1260 13th Av, Marion, Ia, 52302, USA.
ZK2AV	via DF2RG, G. Jaeger, Ruhseugstr. 6-A, D-8460 Schwandorf, W Germany.
ZS2MI	all cards now to WA4SSU (see VY0CA).
5H3FW	F. Walliser, PO Box 296, Arusha, Tanzania.
ex-5X5IU	(now 9K2DR) R. Roberts, PO Box 2, Kuwait.
8Q7MX	via SM3CXS, J. Svensson, Berghemsv. 11, S-86021 Sundsbruk, Sweden.
9V1TL	P. Carbutt, c/o Dover Court Preparatory School, Dover Rd, Singapore 5.

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

The STARS Award

This is to celebrate the 40th anniversary of the Stourbridge & District ARS (G6OI) and is given for a minimum of 25 contacts with West Midlands county during 1978. A station may only be worked once on each band, and repeater contacts do not count. Claims should include date, time, callsign, reports and location of station worked. They should be accompanied by £1 (or equivalent in ircs), and sent to B. Jones, 19 John St, Brierley Hill, W Midlands. The award will take the form of a decorated parchment, and a special award will be given to the W Midlands station who features most in submitted claims.

Band reports

Conditions on the hf bands have varied during the past month. On 30 April the solar flux number reached 200 (according to NOAA) but there have been a number of times when the Ap index has been quite high and there have been several magnetic storms. The smoothed sunspot number in May 1976 was 12·6, in May 1977 it was 24·2, and it may reach 60 this May. The sunspot number has reached an average of about 100—this is only 10 short of the peak reached at the maximum of the 1968-9 cycle.

Many thanks to the following who supplied information for this section: G2HKU. G3s CWI, KDB, KSH, RCA and UOL, GM3LYY, G4s EHQ, ETN and FAM, BRSs 17567, 31301, 33915 and 39097.

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

1·8MHz. 0200 *VE1AXT.* **0300** *LU1DZ, VY0CA, N1AAR, W3JAK/MM, W1BB.*

3·5MHz. 0000 CN8BX, HB0XAA (QSL to DC0HO). **0100** D4CBS, PY. **0200** C31MS (QSL to EA3MS). **0300** FP8DX.

7MHz. 2100 *4K1F.*

14MHz. 0500 ZL4LR/A. **0600** CE0AE, WB7OOV/KH3 (Johnston Is), VK2AGT/LH, VK9ZM, ZK2TT, ZL4QL/A, 5W1BL. **0700** BV2B, FO8s DJ, EX, HC8GI, VK9YS, VR3AK, VR8O, *ZK2AV.* **0800** A35DG, FB8YL, VK9NI, W1-W7, ZK2TT. **0900** KM6FC, VR4BF. **1000** FK8CR, WD9FCC/VQ9. **1100** WB5VCL/KH2 (Guam), VR4BF, 3B8AD. **1600** FB8ZM, YI1BGD. **1700** DU1REX, 3B9DA (QSL to 3B8DA). **1800** AP2ASM, C21ITU, KH6CF. **2000** ST0RK, *TA1BX,* TR8GM. **2100** VK2AGT/LH, VY0CA, *4K1GM,* 5X1AA (Box 1, Entebbe), 9Q5ZZ. **2200** *UA0YAD.* **2300** PY0OD, ZL, 9N1MM.

21MHz. 0000 *ZL4LR/A* (RST 599, QSL to N4NX). **0700** JA (throughout day until 1900), KH6s GMP, LG, LW, KL7IZN, ZK1DR. **0800** FO8AK, KH6XX, ZK2AV. **0900** *KH6s, KM6,* VR8O. **1000** *KG6JIR, KH6DL, KM6BI* (QSL to W8TIX), 9N1MM. **1100** *ZK2AV, 3D2WR.* **1200** KX6BU, 9N1MM. **1300** P29s NPS, RP, SU1PY, *8J9ITU.* **1500** W6-W7. **1600** C5AAG (QSL to LA7GV), W6-W7. **1700** EP2IA, KH6. KL7JCK, VS5XU (QSL to DL1LD), 7Q7LW. **1800** C5ABK/A, KX6BU, VY0CA, YB3QV. **1900** S79MC. **2000** PY0OD (Fernando de Noronha). **2100** OX3BX, VK2, *YS10,* ZL4BX. **2200** CE, HC, J3AH. **2300** VK3.

28MHz. 0800 5H3FW. **0900** VK9YS. **1000** TR8BR, VU 7P8AC. **1100** 5Z4PW. **1300** A4XHH, CX, EP2LI, LU, OD, PY, 5H3, 9J2. **1400** FY7BC, JA3, JA4. **1500** *FG0GD/FS7,* ZS4MG/H5, JA1, JA3, JA6, JY9OZ, *VP2VL* (QSL to W1GNC). **1600** VU2DK, 5H3BP, 9V1SW. **1700** OA4JR (QSL to DJ9JX), VP8NK, XE1FR, 9G1RB (QSL to VE3II). **1800** J28AY, VP8HA, ZD7PV, ZD8KG. **1900** CX, HC. **2000** C5AL, CE, CX, LU, W1-W5. **2100** 5W1AU. **2200** HC, HK, KZ. **2300** TI, W2-W4.

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

Please send all items for the **September** issue **to reach G3FKM by 11 August,** and for **October** by **9 September.**

HF propagation study

Predicted hpfs (MHz × 10) for July 1978

GMT=	00	02	04	06	08	10	12	14	16	18	20	22	24
Aden	188	183	220	270	295	298	301	304	308	304	220	205	188
Ascension	174	161	158	154	282	284	299	307	314	318	309	206	174
Bahrain	215	201	220	263	286	277	279	274	284	293	255	237	215
Bangkok	188	185	214	242	255	249	251	249	257	243	235	213	188
Barbados	233	202	191	176	197	248	255	255	256	260	277	275	233
Bermuda	221	194	176	164	177	227	242	234	238	242	249	249	221
Bogota	232	204	186	173	213	215	249	252	248	256	262	268	232
Buenos Aires	229	211	201	192	159	214	277	284	284	277	299	274	229
Cape Town	148	114	111	257	294	293	308	321	328	309	215	186	148
Colombo	195	196	221	262	281	270	271	267	279	286	253	233	195
Cyprus	205	186	197	241	262	261	258	255	261	272	256	230	205
Dakar	230	227	204	206	281	284	298	307	312	317	308	253	230
Denver	190	177	157	148	131	149	186	201	202	210	211	218	190
Fairbanks	167	166	167	178	190	196	192	192	188	188	192	190	167
Falklands	185	166	147	128	122	180	282	290	289	293	303	230	185
Gibraltar	150	133	128	144	177	181	180	180	182	181	197	174	150
Hong Kong	185	181	208	230	233	237	239	237	246	248	215	206	185
Honolulu	167	163	164	178	190	205	186	174	194	205	200	190	167
Iceland	135	120	125	138	153	159	161	163	166	168	164	155	135
Jamaica	229	196	178	167	191	209	242	239	239	243	253	260	229
Lagos	214	202	180	242	291	290	308	317	326	322	296	235	214
Las Palmas	205	187	183	183	242	248	252	256	257	252	274	244	205
Lima	232	209	194	180	221	187	258	261	262	265	284	275	232
Los Angeles	180	162	157	164	139	129	157	202	209	214	215	208	180
Malta	174	154	157	187	213	216	213	210	214	220	227	195	174
Mauritius	155	135	219	270	294	293	301	308	308	298	251	223	155
Mexico	219	185	161	164	181	166	221	224	228	234	229	234	219
Moscow	161	152	169	192	199	202	205	202	208	215	200	183	161
Nairobi	177	162	211	266	294	295	304	308	309	293	199	186	177
New Delhi	191	187	215	251	263	260	256	257	266	253	235	211	191
New York	219	188	167	145	157	192	218	214	223	229	223	238	219
Osaka	183	185	199	215	219	225	221	220	220	209	202	194	183
Perth	208	195	220	261	280	268	258	195	172	158	141	128	208
Rio De Janeiro	228	214	186	166	153	271	282	289	289	291	303	272	228
Salisbury	230	177	152	263	296	303	309	314	326	313	291	253	230
Seychelles	223	176	219	270	296	289	299	298	303	274	235	228	223
Singapore	191	187	215	251	263	257	256	257	258	241	239	205	191
Suva (s)	169	180	177	195	205	209	211	205	183	195	197	187	169
Suva (l)	232	230	208	237	191	173	155	150	144	130	271	263	232
Sydney (s)	183	181	208	230	232	233	192	174	167	143	140	206	183
Sydney (l)	232	208	195	183	186	153	139	135	130	121	145	274	232
Teheran	208	196	221	262	281	270	271	267	279	286	248	230	208
Vancouver	174	163	158	172	171	177	182	187	190	199	204	190	174
Wellington (s)	186	182	192	211	211	197	183	167	161	136	211	190	186
Wellington (l)	227	227	210	183	153	134	126	124	117	121	220	271	227

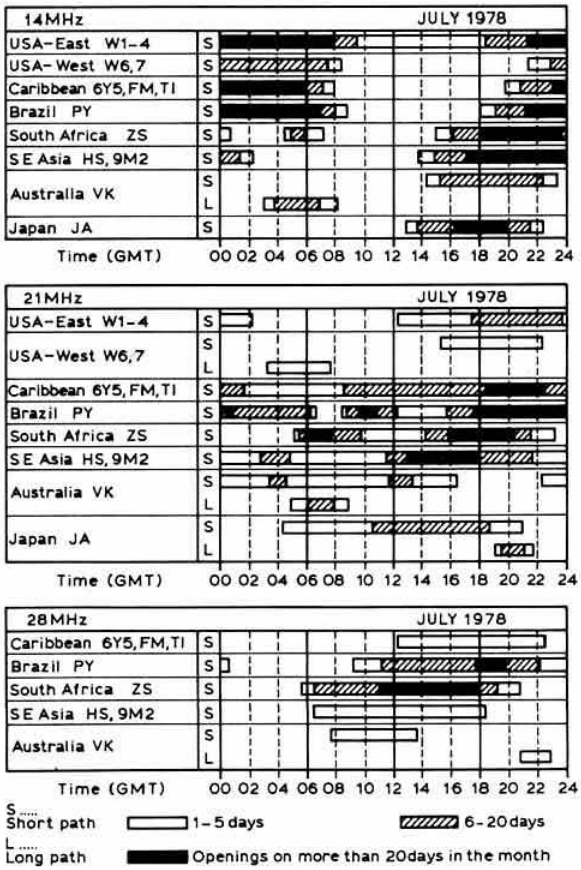
Bands recommended are those between hpf and half hpf.

Propagation predictions

Solar activity has increased much more than expected during the past months, and this rapid increase has been taken into consideration. Conditions on the **28** and **21MHz** bands will not be as good as during the previous months. Traffic with the USA will only be possible now and again, and South America also will only come through occasionally. More certain will be traffic with South Africa. On **21MHz** the eastern seaboard of North America will not be heard every day, but traffic with Central and South America will be certain. Some compensation for the poor dx conditions during summer will be sporadic short skip which will make European traffic possible on **28** and **21MHz**.

During summer, **14MHz** is a night-time dx band. During the afternoon there will be chances of traffic with Australia and South-East Asia, but they may be interrupted by European QRM (mainly via short skip). DX will be possible on **7MHz** when the greater part of the path lies in darkness, but again QRM will interrupt traffic. In daytime **7MHz** will be the ideal band for local traffic, uninterrupted by the dead zone, while **3·5MHz** will be better at night. Dead zones before sunrise will not occur.

The provisional sunspot number for April 1978 provided by the Swiss Federal Observatory was 94·7. The highest daily number recorded was 139 on 25 April. The predicted smoothed sunspot numbers for August, September and October are 89, 94 and 99 respectively. The predictions are based on the following assumptions: (a) time of maximum, August 1979, and (b) height of maximum 150.



obituaries

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

Mr C. F. Barnes, MBE, G3AEW
Frank Barnes, who died on 27 March aged 74, had been active on the dx bands since 1946 when he first obtained a licence. He had WAC, WAS, and WBE certificates, and was working for the WAVE certificate until his death. He was well known both locally on top band, and throughout Canada.

Mr F. Christopherson, G6FC
Frank Christopherson died on 5 May aged 70. He was at one time active on 144MHz a.m., and was a past member of Preston ARS.

Mr C. H. Targett, G6PG
Cyril Targett, "Trig", died on 29 May, after over 50 years as an amateur. He made many contacts over the years, and was still in touch with ex-RAF amateurs with whom he had been involved during his wartime radar days. He was active almost exclusively on cw and, since the mid 'thirties, mainly on vhf.

Mr L. A. E. Sadler, BRS36609
Mr Sadler, who died on 16 May aged 64, was a very keen short wave listener who had hoped to eventually get a callsign.

We have also been advised of the deaths of:
Mr W. A. Collin, G8MCF, on 6 may;
Mr E. E. Holloway, WB9OUG;
Mr R. S. Jackson, G6JN, in October 1977;
Mr M. A. Noble, G3MJQ, on 25 February;
Mr J. Smith, G3RPP, on 22 May.

BOOK REVIEW

Getting to know Oscar—from the ground up. Edited by WA1ZUY. Contributors WB2CHO, W3GEY and W1XZ. Fully illustrated. 48 pages, softbound. Published by ARRL. Obtainable from RSGB Publications (Sales), 35 Doughty Street, London WC1N 2AE. Price £2·75, including p&p.

This is a reprint of the series of articles on amateur satellites, which ran in *QST*, and is designed to be a "guide to satellite operating". The chapters are short, and written in a helpful and interesting way. After an introduction which surveys the situation, and deals with how to find them and when to listen, a brief glossary of terms is useful now, and later for reference. Then "getting started" is tackled with much advice on equipment, including suitable antenna arrangements. Tracking devices and how to use orbital plotters are explained.

The surprising sensitivity of the 432–145MHz transponder in Mode B, Oscar 7, has resulted in this being the preferred operation by many stations, particularly QRP ones, as some exciting performances on low power are possible. Available certificate awards are discussed and very practical advice is given about operating when hunting dx by satellite, over the horizon surprisingly at times.

However, the Phase 3 Oscar bids well to open a whole new activity for amateur radio; its elliptic orbit with an apogee of 20–30,000 miles will favour the 90 per cent of the world's amateurs who live in the northern hemisphere, with an accessibility of perhaps 20 hours per day. It is scheduled for launch in 1979 by the European Space Agency The dx possibilities are obvious, the range will be nearly all the northern hemisphere, and the problem of weaker signals is analysed with optimistic conclusions.

Bound-in with the publication is a polar map of a little more than the northern hemisphere, called an Oscarlocator which, with the help of a plastic overlay obtainable free for the asking from ARRL, will allow anyone in the northern hemisphere to determine when Oscar will be within range.

RSGB AMATEUR RADIO EXHIBITION 1978

Walking through the entrance doors into the main hall of Alexandra Palace, London, visitors must always be impressed by its vast size, both in area and height. This was again the setting for the RSGB exhibition on 5-6 May, where the large floor area provided plenty of space for the many stands and the large throng which moved between them.

The cavernous impression created by the high roof had been skilfully reduced this year by red, white and blue flags stretched across the width of the hall, and, in this cheerful setting, bargains and familiar calls and faces were sought by the many thousands of enthusiasts who crowded in during the event. The weather did nothing to dampen their enthusiasm, and the rival attraction of the Cup Final did not keep them away on the Saturday. This year, opening time was an hour earlier, at 10am, and this was obviously popular, as the increased early activity showed.

Trade stands

All the well-known traders, whose names are household words to the readers of this journal's advertising pages, again supported the event and took the opportunity to show "in the flesh" the vast range of goods that members had only previously read about. All the latest and best of familiar brands of complete and ancillary equipment was there. One could buy a very simple absorption wavemeter with the remains of the month's housekeeping money—or raise a second mortgage to purchase an extremely sophisticated transceiver costing around £1,100! Add to that the cost of antenna systems and ancillaries to match and it became a major investment.

On the other hand, older and simpler a.m. and cw rigs could be had at more realistic prices at the second-hand stalls, which also carried a good selection of test-gear costing only a fraction of "as new" prices. Many hours could be spent by the home-brewer browsing around those stalls selling a lare range of components, "as new" or ex-equipment, at attractive prices. For example, good silver mica compression trimmers—just the job for that new 100W solid-state linear amplifier—were on offer at 5p each.

RSGB stand

The RSGB bookstall was even more impressive this year. Its 36ft length provided five serving bays, and a section where members could put queries to committee members and staff who were in attendance, and where many new members were enrolled.

The great range of publications on sale, both RSGB and imported, provided an eye-catching display which drew the customers and kept the staff busy throughout the exhibition. Particularly popular were the new editions of well-known titles covering every aspect of amateur radio, as were the maps, lists and operating sundries.

Noel Eaton with Dain Evans (r) and David Evans (l) study one of the exhibits

Trying them out

Browsing round the stands

Noel Eaton speaking at the dinner

Photos: P. Jones, G3YLV

Group stands

The various specialist amateur groups were well represented. Pride of place—not to say splendid isolation—on the stage at the end of the hall was occupied by an impressive Raynet display, about which more is written in the Raynet column in this issue.

Another exhibit about which more appears under the appropriate feature heading is this issue, was the microwave display put on by the Havering club. The accident to their display was the one sad note of the exhibition.

AMSAT-UK displayed a fine model of a satellite apparently motionless in space. In contrast, the rtty terminal unit set up by BARTG attracted attention as it busily chattered away producing print in various forms and designs.

