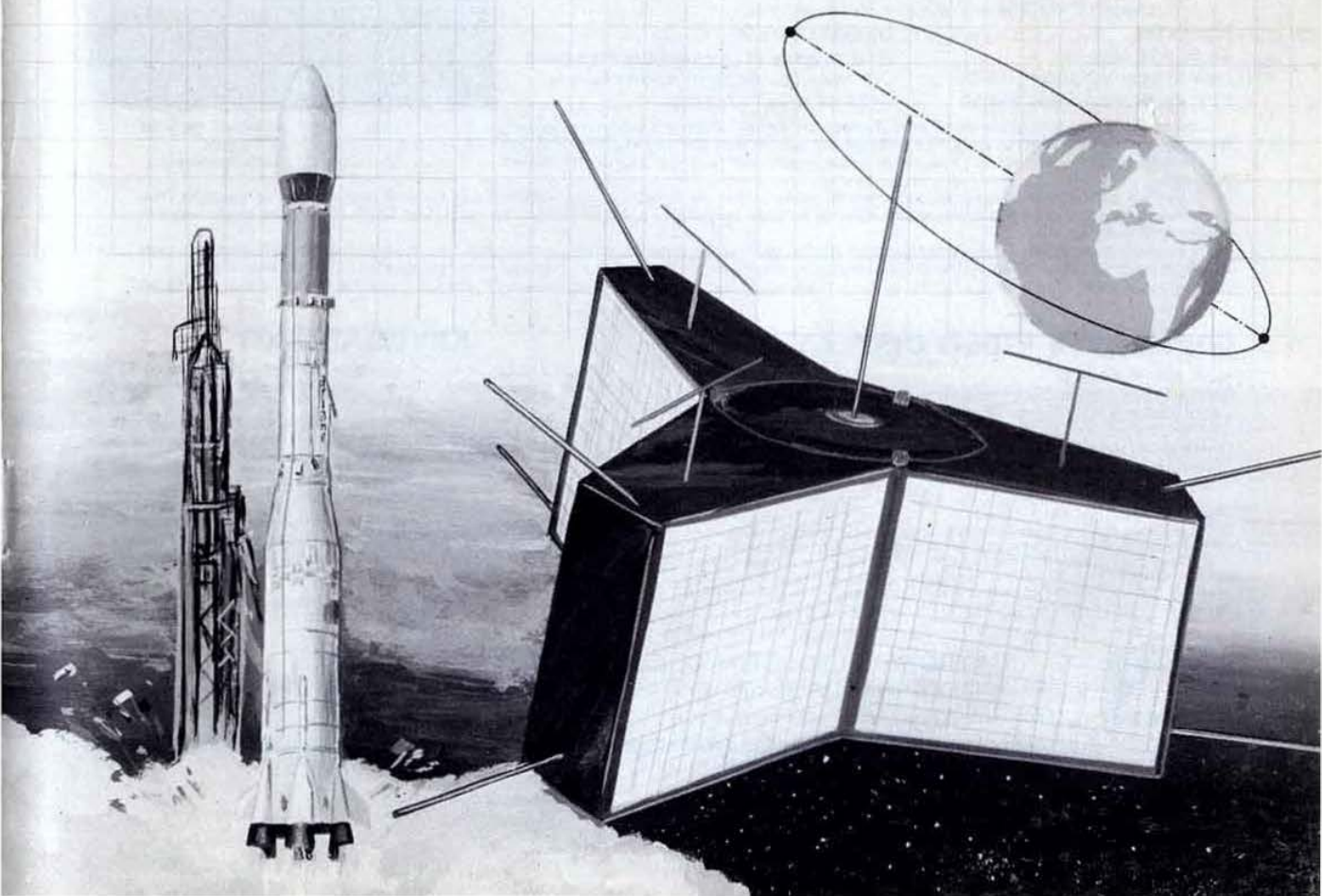
May 1980

radio communication

journal of the Radio Society of Great Britain

Ariane takes off with Oscar

A new era in amateur space communication



AVAILABLE FROM Catronics

VIDEO DISPLAY UNIT MODEL CD310
ESPECIALLY DESIGNED FOR THE RTTY ENTHUSIAST

The video display unit is designed to be an all-electronic replacement for a Teleprinter, and therefore does not suffer its disadvantages—bulk, unreliability and noise.

The basic function is to take Murray Code—either from a Terminal Unit (on receive) or from a Keyboard—and produce a complete TV signal. This signal may be fed into a monitor or modulated and fed into the aerial of an ordinary domestic TV set. The resulting display is a page of 16 lines of up to 64 characters.

It may also be used (with its keyboard) to send fully encoded Murray Code signals for transmit purposes.

16 lines per page
64 characters per line
Standard TTL compatible input
Standard IV video output
Flashing cursor
Auto-scroll at end of page
Cabinet size 9" × 2½" × 7" approx

Front panel controls for: **Letter shift**, **Figure shift**, **Page reset**, **Carriage return**, **Line feed**

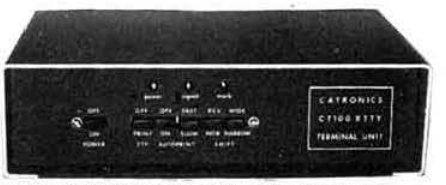
Built-in mains PSU
Styled to match the Catronics CT100 Terminal Unit

Model CD300 VDU as above: £160.00 Model CD310 with built-in UHF modulator: £170.00 (Add £5.50 for Courier delivery)

COMING SOON: 4 PAGE MEMORY VERSION TO STORE UP TO 64 LINES with built-in UHF modulator: PRICE approx £220.00

and don't forget the RTTY TERMINAL UNIT CT100 Mk2

Now incorporating a number of modifications, YOU have asked for: including Completely automatic receive/transmit modes.
Protected and buffered input provided for TTY keyboard.
Automatic re-generation of incoming tones.
Special r.f. interference suppression circuit, etc, etc.



Inputs for:
Audio FSK signal in
Data in from VDU (eg CD300).
TTY Keyboard or Tape Reader

Outputs for:
VDU or other TTL compatible equipment
TTY Magnet – single or double current
AFSK to drive Transmitter

Featuring a unique digitally controlled **'Autoprint'** circuit which is a superior replacement for the 'Antispace' and 'Autostart' facilities found on some other terminal units. The terminal will ignore most CW and phone signals but will respond to a correct RTTY signal.

Tuning correctly into an RTTY signal is made simple with a single **'correctly tuned'** LED plus an additional **'Mark frequency'** indicator.

The FSK demodulator circuit utilises a special 'state-of-the-art' system to give excellent performance and stability at low cost. The demodulator is set to decode signals within 75Hz of nominal frequency i.e. 1200–1350Hz for space and 1370–1520Hz for mark, when in narrow shift position.

The teleprinter interface unit incorporates electronic 'de-bounce' circuitry to eliminate spurious switching from the Keyboard. The loop supply is protected by a separate fuse and is suitable for driving all single current and double current magnets known to be available.

VAT inclusive prices are as follows: CT101 without Teleprinter interface **£99.60**, CT103 Complete Terminal Unit **£104.90**. All models plus **£5.50** Courier delivery

G3PLX RTTY VIDEO DISPLAY

(April 1977 Rad Com)
Kit (excluding modulator and keyboard) **£101.45**
Set of printed circuit boards **£28.45**
UHF Modulator kit **£13.25**
Flashing cursor kit **£7.95**
Diode Matrix kit **£16.35**

Please add 40p postage.

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

KEYBOARD KIT

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

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

G3PLX RTTY VDU
Auto morse sender, etc.

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

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

Price: only £30.25. Please add 50p for postage

Pay by cheque, PO, Access or Barclaycard. HP also available

Access

CATRONICS LTD, DEPT C5 COMMUNICATIONS HOUSE,
20 WALLINGTON SQUARE, WALLINGTON, SURREY SM6 8RG. Tel: 01-669 6700

Shop/showroom open Monday–Friday: 9.00–5.30, closed for lunch: 12.45–1.45. Saturdays: 9.00–1.00.

BARCLAYCARD VISA

ISSN0033-780

Contributions **(including Members' Ads)** and all correspondence concerning the **content** of *Radio Communication* should be addressed to:

The Editor, RSGB,
88 Broomfield Road,
Chelmsford,
Essex CM1 1SS

Tel 0245 84938

Office hours: 0900 to 1700

Correspondence concerning the distribution of the journal and all other Society matters should be addressed to:

RSGB Headquarters,
35 Doughty St,
London WC1N 2AE

Tel 01-837 8688

Office hours: 0915 to 1715

radio communication

May 1980 **Volume56 No5**

CONTENTS

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

ABC MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

23,743 copies per issue average circulation in 1979

Closing date for contributions unless otherwise notified: five weeks before publication date

NUNSFIELD HOUSE

AMATEUR RADIO GROUP

present the eleventh

ELVASTON CASTLE

MOBILE RADIO RALLY

Sunday, 8th June, 1980

The Midland's largest outdoor rally held on the showground of Elvaston Castle Country Park, 5 miles south-east of Derby on the B5010 (signposted)

Rally Opens 10am, Sunday, 8th June, 1980

ADMISSION FREE

CAR PARK 30p (charges levied by local authority) **COACH PARK £1.20**

SPECIAL ATTRACTIONS

Children's entertainment • Sideshows • RSGB Bookstall
Grand Bring and Buy Sale • Prize Draw
Derbyshire Police Crime Prevention Display
Mickleover British Legion Pipe Band • RAF Display
Demonstration by Midlands Kite Flyers—and much more

TRADE EXHIBITORS AT TIME OF GOING TO PRESS

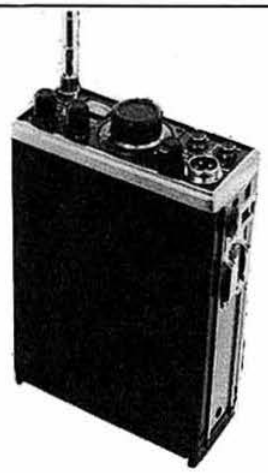
Ace Mailtronix Ltd
AJH Electronics
Amateur Radio Exchange
Arrow Electronics Ltd
B. Bamber Electronics
J. Birkett
Bredhurst Electronics
Chordgate
Corbett Electrical Supplies
Crayford Electronics
Deltec
Digital Devices Ltd
Display Electronics
DS Electronics
Elplan Electronics
R. J. Finch
Fisher Products
Garex Electronics
Grove House Electronics
Horsfield Developments
Ipcomms
Isherwoods Electronics
JMG Electronics
Johns Radio
JPS
Lowe Electronics Ltd
Marco Trading
M&B Radio (Leeds)

Mechanelec Ltd
Microtronics
Microwave Modules Ltd
Minffordd's
MK Electronics
Newton Engraving
Nixon Electronics
Northampton Radio Club
Northern Communications
NW Electronics
Packer Communications
PKG Electronics
PM Electronic Services
Quartslab Marketing Ltd
Radio Telephone Services
Radiotronics
Radtech
Royd Electronics
Scorpio Amateur Aerials
Sentinel Supply
SERT
SGS Electronics
SMC (Jack Tweedy) Ltd
Sota Communication Systems Ltd
Taurus Electrical Services
A. H. Thacker & Sons Ltd
W. H. Westlake
Wilson Valves

TALK-IN by GB2ECR on 144 and 432MHz FM

Further information: I. Cage, G4CTZ, 25 Petersham Drive, Alvaston, Derby DE2 0JU
Tel: Derby (0332) 71875

LOWE ELECTRONICS Ltd



APPROVED TRIO DEALER

TRIO TR2300

£166.75 inc. VAT

Nicad Pack £10.35 inc **VB2300 £49.45 inc**

Trio have always been acknowledged leaders in the field of portable VHF equipment and this leadership is amply demonstrated by the TR2300. Following the long established TR2200 line, the TR2300 combines all the virtues of small size, ease of use and rugged go-anywhere construction but introduced for the first time, full band coverage in 25kHz steps from the same advanced synthesiser used in the TR7500. This provides all 80 FM channels from 144–146MHz together with 600kHz repeater shift (and reverse repeater if requested). Automatic tone burst is provided for repeater operation thus catering for all operational needs.

The high sensitivity receiver section uses a combination of effective RF filters providing optimum cross modulation rejection across the entire band. An extra low profile speaker uses a samarium cobalt magnet to reduce equipment size whilst improving speaker efficiency and clarity of reproduction.

The remarkable asset of the TR2300 has to be it's unexcelled versatility. Using the carrying case and shoulder strap, you can take the 2300 anywhere, powered by the rechargable ni-cad batteries, and this is certainly the way that most operators use the rig. Sit the 2300 on top of a 12V dc supply at home, however, using the power cord provided, and you have a terrific home station FM rig.

If you want mobile operation, slot the 2300 into an MB1 mounting bracket, possibly add the matching VB2300 amplifier and you have a really high performance mobile transceiver—and being so small, the TR2300 fits almost anywhere. The front panel layout was designed for ease of operation and the back illuminated dial is so easy to read that it's a delight to use.

TR2300—truly the transceiver for all seasons.

Now—if you insist on a handheld, and don't need the versatility of the 2300, take a look at the new TR2400.

TR2400

£210.45 inc. VAT

(includes Nicads, charger & helical aerial)

The TR2400 is a futuristic 2 metre FM handheld transceiver incorporating a large LCD frequency display, 400 channel operation from 144–146MHz, 10 memory channels and a host of frequency control systems (including scanning) all designed around a microcomputer. The sophisticated design makes the TR2400 the ideal handheld to meet all repeater or simplex operation for the 2 metre man.

1. Large LCD digital frequency readout. Clearly readable even in direct sunlight, with black illumination for night use. Virtually no current drain (unlike LED displays) so display stays on all the time. Shows RX and TX frequencies and memory channels. Also included in display are indicators for "on air", "memory recall", "battery status" and "lamp".
2. Frequency control functions. Keyboard entry of any frequency from 144–146MHz in 5kHz increments. Up/down manual scanning from 144–146MHz in single or fast continuous 5kHz steps.
3. 10 memories (retained by battery backup), one of which can be used as a non-standard repeater shift. Automatic scanning of all 10 memory channels is provided, and scanning can be for a busy channel or the next free channel.
4. Full repeater operation and also instant reverse repeater operation at the touch of a switch. Proper auto tone burst provided.
5. Fast 1½-hour base charger and stand with full external microphone facilities available.
6. Lock switches are provided to prevent misoperation of the keyboard and also to disable the press to talk switch.

See us at ELVASTON CASTLE June 8th

7. Power output of over 1·5W to a BNC aerial connector (flexible whip supplied as standard). Decent size batteries for long operating time.
8. Superb mechanical design in the Trio tradition of top engineering, based on a die cast frame for real drop-proof performance.
9. Supplied complete with Nicad pack, charger, rubber helical aerial—ready to go.
The TR2400 is the best available; would you expect less than the best from Trio?

It's a little more expensive than it's competitors—but oh so far ahead in performance.

THE TRIO 2 METRE TWINS

LOWE ELECTRONICS Ltd

TRIO TS180S

£679.65 inc VAT
(including DFC memory unit)

Trio's TS180S with DFC is an all solid-state HF transceiver designed for the DXer, the contest operator, and all other Amateurs who enjoy the 160 through 10-metre bands. The following features prove, beyond doubt, that the TS180s is the finest rig available!

Digital Frequency control (DFC) including four memories and manual scanning. Memories are usable in transmit and/or receive modes. Memory frequencies to be tuned in 20-Hz steps up or down, slow or fast, with recall of the original stored frequency. It's almost like having four remote VFOs!

All solid-state . . . including the final. No dipping or loading. Just dial up the frequency, peak the drive, and operate.

High power . . . 200W p.e.p./160W dc input on 160-15 metres, and 160W p.e.p./140W dc on 10 metres. Also covers more than 50kHz above and below each band (28-30MHz), WARC, etc., and receives WWV on 100MHz.

Improved dynamic range.

Single-conversion system with highly advanced PLL circuit, using only one crystal with improved stability and spurious characteristics.

Built-in microprocessor-controlled large digital display. Shows actual VFO frequency and difference between VFO and "M1" memory frequency. Blinking decimal points indicate 'out of band". Monoscale dial, too.

IF shift . . . Trio's famous passband tuning that reduces QRM.

Selectable wide and narrow CW bandwidth on receive (500-Hz CW filter is optional).

Automatic selection of upper and lower sideband (SSB NORM/SSB REV switch).

Tunable noise blanker (adjustable noise-sampling frequency).

RF AGC ("RGC"), which activates automatically to prevent overload from strong local signals.

AGC (selectable fast/slow/off).

Dual RIT (VFO and memory/fix).

Three operating modes—SSB, CW and FSK.

Improved RF speech processor.

Dual SSB filter (optional), with very steep shape factor to reduce out-of-passband noise on receive and to improve operation of RF speech processor on transmit.

13·8 VDC operation.

TRIO TS120V/S

TS120V £347.30 inc VAT

TS120V	£347.30	TS120S	£432.40
PS20 4 Amp	£44.85	PS30 20 Amp	£85.10
AT120	£55.20	MC355 mic	£13.80
SP120	£25.30	TL120 linear	£128.80
VFO120	£89.70		

THE SYSTEM APPROACH

What do we mean by the "System Approach"?

Well, take the TS120V and you have the finest 20W p.e.p. mobile HF transceiver you could buy. Many operators are even buying it as a second station because it's so good. Consider its features, the single conversion PLL derived top performance; the accurate digital readout; the passband tuning; the noise blanker; the superb engineering; THEN maybe add the PS20 mains power supply and you have an equally great home station; OR maybe add the multi-function VFO120 second VFO unit; OR the SP120 external speaker; OR the 100W AT120 antenna tuner or maybe even a superb Microwave Modules 2 metre or 70 cm transverter to get you up on the VHF and UHF bands. It all adds up to a fine station tailored exactly to your own needs.

If you need more power, the TL120 200W p.e.p. linear is now available, but you will need a heftier 12V supply to run it. A suitable unit would be the PS30 which delivers up to 20 amps fully regulated and protected. Lots of people are buying the PS30 as a general purpose heavy duty supply for shack use.

Finally, should you really want high power all the time, consider the TS120S which incorporates all the features of the TS120V but has a built-in high power, fully protected 200W p.e.p. linear and it's still not too expensive to enjoy!

TAKE A GOOD LOOK AT THE PRICES!!!

THE GREAT HF LINE-UP BY TRIO

LOWE ELECTRONICS Ltd

TRIO

R1000

£298.00 inc VAT

The R1000 uses an advanced PLL system in an up-conversion scheme to a high (48MHz) first IF to remove any possibility of image responses. The receiver covers the entire frequency range from below 200kHz right up to 30MHz in 30 bands, each 1MHz wide. The bands are selected, not by ambiguous knob twiddling as in receivers using the Wadley loop but by a 30 position band switch which controls the PLL system.

The band switch also electronically selects the appropriate band pass filter network in the RF stages of the receiver so there are no "preselector" or "antenna trim" controls to twiddle—simply set the band switch to the range required—that's it!

A highly stable VFO tunes each 1MHz range and its linear, back lit scale makes readout easy. However, in addition to this dial, Trio have also provided 5 digit true frequency digital readout so as to guarantee spot-on accuracy on any frequency. As a further feature, the digital display can also be switched to read time, this being derived from a quartz standard. Marvellous for accurate log keeping. The display uses high intensity readout units which can be dimmed for use in low light conditions.

As for what else is inside this superb instrument—selectivity is catered for by three custom made IF filters; a 12kHz wide AM filter; 6kHz narrow AM filter; and a new 2·7kHz SSB filter with a shape factor of better than 1:2 6:60dB. Selectable sidebands are available at the touch of a switch. As an option, on request, you can have 6kHz AM wide, 2·7kHz AM narrow and 2·7kHz SSB. The 12kHz filter remains in the set for use if required.

For the first time in mid-price receiver, a true noise blanket is provided to remove pulse type ignition noise.
To minimise front end overload, a step RF attenuator is included which gives 0·6dB attenuation in four steps.

All the rear panel connectors are recessed on a sloping panel so that you can stand the receiver either on its back, or pushed hard against a wall when used in conventional shelf mounting. The antenna inputs allow the use of either a high impedance wire aerial or a 50ohm balanced input so that the proverbial long lump of wire will work really well with the R-1000.
This receiver is so advanced it makes everything in its price range completely obsolete.

TRIO

R820

£690.00 inc VAT

The R820 represents the ultimate receiver for the amateur radio operator, with more facilities than ever before available in a ham band receiver. The R820 covers all current amateur bands from 160 to 10 metres as well as the 49, 31, 25, 19 and 16 metre broadcast bands. Typical sensitivity of 0·15 microvolts for 10dB S/N ratio gives you an idea of its performance, and the combination of the famous Trio passband tuning (IF shift) system together with fully variable bandwidth makes it easy to dig down in the noise and hear signals that the others can't.

Using a separate IF system at 50kHz to provide a stable notch filter gives the operator a guaranteed 50dB notch depth (minimum), and using a further IF shift system makes the notch frequency tunable without degrading its performance.

Everything that you need in a receiver is given to you in the R820—switchable AGC time constants, RIT, noise blanker, adjustable noise threshold, all mode AM, CW, USB, LSB, RTTY provision, RF attenuator in 10dB steps, full tranceive operation with the TS520 or TS820 series equipment, digital readout with hold facility, true S meter calibration in S units *and* microvolts, and so much more.

A detailed leaflet is available from your authorised Trio dealer and we can supply an unbiased test report from QST. Contact us now for full information on the superb R820 from Trio.

THE FINEST RECEIVERS AROUND

LOWE ELECTRONICS Ltd

TRIO
TR9000

2 metre MULTIMODE

£365.00 (approx)

If you sat down at some time and designed your ideal 2 metre multimode rig, you probably laid down the specification for the new Trio TR9000. I believe that this transceiver will satisfy the needs of every radio amateur, combining as it does small size (same as the TR7600), light weight (same as the TR7600), and powerful performance.

As you can see, the TR9000 has a complete array of facilities including all mode operation, noise blanker, RIT, 5 memories, twin digital VFOs and digital frequency readout to 100Hz. Now for the smart parts.

The TR9000 is based on a 100Hz synthesiser controlled either by a photo microsensor on the main dial or by the remote up/down microphone. On FM, the operator has instant selection of either 25kHz steps (for convenient mobile use), 12·5kHz steps (for future use), or 100Hz steps (for continuous tuning). On SSB and CW, the synthesiser steps are automaticaly switched to 100Hz and the digital display is extended to match.

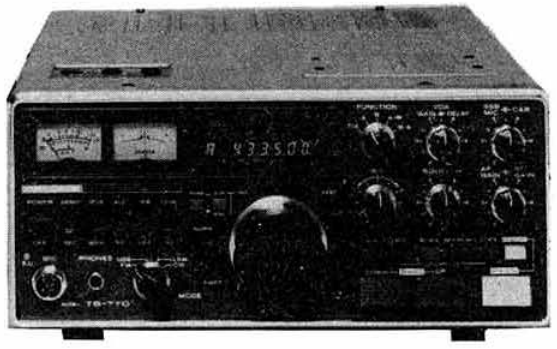
A special feature is the search facility on SSB which tunes the whole band, and the scan facility on FM which scans in 25kHz or 12·5kHz steps, stopping momentarily on any received signal. The scan may then be held by touching the HOLD button or depressing the PTT switch on the microphone.

The TR9000 has so much to offer, it's bound to be yet another leader from Trio. Contact us soon for further details.

TRIO
TS770

2 metre and 70 cm MULTIMODE

£690.00 inc VAT



The only dual band high performance transceiver available today. The TS770 is another successful result of Trio's advanced engineering capability and represents the peak of RF engineering for VHF and UHF.

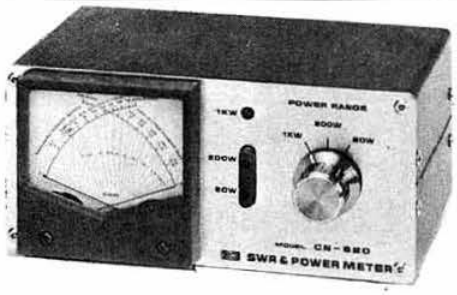
Full coverage 144–146 and 430–440MHz using an advanced microprocessor controlled synthesiser generating 20Hz steps for that "VFO feel". Eight memory channels which can be scanned, cross band operation for satellite use, VOX, break in CW, 15–18W output at any frequency, terrific receiver performance, search and scan facilities, in fact everything one might expect from the best equipment designed by the best manufacturer in the business.

The TS770 gives you a single package to replace all those boxes you use right now. Performance and convenience on VHF and UHF are yours today with the TS770.

For complete information, contact us right now and we will send a detailed brochure.

THE COMPLETELY NEW APPROACH TO VHF/UHF

LOWE ELECTRONICS Ltd



CN-620 SWR & POWER METER

The CN-620 is a radical departure from the accepted norm for in-line power and SWR measurements and represents a considerable improvement over all existing power meters.

The system is based on a crossed needle twin meter, one needle indicating forward power, the other reflected power. The point at which the two needles cross indicates the SWR existing on the system. In one instrument, you combine power and SWR measurement with high accuracy and simplicity of operation.

The CN-620 is simply inserted into any 50 ohm coaxial line. No adjustments are necessary in order to use the instrument. The CN-620 covers the frequency range from 1·8-150MHz and can measure power as low as 400mW reflected and as high as 1kW forward using three easy to read ranges. With the CN-620, doubt in measurement is a thing of the past and once you have used the CN-620, all other power meters will seem old fashioned.

£52.81 inc VAT

CN-620 SPECIFICATION	
Frequency range	1·8-150MHz
Line impedance	50 ohms
Power ranges forward	20W, 200W, 1kW
Power ranges reflected	4W, 40W, 200W
Through power rating	1kW CW, 2KW P.E.P. 1·8-30MHz 250W CW, 500W P.E.P. 140-150MHz
Min. power for SWR measurement	5W
Connectors	SO239
Size	165 × 75 × 97mm

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

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

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

DR7500 **£108.10** including VAT. DR7600 **£154.10** including VAT.

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

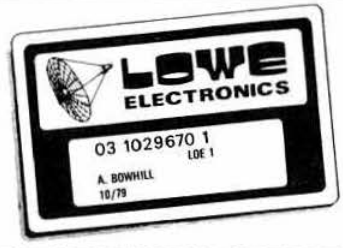
P.S. There's a new fully automatic ATU now from Daiwa. It's magic! Give it a few watts of RF and little motors whizz round and tune for best SWR. Has a CN620 built in too!

AUTHORISED DEALERS IN THE UK

Yorkshire	Leeds Amateur Radio
Birmingham	Ward Electronics
South London	Catronics Ltd
North London	Radio Shack Ltd
Lancashire	Stephens-James Ltd
Wales	M.R.S. Communications Ltd
Essex	Waters & Stanton Electronics Ltd
Sussex	Bredhurst Electronics

REMEMBER. Only an authorised Trio dealer can give you the service, spares and advice that you may need, and only an authorised dealer can give you full advantage of the regular meetings between the distributor and Trio factory personnel at which there is a constant exchange of information and advice.

Everyone is talking about the new Lowe credit card scheme, following its introduction at Leicester. This is the new, easy way to have the rig you wanted right away and avoid any future price rises. How does it work? You simply agree to pay a fixed amount each month and you then get instant purchasing power of 24 times the payment. For example, a payment of £10 gives you £240 of credit, more than enough to buy that TR2400, aerial and accessories. No fuss and no hefty deposits needed. A further advantage is that as the payments continue, your credit is automatically extended to allow further purchases. Why not send for full details right away and join the growing numbers who hold the Lowe blue card—the way to have tomorrow's equipment today. A major advance to your purchasing power.



THE WAY TO HAVE TOMORROW'S EQUIPMENT TODAY

As sole official distributors for Trio, we recommend that you purchase your Trio equipment from an approved dealer (full list above). Any dealer *not* on this list has no connection with the Trio UK sales and service organisation and cannot, despite claims to the contrary, offer any meaningful guarantee of backup service on Trio equipment.

LOWE ELECTRONICS Ltd

TS520SE

In the face of ever increasing complexity in amateur radio equipment, it's comforting to know that the TS520SE is still in volume production. Radio amateurs all over the world (and dealers too) have voted the TS520SE "my favourite transceiver" because of its astounding reputation for reliability, high sensitivity receiver, and of course the unequalled Trio audio quality coming from the transmitter. The TS520SE incorporates all of the features demanded by today's amateur, and at an outstandingly low price. No wonder it's top of the list in popularity, and comparison with other transceivers will convince you that the TS520SE is the best value for money on the market today.

Of course, the bare figures cannot tell you just how nice the TS520SE feels in use, nor can they tell you the pleasure of hearing other operators saying "never heard better audio OM, what rig are you using?"

The TS520SE standard specification includes CW wide/narrow switching (using the optional 500Hz filter), semi breakin keying with sidetone, PTT or VOX operation, really effective noise blanker, switched AGC time constants, 5 function metering, switched RF attenuator, RIT, speech processing for punchy transmit audio, fixed channel facilities, 25kHz calibrator, fan cooled PA, internal loudspeaker, and of course the TS520SE will take all the wide range of current matching accessories including the DG5 true frequency digital readout, the VFO520S remote VFO unit, the SM220 station monitor scope and panoramic display and so on.

When talking to prospective purchasers of the TS520SE, the question we are most often asked is "how does it compare in price to is rivals?" and the transceiver it is most compared with is the Yaesu FT101Z series. The price for the **FT101Z** taken from March 1980 RadCom is **£575** including VAT and you also should add PA fan at **£13.80** (the fan is standard on the TS520SE) making a grand total of **£588.80.**

THE TS520SE COSTS £437 INCLUDING VAT.

Now tell me if that's not value for money.....