RAIBC, as always, were at hand with help and advice for the handicapped amateur to enable him or her to better enjoy the hobby.

A film show for newcomers to amateur radio presented by the Education Committee, which ran throughout the exhibition, attracted many visitors and the "house full" sign appeared regularly.

While not a "group" stand, that of the Radio Regulatory Division of the Home Office was certainly "specialist". An impressive display using television monitor receivers showed the effects of transmitter signals breaking through on to the screens, and advice in dealing with the problem was available.

Getting there

Some would say that, putting first things first,this heading should have opened these impressions of the exhibition. For many of the visitors who arrived by car and were unfamiliar with the area, the talk-in was their most vital first impression, and once again this service was provided by the Grafton RS and Southgate RC.

GB2VHF consisted of two main 144MHz fm channels, a third "lost director" channel, supplemented by 144MHz ssb and 432MHz fm. In addition to approach and final directions, parking and departure information was also available this year. Over 900 contacts were made during the two days, mainly between 9.30am and noon. Antennas on the roof were a key contribution to the success of the station.

The stand, with its four "sound insulated" positions and hand-drawn full-colour local maps, was very impressive, and members of both clubs are to be congratulated on their efforts and success.

The dinner

The first day ended with a well-attended dinner at which the guest of honour was Noel B. Eaton, VE3CJ, president of the International Amateur Radio Union. He had earlier toured the exhibition with the RSGB President, Dain Evans, G3RPE, and general manager David Evans, G3OUF.

Acknowledgements

The success of an event such as this cannot be achieved without considerable organization and effort spread over many months, and Les Hawkyard, G5HD, the exhibition organizer, is to be congratulated.

Supporting him was a band of willing helpers who, among other things, erected, stocked and manned the RSGB stand, and at the close reversed the procedure. To them all, the Society offers its grateful thanks.

One of the talk-in operating positions

contest news

April 144MHz CW Contest results

This contest was well enjoyed by nearly all participants, and it was good to welcome several new entrants in addition to the reliable old hands. However, there were several reports of serious key clicks, all affecting different stations, so no disqualifications were considered. Certain commercial transceivers, especially when followed by high power amplifiers, are very prone to this problem and simple modifications can effect a cure. Conditions on the whole were considered fair to poor, with plenty of QSB, but some good dx was worked.

Congratulations and certificates to G3POI and G3SRT/A. Thanks to G2BQ and G2HH for checklogs.

G3FZL

Posn	Callsign	Points	QSOs	Best dx	Km
1	G3POI	736	66	GI3ZJR	546
2	G3SRT/A	630	78	DF1ET	618
3	G3IMV	617	96	PA2GFL	515
4	G3PEJ/A	558	64	DF2JQ	568
5	G3NSM	522	74	GM4DSZ	580
6	G3SPJ/P	519	71	G3BDQ	410
	G3BDQ	519	72	G3BW	490
8	G3LCH/P	500	73	DF1ET	582
9	G4CZE/P	490	64	G3BDQ	—
10	G4DZW	468	64	PE1AVU	615
11	G3YYF/P	447	62	PA2GFL	450
12	G4ERG/P	439	65	F6DWG	575
13	G3ERN	355	71	PA0BAT	423
14	G4EEE	342	60	DL1DF	511
15	G4RS/P	282	44	G3POI	360
16	G4DDL	261	61	PE1AVU	424
17	G4CLR/P	257	39	GI4GVS	—
18	G3AHD	242	36	G3YYF/P	375
19	G3FIJ	169	29	G3AHD	260
20	G2BLA	160	48	PA0RDY	354
21	G4CWS	159	29	GI4GVS	380
22	G4EEV	146	21	G3YYF/P	375
23	GW4CZK	135	17	GM4DSZ	450
24	G5UM	134	26	G3JDO	248
25	G3XTT	133	27	G3SPJ/P	220
26	G2WS	111	19	G3SPJ/P	295
27	G5DF	108	15	G3POI	385
28	G3XWZ	105	25	G3YYF/P	280
29	G4EGG	88	14	G3POI	303
30	G4FKS	61	15	G3POI	302
31	G4AGQ	56	22	G3DAH	139
32	G3XFW	6	4	G4GWR	53

144MHz Open and SWL Contest rules

1600–1600gmt, 2–3 September 1978

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

The following general rules, published in the January 1978 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5a, 6a, 7a, 8, 9a, 10a, 11a, 11b, 12–22.

As this contest is timed to coincide with an IARU Region 1 event, QTH locators only need be sent. Stations wishing to enter the IARU event should score their logs according to rules 7a and 7b.

The Mitchell Milling Trophy will be awarded to the leading portable station; the Thorogood Trophy to the leading fixed station, and the GM4HAM Trophy to the leading Scottish station.

Listeners Contest: Rules 1–3.

70MHz March Open Contest results

The band was quite good during the early part of the contest on a N-S path, but started to fade during the latter part, with stations reverting to cw to maintain contact.

The winner, G3UUT/P, operated from North Yorkshire, and runner-up G4ASR/P operated from a point 14km north of Hereford. Congratulations and certificates go to both stations.

A reminder about cover sheets (VHF/UHF Sheet Form 427) or similar format; a large sae and about 15p postage will bring you enough for several contests.

G4CUT

Posn	Callsign	Points	QSOs	QRA	ASL	Ant	Best dx	Km
1	G3UUT/P	567	55	ZO55	1,078	4Y	GU3HFN	535
2	G4ASR/P	347	49	YM67	774	6Y	GM3WOJ	325
3	G3RDQ	342	62	ZL74	325	4Y	G4BWW/P	381
4	G3WFK/P	326	28	XK56	800	5S	G4DKX	460
5	G3BA	285	43	ZM31	580	4Y	GM3WFJ	483
6	G3JEQ/P	281	61	ZL77	950	8Y	GM3WOJ	490
7	G3YCW	278	60	AL33	384	4S	GM3WOJ	460
8	GD2HDZ	275	23	XO68	300	4Y	G3DAH	485
9	GU3HFN	263	25	YJ48	275	4Y	G3UUT/P	540
10	G4ENA/P	244	58	ZL18	790	8Y	GM3WOJ	410
11	G3UKC	240	41	AL56	200	5Y	GD2HDZ	485
12	G3PFM/P	239	43	YK09	845	5Q	G3UUT/P	388
	G3SPJ	239	54	AL41	50	4Y	GM3WOJ	470
14	G3ONP	225	37	YM40	350	4S	G3WKF/P	313
15	G3OIT	219	49	AL33	280	4Y	GM3WOJ	479
16	G4FEV/P	209	47	ZM68	300	11Y	GM3WOJ	370
17	G3FJE/P	208	56	ZM79	250	4S	GM3WOJ	400
18	G3WHK	205	51	ZL49	120	4Y	GD2HDZ	420
19	G4APA	202	57	ZL47	205	3Q	G3UUT/P	325
20	G8GP	188	50	ZL50	75	3Y	GM3WOJ	458
21	G3XTT	183	41	ZM66	200	4Y	GD2HDZ	318
22	G3ZIG	162	26	AM35	180	6Q	GU3HFN	420
23	G3IKR	158	31	YM70	—	4Y	GM3WOJ	—
24	G5DF	40	7	ZO51	750	4Y	G3BA	—
25	GM4BWT/P	19	5	YQ08	—	—	GM3BQA	—

DF Qualifying Event Salisbury results

Twenty teams assembled at the start on Pepperbox Hill, a local beauty spot about 6 miles SE of Salisbury. Fortunately the weather, which had been dull and wet for several days, cleared to a pleasant mild afternoon. Most competitors decided to go for the "A" station first, which was operated by G2FIX and situated about 11 miles SW in the centre of the thickly wooded Vernditch Chase. Station "B", operated by G4AJD, was also hidden in a wooded area 11 miles N of the start.

Eric Mollart had extremely accurate bearings to find Station "A" only five minutes after the third transmission. Perhaps it was luck—or was it the change from valves to a transistor receiver?

The contest was organized by G2FIX, supported by members of the Salisbury R&ES, and was ably supervized by Sir Evan Nepean, G5YN. Thanks also go to G3ZNH for arranging the tea at the large NAAFI site near Amesbury.

Posn	Name	Club	Time of arrival Station "A"	Station "B"
1	E. L. Mollart	Mid-Thames	1421	1526
2	B. M. Bristow	Mid-Thames	1426	1526½
3	I. Butson	Chelmsford	1447	1527
4	C. M. Wells	Mid-Thames	1428	1528
5	B. J. Mahony	RATS	1442	1529
6	B. R. Poole	Mid-Thames	1425	1531
7	W. J. North	Mid-Thames	1433	1531½
8	J. R. Vickers	Slade	1431	1538
9	P. Tyler	Mid-Thames	1432	1539
10	A. W. Butcher	Chelmsford	1433	1541
11	P. Lisle	Mid-Thames	1432	1549
	C. D. Plummer	Coventry	1549	1437
13	G. Whenham	Coventry	1444	1550
14	C. Merry	Dartford Heath	1603	1440
15	T. C. Gage	Mid-Thames	1606	1441
16	P. Yeates	Salisbury	1443	1608
17	D. Newman	Slade	1427	1613
18	P. Woollett	Dartford Heath	1508	1619
19	P. Homer	Dartford Heath	1509	1620
20	S. M. Holley	Salisbury	—	—

B. M. Bristow and C. M. Wells quality for the National Final.

DF Qualifying Event Chelmsford results

Seventeen teams assembled at the start for the first qualifying event of the 1978 season. Transmitter "A" G3VKQ/P, located at Curtismill Green about 16 miles from the start, and transmitter "B" G3WMM/P, in Hatfield Forest near Bishop's Stortford, were both situated in very dense prickly undergrowth. Their location presented no problems to Peter Lisle, although most competitors found that close-in bearings were misleading.

Heavy rain during the preceding week produced seas of mud at both transmitter sites to the obvious embarrassment of the gym-shoe brigade. The unluckiest competitor of the day was Arthur Butcher from Chelmsford. Not superstitious, he was happy to sign in as competitor No 13, and ended the day a sadder and wiser man for he was placed 13th in the contest and also lost his compass in Hatfield Forest.

Posn	Name	Club	Time of arrival Station "A"	Station "B"
1	P. Lisle	Mid-Thames	1535½	1430
2	I. Butson	Chelmsford	1536	1432
3	B. Bristow	Mid-Thames	1536½	1430
4	C. Wells	Mid-Thames	1546	1431
5	B. Poole	Mid-Thames	1546¼	1432½
6	D. Holland	S Manchester	1548	1452½
7	D. Newman	Slade	1604½	1434
8	P. Tyler	Mid-Thames	1616	1452
9	G. Foster	Stratford	1617½	1433
10	B. North	Mid-Thames	1619	1431
11	D. Brocks	Chelmsford	1620	1456
12	C. Merry	Dartford Heath	1629	1455
13	A. Butcher	Chelmsford	—	1431
14	P. Wells	Dartford Heath	—	1508
15	P. Yeates	Salisbury	—	1510
16	T. Gage	Mid-Thames	—	1534
17	P. Homer	Dartford Heath	—	1617

P. Lisle and I. Butson qualify for the National Final in September.

DF Qualifying Event South Manchester

Date: 6 August 1978.
Map: OS Sheet 109 1:50,000 series, Manchester.
Assembly: 1300bst for start at 1320bst.
Location: Lay-by on A57, approximately ¼mile South of junction 2 of M63, ngr 748972.

Intending competitors requiring tea are asked to notify Mr D. C. Holland, G3WFT, 32 Woodville Drive, Sale, Cheshire M33 1NF (tel 061-973 1837), not later than 1 August. The winner of the event will be awarded the South Manchester DF Cup.

DF Qualifying Event Slade

Date: 20 August 1978.
Map: OS Sheet 150 1:50,000 series, Worcester and the Malverns.
Assembly: 1300bst for start at 1320bst.
Location: Car park at Pershore, ngr 951458.

Intending competitors requiring tea are asked to notify Mr P. M. Williams, 20 George Road, Water Orton, Birmingham B46 1PE, not later than 11 August.

8th SARTG World-Wide RTTY Contest 1978 rules

RTTY operators are invited to join the 8th W/W RTTY Contest run by the Scandinavian Amateur Radio Teletype Group.

1. Test periods. 1: 0000–0800gmt 19 August
2: 1600–2400gmt 19August
3: 0800–1600gmt 20 August

2. Bands. Use all bands 3·5, 7, 14, 21 and 28MHz.

3. Classes. (a) Single-operator.
(b) Multi-operator, single-transmitter.
(c) SWLs.

4. Exchange. RST and QSO number.

5. Points. QSO with own country five points. Other country in same continent 10 points. Other continent 15 points. In USA, Canada and Australia each call-district will be considered as a separate country. The same station may be worked once on each band for QSO and multiplier credits. Only two-way rtty QSOs will count.

6. Multipliers. Use the DXCC List and each district in W/K, VE/VO and VK.

Note. Contact with a station which would count as a multiplier must be found in at least five logs, or contest log from the multiplier station must be received in order to be valid.

7. Scoring. Sum of QSO points × sum of multipliers.

8. SWLs. Use the same rules for scoring, but based on stations and messages copied.

9. Logs. Logs must be received by 10 October 1978. The logs to contain: band, date, time gmt, callsign, exchanges sent and received, points and multipliers. Use a separate sheet for each band and enclose a summary sheet showing the scoring, classification, callsign, name and address. Comments will be very much appreciated. Send your log to: SARTG Contest and Award Manager, C. J. Jensen, OZ2CJ, Meisnersgade 5, 8900 Randers, Denmark.

10. Awards. To the top stations in each class, country, W/K, VE/VO and VK call districts.

Contests calendar

9 July	DF Qualifying Event, Coventry (Details in June issue)
16 July	3·5MHz FD (Rules in June issue)
23 July	DF Qualifying Event, Dartford Heath (Details in June issue)
30 July	144MHz QRP (Rules in May issue)
6 August	DF Qualifying Event, South Manchester
12-13 August	70MHz Open and SWL (Rules in June issue)
20 August	DF Qualifying Event, Slade
2-3 September	SSB FD (Rules in June issue)
2-3 September	144MHz Open and SWL
10 September	RSGB Region 1 VHF
17 September	DF Final, Basingstoke
October-November	432MHz Cumulative
7-8 October	432/1,296/2,304MHz
14-15 October	21/28MHz SSB (Rules in May issue)
21-22 October	7MHz SSB (Rules in June issue)
22 October	70MHz Fixed
4-5 November	7MHz CW (Rules in June issue)
4-5 November	144MHz CW
11-12 November	2nd 1·8MHz
3 December	144MHz Fixed

Mobile rallies calendar

9 July—Upton Radio Rally. Details from M. Monro, G8DLL, 127 Monarch Drive, Worcester, tel Worcester 423276.

16 July—Hornsea ARS Mobile Rally, Hornsea School, Eastgate, Hornsea, North Humberside, 1200–1700. Trade stalls, bring and buy, tombola, lucky number programmes, refreshments. Free parking and admission. Talk-in on 144MHz S22 G4EKT/A.

16 July—RAIBC Picnic, Broadlands, Romsey, Hants. Details from G4COM.

23 July—Cornish Mobile Rally, Penweathers School, Truro. Details from Harry Adcock, 1 Bowglas Close, Ludgvan, Penzance TR20 8HD.

23 July—Anglia Mobile Rally, Stanway School, Winstree Road, Colchester, 10am. Details from G4DKI, QTHR, tel Colchester (0206) 67512.

30 July—Scarborough RS Mobile Rally, Scarborough Technical College. Details from G3RTN.

6 August—RSGB National Mobile Rally, Woburn Abbey.

13 August—Derby Mobile Radio Rally, Lower Bemrose School, Bedford Street, Derby. Gates open at 12 noon. Free admission and parking. Attractions include trade stands, junk sale, prize draw, flea market (tables £1 per hour, no traders) and refreshments. Ample accommodation if wet. Details from G3EYM.

20 August—Cardiff RSGBG Mobile Picnic, Porthkerry Park, Barry, South Glam.

20 August—Preston ARS Mobile Rally, Walton-le-Dale County High School, Bamber Bridge, Preston (one mile from M6, junction 29). Talk-in on S22. Usual attractions including bring and buy stand. Plenty of free parking. Doors open at 11am. Details from G8KTM, QTHR.

27 August—Torbay Mobile Rally, venue to be arranged. Details from G3UIQ, tel Newton Abbot 3025.

10 September—Stalybridge Festival Mobile Rally, Cheetham Park, Stalybridge, Cheshire. To be held in conjunction with the Stalybridge 1978 Festival. Details from G8KQP, QTHR.

10 September—Telford Mobile Rally, Town Centre Malls, Telford, Salop. (Approached via A5 exit off M6, A442 from N or S, or M54 from W.) Free convenient parking and admission. Opening 11am; talk-in on GB3TRG. Jointly organized by Salop and Telford radio societies, attractions include trade stands and exhibits, full catering, bring-and-buy stands (£1 per table per hour), free coach ride to Ironbridge Open Air Museum, horse and trap rides, police dog display, RSGB bookstall, club stand, etc. Further details from G8DIR, tel Shrewsbury 64273; G8FSV; or G3UKV; all QTHR.

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

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

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

Special event stations

GB3MAM, 1–9 July
Verulam ARC will be operating a station at Salisbury Hall, London Colney, prior to an open day at the Mosquito Aircraft Museum on Sunday 9 July.

GB3FI, 7–11 July
Barry College of Further Education RS hopes to set up a station during a visit to Flat Holm Island, in the Bristol Channel. This is the second attempt by the society to visit the island, previous attempts being unsuccessful due to bad weather conditions.

GB2BS, 8 July
Beckets School Fete, Priory Grove, Chesham, Bucks. Please QSL via G2DRT.

GB3DTS, 8-9 July
The Barking Radio & Electronics Society will be exhibiting at the Dagenham Town Show at Central Park, Wood Lane, Dagenham. In addition to GB3DTS, rtty and AMSAT-UK, there will be extensive cctv coverage of the continuous arena displays. Further details from N. Dowsett, tel 01-594 6584.

GB3LNC, 11 July
Members of Leith Nautical College ARC will be operating a special station to commemorate the opening of the new Leith Nautical College, at 24 Milton Road East, Edinburgh, by HRH Prince Charles Prince of Wales. The college will be opened officially at 11.30am, although the station will be operating throughout the day on the hf and vhf bands. All contacts will receive a special QSL card.

GB3FAA, 4–5 August
Yeovil ARC, which is affiliated to the RNARS and the RSGB, will operate from the Royal Naval Air Station, Yeovilton, Yeovil, Somerset, on the occasion of the International Air Day on August 5. Operation will be on all bands 3·5 to 28MHz A1, A3J; 144MHz A1, A3J, F3; with talk-in on S21 if required. The air station is near Ilchester on the A37 and A303, and will be well signposted. Visitors will be most welcome. Special QSL cards will be issued; QSL to G3NOF.

GB3ITZ, 19 August
RAF Sealand ARC will have a special station at the RAF Sealand Open Day, at Deeside, Clwyd, from 1000–1800. Operation will be on 3·5, 14, 21 and 28MHz, and talk-in on 144·22 ssb or via GB3MP on R6, later directed to S22 for local traffic. Visitors welcome; ample car parking space.

Town and Country Festival, 26–28 August
Several clubs in Region 3 are expected to be operating equipment and stations at the Town and Country Festival, Stoneleigh, Nr Kenilworth.

The following special callsigns will also be on the air during July and August:

6 July	**GB3DTS**	Dagenham, Essex
7 July	**GB3AGS**	Aylesbury, Bucks
	GB3CAD	Catterick, Yorks
8 July	**GB8IWS**	East Cowes, IOW
9 July	**GB3KYC**	Kidderminster, Worcs
10 July	**GB3RRC**	Southampton
	GB3SSF	Sheffield
	GB2GYS	Harrogate
15 July	**GB3BOT**	Burton-on-Trent
	GB3PDS	Kenley, Surrey
18 July	**GB3SHQ**	International Scout Camp, Perthshire
21 July	**GB3LCS**	Lambeth, London
22 July	**GB3ATC**	Southgate, London
	GB3SWN	Swansea
29 July	**GB8SPF**	Guildford
	GB3PII	St Helens
	GB3URS	Yorkshire
1 August	**GB3SC**	Sutton Coldfield
5 August	**GB3WHF**	Wimborne
19 August	**GB2TS**	Tollerton, Yorks
20 August	**GB3PRS**	Bamber Range, Lancs
21 August	**GB3RN**	*HMS Mercury*, Hants
23 August	**GB3SRC**	Chingford, London
28 August	**GB3VER**	St Albans, Herts

REGION 15 ORM

Park Avenue Hotel
158 Holywood Road
Belfast

2.30pm, 29 July 1978

The RSGB President and the general manager will be present at this official regional meeting

Trade stands — RSGB bookstall

Raffle — Talk-in on usual channels

Please bring your RSGB membership card

DINNER

7.30pm – ticket only

Book through area or regional representatives

SCOTTISH CONVENTION

Beach Ballroom, Aberdeen

30 September 1978

Lectures on hf and vhf

Trade exhibition

Dinner

All profits to RSGB funds

Further details from GM8FFX, PO Box 49, Aberdeen

BARTG 1978 CONVENTION

Public Hall,
Harpenden, Herts

Saturday 15 July 1978
11am–5pm

Trade stands, live rtty station; bring and buy; picture tape factory; lectures, "Microprocessors in rtty" by G3PLX, "Two-tone terminal units", "Getting going and operating on rtty", "Brains Trust"; refreshments.

Talk-in on 144MHz—M1 junction 9 is five miles away—and there is plenty of car parking space available. Harpenden railway station is a few minutes walk from the hall.

Looking ahead

11-14 July—Radio Receivers and Associated Systems Conference, Southampton University. Details from Peter Elliott, IERE, 99 Gower Street, London WC1E 6AZ
15 July—BARTG Convention, Harpenden Public Hall, Harpenden, Herts.
29 July—Region 15 ORM, Belfast.
17 September—IOW "get-together", Alverstone Manor. Details from G3KPO.
24 September—Welsh Amateur Radio Convention, Oakdale Community College, Blackwood, Gwent. Details from GW3KYA.
2-4 November—ARRA Exhibition, Granby Halls, Leicester.

your opinion

JAMBOREE ON THE AIR
21-22 October 1978

The Editor
Radio Comunication

Sir—It may be of interest to your readers to know that every year the Scout Association holds a world-wide Jamboree on the Air. This year will be the 21st Jamboree and, as such, is the "coming of age", so to speak, of the net. We want this year's to be a really special get-together and would be grateful if members who have not yet taken part might like to do so this year in addition to our old friends.

Scout groups throughout the world will be very pleased if any amateur willing to take part this year would contact their Area Scout Association. Here in Sunderland, I have been approached by three groups who want to set up jamboree stations. In each station we would like three multiband transmitters, one receiver, one vhf link, one sstv and one fstv.

There are many Scouts who have taken the Communicators Badge and have been taught how the world of amateur radio can be of great interest. They will look after all the paperwork and also prepare for despatch any QSL cards required by our operator friends.

All we ask is for operators and equipment; I promise a really interesting weekend for all participants.

J. I. Batley
QSL sub-manager G3YAA-YZZ

Sir—May I appeal through your pages for assistance in running a Scout Jamboree on the Air station in October. Since I only have a Class B licence (it does not appear likely that I will have passed my morse test before then) I shall not be able to operate the hf bands myself. The station will be in Whalley Range, South Manchester. It will be our first attempt at JOTA, and we are hoping to make a good job of it.

Anyone who would be willing to assist in running the station should contact me c/o UMIST ARS, PO Box 88, Sackville St, Manchester M60 1QD.

P. E. Maggs, G8NZQ

IMPORT CHARGES
The Editor
Radio Communication

Sir—I have noticed that your recent issues have had adverts from foreign suppliers of equipment; neither of the two adverts perused by me had any indication that the prices were exclusive of UK Customs charges.

The charges can be quite high if received by post from outside the EEC: notable Customs duty, VAT (usually 12½ per cent) and Post Office clearance fee. For any customer not expecting Customs charges when the postman calls it will be too late to cancel the order.

I hope this letter will prevent any misunderstanding or disappointment when the true price of the goods is realized.

P. F. Vella, G3WVP

CB
The Editor
Radio Communication

Sir—As an ex-American citizen's band operator (KDT4850) and an active amateur radio operator (G5DAK/WB5QWT), I read with interest the "Current Comment" on page 388 of the May 1978 *Radio Communication* regarding a citizen's band.

I whole-heartedly concur with the RSGB's position on this matter. Whereas a low-powered, line-of-sight, personal communications service would be beneficial to many, it seems to me that a valuable lesson could be learned from the current American 11m mess. Hobbyists, unlicensed operators, obscene language, intentional jamming, and high-power operation are just a few examples of what one hears daily on the band of frequencies allotted by the Federal Communications Commission for "personal communications of a necessary nature".

I implore your lawmakers to learn from the mistakes of others. Please do not make the same blunders.

F. Wesley Pitts, G5DAK/WB5QWT

HOME OFFICE STATISTICS
The Editor
radio Communication

Sir—I read with interest, the latest tvi/bci statistics which were reported in "Technical Topics" (March 1978). While interference classified as due to amateur stations is minimal, I cannot help but recall the well-known saying "You can prove anything with statistics" and suggest that the present situation is still highly unsatisfactory from the amateurs' point of view.

Consider, for example, the neighbour who complains that he cannot listen to records due to RF breakthrough. It is little comfort to him to be told that his newly purchased music centre has poor immunity and might require internal modification to improve matters. An amateur who is reasonable friendly with a neighbour and finds himself in this position may feel under an obligation to reach a compromise on operating times even when the fault lies in the complainant's equipment.

I expect there are many amateurs, like myself, who live in densely populated areas and who think twice before operating during tv hours due to the likelihood of causing interference. Statistics published by the Home Office will never reflect these instances.

Assuming that the transmitter is producing a clean signal, the question which has to be answered is: "Should the amateur operate as it suits him or should his conscience win?"

In real life situations this decision is not always an easy one to make.

B. R. George, G3ZOH

BAND PLANNING
The Editor
Radio Communication

Sir—I am a regular user of a.m. on 144MHz. Setting aside the usual arguments about the efficiency of a.m. versus fm, I am raising the point that there is no apparent section of the band plan allocated to this mode.

This results in the newcomer to amateur radio, and in particular to 144MHz, being suspicious of this mode, mainly because of the uncertainty of which frequency to use. He is therefore forced into paying substantial amounts of money for Japanese commercial amateur gear while there is a considerable quantity of excellent ex-commercial a.m. equipment available at very reasonable prices.

In the area where I live, there is a very healthy level of a.m. activity and newcomers know that they will always get a QSO.

It seems strange that nothing is allocated to this mode, as all other modes are catered for in the band plan. If a section of the band is allocated with a defined calling frequency, it will give a sound foundation for QRM-free operating.

At present the only "official" area is the "all modes section" with no exclusive a.m. frequency, and therefore it is not used. For this reason the old common frequency of 145·800MHz is still in current use and, because of this high level of activity, adjacent frequencies are already being used as an overflow.

The increasing number of users makes the following application for an a.m. allocation in the band plan a necessity, and the RSGB, being the national society to help the radio amateur, is in a position to help rectify this matter.

P. J. Dick, GM4DTH

HAM SPIRIT
The Editor
Radio Communication

Sir—On 20 May I was in Portstewart, Co Londonderry, for the North West 200 motor cycle races, and at the end of the day I discovered I was unable to put my car into gear to drive home. In most instances this would have meant being stranded there for the weekend, since home is in Lisburn about 60 miles away. I should like to express my appreciation for the help given to me by several amateurs who enabled me to get the car home late that night. My thanks are due to Mervyn Witherow, an swl and car mechanic, who heard of my predicament through listening to a 2m fm contact and who arrived out of the blue to offer assistance. Mervyn made several telephone calls on my behalf to try to locate a spare part, and drove 12 miles to Ballymoney to obtain the part in a scrap yard when no spares were available. He made the repairs on the side of the road at 1130pm HI.

A number of 144MHz stations assisted by providing hot coffee and scones, contacting my wife, offering lifts home in the event of not being able to repair the car etc. In this context I should like to mention GI3ZX, 3USS, 4AHD, 4FVM, 4GDV, 8JTS, 8KZS, 8ICJ 8OLH.

Gentlemen, thank you very much.

D. Hutchinson, GI4FUM

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 28 July for the September issue.

Club secretaries are QTHR unless otherwise stated.

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

Ainsdale (AARC)—Thursdays fortnightly; 13, 27 July, 10, 24 August. Ainsdale Scout Headquarters. For details please contact G2CUZ.

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

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

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

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

Bury (BRS)—Main meeting second Tuesday in each month, 8pm. 11 July (Foxhunt, details in May *Feedback*), 8 August ("TVI and the amateur" by G2BTO). Mosses Community Centre, Cecil Street, Bury. Club rig on the air, cw classes and constructional projects. RAE course, in conjunction with Bury Technical College, starting in September. Hon sec E. Thirkell, G4FQE, tel Rochdale 32730.

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

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

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

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

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

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

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

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

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

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

Manchester (South Manchester RC)—7 July (Night for swls), 14 July (DF practice), 21 July ("Radio astronomy" by M. Wooley), 28 July ("Noise and its implications at vhf" by R. Butterfield, G3VYB), 4 August (Discussion and shack operating night), 11 August ("Design and construction of QRO linear amplifier" by D. Holland, G3WFT), 18 August ("Teletext" by M. Counsell), 25 August (QRP review), 8pm. Sale Moor Community Centre, Norris Road, Sale. The club has secured exclusive use of a room at the centre as a shack and this is now in operation. It is hoped, therefore, to resume the Monday evening informal meetings. Further particulars on club activities from W.L. Seddon, G3VIW, tel 061-973 3355.

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

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

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

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

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

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

Stockport (SRS)—Second and fourth Wednesdays in each month, 8pm. 12 July ("SSTV" by G3LEE), 26 July ("Brains trust"), 9 August (Tape recorded lecture), 23 August (Natternight), 13 September (Visit from Lowe Electronics). Meetings preceded by cw practice. For details apply hon sec G3FYE. New members and visitors always welcome.

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

UK FM Group (Western)—Informal meeting first Thursday in each month, 8.30pm. "Legh Arms", Knutsford. Sec G3LEQ, tel Knutsford 4040.

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

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

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

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

REGION 2—RR *(Election result not available at time of going to press)*

Following information is latest received.

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

Bradford University (UBURS)—Thursdays, 7.30pm. N10, University Main Building, Richmond Road. Come and see the 144 MHz station, G8IIW. Details from G8GOV.

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

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

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

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

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

Hull (H&DARS)—New venue. Fridays, 8pm. Community Centre, Fountain Road, Hull. Hon sec G3WYW.

Hull (HUR&ES)—Fridays, 1pm. Room 313B, Union Building, All amateurs invited. Enquiries to G4FVP.

Leeds (White Rose RR)—Wednesdays, 7.30pm. (Lectures start 8pm). Sec G4DZI.

Leeds (LUUARS)—Tuesdays, 8pm. Union Annexe (second floor), Woodhouse Lane. All new students welcome. Sec G4CNG, QTHR, or at "E" block, Lupton Flats, Alma Road, Leeds 6, during term.

Otley (OR&ES)—Tuesdays, 8pm. 14 Back of Court House Street, Otley. Sec G8DFZ.

Scarborough (SARS)—New night, Mondays, 7.30pm. Scarborough Technical College, Scalby Road, Scarborough. Sec G3RTN. Visitors always welcome.

Sheffield (ARS)—Third Monday in each month, 8pm. "Sheaf House Hotel".

Wakefield (W&DARS)—7.30pm. Ines Road School, Wakefield. Sec G3WWF.
York (YARS)—Fridays (except third in each month), 7.30pm. United Services Club Room, 61 Micklegate, York. All details from sec G3WVO.