VOTED "MY FAVOURITE TRANSCEIVER" BY RADIO AMATEURS WORLDWIDE

SPECIFICATIONS

GENERAL

Frequency Range:	160 meter band-1·8 to 2·0MHz 80 meter band-3·5 to 4·0MHz 40 meter band-7·0 to 7·5MHz 20 meter band-14·0 to 14·35MHz 15 meter band-21·0 to 21·5MHz 10 meter band-28·0 to 28·5MHz 28·5 to 29·1MHz 29·1 to 29·7MHz WWV -15·0MHz (receive only)
Mode:	SSB (USB,LSB), CW
Antenna Impedance:	50 to 75 Ohms
Frequency Stability:	Within ±1KHz during one hour after one minute of warm-up, and within 100Hz during any 30 minutes period thereafter
Tubes and Semiconductors:	Tubes. .3(2 × 6146B, 1 × 12BY7A Transistors..... 52 FETs..... 19 Diodes..... 101
Power Requirements:	120/220 V AC, 50/60Hz
Power Consumption:	Transmit: 280 Watts Receive: 26 Watts (with heater off)
Dimension:	333 (13-1/8) wide × 153 (6·0) high × 335 (13-3/16) deep mm(inch)
Weight:	16·0kg (35·2lbs)

TRANSMITTER

RF Input Power:	SSB:200 Watts PEP CW: 160 Watts DC
Carrier Suppression:	Better than 40dB
Sideband Suppression:	Better than 50dB
Microphone:	High impedance microphone (50k Ohms)
AF Response:	400 to 2,600Hz

RECEIVER

Sensitivity:	0·2μV for 10dB (S + N)/N
Selectivity:	SSB: 2·4kHz/-6dB, 4·4kHz-60dB CW: 0·5kHz/-6dB, 1·5kHz/-6dB (with optional CW filter)
Image Ratio:	Better than 50dB
IF Rejection:	Better than 50dB
AF Output Power:	2 Watts (8 Ohms load, with less than 10% distortion)
AF Output Impedance:	4 to 16 Ohms

HOKUSHIN AERIALS

From the makers of our popular HF5 vertical, we have a complete range of vehicle aerials for VHF and UHF use. All the whips terminate in a PL259 plug so that you have complete flexibility, and any aerial in the range will fit the RG4M base or the magnetic mount. The 2E, 2NE, and 430E have a quick foldover joint at the base so that you can drive in and out of your garage without dismantling the aerial.

2E	2M 5/8, 3·4dB gain foldover whip	**£6.50** inc VAT
2NE	2M 7/8, 4·5dB gain foldover whip	**£11.00** inc VAT
430E	70cm 5/8+5/8, 5·5dB gain	**£10.00** inc VAT
HS-F1	2M rubber helical on PL259 plug	**£3.95** inc VAT
320	2M stainless quarter wave on PL259	**£1.50** inc VAT
RG4M	Base for all above units including 4 metres of cable ready terminated in PL259	**£3.00** inc VAT
GSS	Heavy duty gutter/boot mount to take RG4M base	**£3.15** inc VAT
MB5	Magnetic mount complete with 5m of cable and PL259	**£7.95** inc VAT

Also two really great base station aerials

GPV5	High performance 2m base station colinear. Forget the S ...MJ ...M and R ...OR ...R	**£22.00** inc VAT
GDX2	3dB gain over the range 50-480MHz. The classic wideband aerial. 500W p.e.p.	**£36.80** inc VAT
HF5	Our original success. 5 band vertical 80-10m with great performance, great savings only	**£41.40** inc VAT

Great News!

The AR240 is back in town but with higher battery capacity, provision for separate microphone and the hot performance (better than 0·2μV for 12dB SINAD, and 2W output on TX) that you all appreciate.
PRICE? Even better value at £168 inc VAT (price includes Nicads, charger, etc).
It has a new name too—the AR240A.

144-148MHz synthesized FM Hand-Held

SEND 48p IN STAMPS FOR COMPLETE CATALOGUE AND ANTENNA BOOK

PLEASE SPECIFY ANY PARTICULAR INTEREST AND WE WILL SEND FULL INFORMATION

HEAD OFFICE AND SERVICE CENTRE

CHESTERFIELD ROAD, MATLOCK, DERBYS. TEL: 0629-2817 or 2430. TELEX 377482. OPEN 9-5.30 TUES-SAT. PHONE IN 9am-9pm

For personal attention on the South Coast contact John, G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex. Ringmer 812071.

For equally helpful attention in Scotland contact Sim, GM3SAN, 19 Ellismuir Road, Baillieston, Nr. Glasgow. 041-771 0364.

FOR ALL THAT'S BEST IN HAM RADIO CONTACT US AT MATLOCK ANYTIME

ANNOUNCING A NEW COMMUNICATIONS COMPUTER

TONO THETA 7000E

The new Theta 7000E means that every Amateur can enjoy the visual display of CW, RTTY, and ASCII in both transmit and receive modes. Just connect the TONO to any TV set via the antenna terminals or to a page printer from the parallel port provided. Bring up your CW speed in receiving or sending by either watching receiver sent or from recorded cassettes. Connection to the transceiver is via the key, phone and mic sockets.

THETA 7000E. SOME OF THE OUTSTANDING FEATURES

VHF and Composite video output provided

Printer interface
Wide range of transmitting and receiving speeds – 10CW speeds + 8RTTY
Built in demodulator for high performance for 170, 425 & 820Hz shift
Crystal controlled modulator for AFSR – Hi or Lo tone
Convenient ASCII key arrangement
Large capacity display memory – 2 pages 32chr × 16 lines split screen for Rx & Tx if required
Automatic transmit/receive switch
Anti noise circuit
Battery backed-up memory 7 channels of 64 chrs
Send function
Buffer memory – 53 character type ahead
Rub out function
Simultaneous access of the memory
Pre-loading function
CR (carriage return) LF (Line feed) cancel function
Cursor control function
Word Mode operation
Automatic CR/LF (72, 60 or 80 chrs per line)
Echo function
Word Wrap around function
Transmit/receive in ASSCII mode in RTTY
CW identification function
Mark and break (space and break) system
Monitor circuit
CW practice function
Variable CW weights
Cross pattern checking output terminal
Log computer output provided
Test message function (Ry and QBF)

£640.00 inc

Computer compatible

IC-701 HF £899

ICOM's superior LSI technology takes the lead in Amateur HF. The extremely compact **IC-701** delivers 100 watts output from a completely solid state, no tune (broad band design) final, on all modes and all bands, from 160-10 M. With single knob frequency selection and *built-in dual VFO's*, the LSI controlled **IC-701** is the choice in computer compatible, multi-mode Amateur HF transceivers.

The **IC-701's** single frequency control knob puts fully synthesised instant tuning at a single finger tip. **WIDE** bandspread, with 100Hz per division and 5kHz per turn, is instantly co-ordinated between the smooth turning knob and the synthesiser's digital read-out with positively no time lag or backlash (no waiting for counter to update: less operator fatigue). And at the push of the electronic high speed tuning button, the synthesiser flies through megacycles at 10kHz per step (500kHz per turn).

The computer compatible **IC-701** LSI chip provides input of incremental step or digit-by-digit programming data from an external source, such as the microprocessor controlled accessory which will also provide remote band selection and other functions.

Full band coverage of all six HF bands, and continuously variable bandwidth on filter widths for SSB, RTTY, and even SSTV, help to make the **IC-701** the very best HF transceiver ever made. **IC-701** includes two CW widths, all of this standard at no extra cost.

Sold complete with the high quality electret condenser base mic (SM-2), the **IC-701** is loaded with many ICOM quality standard features. Standard in every **IC-701** are *two independently selectable, digitally synthesised VFO's at no extra cost.* Also standard are a double-balanced schottky diode 1st mixer for excellent receiver IMD, and RF speech processor, separate drop times for voice and CW VOX, optionally continuous RIT, fast/slow AGC, efficient IF noise blanker, fast break-in CW, and full metering capability.

ICOM® FROM THANET OF COURSE

PAUL
G3VJF

ICOM®

IT'S THE FASTEST MOVER YET, SO TRY TO CATCH ONE!

THE MOBILE OF CHOICE FROM THE WORLD FAMOUS

ICOM STABLE – THE IC-255E

25 Watts–5 Memories–Scanning–600kHz AND User Selectable Repeater Shift–Full Coverage in 5kHz or 25kHz Steps

We have had a poke around one of these little beauties and are certain that ICOM, yet again, have come up with a winner. As you can see it has the expected smart ICOM appearance. Features include:-

- ★ Crystal controlled Tone Burst
- ★ Full band coverage–extendable to 148MHz if required
- ★ Four digit LED display
- ★ 25 Watts output or TW low power
- ★ A superb receiver using grounded gate FET front end
- ★ Scanning over a user programmable range
- ★ Memory scan
- ★ Stop on empty or busy channels
- ★ Tuning in 25kHz or 5kHz steps
- ★ 5 Memories–retained while the power is connected to the rig
- ★ Built-in 600kHz Repeater Shift
- ★ Alternative programmable shift
- ★ Reverse Repeater facilities
- ★ RIT (±3kHz) for those off channel stations
- ★ Scan control from the microphone (an optional mic available shortly)
- ★ Good loud audio
- ★ Optically coupled tuning between control knob and CPU
- ★ Multiway 24 pin socket on back for touchpad, computer, or external control (note the current RM3 cannot be used but a new version is to be introduced)
- ★ Rugged modular PA (Guaranteed of course!)
- ★ Mobile mount which can be padlocked

Please note that from THANET you get a full year's warranty on *all* parts and labour (including PA's). Orders direct to us are despatched free using registered first class post.

FROM **THANET** OF COURSE

GB2SMR

RADIO AMATEURS

visit the

Talk-in on
80m
2m (R3 & S22)
70cm (RB6)

THE SUSSEX MOBILE RALLY

AT THE BRIGHTON RACE COURSE, BRIGHTON, SUSSEX

SUNDAY 1st JUNE 1980

Doors open at 11.00 am

Admission 50p per person—Children under 14 years FREE

FREE PARKING FOR OVER 4,000 CARS

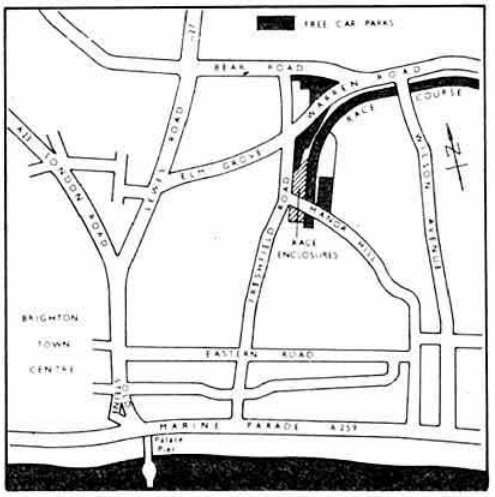
Many other attractions including

Over 15,000 sq ft of indoor space for Trade Stands • Licensed Bar
Restaurant • Refreshments • Fashion Parade for the Ladies
Children's amusements • Free Minibus to and from Brighton Beach
Talk-in Station • Gymnastics Display • Marching Majorettes • Bring & Buy
Post Office Prestel Demonstration

HOW TO GET THERE

From the North—M23, A23
From the East—A27 or A259
From the West—A27 or A259
From the South—Seajet from Dieppe
By train—to Brighton Station
By bus—Nos 6 or 6A, 2 or 2A, 45

SOMETHING FOR ALL OF THE FAMILY DON'T MISS IT!



TRADE & OTHER ORGANISATIONS ATTENDING INCLUDE

Lowe Electronics
RAIBC
QSL Crystals
AmSat
Bredhurst Electronics
Raynet
J. Birkett
BARTG
Amateur Radio Exchange
Sussex Repeater Group
Display Electronics
RSGB Books
Bob Finch
Modular Electronics
Garex
Hastings Repeater Group
Thanet Electronics
C P Developments
J. Fisher
JMG Electronics
BATC
Post Office Radio Service
Territorial Army
ATC (Hove) Squadron
South East Computers
Sentinal Supply
Richard White
Newton Engraving
Chordgate
ARMS
Crayford Electronics
H. J. Allison

ONE OF THE LARGEST AMATEUR EVENTS IN THE SOUTH

Organised by Clubs & Societies throughout Sussex

For further information please contact John Trimmer, G4JDM, on Brighton 693655 Extn 2266, office hours

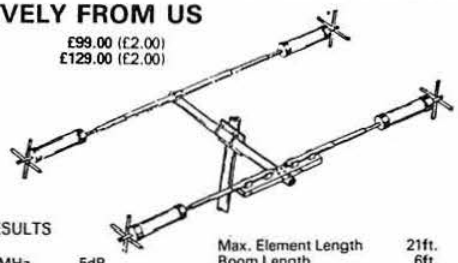
WATERS & STANTON ELECTRONICS

NEW!

MOSLEY MINI-BEAM 10-15-20M

EXCLUSIVELY FROM US

600 watt model **£99.00** (£2.00)
2kW model **£129.00** (£2.00)



FIELD TEST RESULTS

Forward Gain:		Max. Element Length	21ft.
28MHz and 21MHz	5dB	Boom Length	6ft.
14MHz	4dB	Turning Radius	11ft.
Front to Back Ratio	15dB	Wind load	60lbs.
S.W.R. at Resonance	1·5:1	Weight	17lbs.

NOTE:
The performance of this antenna is almost identical to a full size array by virtue of its low-loss capacity loading.

SAE FOR DETAILS

OTHER MOSLEY MODELS (EX STOCK)

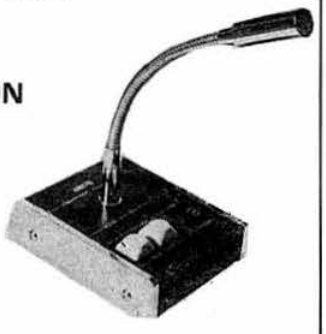
MUSTANG 2kW 10-15-20M	**£166.75** (£2.50)
TA33 600 WATTS 10-15-20M	**£133.40** (£2.50)
TA32 600 WATTS 10-15-20M	**£89.70** (£2.50)
TD3JR WIRE DIPOLE 10-15-20M	**£31.00** (£1.00)
RD5 SWL ALL BAND DIPOLE	**£40.25** (£1.00)

AM802 BASE STATION MICROPHONE

CONDENSER INSERT
PTT/LATCH
HIGH/LOW COMPRESSION

MATCHES ANY TRANSCEIVER
500 ohms–1 meg

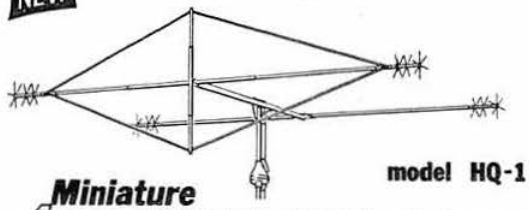
£39 inc VAT



SPRING NEWS

NEW

Hi-pot Multiple Hat Loaded!

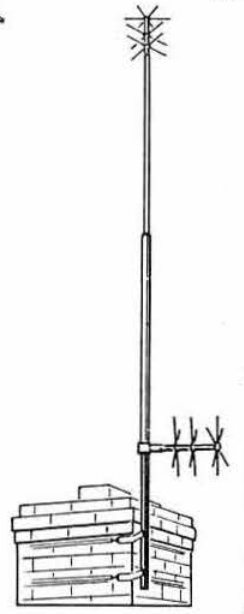


model HQ-1

***Miniature* 4 Band HYBRID QUAD Antenna**

HQ-1 A further stock of the fast selling HQ-aerials from USA has arrived. This amazingly compact beam covers 10–15–20 metres and has a turning radius of 6ft. 2in. It will take the full UK legal limit and is the ideal way of putting out a big signal from a small garden.

Price: £96.50 (£2.50)



HF Coaxial Vertical

(Also covers 6 metres)

MODEL C4 £48.50 (£2.00)

The MODEL C4 features the patented multiple hat* principle which allows operation on the 10–15–20 metre amateur frequencies with a single feedline. The C4 operates as a full electrical half wave on all bands. This unique feature permits the elimination of cumbersome ground plane radials normally used with vertical antennas. The C4 mounts in minutes with inexpensive TV type hardware.

BL40X BALUN 50 ohms

IMPROVES TVI
BETTER RADIATION
WATERPROOF
12 MONTH GUARANTEE
1kW RATING

£11.25 inc VAT

AM502 DE LUXE STATION MICROPHONE

SIMILAR TO AM502 BUT WITH THESE ADDITIONAL FEATURES

- ★ Cardiod response
- ★ 3 levels of compression
- ★ Audio meter
- ★ 3 switched outputs (adj)
- ★ Connects up to 3 rigs

£59 inc VAT

WATERS & STANTON ELECTRONICS

FDK
UNITED KINGDOM

NEW SPRING COLLECTION!

MULTI 700EX 25 WATTS 2M FM 25 & 12½kHz CHANNELS PRIORITY SCANNING

Price Delivery expected April

£199 inc VAT

The Multi 700EX is the replacement for the Multi 700E, having an updated specification—without making it too complex for safety under mobile conditions! Its powerful 25 watts output has been retained together with the front panel continuously variable power controls. The frequency range has been expanded to cover the entire band 144-146MHz in 25kHz steps. Of course, essential to all current equipment is its ability to operate on 12½kHz channel spacing and this you can do at the press of a button. Four priority channels that are user programmable have been added and these can be electronically scanned. The channels are not lost when the equipment is switched off! The stable crystal controlled tone-burst is automatic and both normal and inverse repeater operation is possible at the press of a button. By simple alteration of the diode matrix the plus 600kHz facility can be changed to 1·6MHz for operation through the proposed FDK 70cms transverter (in matching cabinet). Altogether a simple but highly effective mobile transceiver that provides everything you could wish for in a 2 metre FM mobile.

MULTI 750 15 WATTS FM/SSB/CW—EVERYTHING YOU NEED AT A VERY SENSIBLE PRICE!

NEW MODEL

Delivery expected April

Provisional price

£299 inc VAT

The Multi 750 is FDK's new, all mode 2 metre unit for both base or mobile use. Using the same cabinet dimensions as the M700EX, this really does provide the basis for an action-packed, go anywhere station. To list all its features would be impossible in the space available on this page. However, we will list its main points so you can get some idea of just what this amazing package is capable of.

144-146MHz at 10 WATTS OUTPUT (Minimum!); SWITCHABLE 1 WATT on ALL MODES—FM/USB/LSB/CW; REPEATER OPERATION—normal or reverse with automatic crystal controlled tone-burst; DUAL VFOs—these are selectable at the press of a button so that one vfo can be left at the SSB end of the band and the other at the FM end; NOISE BLANKER—a really efficient circuit to take out those ignition pulses on ssb; DUAL SPEED TUNING—enables 5kHz or 100Hz step tuning on SSB/CW or FM; RIT—essential for accurate tuning of the received SSB signal; LOW EFFECTIVE PRICE—at present we cannot tell you what the final price will be—suffice to say it will be extremely competitive—so much so that we would strongly recommend you to hold back on purchasing a similar unit until we unveil our SUPER LOW PRICE PACKAGE!

FDK products are distributed by:

FDK UNITED KINGDOM, WARREN HOUSE, MAIN ROAD, HOCKLEY, ESSEX, ENGLAND.

WATERS & STANTON ELECTRONICS

TRIO

APPROVED TRIO DEALER

NEW LOW PRICES ALL MODELS STOCKED

24 HOUR DELIVERY— —FROM THE PEOPLE YOU CAN TRUST

ALL PRICES INCLUDE 15% VAT

TRIO TS120V £347
TS120S £432

SOLID STATE RIG RELIABLE AT LAST

Up until now there has been a natural reluctance to accept solid state HF rigs as anything but a second rig or mobile unit with dubious reliability of the PA devices. Now at last the new TS120 series gives you 80–10 metre coverage at either 10 watts output or 100 watts output. Digital readout and variable selectivity are just two features that put them in a class above any other solid state rig we know of (apart from the TS180S)—even those costing nearly £1,000. The TS120 will put to shame many of the older valve PA designs and can confidently be regarded as a good reliable base or mobile station—and no tune-up means instant QSY from band to band at the flick of a switch.

TRIO TS520SE £437 inc VAT

NEW LOW PRICE UNBEATABLE

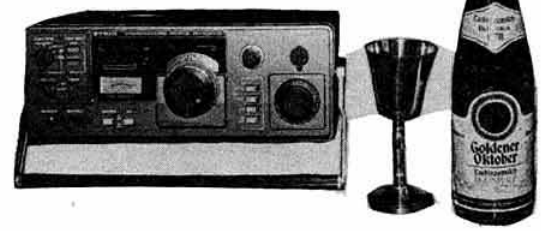
For the operator that wants an HF transceiver on a budget this surely must be the answer. 160–10 metres (full coverage) with built-in speech processor and the fine Trio engineering that now has become a legend amongst amateurs around the World. The price is really competitive and from tests we have carried out we must say that if you are looking for a 100 watts output base station the TS520SE should be top of your list for value for money. A pair of fan cooled 6146B's ensures high efficiency and good linearity. There's no longer a 12 volt facility but for mobile work it's a little big these days—for base station use it's unbeatable at this price.

NEW TRIO R1000 RECEIVER

YOUNG—BUT VERY MATURE!

Every one is individually tested by us and despatched by Securicor

£298 inc VAT—A REAL WINNER



NEW TRIO TR9000

2 METRE FM/SSB/CW MOBILE OR BASE ONLY

£340 inc VAT

The new Trio TR9000 heralds the beginning of a new era in 2 metre mobile or base station operation. A host of new features that makes its direct competitor look pretty expensive! FM has two tuning rates either 25kHz or 12½kHz per step. On SSB the tuning rate is in 100Hz steps or with the search button depressed, it will step in 10kHz at the same time searching for signals within each 10kHz segment. Dual VFO enables the operator to hold one frequency whilst searching for another. The inclusion of five memory channels provides for the storage of your five favourite frequencies.
Built-in scan permits FM scanning 25 or 12½kHz steps with momentary pauses on busy channels whilst providing continuous scanning of SSB/CW over 2MHz. Positive or negative repeater shifts are already programmed into the unit. For base station use, the PS20 AC supply can be used plus the SP120 external speaker and the BO-9 system base plinth. An exciting rig at a very reasonable price. Send today for details.

NEW

TRIO

TR2400 £210 inc VAT

The new TR2400 really does eclipse all other hand-helds in its sheer technology. There's no other model that can approach its performance. The large LCD readout has low current drain and the 1·5 watts output is a good compromise between effective communication and reasonable battery drain. 10 memories, automatic scanning, instant reverse repeater operation, 16 key touch-tone encoder, 144–148MHz etc etc . . . all adds up to the new leader in hand-helds . . . the Trio TR2400. Get your Barclaycard or Access cards ready for this one . . . half its fascination is operating it—the other half is owning it.

Waters & Stanton

TWO SUPER POWER HOUSES . . . IMPORTED DIRECT BY US

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

Send 25p for complete DenTron HF Catalogue

NEW 'B' VERSION NOW IN STOCK
FITTED HIGH/LOW POWER SWITCHING

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

160–10m ATU's also in stock

144 MHz!
NAGAI
2200 LINEAR
£429
inc. VAT
(Securicor £4.50)

Sae for colour brochure

- 240v AC
- 4CX-350F tube
- Receiver pre-amp
- 10–13 watts drive
- SWR meter built-in
- 500W PEP input
- 400W FM/CW input
- Fan cooled
- 12v DC output—3 amps
- Covers 144–146MHz

FDK **PALMSIZER**

40 × 25kHz Channels 145–146MHz
BULK SHIPMENT AT SUPER PRICE!
£149 inc. VAT buys this.....

- Cigar lighter plug
- External DC cord
- Over one watt output
- AC charger included
- 40 channel capability
- Simplex or ±600kHz switch
- BNC aerial socket
- Flexible whip supplied
- Xtal controlled tone-burst
- Ni-cad battery pack supplied

NEW! DenTron HF200A
100 WATTS OUT 80–10 METRES

£395 inc. VAT & AC PSU!

All solid state transceiver with separate AC PSU. Incorporating USB/LSB/CW, this American made transceiver makes for a really compact station at a really low price. There's no tune-up needed and the PA transistors are virtually indestructible.

DenTron GLA–1000

(IN STOCK NOW)
10–80m 1200W LINEAR
LOW COST, SMALL SIZE, BUT . . .
. . . BIG VOICE DELIVERY FREE IN UK. **£295 inc VAT**

This beautiful HF linear covers 80 to 10 metres and has its own built-in 117/234V power supply. Its diminutive size means less table space needed but without sacrificing power capability. Weighing in at just 24 pounds it measures only H.5¾" × W.11" × D.11" with room to spare inside. An almost silent fan ensures cool running whilst the little power house generates 1200 watts input on SSB or 1kW DC for CW. RF drive required is approx. 80 watts and the amplifier can be instantly switched in or out of circuit. Comprehensive metering monitors HF volts, PA current and output RF voltage. Altogether a linear we can thoroughly recommend at a price you can afford—just £295 delivered.

IF IT'S GOOD ENOUGH FOR THE NAVY . . . !

£10.50 inc VAT
(p&p 50p)

YES, THIS MORSE KEY IS IN CURRENT PRODUCTION AND USED BY THE NAVY AROUND THE WORLD

SPECIAL OFFER

Previously advertised at £43.50

STOLLE 2050 VHF ROTATORS

(USES 3 CORE CABLE)

£32.75 inc. VAT!

Carriage £2 extra

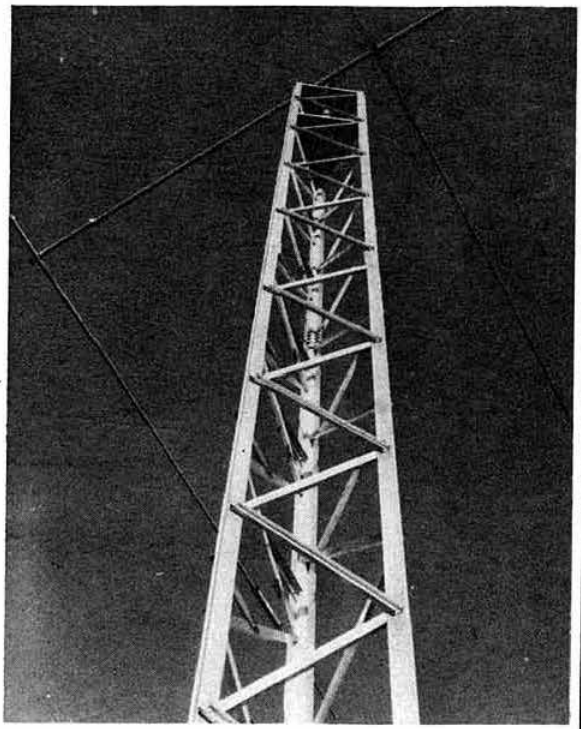
MATCHING 3 CORE CABLE 16p per metre

Electronics (UK) Ltd

THE UNIQUE ALUMAST

"THE TOWER THAT COMES IN A TUBE"

The **ALUMAST** is a 15" (375mm) wide triangular cross section lattice sectional aluminium mast based on a 10ft (3.05m) section length. It is supplied "knocked-down" in a tubular carton for ease of transport, but can easily be assembled needing no special tools or skills, The system includes top plate with bearing sleeve, rotor plate and a choice of a fixed base frame (FB-1) or one with hinge joints (HB-1) to enable the mast to be pivoted at ground level. Guy brackets are available for use at heights above 30ft.



- ★ **Made from high strength corrosion resistant alloy using WESTERN'S EXCLUSIVE 'W' section leg extrusions.**
- ★ **Easy assembly using bolts and "Nyloc" locking nuts for security.**
- ★ **Free-standing to 30ft (9.15m) with a typical tri-bander plus VHF/UHF antennas.**
- ★ **Heights to 250ft (75m) with appropriate guy configurations (ask us for quotes).**
- ★ **Lightweight—only 25lb (11kg) per 10ft (3.05m) section.**
- ★ **30ft (9.15m) mast is delivered in a tube only 10ft 6in (3.2m) long, 6in (0.126m) dia.**

A COMPLETE 30ft (9.15m) MAST for £240.35

375/PSS/3; HB-1; RMP-1; TP-1

FULL PRICE LIST

375/PSS/3	30ft mast (3 sections)	£184.00
375/PSS/1	Additional 10ft section	£ 62.68
HB-1	Hinged base unit	£ 31.05
FB-1	Fixed base unit	£ 21.85
RMP-1	Rotor mounting plate	£ 12.08
TP-1	Top plate with sleeve	£ 13.23
GB-1	Guy brackets (set of 3)	£ 11.50

All prices include carriage and VAT at 15%

DEALER ENQUIRIES WELCOME

DESIGNED and MANUFACTURED in GREAT BRITAIN by Western

BUY BRITISH AND HELP THOSE BALANCE OF PAYMENT FIGURES!

★ ★ ★ SPECIAL SUMMER OPENING HOURS ★ ★ ★

For the benefit of personal callers we are OPENING ALL DAY ON THE SECOND SATURDAY EACH MONTH from MAY to OCTOBER. This is in addition to our normal hours of 9–12; 1–5 on weekdays.

Telephone enquiries will be taken by our answering machine as usual.

MAKE A NOTE OF THE DATES NOW!
10 May; 14 June; 12 July; 9 August; 13 September; 11 October. 9 a.m. to 5 p.m.
COME and BROWSE over the gear, or natter over a COFFEE!

Western Electronics (UK) Ltd

HEAD OFFICE (All Mail/Enquiries)
FAIRFIELD ESTATE
LOUTH, LINCS, LN11 0JH
Tel. Louth (0507) 604955

Our Agents
Southern: Alan Paxton, G4BIZ, Southampton, Hants (0703) 582182
N. Ireland: Les Lyske, GI3CDF, Newtownards (0247) 812449

Opening hours:
LOUTH: 9–12; 1–5pm Mon–Fri. By appointment Sat 9–12.
LEICESTER: May's Hi-Fi, Churchgate (Tel: 0533-58662). Mon–Sat 9–6pm; closed Thurs.

AMATEUR ELECTRONICS UK

AEUK – Your number one

AS FACTORY APPOINTED DISTRIBUTORS WE OFFER YOU— WIDEST CHOICE, LARGEST STOCKS, PROMPTEST DEAL AND FAST, SURE SERVICE RIGHT THROUGH —

YAESU FT-107M (Normally in grey livery)

AMATEUR ELECTRONICS UK has been established for over 20 years and specialises for the amateur by employing licensed operators on our staff. At our H.Q. in Birmingham will be found the following Calls Signs:
G3FIK—Ken, G3RGD—Ray, G4EWD—Peter, G4GSJ—Ken, G8GUS—Martyn, G8VXM—Gary, G8VXN—Paul.

HOW TO REACH US (EASY PRIVATE PARKING ON OUR 90ft FORECOURT)

FROM SOUTH AND EAST. We are located approximately two miles from Junction 5 of the M6 from which follow signposts to Birmingham. Within ¼ mile turn right at Clock Garage and proceed towards city. After one mile look for traffic lights at Fox & Goose and immediately over the lights take minor left fork into Alum Rock Road. We are located one mile from this point.
FROM NORTH. Leave M6 at Junction 6 (Spaghetti) and follow left fork down to traffic island beneath motorway complex. Take third turning off to Lichfield. One mile further on follow A4040 to the right and within 100 yds. veer again to the right, approximately one mile further on brings you to the Fox & Goose. Turn right and see preceding directions.
FROM THE WEST AND SOUTH/WEST. Follow M5 then M6 to Spaghetti Junction (see above). Alternatively, leave M5 at junction 4 or 3 and proceed to inner ring road. Turn South on ring road and leave on A47 (East). We are located three miles from this point.

Hours: 9.30-5.30 Continuous including Saturdays—Early closing Wednesday, 1 p.m.

Access

Access or attractive H.P. terms readily available for on-the-spot transactions. Full demonstration facilities. Free Securicor delivery.

Access

AMATEUR ELECTRONICS UK

source for YAESU MUSEN

The superb FT-107M all Solid State H.F. Transceiver is now appearing in increasing numbers on the bands and the impressive reputation that it has already built is largely due to the fact that it incorporates time proven design techniques borrowed from the outstanding FT-101Z and FT-901 transceivers. The receiver performance of the new FT-107M has brought high praise from experienced and critical operators and this, coupled with the undoubted convenience of all solid state construction makes operating a joy and a delight indeed. The specification of the new FT-107M includes variable IF band width, audio peak/notch filter, RF speech processor, variable-threshold noise blanker, and full metering including SWR. An all new memory system is included providing 12 memory channels with fine tuning, scanning from the optional scanning microphone and YAESU's exclusive digital memory shift system. Modes include SSB, CW, AM and FSK with variable band width of CW.
Also pictured is the FT-107M together with it's matching accessories which include separate VFO, transverter, tuning unit and speaker which interface to build a high technology base station designed for the 80s.

This month we also include a view of the new YAESU FT-707 compact H.F. all Solid State Transceiver which combines the technology engineered in the FT-107 and the FT-7B. The new FT-707 is, as would be expected, typically YAESU in design, construction and cosmetics and sets new standards for equipment in it's class. Taking into account the time, money and effort which YAESU MUSEN put into their extensive research and design laboratories it is no wonder that YAESU MUSEN, the world's largest manufacturer of amateur radio equipment, always lead the field.

YAESU FT-707

THE ABOVE IS ONLY PART OF THE YAESU STORY—FOR FULL DETAILS OF ALL THE MODELS 36p IN STAMPS WILL BRING YOU THE LATEST GLOSSY CATALOGUE OF THE FULL PRODUCT RANGE TOGETHER WITH OUR CREDIT VOUCHER FOR £3.60—A 10-1 WINNING OFFER!

AGENCY APPOINTMENTS

We are pleased to announce that we have extended our service to out-of-town customers with the appointment of two new agents in areas which are, in our view, lacking in amateur sales facilities at the moment. AMATEUR ELECTRONICS UK is now fully represented by the following additional AGENTS and the personnel involved, named or otherwise, are fully licensed operators who have been selected for their interest in and knowledge of, the hobby not to mention their impeccable bona fides.

EAST ANGLIA—Dr T. THIRST (Tim) G4CTT, NORWICH. 06925 403
NORTH EAST—NORTH EAST AMATEUR RADIO, DARLINGTON. 0325 55969

We are sure customers in the above areas will derive great benefit from expert local help.

Our existing representatives remain, of course, as below.

BRANCH: AMATEUR ELECTRONICS, UK—COASTAL, CLIFTONVILLE, KENT, KEN McINNES, G3FTE, THANET (0843) 291297. 9 a.m.-10.30 p.m.
BRANCH: AMATEUR ELECTRONICS UK-SCOTLAND, 287 MAIN STREET, WISHAW, LANARKSHIRE, GORDON McCALLUM, GM3UCI. TELEPHONE WISHAW 71382. (EVENINGS CARLUKE 70914)
AGENT: WALES & WEST—ROSS CLARE, GW3NWS, CAERLEON, NEWPORT. (CAERLEON 422232)—ONLY 20 MINUTES OVER THE SEVERN BRIDGE.

508-514 ALUM ROCK ROAD
BIRMINGHAM 8
021-327 1497
Telex 337045 6313

G3FIK

VERSATOWER

TELESCOPIC & TILTOVER RADIO TOWERS

Twelve years of continuous development has produced a range of over 50 models, all of which conform to the current B.S.S., requiring *minimum* designed wind speeds of 85mph and up to 117mph.

Before purchasing a Tower, we strongly recommend consulting one of our engineers for advice regarding the most suitable combination for an installation. *It would be incorrect to nominate a specific headload as this is dependent upon load distribution, geographical location and siting.*

25–120ft, post, base plate, wall, fixed base or mobile (on high-speed trailer) versions.

Price of towers are for the complete package – tower sections, mounts, telescopic and luffing gear, guys, head unit and winches.
AS APPROPRIATE FOR ANY PARTICULAR MODEL

The sample of prices exclude VAT and delivery

STANDARD 13M20 SERIES				*HEAVY DUTY 16M20 SERIES*			
Post Mounting 13M20				*Post Mounting* 16M20			
P25	25'	Tower	£236.20				
P40	40'	Tower	£323.60	P40	40'	Tower	£476.60
P60	60'	Tower	£392.70	P60	60'	Tower	£541.10
Fixed Base 13M20				*Fixed Base* 16M20			
FB25	25'	Tower	£175.60				
FB40	40'	Tower	£262.40	FB40	40'	Tower	£382.20
FB60	60'	Tower	£332.20	FB60	60'	Tower	£446.70
Socket Types 13M20				*Socket Types* 16M20			
SP25	25'	Tower	£274.60				
SP40	40'	Tower	£361.50	SP40	40'	Tower	£528.50
SP60	60'	Tower	£431.30	SP60	60'	Tower	£592.70
Base plate 13M20				*Base plate* 16M20			
BP25	25'	Tower	£276.00				
BP40	40'	Tower	£361.90	BP40	40'	Tower	£496.30
BP60	60'	Tower	£431.20	BP60	60'	Tower	£560.70
Wall Mounting 13M20				*Wall Mounting* 16M20			
W25	25'	Tower	£190.20				
W40	40'	Tower	£277.00	W40	40'	Tower	£390.30
W60	60'	Tower	£346.80	W60	60'	Tower	£449.50

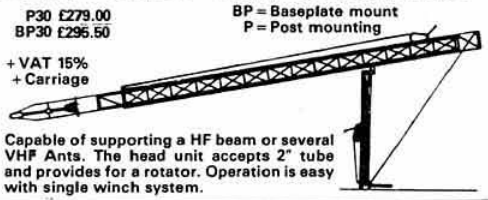
80-85-100-120' and MOBILES PRICES ON APPLICATION

NEW '30ft': 10ft SECTIONS

P30 £279.00
BP30 £296.50

+ VAT 15%
+ Carriage

BP = Baseplate mount
P = Post mounting



Capable of supporting a HF beam or several VHF Ants. The head unit accepts 2" tube and provides for a rotator. Operation is easy with single winch system.

SOUTH MIDLANDS COMMUNICATIONS LTD

OSBORNE ROAD, TOTTON
SOUTHAMPTON SO4 4DN

Telex: 477351 SMCOMM G
Tel: Totton (0703) 867333

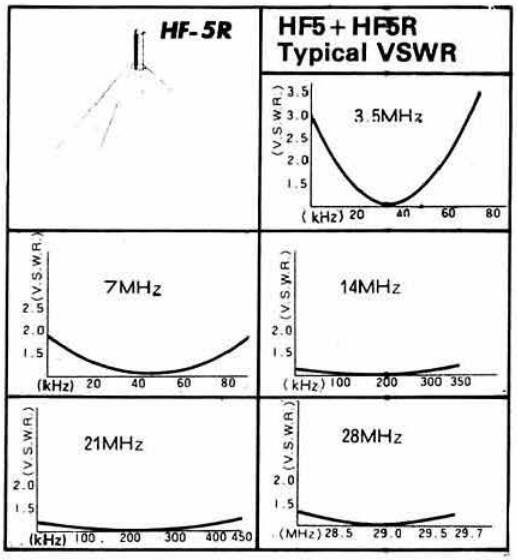
SMC-HS

FIVE BAND VERTICAL ANTENNA

Only 15' 9" high (4.8m) and around 1⅝" in diameter (4.2cm). This remarkable new antenna operates on 80, 40, 20, 15, and 10 metres. Power handling of 500W PEP on 10, 15 and 20m and 200W PEP on 40 and 80m, within its 1.5:1 V.S.W.R. bandwidth.

The SMCHF5 weighs only 6lb 6ozs (2.9kg) and is suitable for mounting at ground level on a good earth post (with or without radials) or in an elevated position with wire radials or better still the SMCHF5R.

THE SMCHF5R Radial kit, with power handling capabilities of 150W PEP weighs only 4lbs (1.8kg) and is the perfect answer to restricted locations, consisting as it does of five solid rods of similar length 6' 6"–7' 3" (2.05–2.2m) sloping at 45° to the antenna.



SMCHF5V and SMCHF5R are available from reputable amateur radio dealers throughout Britain.

SMCHF5V £35.00 + 15% VAT, £40.25 Ex-works
SMCHF5R £25.65 + 15% VAT, £29.50 Ex-works

Carriage–Antenna or radial or both together
SECURICOR DELIVERY £3.30 + 15% VAT, £3.80
RAIL DELIVERY £1.50 + 15% VAT, £1.73

Check out our exciting new range of mobile and VHF colinear antennas today.

SOUTH MIDLANDS COMMUNICATIONS LTD

OSBORNE ROAD, TOTTON
SOUTHAMPTON SO4 4DN

Telex: 477351 SMCOMM G
Tel: Totton (0703) 867333

South Midlands

SMC & YAESU FOR HF—SMC & YAESU FOR HF

FT707 NEW SOLID-STATE TRANSCEIVER

The FT707 'The Wayfarer' is an ultra-compact solid-state transceiver covering 80-10m, including 30, 17 and 15m—all factory installed, with 100W output (IOW's' model) 50% out developed in 3:1 VSWR, digital (bright LED's in mode sensitive counter) and analogue readout, status at a glance (from string LED and single displays) 16 poles of crystal filtering continuously adjustable IF bandwidth 2·4kHz to 300Hz. Noise blanker of most advanced design using local AGC loop, Schottky diode ring module, power transistor buffers, ultra-clean low noise local oscillator are combined to produce, size and price not withstanding: Probably the best receiver you have ever used.

FT707 Transceiver 100W	£455.00	FV707DM Ext. Dig. VFO	£157.00	FP707 12 Volt P.S.U.	£95.00	MMB707 Mobile Mounting	£12.00
FT707S Transceiver 10W	£425.00	FC707 Antenna Tower	£63.00	MR7 Rack Mount Cabinet	£11.50	YM35 Scanning Microphone	£11.00

FT107M SOLID STATE TRANSCEIVER

FT107M

All solid state transceiver. 160-10M (+WWV Rx and 2 Aux). 12V DC. SSB, CW, FSK and AM. 240W PIP. The fan cooled (thermostatically controlled) no tune "broad band" power amplifier delivers 75% power output into 3:1 VSWR. Analogue and digital readout to 100Hz. Sensitive and with excellent dynamic range (hard driven schottky diode ring mixer). Continuous variable bandwidth 300Hz to 2·4kHz plus optional "basics" of 350/600Hz and 6kHz. Full equipment includes: audio peak/notch filter, full metering including SWR, RF speech processor, advanced noise blanker, semi break-in with side tone, VOX, clarifier on Tx, Rx, or both, 20dB attenuator etc. The optional memory system provides 12 stored channels (with fine tuning), and offers scanning from the microphone. The store employs DMS—digital memory shift—to allow tuning, via a photo interrupter of any of the memorised frequencies (equivalent to 13 VFOs!!).

FT107M Transceiver	£660.00	FV107 Ext. VFO	£80.00	FTV107 Transverter frame	£96.50	YM34 Mic. desk	£18.50
MEM/DMS Memory	£87.00	FC107 Antenna Tuner	£92.50	430-440 70cm module	£158.50	YM35 Mic. hand. scan	£11.00
FP107E AC PSU Extnl.	£92.50	SP107 External speaker	£24.00	144-148 2m module	£88.50	YM36 Mic. noise cancel	T.B.A.
FP107 int. AC PSU	T.B.A.	FTV107(2) Transverter	£181.50	50-54 6m module	£68.50	YM37 Mic. Hand	T.B.A.

FT901DM THE SUPERB PERFORMER

FT901DM

160-10m (+WWV Rx), 12 and 234V (PSU Built-in). SSB, AM, CW, FSK and FM (Tx & Rx), 180W. PIP, 80W FI. Analogue 1kHz and Digital to 100Hz. Sensitive, ¼μV with AGC controlled Mosfet RF, to push pull FET RF, Balance active mixer, push pull IF amp, to crystal filter then noise blanker. Continuously variable selectivity 300Hz to 2·4kHz and fixed 350/600Hz, 2·4kHz, 6kHz and 12kHz (at 6dB), 80dB cross mod rejection, 90dB desensitisation immunity (at 20kHz off at 14MHz). Audio Peak and separate notch tuning. Negative RF feedback on 6146B output stage (−31dB 3rd order). RF processor, VOX, Curtis electronic keyer, tune button (10sec on full power), PLL VFO with memory for any Tx, Rx or T/Rx frequency, Modular plug-in construction, permeability tuning (for new band allocations) 25kHz calibrator, 20dB switchable attenuator, sidetone, clarifier and an advanced noise blanker are all features of the FT901.

FT901DM Transceiver	£800.00	YVM-1 Video Monitor	£125.00	FTV901 Transverter	£245.00	FC901 Antenna Tuner	£115.00
FT901D Transceiver	£710.00	YO901 Monitorscope	£240.00	430-440 70cm module	£160.00	FL2100Z Linear Amp.	£355.00
FT901DE Transceiver	£700.00	YO901P YO901 with pan	£280.00	50-54 6m module	£60.00	FV901DM Synth. Ext. VFO	£215.00
YR901 Morse/TTY read	£395.00	PAN KIT Mod kit	£47.00	70-74 4m module	£75.00	SP901 External speaker	£24.00

FT101ZD PERFORMANCE AND ECONOMY

FT101ZD

A hybrid HF transceiver. 160-10M (+WWV Rx + Aux). 234V AC and 12V DC (inbuilt inverter option). SSB, CW and AM. 180W PIP from a pair of 6146B with negative feedback. Analogue and "mode sensitive" digital readout to 100Hz. Continuously variable IF bandwidth 300Hz-2·4kHz plus optional "basic fixed" of 350/600Hz. Full equipment includes:— adjustable level RF processor, advanced adjustable level noise blanker, front panel adjustable VOX, semi break-in with side tone, 0-10-20dB attenuator, switchable AGC, Slow/fast/off, clarifier (RIT) selectable on Tx, Rx or both etc., etc.
The FT101ZD is compatible with nearly all the FT901 accessories listed above—morse reader and video display, monitor scope with panadaptor, 3 band transverter, ATU, linears, speakers, and a choice of synthesized or conventional (NEW FV101Z) external VFOs.

FT101ZD Transceiver Digital £575.00 | FT101Z Transceiver Analogue £500.00 | Count Analogue/Dig. kit £80.00 | FV101Z £110.00

FT7B MOBILE AND BASE TRANSCEIVER

FT7B & YC7B

A compact all solid state HF transceiver. 80-10M. (full 2MHz coverage of 10 with optional crystals). USB-LSB CW-AM. 100W PIP (A3j and A1), 25W (A3). VFO control with clear analogue scale to 1kHz, plus an optional digital readout unit that can be conveniently sited above the transceiver, on the dash or steering column. The front panel remains remarkably uncluttered for a transceiver boasting a; crystal calibrator, vox, clarifier, side tone, and an excellent audio peak filter for CW. A mosfet RF stage for sensitivity, and a schottky diode ring mixer for dynamic range provides a level of receivers performance that outclasses "competitive" (?) transceivers. Supplied complete with mobile bracket, microphones, leads, plugs, etc. The FT7B provides the economic answer to world wide communications from home or from the car.

FT7B Transceiver £375.00 | YC7B Digital Readout £60.00 | FP12 12V 12A PSU £67.00 | YD148 Desk Mic. £18.50

PRICES EXCLUDE VAT (15%) BUT INCLUDE DELIVERY—SECURICOR/POST IN THE UK

SOUTH MIDLANDS COMMUNICATIONS LIMITED.
OSBORNE ROAD, TOTTON
SOUTHAMPTON, SO4 4DN
Hours of business:
9-5.30 Monday-Friday
9-1.30 Saturday

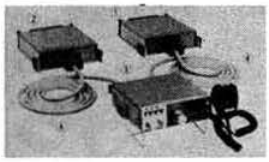
Head Office, Showrooms
Cables: Aerial Southampton
Telex: 477351 SMCOMM G
Tel: Totton (0703) 867333 (3 lines)

A	G3ZUL	Brian	Stourbridge	(03843) 5917
G	GI3KDR	John	Bangor	(0247) 55162
E	GM8GEC	Jack	Edinburgh	(031665) 2420
N	GI3WWY	Mervyn	Tandragee	(0762) 840656
T	GW3TMP	Howarth	Pontybodkin	(035287) 846/324
S	GW4GSW	Alan	Swansea	(0792) 24140

Communications Ltd

SMC & YAESU FOR VHF—SMC & YAESU FOR VHF

YAESU



FT720R NEW 'REMOTABLE'

The FT720R is a new concept in mobile FM. Take a neat 'remotable' control head (2m or 4m of extension cable and your choice of 2m (10 or 25W) and 70cm 10W main units. Add if you wish a switching box and both 2 and 70cms are available from the one money and space saving controller.

The package offers sophisticated microprocessor PLL control system, optical coupled tuning, 5 memory channels, priority channel, up/down scanning from the mic (stop on busy or empty), auto or man. Tone burst up/down repeater shift and a string of yellow and red leds for power out and S meter etc.

FT720R Control head £130.00
S72 Switching box £47.50
E72S 2m cable £20.00
720RV Transceiver 10W 2m £148.00
E72L 4m cable £23.50
720RVH Transceiver 25W 2m £153.00
720RU Transceiver 10W 70cm £179.00

FT207R–FT202R: 2m HANDHELDS

The FT207R is a microprocessor controlled synthesized handheld that offers 12·5kHz channel steps!! 4 memory channels are provided and these may, as can the whole band, be scanned. Any one of the memories can be used as a priority channel. Simply operate as normal on any frequency, designate one of the memories as priority, and every few seconds, for a few milliseconds, the set will check occupancy of the channel. All frequency entry is by the keyboard (which includes touch tone). The readout displays frequencies (to 100Hz), memory channel number and 'P'. Switches are provided for keyboard lock (prevents accidental operation) and display 'time-out'. A 600kHz shift, and any programmable split, is available, both of course plus and minus. Memory back-up is provided but can be switched off for long-term storage. 2.5W + 200mW outputs and a whole host of accessories complete the brief specification of this exciting transceiver.

The FT202R is an economical 6 channel handheld physically similar to the FT207R.

FT207R Transceiver £173.04
NC-1A Slide-in charger £16.50
NC-2 Charger eliminator £34.50
NC-9C Small charger £6.50
NBP-9 Nicad pack spare £14.50
FBA-1 Pack/charger adaptor TBA
YM24 Speaker/mic £14.50
FLC1 Heavy duty case TBA
AA Nicads, each £0.87
FT202R Transceiver £103.50
NC-1 AC charger '202 £16.50
PA-1 12V PSU '202 £16.50

CPU2500 MICROPROCESSOR CONTROLLED

The CPU2500 family are 2 metre FM transceivers available in 25W or 10W output form with keyboard or standard push tune microphones. CPU stands for Central Processing Unit and it is this microprocessor that governs the synthesizer functions. Frequency control is possible either by rotating the main tuning knob (optically coupled), by using the up/down push buttons on the front panel, by using the up/down buttons on the microphone or by tapping in the data on the keyboard microphone. Plus and minus 600kHz repeater shift and any split (up to 4MHz) can be programmed in. Four memory channels with back-up are provided and these may be scanned, as can the whole band, the scanner stopping at the first vacant or occupied channel. The SMC stepper (St) provides 25kHz steps between 145–146MHz (and entry of 5kHz direct from the keyboard) rather than the 10kHz (+5 up) synthesizer steps only, when it is switched into circuit.

CPU2500R 25W standard £292
CPU2500St 25W c/w stepper £319
CPU2500RKS 10W key mic £292
CPU2500RKSSt 10W key, stepper £319
CPU2500RK 25W key mic £308
CPU2500RKSt 25W key, stepper £335
CPU2500RS 10W standard £272
CPU2500RSSt 10W c/w stepper £299

FT227 SYNTHESIZED MOBILE TRANSCEIVER

The FT227s are 10W output 2 metre transceivers whose receiver performance—sensitivity and immunity to overload has become the standard against which others are compared. They use a signal knob (photo interrupter) to control the synthesizer, which basically turns in 10kHz steps with a 5kHz 'fill in' oscillator.

FT227RXS is an FT227R fitted with SMC's scanner. This maintains all the normal features of the 227 but the neat internal installation provides automatic tuning from 145 to 146 in 25kHz steps. When finding an occupied frequency the scanner pauses for about seven seconds and if not held will move on. A flick of the P.P.T. will lock out one (or all) unwanted channels next scan around.

FT227RBXSt is an FT227RB fitted with SMC's stepper. A four channel memory is provided in this model and tuning may also be accomplished by push buttons on the microphone. A single push moves the transceiver 25kHz, hold the button down for ½ second and it scans the band until a station is found.

FT227RXS Transceiver £252.17
FR227RBSt Transceiver £247.83
FP4 12V 4A PSU £35.00
YD148 Desk mic £18.50

FT225RD MULTIMODE 2 METRE TRANSCEIVER

144–146–148MHz. USB, LSB, AM, FM, CW (semi-break-in with side tone). Smooth dual speed VFO control and 11 (×4) crystal channels. Simplex and (auto tone burst) repeater, 600kHz and auxiliary shifts both up and down. Single signal mix, with phase locked conversion oscillator, for spurious free output. Mains 234–100V 50/60Hz and 12V DC for world wide portability. Excellent selectivity, SSB 2.4kHz with 1.75: 1 SF, FM 12kHz at −6dB. High sensitivity with modern MOSFET RF stage. Good strong signal handling by careful gain distribution, mixer and crystal filter design. High power output 10W AM, 1–25W CW and FM, SSB 25W + + with great reliability and low IMD's. Mode sensitive digital readout to 100Hz and easy to service superior plug in board construction. Front panel controls for: SSB mic gain, FM power, squelch, 'Vox/Mox sensitivity, noise blanker, AGC, readout brightness, meter functions (S/centre plus relative power) etc etc. Digital and Analogue versions and memory option.

FT225RD Transceiver £485.00
FT225R Transceiver £445.00
MEM memory option £85.00.
COUNT Counter R/RD £50.00

PRICES EXCLUDE VAT (15%) BUT INCLUDE DELIVERY—SECURICOR/POST IN THE UK

Access

S.M.C. (Jack Tweedy) LTD
Roger Baines, G3YBO
79 Chatsworth Road
Chesterfield, Derbyshire
Chesterfield (0246) 34982
9-5; Tuesday-Saturday

NORTHERN (Leeds) BRANCH
Colin Thomas G3PSM
257 Otley Road,
Leeds 16, Yorkshire.
Leeds (0532) 782326
9-5; Mon-Wed & Fri-Sat.

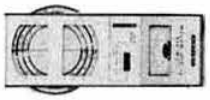
S.M.C. (Jack Tweedy) LTD
Jack Tweedy, G3ZY
150 Horncastle Road,
Woodhall Spa, Lincolnshire
Woodhall Spa (0526) 52793
9-5: Tues-Sat (+appointments)

BARCLAYCARD VISA

Communications Ltd

SMC FOR ALL YOUR STATION REQUIREMENTS

YAESU



DIP OSCILLATOR
1·5 250MHz on fundamental c/w earphone, battery, 6 plug in coils 1-15MHz crystal test, 2kHz modulation.
LDM815 (p&p foc) **£45.00**

V.H.F. LINEAR AMPLIFIER
80W out for 10W nom drive. 145MHz 12V (circa 10A). Switchable; SSB/FM Hang time. RF or man cont. Low noise pre-amps
RC1 Remote control (p&p £0.40) **£15.00**
B108 Amplifier (p&p foc) **£99.00**

WATT METERS
Through line. 1.8-54MHz. SWR scale.
LMP885 20, 200, 1000W FSD (p&p foc) **£51.00**
Absorption 1·8-500MHz
LDM880 5, 2, 120W FSD (p&p foc) **£79.00**

MULTIMETERS
20K ohms per volt. 1000X overload on ohms Plug in range selection.
80 Microtest 40 Ranges (p&p foc) **£16.50**
680G Supertest 48 Ranges (p&p foc) **£24.50**
680R Supertest 80 Ranges (p&p foc) **£32.00**

VHF/UHF SWR/POWER METER
Power 10W FSD on 50 (70), 144, 432MHz VSWR. Calibrated to 3:1 50 ohms
Detachable RF head/indicator unit
UH74 (p&p £0.60) **£12.75**

DIGITAL MULTIMETER
1- 10- 1000- 10000. ACV-DCV-ACmA. DC-mA, Ohms. 10M ohm input impedance, AC & DC. Automatic zero and polarity.
ME521 (p&p foc) New Low Price **£38.26**

COAXIAL RELAYS
12V dc operation, 50 ohms. 1kW PEP @ 30MHz 50dB isolation at 1 GHz. 0.2dB loss at 0.5GHz.
CX540D 3 BNC Sockets (p&p foc) **£18.50**
CX530D 3 BNC + 1 'N' (p&p foc) **£18.50**
CX520D 3 'N' sockets (p&p foc) **£18.50**

AERIAL ROTOR 'OFFSET TYPE'
Carriage UK, post free, all models
CDE manufacture
Silent self-calibrating control box
AR30—"Dial and push" **£41.00**
Stolle manufacture
Silent automatic control box. Turning shaft passes through rotator (as illustrated)
2050 Memomatic control box with moving light gives indication of beam heading during rotation period **£37.50**
2010—"Dial up direction" control box with excellent synchronization **£45.83**

POWER SUPPLY
12V dc regulated supply,
240V 50/60Hz input
3 Amps cont. 5 Amp peak 3 × 4½ × 6". 3½lbs
ODR123C (Post free) **£13.50**

V.H.F. LINEAR AMPLIFIER
160W out for 15W maximum drive. 145MHz. 12V dc (circa 18A). RF or manual switching. SSB/FM Excellent heat sink—over temp, trip out/reset.
PA 15-160BL (Post free) **£178.50**

COAX SLIDE SWITCHES
50 ohms impedance SO239 sockets
TWS120 1 in 2 out (p&p 20p) **£5.75**
TWS150 1 in 5 out (p&p 30p) **£10.50**
TWS220 2 in 4 out (p&p 30p) **£10.85**

ANTENNA COUPLER
3.5-30MHz. 50/75 ohm Coax (VSWR<5:1) and Single Wire (10-250 ohms) transformed to 50 ohms. To 500W PIP SSB
Wattmeter 20+250W FSD meter
LAC895 (p&p foc) **£92.00**

HF/VHF SWR METER
Twin Meter. 3.5 to 170MHz. 50ohms. SWR. Calibrated to 3:1
Relative Power. SO239 sockets
T3-170L (p&p £0.60) **£11.25**

DIGITAL FREQUENCY COUNTER
100kHz to 30MHz. 12V dc operation. 5-7 segment displays resolves to 10Hz.
Only 6½ × 2½ × 5½"
RT75D (p&p 50p) New Low Price **£38.26**

TRANSVERTERS, SOLID STATE
MMT28/144 10m, 2m, 1F 10W out **£79.00**
MMT70/144 4m, 2m, 1F 10W out **£79.00**
MMT144/28 2cm, 10m 1F 10W out **£86.00**
MMT432/28.S 70cm, 10m, 1F Satellite shift **£119.00**
MMT432/144R 70cm, 2m, 1F Repeater shift **£151.00**
MMT1296/144 23cm, 2m, 1F 1·3 R.F. **£139**

ANTENNA ROTATORS 'BELL TYPE'
Carriage UK (Post or Securicor) free.
AR40 Silent self-calibrating control box to 3sq ft ant wind area **£52.00**
BT1 4 pre set plus manual control to 5sq ft ant wind area **£79.00**
Continuous readout on large meter
Superior brake mechanism
CD45 to 8½sq ft ant wind area **£99.00**
Ham IV to 15sq ft ant wind area **£145.00**
T2X to 30sq ft ant wind area **£199.00**

HIGH EFFICIENCY VHF VERTICALS (illustrated right)
RINGO RANGER: 6dB gain over ¼λ ground plane. Uses 3 phased ¼λ and ¼λ stub. Ultra low angle radiation. No radials required.
ARX2 144MHz 9'6" tall, 1½lbs (p&p £1.00) New Low Price **£20.00**
Other Cushcraft VHF antennas—horizontal and vertical in stock.
All at 10% off list prices!!!