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

Birmingham (Birmingham University RS)—Tuesdays during term, RAE classes fortnightly, 7pm. Students' Union. Sec G8HTH. Meetings followed by tour of real ale establishments. Club stations G3IUB and G8IUB.
Birmingham (Midland ARS)—18 July, 22 August, 8pm. Room 110, University of Aston, Gosta Green, Birmingham. Sec G8BHE.
Birmingham (Slade RS)—Alternate Fridays, commencing 21 July, 8pm. The Committee Room, Church House, Erdington, Birmingham. Sec G4FGF.
Birmingham (South Birmingham RS)—Thursdays (HF night on the air), Fridays (Construction and morse classes), 7.30pm. 2 August (Holiday natternight), 6 September ("The radio aurora", tape and slide lecture), 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G4GZI (G8KPA, QTHR).
Bromsgrove (B&DARC)—14 July (Natternight), 11 August ("PO earth stations" by Geoff Anderson, G3NPA), 2, 3 September (SSB Field Day at Signet Fields Farm), 8 September (Surplus sale), 8pm. Avoncroft Art Centre, Bromsgrove. Sec G4GBE.
Burton-on-Trent (BonT&DARS)—New programme arranged. Wednesdays, 8pm. Stapenhill Institute, Main Street, Stapenhill, Burton-on-Trent. Sec G3ACR.
Cannock Chase (CCARS)—First Thursday in each month (Business meeting), other Thursdays (HF and vhf club stations, natternights, morse classes, talks etc), 8.30pm. "Acorn", Mill Street, Cannock. Sec G8MWE. Visitors welcome.
Coventry (CARS)—14 July (Natternight), 21 July (Natternight), 28 July (Natternight), 4 August (Treasure hunt), 11 August (Night on the air), 18 August (Family night out at "The Old Bull and Butcher", Ryton-on-Dunsmore), 25 August (Preparations for the Town and Country Festival), 1 September (CW night on the air), 8 September (Quiz), 8pm. Baden Powell House, 121 St Nicholas Street, Radford, Coventry. Sec Dave Parker, G8OMB, 41 Brookdale Road, Nuneaton CV10 0BL. Visitors welcome.
Coventry Technical College (CTCARS)—Mondays and Thursdays, 7pm. Winfray Annexe of the college. Sec G8ISJ.
Coventry (University of Warwick ARS)—Wednesdays during term, 7pm. Cryfield Farm, University of Warwick. Talk-in on S20, or contact G4BXI or G4DCW, Hurst Flat 40, Cryfield Village, University of Warwick.
Dudley (DARC)—Second and fourth Tuesdays in each month, 7.45pm. Central Library, Dudley. Sec Norman Rock, 28 Conway Close, High Acres, Kingswinford, Brierley Hill DY6 8PT.
Hereford (HARS)—First and third Fridays in each month, 8pm. Civil Defence HQ, Gaol Street, Hereford. Sec G4CNY.
Lichfield (Chad RC)—Alternate Wednesdays, commencing 19 July, 8pm. The Naval Club, Burton Old Road, Lichfield. Sec G4ESK.
Lichfield (LARS)—First Monday and third Tuesday in each month, 8pm. "Swan" (bar), Lichfield. Sec Ted Bowen, RS33003, tel Ibstock (0530) 60396.
Mid-Warwickshire (MWARS)—First and third Mondays in each month, 8pm. 61 Emscorte Road, Warwick. Sec G8CXL.
Redditch (RRC)—Second and fourth Thursdays in each month, 8pm. WRVS Centre, Salop Road, Redditch. Sec G3EVT.
Rugby (RATS)—Wednesdays, 7.30pm. Cricket pavilion entrance to B Building, Rugby Radio Station, A5 trunk road, Hillmorton, Rugby. Sec G4ECO.
Shrewsbury (Salop ARS)—Thursdays, 7.30pm. "Albert Hotel", Smithfield Road, Shrewsbury. Sec G3VZG. New members welcome.
Solihull (SARS)—18 July (Film show), 15 August (10th anniversary meeting; surplus sale), 7.30pm. The Manor House, High Street, Solihull. Sec G4AEJ. Visitors welcome.
Stoke-on-Trent (North Staffs ARS)—First and third Mondays in each month (Lectures, etc), other Mondays (Natternights, Raynet and club station, G4BEM), 7.30pm. Harold Clowes Community Centre, off Dawlish Road, Bentilee, Stoke-on-Trent. Sec S. Capper, G8ORU, 24 Tregrew Place, Silverdale, Newcastle, Staffs ST5 6PG. New members welcome.
Stoke-on-Trent (SonTARS)—Thursdays, 7.30pm. 2a Racecourse Road, Oakhill, Stoke-on-Trent. Sec G4CWN.
Stourbridge (StARS)—Informals on the first Tuesday in each month, 9pm. "Shrubbery Cottage" public house, Heath Lane, Oldswinford, Stourbridge. 17 July, 21 August; 7.45pm. Longlands School, Brook Street, Stourbridge. Sec G4IP.
Stratford-upon-Avon (SuponA&DARC)—Every third Friday, commencing 14 July, 7.30pm. The Clubroom, Swimming Pool, Bridgefoot, Stratford. Sec G4EXR, tel Stratford 5638, weekends only. New members welcome.
Sutton Coldfield (SCRS)—Second and fourth Mondays in each month, 7.30pm. Central Youth HQ, Clifton Road, Sutton Coldfield. Sec G8KRW.
Tamworth (TARS)—Second and fourth Mondays in each month. Indoor Sports Centre, Corporation Street, Tamworth. Sec G4EUF. New members welcome.
Telford (T&DARS)—Wednesdays, 7.30pm. Phoenix Centre, Webb Crescent, Dawley. Sec G8MXS, tel Much Wenlock 357. Visitors welcome.
Walsall (WARC)—12 July (Morse practice), 19 July (Night on the air), 26 July (Morse practice), 2 August ("Prisoner of war radio" by Jim Lambert, G3JFZ), 9 August (Morse practice), 16 August ("Two metres" by Ken Boucher, G8KML), 23 August (Morse practice), 30 August, 6 September, 8pm. Forest Community Centre, Forest School, Hawbush Road, Leamore, Walsall. Sec G8KML.
Willenhall (W&DARS)—Alternate Wednesdays, commencing 12 July. Little London Community Centre, Bloxwich Road South, Willenhall. Sec M. P. Batchelor, 19 Newslands Close, Willenhall, West Midlands WV13 2DQ. New members welcome.
Wolverhampton (WARS)—17 July ("SSB above 432MHz" by Russ Steward, G8BHH), 24 July (Natternight), 31 July (Natternight), 7 August (Surplus sale), 14 August (Natternight), 21 August (Discussion—df hunts), 28 August (No meeting), 4 September ("Early years of dx activities" by Ernie Gardner, G6GR), 11 September (Natternight), 8pm. Neachells Cottage, Danescourt Road, Stockwell End, Tettenhall, Wolverhampton WV9 9PH. Sec G8EDG.
Worcester (W&DARC)—7 August, 4 September, 8pm. "Old Pheasant", New Street, Worcester. Acting sec G3TQD.
Several clubs in the region will be operating equipment and stations at the Town and Country Festival being held at Stoneleigh, near Kenilworth, on 26-28 August.

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

Derby (D&DARS)—Wednesdays, 7.30pm. 5 July (Bring and buy sale), 9 July (Coach trip to Upton-on-Severn Radio Rally; fully booked), 12 July (Social natternight), 9 August (Preparation for rally at Lower Bemrose School), 13 August (Derby Mobile Radio Rally, Lower Bemrose School, Derby). Morse classes Tuesdays and Fridays, 7pm when arranged; new session of morse classes starts September. 119 Green Lane, Derby.
Derby (NHARG)—Fridays, 7.30pm. Nunsfield House, Boulton Lane, Alvaston, Derby.
Grimsby (GARC)—First and third Thursdays in each month, 8pm. Alexandra Club, Cleethorpes.
Leicester (LRS)—Mondays 7.30pm. Club House, Gilross Estate Cottage, off Groby Road, Leicester.
Leicester (LPARS)—Mondays, Wednesdays, Thursdays and Fridays, lunchtime during term. Leicester Polytechnic. Sec R. Newstead, G3CWI, 24 Richmond Road, Leicester.
Lincoln (LSWC)—Lincoln Short Wave Club has been re-formed. Second and fourth Wednesdays in each month. Lincoln Corporation Social Club, Waterside South, Lincoln. Further information from G3VRD.
Mansfield (MARS)—First Friday in each month, 7.30pm. "New Inn", Westgate, Mansfield.
Matlock (Derwent Valley ARS)—First Monday in each month, 7.30pm. "The Royal Oak", Nr Matlock. Guest speakers each month.
Melton Mowbray (MMARS)—Monthly, 7.30pm. St John Ambulance Hall, Ashfordby Hill, Melton Mowbray.
Nottingham (ARCON)—Thursdays, 7.30pm. 6 July (Forum), 13 July (Foxhunt), 20 July (Talk), 27 July (Activity night), 3 August (Forum), 10, 17, 24, 31 August (Activity nights). Sherwood Community Centre, Mansfield Road, Nottingham. Officials for 1978 are: president, G8FRB; chairman, G3YUT; vice chairman, G4DVW; treasurer, G4CKG; sec G4EKW.
Nottingham (Trent Polytechnic RS)—New Club! Wednesdays. Newton Building, Room 105. Further information from the chairman, Paul Robinson, via Students' Union, Trent Polytechnic.
Nottingham University (NURC)—Tuesdays. Contact R. Dixon, G4BVY, c/o Students' Union, Nottingham University.
Scunthorpe (SARC)—Tuesdays, 7.30pm. The Shack, Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe. It is regretted that, due to the lack of a suitable instructor. RAE classes have been discontinued. Visitors always welcome.
Leicestershire Raynet Group meets monthly at the County Hall, Glenfield. Further details from G8CAC.

REGION 5—RR *(Election result not available at time of going to press)*

Following information is latest received.

Bedford (B&DARC)—Wednesdays, 8pm. Ravensden. Sec G4FFC.
Cambridge (C&DARC)—Fridays, 7.30pm. Air Training HQ, Newmarket Road. Sec G4BAO.
Cambridge (CUWS)—Tuesdays fortnightly during full term. Details from sec G8KTJ, Queens' College.
Corby (CARG)—Fridays, 7.30pm. Hightrees Scout Centre, The Nook, Corby. Sec G8MLA.
Dunstable (DDRC)—Fridays, 8pm. Chews House, 77 High Street South. Sec G3HJF.
March (M&DRAS)—Tuesdays, 7.30pm. 2 Grays Lane. Sec G8GNE.
Northampton (NRC)—Thursdays, 8pm. Kingsthorpe Community Centre, Thornton Park, Kingsthorpe. Sec G8LHR.
Peterborough (GPARC)—20 July (G4FDF), 24 August (Pub night), 7.30pm. Southfields Junior School. Sec G4FDF.
Peterborough (PR&ES)—Third Friday in each month, 7.30pm. Scout Hut, Occupation Road. Sec G3EEL.
Shefford (S&DARS)—6 July (Inventory), 24 August (Contest plans), 8pm. Church Hall. Sec G8HHO.

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

Banbury (BARS)—First Friday in each month, 7.30pm. The General Foods Sports and Social Club, Spriceball Park, Banbury, Sec S. L. Terry, G8OCT, tel Banbury 4769.
Bracknell (BARC)—Mondays, 8pm. Coopers Hill Centre (adjacent to station). For meeting details please contact sec D. Williams, G4CVN, tel Windsor 56096.
Burnham Beeches (BBRC)—First Monday in each month, 8pm. Hedgerley Scout HQ. Sec Peter Flynn, tel Farnham Common 2609.
Harwell (Atomic Energy Research Establishment RC)—Fridays, lunchtime. The Shack, AERE Harwell, Didcot, Berks. For further meeting details contact sec G8DVK.
High Wycombe (Chiltern ARC)—Forthcoming visit from Oxford D&ARS for talk by RR, G2DRT, and social evening. For meeting details contact sec G4FRL, tel Kingston Blount 52006.
Maidenhead (M&DARS)—Please contact G3WKX for details of next meeting.
Milton Keynes (MKARS)—10 July ("Computer games" by Phil Gibbson, G4DAW). Lovat Hall, Newport Pagnell. For times and details of meetings contact G3PZA, "Rose Cottage", Shenley Brook End, tel Shenley Church End 310.
Newbury (N&DARS)—First Monday in each month, 7.30pm. Newbury College of Further Education, Oxford Road, Newbury. Sec G4EEE.
Oxford (O&DARS)—Second and fourth Wednesdays in each month, 7.30pm. Civil Service Sports Club, Marston Road, Oxford. Sec G4BHR.
Oxford University (OURS)—Please contact sec M. Evans, G8LTE, Worcester College, Oxford, for meeting details.
Reading (RARC)—Details from sec Chris Young, G4CCC.

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

Consultation with members in Region 7 on what to do about vandalism on GB3LO was successfully concluded at a meeting of area representatives and affiliated society representatives held on 14 April. Chris Goadby, G8HVV, RSGB repeater co-ordinator, and Doug Davis, G3PAQ, chairman of the UK FM Group (London), attended and spoke by invitation. All affiliated societies represented were against closure of GB3LO, either unanimously or by a very large majority, and a few letters had been received by area representatives and the regional representative, with only one letter supporting closure. The view taken by Region 7 was that action should be taken by the Home Office to stop the offences, that authorization for more 144MHz repeaters in London should be sought, and that more information about RSGB action should be published. (*See open letter from RSGB President in this issue—Ed*).

Addiscombe (AARC)—Tuesdays, 9.15pm. "Spreadeagle", Portland Road, South Norwood. Sec G3SJX.
Ashford (Echelford ARS)—Second Monday and last Thursday in each month, 7.30 for 8pm. The Hall, St Martin's Court, Kingston Crescent, Ashford, Middx. Sec G3TDR, tel Staines 56513.
Bexley Heath (North Kent RS)—Second and fourth Thursdays in each month, 8pm, St Mary's Institute, 2 North Cray Road, Bexley. Sec G3VFD.
Coulsdon (CATS)—First Thursday in each month, 7.30 for 8pm. 10th Purley Scout Hall, Chipstead Valley Road (opposite Rickman Hill). Third Monday in each month, 7.30 for 8pm. 1st Purley Scout Hall, Purley Park Road, Purley. Sec G8KDQ.
Cray Valley (CVRS)—First and third Thursdays in each month, 8pm. Christchurch Centre, High Street, Eltham, London SE9. Sec G4FUG.
Croydon (Surrey Radio Contact Club)—First and third Wednesdays in each month, 7.30 for 8pm. TS "Terra Nova", 34 The Waldrons, Croydon. Sec G4FFY.
Crystal Palace (CP&DRS)—Third Saturday in each month, 8pm. 15 July ("Oscar operating" by Ron Broadbent, G3AAJ, secretary of AMSAT UK). Emmanuel Church Hall, Barry Road, London, SE22. Sec G3FZL, tel 01-699 6940.
Guildford (G&DRS)—Second and fourth Fridays in each month. Model Engineers HQ, Stoke Park, Guildford. Sec G4BHQ, tel Guildford 76375.
Guildford (University of Surrey E&ARS)—Informal meetings, lunchtimes during term. Lower Bar, Union House, G&AHK is active on vhf, and G31GQ on hf. Skeds and QSOs always welcome. Sec G8MIO, tel Guildford 71281.
Kingston (K&DARS)—Second Wednesday in each month, 8.15pm. Berrylands Scouts and Guides HQ, Stirling Walk, Raeburn Avenue, Surbiton. Sec G4APG, tel 01-399 8113.
New Cross (Clifton ARS)—Fridays, 8pm. 225 New Cross Road, London SE14. Details from R. A. Hinton, 42 Sutcliffe Road, Welling.
Reigate (RATS)—First Tuesday in each month (Natternight), 8pm. "Marquis of Granby", Hooley Lane, Redhill. Third Tuesday in each month, 8pm. 18 July (Junk sale). Constitutional Centre, Warwick Road, Redhill. Sec G3XSZ.
Sutton and Cheam (S&CRS)—Meetings at Sutton College of Liberal Arts and at Ray's Social Club. Details from sec G2DMR.
Thames Ditton (Thames Valley ARTS)—First Tuesday in each month. Giggs Hill Green Library, Giggs Hill Road, Thames Ditton. Sec G3ZNW.
Wimbledon (W&DRS)—Second and last Fridays in each month, 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon SW19. Sec G3XTC, tel 01-644 3698.

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

Brighton (B&DRS)—8pm prompt. Catholic Church Hall, Bristol Road, Brighton. Details from N. Hewitt, G8JFT.
Burgess Hill (Mid-Sussex ARS)—7.45pm. Marle Place, Burgess Hill. Details of future events from G3PEQ.
Canterbury (East Kent RS)—Details of future events from sec G8GHH.
Chichester (C&DARC)—First Tuesday and third Thursday in each month. Lancastrian Boys School. Details from G4ETU, tel 0243 88069.
Crawley (CARC)—12 July (Informal, G3TR). United Reform Church Hall, Ifield, Crawley. Details of future events from G3MGL.
Dartford (DHDFC)—Second Friday in each month. Scout House, Broomfield, Dartford. Details from Jeanette Maggs, 25 Leybridge Court, Eltham Road, Lee, London SE12.
Dover (South East Kent YMCA ARC)—Wednesdays. Details from G6KEN.
Eastbourne (Southdown ARS)—3 July (Open air meeting on Butts Brow, Willingdon, Eastbourne; refreshments, bring and buy, talk-in on 145, all welcome), 29, 30 July (Polgate Steam Engine Rally, exhibition station GB3SS; East Sussex RAEN and Sussex Repeater Group will also be in attendance; talk-in on 145). Further details from G8CVV, or pro G3LFZ.
Hastings (HERC)/(ITT(H)S&AC)—Details of future events of both units from G8DNO.
Horsham (HARC)—First Wednesday in each month. Civil Defence GQ, Moons Lane, Brighton Road, Horsham. Details of future events from G3NPF.
Maidstone (MYMCAARS)—Fridays, 7.30pm. RAE and morse tuition each week. Y Sports Centre, Melrose Close, Maidstone. Details of future events from hon sec G. Pennie, G4GAV, tel Maidstone 30892.
Medway (MARTS)—Details of events and venue from G4EVY.
Tunbridge Wells (West Kent ARS)—Alternate Fridays (Formal). Adult Education Centre, Monson Road, Tunbridge Wells. Tuesdays following, (Chat, morse practice, technical advice). Drill Hall, Victoria Road. Details from sec G4DYF.
Worthing (W&DARC)—Tuesdays, 8pm. Adult Education Centre, Union Place, Worthing. Details from G8MSQ.
Kent Repeater Group—Details of membership from G3XDV, 5 Lambs Walk, Whitstable, Kent.
Sussex Repeater Group—Information from G8HVV.

The West Kent ARS recently ran a competition, following a challenge by Richard Leman, G8CDD, to produce the loudest crystal set capable of receiving BBC Radio 2 on long wave and one medium wave station. The photograph shows Ron Ham, BRS15744, presenting prizes on 12 May. Left to right: R. Bower, 3rd prize; S. Broomfield, 2nd prize; R. Leman, the challenger; Ron Ham; and 1st prize winner B. Castle, G4DYF

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

Camborne (Cornish RAC)—6 July ("Mining" by Mike Cooper), 23 July (Cornish Mobile Rally at Truro), 3 August ("Down in the mouth" by G8HTE), 7 September (Talk by G4EWQ), 7.30pm. SWEB Clubroom, Pool, Camborne. Cornish net each weekday 10am on 3·715MHz and on Sundays 11am on 3·682MHz. Full details from new sec G3VGO, tel Devoran 864255. Visitors always welcome at meetings.

Exeter (EARS)—Second Monday in each month, 7.30pm. Community Centre, St Davids Hill, Exeter. Details from G3HMY.

Newquay (N&DARS)—Alternate Wednesdays, 7.45pm. Treviglas School, Newquay. Details from G8GOR, tel Newquay 4168.

North Devon (NDRC)—12 July ("Converting ex-mobile sets to 144MHz fm" by G8MWW and G8OSR), 26 July (Morse evening—bring a cassette recorder for machine sent morse), 9 August (Talk by G3JUW), 23 August (TBA). 12 July and 9 August at Barnstaple, other meetings at Bideford. Full details from G4CG.