QUARTZ & CERAMIC FILTERS
QUARTZ 3·18, 9, 10·7Mhz centre frequency; 350/600Hz, 2·4/6/12kHz, 6&8 pole
CERAMIC 455kHz centre frequency
2/4/6/12kHz, 9&11 poles
Prices: Ceramic **£5-£11** Crystal **£16-£22**

NB. ALL PRICES EXCLUDE VAT 15%

Access

S.M.C. (Jack Tweedy) LTD
Roger Baines, G3YBO
79 Chatsworth Road
Chesterfield, Derbyshire
Chesterfield (0246) 34982
9-5; Tuesday-Saturday

NORTHERN (Leeds) BRANCH
Colin Thomas G3PSM
257 Otley Road,
Leeds 16. Yorkshire.
Leeds (0532) 782326
9-5; Mon-Wed & Fri-Sat.

S.M.C. (Jack Tweedy) LTD
Jack Tweedy, G3ZY
150 Horncastle Road,
Woodhall Spa, Lincolnshire
Woodhall Spa (0526) 52793
9-5: Tues-Sat (+appointments)

BARCLAYCARD VISA

KYOKUTO

KYOKUTO DENSHI COMPANY LIMITED

KDK 2025 2m SYNTHESIZED 25w TRANSCEIVER

- ★ Custom designed microprocessor control
- ★ 25kHz *and* 12·5kHz synthesizer steps!!
- ★ 'Instant QSY', 10 times rate button
- ★ 25 Watts of reliable RF output
- ★ Band scan between any 'easy set' limits
- ★ 10 write-in non-volatile memory channels
- ★ Memory scanning with hold facility
- ★ Standard ± 600kHz or any repeater split

The KDK FM2025E is a 12V DC two-metre FM transceiver for mobile or base station use. Although packed with more features than any previous model, operation is even easier, by using a "custom built" microprocessor.

Digital frequency synthesis provides full band coverage 12·5kHz or 25kHz steps. "Single knob" frequency selection is by an optically coupled encoder plus a dialling speed switch that increases the tuning steps tenfold to facilitate the selection of widely spaced frequencies.

A memory, with Ni-Cd back-up, provides 10 simplex (plus standard ± 600kHz shift) and/or five semi-duplex channels from the 10 slot, two group store, making the 2025 as easy to use mobile, as a crystal controlled transceiver. One memory slot is semi-dedicated to "priority" use, and is programmable even when the 2025 is dial controlled.

The 2025 embodies the best non-lockout scanner available. It seeks occupied or empty channels and a flick switch hold facility enables immediate transmission on a desired frequency. The scanner functions on both memory channels and across any selected portion of the band; scan limits are defined by two of the memory channels.

Dual gate UHF MOSFETS in the RF and mixer provide superior intermodulation performance with high sensitivity maintained over the band by auto varicap tuning.

A monolithic crystal filter in the first IF and a commercial quality 15-pole ceramic filter in the second IF provides extremely sharp selectivity. A one-chip multifunction IC provides all the second conversion circuitry.

The single conversion transmitter uses a balanced mixer and a VCO on the signal frequency (directly modulated for superb FM) and a hybrid power module for 25W (or 3W) RF output. The PA is impervious to breakdowns under infinite VSWR and produces a substantially spurious free signal.

Necessary control function instructions are programmed into the microprocessor itself. But by re-arranging a diode matrix, the lower frequency transceive limit, the high frequency receive limit and the high frequency transmit limit may be altered to allow for changes of band plan or location.

Switchable auto-tone-burst, RF attenuator, squelch, microphone, microphone clip, power lead, mounting bracket, handbook are, of course, part of the package.

THE 2025 IS AVAILABLE DIRECT FROM THE IMPORTERS AT £250
(INCLUDING VAT AND SECURICOR DELIVERY) OR FROM ANY OF THOSE LISTED

AMATEUR RADIO EXCHANGE, 2 Northfield Road, London, W13	D. P. HOBBS, 13 Benedicts Street, Norwich	REG WARD & CO LTD, George Street, Axminster
AMATEUR RADIO SHOP, 4 Cross Church Street, Huddersfield HD1 3PT	L. HARDIE, 542 George Street, Aberdeen	SMC (JACK TWEEDY) LTD, 150 Horncastle Road, Woodhall Spa
J. BIRKETT, 25 The Strait, Lincoln	HOLDINGS LIMITED, Mincing Lane, Blackburn BB2 2AF	SMC (JACK TWEEDY) LTD, 79 Chatsworth Road, Chesterfield
BREDHURST ELECTRONICS, Handcross, West Sussex	LEYS AND DUNCAN, 19 Low Street, Banff	SMC (NORTHERN) LTD, 257 Otley Road, Leeds 16
C. B. ELECTRONICS, 771 Ormskirk Road, Wigan	LOWE ELECTRONICS, Chesterfield Road, Matlock	SOUTH MIDLANDS COMMUNICATIONS LTD, Osborne Road, Totton, Southampton

SMC

SOUTH MIDLANDS COMMUNICATIONS LTD

S M HOUSE, OSBORNE ROAD
TOTTON, SOUTHAMPTON
HAMPSHIRE SO4 4DN

TELEPHONE: TOTTON (0703) 867333
CABLE: 'AERIAL' SOUTHAMPTON
TELEX: 477351 SMCOMM G

RADIO SOCIETY OF GREAT BRITAIN

35 Doughty Street, London WC1N 2AE
Telephone 01-837 8688

Founded 1913
Incorporated 1926

Member society, International Amateur Radio Union

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

The national society representing all UK radio amateurs

Membership is open to all those with an active interest in radio experimentation and communication as a hobby. 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: £10, including VAT — **Overseas: £10**

Associates under 18: £4. — **Students aged 18 to 21: £6**
(Student applications should give the member's age at last renewal date and include evidence of student status)

Affiliated societies: £10 (including *Radio Communication*);
£6 (excluding *Radio Communication*).

MEMBERS' ADS RATE INCREASE

The rate charged for Members' Ads has remained unchanged since July 1977, while during that time printing costs have risen substantially in line with inflation. Although some of these increased costs were offset by a change of printers in 1978, subsequent increases now make it necessary to pass the increased typesetting cost of Members' Ads on to the rate charged for them. It is emphasized that these advertisements will continue to be heavily subsidized; among other items, the increased cost of paper and printing will continue to be absorbed by the Society.

The flat rate will therefore be increased from 75p to £1 for every 40 words or part thereof, with effect from 1 June 1980.

All Members' Ads postmarked before that date will be accepted at the current rate, but thereafter only advertisements at the new rate will be accepted.

PRINTING DELAYS

Delays have occurred during the production of this issue of *Radio Communication* as a result of a national dispute in the printing industry. These have inevitably led to late publication.

Until the dispute is resolved and the cumulative backlog in print production has been overcome, there is a possibility that one or more subsequent issues may also be delayed, although every effort will be made to avoid excessive delay.

QTC
amateur radio news

Milestone in membership
The membership of the RSGB has now passed the 25,000 mark, with the annual net increase continuing at approximately 10 per cent per year. The application for membership of newly-licensed Miss Diane Parker, G8VVV, was the one which reached this milestone in the Society's history, and a special membership certificate for G8VVV will be issued to mark the occasion.

It has taken 67 years to reach this membership figure, but if the current rate of increase is maintained the next 25,000 will be reached within eight years.

DARC award for G2BVN
Roy Stevens, G2BVN, has been awarded the highest distinction of the West German national society DARC, the "Goldene Ehrennaded", for outstanding services to amateur radio.

This is yet another of the many tributes which have been paid, in the UK and overseas, to the outstanding achievements of this remarkable man in the realm of amateur radio.

RSGB IARU Committee
At its meeting on 3 April, the RSGB IARU Committee elected Mr R. J. Hughes, G3GVV, as chairman; Dr E. J. Allaway, G3FKM, as vice-chairman, and Mr R. M. Warner, G3SAR, as secretary. Mr J. Bazley, G3HCT, was confirmed as IARU information officer.

Stockport RS diamond jubilee
The Stockport Radio Society celebrates its diamond jubilee this year, and its president for the year is a founder member, Bill Banks, G2ARX, who has held the offices of secretary, chairman and treasurer of the society. The society's first meeting in June 1920 was attended by 12 people, and today's membership is around 160, with the vast majority being licensed.

The society has a history of successes in national and regional hf and vhf contests, and, with a varied programme of other activities, continues to thrive. The current chairman is Mel Betts, G4FFW, and further details of the society's activities can be obtained from the secretary, Ray Phillips, G3FYE.

Overseas news items
JARL, the Japanese national society, will be holding an amateur radio festival in Tokyo from 22 to 24 August 1980. The 1979 festival attracted some 30,000 visitors.

NZART, the New Zealand national society, will hold its 54th annual conference from 30 May to 2 June at Graymouth, South Island. Details from ZL3TC.

In the USA, the national society ARRL, is to purchase RSGB books for resale. In heavy flooding in parts of California in February, it is estimated that 95 per cent of the relief traffic between the Red Cross and the Salvation Army was carried by radio amateurs.

GB2ITU
GB2ITU will be on the air from Tonbridge School from 1 to 28 May. It will celebrate World Telecommunications Day (17 May) and will be active on all bands 3·5 to 28MHz and 144MHz. Please QSL via the bureau only.

Ex-5Z4 net
This takes place at 1200gmt every Wednesday on or about 7·095MHz. All ex-5Z4s are invited to join in, as are friends and other interested amateurs. Further information may be obtained from Mrs P. Greenwood, G4EOP, Elgon Lodge, French Drove, Thorney, Cambs PE6 0PF.

Trio/Kenwood International Users Club
This club is open to all owners or prospective owners of Trio/Kenwood equipment. It publishes a newsletter 10 times a year and holds on-the-air meetings on about 14,300kHz at 2000gmt on Sundays. Interested readers are invited to contact G3RKC, QTHR (sase please) for further information.

Crystal exchange
Mr K. Turner, GMHQR, has suggested the setting up of a crystal exchange similar to that operated by G5UM some years ago for vhf. He suggests that amateurs with unwanted crystals, and those who require crystals, should send lists of these to an exchange organizer, who would then put them in touch with each other. GM4HQR would appreciate readers' reaction to this suggestion: his address is 31 Duddingston Park South, Edinburgh EH15 3NZ.

Pen-friend wanted
A Czechoslovak swl is looking for a pen-friend in the UK. He is Jura J. Bohunsky, Zelenohorska 3, 81500 Bratislava 15, Czechoslovakia. In addition to listening, his hobbies include languages and correspondence.

The RAC Amateur Radio Group Scheme
Membership of this scheme is open to all amateur radio enthusiasts and provides membership of the Royal Automobile Club at a discount of £2.50 below the current ordinary RAC membership subscription rate. The present annual subscription for members of the group scheme is £10.50, and no additional subscription is payable for a member's spouse.

The group scheme's subscription renewal date is 17 May (World Telecommunication Day) each year, and all members renew on the same date. Anyone joining the scheme will pay at the pro-rata rate of 88p per month for the remainder of the year. In addition, the RAC once-only joining fee of £2.50 is also payable, regardless of the period remaining in the membership year. Radio amateurs who are already members of the RAC and wish to transfer to the group scheme will not pay the joining fee. A desirable option is the RAC Recovery Service, the annual subscription for which is £8 for the whole or part of the year.

The scheme is administered by RAC Motoring Services Ltd, Scottish Western Counties Office, 242 West George Street, Glasgow G2 4QZ. The co-ordinator of the scheme is Mr A. W. Hutchinson, 88 Broomfield Road, Chelmsford, Essex CM1 1SS, who will be pleased to deal with any queries from potential members.

The Phase 3A satellite

by R. F. STEVENS, G2BVN

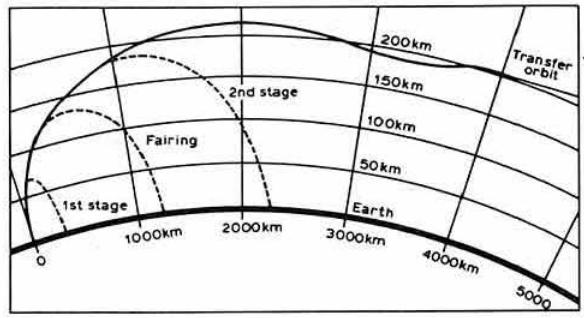


Fig 2. Ariane will place the Phase 3 satellite and its apogee motor in transfer orbit (perigee 200km, apogee 35,800km. During the initial phase of its trajectory, Ariane is tracked and its telemetry data received by the facilities of the French Guiana space centre. In order to ensure coverage throughout the trajectory, downrange stations are also used: two in Brazil, at Belem and Natal respectively, and a third on Ascension Island

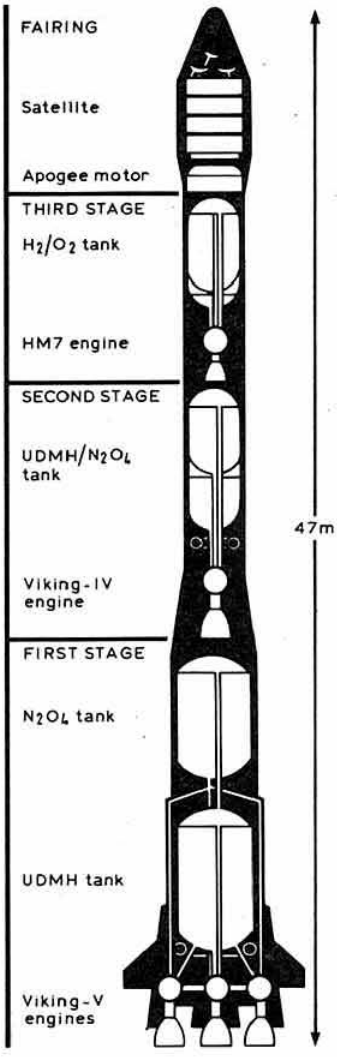


Fig 1. Ariane is a three-stage launcher with a total height of 47·4m and weighing 208 tonnes at lift-off, 90 per cent of the mass being constituted by propellant. The structures and the payload account for about 9 and 1 per cent of the total weight respectively

THE successful launch of the Ariane LO/1 mission from the space centre of the European Space Agency at Kourou, French Guiana, on 24 December 1979 cleared the way for the anticipated launch of the LO/2 mission, scheduled for 23 May 1980 between 1500 and 1800utc. The primary satellite experiment will be Project Firewheel, which was mentioned in "Oscar news" (*Radio Communication*, April 1980). Located below the canisters of Firewheel is the Phase 3A satellite, which will be known as AMSAT Oscar 9 after ejection.

The Ariane rocket comprises three stages, and the payload is above the last stage. A typical launch will produce a first-stage burn of 45s, and the first stage will separate at an altitude of 52km. The second stage will carry the rocket to an altitude of 138km, while a third-stage burn of 570s will be followed by a fall-off at 213km altitude. The Phase 3A spacecraft will be

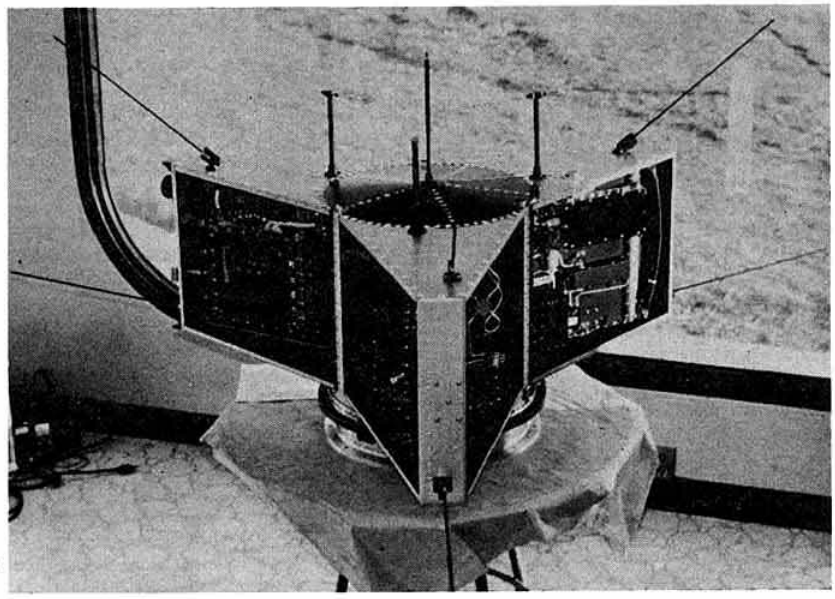


Fig 3. The Phase 3A spacecraft with antennas installed. *Photo:* AMSAT

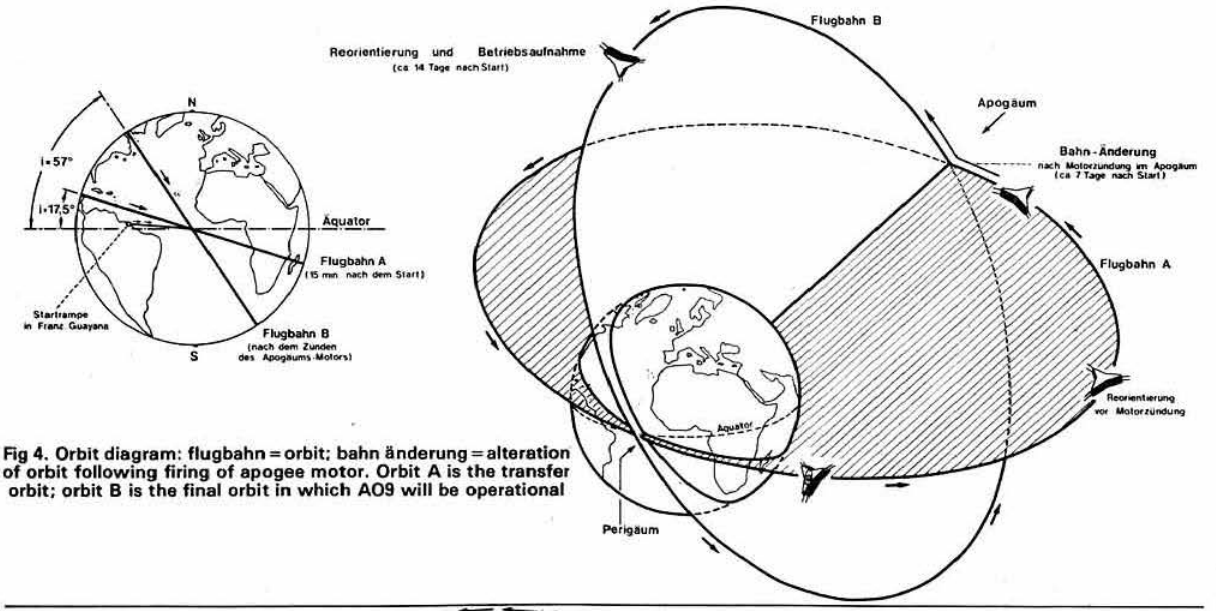


Fig 4. Orbit diagram: flugbahn = orbit; bahn änderung = alteration of orbit following firing of apogee motor. Orbit A is the transfer orbit; orbit B is the final orbit in which AO9 will be operational

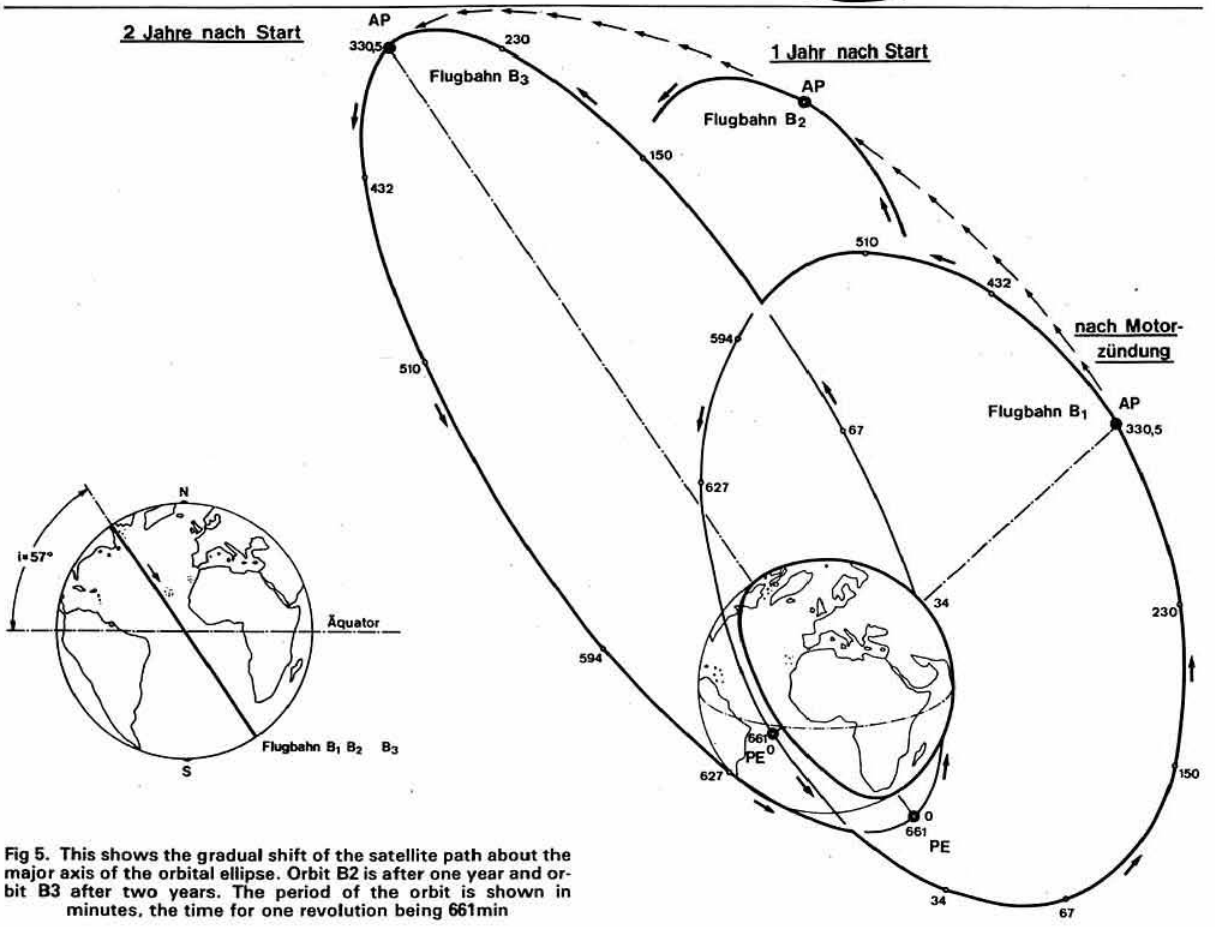


Fig 5. This shows the gradual shift of the satellite path about the major axis of the orbital ellipse. Orbit B2 is after one year and orbit B3 after two years. The period of the orbit is shown in minutes, the time for one revolution being 661min

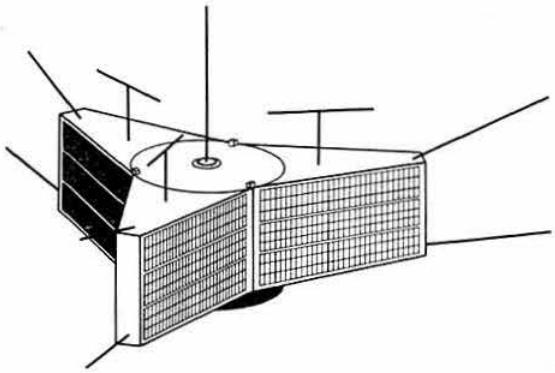


Fig 6. The antennas of AO9. At the end of the three arms are the 144MHz directional antennas; on top of the arms are the 435MHz directional antennas. In the centre is the 144MHz/435MHz vertical for use ± perigree

ejected into an elliptical orbit (Fig 4) while Ariane goes into a higher apogee for the Firewheel project.

AMSAT Oscar 9 will remain in the transfer orbit for about seven days, and it will not be available for two-way communication during this period. While passing through the apogee the drive motor will be fired, which will raise the degree of inclination to about 57°, giving an increase in the height of the perigee to 1,500km, while the height of the apogee remains at about 36,000km. In this way it is hoped to achieve orbit "B", and AMSAT Oscar 9 will be operational after about 14 days following further reorientation.

The orbit of AO9 will not remain constant over a long period, as a shift about the major axis of the orbit is caused by the higher pull of gravity above the equator on the satellite. Initially the apogee will shift northerly by 0·07° per day. Fig 5 shows the anticipated shift of the apogee.

Launch information

Prior to the launch date, GB2RS news bulletins, the AMSAT international nets and the AMSAT-UK net will carry the latest information regarding the time and date of launch. Additionally an hf bulletin service will run from one week pre-launch up to three weeks into the post-launch period. This will be as follows:

Europe	28·555MHz	1800utc	Monday–Saturday	W2JT
Europe	21·260MHz	1820utc	Monday–Saturday	W2JT
Europe	14·260MHz	1830utc	Monday–Saturday	W2JT

Each bulletin will begin promptly and last less than 5min.

The launch day network will begin 45min before launch and continue until AO9 is in transfer orbit, ie lift off + 20min. For Europe, W1AW will be operating on 21·39 and 28·59MHz during this period.

Antennas

The configuration of the spacecraft antennas is shown in Fig 6. The high gain antennas will switch in at about 40° off axis up to apogee and have their −3dB points at 40°. However, the 144MHz apogee antennas show a large side lobe at about 60°. The spin axis of the satellite is always parallel to the major axis of the orbital elipse; at apogee the spacecraft antennas face the earth, while at perigee the antennas face away from earth.

Transponder operation

The band plan for operation through AO9 is shown in Fig 7. Slight changes to the beacon frequency shown may be found following environmental changes. At the time of writing it appears that the actual frequency of the general beacon will probably be 2-4kHz lower than the planned 145·810MHz. Until the post-launch measurements and sensitivity tests have been carried out it is not possible to provide a firm figure for the erp

(Continued on page 482)

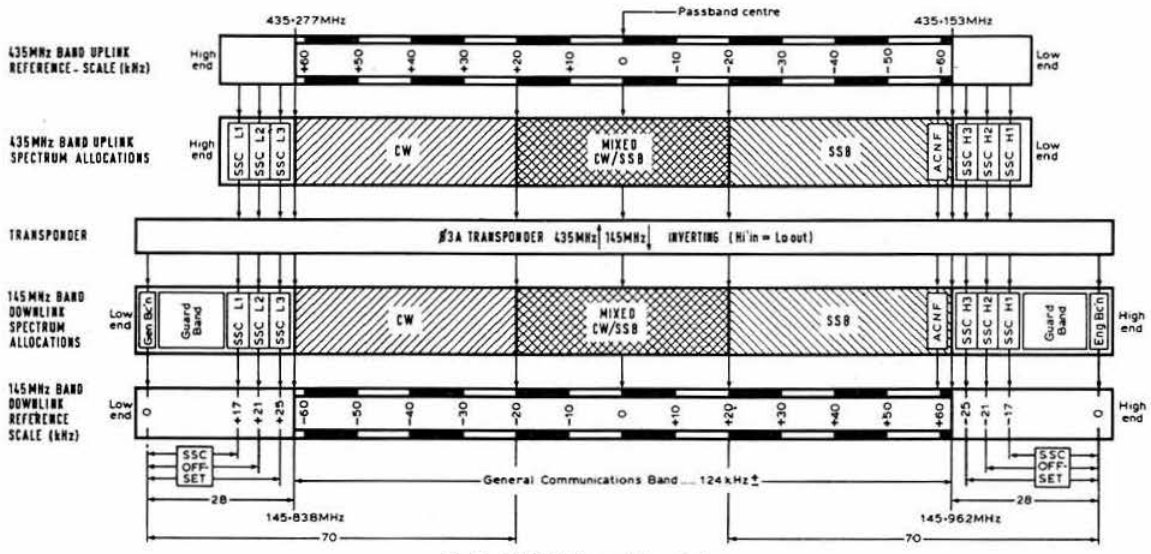


Fig 7. AMSAT Oscar 9 band plan

AMSAT Phase 3A satellite telemetry

Channelization, beacons, recovery systems and applications

by R. RUEDISUELI, W4OWA*

Introduction

The telemetry of the AMSAT Phase 3A satellite, in addition to being essential to its well-being, will offer a new dimension to those users interested in pursuing the opportunities for experimentation which will be made available by its expanded capabilities. It is the intention of this article to present an overview of the various elements—beacon transmitters, telemetry signal formats, recovery methods, etc—of what may be considered a telemetry sub-system of the satellite.

The technical aspects of parts of this sub-system have already appeared in articles in various issues of *AMSAT Newsletter* and in other publications (specific references will be made at appropriate places throughout the article). For this reason the article is non-technical and brings together what the author considers to be all the essential information required by prospective users who may wish to make use of the sub-system's capabilities. This complex subject is divided into five parts, each intended to give the reader the basic background required to pursue, to whatever depth he may choose, the challenge to be offered through the use of the special service channels on board the satellite.

First, the reader should have some understanding of the transponder channelization scheme to be employed in the satellite and, in addition, some knowledge of how the use of these channelized services will be co-ordinated. The relationship between the beacons, the service channels and the transponder passband will therefore be explained. The second section is devoted to the "on-board" hardware, including the beacon transmitters, and the reader will require information regarding the beacon frequencies, transmitted power and details relative to keying methods.

In the third section, beacon signals and telemetry transmission formats are discussed; this will provide the reader with some tentative information that will be useful in understanding the significance of the message content of the beacon transmissions. Part four concerns the proposed AMSAT Phase 3A beacon signal recovery system, and makes reference to specific technical information available elsewhere, again allowing the reader freedom to choose his degree of involvement. The final section suggests some avenues of experimentation that may appeal to prospective users of the telemetry sub-system.

The author has been overwhelmed by the amount and complexity of material available relative to all phases of amateur radio space communications. Trying to grasp the "big picture" by which to pursue an orderly study geared to one's own interests and capabilities can often spell the difference between moving ahead in a hobby and losing interest. It is with these thoughts in mind that this article has been prepared.

*1537 Crowell Road, Vienna, VA 22180, USA

Transponder channelization and co-ordination

What does telemetry have to do with transponder channelization? Simply this: the telemetry signals must be transmitted by some form of transmitting device operating outside the normal passband of the satellite's transponder. On board the AMSAT Phase 3A satellite there will be two such devices, referred to as the "general" and "engineering" beacons, and it is of interest to know where the frequencies of these beacon transmitters lie with respect to the transponded passband.

The AMSAT Phase 3A satellite band plan was described in detail in an article by Vern Riportella, WA2LQQ, in *AMSAT Newsletter*, June 1979. This plan divides the 180kHz-wide downlink passband into three major usage bands, consisting of a general communications band sub-divided by emission type, a channelized "special services" band, beacon and guard channel bands.

The specific details of the band plan will not be repeated here, but there are some significant points that are important to prospective users interested in the telemetry signals. These are:
(1) The centre frequency of the downlink passband will be 145·900MHz.
(2) The general communications band will extend ±62kHz on each side of this centre frequency.
(3) Two beacon transmitters, one on the low edge and another on the high edge of the passband, will operate on frequencies of 145·810 and 145·990MHz respectively.
(4) Three special service channels (sscs) (L1, L2 and L3) will operate at frequencies 17, 21 and 25kHz *above* the 145·810MHz beacon.
(5) Three sscs (H1, H2 and H3) will appear at frequencies 17, 21 and 25kHz *below* the 145·990MHz beacon.

Although the sscs are not part of the telemetry sub-system in the strictest sense, they are mentioned here because of their relationship to the beacon frequencies and because they will appear as "receive only" channels to the casual observer; that is, the sscs will not be available for general two-way communication. For these reasons the use of the sscs will be closely co-ordinated (for specific details, see WA2LQQ's article). Briefly, the sscs will be used and co-ordinated as follows:
L1—Scientific, will be co-ordinated by N1DM.

L2—AMSAT international computer network (AMICON) (acting co-ordinator, WA2LQQ).
L3—NTS traffic (co-ordinator, K1XA).
H1—CW practice (co-ordinator, W1EH).
H2—Education (co-ordinator, WB1EYI).
H3—General bulletin (co-ordinator, G3IOR).

Anyone interested in the experimental opportunities to be offered by the AMSAT Phase 3A project will readily appreciate the value of sscs and the fact that they exist at specific frequencies with respect to the beacons.

The general bulletin channel (H3) is of particular interest to the experimenter, and for this reason the author draws the attention of readers to an article by Vic Politi, W1NU, and Kaz Deskur, K2ZRO, which described an early proposal for the use of the AMSAT Phase 3A satellite general bulletin channel, and which appeared in *AMSAT Newsletter,* June 1979.

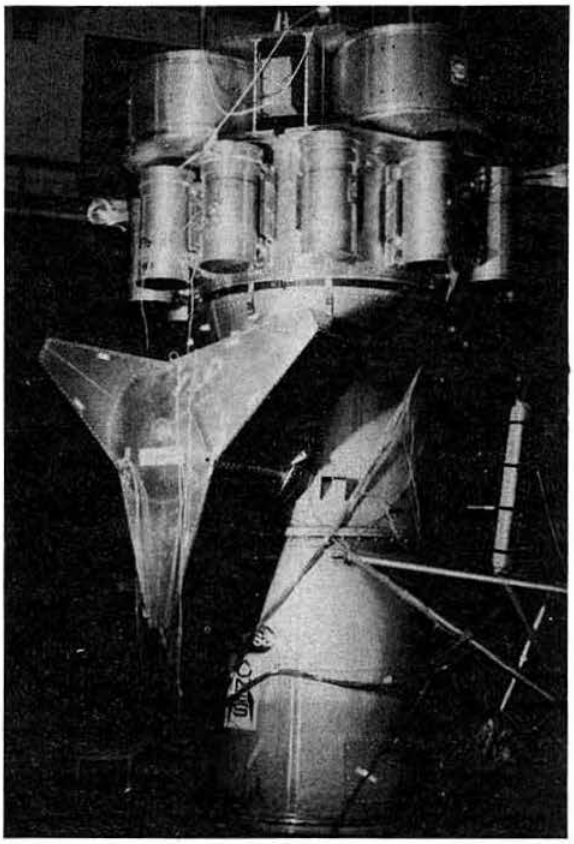
On-board hardware

The term "telemetry" as used in this article refers to the transmission of information originating on board the spacecraft, and information originated at a ground station that has been transmitted to the spacecraft and stored there for later retransmission back to the ground station. These retransmitted data do not necessarily constitute telemetry signals in the strictest sense, but for the purpose of this article will be referred to broadly as such. This implies the use of some form of recorder and/or storage device aboard the satellite.

Unlike earlier Oscars, the AMSAT Phase 3 satellite will be equipped with an on-board computer having a memory capacity of 32,000 bytes (256,000 bits). The main function of the computer will be to support the various "housekeeping" items required to assure the well-being of the spacecraft. In addition, however, this computer will provide a new dimension, inasmuch as it will be able to act as a data-store, allowing the retransmission of data upon appropriate command from one or more ground stations.

Previous Oscars were equipped with simple beacon transmitters, and the information transmitted by these beacons was limited to seemingly meaningless strings of numbers, but the situation on board the Phase 3 satellite will be quite different. AMSAT Phase 3A Oscar will carry two beacon transmitters, one identified as the engineering beacon (eb) and the other as the general beacon (gb). Each beacon will have a nominal power output of about 2W and will feed antennas with gains of 0 or 10dB. This will result in an effective radiated power of 2 or 20W, which could provide very usable signals at even the most modestly equipped ground stations. In addition, the power of the engineering beacon can be increased to about 4W when the transponder is turned off. The engineering beacon will transmit on 145·990MHz, and the general beacon will transmit on 145·810MHz. Note that this 180kHz separation will place the beacon transmitters just outside the usable 150kHz of the passband of the transponder.

The engineering beacon will employ phase-shift keying operating at a rate of 400 bits/s. A ±90° phase shift will be utilized in which bits are represented by shifts from plus to minus or from minus to plus. That is, a "0" is represented by a positive-going or a minus-to-plus transition, while a "1" is represented by a plus-to-minus or negative transition. As if to further complicate matters, the engineering beacon receiving equipment will look at bits two at a time. If two adjacent bits are the same, a "0" is intended, if the adjacent bits are different, a "1" is indicated.



Equipment bay of Ariane with "Firewheel" satellite (upper part) and the Phase 3A spacecraft. *Photo:* AMSAT-DL/DJ5KQ

Obviously, rather sophisticated receiving equipment is required to "strip away" the message content of the engineering beacon, and at this point, the author can only refer the reader to a very interesting technical article by Karl Meinzer, DJ4ZC, which appeared in *AMSAT Newsletter,* June 1979. The article deals with the digital communication techniques to be employed in the Phase 3 satellite.

It might be expected that the engineering beacon will be of interest only to those equipped to employ advanced technology, but the general beacon will have something to offer for everyone and will employ three modes of transmission. First, on-off keying or just plain cw at 15wpm; second, for the rtty enthusiast, rtty (fsk at 170Hz shift at 60wpm) will be transmitted at appropriate times, and finally, psk as employed on the engineering beacon and as described above will be used for specific situations.

Message content, beacon signals and telemetry formats

As suggested above, the engineering beacon will be used exclusively to control the satellite, and its transmitted data will be used by certain ground stations which will be "geared up" to decode and use it. However, the signals will be there at 145·990MHz for anyone to copy. The material that follows is

thus specifically related to the general beacon and to its signals which will be heard at 145·810MHz.

The general beacon is intended to provide specific transmissions of information for general users, experimenters, and for educational programmes, and it will transmit its messages using either standard fsk rtty (space-only keying) or cw at 15wpm. Transmissions will consist of telemetry in the strictest sense, ie information relative to the well-being of the subsystems aboard the satellite and of the satellite itself; and, in addition, they will include Codestore bulletins, seasonal greetings, orbital data (pertaining to current orbit), real-time sub-satellite position in latitude and longitude, orbital clock counts, and possibly even altitude data according to the schedule shown in Fig 1.

Unlike the data received from earlier Oscar beacons, the AMSAT Phase 3A telemetry information will consist of blocks of numbers having specific meaning, ie data will be encoded as in previous satellites, and translation from arbitrary values to understandable data will be performed in the satellite. For example, a typical telemetry message will consist of a frame of 20 five-digit words: the first two digits of each word will identify the parameters to be measured, such as battery voltage or a charging current, and the next three digits will represent an actual value of the parameter; for example, 138 might represent 13·8V. Prospective users will employ a "look-up" table consisting of 64 possible parameters, related units and a multiplier for each, such as times 0·1 to denote 13·8V in the above example.

Why five-digit words? It has been determined that three digits are quite adequate for understandable data. At least two digits are required to identify the appropriate parameter out of a possible 64. A transmission speed of 15wpm and a desire to limit each transmission to 3min, places a 270-character limit on each transmission (assuming five characters per word plus one character space). Therefore it turns out that a telemetry message consisting of 20 five-character words could be transmitted during a 3min period (20 words times five characters times two transmissions equals 200 characters). If a telemetry message of more than 20 words were to be transmitted it could consist of up to 40 words and be transmitted just once within the allotted 3min period.

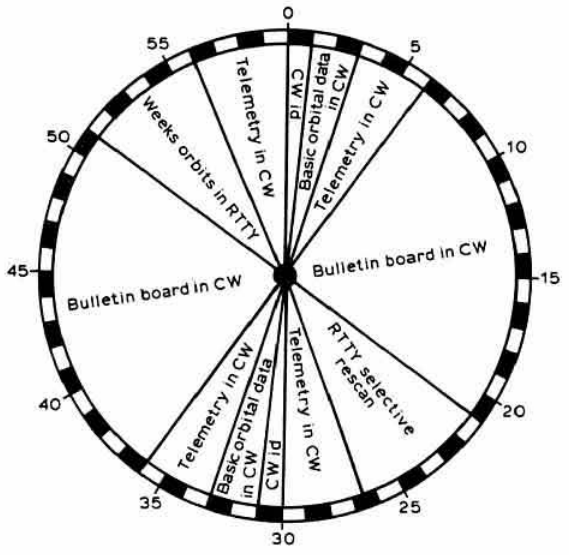


Fig 1. Proposed AMSAT Phase 3A general beacon hourly format. Notes: (1) transmissions will be sent at 15wpm; (2) rtty transmissions will be at 60wpm Baudot (five-level) code and will be 170Hz shift fsk; (3) telemetry will be used as fill material when needed

The on-board telemetry sub-system will be configured to allow up to 64 individual channels—think of each channel as being available to measure some particular parameter. The on-board computer will be used to associate channels and encoded telemetry data, and it will also decode the telemetry information so that understandable data can be transmitted. Tentatively, the following are some of the specific items to be measured: battery voltage, transponder transmitter temperature, total array input current, spin rate, transponder power output, battery charge–discharge current, transponder agc voltage, +Z skin temperature, −Z skin temperature, central support cylinder temperature, sub-battery No 1 temperature, sub-battery No 2 temperature, auxiliary battery temperature, 5V memory regulator voltage, separated 14V bus voltage and 9V regulator voltage.

Since the general beacon will be used to transmit much more than just pure telemetry, a tentative transmission schedule has been worked out assigning time slots (12 in all, from T0 to T11) to the various types of messages to be transmitted, as shown in Fig 1. The time slots will be repeated each hour and will run something like this:

Time	Duration	Content
T0	1·0min	CW id and preamble
T1	2·0min	Basic orbital data
T2	3·0min	CW telemetry data
T3	15·0min	CW bulletin board
T4	5·5min	RTTY rescan of the above information
T5	3·5min	CW telemetry

Time slots T6, T7, T8 and T9 will be a repeat of time slots T0, T1, T2 and T3 as above. Time slot T10 will consist of an rtty transmission lasting about 5min and covering the week's orbits. T11 would be a transmission fill to the hour consisting of cw telemetry.

Beacon recovery systems

For this discussion, it will be assumed that the user will be interested in receiving signals from both the engineering beacon and the general beacon, but it must not be overlooked that he may want to take an occasional look at one or more of the special service channels, which could be of real interest and value to the experimenter. Also, it must be kept in mind that a general bulletin service channel, H3, will keep one up-to-date with the very latest happenings.

Another point to keep in mind is that, unlike previous Oscars, the Phase 3A satellite on an optimum pass will provide up to about 10·5h of continuous beacon signals; ample time to carry out some very sophisticated experiments if one is so inclined. No more 5 to 10min scurries to adjust equipment followed by nearly two or more hours of waiting before being able to receive signals.

Finally, also keep in mind the effects of doppler shift, which will have an effect on the frequency to which the user's equipment will be tuned.

Depending upon one's interest, and possibly the size of one's wallet, a recovery system may be configured to do one or more of the following:

1. Copy cw using normal equipment capable of being tuned to the general beacon, 145·810MHz. This will permit the copying of information during all time slots, except during T4 and T10 which are reserved for rtty.
2. Copy rtty transmissions during time periods T4 and T10. In addition to receiving equipment tuned to 145·810MHz, an appropriate Baudot teletype machine and terminal will be required.
3. If the user has a microprocessor he may wish to interface his teletype machine to the computer; this will require a special interface board. A board designed especially for this use is available, and it also contains its own afsk terminal unit which will simplify the interface.
4. Ultimately, one may want to go all-out to utilize a recovery system equipped to receive the special psk signals from the engineering beacon on 145·990MHz (note also that the general beacon may also be keyed using psk on some occasions).

Based on these recovery system configuration requirements, a typical system may be developed in steps which would consist of:

(a) Antenna—almost any antenna may be tried to start with; eg ground planes, horizontal loops etc. Fading due to satellite "spin modulation" may be objectionable, however, unless a right-hand circularly-polarized antenna, such as a helix or crossed-Yagi, is used.

(b) Converter—home-brew or commercial—designed to work at 145MHz with an output of 28 or 29MHz.

(c) Existing high frequency receiver tuned to the 28 or 29MHz band. Any reasonably good receiver capable of receiving cw and single-sideband should suffice.

This will put one in business for copying cw transmissions. Add an rtty machine and terminal unit, and one will be in business for copying rtty signals from the general beacon. To move beyond this level of sophistication, one should become acquainted with the AMSAT-80 project which involves the design of a complete computer hardware and software package to be used to enhance Phase 3 communications.

A detailed description of this project is beyond the scope of this article, but reference to the following articles will provide a starting point: Joe Kasser discusses the AMS-80 project in detail in his three-part series appearing in *AMSAT Newsletter* (September and December 1977, and March 1978) and in a follow-up article (June 1978). Karl Meinzer's article in the June 1979 issue, referred to earlier, contains more of the related material. Also refer to *Byte Magazine*, September 1979, for Joe Kasser's article covering the AMSAT-GOLEM-80.

Once acquainted with AMS-80, one is ready for the ultimate recovery system, which will consist of the above basics plus an interface to a computer consisting of boards designed to convert psk signals to a computer-compatible digital format.

Once again, attention is drawn to DJ4ZC's very detailed technical discussion, in *AMSAT Newsletter*, June 1979, which deals with the psk signal format to be employed, and a detailed description of the prototype interface circuit boards. Incidentally, these boards will be made available to AMSAT members to aid in the construction of receiving equipment for the psk telemetry.

Telemetry applications

While the Phase 3A satellite will be kept "healthy" by the official AMSAT ground stations, which will have ears tuned to the engineering beacon, prospective users will be looking to the general beacon to support other needs.

Obviously, beacon signals may be used to determine the acquisition and loss of the satellites (aos and los), but beacon signals can also be used to determine the characteristics of a satellite's orbit. Will Webster, WB2TNC, tells how doppler techniques can be employed to determine time of closest approach (tca), which in turn can be used to determine a satellite's orbit, in *AMSAT Newsletter*, September 1979.

While on the subject of doppler shift, it is of interest to take another look at WA2LQQ's article referred to earlier. In this he deals with the subject of doppler compensation in connection with the reception of the special service channels as well as the beacon signals, and points out that there is a distinct difference in the doppler shift to be experienced with Phase 3 satellites as opposed to those of Phase 2. The difference has to do with the satellite orbital speed, which is nearly constant for circular orbits, but appears to change in the case of elliptical orbits. A significant point here is that "the average change in frequency for the period of apogee ±4 hours is about 13Hz/min. Thus, for an 8h window the net rate of change in receive frequency will be less than the drift in some equipment". WA2LQQ includes a very interesting graph depicting net downlink shift versus time from apogee.

How about using beacon signals to determine the effectiveness of new antenna designs, or changes in existing structures? Beacon signals would certainly prove useful in adjusting and/or "fine tuning" the recovery system. Any other ideas? The author would like to hear about users' experiences with the Phase 3A beacons, telemetry and service channels. The telemetry sub-systems should add a very interesting dimension to amateur radio satellite communications.

Photo-copies of the articles in *AMSAT Newsletter* referred to above may be obtained from AMSAT-UK, 94 Herongate Road, Wanstead Park, London E12 5EQ. The cost is 20p per article plus a suitably sized sase (UK readers), or ircs to cover cost and postage (overseas). For further information on AMSAT write to AMSAT-UK if in IARU Region 1, outside this region write to AMSAT, Box 27, Washington DC 20044, USA. □

The Phase 3A satellite

(Continued from page 478)

necessary to access the transponder. However, it appears from ground measurements that 600–800W erp will be required. Whatever figure may finally be realized, it is most important to use only the **minimum power** necessary to access the transponder. Remember that erp is output power multiplied by antenna gain.

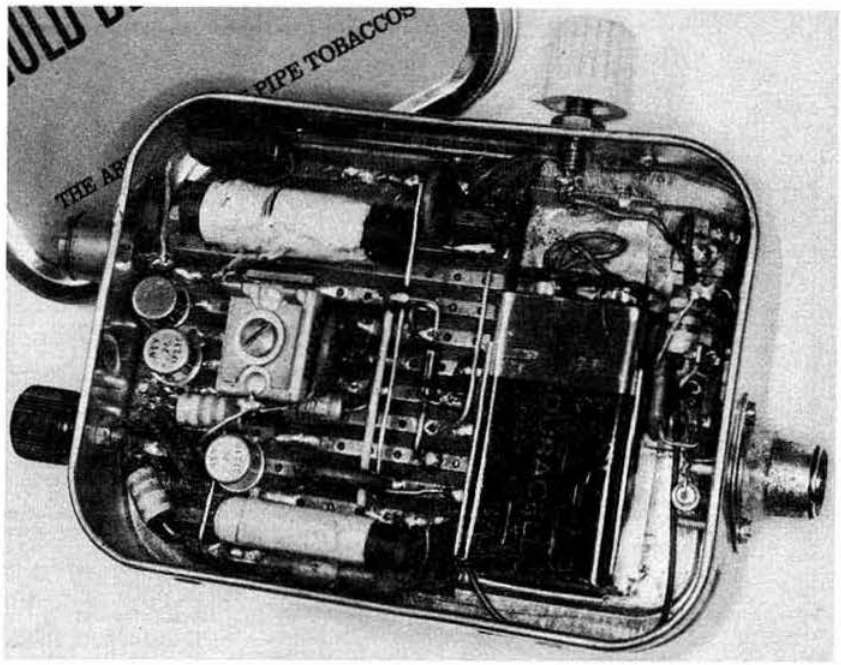
The anticipated orbital period is 661min. However, within periods of three hours before and after apogee AO9 will move slowly through a comparatively small arc, thus making tracking a simple task. Once the final orbital parameters have been ascertained, tracking calculators will be readily available from several sources. Their availability will be reported in *Radio Communication*.

Acknowledgements

The author expresses his thanks to the following for information and assistance: Alex Schoening, DC7AS; AMSAT; and Mrs Ann Williams. □

A QRP "tobacco tin" a.m. transmitter for top band

by K. W. CLARK, CEng, FRAeS, G3WIF*



Introduction

The author's original idea was to attempt to build a very-low-power a.m. phone transmitter that could be housed, together with its battery, in a 2oz tobacco tin, and then to find out how effective it would prove when used with a $\lambda/4$ long-wire antenna. The first version used a pack of four 1·5V Duracell AA-size alkaline batteries. Initial tests, and contacts with stations up to five miles away, proved so encouraging that various modifications to the circuit were tried, some of which resulted in improved performance. Changing to a 9V PP3 size Duracell alkaline battery provided a further improvement and a better layout.

Apart from the battery, all the components used were "ex-junkbox"—hence the choice of transistors was very limited. There are only 23 parts, and the rig can be built in one evening. There is nothing very critical about the layout, and the final arrangement is described below.

Circuit (Fig 1)

The vfo uses a single ASY26 transistor and is tunable over top band by means of the 100pF trimmer across coil L1, and is directly coupled to the base of the BFY51 transistor pa. The top end of the pa coil feeds the antenna coaxial cable socket via C5, the optimum value of which should be determined by experiment to suit the antenna and feeder system in use. In the author's case it was not very critical, but 200pF provided the maximum rf output.

The pa is modulated by an ASY26 transistor in series with its emitter. This method works quite well and eliminates the need for a transformer, for which there was insufficient space. A 2G301 transistor, serving as a speech amplifier for the crystal microphone, is used to excite the base of the modulator.

*16 Goldney Road, Clifton, Bristol BS8 4RB

Construction (Fig 2)

The vfo, pa and modulator components were assembled on the metalized side of a piece of Veroboard 2·8 by 2·4in having 0·2in pitch copper strips. Two corners were cut back to enable it to fit into a standard 2oz tobacco tin close to one end. Three of the copper strips were cut away locally (by countersinking with a $\frac{1}{4}$in-diameter drill) between the connection points of C1, between those of C7, and between the connections of L2 centre tap and C2.

After soldering the components to the Veroboard the wire ends were cut off flush with the underside surface. A sheet of rubber was cut to size from an old car inner tube and glued with Evo-stik to cover the surface, and then the completed assembly was glued in position inside the tobacco tin.

The speech amplifier components were sub-assembled at the opposite end of the tin on a piece of tag strip having five tags at 0·35in pitch. The two tags having fixing feet were first soldered to the base of the tin, and then the 2G301 transistor and associated components added. The speech amplifier sub-assembly was wired to the main assembly with leads sufficiently long to clear the battery holder.

The microphone and antenna coaxial sockets were soldered to the end sides of the tin after drilling suitable holes to clear their central pins. An earth terminal was also fitted at the antenna socket end of the tin, for possible future use with different antenna and earth systems. The battery holder was made from a piece of tinplate cut from another tin, shaped and bent to grip and locate the battery. The holder was soldered to the base of the tin.

Originally a toggle type on/off switch was fitted, but it was found inconvenient to hold down the rig with one hand while operating the switch with the other! A more suitable (and smaller) switch was made by soldering the foot tag on a short length of tag strip to the base of the tin and using the remaining

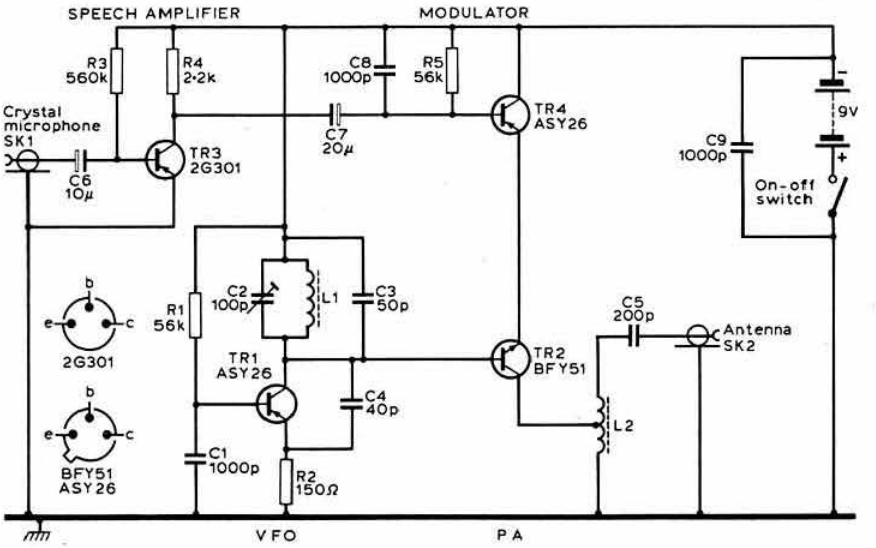


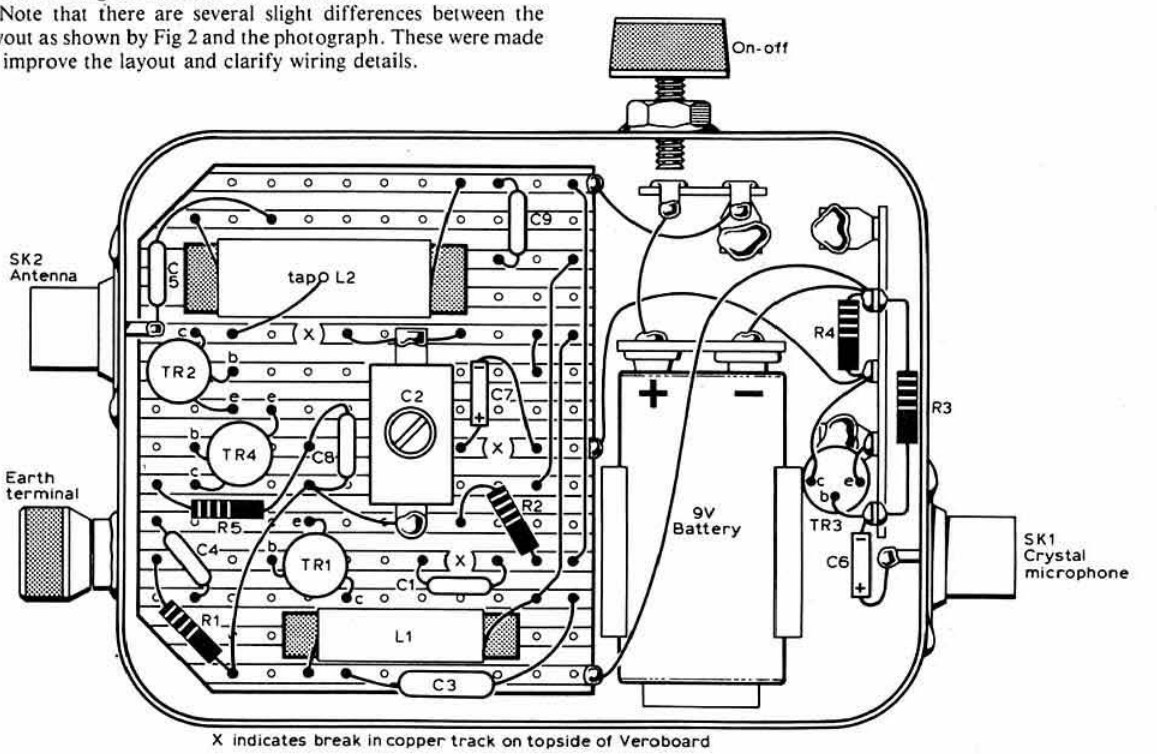
Fig 1. Circuit diagram

insulated tag as a switch contact. The other contact was formed by soldering a 2BA brass nut over a hole drilled in the side of the tin in line with the insulated tag, and screwing in a $\frac{1}{4}$in length of threaded brass rod fitted with a knob. When set up correctly, a half turn of the knob is sufficient to switch on or off. Switching on connects B+ to chassis.

Note that there are several slight differences between the layout as shown by Fig 2 and the photograph. These were made to improve the layout and clarify wiring details.

Setting up

The transmitter should work immediately it is switched on but, as the output will be too low to light even a small bulb, a sensitive rf field strength meter or a receiver covering top band will be necessary to detect the presence of rf. Check, with the



X indicates break in copper track on topside of Veroboard

Fig 2. Construction and layout

Components list

R1, 5	56kΩ	C1, 8, 9	1,000pF disc cer
R2	150Ω	C2	100pF compression trimmer
R3	560kΩ		
R4	2·2kΩ	C3	50pF s/mica
TR1, 4*	ASY26	C4	40pF s/mica
TR2*	BFY51	C5	200pF s/mica
TR3*	2G301	C6	10μF elect
		C7	20μF elect

L1 35t 28swg enam close wound on 0·25in dia ferrite rod 1·25in long covered with adhesive tape

L2 30t 24swg enam close-wound centre tapped on 0·375in dia. ferrite rod 1·5in long

Sk1, 2 Television type coaxial sockets.

Veroboard 2·8in wide, 2·4in long, with 0·2in pitch strips

Tag strip, control knob, earth terminal, on/off switch

***Alternative transistors**

TR3. Almost any small germanium pnp transistor may be used. OC44, OC44N, OC77 and 2N2614 have been tried and are satisfactory.

TR1. Near equivalents are MA1703, 2N799 and 2SA1550. OC44N and OC77 worked but gave slightly reduced output at the pa. Several unmarked germanium pnp transistors were also tried and worked satisfactorily in this position.

TR4. Every germanium pnp type tried worked in this position, with varying degrees of modulation depth and pa output. Choose one by experiment to provide the best compromise.

---

receiver bfo switched on, that the trimmer covers the range 1·8–2MHz; if necessary change the value of C3 to suit. Check modulation by monitoring on the receiver with the bfo switched off, using just a few inches of wire as an antenna to prevent possible overload.

Note that fitting the lid on the tin shifts the frequency range higher. The prototype has always been operated with the lid removed for quick and easy netting on to the other station's frequency. To have the lid fitted permanently, drill a screwdriver access hole in line with the trimmer adjustment screw, fit the lid, and then carry out the frequency range adjustments as before.

With the antenna connected, and with the vfo trimmer set at around 1·9MHz, experiment with values of C5 between 50 and 1,000pF to obtain maximum rf output, as indicated by a field strength meter placed near the antenna on the output side of the atu.

Experience has shown that conventional PP3 batteries are useless for this particular rig because their gradual drop in voltage under load causes unacceptable frequency drift. However, when using the PP3 size Duracell alkaline battery (at roughly three times the price) the vfo frequency remains steady over a considerable period; the total current drawn by the prototype being 9mA. Slight fm on the transmission can be detected on peaks of modulation when monitoring with the bfo switched on, but this has not been criticized by any of the stations worked to date.