Saltash (S&DARC)—First and third Fridays in each month, 7.30pm. Burraton Toc-H Hall, Saltash. Full details from G4GTG, tel Plymouth 771135.

Torbay (TARS)—Fridays, and special meeting on last Saturday in each month. Torbay net weekdays 3·756—3·764MHz, Mondays to Fridays 10.30am, Saturdays 9.30am. Full details from G3UIQ, tel Newton Abbot 3025. Visitors most welcome to club meetings.

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

Barry (BCoERS)—Thursdays, 8pm. Barry Rugby Football Club, Reservoir Road, Barry. Details from sec S. N. Lloyd Hughes, GW8NVN, 1 Min y Mor, Barry.

Blackwood (BARS)—Fridays, 7pm. 7 July ("Military radio telephone systems"—a film), 14 July (Tune-up night). No more meetings until September. Oakdale Community Centre, Oakdale, Blackwood, Gwent. Details from GW4BLE, 10 Llanthewy Road, Newport, Gwent.

Bridgend (Glamorgan VHF/UHF Group)—Second Wednesdays in each month, 7.30pm. NCB Social Club, Tondu, Bridgend. Details from sec GW4BDV.

Cardiff (CRSGB)—Second Monday in each month, 7.30pm. "Pantmawr Inn", Pantmawr Estate, Cardiff. Details from sec GW3VOW.

Merthyr (Hoover ARS)—Mondays, 7.30pm. Hoover Social Club, Pentrebach, Merthyr. Details from GW3RNC.

Newport (NARC)—Mondays, 7pm. Adult Educational Settlement, Brynglass Road, Newport. Details from sec GW8MER.

Pembroke (PRSGBG)—Last Friday in each month, 7.30pm. Defensible Barracks, Pembroke Dock, Dyfed. Details from sec GW3XJQ.

Pontypool (PRSGBG)—Tuesdays, 7pm. Education Settlement, Park Hill Road, Pontypool. Details from GW3JBH.

Port Talbot (British Steel Corporation ARS)—Thursdays, 7.30pm. BSC Sports and Social Club, Margam. Details from GW4ESV.

Rhondda (RARS)—Every other Thursday, 7.20pm. Transport Employees' Club, Porth. Details from GW3PHH.

Sully (S&DSWC)—Mondays, fortnightly, 7pm. Sully Bowls and Social Club, 58 South Road, Sully. Details from sec GW8JHF.

Swansea (SARC)—Tuesdays fortnightly, 8pm. West Cross Hotel, West Cross, Swansea. Details from sec GW8CMA.

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

REGION 11—RR *(Post vacant)*

Following information is latest received.

Rhyl (R&DARC)—Club reopened! Third Thursday in each month. Other Thursdays (On the air on 144·00 at 2000A). Ambulance Station, Rhyl.

Conway Valley (CVARC)—Second Thursday in each month, 7.45pm. The Quarry Offices, Llanddulas.

Bangor (UNCWARS)—Thursdays, 7.30pm. Small lecture theatre, School of Engineering Science, Dean Street, Bangor.

REGION 12—RR *(Election result not available at time of going to press)*

Following information is latest received.

Aberdeen (ARS)—Fridays, 7.30pm. 80 Guild Street, Aberdeen (next to "Station Hotel" immediately adjacent to railway station). Programme details from sec GM4BKV.

Dundee (Kingsway Technical College ARC)—Wednesdays, 6.30pm. Dundee Technical College. Club will be closed during the summer months, although new members and visitors will be welcome when meetings resume in September. Sec GM4FLP.

Elgin (Moray Firth ARS)—Wednesdays. Elgin Technical College. Club members are considering a possible 144MHz repeater for the Moray Firth area. Tests show that very good coverage in the north of Scotland could open up a difficult vhf area. Details from sec GM8LHE.

Grampian Repeater Group—The AGM on 29 April elected: president W. M. Beaton, GM3DWX; project manager R. H. Cook, GM4BYT; secretary and treasurer A. M. Jones, GM8HGD; committee members N. A. Hendry, GM8CBQ, P. M. Coull, GM4GLD, F. Baxter, GM3VEY, and J. C. Johnston, GM8OHU. The Grampian repeater, GB3GN, was off the air from 28 April to 13 May while new improved logic and a 40W pa were fitted—the erp is now approximately 25W. Further info from sec GM8HGD.

Invergordon (Easter Ross RC)—Every second Tuesday. 100 High Street, Invergordon. It is intended to hold classes for the RAE and morse test, and practical nights every second Wednesday for those with own projects or who wish to work on club projects. Details from GM4DKL.

Inverness (Technical College ARC)—Every second Wednesday, 6.45pm. Room C30. Sec W. Lee, 36 Old Mill Road, Inverness.

Lerwick (ARC)—Wednesday evenings. Annsbrae House. Sec GM3HTH.

Perth (P&DARG)—Wednesdays, 7pm. Perth Technical College. Club will be closed from end of June until beginning of September. Sec GM4DQJ.

Visitors intending to visit clubs in Region 12 during the summer months please contact secretaries first as some clubs are known to close over the holiday period.

REGION 13—RR *(Post vacant)*

Following information is latest received.

Berwick upon Tweed (Border ARS)—First and third Fridays in each month, 7.30pm. Roxburgh Hotel, Berwick upon Tweed. Details from sec GM8IIO.

Dunfermline (DARS)—Second Wednesday in each month, 7.30pm. CCTV Studio, Pittencrieff School, Maitland Street, Dunfermline. Details from sec GM3MGX, tel Limekilns 313.

Edinburgh (E&DARC)—Tuesdays, 7.30pm. City Observatory, Calton Hill, Edinburgh. Details from sec GM8MJV, tel 031-663 2033.

Edinburgh (Heriot Watt University ARC)—Wednesdays, 2pm. Aerial Laboratory, Top Floor, Mountbatten Building, 31-35 Grassmarket, Edinburgh.
Edinburgh (Leith Nautical College ARC)—First and third Thursdays in each month, 7.30pm. Leith Nautical College, 24 Milton Road East, Edinburgh 15.
Edinburgh (Lothians RS)—Second and fourth Thursdays in each month, 7.30pm. Adult Education Centre, Riddles Court, High Street, Edinburgh. Details from sec GM4BYF, tel 031-447 3201.
Glenrothes (G&DARC)—Third Sunday and every Wednesday in each month, 7.30pm. Old Nursery School Building, Provosts Land, Douglas Road, Leslie, Fife. Details from GM4BRM, 31 Church Stret, Glenrothes, or GM3YOR, tel Kirkcaldy 200335.

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

REGION 14—RR I. L. McKechnie, GM8DOX, 42 Newton Crescent, Dunblane, Perthshire.

Ayr (AARG)—Every second Sunday evening commencing 8 January. Community Centre, 24 Wellington Street, Ayr. Details and calendar from sec GM3THI.
Helensburgh (HARC)—First and third Wednesdays in each month, 7.30pm. Clyde Street School, Helensburgh. Further details from GM4FEO.
Glasgow (West of Scotland ARC)—Fridays, 7.30pm. Robertson Street, Glasgow. Meetings opened by GM3EDZ. Details of events from sec GM8NBG on receipt of a 9p stamp.
Greenock (G&DARC)—Tuesdays and Fridays, 7.30pm. 22 Inverkip Street, Greenock. Details from sec GM3LYI.
Motherwell (Mid-Lanark ARS)—Two items known for July ("How to succeed with QRP" by GM3KMG), ("How I would run a repeater" by GM8BBA). Wrangholm Hall Community Centre, Jerviston Street, Motherwell. Details from sec GM4FKD.
Stevenson (Ardeer RCARS)—Thursdays, 7.30pm. Ardeer Recreation Club, Stevenson, Ayrshire. Details from GM3USL.
Stirlingshire (SARG)—New group! Starting up initially to put a 70cm repeater on the air. Anyone welcome to join including members of the diminished Falkirk & District RC, to enlarge club activities. Details from sec GM3POK, or GM4CXF.

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

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

REGION 15—RR *(Election result not available at time of going to press)*

Following information is latest received.

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

REGION 16—RR *(Election result not available at time of going to press)*

Following information is latest received.

Bury St Edmunds—Second Monday in each month, 7.30pm. Details from J. Munro, 29 Angel Hill, Bury St Edmunds.
Chelmsford (CARS)—First Tuesday in each month, 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details from R. Brocks, 30 Rowan Drive, Heybridge, Maldon.
Colchester (CRA)—Wednesdays, 7.30pm. 114 Ipswich Road, Colchester (Above Candor Motors). Details from G3YAI.
Great Yarmouth (GYRS)—Last Thursday in each month. 67 Southdown Road, Great Yarmouth. Details from G3NHU.
Harlow (H&DRS)—Tuesdays, 8pm. Mark Hall Barn, First Avenue, Harlow. Details from G3WUX.
Ipswich (IRC)—Wednesdays fortnightly. Ranelagh Road School. Ipswich.
Loughton (L&DRS)—Loughton Hall, Rectory Lane, Loughton. Details of meetings from G8DZH, tel 01-508 3434.
Lowestoft (L&DARC)—Fridays, 7.30pm. Morse class every Tuesday. YMCA, Park Road, Lowestoft.
Martlesham (MRS)—First Wednesday in each month, 7.30pm. Details from M. Appleby, PO Research Centre, Martlesham, Ipswich.
Norwich (Norfolk ARC)—Wednesdays.
Norwich (U of East Anglia R&EC)—Details from G3IOR.
Southend (S&DRS)—Fortnightly, 8pm. Church Hall, Sir Walter Rayleigh Drive, Essex. Contact sec G3YOA.
Stowmarket (SDARS)—First Monday in each month. Red Cross Hall, Stowmarket Railway Station. For details contact sec G8MYE.
Vange (VARS)—Thursdays, 8pm. Youth Hall, Barstable Tenants' Community Association, Long Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon SS14 1TE.

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

Basingstoke (BARC)—First Saturday and third Wednesday in each month, 7.30pm. Chineham House, Popley, Basingstoke. Sec G3CBU.
Basingstoke (UK FM Group Southern)—First Wednesday in each month. Chineham House, Popley, Basingstoke. Details from sec Mrs J. Payne, tel Aldershot 26108.
Bournemouth (Wessex ARG)—First and third Fridays in each month, 7.30pm. "The Dolphin Hotel", (Club Room), Holdenhurst Road, Bournemouth. Sec G. Cole, 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)—Second and fourth Wednesdays in each month, 7.30pm. Railway Enthusiasts' Club, Access Road, off Hawley Lane, Farnborough. Sec G3TMQ, 103 Hawley Lane, Farnborough.
Guernsey (GARS)—Tuesdays and Fridays, 8pm. Details from sec GU8ITE, PO Box 100, St Peter Port, Guernsey.
Horndean (H&DARC)—Second Thursday in each month, 7.30pm. Merchiston Hall, Horndean. Net Sundays, 6.30pm. 21·40MHz. Sec G4CHQ.
Jersey (JARS)—Sundays, 10.30am, and Fridays, 8pm. Le Hocq Tower, St Clement, Jersey. Sec Mary McTaggart, 19 Parade Road, St Helier.
Poole (PARS)—Last Friday in each month, 7.30pm. Poole Technical College. Sec J. Worth, G3ZKA.
Portsmouth (P&DRC)—Wednesdays, 7.30pm. Portsmouth Community Centre, Malins Road, Buckland, Portsmouth. Sec G3CNO.
Salisbury (SR&ES)—Tuesdays, 7.30pm. Salisbury Activity Centre, Wilton Road. Sec G3FIX.
Southampton University (SUARC)—Tuesday evenings. Also informal meetings every lunchtime in the clubroom, Old Union Building. Sec D. Price, Chemistry Dept.
Southampton (SRSGBG)—First Monday in each month, Lanchester Building, Southampton University; Wednesdays, the clubroom, Kent Road; both at 7.30pm. AR G4COM.
South Dorset (SDRS)—7.30pm. Lecture Hall, South Dorset Technical College, Newstead Road, Weymouth. Details from G3YWG.
Swindon (SD&ARC)—Alternate Wednesdays, 7.45pm. Clubroom above "Coldharbour" public house, Blunsdon, just north of Swindon. Sec G8KWC.
Winchester (WARC)—First Friday and third Thursday in each month. 7.30pm. "Crown Hotel". Sec Chris Jackson, BRS39944, 69 Buriton Road, Harestock, Winchester.

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

Durham (DUARS)—Alternate Wednesdays during term. Physics Dept, Durham University. All local amateurs are welcome to join. Talk-in by G4DUR on R5 or S20 before all meetings.

Easington (EAR&EC)—Tuesdays and Thursdays, 7.30pm. Easington Village Workmen's Club. RAE and morse tuition if required (the club has a good RAE pass record). ATV can be received on 625 lines. The club is now equipped with an hf transceiver as well as other gear. Sec G4COI.

Great Lumley (GLAR&EC)—Alternate Wednesdays, 7.30pm. Great Lumley Community Centre. Sec G8JLQ. Assistance with RAE and morse if required.

Hartlepool (HRC)—Mondays, 7.30pm. Methodist Church Hall, Grange Road. Sec G3NWU.

Middlesbrough (Post Office ARC)—All amateurs welcome, but first contact sec G8CDP.

Middlesbrough (Teesside Repeater Group)—Last Tuesday in each month, 7.30pm. 196 Marton Road, Middlesbrough, Cleveland. All amateurs and swls invited but first contact sec G8MBK.

Morpeth (Northumbria RC)—Now meets Thursdays. British Legion premises, Gambois, near Blyth. Sec G4AVO.

Newcastle upon Tyne (Tyne & Wear Repeater Group)—First Wednesday in each month. Arts Common Room, University of Newcastle. Open to all amateurs and swls. Sec G4DOB, tel Newcastle 744444.

Northumbria (NRC)—16 July (NRC 1·8MHz Foxhunt) 7, 30 July (RSGB 144MHz QRP Contest), 6 August (B&DARC 1·8MHz Foxhunt), 2, 3 September (RSGB SSB FD), 15 September (B&DARC annual dinner), September (NRC/B&DARC Border Mobile Rally).

South Shields (SS&DRS)—Fridays, 7.30pm. Trinity House. Old and new members welcome. Sec G8BQF, 67 Lauderdale Avenue.

Tyneside (TRS)—Mondays, 8pm, The Community Centre, Vine Street, Wallsend. Sec Alex Frazer, 35 Percy Street, Tynemouth.

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

Barking (BR&ES)—Mondays (Constructional), Wednesdays (CCTV techniques), Thursdays (Informal). Morse classes Tuesdays, 7.30pm. Westbury Recreation Centre, Ripple Road, Barking. Sec N. Dowsett, 44 St Ann's, Barking. Forthcoming event: The Dagenham Town Show, 8, 9 July.

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

Chiswick (Acton, Brentford and Chiswick RC)—18 July (Amateur equipment tests), 15 August (G3CCD as F0UT in France), 7.30pm. Chiswick Trades and Social Club, 66 High Road, Chiswick W4. Sec G3GEH, tel 01-992 3778.

Ealing (E&DARS)—Tuesdays, 8pm. Northfields Community Centre, Northfields Road, W13. Sec G8KPN, tel 01-997 5949. All welcome.

East London (ELRSGBG)—No meetings until third Sunday in September, then third Sunday in each month. Sec J. Bundock, G4CJQ; chairman K. Thompson, G3AMF.

Edgware (E&DRS)—Second and fourth Thursdays in each month, 8pm. Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Programme includes regular morse code practice classes. Sec G3MNO, tel 01-907 1237.

Harrow Weald (RSH)—Fridays, 8pm. 7 July (Visit by RR19), 14 July (Talk by a well-known amateur), 21 July (Informal night), 28 July (Visit to an outside organization), all August meetings (Informal). Harrow Arts Centre, High Road, Harrow Weald. Details from sec G4AUF, tel 01-868 5002.

Havering (H&DRS)—Alternate Wednesdays, 8pm. 5 July (Business meeting), 19 July (Equipment testing), 2 August (DF hunt on 160m), 16 August (Quiz night), 30 August ("Microprocessors" by G8LLB). Fairkytes Arts Centre and British Legion. Details from sec G8MKN, tel 01-704 7339.

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

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

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

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

Southgate (SRC)—Second Thursday in each month, 7.45pm. July (Informal, all welcome). The Scout Hut, Wilson Street, Winchmore Hill Green, London N21. Sec G8EWG, tel 01-440 7353; pro G4DRI.

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

Stevenage (S&DARS)—First and third Thursdays in each month, 8pm. 20 July (Contest planning night), 3 August (VHF station), 17 August (Natternight), 7 September ("How I got started" by G8KMG). Morse classes held 30min before the start of each meeting. Hawker Siddeley Dynamics, Staff Canteen. Sec T. Tugwell, G8KMV, tel 0438 54089.

St Albans (Verulam ARC)—Fourth Thursday in each month, 8pm. 27 July ("Repeater building" by G8AMG). Market Hall, St Albans, Herts. Second Thursday in each summer month (Informal—rag chews and a glass of ale). Salisbury Hall, London Colney. The club is operating a special event station, GB3MAM, at the Mosquito Aircraft Museum from 1 - 9 July. Open day is on Sunday 9 July; all welcome. Sec B. Pickford, G4DUS, tel Rickmansworth 77616.

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

Wormley (Cheshunt & DRC)—Wednesdays, 8pm. The Church Room, Church Lane, Wormley, Herts. Sec R. Chastrell, G8LNM, tel Waltham Cross 35393.