Conclusions

The project has shown that such a rig can be quite effective for QSOs up to 10 miles on top band, costs very little and can be built in one evening. It has given satisfaction equivalent to that obtainable from working VKs and ZLs on the fullpower equipment.

No doubt the use of modern transistors, improved circuit design and better antenna systems would make it even more effective. The author would be grateful to hear about any improvements that constructors may come up with, or of any exceptional contacts made. □

NEW PRODUCT

CK-90 cleaning kit

A new multi-purpose cleaning kit for use on a host of electronic, recording, office and computer equipment is now available from 3M. The Scotch CK-90 cleaning kit, produced by the 3M Data Recording Products Group, has been specifically designed to remove harmful contaminants and debris from recording heads, guides, capstans, tape paths and other components of magnetic recording equipment. In addition, the CK-90 cleaning solution is perfectly suitable for computer and word processing systems, typewriters, typing elements, stereo tape recorders and other electronic equipment. The CK-90 cleaning solution has a number of other important advantages over conventional cleaning fluids: it is quick drying; leaves no residue; will not harm metals, plastics or painted surfaces; removes even heavy dirt build-up, and is completely non-flammable.

Each Scotch CK-90 kit contains two 4oz bottles of cleaning solution, a dispersing cap, 10 versatile, double-ended cleaning wands which can be bent to any shape to remove contamination from hard-to-reach components, and 50 conveniently-sized lint-free wipes.

The CK-90 kit is priced at £11.80 and is available from 3M United Kingdom Limited or through 3M approved distributors.

Futher information from: Ruth Pollak, Customer Services Department, Data Recording Products Group, 3M United Kingdom Limited, 3M House, Bracknell, Berks RG12 1JU. Tel Bracknell (0344) 58502.

technical topics

Pat Hawker, G3VA

ALTHOUGH the noisy Russian "Woodpecker" is not quite as racketty or as vicious a source of interference as when it began pecking a few years ago, it is still a confounded nuisance and may well become even more so during the next few years. This is because the signal tends to follow the muf up and down the spectrum. As the sun quietens down, there will be a corresponding reduction in the diurnal change of muf, and the "pecker" will tend to linger longer in the vicinity of 14 to 21MHz. There is a curious belief (I am convinced it is a pure myth) that the "Woodpecker" can be temporarily silenced or shifted by amateurs sending a series of dits at a specific rate: don't you believe it!

The "Woodpecker" noise blanker

For those seeking an effective way of minimizing the effect of the "pecker" (or indeed other regular pulse interference), Fig 1 shows a noise blanker recommended for this purpose by Ulrich L. Rohde, DJ2LR/W2 *(Electronic Design*, 6, 15 March 1980, noted by Edgar Janes, G2FWA; Dave Sergeant, G3YMC, and Patrick King, G3PVA). This is a later version, using two ic devices, of a circuit originally developed by M. Martin. DJ2LR claims that, unlike earlier noise blankers, this arrangement does not reduce the receiver's sensitivity and has the very useful dynamic blocking range of 80dB. He suggests that it can be added to most current communications receivers and is relatively easy to construct. He writes:

"The rf (for example, at 9MHz i.f.) is taken off the receiver's first mixer, amplified by two CP643 fet stages and then fed through a frequency-compensated four-diode gate:

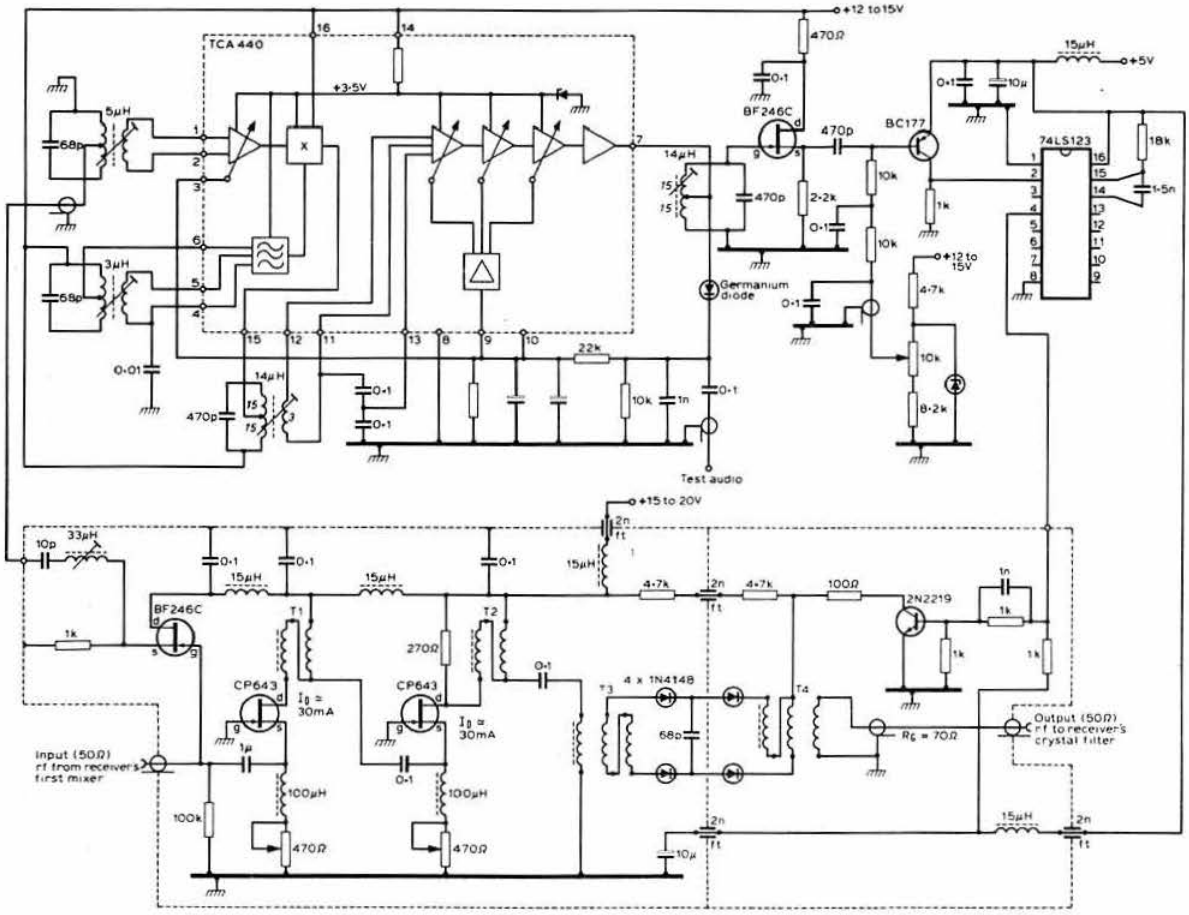


Fig 1. Noise blanker developed by DJ2LR specifically for use on high-performance receivers to minimize interference from the "Woodpecker". It effectively places a diode switch in the signal path, turned on and off by the 74LS123 Schmitt trigger in response to pulsed interference. Dynamic blanking range is about 80dB. Note that the use of CP643 power fet devices would be wasted if the front-end of the receiver does not itself have wide dynamic range

the output then goes to the 9MHz crystal filter in the receiver. A portion of the rf signal is also coupled, via a BF246C source follower and a tuned circuit, to a Siemens TCA440 "one-chip a.m. receiver" device. This ic operates up to 40MHz and has no USA equivalent or replacement.

"The TCA440, which contains its own oscillator, converts the 9MHz signal to another intermediate frequency, which is amplified and detected at the output of the TCA440. The output is connected to another BF246C source follower, which drives a BC177 amplifier having an adjustable trigger. The amplifier, in turn, drives a 74SL123 Schmitt trigger ic. This, via voltage-translator transistor type 2N2219, activates the diode switch in the primary signal path."

The Gypsum-fertilized earth

Many years ago one used to be able to buy a small copper pot containing crystals of copper sulphate for use as an earth "rod" for domestic wireless sets. I have no idea how effective this was, but the principle of using certain salts to reduce the resistance of earth electrodes, particularly in areas of poor earth conductivity, is of long standing. The term "chemical earth" is often used where deliberate action is taken, for instance in placing chemicals in trenches around and above earth electrodes in order to lower soil resistivity in their vicinity. The basic principles of chemical earths are well explained in a recent article, "A solution to lower earth-electrode resistance", by W. Hymers, of Marconi Communications Systems Ltd, in *Electrical Review,* Vol 206, No 10, 7 March 1980, pp33–35 (brought to my attention by Brian Castle, G4DYF). The author makes it clear that chemically-treated earthing systems can be spectacularly effective where soil resistivity is high, but tend to provide only a temporary respite, since the salt solution becomes progressively diluted by rain, leaching, gravity etc. Common salt (NaCl), for example, can result in extremely low-resistance earths, but its very high degree of solubility means that large amounts of salt are needed to prevent the soil solution from becoming progressively weakened.

W. Hymers indicates that a far more suitable substance is calcium sulphate ($CaSO_4 . 2H_2O$) commonly known as gypsum and used for making plaster of paris, plaster board, cement, glass, fertilizers etc. Gypsum can be applied in particle form as a top dressing over earth rods, earth mats etc, and then left to percolate through the soil with the surface water. He points out that "this also applies where retrospective action is taken to improve existing installations, or mixed with excavated soil when refilling. On new sites which have to be landscaped later it would not be impracticable to top dress entire areas of the site and plough the gypsum into the sub-soil". Gypsum is much less soluble than common salt, and presumably will remain effective over a much longer period. The particle size of the gypsum is important, as microcrystalline particles could impede the flow of moisture: "a grading equivalent to coarse sand would be ideally suitable", he suggests.

Any form of salting slightly increases the corrosion of the metal electrodes, but it is claimed that sulphates are not particularly aggressive in this respect; however, it is advisable *not* to put gypsum too close to concrete building foundations.

In view of the importance of low-resistivity earths for most forms of vertically-polarized hf antennas, and particularly monopoles, this seems a technique well worth trying out, especially in urban gardens. And you might even be able to convince the xyl that you have found an excellent new fertilizer for the roses!

Contaminated coaxial cables

In a letter to *Ham Radio* (January 1980, pp88–89) Robert Wheaton, W5XW, points out that the effectiveness of coaxial cable for conveying rf at low loss depends on the wires of the braiding remaining bright and shiny, so that the individual wires are in constant and effective electrical contact with each other throughout the entire length of the feedline. If water enters the cable due to damage to the outer plastic jacket, improper sealing of the line terminations ("or, even worse, no sealing at all") then, because of capillary attraction, it will penetrate along the cable with the braid acting as a metal sponge.

Moisture-contaminated cable is rapidly rendered unsuitable for rf applications due to braid corrosion, and also due to changes of impedance where the centre dielectric becomes a combination of plastic, water and corrosion. Sometimes much of the cable can be salvaged by cutting away those sections where the braid has become corroded, but W5XW stresses that it is important to check the salvaged line for rf losses before putting it back into service. He adds that where cable has to be discarded for use as feeders it may still find useful application for carrying (on the braid) high-current, low-voltage dc, for example in mobile installations, provided that corrosion is removed from the ends before soldering; this can be done by dipping exposed braid and centre conductor in a chemical cleaner such as those used for cleaning silverware and copper kitchen utensils (after dipping, wash cleaned copper in water and it should then take solder readily).

W5WX also notes that many recently manufactured cables, in view of the high cost of copper, now have fewer wires in the braid and this will reduce the dc rating from the normally high figure of some 50–60A.

Making antennas work

Over the years it has become increasingly evident that different amateurs, when attempting to reproduce established designs of beam antennas (or even when using factory-built beams), often end up with very different results. Similarly it also seems that the use of model vhf/uhf antenna ranges to evaluate hf designs is far more difficult, and calls for more care, than many people realize. The vhf antenna gain contests that are held in the USA and New Zealand always produce an extremely wide spread of results, even though the entries are often based on a restricted number of types and designs. There is some evidence that operators often tend to judge the "goodness" of antennas by straightforward measurement of front-to-back ratio rather than by forward power gain or the precise position of the deepest nulls (indeed, for reception, the nulls are often operationally *more* important than forward gain). The very large number of variables (element lengths, element spacings, element diameters, coupling between elements, the degree of balance or unbalance of the currents, and the height and environment of the array) all combine to produce this very considerable spread of results, which have little to do with the theoretical analysis of an optimized design. For example, over the past few weeks a number of comments have been received from those who have used, or considered using, the VK2ABQ triband array (*TT* March 1980); while most of these have been extremely favourable, some have complained of lack of gain.

This is why the work carried out over many months and years by Les Moxon, G6XN, is particularly valuable: unlike most of us he evaluates a design carefully both in theory and practice, and is never satisfied until he can explain fully the

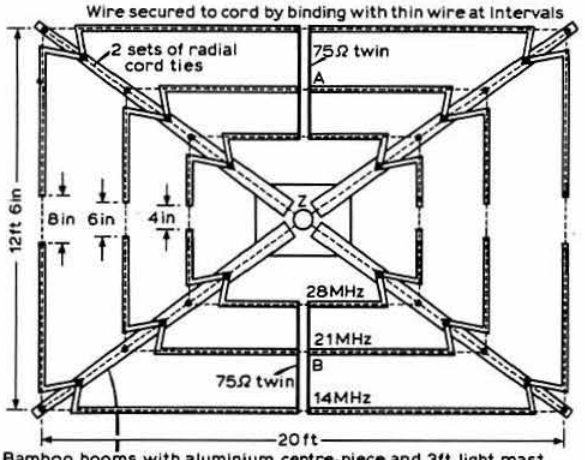


Fig 2. G6XN's suggestions for evolving a VK2ABQ beam into an antenna that should be "good by any standards" and seen as a step towards the ideal antenna. Transformers at A, B are either 1:1 baluns into 50Ω unbalanced feeders or 1:4 bal-bal units to give 200Ω for a 3:1 mismatch into open 600Ω line. Radial cord ties go to mast extension. Corners of elements are tucked in and hitched up onto the cord ties, thus keeping the wire elements clear of the bamboo spreaders

difference between what he achieves and what he feels should be possible. In doing so, he seems constantly to cut right across commonly-held beliefs about many forms of full-size and miniature arrays, as we have noted on previous occasions.

Arising out of recent comments on the VK2ABQ beam, G6XN has now put forward a number of points which have far-reaching implications, especially for those who may still dismiss the VK2ABQ approach as only to be commended on the grounds of being "simple and cheap" rather than "good by any standards".

To summarize briefly a number of his views:

(1) G6XN is coming to the view that if there is one shape for an element that is definitely *wrong*, it is "straight".

(2) VK2ABQ believes his design can outperform a good conventional full-size Yagi or quad. G6XN reckons that it *should*, though adding: "I am dashed if I can see *how* unless the ends are separated more, the shape made more rectangular, and each element given its own feeder." (*Note*: Peter Dodd, G3LDO, has developed an interesting variation called the "Double D" which it is hoped will form the subject of a forthcoming *Radio Communication* article—*G3VA*).

(3) G6XN stresses that of two-element designs published so far (including quads), the VK2ABQ is the *only* one to permit (at least in theory) adjustment of the critical distance between the *ends* of the elements, adding: "As I see it the correct operation of *any* two-element beam is a matter of achieving correct phase and amplitude balance, so that nulls are obtained in directions chosen to give the best compromise between gain and rejection of unwanted signals; the operation is just like balancing an ac bridge, with amplitude balance demanding slightly more than 'critical coupling' between the two elements. One needs the coupling that gives equal currents when the relative phase is adjusted to put nulls on bearings of about 140° (see "Supergain aerials" *Radio Communication* September 1972). This gives null depths above 23dB over a span of 110°, compared with 90° for a null in the back direction (ie 180°), and 4·6dB forward gain as against 4·2dB.

(4) It is a great advantage to be able to put the null where one wants it (not necessarily in the same place for transmission and reception). This need not be particularly difficult to achieve, as indicated by the "antenna vector processor" developed by Ken Franklin, G3JKF, (see below) which provides independent adjustment of phase and amplitude.

(5) The "standard' VK2ABQ has wire elements fixed to bamboo (when wet, bamboo becomes a very poor insulator) with very small "button" plastic insulators which provide no scope for adjustment. Fig 2 shows one way of killing all these birds with one stone.

(6) The highly reactive nature of the coupling in the VK2ABQ has the important bonus of providing most of the required phase shift. If two feeders are provided, as in Fig 2, one is more or less idling, although available for immediate beam reversal (another *very* important bonus) and for fine tuning.

G6XN compares these useful characteristics of the VK2ABQ approach with those of using just two straight elements in the conventional manner, much to the disadvantage of the latter! He points out that "the VK2ABQ is unique in offering also no difficulties when it comes to adding elements to cover the new bands (18 and 24MHz)". However, he warns that: "I consider a balun is *essential* if this beam (or any other) is fed from coaxial feeder". In the past it has been noted in *TT* that there are serious doubts as to whether balun transformers are really useful for dipole-type antennas, and that (for beam arrays) there is much to be said in favour of using balanced feeders with a balun arrangement at the transmitter end; the point that

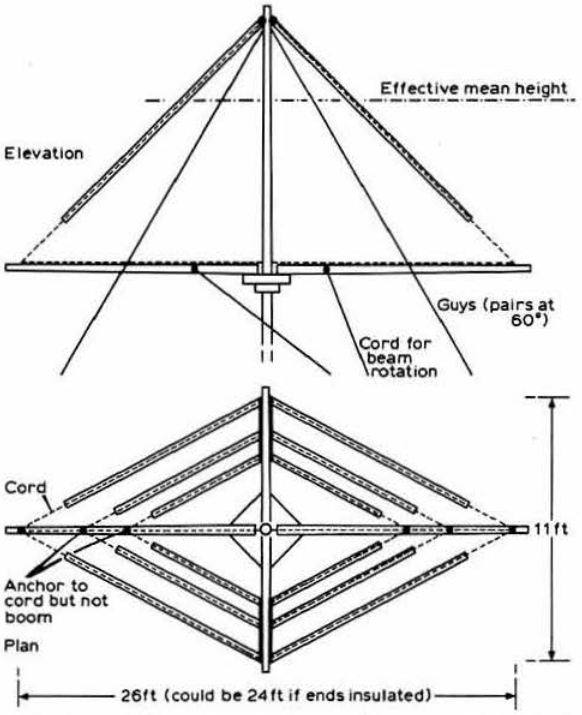


Fig 3. Inverted-V form of VK2ABQ array as suggested by G6XN. It is electrically almost equivalent to the standard VK2ABQ array

G6XN is making is for the many who use coaxial feeders with beam arrays.

With a reversible beam, G6XN comments, why go to the expense, slow turning motion and unreliability of beam rotators? Two cords and ±60° rotation is enough. Another major mechanical simplification is also possible: a light spreader is needed, but two of the spider arms can be disregarded by adopting an inverted-V approach: Fig 3. Theoretical forward gain, compared with a full-size quad, is only down 0·5dB, and this could easily be made up by a relatively insignificant amount of "height gain" (eg at 42ft such a VK2ABQ array should equal the gain of a quad at 40ft!).

The "ideal" VK2ABQ?

The above comments and suggestions have been rather ruthlessly extracted from G6XN's letter, but lead directly to a summary of his recommendations on how one could go about evolving an "ideal" antenna using the VK2ABQ as a starting point.

(1) Alter shape to rectangular to obtain a slight improvement in gain/directivity (recommended dimensions 20 by 12·5ft with same shape on all bands, but this is not critical).

(2) Use polythene cord-braced construction, partly to allow further reduction in weight and windage, but mainly to allow the wires to be routed clear of bamboos and to permit easy adjustment of element lengths, and especially adjustment of the spacing between adjacent ends as required for **(3)**.

(3) Adjust reflector length and coupling (controlled by the end spacings) to obtain "infinite" rejection on bearings of 140° relative to the beam heading. This gives best rejection of signals off the back (more than 23dB over a total arc of 110°) and a possible gain of 4·6dB (only 0·5dB down on a quad at the same height and identically tuned).

(4) Use two feeders to allow instantaneous beam reversal and fine tuning from the shack. Consequential advantages include separate optimization of transmitting and receiving properties and more effective monitoring of performance.

(5) Taking advantage of **(4)**, eliminate the beam rotator. This is a big cost saver which results in more rapid change of beam direction (use two cords to give at least ±60° rotation), less weight to be supported and greater reliability.

(6) Use a balun into 50Ω (balun vital *as an insurance policy*) or use 4:1 bal-bal and work with 600Ω line at an swr of about 3·0. For long feeder runs use open wire line in multiples of 20m (1λ at 14MHz), then a 4:1 balun into less than 20m of 50Ω coaxial cable (this is a good idea for any beam as it avoids losses without much inconvenience. Balun transformer losses need not be more than 0·2dB).

(7) Do not bring the centres of the elements together. Join them with short lengths of low-impedance twin feeder. This has negligible effect on the tuning and makes it unnecessary to resort to undesirable (eg square) shapes.

(8) Use the device of Fig 4 to kill any 28MHz current flowing in the 21MHz element. Note that this technique will allow operation to be extended to new bands in due course and confers a unique advantage on this type of antenna.

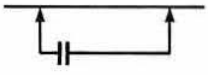


Fig 4. Traps used to kill any 28MHz current flowing in the 21MHz elements. A technique that allows operation to be extended to the new hf bands in due course and confers a unique advantage on this type of antenna

(9) Separate the transmitting and receiving functions, providing in the shack: *(a)* remote tuning of the reflector on transmit; and *(b)* separate phase and amplitude adjustments for receive, possibly on the lines of the G3JKF processor. This, incidentally, should make possible up to 0·5dB more gain on transmit.

(10) Take further advantage of item **(4)** by considering the alternative inverted-V configuration which is electrically almost identical although mechanically different. This eliminates two of the spider arms, the other two acting as a boom and supported at a relatively low height, thus helping with the mast. It requires the addition of an 11ft spreader.

(11) As an alternative to **(10)** consider the use of a third element, but not recommended to the novice.

G3JKF antenna vector processor

"New products", *Radio Communication* April 1980, provided some details of the AVP4 antenna vector processor now being marketed by Radmic and based on several years of intensive development work by Ken Franklin, G3JKF. G3JKF has sent me a mass of information on this system, which provides remote control of the polar diagrams of Yagi, quad, W8JK, VK2ABQ, etc beam arrays—providing controllable deep nulls over a wide arc, using servomechanisms controlled from a unit in the shack. The antenna unit is mounted alongside the reflector element, and the operator simply tunes "phase" and "gain" controls to reduce interfering signals arriving from the rear, and in the commercial unit it is claimed that a distinctive null some 20–50dB deep is obtained at any frequency over the band, and may be positioned anywhere with a 140° rear arc. Nulls, it is claimed, are typically 40–50dB on ground wave signals, 30–40dB on low angle dx signals, and 20–40dB on unstable high angle signals. Four capacitors are each remotely tuned, using the servomechanisms in conjunction with inductors and a phasing line. Clearly a lot will depend on the long-term reliability of the mechanisms, but there can be little doubt that the system represents a fascinating way of improving the performance of existing or new antennas. Rather reluctantly, however, I have come to the conclusion that at this stage it would be impracticable to attempt to describe the whole system in any detail in *TT*. It needs a full treatment.

Power supply for solid-state linears

A series of general-purpose kits, developed in New Zealand as part of the Galbraith series of power supplies by members of NZART, includes a PS4 unit capable of providing 18A continuous output, higher intermittent currents for fm and rtty transmitters, and very high peak outputs up to 50–60A for ssb linears. This is briefly described by T. M. Empson, ZL3TKI, in *Break-in* December 1979, although, being a kit, no detailed specification is given of the components: Fig 5. An interesting feature is the use of two mains transformers: this was done originally to preserve the same modular height as other kits in this series, but ZL3TKI points out that it worked out slightly cheaper to use two lower-rated transformers than one rated for the full power; similarly, four rectifier diodes were cheaper than two of double rating. A compound-triple stage is used with parallel output transistors; this gives the required current gain at minimum regulator input voltage. Ripple is quoted as less than 10mV at 16A and load regulation better than 200mV. ZL3TKI also comments:

"Care must be taken when paralleling transistors and diodes to ensure that the load current is shared between both units. Direct parallel connection will inevitably lead to unbalanced

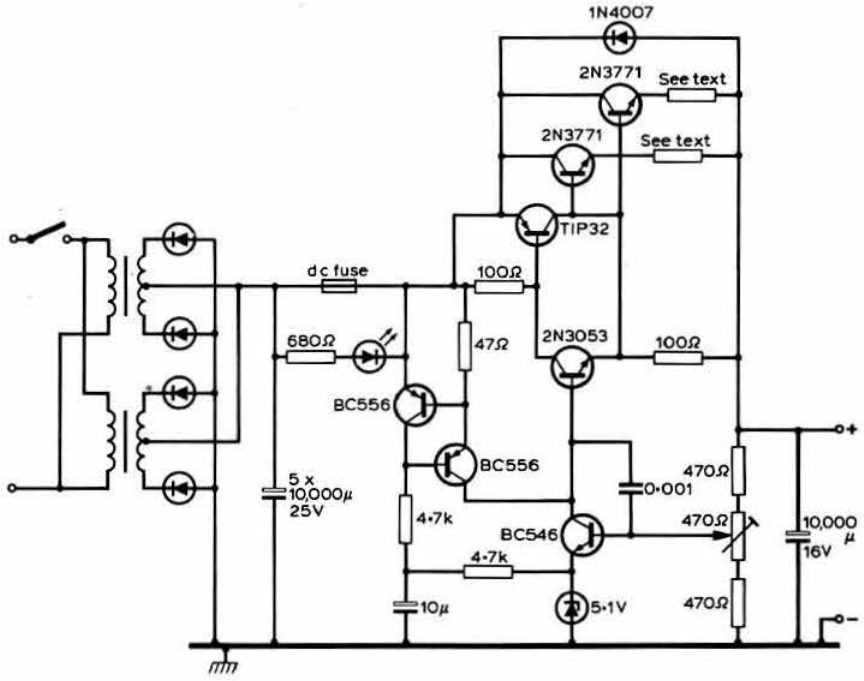


Fig 5. New Zealand "Galbraith PS4 power supply" providing up to 16A continuous current and much higher peaks for ssb linears

current distribution, often to the extent that one of the pair does all the work. Ballasting transistor emitter circuits by incorporating equal emitter resistors alleviates this problem, and appropriate resistance values for the emitter curent should be used. With emitter currents of the order of 10A, it is sufficient to use equal lengths of wire between the emitters and the pcb, approximately 200mm in the PS4."

Simple voltage protection

Alex Sinclair, GM4BWT, writes: "I am the possessor of two bench power supplies that deliver 13·8V. One uses a 78HG type regulator, while the second uses the ubiquitous type 2N3055 and capable of supplying up to 40A. After much experimentation with various complex over-voltage-protection circuits, I found they were prone to "switch-down" when used to supply switched inductive loads, or if used in the vicinity of strong rf fields.

"My experiments have led to the arrangement of Fig 6 which I find provides the required protection without dropping out; it may appear too simple to be good, but work it does. Although not original, I have not seen it mentioned recently, so this reprise may be of interest.

"If the input voltage rises above the zener knee voltage, current flows through the potential divider and a potential difference across the 56Ω resistor causes the thyristor to switch on, thus blowing the fuse.

"The voltages of the zener diodes depend on the trigger voltage required to fire the scr, usually about 1V less than the required 'protected' voltage, ie trip voltage. A circuit that meets the principle of 'kiss' (keep it simple, stupid) but perhaps readers may not agree?"

Protecting chargers

A means of protecting the rectifier diodes in battery chargers without having to replace blown fuses is described by R. H. Bennett of Christchurch, New Zealand, in *Wireless World* April 1980, p90: Fig 7. This arrangement ensures that charger current does not flow unless the battery provides an appropriate voltage across the output leads. When such a voltage exists across the output leads, the thyristor fires as each half

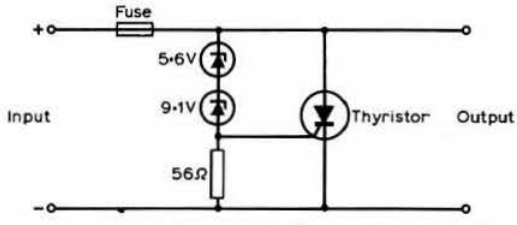


Fig 6. Simple form of "over-voltage" protection for 13·8V power supplies found effective by GM4BWT

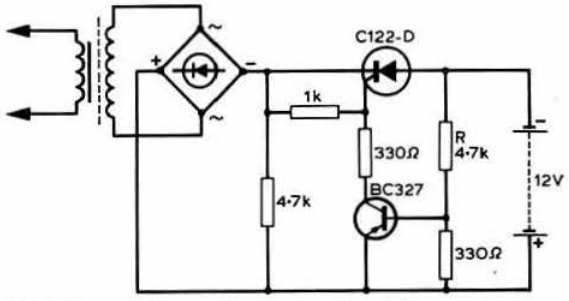


Fig 7. Method of protecting the rectifiers in battery chargers

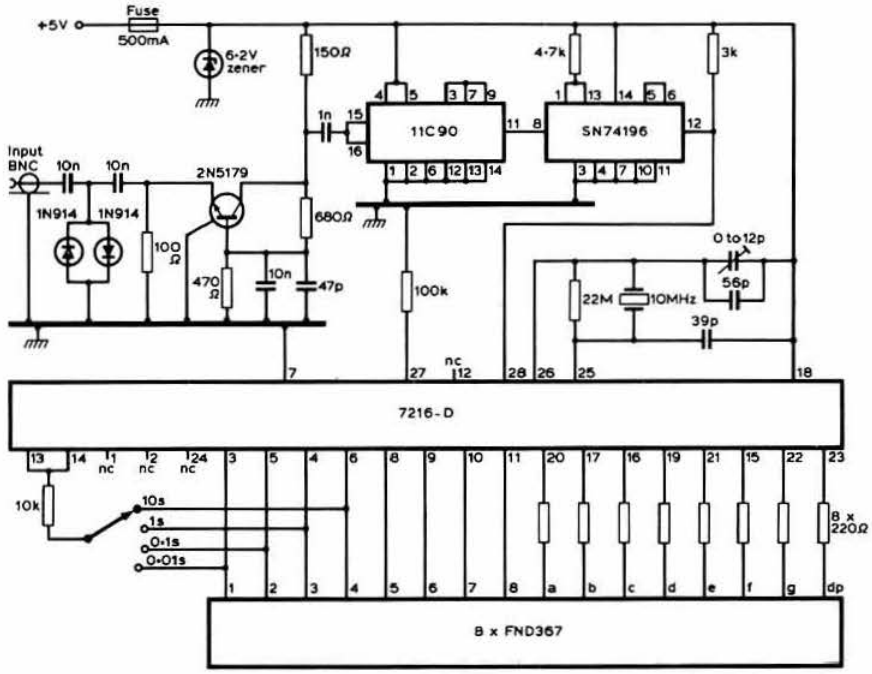


Fig 8. Circuit diagram of the low-cost 500MHz frequency counter

cycle of the rac output of the charger rises above the battery voltage. When there is no voltage across the terminals, owing to an open or short-circuit, or if this voltage is too low (eg if a 6V battery has been connected to a 12V charger), or if the battery has been connected with wrong polarity, the thyristor will not fire. Similarly, a reasonable over-voltage across the terminals should not result in damage, since scr base current will be well below maximum safe rating and the scr will be reverse biased. An additional 1V is required from the transformer to compensate for the voltage drop across the scr.

Follow-up

Considerable interest was aroused by the notes on Hellschreiber machine-telegraphy (February *TT*) particularly among those with long memories. Apart from press and military traffic, G3XFD mentions they were used by the German State railways (and considered by British Rail). G3JRD unearthed notes he made on the system when it was being used in the early 'fifties at Rugby Radio on long-distance press circuits. G3VWK has developed an electronic version using a microprocessor chip, programmed to produce 5 by 7 matrix characters along the bottom of a vdu, and confirms the extremely reliable "copy" inherent in the system compared with Baudot or ASCII rtty codes; adding that while theoretically slower it is nevertheless about as fast as can conveniently be typed or read. Altogether a system (particularly in its electronic form) not to be ignored!

500MHz frequency counter

In *TT* (November 1976, p828) and *ART6*, details were given of a very simple four- or five-digit frequency counter suitable for use up to 5MHz and based on a very simple multivibrator clock. This required the use of only five discrete components! Rather more, but not so many more, discrete components are used in a relatively low-cost counter described by Cyrill Nadig, HB9AKR, and Max Keolz, HB9AFR (apparently based on a design by K5WKR), and this appears capable of a more flexible and much higher standard of performance. With eight seven-segment FND367 l.e.d. displays, the unit counts from 1·5 to 500MHz with inputs of 50mV up to 146MHz and 120mV up to 500MHz, uses a 10MHz reference crystal oscillator, and has four switched ranges for steps of 10Hz to 10kHz: Fig 9. The unit is briefly described in *Old Man* No 2, 1980 (German text) where it is stated that it can be built for less than 200 Swiss francs (just over £50, although the components may be available more cheaply in the UK).

Mobile tips

Martin Swift, BRS37108, sends along some short tips picked up in the course of his professional activities in the mobile radio field:

(1) To hide ugly holes or slots on the edges of the front panels of ex-rack-mounting equipment when used as bench-top equipment, the triangular plastic strips sold as picture tea-towel hangers (and book binders) provide a neat and cheap answer; they are available in black, grey and white or may be painted to match the front panel (available in various lengths).

(2) High levels of rf in the vicinity of heated rear window elements can be troublesome and may result in the need for expensive repairs.

(3) High rf fields can affect ic-controlled flasher units, due to pick-up of rf in the wiring harness. Flasher units may rattle when not on, or flash erratically when selected for a turn; indicator lights, such as fog lights, may also glow when the transmitter is on. The usual answer is a small 0·01μF disc ceramic capacitor across the terminals of the misbehaving unit (it is usually possible to fit the component inside the unit). □

microwaves

Charles Suckling, G3WDG *

Microwaves at Whitton

The three lectures organized by the Microwave Committee at the 1980 RSGB National VHF Convention were once again very well attended. After a short introduction by G3RPE, G3WDG described how to build and operate 24GHz equipment. It was mentioned that getting on 24GHz is no longer such a formidable task, now that commercial Gunn oscillators are available at reasonable prices. The performance of simple wideband equipment was discussed, and it was suggested that the type of equipment recently described in *Microwaves,* in conjunction with an 18in dish antenna, should be able to cover 200km line-of-sight paths under reasonable weather conditions.

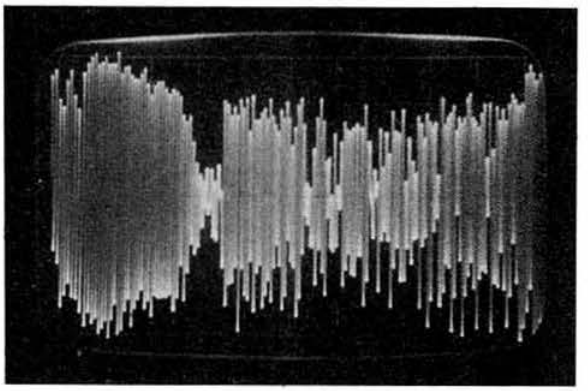
In the second lecture G3YGF described the advantages of narrow-band, crystal-controlled equipment for 10GHz, compared with wideband equipment. Various designs for generating crystal-controlled signals on 10GHz were presented, including a very simple one capable of a few milliwatts output intended to replace the Gunn oscillator of conventional equipment to give a narrowband capability. The generation of ssb on 10GHz was discussed next, and a live demonstration of a two-way ssb link was given. Many people in the audience were surprised at the high quality of the signals. The importance of very accurate frequency checking for 10GHz narrowband was stressed, and G3YGF described his Droitwich locked frequency standard which permits equipment to be set to within a few kilohertz at 10GHz.

The last lecturer, G3JVL, gave a review of some of his latest experimental work in the antenna field. One of his current interests is the design of horizontally-polarized omnidirectional antennas for 1·3GHz beacon and repeater use, and he outlined his results with cloverleaf and Alford slot antennas. The latter antenna seems to show the most promise, with useful gains over a dipole now being achieved. In the second half of his lecture G3JVL described the design and construction of periscope (flyswatter) antennas, and their usefulness for home-station operation, particularly on 10GHz.

In the interval between the lectures and the dinner, all three lecturers plus G4CNV took the opportunity to test G3JVL's antennas. A 1·3GHz receiver had been brought and was set up on one of the footbridges close to the Winning Post. Signals from GB3BPO were received on a dipole, cloverleaf and two versions of the Alford slot—the latter antennas producing the strongest signals.

Unusual signals on 10GHz troposcatter

Winter is not normally considered the best season for microwave tests, but this did not deter G3YGF and G8RHI, of the Oxford University RS, from operating portable on 5 January. Signals were received by G8RHI/P at Winter Hill from G3YGF/P, 222km away at Brill near Oxford. Equipment used consisted of a 2ft dish and a crystal-controlled G3JVL mixer-type receiver at G8RHI/P, and an 8W twt transmitter plus 4ft dish at G3YGF/P.



G3YGF/P's signals as received on 10GHz via troposcatter at G8RHI/P over a 222km path

Signals were a substantial 20dB above noise in 500Hz bandwidth, agreeing well with the theoretically-predicted level, over a period of two hours. They exhibited the usual flutter characteristic of troposcatter signals, but also seemed to chirp slightly from time to time. The signals were tape recorded, and on later analysis of these it was seen that the apparent chirp was due to very deep, sudden, fades which took pulse-like "bites" out of the signal. The rise time of the fades were of the order of 1ms or less. An oscilloscope trace of the signal was produced, and is shown in the photograph. This shows the basic audio frequency (650Hz) modulated by the fading. The overall width of the trace represents 200ms. The sharp "spikes" are individual cycles of the audio tone, and the very rapid fading can be seen from the fact that adjacent cycles often differ considerably in amplitude, sometimes being absent altogether.

The type of fading previously observed many times by G3YGF on G3JVL's troposcatter 10GHz signal was much slower, in the region of tens of hertz. However, a re-examination of recordings of G3JVL's signals did reveal a fast fading component, but of a much smaller amplitude than that observed during the G3YGF/G3RHI test. The presence of such rapid fading shows that, from time to time, there must be some very rapid changing turbulences in the atmosphere responsible for scattering the signal. At the time of the test the weather was foggy at Winter Hill and clear with a light wind at Brill.

No doubt many more interesting observations will be forthcoming in the near future over the Oxford-Hayling Island path, now that G3YGF has reinstalled his fixed-station equipment, and G3JVL has repaired winter damage to his flyswatter antenna. Already G3JVL's signals have been heard again in Oxford. Shortly after the beginning of the first test, heavy rain set in at G3JVL, and the signal rose to 20dB above noise. A solid two-way QSO on ssb followed. G3JVL has also been heard a number of times by troposcatter in Northamptonshire by G3WDG, using a 4ft dish and a G3JVL mixer, over a 154km path.

G3NKL—G3FNQ 10GHz fixed-station experiment

The existence of a marginally-obstructed path between the fixed stations of G3NKL and G3FNQ has led them to attempt

*31 Oakwood Road, Chandler's Ford, Hants SO5 1LW.

to make contact on 10GHz, with the aim of monitoring propagation conditions over their 37km path. Initial tests at rooftop level with portable equipment were not too encouraging, with signals being in the noise, despite the use of a 30in dish at G3NKL. After two years of occasional tests with similar results, a final "do-or-die" attempt was made late in 1979. Again results were disappointing, until G3NKL requested G3FNQ to put a Gunn oscillator as high as possible on a piece of wood held at arm's length. Immediately a very strong 59+ signal was heard. The change in height of 6ft had made all the difference: this sort of effect is often found over marginal paths.

Based on their success, G3NKL then constructed a remote mixer, local oscillator mosfet i.f. preamp and 20dB horn for installation at rooftop level, the i.f. output at 30MHz being fed to the receiver in the shack via 100ft of coaxial cable, which is also used to feed power up to the Gunn and i.f. preamp. Meanwhile G3FNQ installed the Gunn transmitter and 20dB horn at his location. Tests recommenced on 24 November.

Regular tests have been carried out since, and the results achieved far exceeded expectations. More than adequate signal is present for reliable fm speech, even under the worst conditions. Over a period of three months no mechanical tuning has been necessary, all the tuning being done by variation of the Gunn supply voltage. An afc system is used which will hold the signal for hours despite changes in the outside temperature. Signal levels have been found to vary considerably, both daily and hour by hour. No accurate measurements have been made so far, but it is hoped to calibrate the system soon in order to make this possible; G3NKL is looking for a pen recorder so that some continuous monitoring may be undertaken.

The results obtained may well encourage others to attempt promising fixed-station to fixed-station paths, using simple equipment. G3NKL and G3FNQ are very keen to attempt any line-of-sight or near line-of-sight paths with anyone operating portable in north Wales.

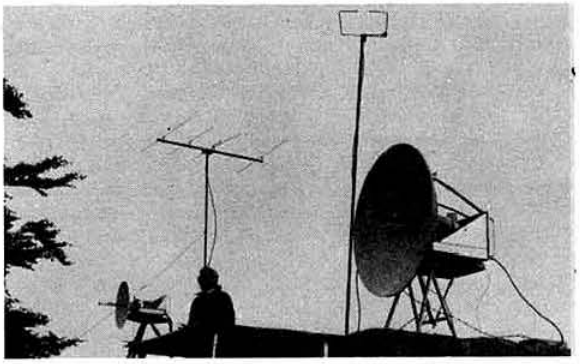
News from abroad

KA1GT, ex-G8EKB, has sent details of his 1·3GHz operation from Yale, Connecticut. Activity in his part of the USA is rather low on this band, but this has not deterred him from putting together a rather powerful station. On transmit, a pair of 2C39s develop over 100W output, and this feeds a single 38-el G3JVL loop-Yagi. On receive, an NE645 preamp is used ahead of an MRF901 and home-built interdigital converter. Regular tests have been carried out with a local station, WA1VUW, but the next nearest station is W1JR, some 200km away! Following a number of tests, a two-way contact was finally made, although W1JR was only running 5W output from a tripler. Signals have also been exchanged with K2UYH, at about the same distance. KA1GT is looking forward to the summer tropo season, when contacts down the east coast as far as Florida may be possible. He is also operational on 10GHz, but contacts have only been made so far with stations to whom he has lent his spare set of equipment.

F0AAL reports from Geneva that he is now fully operational on 10GHz, having become enthusiastic during the Telecom 79 exhibition/lecture by G3RPE, where a good deal of microwave equipment was on display and working. His equipment consists of a "throughline" mixer (*Radio Communication* June 1978) with a 100MHz i.f. Tests have been carried out with F6FYI, also of the CERN group, who was using a Gunnplexer transmitter. One of their main interests is tv, and good quality fast-scan pictures have already been sent over a 5km path, using wideband fm in 2·5MHz bandwidth. Further work is in hand to construct larger antennas to allow longer paths to be covered, using tv, and there are also hopes for a 10GHz beacon for the Geneva area.

Photo feature

This month's photo feature shows G3LQC/G6XM operating portable from Liddington Hill during last year's 10GHz Cumulative Contest. As can be seen, their talkback frequency, in common with nearly all other 10GHz operators, is 144MHz, specifically 144·33MHz ssb. Although on occasions 10GHz will cover paths which 144MHz will not, it is very helpful to use talkback for setting up 10GHz contacts, especially in contests.



G3LQC/G6XM operating portable on 10GHz

Further photographs would be most welcome for inclusion in this feature. For satisfactory reproduction they must be black and white glossy prints with very good contrast.

Microwave mobile experiments

During a recent trip from Northampton to Blackpool, following the installation of one of the Alford slot antennas described by G3JVL in his lecture at the vhf convention the day before, the writer took the opportunity to monitor several 1·3GHz beacons while mobile. Signals from GB3DUN, GB3BPO, GB3MLE and GB3CLE were received at various times, and there were indeed few periods when no beacons could be received. The signal from GB3BPO was outstanding—it was received almost solidly along the M1 from Northampton to just south of Sheffield up to a distance of 200km. The mobile receiver consisted of a 2·5dB nf preamp feeding a MuTek converter and IC202.

On the same journey GB3LEX was copied on 10·4GHz for a few miles along the M1, south of Leicester, using a wideband receiver and 15dB horn. Its 1s tone pips were very distinctive!

Some interesting effects were observed on the signal from GB3DUN during another journey on the M1, travelling to London. When travelling away from the beacon a second signal could be heard when approaching motorway exit signs. These were due to the reflected signal (ie the second signal) being doppler-shifted higher in frequency, while the direct signal was shifted low. On passing the signs the second signal disappeared immediately. □

4-2-70

Graham Knight, GM8FFX*

RSGB National VHF Convention 1980

As last month's late news detailed, the 1980 RSGB National VHF Convention took place at Twickenham in March and was the best attended in the long history of this most popular event. Nearly 1,000 vhf enthusiasts attended the daytime exhibition and lecture sessions, with 156 staying on for the evening dinner and entertainment.

RSGB President Peter Balestrini, G3BPT, welcomed those who attended the lectures, which took place in the nearby Whitton School and where large crowds listened to all the speakers. Mike Goddard, from the Home Office, gave a most interesting talk on WARC 1979, and spoke optimistically of the possible amateur use of the 50MHz band. Peter Blair, G3LTF, spoke on the latest moonbounce techniques, and illustrated the recent advances in technology by playing tapes of eme contacts. Ian White, G3SEK, chaired a session entitled "How to work more dx", and this concentrated on the latest receiver techniques and, in particular, the front-end he has designed for the FT221 to bring it up to eme capability. Ron Broadbent, G3AAJ, who does so much to spread the enthusiasm for Oscar working, chaired a session on "Oscar Phase 3" during which many well-known members of AMSAT UK described the new techniques which will be needed to operate on these latest satellites. Your scribe and Alistair Simpson, GM8NCM, demonstrated the use of microcomputers to predict the best communication times during meteor showers, and how to use a micro to track the moon and satellites. The final session of the afternoon was chaired by Roger Taylor, G4BEL, in his capacity as chairman of the VHF Contests Committee. This has always been a lively forum in the past, and this year was no exception, with many suggestions being made for improving the vhf contests organized by the Society.

The excellent facilities available at the Whitton School meant that all the lectures took place there, and many of the exhibitors were also using classrooms to exhibit their wares. The number of firms increased from 18 last year to a record 27 exhibitors—all showing mainly components and accessories. It was most refreshing to attend an event where the "ubiquitous" black boxes were nowhere to be seen. Items in popular demand were Packer Communications' absorption wavemeters, Mutek's gasfet transistors, Cambrian's 4CX250b valve bases, and many visitors walked away from Randam's stand carrying 16-el antennas.

Apart from the lectures, visitors to the school section of the convention were able to meet members of AMSAT UK and the RSGB Propagation Committee, who manned their own exhibits. G3AAJ and his assistants were kept busy all day with enquiries about the new soon-to-be-launched satellites. The Propagation Studies Committee's stand had a steady stream of visitors, and Charlie Newton, G2FKZ, had prominently displayed the propagation and auroral forecasts for the next 14 days—his predictions were subsequently to be proved to be correct. One of the most interesting features of that committee's display were charts and recordings, explaining by diagram and sound the best of the recent transequatorial openings between Greece and Southern Rhodesia.

During the evening a buffet dinner was served, and time was taken out from the musical entertainment for the President to present many trophies to the winners of vhf contests. G4BPO, the Martlesham group, again seemed to collect more trophies than any other group, with a conga of eight members going onto the floor to be presented with their final trophy of the night. Bob "Boogie" Burns, G3OUU, led the Second Foundation—a nine-piece band with two especially-talented yl singer/dancers, who kept the crowd dancing until after midnight with music which varied from 'fifties rock to the latest disco hits. Informality was the keynote for the evening entertainment, and those who were unable to attend may be surprised to learn that G3BA, G3BPT, G3AAJ and G3FZL seemed to be able to pogo to the music with as much enthusiasm as younger disco devotees Jill and Ray Eckersley, G4FTJ, and Angelika G5CCI.

The VHF Committee was again highly successful in organizing yet another vhf convention under the guidance of Geoff Stone, G3FZL. Geoff has already made a provisional booking for next year's convention to be held on 14 March 1981; doubtless it too will be bigger and even more popular—mark that date in your diaries now for the vhf event of 1981.

*PO Box 49, Aberdeen AB9 8JA

NEW CONTRIBUTOR

John Morris, G4ANB, has been appointed to succeed Graham Knight as contributor of *4-2-70*, with effect from the July issue.

All items of vhf operating news should in future be sent to: Dr J. Morris, 120 Whitehorns Way, Drayton, Abingdon, Oxon.

Members of the VHF Contests Committee taking part in the "Open forum"

During the social evening at the RSGB National VHF Convention, the RSGB President, Peter Balestrini, G3BPT, presented various vhf trophies, and is seen here with some of the recipients. (*Photos:* G4FAW)

Top, l to r, the Thorogood Trophy, won by GJ4ICD, being received on his behalf by G8HVY (in the background is VHF Committee member G3FZL, the convention organizer); the 1962 Committee Cup to G3WDG; and G8IFT and GW4FJK with the Mitchell Milling Trophy, won by the Wulfrum Contest Group.

Bottom, l to r: members of the Martlesham RS and Ipswich RC with the Surrey Trophy (the Martlesham RS also received the 1951 Council Cup and the VHF Contests Committee Cup); the VHF Manager's Trophy, won by the Westmorland Contest Group, collected by G3SPJ (on left is vhf manager G3BA, who presided at the presentation ceremony).

VHF conventions in Belgium and Sweden

Many overseas amateurs attended the recent RSGB National VHF Convention, and it would be nice if UK amateurs could attend some of the vhf events which are due to take place in Sweden and Belgium soon. ON5FF and ON6UG persuaded a number of UK amateurs at the RSGB event to book for the Ghent VHF/UHF Convention which takes place on 31 May 1980. Chris Bartram, G4DGU, well known for his eme activities, is to give one of the lectures, and G3WDG, G3YGF and G3JVL are going to participate in the moonbounce sessions. The Ghent Convention runs from 9am until midnight, ending with a night-time fox hunt competition. Further information about this convention can be obtained from Freddy Guchteneire, ON6UG, Olmstraat, B9910 Mariakerke, Belgium.

Lars Wahlstrom, SM4AXY, a keen 144MHz vhf dxer and RSGB member, has kindly sent details of the next vhf convention which is scheduled in Sweden for the weekend of 13, 14 and 15 June. The convention takes place at Annaboda in HT55b, at a sport and leisure centre which is conveniently situated 250m asl to give vhf enthusiasts an added incentive to go to the convention. The centre has a camp site and hotel facilities, and SM4AXY hopes some UK holidaymakers can attend, enjoy the exhibition, and take part in the lecture sessions which are being organized by SM4COK, SM4CSK, SM4FXR, SM4IAZ and SM4JCJ—all well known for their vhf and uhf activities. Further details can be obtained by contacting SM4AXY at PO Box 242, S-70104 Orebro, Sweden.

EME listeners

February's *4–2–70* detailed the achievements of the group of listeners which is using a home-constructed 30ft dish to listen to the fascinating dx being worked on 432MHz by eme operators in all continents. Since the last report the group, which consists of James Keiller, G4EZN; Steve Hoy, G4FIL; Richard Newstead, G3CWI, and Nick Whyborn, G8OCJ, has been working hard on improving the receive system. A new gasfet preamplifier has been built by G4EZN and G3YGF; it has been tested and has a noise temp of 40°K (this is close to a noise figure of 0·5dB). Initial sun noise tests revealed measurements in the region of 15dB, and improvements have since been made to the coaxial cable. Stations heard include K2UYH, I5MSH, DL9KR, SM6CKU, G4DGU, JA6CZD and JA6AHB. G4FIL, who did all the structural design and much of the welding, has made a few small changes to the dish, and he was pleased to hear G3WDG, GW3XYW, ZE5JJ, W1JR, OK3ATP and W7GBI.

The group has had a great deal of success with its quickly erected 30ft dish antenna, but is now planning an even better installation. The listening site near Norwich is well clear of

local buildings and houses, and the freedom from man-made noise greatly assists in the eme listening project. The group is now developing designs for a 50ft dish antenna which should make it the largest amateur dish antenna in the UK.

Further eme experiments at G3WDG and G3YGF

Julian Gannaway, G3YGF, and Charles Suckling, G3WDG, have been making further improvements to the preamplifiers used in the receive sections of their eme systems. The latest device to be incorporated is a Plessey GAT6 gasfet, a device normally used at frequencies around 20GHz. The new preamplifiers' performance has been measured using the established hot and cold resistor technique, and a noise factor of 0·4dB is the best achieved so far. The new system has been air tested too, with contacts being made with LU3AAT, KA1GT (the new call of W1YU/G8EKB/W1), K9KFR, OK3CTP, W0PW and VE4MA.

Conditions during March for moonbounce contacts were noticeably down on previous months, with some signals being notably weaker than on previous occasions. Contrary to popular belief, eme conditions do vary—there is of course the 2dB variation due to the monthly change in the earth to moon distance, but ionospheric conditions also play a part. G3WDG and G3YGF have been noticing high Faraday rotation, even through the night, for the past three months. G4DZU at Leeds has also reported high Faraday during his 144MHz eme experiments with ZS5ZY in South Africa using his 76-el Cush Craft boomer array. G3WDG and G3YGF attribute this to the high solar activity, and they have noticed that signals not only rotate but that the polarization spreads out, with the effect that the received signals get weaker as it is only possible to listen on one polarization at a time.

G3WDG and G3YGF are able to measure the depth of the nulls by rotating the feed on their dish and measuring the difference between signals. When conditions are good the nulls are very sharp, but, when conditions for eme are poor, signals can often be heard even at the null point. This indicates that polarization spreading is taking place, and worldwide tests into this effect are now being carried out by Al Katz, K2UYH, who transmits test signals at prearranged times and at prearranged polarizations. Stations on a worldwide basis are thus able to participate in this unique experiment by reporting the signal strengths received at the different polarizations.

Another new area under investigation is that of the actual procedure used for moonbounce contacts. As stated earlier, Faraday rotation is rarely predictable, which means that it is only a matter of chance if the incoming signals match the polarity of the antenna. With a dish it is possible to rotate the feed to take account of polarity changes, and when schedules are run with a fixed Yagi station it is normal for the dish-equipped station to optimize the received signals by adjusting the feed to match the incoming polarization. However, since Faraday rotation is non-reciprocal the dish operator has no way of knowing which polarity to use for transmit. G3WDG and G3YGF have recently adopted a new procedure which has been used successfully for three contacts with KA1GT. They transmit for the first 2·5min period starting at horizontal and rotating 36° every 30s. During the dx station's transmit period a number is sent in the range 1 to 5 and this corresponds to the 30s period in which signals were received best. Faraday rarely changes much during the average 30min schedule on the 432MHz band, and this new system tells the dish-equipped operator where to fix the polarity for the rest of the schedule. Results under this new procedure are being carefully documented to see whether it is possible to predict the polarization which should be used at the dish station to give optimum results with the Yagi-equipped operator.

Auroral reports

John Branegan, GM4IHJ, at Saline in Fife, has recorded details of the most recent auroral openings. An opening on 27 January lasted from 1511 until 2210gmt, with good signals on 144MHz from LA, PE, DL, EI and SM0, plus strong Polish fm on 70MHz. Another opening on the following day was stronger still, but only lasted from 1820 until 2020gmt. This was followed by another aurora on 29 January, but this one lasted for only 7min from 2029gmt. A long seven-hour auroral event occurred on 6 February, with strong 144MHz signals from LA, SM, DL, EI, PA0 and SM4; as this event faded on 144MHz, Polish and Icelandic vhf tv signals were received at GM4IHJ. One of the so-called "Scottish" type auroras occurred on 15 February, with strong signals being heard from GM3JIJ in Stornaway and from GM8PSM in Kirkintilloch near Glasgow. This northerly event lasted from 2111 until 2250gmt but did not extend further to the south on 144MHz, although many tv stations could be received on the Band 1 frequencies. An unusual morning aurora was noted by GM4IHJ on 1 March between 0730 and 0845gmt, with many Scandinavian tv stations being received via the aurora—this was the first morning aurora recorded by GM4IHJ in over a year.

As can be seen from the above reports many of the auroral events are first noted on the lower frequencies, but so far this year *4-2-70* has received no reports of 70MHz auroral contacts. ON6UG and ON5FF mentioned at the vhf convention that they are keen to make auroral contacts on 432MHz, and to this end they have joined the ranks of operators who monitor 432·050MHz during strong auroral events. The IARU auroral co-ordinator, Charlie Newton, G2FKZ, predicts that there will be a very large increase in auroral activity next year following a comparatively quiet period during the next 12 months.

50MHz tests at G3FXB

Al Slater, G3FXB, is probably best known to readers of *Radio Communication* as a highly successful contest operator on the hf bands. G3FXB has, however, had a long interest in the 50MHz band, and was one of the most active stations during the openings in 1957. He has been very active during the last 12 months, and now feels that the path to North America has closed, at least for this season. G3FXB had a last crossband contact with VE1AVX on 11 January.

G3FXB's results during the last year are very much a re-run of what happened in 1957, although conditions were probably not so good this time. On the other hand there have been huge improvements in equipment with ssb, lower noise preamplifiers, higher gain antennas and the much higher levels of activity more than compensating for the slightly poorer 50MHz propagation. G3FXB worked a total of 702 stations and a total of 45 of the USA states—missing were Idaho, Oregon and Utah, plus KH6 and KL7 which were always a forlorn hope. In Canada contacts were made with stations in VO1, VO2, VE1, VE2, VE3, VE4 and, most interestingly, with VE5LY who was running only 25W.

Apart from the American and Canadian stations, there were also contacts with HC1JX, VP2VJ, VP9WB, VE1AI/1 on Sable Island, and several KP4s. Signals were heard on 50MHz from XE and PJ2, but it proved impossible for G3FXB to get their attention on 28MHz for a crossband contact. Back-scatter

signals were recorded on transmissions from EI2W and ZB2BL. Several contacts were established with stations in the USA who were running very lower power, often less than 3W, and one contact was established with WA1UQC who was operating on 50MHz and tuning for G3FXB on 28MHz while mobile. Many maritime mobile stations were contacted, and QSOs were often made with K3SXA while he sailed in the Atlantic and the Carribean.

The equipment at G3FXB consisted of a Microwave Modules converter feeding into a Drake C line receiver with a homebrew 3-el Yagi at 45ft being used as the receive antenna on 50MHz. On 28MHz G3FXB used a Quagi—a 2-el quad with a single Yagi director. G3FXB feels that activity on 50MHz will now be restricted to N-S paths, but says that he will be there on watch during October hoping for some further openings on the North Atlantic path, although he is sure that the best of this solar cycle is now past.

The most memorable day was 16 November, with S6 signals being received from W6BJI in California who was running just 6W output. The problem on that special day was the fact that the muf was so high that absorption on 28MHz was a problem. G3FXB was giving much better reports on 50MHz signals than he received in return for his lower frequency 28MHz transmissions. G3FXB's report on his 50MHz activities will be of great interest to the RSGB Propagation Studies Committee, and other amateurs who participated in the spectacular 50MHz openings are invited to submit reports on their experiences to the committee for further study.

50MHz in Hong Kong

Anthony Green, VS6EZ, has written to *4-2-70* from Causeway Bay, Hong Kong, to report on the high level of 50MHz activity on the island. VS6 stations are licensed to operate between 50·050MHz and 51·500MHz and on two special out-of-normal-band frequencies—52·025MHz for cw and 52·100MHz for fm, a.m. and cw. These two frequencies above 52MHz were allocated to permit Hong Kong stations to operate in the same band as that allocated to Australian amateurs. VS6EZ uses an Icom 211/701 set-up in conjunction with a Microwave Modules transverter running 5W output to a 5-el antenna at 250ft asl. By the end of last year VS6EZ had worked hundreds of stations in Japan, Indonesia, Papua and Guam.