It is believed that meetings are held by Bishop's Stortford, City University and Queen Mary College ARS, but no information has been received to date.

REGION 20—RR *(Post vacant)*

Following information is latest received.

Bath (B&DRG)—Tuesdays, 8.30pm. The Crypt, Ascension Church, 35a Claude Avenue, Oldfield Park, Bath. Sec N. S. Cridland, Flat 3, 30 Paragon, Bath BA1 5LY.

Bridgwater (HPSSARS)—First and third Fridays in each month, 7.30pm. ATC HQ, Rope Walk (next to the bus station), Bridgwater. Hon Sec F. Mead, 15 Park Close, Cossington, Nr Bridgwater.

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

Bristol (BRSGBG)—31 July ("FMD and how it works" by G5UM), 20 August (Mobile picnic, Ashton Court), 21 August (Home construction evening), 25 September (G6GN). Small Lecture Theatre, Queens Buildings, University Walk, Clifton, Bristol 8. Hon sec G4FRG.

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

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

Cheltenham (CARA)—The Cheltenham Amateur Radio Association is derived from two long established clubs who have amalgamated—the Cheltenham ARS and the Cheltenham &DRSGBG. First Thursday and third Friday in each month, 8pm. The Old Bakery, Chester Walk, Cheltenham. Sec G3JJG.

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

Weston-super-Mare (WsMARS)—Second Friday in each month, 7.30pm. Room Lewis M2, Worle School, New Bristol Road, Worle. Sec G3PQE.

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

Yeovil (YARS)—6 July ("To set a trap" by G3XFW), 13 July ("Lambda diode experiments" by G3MYM), 20 July (RSGB tape lecture "Radio aurora"), 27 July ("Phasor diagrams and applications of J" by G8NBM). Hut 101 Houndstone camp (three miles west of Yeovil off A3088). Hon sec G3NOF. Info at main gate, S20 fm talk-in, club net 10.30am Sundays, 3·660MHz.

raynet

S.W. Law, G3PAZ *

The Raynet exhibit at the RSGB exhibition at Alexandra Palace was fortunate in being allotted the stage position in honour of Raynet's 25th anniversary, and it made an excellent impression on the visiting Raynet members and many others who attended the event. The visitors' book on the stand was well filled and a number of overseas callsigns were noted. A large number of enquiries was dealt with and there were the usual lively discussions with visiting members. Thanks are due to those members who put in such hard work in setting-up the stand, and to the volunteers who spent so much of their time in manning it this year. The Raynet supplies officer recorded an excellent number of sales of various items to members, old and new, many of them to applicants for membership. We must not omit our thanks also to those groups who submitted exhibition material in the shape of photographs of various types, even though it was not possible to make use of them all at Alexandra Palace.

Raynet Committee meeting

The Raynet Committee wishes to record that the above thanks were an agenda item at the meeting held on 3 June at RSGB HQ, as were the thanks to those members who helped, in no small measure, to ensure the success of the Raynet Symposium at Leicester on 15 April. Some 60 tickets were issued for this symposium, and most were taken up. Discussions are under way as to the possibility of further events of this nature being held at other centres in the UK, in order to provide as wide a coverage of the country as possible for the benefit of members nearer to other centres. The agenda also showed that at the meeting on 1 April confirmations had been made of group controller G8AFG (SE Hants), and county controllers G4EWK (Staffs), G3ZDQ (Dorset), G4FRG (Avon), G8DHQ (Cheshire), and GW2HPG (W Glamorgan).

Liaison

It is always gratifying to receive letters from user services, and the Raynet Committee has had several from emergency planning officers of late; notably from Kent and Surrey. It is even more of a pleasure when the RSGB emergency communications manager is invited to observe an event such as the demonstration of equipment and services put on by the W Sussex group for the benefit of the local epo, who expressed appreciation of the service potential of Raynet.

We hear that many groups are now finding similar exercises of great use in bringing Raynet to the notice of the local authorities, and nothing but good can come of such endeavours. Naturally, care should be taken that the group personnel is well versed in message handling procedure and is well able to cope with any unexpected difficulties which may crop up. However, given an efficient controller and a willing, well trained team there is almost certain to be a good outcome.

Where other user services are concerned there may be some slight misunderstandings as to Raynet functions. An example which came to our notice was where a controller expressed doubt as to the legitimacy of Raynet taking part in an event where the user service was paid by the organizers of the event for the attendance of its trained personnel. This is a knotty point, but the Raynet Committee is of the opinion that it is the nature of the event which should be the guiding factor in making any decision. For example, a car rally or similar event would not be looked upon favourably and might well incur strong disapproval from the Home Office, as being outside the terms of their permitted conditions to us. Controllers would be well advised to seek the opinion of the emergency communications manager if they are asked to participate in any event where there might be any doubt.

*130 Alexandra Road, Croydon, Surrey CR0 6EW

Photographed at the Raynet Symposium, held on 15 April at Leicester, by Deryk Wills, G3XKX. Read all captions left to right.

G3GHZ, G8CAC—chairman of the Raynet Committee and of the symposium, and G8NMW

G3CNV, and G3BPT—RSGB emergency communications manager.

GBHF, G4CHH and G3GJW

G3YWT, G4FPF, G3UIQ, G3ZDQ, G4FCN and his xyl

members' ads

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

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

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

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

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

Do not post to RSGB HQ or Advertising Representative

FOR SALE

"Rad Comms", comp with full index for '68 to '77, any reasonable offer please. G8AKS, QTHR. Tel Doncaster 66311.

HW8 QRP tx/rx, HWA-7-1 psu, as new; Pye Bantam, ex-GPO vhf tx/rx, aligned for 144MHz, fitted S10 xtals; offers. Page, G4BUE, QTHR. Tel Hassocks 2394.

Standard C826MC, 10W/1W, 2m fm on S20, S22, 144·8, R5, R6, R7, auto toneburst, mobile mount, etc, £100. 2m 5-el Jaybeam, £4. Sugden, 36a Bassett Street, Leicester.

Recording tape: 7in reels of ¼in wide super quality magnetic tape, £1.45 ea; 11in diameter bulk reels ¼in tape, enough for four 7in reels, £3.35; 11in reels of ½in wide, suitable for video, £3.15; all prices incl p and p. G3AZI, QTHR.

Liner 2, plus usual extras, £115 ono. G8NAT, QTHR. Tel Peterborough 61419.

Heathkit RG1 gen cov rx, good cond, handbook, £35 or offers. Carr extra. G3KBQ, QTHR. Tel Hexham 2488.

Creed 7B teleprinter, wkg, £20. Headset test set, new, £5. Telex teleprinter psu, £10. Creed 7B, 54, 75, etc; teleprinter spares, state needs. Jeremy Harmer, 39 Harrogate Road, Rawdon, Leeds. Tel Leeds 502954.

Yaesu 600Hz cw filter for FT101 etc, XF30C, £10. SSM E-Zee match, as new, £20. G4FKR. Tel Sparsholt (nr Winchester, Hants) 557.

Inverters, input 24V, output 240V, 200W continuous rating, 50Hz sin, c/w handbook, £25. Pye FM20 base stn, in cabinet, requires a little work but comp, £20. G8GTR, "Fairmile Farm Cottage", Denby Road, Cobham, Surrey. Tel Cobham 5491, evenings or weekends.

YC601 digital display unit, mint cond, £95. FT101E, as new, few hours use only, £425. Microwave Modules 2m converter, £10. G3MSL, QTHR. Tel Fleet 21446, after 6pm or anytime at weekends.

Commercial sound and vision tv tx, 10W output, tunable 420–850MHz, xtals for 70cm and ch44, in cabinet with psu and documentation, £60. A. N. Emmerson, 3 Curtis Way, Faversham, Kent ME13 7RT. Tel 0795 82 5457.

Pye repeater type base stn F9U/T, nearly new, 5W output, talk thru' module, presently on 419–425MHz, re-xtal and tune, £120 ono. GM4FOM, QTHR. Tel 050 581 5468.

Liner 2, PA3 preamp, accessories, £100 ono. G3ZVC board, cased with reg/amp board and relay switching, £50. Gel Courier Hi-band, rechargeable batteries, leather case, £20. G8IMZ. Tel 0642 319537.

Pye Lynx tv camera, good cond, exch for Pocketphones on 70cm or other uhf tx/rx. Telequipment D43 'scope, dual beam, exc cond, £50. P8 boat compass, offers. G8HOD, 32 Headlands, Fenstanton, Cambridge. Tel 0480 62846.

R209, £5. R1475, £4. '77 *Rad Comms. Wanted:* UR67, Andrews cable; ARRL, RSGB handbooks; *VHF Comms*, "Valve-transistor data"; QRO 10GHz diodes. G8BLH, "Mews Cottage", Pond Lane, Clanfield PO8 0RG. Tel 0705 596058.

SP25 Garrard deck, Shure magnetic cartridge, £15. Sinclair Project 60 20W stereo amp, filters, £20. ETI digital 24h alarm clock, £7.50. Zenith E 35mm slr camera, inbuilt lightmeter, w/a lens, electronic flash, £40. P. Martin, "Oakcroft", Kingston Lane, East Preston, Nr Littlehampton, Sussex. Tel 09062 73145.

Sommerkamp FTDX150, 80–10m, 120W p.e.p., 240/12V, handbook, spare pa valves, £150. 5-band G-whip with 160m coil, £10. Reversible geared motor 110rpm, 110V, 115lb/in², £10. *Wanted:* circuits: Decca M120 tv, Pye 848008 monitor, Hudson FM208. G3NXT. Tel King's Lynn 828339.

Heathkit HA14 linear, £100. Will consider exch for KP202, adjustment as necessary. G3ZCD, QTHR. Tel 0344 54759.

Hallicrafters gen cov rx, bandspread on all amateur bands, modern appearance, £40 ono. *Wanted:* vfo fm rig, Icom 210 or similar. G4EVZ, QTHR. Tel Romford (Essex) 45733.

IC22A, R3, R4, R5, R6, R7, toneburst, S0, S20–S24, R, R, R6 and R7, good cond, £115 or nearest offer. G4EDM, QTHR. Tel 061-973 7398.

Trio 2200GX, S20–S24, R6, R7, nicads, case, etc, £110. 4m 4-el Yagi (2), £5. RCA 8828 conduction cooled uhf tetrodes, similar to 4KC160M, with data, £1.50. G4AEZ, QTHR. Tel 01-366 7166, evenings.

HyGain 14AVQ/WB vertical trapped antenna, 10/40, brand-new, unused, in orig carton, £35 plus carr. AC mains 2·5A circuit breakers, front panel fitting, press-button reset, £1 ea post paid. Also shack clearance bargains, sae for list. G3ZDO, QTHR.

Trio TS700G, eight months old, comp with VOX3 and accessories, £360. G8NWP, 82 Leslie Road, Nottingham NG7 6PR.

RTTY terminal unit, MK Products RT/I/B, few hours use, £55 ono. J. Hancock, 2 Willowbrook Road, Leicester LE5 0FE.

FT101B, as new, incl G3LLL clipper, Shure 444 mic, £310, no offers please. G3UEE, QTHR. Tel 0213 71004, evenings.

AR88 rx, manual, spares, slight audio distortion, £35. Available in Glasgow. McArthur. Tel Inverness 34366.

IC22A all accessories, orig packing, xtal toneburst, preamp, nine repeater and 11 simplex chs fitted, £150 ono. G3PLF, QTHR. Tel Basildon (0268) 24453, after 6pm.

IC202 ssb handheld, accessories, nicads, £150. Sentinel 2m mf converter, as new, £12. Two mw/lw push-button tune car radios: Lucas, unmarked, still in box, £20; Radiomobile, on/off switch u/s, hence only £10. G4DOV, QTHR. Tel Walsall 27738.

Valves for AR8516L/HW17A, (new, boxed), 7AU7, 12CU5, 3BZ6, 3CB6, 3AL5, 5U8, 12GN7A, 7059, 8156, £15 incl postage. G3PLI, QTHR. Tel Bradford (0274) 41405.

Storno Viscount 2m tx/rx, comp, xtal S20, fb cond, £35; UR-1A solid-state gen cov rx, suit beginner, £15; both ovno. *Wanted:* KW E-Zee match. R. J. Harris, G4GIY. Tel Ash Green 873487 (Kent).

Trio TR2200G, Modular Electronics 10W pa, preamp, 10ch, S0, S17, S20, S21, S22, S24, S32, R5, R6, R7, £130. GW3WSU, QTHR.

FT200, FP200, comp, mint cond, as new, £250. 144/432 transverter, solid-state, £50. Garex 2m a.m./fm tx/rx, incl rx vfo, 18W, £80. *Wanted:* Hilo mast, hf beam, rotator. G8ISC, QTHR (now G4GZH). Tel 02406 3460.

VHF sig gen (Marconi), two units, suitable for 2m and Band 2, 95-155MHz, precision attenuator, a.m./cw, £25. Buyers must collect. K. Viney, G8KDC. Tel Orpington 22443.

Yaesu FLDX400/FRDX400, matching spkr, comp with all filters, 4m and 2m converters, in exc cond, plus new Joystick vfa, sacrifice price £320, carr paid. GM4BHH, QTHR. Tel 0349 882483.

Drake T4X plus AC4 power pack and MS4 spkr, R4C with noise blanker, filters for 1·5, 0·5, 0·25kHz, extra xtals for 160m WWV and 10m, £600. G3FKM, QTHR. Tel 021-429 3200.

FT2FB, R3–R7, S0–S24, 145·8, usual refinements, plus switched a.m./fm, switched/auto toneburst, £130; why. G3HQU, QTHR.

KW202 rx, £160. Collins 75A-2 rx, £100. Pye Cambridge, £30. Creed 54/N4 teleprinter, £30. Creed 6S/6M tape reader, £10. Creed 7P/N3 perforator, £15. Creed 92Mk3 tape reader, £3. Keyboard, 48-pos, £18. Pye 8½in monitor, £5. G8KNJ. Tel 01-669 4071 (Wallington).

FL50, FR50, FV50, comp stn, mint cond, £160. Trio 9R59D, with Heath Q-mult, good cond, £30. Going QRT. G4BNB, QTHR. Tel 01-504 3260.

Minimitter 150W a.m. fm cw tx, 3·5MHz to 30MHz, size 24in by 17in by 13in, £20. BC221J freq meter, with charts and power pack, £20. G4DZV, QTHR. Tel 01-524 3193.

Yaesu FRDX400 rx, 10m–160m, plus 2m/6m/cb/160m converters built in, filters for cw rejection tuning, modes narrow/wideband a.m., ssb, CW1, CW2, fm, perf cond, manual, £165. Tel Worcester 841366.

Sommerkamp FRDX500 160–10m amateur waveband rx, £120; no offers. Buyer collects. Tel Alton, Hants(0420) 85474.

Pye U450L 70cm tx, separate xtal switching unit, xtals, also 951 coaxial relay, £25. Linear 80–10m hb, four 6HF5s as per *Rad Comm Handbook*, £40. Buyers collect. G8VN, QTHR. Tel Derby 514464.

TA32Jr beam, £25. 30ft telescopic mast consisting of 15ft triangular lattice base section and 15ft aluminium pole, galvanized finish, incl rotator mount, buyer collects or arranges transport, £35. G3WXO, QTHR. Tel Milton Keynes (0908) 564419.

Strumech tower, galvanized winch, ground post, height 35ft, with TH3 Mk3 beam, balun, Ham M rotor, cdr indicator, 200ft RG8U 50Ω coaxial cable, 200ft 8-way feed line, exc cond, £250; offers considered. Purchaser to dismantle. Late G3EQR (Birmingham). Tel 021-554 4791, evenings.

Trio JR599CS rx, 160–10, WWV, 2m, separate xtal filters for a.m., ssb, cw, lc for fm, 100 and 25kHz calibrators, squelch, etc, manual, £180, incl Securicor delivery. Tel Larbert (Scotland) 6594, after 5pm.

Radiospares MR21S amp 1mA meter, with 30mA, 10mA, 100mA shunts, £5.50; steel cabinet, 15in long by 9in high by 8in wide, louvres back and side, no front, £3.50; RS universal output transformer, £1. G4GHB, QTHR.

Liner 2, sprog free, Mk1 but with SL641 mixer, £105; no offers. Homebrew stab psu, £5. TR2200GX, nicads, charger, heli whip, auto t/burst, hi/lo power, 6 simplex plus R4, R6, R7, £120. G8ARQ, QTHR. Tel 09363 4373.

Heathkit model HP13A mobile dc psu, comp with connecting cables and plug to fit KW2000 series, little use, in good cond, £45. Harlow, G3SHL, 90 Kettering Road, Market Harborough, Leicester. Tel Market Harborough 4384, after 6pm or weekends.

FT301 digital all ss tx/rx, brand-new, May list price without VAT, (in other words £73 off). Also TS820 digital, £615. Robinson, G2KF, QTHR. Tel 072 681 2337.

Drake R4C rx, fitted with cw filter and 160m xtal, £350 ono; property of late G2HR. G4AJA, QTHR. Tel 01-529 2282.

G2DAF tx and psu, well constructed, £45. G4ACK, QTHR. Tel Banwell 3832.

Drake T4XB and R4B, MS4 spkr, psu, new, factory built, SB200 linear, Heathkit rf wattmeter, spare finals, little used, exc cond, £750; offers considered. FTDX401, mic, Eddystone spkr, perf, £260 ono; inspection arranged. G5FH, QTHR. Tel 0425 25974, evenings.

CR100 gen cov rx, wkg, comp manual, some spares, £17; or exch good 2m converter. Johnson. Tel Bollington 73661.

Microwave Associates 3cm tx/rx front end, £69. SAE details. G8APX, QTHR.

75 teleprinter, reperf, synch-motor, gears 45/50Bd, paper, manuals, connectors; 6S6 autohead, 45/50Bd, tuning fork, connectors; PF1s two txs two rxs, xtals for 433·2 RB14, one rx not wkg; 2 × 12-way Pye charger; five tx, five rx batteries, poor cond, offers. GM8EUG, QTHR.

Solid-state Modules 2m preamp PA3, brand-new and unused, instruction leaflet, purchased in 1976 for £6.27, £5 ono. G3DSI, QTHR.

Heath SB104A with matching SB604 and HP1144 psu, superb cond, £610 ono. G3RRA, QTHR. Tel 0276 25040.

Drake TR3, remote vfo, ac psu, £220. Heath freq counter IB1100, with homebrew 200MHz prescaler, £50. Partly renovated Strumech W60, new cables and strain relief, £100. Buying TR7 rig. G4AIR, QTHR. Tel 0625 24839.

Trio TS700, vgc, 100W class ABC linear amp, £350 ono. G8KAS, QTHR. Tel Uckfield (Sussex) 2771.

Oscilloscope, Solartron CD1400 dual-beam, 15MHz bandwidth, vgc, comp with manual and hoods, £110. G8OAY. Tel Orpington 29324, after 6pm.

Technical Associates xtal calibrator, recently purchased, tried but never used, battery incl, £16, postage extra. G4FKH, QTHR. Tel 0245 61082.

Atlanta, Shure 444, £200. Exch for T-4XC. Top-band tx, a.m./cw, mains, compact, xtal/mic, £25. Realistic solid-state ac/dc gen cov rx, Joymatch atu, spkr, £60. *Wanted:* swr bridge. Turvey, G3BLZ, 2 Knowles Street, (off Walsall Street), Wednesbury, West Midlands.

Microwave Modules 432/144MHz transverter, as new cond, boxed and comp, £130. Sine/square wave audio gen, approx 12Hz–150kHz, wkg, transistorized, requires case and calibrating with diagram, £6. G8KXM,QTHR. Tel 0782 535316, after 7pm except Monday evenings.

Auto transformer, RS type 207–065A 1000VA, 0–100, 110, 150, 200, 220, 240, 250V, weight 8kg so buyer collects or arranges carr. G3DVL, QTHR. Tel Brighton (0273) 558412, evenings.

BC 221M frequency meter, built-in mains psu, wkg order, comp with charts and circuit, £20 ono. Buyer collects. G3THC, QTHR. Tel Milton Keynes (0908) 316730, evenings and weekends.

FT75, dc/ac psus, plus vfo, £140. KF430 70cm tx/rx, £150. Liner 2, with preamp, £100. GM8BOV. Tel 031-331 2755, after 6pm.

Trio JR-599 custom special rx, SP-599 matching spkr, both in immac and orig cond, £180. Hy-Gain 18AVT/WB hf ant, brand-new, never used, in box, £65. G8OSA. Tel John, 01-552 1182, evenings.

Heathkit utility solid-state voltmeter, model 1M-17, ac, dc volts, resistance 1Ω–1,000MΩ, comp with probe leads and case, exc cond, £27 ono. Peter Valteris, G8KLT ,16 Cambrian Street, Jarrow, Tyne & Wear. Tel 0670 714848, evenings.

Camera unit, in case, with Taylor Hobson 20mm f1·9 wide-angle lens, vidicon focus, defl coils, not wkg but suitable camera constructor, also spare used vidicons 9677, £30. G3NEG. Tel c/o Southend (Essex) 521966.

Storno CQL 600 fm base stn, fitted S0, S20, S21, S22, R5, R7, comp with stand, ptt mic, mains transformer, extension spkr, service manual, 10W out, absolutely mint cond, offers over £90 please. G8MEN, QTHR. Tel 01-733 8878.

Racal 117, unmarked, £250. CT53 sig gen, mint, manual, £25. GR frequency meter, 125kHz–60MHz, manual, £25. *Wanted:* TF1066 sig gen; CV-157 sideband unit; frequency deviation meter; mechanical filter, 500kHz i.f. Fletcher, 62 Moorbridge Lane, Stapleford, Notts. Tel 0602 397446.

Heathkit SB303 hf rx, with SB401 hf tx, wkg as tx/rx, 80 to 10m, fitted cw filter, connecting leads and manuals, £320. G4CNC, QTHR. Tel 01-363 1653.

Need room: collector's item, McMurdo 15/17, D-shaped walnut cabinet, 1946, electrically similar to AR88D, 140kHz 50MHz, orig cond, 15in spkr and auto change, sell or exch for orig silver finish 750 or BRT400K. Clappison, 190 Victoria Avenue, Hull.

Beautiful 1kW rating variables 500μμF and 250 × 2 split stator, TA speech comp, £12. Shure 444, £10. MFS cw filter, £8. Omega TE7-01 noise bridge, £8. Robson, GM3CFS, 8 Shebster Court, Thurso KW14 7ES.

FT221R suffix D, as new, with SEM preamp, £360 ono. 5-el /P Yagi, £6. G3KEF. Tel Coventry (0203) 78947.

Liner 2, mains psu, £110; or exchange for TR2200GX. G4GLQ, 18 Thompson Street, Toll Bar, St Helens, Merseyside.

TV camera, 625-line, modern transistor type, std 1V video output, good cond, £30. G8NGF, QTHR. Tel 01-527 6502, evenings after 7pm.

TC9 fm tx with vfo, Mk2 spec, £57. TC7 fm rx, comp with converter, £35. Prefer buyer inspect and collect if poss. Tony Groombridge (not QTHR). Tel Folkestone 862145, mornings or evenings.

RA1 rx, comp with xtal calibrator, matching ls QPM16, Q-mult and handbooks, unmodified, exc cond, £40. G3TQU, 83 Riverside, Leighton Buzzard, Beds LU7 7HX. Tel Leighton Buzzard 75514, evenings.

Heath HW-8 four band QRP tx/rx, comp with matching HWA–7–1 mains psu, matching Heath headset, built-in spkr, handbooks, factory aligned, perfect, £85. G3GGL, QTHR. Tel Bewdley (Worcs) (0299) 403372.

P40 Strumech Versatower, dismantled, in good wkg order, £130. Heathkit SB303 rx, £150. MBM46 432MHz beam, £5. F.W. Evans, GW8AWM, 142 The Highway, New Inn, Pontypool, Gwent. Tel 04955 2254.

RTTY Digitex D110 visual display system (see ad p980, Dec '77 *Rad Com*); Baudot ASCII, four speeds, 80 character line, 13 line display, with Waltham tv rx; both items as brand-new, £360. Carr extra by arrangement. G3RDG, QTHR. Tel 01-455 8831.

IC21 vfo, £25. *Wanted:* Standard C828. G4CTU, QTHR. Tel Kidderminster (0562) 3966.

Brenell 610 tape transport, £80. Heathkit OS-1 'scope, £15. Heathkit RF1U sig gen, £10. KW E-Zee match, £25. G4CRY. Tel 06493 70054, evenings.

QVO8–100B with base, exch for 7094. *Wanted: Rad Com,* '72–'77 comp, plus Jan and Feb 1978. G3SRZ, 30 Fore Street, St Blazey, Cornwall. Tel 0726 813375.

EC10, good cond, fitted discriminator, mains psu, and transceive facility, £65. Microwave Modules 2m conv, suits above, £15. *Wanted:* gdo Heath or similar. G8JXS. Tel 0684 295505.

1,296MHz equipment, quad-loop Yagi, £11; Microwave Modules converter, 28–30MHz, £25; Varactor tripler, 30W, £27; all as new. Eddystone 730/4, vgc, £125 ono. Honeywell Electronik 194 strip chart recorder, little used, offer? G3OHC, QTHR. Tel 021-308 2512.

FT2F 2m tx/rx, mic, mobile bracket, modern i.f. filter fitted, R3–R7 incl, R6 input, S0, S20–S24 incl, £110. Video Circuits cross match generator, £12. G3VPX. Tel Sheffield 874324 or Leigh 674573.

AR88D, S-meter, exc cond, professionally re-aligned (costing £55), comp with box of spares incl tuner unit, brand-new output transformer, plus valves, ifs, etc, handbook, £65 ono. G4BKM, QTHR. Tel 01-568 8497 or Denham 4358.

Sphinx ssb/cw tx, 160/80/20, 80W p.i.p., single 6146 pa, late model with ptt relay control, circuit and info supplied, self-contained mains psu, £45. G.T. Barrell, G3TKQ, QTHR. Tel Colchester (0206) 74917, after 7pm.

Yaesu FTDX401, vgc, £250, plus Securicor. GD3KHE, QTHR. Tel 0624 6636.

WG16 components: three detector assemblies, 4-port circulator, dummy load and matching stub, neon wattmeter, other WG16 components, adaptors, locking rings, £25. GM3LJR, QTHR. Tel 0383 860462.

Yaesu FT101B tx/rx, £350. FL2100 linear amp, £200. GW4BIQ, QTHR. Tel Bishopston (044 128) 3245.

Items for Redifon ssb tx/rx type GR410, incl mains psu, dc psu, connectors, modules, etc. SAE for list with prices. *Wanted:* Canadian 52 set (tx/rx); or any individual items, connectors, atu, psu, etc. Taylor, G3UCT, 27 Glen Road, Fleet. Tel Fleet (02514) 6998.

Heathkit HW32A ssb tx/rx, full 20m band cov, homebrew psu, £70. G3MRJ, 62 Long Grove, Baughurst, Basingstoke. Tel Tadley 4606.

Eddystone 730/4, good cond, cabinet slightly used look, spare valves, view, collect, cash please, £80. G4FKN, QTHR. Tel St Ives (Cambs) (0480) 65308.

FT2FB, 10W, mobile, S0, R3, R6, 144·48, 144·60, 144·80, 145·20, £100. Pye base tx 3·20A, £15 ono. MM 2m converter, 27·7–29·7, £10. *SWM, PW, PE,* from 1954 odd copies *PW* 1945, offers. Buyers collect or arrange. G8HKC, QTHR. Tel Maldon (Essex) 54080, after 6.30pm.

AR88 with S-meter, modified to receive ssb, 240V, some slight rust on cabinet but works well, manual, £35 ono. Delivery not possible. R. Morley, 66 New North Road, South Park, Reigate, Surrey. Tel Reigate 45177, evenings and weekends only.

Trio 2200GX, 8ch, mobile bracket and helical, £130. Trio 3200, mobile bracket, two helicals, £180. TD224 rtty vdu and ITT tv and modulator, £200. Motorola D1 kit, full ram etc, £100. SWTPC dual floppies, built and tested, with software, £800. G4DAW, QTHR. Tel Northampton 714821, anytime.

FT221R suffix D, orig packing, eight months old, £320 ono. AR88D plus spare valves and a spkr, £45 ono. Delivered within 50 miles Plymouth. *Wanted:* FLDX400 tx. G4GTG. Tel Plymouth 771135, evenings.

Trio TS520, cw filter less 12V inverter, £330. KW107 supermatch, swr/pwr metering, 50Ω dummy load, £50. CR100, needs some attn, £17.50. Marconi Atlanta rx, 25kHz to 30MHz, requires attn, £75 ono. G3SWC. Tel Horsham (0403) 2742, evenings.

Microwave Modules 2m to 70cm transverter, £110; 23cm to 2m converter, £22; 23cm varactor tripler, £26; antenna relay, 12V, £5; All in exc cond. G4EQD, QTHR.

Trio TS520 matching TV502 ext spkr, "mint" cond, £450. 18 AVT/WB, £40. TCC forward reverse p/meter with KW antenna switch and KW E-Zee match, £35. G4BQE. Tel Rotherham 893575.

Bargain equipment/component clearance: many items incl heterodyne frequency meter, vvm, sig gen, 'scopes, SFH test gear, transformers, cables, components etc, sae for list, no reasonable offer refused. Retiring to smaller QTH so must sell. GW4EEX, QTHR.

Marconi ¼% universal bridge TF1313; Wayne Kerr component bridge B121; Advance sig gen 81A; Advance af gen type H1; Solartron Solarscope type CD513; Cossor oscilloscope, double beam, 1071K; no reasonable offer refused for lot or single item. G3ZTM. Tel Walton-on-Thames 21731.

Philips Vidicon camera, £40. Akai M8 stereo tape-recorder, ¼ track, two speed, £35. National RQ2125 cassette recorder, can be used for dictation, £27.50. *WW* dolby noise processor, £40. Two Reslo ribbon mics, offers. 3BPI tube, £3. GM8CJW, QTHR. Tel 0324 26367.

MMT 144/432 transverter, as new, little used, £125. Liner 2, fitted rf preamp, exc cond, £105. King, G8CHK, QTHR (Northants). Tel 0327 50581 ext 359 day, 0327 35788 night/weekend.

Suffolk, two bedroom cottage, modernized, good country vhf site, small tower, 1½ miles south of Debenham, £14,750. G3XSF, QTHR. Tel Halifax 60438.

Canadian 52 rx, c/w power pack, orig wkg 1944, £20. MFJ cw filter, ssb filter, freq standard, £10 ea p/paid. Exch fet preselector/Mohican gc rx. Tel Coventry 22201.

7200G, unmodified, 15ch fitted, VFO30G, orig packing, £160. NR56 2m rx, as new, hardly used, S20 and R3 xtals fitted, £40. G4GCL, QTHR. Tel Heckmondwike (0924) 402257.

Eddystone EC10 Mk 2, immac, fitted fm discrim, 2m converter, £110. GEC 2110 colour chassis, works ok, less crt, 2m 6-el beam, offers. G4BPU, QTHR. Tel Basildon 414044.

Mic/tel headsets, Hosiden BH001 200/15Ω, new, boxed (sae for photo), £6 plus 45p post. Edgewise meters, 2in scale, 0·5 or 1·0mA fsd, new, £1.75 plus 20p post. Transformers, 18·5V 1·5A, 6·3V 0·5A, new, £1 plus 30p post. G3YLO, QTHR. Tel Berkhamsted 73717.

Heathkit HW202 mobile 2m fm tx/rx, recently professionally overhauled, also psu, £120 ono. G8IWU, QTHR. Tel Chesham (02405) 5557.

FT75B, little used, ac and dc psus, FV50C, VC75, £220. TR2200G, 10ch, nicads, charger, helical, £130. ETM2B keyer, £30. Datong frequency agile filter, £35. 18AVT/WB, £35. Heath HA201, £13. Heath HD1250 gdo, £25. BC221AF h/b psu, £20. Wright. Tel Slough 70085.

Trio 7010, exc cond, £140. KP202, nicads, helical antenna, nine sets xtals, leather case, f-uhf, £100. MMC 144/28, £12. MMC 432/28, £15. Sentinel 144MHz low noise preamp, £2. G8LYD, QTHR.

Special fm Westminster/pa combination, 80W out at 12·5V, rx improved 31dB at 1μV emf, 130dB, 12kHz filter, all cables, mic, etc, R5, R6, R7, S22, S20, S0, long boot box, t/b incl, offers not under £120 considered. Adrian Andrews, G8AVR. Tel Templecombe (Somerset) 587, evenings not weekends.

Liner 2, preamp fitted, leads and manual incl, good cond, £95. G8KON, QTHR. Tel Stroud (Glos) 2429.

KW Atlanta, 10–80, tx/rx, 500W p.e.p., £235. Standard C146A 5ch fm, extra xtals, £115. Belcom psu 12V/3A, £14. MM 2m convtr, 28MHz i.f., £14. Heath Comanche rx, 80–10m, £35. G4AFY, QTHR. Tel Kidderminster 63358.

FT227R 2m rig, mic, mobile mount, etc; ASP λ/2 mobile whip with mag mount; AR2 Ringo base antenna; £190. G3VLQ, QTHR. Tel Reading 599591, after 6pm.

QTH, 400ft asl, four beds, study, utility/playroom, pantry, lounge 18ft by 16ft, full ch, mains services, stone outbuildings, 12ft square greenhouse, barn holds five cars, shack, fell-side village, view appointment only, £27,000. G3NMP. Tel Culgaith 637.

Marconi HS27 tx with HR28 rx, 2·27MHz continuous cw/fsk/ssb/dsb/isb monitorscope, rtty unit, psu, atu, etc, complete installation, manual. G3UDO, QTHR. Tel 01-654 8043.

Shack clearance: Inoue ssb hf tx/rx, £125. Eddystone marine rx, £30. 840, £55. Unmodified HRO, £40. R208, £15. Solartron oscillator, 25Hz/500kHz, offers. SAE list and details other gear. G3DVF. Tel Alnwick 2487.

Yaesu FTDX401 tx/rx, very good cond, recent overhaul by Yaesu agent, can be heard often on 80, orig packing, manual, £260. GW4FLZ, QTHR. Tel 0244 531782.

Marconi TF867 sig gen, £50. Eddystone 830 gen cov rx, £80. Philips LDL1000 vtr, requires heads, £50. Cintel monitor, £16. Marconi TF142F distortion factor meter, £50. Other test gear, sae for list. G3MHS, QTHR. Tel Sedgley (09073) 73465.

SB104A digital readout broadband tx/rx, SB644 remote vfo, HP1144 psu, change band/frequency and instantly transmit without tune-up, nice outfit, built to professional standards, pcbs ultrasonically de-fluxed, £525. G3XHX, QTHR. Tel Liskeard 43749, after 7pm.

Auto xtal toneburst, £7.50. 3·579MHz toneburst xtal (÷2^{10} = 1748Hz), £1.75. Doram 5/8 whip, £7.50. 13·5V psu, will drive Cambridge etc, £12.50. G4FFJ, QTHR. Tel Newcastle Upon Tyne 815966.

Eddystone EC10 gen cov rx, vgc, with manual, a bargain at £60 ono. Tel Brentwood (0277) 217517, after 5pm.

FT101, orig owner, low usage, mint cond, no mobile use, fitted latest rf board, £340. KW Atlanta, pro fitted solid-state vfo, new pa valves, £225. KW107 antenna matching unit, £75. Top band transverter, pro built in commercial cabinet to design in *Rad Comm,* all leads and plugs for operation with FT101, £25. Datong rfc processor, £25. Drake 2B rx, fitted 160m band mods and xtal, 100kHz calibrator, mint cond, £100. *Wanted:* Datong FL1 filter unit. G6XY, QTHR. Tel Kenilworth 52679.

WANTED

RX design wizard required to construct solid-state hf rx, all parts plus metalwork to commercial standard supplied, any reasonable fee. There is no commercial rx on the market which comes up to req'd spec! Jenkins, 22 Foulden Road, Stoke Newington, London N16.

KW Vespa or Viceroy tx, price and cond to G3GGK, QTHR. Tel Madingley 374.

TX/RX for hf bands, Trio 520, Yaesu FT101E, Heathkit HW101, SB102 etc, or similar, must be in really nice cond. Also KW107 and KW103. G3WY, QTHR (Worcs). Tel Evesham 45497.

Bungalow or cottage in country, SW of Southampton to Cornwall, for VE3HFK returning home; three bedrooms, lounge, dining room, kitchen, full central heating, garage. Reply to Fred Hamer, c/o 198 Malmesbury Park Road, Bournemouth BH8 8PP.

5·5V 20A transformer, QRO psu, aluminium poles, rods, Andrews cable, coaxial cable, aluminium mesh, rotator, 813 plus base, lathe change wheels 16 DP. G8BLH, "Mews Cottage", Pond Lane, Clanfield PO8 0RG. Tel 0705 596058.

KW Monitorscope or similar; Trio TX599, silver front panel; Variac 0-270V 8A with meter; also 2m Yagi; all items must be fb cond. G3WXT, QTHR.

Manuals for R1155 and Cambridge AM10B, to buy or copy. G8KBZ, QTHR. Tel 01-743 8000 ext 3330 (work), or 01-579 3958 (home).

RF board for Pye Cambridge AM10D, modified 2m with Variac tuning. G4CNB, QTHR. Tel 0621 782388.

Cheap 10–80m ssb tx, KW Vespa or why? G3NAS, QTHR. Tel Aldridge 53718.

Drake SPR-4 rx, in good cond. Carver. Tel Chelmsford (0245) 440325.

Pye Cambridge or similar model for 2m fm. *For sale:* BC221N, mains psu, manual, £15. Two 811A valves, as new, £4 ea. Muirhead/HRO dial, £4. GM6MS, QTHR. Tel Lesmahagow 2827.

Ham M rotator or similar. High power 2m linear. 70cm beam. Very high current diodes, eg 200A 100V for arc welder. GM8HSY, QTHR. Tel Falkirk 23860.

Pocketphone PF1 plastic case, rx only. G8CZM, QTHR. Tel 021-422 2986.

Heath or other compatible psu for use with HW12 single bander on mains. G4ACK, QTHR. Tel Banwell 3832.

House or flat in W or SW London, near tube (District or Piccadilly lines), for four sensible third-year geology students at Royal School of Mines, good references, anything considered. G4ENL, QTHR. Tel 0670 4242.

Xtals for G2DAF rx, 7MHz, 9MHz, 12·5MHz, 19·5MHz, 26·5MHz, 33·5MHz, 34·0MHz, 34·5MHz, 35MHz, plus 6·0MHz, 6·5MHz, 11·3MHz, 15MHz, 17·1MHz, 20·5MHz, 23MHz, 27·0MHz, 31·1MHz; also RF26 type twin gang 75PF, and 75PF with ext ganging spindle. G3AMF, QTHR. Tel 01-989 9224.

HP noise sources 343A and 349A. Spectrum analyzer Tektronix type 491. DL7QY. Claus Neie, Martin-Luther-Str 121, D-1000 Berlin 62. Tel Berlin 030 7824418.

QM70 high power transverter, 28/144MHz Eddystone Edometer gdo, 6K8 6SJ7 metal valves. Taylor, 8 Heythrop Drive, Middlesbrough.

Circuit/Manual for Mullard vtvm E7555/2, buy or borrow. Banfield, 2 Oaklands Avenue, Sidcup, Kent.

Logging plastic scale for Hallicrafters S20 rx; wafer for rf section switch on Eddystone S640 rx; Philips "pick-up arm" stereo for GC028, GA228; 12077·5kHz HC6U xtal for KW2000. *For sale:* valve A2426, £2. G3MBL, QTHR. Tel 01-445 4321.

Reasonably priced rx, suitable for cw work, eg CR100 or similar. All letters answered. Hallam, 15 Wootton Crescent, Bristol BS4 4AN. Tel Bristol (0272) 770984.

MMT 432/144R or similar; exch for unused 115V Ham 2. G8CYQ, QTHR. Tel Runcorn 65186.

Morse key, type D 10D 7373 or similar. "Q" code books. GM8JYZ, QTHR. Tel Tealing 313.

Ex-RAF intercom amp, type A1134. Strong, 58 Napier Road, Ashford, Middx. Tel Sunbury 87913.

Lorentz type 15 teleprinter, 45·5Bd gear set. D. Stephenson, VE5KQ, Apt 34 30 Summers Place, Saskatoon, Saskatchewan, Canada S7H 3W4.

Trio TS900, must be exc cond. G3RDT, QTHR. Tel Chichester 87704. Trio JR500SE rx, in good cond. Also Codar AT5 and T28. Details to G3NJQ, QTHR.

2m linear; 70cm gear, fixed, portable; freq counter, hf, vhf; vfo for FT75; EC10, Mk2 pref; G2DAF tx, rx, (linear), Mk2 pref; recent callbooks, USA, USDX; KW E-zee match. *For sale:* B2, comp; A3 spy set. G2BAM, "Manor House", Woolland, Blandford, Dorset.

12V cw-QRP rig, pref transistor, any bands, for use on holidays in mobile caravan, prefer tx/rx but separates considered, incl good homebrew. Details and price (all letters answered) to Bainbridge, G4GSY, 7 Rothbury Close, Bury, Lancs.

Wartime Magnetron CV64 or similar. G4AIJ. Tel Ludlow 3197.

Any information on 2m tx/rx Emsac CN2/TX2. All letters answered. ZC4AK, Akrotiri Radio Club, GRSS, RAF Akrotiri, BFPO 57.

KW2000A, with spkr, ac psu, leads, manual, etc; KW107 for schoolboy amateur; must be in perfect wkg order. Details and price please to Kittle, G4GWT, 127 Palmerston Road, Grays, Essex RM16 1YL.

FT221R; also vfo FV101B, must be in good cond, no mods, state price. Tel Vic Wyse (Dalkeith, Midlothian), 031-663 4280, after 6pm.

KW E-Zee match, atu; Heathkit Cantenna dummy load; KW low pass filter 52Ω. Steve, G8OTX. Tel Appley Bridge (Wigan) 2330, evenings.

Canadian 52 set (tx/rx), comp and in good wkg cond. Individual items, atu, psu, connectors, etc, also considered. Taylor, G3UCT, 27 Glen Road, Fleet, Hants. Tel Fleet (02514) 6998, after 7pm.

Yaesu FT101, preferably model with top band, must be absolutely mint, with manual, etc, within reasonable distance to inspect and collect. Offers please to Guy, G3IBH, QTHR. Tel Hitchin (0462) 56714.

Coil box cover and case for R1155 rx. FT101 tx/rx, basic or B model, must be in good cond, to be used as transverter source until morse test is passed, £260 offered. Salisbury, GW8KSF, QTHR.

Blower motor and 1mA meter for ex-RAF radar indicator unit, type 162. Strong, 58 Napier Road, Ashford, Middx. Tel Sunbury 87913.

Definite information where following obtainable: ceramic caps; tubular 750V dc 500pF; disc 1,000V dc 1,000pF; shortening switch for Pi-network coil. Postage refunded. G6BJ, QTHR.

Someone to overhaul my Telford TC7 tunable i.f. Please help. Tel Sunderland (0783) 280080, 6–8pm.

Four or eight poly-quad fibreglass spreaders, or similar make. G3CEG, QTHR, Tel Miserden 395, after 6pm.

KW107/9 Supermatch or similar; SP101 spkr; G-whip hf mobile antenna; details and prices please. *For sale:* KW101 swr meter, £8.50. Louisa James-Robertson, 17 Heol Wen, Rhiwbina, Cardiff. Tel Cardiff 64669, evenings.

Yaesu FV101 vfo YO100 monitorscope; non-wkg hf bands tx/rx. 1 Lovelace Road, Oxford.

Westminster W15AM hb dash or boot set, cash waiting. G4AFY, QTHR. Tel Kidderminster 63358.

Trio JR310 rx. G4BPY, QTHR.

Valves type KT8C (CV1079) and STC 4304CB (CV315); G2AK type bandswitched metered hf absorption wavemeter; exch small megger in leather case for good gdo, valve or transistor. *For sale:* KW 1pf, 75Ω, £6. 1,250V pu, £15 ono. G3JFC, QTHR. Tel Crayford 52289.

Viceroy Mk3A/4,, extra half lattice filter, manual, state cond and price; can collect 100 mile radius of Lowestoft. G3WDN, QTHR.

DIODES/ZENERS

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

SOCKETS/BRIDGES

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

TRANSISTORS, LEDS, etc.

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

C MOS

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

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7400	.10
7401	.15
7402	.15
7403	.15
7404	.10
7405	.25
7406	.25
7407	.55
7408	.15
7409	.15
7410	.15
7411	.25
7412	.25
7413	.25
7414	.75
7416	.25
7417	.40
7420	.15
7426	.25
7427	.25
7430	.15
7432	.20
7437	.20
7438	.20
7440	.20
7441	1.15
7442	.45
7443	.45
7444	.45
7445	.65
7446	.70
7447	.70
7448	.50
7450	.25
7451	.25
7453	.20
7454	.25
7460	.40
7470	.45
7472	.40
7473	.25
7474	.30
7475	.35
7476	.40
7480	.55
7481	.75
7483	.75
7485	.55
7486	.25
7489	1.05
7490	.45
7491	.70
7492	.45
7493	.35
7494	.75
7495	.60
7496	.80
74100	1.15
74107	.25
74121	.35
74122	.55
74123	.35
74125	.45
74126	.35
74132	.75
74141	.90
74150	.85
74151	.65
74153	.75
74154	.95
74156	.70
74157	.65
74161	.55
74163	.85
74164	.60
74165	1.10
74166	1.25
74175	.80
74176	.85
74180	.55
74181	2.25
74182	.75
74190	1.25
74191	.95
74192	.75
74193	.85
74194	.95
74195	.95
74196	.95
74197	.95
74198	1.45
74221	1.00
74367	.75
75108A	.35
75491	.50
75492	.50
74H00	.15
74H01	.20
74H04	.20
74H05	.20
74H08	.35
74H10	.35
74H11	.25
74H15	.45
74H20	.25
74H21	.25
74H22	.40
74H30	.20
74H40	.25
74H50	.25
74H51	.25
74H52	.15
74H53J	.25
74H55	.20
74H72	.35
74H101	.75
74H103	.55
74H106	.95
74L00	.25
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74L74	.45
74L75	.55
74L93	.55
74L123	.85
74S00	.35
74S02	.35
74S03	.25
74S04	.25
74S05	.35
74S08	.35
74S10	.35
74S11	.35
74S20	.25
74S40	.20
74S50	.20
74S51	.25
74S64	.15
74S74	.35
74S112	.60
74S114	.65
74S133	.40
74S140	.55
74S151	.30
74S153	.35
74S157	.75
74S158	.30
74S194	1.05
74S257 (8123)	1.05
74LS00	.20
74LS01	.20
74LS02	.20
74LS04	.20
74LS05	.25
74LS08	.25
74LS09	.25
74LS10	.25
74LS11	.25
74LS20	.20
74LS21	.25
74LS22	.25
74LS32	.25
74LS37	.25
74LS38	.35
74LS40	.30
74LS42	.65
74LS51	.35
74LS74	.35
74LS86	.35
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74LS107	.40
74LS123	1.00
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144-030 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144·4/433·2 ..	a	b	a	b	b	c	b	c	b	b	b	b	b	b
144·480 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144·800 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
144·850 ..	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145·000/SO ..	a	a	a	a	a	a	a	a	a	a	a	a	a	b
145·050/R2T	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·075/R3T	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·100/R4T	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·125/R5T	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·150/R6T	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·175/R7T	a	a	a	b	b	a	b	a	b	b	b	b	b	b
145·200/R8T	a	a	a	b	b	a	a	a	b	a	a	b	a	b
145·300/S12	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145·350/S14	b	b	c	b	b	c	c	c	b	c	c	b	b	b
145·400/S16	b	b	b	b	b	b	b	b	b	b	b	b	b	b
145·500/S20	a	a	a	a	a	a	a	a	a	a	a	a	a	b
145·525/S21	a	a	a	a	c	a	a	a	b	a	a	b	a	b
145·550/S22	a	a	a	a	c	a	a	a	b	a	a	b	a	b
145·575/S23	a	a	a	a	c	a	a	a	b	a	a	b	a	b
145·600/S24	a	a	a	a	c	a	a	a	b	a	a	b	a	b
145·650/R2R	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·675/R3R	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·700/R4R	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·725/R5R	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·750/R6R	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·775/R7R	b	b	b	a	b	b	a	b	b	a	a	b	a	b
145·800/R8R	a	a	a	a	a	a	a	a	b	a	a	b	a	b
145·95 ..	a	b	a	a	b	b	b	b	b	a	b	b	b	b

Prices: (a) £2.36, (b) and (c) £3.20 + VAT (H).
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Modes	LSB USB CW AM FSK FAX/SSTV
Power Requirements	100/234V AC or 13·5V DC
Input Power	280W PEP (240W on 28MHz)

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Frequency Counter	10Hz to 30MHz
Output Voltage 2V (p-p)	Impedance 50-100ohms
Counter unit input Level	0·1V (p-p) 100kHz > 1V (p-p) 100kHz <
Power Requirements	100/234V AC

CQ 301 LINEAR AMPLIFIER

Frequency Range	10M to 160M
Mode	LSB USB CW AM
Power Requirements	100/234V AC
Max Input	2KW SSB 1KW AM
Drive Power	100-200W
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Oxley airspaced 9mm sq base 1-10pf and 1-15pf, **18p** each; 2-30pf **20p** each.

JACKSON TETFER TRIMMER Cat. No 5640 9mm sq base, **25p** each; also 8mm P.C. mount, **25p** each.

PLASTIC SEMI-AIRSPACED TRIMMER as used in PYE Westminsters P.A. stages 10-60pf, **15p** each.

JACKSON BUTTERFLY TRIMMERS 17+ 17PF 1·2mm air gap Cat. No C713, **50p** each.

ELECTRONIQUES TUNING DIALS reduction 6-1 and 36-1, uses epicyclic drive, moulded clear plastic front, size 100mm × 160mm, supplied with two scales and two pointers, **£6.50.**

STEREO CAR CASSETTE player amplifier boards with two amp. ICs NEC-uPC 1001 H2, some models with uPC 1025H, requires 12V D.C. 3½W per channel, removed from new equipment by manufacturer, size 120mm × 45mm, supplied with circuit. **£2.25**, each 5 watt version **£3.00** with circuit.

FM RADIO FRONT END TUNER Units 88-108MHz (remove three Cs and it tunes Air Band) and 2m very high quality and stable unit with exceptional sensitivity FET RF amp. NPN mixer and separate osc. AFC, and AGC inputs, works from 9-15V D.C., with circuit; new and unused BARGAIN @ **£3.30** each;

470KHz AM IF AMPLIFIER BOARDS as used in Car Radio/Cassette players full of miniature Rs & Cs two double tuned IFTs, trimmers, coils, tantalum Cs, transistors, and LM382N low noise stereo pre-amp, size 1½" × 4½" new unused with circuit **£1.00.**

REVCO VHF AERIALS MA200 Magnetic base with ⅝th 144–146MHz coil & whip approx 3db gain **£19.00** p/p £1.00.

REVCO 144–146MHz ⅝th mobile aerial **£8.50** also commercial R/T band 156–172MHz (approx 3db gain both types) **£8.50.**
500μA small Jap type **45p** each

CRYSTALS OK for 2 Mtrs ie:- × 4 + 10·7MHz, 33·5, 33,550, 33,575, 33,600, 33,675, 33,700, 33,725, 33,750, 33,775, 33,800, all **£1.25** each.

SECOND CONVERSION CRYSTALS 11·170 HC6/U, 11·155 HC6/U, 10·230 HC6/U & HC18/U, all **£1.75** each. 4,000MHz HC6/U **£2.00.** 7,000MHz HC6/U **£2.00.**

BARGAIN BOX of P.C.B. this contains damaged, broken, or incomplete car radio boards, hundreds of useful components etc, sold by weight approx 2Kg (4½lb) only **£2.00** plus postage £1.25 (U.K. only).

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