VS6EZ took advantage of the special frequency dispensation on 7 and 8 March to work VK4ZBJ, VK8GB, VK8VV and VK8ZBW, all of whom were contacted on 52·100MHz ssb. VS6EZ managed to contact some locals on an R0 repeater, and soon VS6FX, VS6EG and VS6AB all moved frequency to 52·100MHz and each worked stations in Australia. VS6EZ reports that Peter Bacon, G3ZSS/VS6BF, using an IC551 running 10W to a groundplane, has been working lots of JA stations, and even a KC6 on cw: the latter being worked without a morse key—just bare wires from the jack plug.

Anthony Green is also the Hong Kong QSL Bureau manager, and when he is free from his filing duties he is to be found on 28·490MHz looking for crossband contacts to 50MHz.

GJ to VE on 50MHz

Lawrence Woolf, ex GJ8AAZ, finally passed the morse test after starting to learn the code 20 years ago. He is now licensed as GJ3RAX and promises to become active on 70MHz from his excellent site at St Brelade in Jersey. He managed to work crossband from 28MHz to VE1AVX and VE1ASJ who were both on 50MHz, and GJ3RAX believes these were firsts from Jersey. GJ3RAX's main aim in getting the cw qualification was to be able to use rtty on the hf bands, but he is now getting keen on 70MHz and on 144MHz rtty. Now that he has passed the morse test he happily admits to having already forgotten it and thinks it is outmoded—and that the maximum incentive should be to learn about the latest technology and to program the electronics rather than just the operator. Readers of *4-2-70* will remember that Lawrence already holds a number of other records from Jersey, including the first fast-scan 625-line G to GJ television contact.

ZS6LN again worked crossband to 50MHz

Steve Richardson, G4JCC, of Hayling Island, has sent information about the most recent openings on 50MHz. G5KW, G4BPY and DK1PZ all managed crossband contacts with ZS6LN during march, at times which varied between 1100 and 1240gmt. The beacons from ZS6LN on 50·050MHz and ZS6PW on 50·038MHz were also heard, and it was noticed that the beacon signal from ZS6PW was 8kHz higher than its allocated frequency.

One operator in Cyprus, 5B4AZ, has now received authorization to transmit on the 50MHz band, thus joining ZB2BL who is already very active on the band. This new licence should greatly assist the study of transequatorial propagation on 50MHz and provide UK listeners with yet another station with whom to attempt crossband contacts. The Eire Department of Posts and Telegraphs has now authorized EI9D to transmit on 50MHz, and he joins up with EI2W and EI6AS who can also transmit on this most interesting band.

Meteor scatter

Dave Butler, G4ASR, of Hereford, has been concentrating on meteor scatter on the 144MHz band. He is active every weekend from 0400gmt until 0800gmt, and has already completed contacts with Germany, Hungary, Italy, Norway, Sweden and Yugoslavia. G4ASR heard OY5NS via sporadic meteors but was unable to contact the Icelandic station. OY5NS has been quite active lately and has been heard by many members on the meteor scatter calling frequency. G4ASR uses a Trio TS-120V driving a Microwave Modules transverter and a 250W Lunar solid-state amplifier. A 3SK88 preamplifier and a 6-el quad completes the G4ASR set-up for meteor scatter contacts.

Island of Berneray activity on 144MHz

Barry Titmarsh, GM8SAU, who is usually located at Benbecula but is also sometimes active from St Kilda, reports on a new QTH square being activated in the Outer Hebrides. GM8SAU recently worked Colin German, GM3VBB, who was operating portable from the very rare QTH square of WQ21j on the uninhabited Island of Berneray which is a little to the south of Barra. GM3VBB's home location is Edinburgh, but he is the visiting lighthouse keeper and travels to Berneray once a year, and during these visits he takes time out from work to surprise 144MHz operators. GM3VBB/P was running 3W of fm from an IC215 and using a hand-held 4-el beam; by operating from the top of the lighthouse he was able to make full use of the good site, and was a good signal on S20 and S21. Many of the QTH squares hunters will be hoping that GM3VBB is able to take ssb or cw on his next visit to this much sought-after QTH square.

There is now considerable activity from the Hebrides, with GM3SWK at Knock Point on Lewis, GM3JIJ at Lower Gable, GM8PEV at Balallan, GM4JAP at north Harris, GM8SAU at north-west Benbecula, and GM4HDL at south Benbecula. Many UK stations have now made 144MHz contacts with these stations, and they are especially popular during tropospheric and auroral openings.

UK television received in Australia

VK6HK, VK6OX and VK6WD have been copying BBC television transmissions on 48·25 and 51·75MHz. Signals were received on 9 March at 1215gmt, and again on 12 March at 0915gmt, but so far this year *4-2-70* has not received any reports of reception in the UK of the various Australian 50MHz beacons. These beacons should give a guide to the best times to attempt a G to VK crossband 50MHz QSO. G4BPY reported hearing VK6RTV on 52·300MHz last November—the others to check for are VK8VF on 52·2MHz, VK5VF on 52·300MHz, VK2WI on 52·450MHz, VK4RTL on 52·440MHz and VK7RNT on 52·4MHz. VK6OX, who is located at Caernavon in Australia, runs 350W on 50MHz to a 5-el beam, his usual transmit frequency is 52·005MHz and he listens for crossband contacts on 28·885MHz.

First Class B "Supreme" to G8BHH

Another piece of vhf history was made on 1 March when the first-ever Supreme Award to be attained by a Class B licensee was entered in the record books kept by the vhf awards manager, Jack Hum, G5UM. Russ Stewart, G8BHH, of Wolverhampton, attained Supreme Award No 31 after having succeeded in qualifying for two Senior Awards for 144 and 432MHz and then claiming a further 1,296MHz Standard. G5UM notes that some of the cards for the last award were obtained over a three-year period, thus emphasizing the difficulty of obtaining cards from some operators, many of whom do not QSL at all. Russ Stewart, G8BHH, is of course well known as a contest operator, but this Supreme Award is for contacts made from his home in Wolverhampton. For Class B operators, denied the use of 70MHz, it is impossible to earn three Seniors to achieve a Supreme Award. They must obtain a 1,296MHz Standard to put with the 144MHz and 432MHz Seniors before they can claim a Supreme Award. Russ Stewart, G8BHH, is to be congratulated on achieving the first G8 Supreme and G5UM believes that there may be one or two more Class B operators who are near to qualifying for a Supreme Award.

QTH Squares Awards

There have still not been any claims for either the 70MHz or 432MHz QTH Squares Awards. There has been considerable activity on the 144MHz side, with four being issued in the first two months of this year. In the 40/10 category awards have been issued to G4IJE and G4HMF (Nos 5 and 6) and in the 80/18 section GJ4ICD and G3VYF have attained awards Nos 2 and 3 respectively.

Many operators are still collecting cards for the Standard and Senior Awards, and certificates have recently been issued to G8GXE-144MHz Standard No 542; G8KAX-144MHz Senior No 144; G8BHH-144MHz Senior No 145; and 144MHz Senior No 146 to G3AZI. Two 432MHz Standards were issued during the same period to G8BJG and G3WHK. In the 432MHz Senior category No 58 went to G4FMD and No 59 to G3WHK.

Repeater news

GB3TR is the callsign of the latest vhf repeater, which became operational at the beginning of April on Ch R2. GB3TR is located at Newton Abbot in Devon, and further information can be obtained from G3UIQ, 2 Lower Coombe Road, Blindwell Park, Kingsteignton, Devon. The uhf repeater GB3MK, at Milton Keynes in Buckinghamshire, is now operational on Ch R0. Further information on this unit from D. Coxhill, G8CXT, 82 Williams Close, Hanslope, Milton Keynes MK19 7BT.

The Repeater Working Group held an open meeting at Bath on 29 March. Further open meetings are planned for Motherwell on 14 June, and at Cambridge on 22 November. These meetings are intended to keep everyone informed of the work being done by the Society in connection with repeaters—repeater builders and especially repeater users are invited to attend. An open forum will allow anyone present to express their opinions on repeaters and related topics.

A proposal has been received for a 144MHz repeater, GB3MB, to supplement GB3MN in covering the Manchester area. Proposals have also been received for uhf repeaters to cover Perth, Swindon, Port Talbot, Salisbury, Newtown (Powys) and Leek. At the most recent count, 32 repeaters were operational on 145MHz, and 62 were in service on the 433MHz band. A further 18 vhf and 33 uhf units were already in the pipeline.

Repeater group of the month—GB3WH

The GB3WH vhf repeater on R4, sited near Abingdon in Oxfordshire, has now been operational for 18 months, and Cliff Sharpe, G2HIF, has appointed himself public relations officer of the Vale of the White Horse Repeater Group which is about to be formed! A group of enthusiastic amateurs belonging to the Culham Radio Club designed and built GB3WH under the guidance of G4DPA. GB3WH has been operating satisfactorily since it came on the air, and the policy has been to frequently upgrade and improve the system. In recent months a new logic has been fitted which allows access after a valid tone and 5s of audio—this is a very desirable feature when the repeater's receiver is subjected to a considerable amount of electrical noise generated by building contractors working a 24h day on an adjacent site.

GB3WH was the first repeater to incorporate a logic control system to report automatically the signal strength of all the stations accessing the repeater. This works by substituting a short morse numeral in place of the usual K. Short morse numbers are sent in the normal morse code for the report less all the dahs except one: 2 is sent as U, 3 as V, 4 as 4 . . . 8 as D and 9 as N. This reporting system is greatly appreciated by the users of GB3WH, who can use the repeater as an unbiased reporter on new antennas etc.

The site used by GB3WH will soon have to be changed, as the antennas are rapidly being enclosed by high-voltage power grids on three sides. It is hoped to change to a more elevated site in the Oxford area which will give even better coverage to GB3WH. The planned area includes the Vale of the White Horse and Swindon to the southwest, Aylesbury and the Chilterns in the east, and Reading through the gap between the southern end of the Chilterns and the Berkshire Downs. The planned site is 600ft asl, and tests indicate that the above improved coverage can be achieved, making GB3WH a true area coverage repeater. Further information about GB3WH and the proposed Vale of the White Horse Repeater Group can be obtained from G4DPA, QTHR. □

swl news

Bob Treacher, BRS32525 *

New faces

Welcome to Michael Chace, ARS43446; David Grainger, ARS43261; Michel Delvaux, ARS42503; Stephen Bowlzer, BRS43273; Raymond Gordon, ARS43743; R. L. Tough, ORS43382, and Tim Gentle, BRS41680.

Michael runs a National HRO-MX with a long wire. He queries a station he copied as "3D3NC", and your scribe is very doubtful about its legality. The 3D prefix is allocated to Fiji and, as Michael said he was in the USA, the best explanation is that the callsign was misread. David uses a Lowe SRX-30 receiver with only 40ft of wire, just 5m above ground. Michel is a member of the Worthing ARC and has an AR88LF receiver with three antennas to choose from.

Stephen is currently using a DX160 but is hoping to buy a better receiver soon. He submits an interesting list of dx heard, including PY0AH (Arvoredo Is—no DXCC status), AH8A, YC1OZ, 9X5LE and ZL1BHC heard at 0214 on 21MHz. Raymond is a young member of the Society who is interested in meeting others.

R. L. Tough is an overseas member who lives in West Germany. He is studying for the May exam and tunes the bands with a Frontier 500D. Tim is yet another member from Guernsey. He has an R1000 receiver and reports picking up some interesting callsigns, including N4HX/TT8, ZD8TC, 4M3AZC (YV) and 6D2HF (XE), but offers a dubious one in the shape of VR6FQF—obviously another mislogging.

Several queried the "rules" of the countries table; they appear in *Radio Communication* February 1980, p123.

March dx

The month started with the new-style ARRL DX Contest which certainly livened up all six bands. The 28MHz band produced AH8A, FK8CR, several KH6s and KL7s, and ample dx from the Caribbean area. W7KHN/KH9 on Wake Is was also active during this weekend and was reported as a new country by several correspondents. It was also the first time we had heard VEs operating below 7·100kHz. The VEs will obviously benefit from this arrangement, being in the dx portion of the band and away from the majority of the bc interference. The 1·8MHz band provided signals from all over Europe—although only UQ2GBU was reported from the USSR—including EA5TD. Several Ws were heard at this QTH, but Dave Whitaker, BRS25429, reports 45 different Ws, plus a VE3, VP5EE and YV4TI.

4S7DX was also very active during the month; he was in Colombo for four weeks and was then scheduled to go to 8Q7, 9M6, HS1 and VS6. FR7AI/T was also active on 14 and 21MHz. 3B8CF activated 3B7 and was reported on 21 and 28MHz. VK9XT was another expedition which had good signals into G-land. He was also reported on 7MHz cw. P29JS was also active as VK9NS and VK9NS/LH, but few reported hearing him. TI9TE was also active from Cocos Is and was reported on 14MHz, but this trip lasted only one day. CQ WPX obviously threw the bands into chaos during the last week in March, with everyone trying to out-smart everyone else. Several G groups were expected to amass large scores.

VP8SO is now QRT from South Orkney; the new operator is VP8ZR. Hopefully, by the time this is read there may be more information on the proposed trips to CE0Z, KH3 and XZ.

1980 hf countries table

(starting score 150)

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS43475	107	133	186	69	71	7	573	ssb/cw
RS42604	126	123	107	91	84	16	547	ssb
ARS8841	82	83	148	70	76	0	459	ssb/cw
BRS35943	97	97	93	76	85	5	453	ssb
BRS43273	58	59	71	20	4	0	212	ssb
BRS40705	50	56	46	38	19	0	209	ssb
BRS20185	47	37	67	16	27	2	195	ssb
ARS42503	35	50	61	26	20	0	192	ssb
BRS40293	39	50	56	25	20	0	190	ssb
BRS41992	33	32	50	11	31	7	164	ssb
ARS43261	44	35	49	18	12	0	158	ssb

Other happenings

Dave Stewart, BRS40293, reports QSL returns from OA, HI8, VS6, YB0 and ZF1, while Robert Small, ARS58841, was pleased with cards from FM0, HL9, VP2K, ZK1, 3D6, 8Q7 and 9L1. Mark Hattam, BRS43475, similarly reports cards from HV3SJ, 3V8 and 9G1, and he is now able to copy 99 per cent of cw signals at 14wpm and the "rubber stamp"' type QSO at 16wpm.

Keith Kerr, BRS35943, had been inactive due to sitting his surgery finals and was bemoaning his luck at missing some good dx. He had also lost his antenna farm due to bad weather. The QSLs continue to arrive, however, and his latest batch included HM1EY, FB8YF, VK9ZR, 1S1DX and 9K2DR.

Brian Russell, BRS33915, has also been inactive due to work commitments but now has an FRG7 in his car. He reported QSLs from two new countries—TZ4AQS and 7Q7BC—taking his confirmed total to 309. He suggests another table—for confirmed countries—but your scribe feels this would be of limited interest, which perhaps proves the point Brian was trying to make. He sent a photocopy of part of WA1CFT's QSL manager's directory which lists the manager's addresses as well. It is interesting that Brian never logs any stations heard working in contests and that he always reports to stations not working Gs, and to those working via non-obvious routes, eg VK0-VS6, VK-JA. Good sense, and it obviously pays when the stations confirm reports.

Finale

Next deadline data for news to reach your scribe is 20 May. □

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

the month on the air

John Allaway, G3FKM *

A letter from Alan Williams, G3KSU, raises a number of very pertinent points. He writes: "I noticed in the recent ARRL DX Contest that conditions were so good that everyone was giving everyone 599. This was on 21MHz cw, despite QSB, heavy QRM, and, to me at any rate, numerous weak signals. Intrigued, I joined in this number-swapping event, with the aid of 1W to a dipole in the attic, and received 599 reports from W6s and W7s, several of whom, not surprisingly, had some difficulty in copying my call! I have even received a QSL with "599" printed on it. . . . Now why is this? I guess that sending 599 as "5NN" saves time—and full marks to the VP2 running "nearly 1kW" who gave "5NN NNN"—and allows the use of a memory keyer. But if contest reports are to be so meaningless why send them at all? Is the ARRL aware of this ludicrous situation? It must be. And do RSGB events suffer the same indignity? It has all become very silly but I do not know what the answer is . . . perhaps someone else does?

A new claim for the fastest WAS has been received from G3SDC (Leicester Polytechnic Club). The station achieved the feat in 4h 33min on 1 March this year with G3CWI and G4FPH operating.

GM4HPO reports receipt of QSL cards for alleged hf ssb contacts.

Readers who have not already applied to G3KDB for ircs are asked not to do so! The response to the advertisement in the March *MOTA* was overwhelming and his supply is exhausted. When more become available further mention will be made in this column.

News from overseas

G3ZMF has sent information about VP8SB's activities. His preferred operating frequencies appear to be 3,775, 3,799, 7,007, 14,275, 21,185, 21,296, 21,357 and 28,450kHz. On 7MHz phone he operates "where there is a hole" and he asks people not to call him when he is on the VP8 net (for QSL managers) on 14,127kHz. Laurence also has 144MHz listening equipment, and he is making determined efforts to work into the UK on 1·8MHz—for this band he constructed a two-element beam at 50ft but found he had to lengthen it by 12ft from the original calculations due to the abnormal ground conditions. He will be on 1,810kHz, listening for replies between 1,827 and 1,833kHz from 0100 for up to three hours. Antennas for the other bands consist of two 759ft Vs, two 750ft rhombics, and an 1,850ft wire—all at 50ft above ground. He has a Racal RA1772B receiver and a fully synthesized transmitter. G3ZMF (who is VP8SB's QSL manager) welcomes listener reports and offers up-to-date information to those who supply at least two reports (please enclose sase). Laurence will remain in VP8 until May or June next year. Willie, VP8PM, returned home last November.

VS6CT wishes to draw attention to the existence of two nets which are used for emergency, medical, and typhoon warnings in the western Pacific area. These are the Pacific Inter-Island Net, which meets daily at 0800 on 14,315kHz, and the Pacific Maritime Mobile Net which meets daily at 0530 on 14,313kHz. He says that any interference, however innocently caused, could be disastrous for someone in trouble and relying on the network. Recently a group of 10 G stations was heard in contact with a VK on 14,315kHz and oblivious of the problems that they were causing. VS6CT will be in England this month and hoped to meet many of the friends he has made on 28MHz at Alexandra Palace on 9 May.

Top band

VK6HD has written to say that a parcel of letters from Europe, all posted by air-mail between 15 and 18 December 1979, arrived on his doormat on 10 March. Included were several QSL cards for non-existent contacts with VK6HD. Mick feels very bitter about the piracy, and his first reaction was to not use the band any more so that there would not be any more disappointed people. He finds it difficult to tell someone who has been trying to work VK on the band for 10 or more years in order to complete a WAC that he has worked a pirate. It is felt that the culprit is probably in the British Isles, as there have been no claimed contacts from mainland Europe.

DX news

From the Greater Fairfield ARS comes news of their Dogwood Festival which will be celebrated by a "QSO Party" on 17 May. The club station WB1CQO will operate on six bands and will explain the significance of the festival during contacts. It will be on the air from 1300 to 2200 and will send out a special QSL. Possible QRGs are listed as 3,975, 7,235, 14,330, 21,420 and 28,710kHz. QSLs go to Grace von Stein, 248 Euclid Avenue, Fairfield, Conn, 06432, USA.

Another special activity in the USA is the Mystery Hill Dxpedition which will be on the air from Mystery Hill, North Salem, New Hampshire, for 24 hours from 1800 7 June. The callsign will be K1MDX, and a certificate will be sent to all who contact the station. QRGs listed include 14,050, 14,280, 21,050, 21,110, 21,380, 28,150 and 28,580kHz. Send sase to K1RCT, PO Box 123, North Salem, NH, 03073, USA.

Anyone wishing to make contacts with JW, JX, OX and TF might well look for the Arctic/Norwegian Net. This is conducted by LA7JO and LA9TQ at the following times and on the following frequencies: Tuesday and Wednesday at 2100 on 14,207kHz; Fridays at 1500 and 2330 on 7,085kHz; Saturdays at 0900 on 14,207kHz, at 1400 on 21,345kHz, and 2300 on 3,795kHz; and on Sundays at 1100 on 28,570kHz and 1600 on 3,795kHz. Schedules can be arranged on cw or phone.

KH3AA has told VE3MR that he will be on Johnson Is until the end of September. He holds a general class licence and is limited to the appropriate parts of the hf bands. He likes cw and may be found near 14,025kHz from 0300, after which time he goes to the area above 14,275kHz. Two other stations are currently active on the island—KA6HIQ and WH3AAA—who are both novice licence holders and are both called Bill.

Regular signals from Sudan are being received from Dr Sid, ST2SA, who is often to be found on the Arabian Knights Net on 14,250kHz every Friday from 0400. Steve, DJ1US/ST3,

*10 Knightlow Road, Birmingham B17 8QB.

The old rodgers—9H1R, Ron Meachen—the "old salt" swinging the lamps as usual

also holds the callsign N5SB and has also been A35MB, ZK2AV, 3D2BB and 5W1BM. He frequents 14,110 or 14,300kHz from 1900, with excursions to 14,295kHz at 1700 on Fridays; 14,240kHz on Wednesdays at 1730; and 21,275kHz or 21,310kHz daily from 2000. QSLs for those who worked VE3BVD/ST2 should be in the mail this month.

FR7AI/T is now on fairly regularly on Tuesdays, Thursdays and Sundays, near 14,210kHz at 1600. F6EXV has been making lists in an attempt to control the large numbers wishing to contact Tromelin Is.

A reminder to those who still need a QSL for a contact made with VQ9HCS a few years ago is that he is now H. C. Stickley, PO Box 941 Mbabane, Swaziland.

VE3HRS has returned to Canada from Africa to find a number of QSLs awaiting him for VE3HRS/TZ contacts with an operator named Jack. The only QSOs he is able to verify are those made by Ken himself between 7 November and 5 December 1979.

Moossa, 3B8AE, was due to arrive in Rodriguez Is on 3 March for an extended stay. He is a relatively inexperienced operator and as 3B9AE will be crystal controlled on 14,240kHz and announcing his listening frequency.

FB8ZO is said to be on 14,260kHz almost daily at 0030, and also to operate on 14,030 or 14,105kHz daily at 1100, 1700 and 2200. There is thought to be an amateur in the present group on Crozet Is, but he is not allowed to operate because of the possibility of causing interference to delicate experiments which are being made.

The much-hoped-for signals from Heard Is, VK0RM, seem to have been a great disappointment, as equipment trouble reduced the power output of the transmitter to a few watts. It is not known whether any genuine European contacts were made.

K5VT has a new address (see "QTH Corner") to which all requests for QSLs from FM7WO, K5VT/SV5, SV0AA/5 (1979), 5H3KS (cw-1979) and 9Q5VT should be sent.

VP8ZR is located on S Orkney Is and will be there for two years. He is called Dennis and has been worked on 14MHz around 1900.

Panamanian amateurs have been heard using their new alternative H8 prefix during recent contests.

Dxpeditions

Iris and Lloyd Colvin made 12,000 contacts from St Kitts as VP2KAH. They contacted 137 different countries and made the largest number of QSOs yet on their current expedition. Visiting amateurs would normally use their home callsign with /VP2K as a suffix, but as they had visited St Kitts previously they were granted "semi-resident" status. They visited Kit Carson, VP2KC, whom they consider possibly has the largest and most expensive amateur radio station in the world!

The Wiesbaden ARC will visit Liechtenstein from 24 May to 1 June. Their callsign will be DA1WA/HB0, and European amateurs should send QSLs to the address in "QTH Corner". Operating frequencies will be 25kHz up from the lower edge of each band (on cw) and 3,780, 7,090, 14,275, 21,350 and 28,650kHz on ssb. Special emphasis will be placed on making contacts with Africa, the Far East, Oceania and S America, and an attempt will be made to achieve a DXCC.

Eric, SM0AGD, will most likely be in Africa at the time this is being read. Exactly where is not known, but he will visit 6W, J5, 9Q, ZS and A22 for certain, and may also go to 7P, 3D, S8, H5, T4, 9X, S9 or TN. He will not know from which he will be allowed to use his IC701 until he arrives. All QSLs should be sent to SM3CXS.

The *DX Bulletin* records a rumour that the same Jordanian group which operated so successfully from 8Z4A last year is planning a visit to Kamaran Is sometime this summer.

The N2KK expedition to the Indian Ocean area has been cancelled on account of the great damage done by hurricanes to the places which it had hoped to visit. K5CO and N5AU may well turn their efforts towards the Pacific instead.

HM King Juan Carlos

A further honour to the amateur radio service is the presence of HM King Juan Carlos of Spain on the bands. He uses the call EA0JC, and is frequently on 14,220kHz around 2330.

URME

The Radio Aficionados Minusvalides Espanoles (URME) has been founded to promote the interests of handicapped amateurs in Spain, and to strengthen the links between them and others throughout the world. Already a twice-monthly magazine is published on tape and circulated free to all who wish to receive it. Last year the association organized its first Guide Dog Award—a competition which proved a great success and attracted competitors from all parts of the world. A second Guide Dog Award is scheduled and it is hoped that even more will take part. Details are as follows:

Second Guide Dog Award—0000 2 June until 2400 6 June. All bands 3·5 to 28MHz, phone only. Contacts with members of URME are worth one point, and two points with their "special" station. Exchanges consist of report and serial QSO

number (from 001). A station may be worked once per day on each band but there must be at least one hour between QSOs on different bands. Various diplomas and trophies will be awarded, but the overall winner will win a four-day stay at the Hotel Samil Playa in Vigo. Top listener will also receive a trophy and diploma. Log forms listing 40 QSOs per sheet should be used and should list date, time, station worked, exchanges and points claimed. Post before 15 July to Delegacion Comarcal de URE, PO Box 742, Vigo, Spain.

SSTV

Congratulations to G3NOX (formerly G8ACN) who made the first high-definition colour two-way sstv contact across the Atlantic with K2RZ on 28,680kHz at 1141 on 8 March. This was achieved by making three pictures—using red, green and yellow filters, and storing them in the memories of three Robot scan converters. Each picture was transmitted to K2RZ who tape-recorded them and played them back over the air to G3NOX, who viewed them electronically mixed on his colour monitor. G3WW also reports that a similar transmission was made to W9NTP later in the afternoon, but not transmitted back.

Canadian frequency changes

Canadian amateurs may now use phone on the 7,050 to 7,100kHz part of the 7MHz band, and this will also apply to the whole of the band 1,800 to 2,000kHz in six months' time. A report of highlights of the ARRL board meeting of 19 January 1980 indicated that "a committee study was ordered of possible expansion of the 20 metre phone sub-band".

Contests

Canada Day Contest

0001 to 2359 1 July

All bands, cw and phone combined. Single-operator single- or multi-band, and multi-operator all-band single-transmitter. Stations may be worked twice on each band—once on cw and once on phone, and exchanges consist of RS/T and serial number (from 001). VE1 stations will also indicate their province. QSOs with Canada count 10 points, with others one point. The first contact with any CARF official news station (using the suffix TCA or VCA, eg VE7TCA and VO1VCA) counts 20 points. The multipliers are the number of Canadian provinces/territories worked on each band and mode (12 provinces/territories × eight bands × two modes = a maximum of 192). It is suggested that activity be centred around 1,810, 3,525, 3,770, 3,900, 7,025, 7,090, 14,025, 14,150, 14,300, 21,025, 21,200, 21,400, 28,025 and 28,500kHz. Send all logs, dupe sheets, summary sheet and comments to: Canadian Amateur Radio Federation, Box 76752, Vancouver, BC, V5R 5S7, Canada, postmarked before 31 July 1980, and enclose sae and irc for a copy of the results.

The USSR "M" Contest

2100 10 May to 2100 11 May

Bands 3·5 to 28MHz. Phone and cw. Same station may be worked once per band, either on cw or phone. Single-operator single- or multi-band, multi-operator all-band and listener sections. Exchange RS/T plus serial QSO number. USSR stations will give RS/T plus their oblast number. Contacts with stations in one's own continent count one point, in others three. Own country may be worked for multiplier credit only. The multiplier is the total of "R-150-S" countries worked on each band. This list is essentially as the ARRL DXCC list plus oblasts 002, 013, 014, 056, 084-089, 090-098, 159, UA1 Novaya Zemlya, UA0 Kuril Is, and UA0 New Siberian Is. Final score is total QSO points multiplied by the total of multipliers from all bands. Listeners earn one point for reporting one station exchange, three if they report both. Badges will be awarded to entrants working at least 10 USSR stations, and contest QSOs may be used for claiming awards (R-150-S, R-100-U, W-100-U, R-15-R, R-6-K and R-10-R). Post logs before 1 July to Krenkel Central Radio Club, "CQ-M" Contest Committee, PO Box 88, Moscow, USSR.

CQ WW WPX Contest (CW)

0000 24 May to 2400 25 May

Rules for this contest were given on page 276 of the March issue of *Radio Communication*.

February *CQ* contained the results of the **1979 CQ WW WPX SSB Contest.** UK scores were as follows (certificate winners in bold type):

Callsign	Band	Points	Callsign	Band	Points
G3FXB	All band	2,441,392	**GU4MBS**	28MHz	21,825
G4CNY	–	2,206,908	**GM4CHX**	(21MHz)	51,788
GI4FUM	–	107,598	GM4FSA	–	8,190
GM3GPN	–	549,840	**G4CVZ**	14MHz	216,513
G3TKR	–	102,608	G4DBW	–	128,156
G3NT	–	90,922	**GW4GXR**	–	92,254
G2AJB	–	70,308	G4HLN	–	82,544
GW4HBK	–	67,716	G4AHO	–	76,820
G3JKY	–	52,716	G3RAM	–	63,070
G3XBY	28MHz	551,551	**GU3YIZ**	(7MHz)	189,128
G4DKT	–	132,125	**G5CMX**	–	108,680
G3XFW	–	37,050	**GW3SLA**	(3·5MHz)	21,472

Results of the **20th All Asian DX Contest** (phone) have been received from JARL. Only one UK call is listed—that of **G6UW**—who scored 9,660 points and was a multi-operator entry. Rules for this year's contests contain a number of changes and will appear in next month's *MOTA*. The phone section will take place on the weekend of 21-22 June.

Awards

The Worked All Zones (WAZ)

January *CQ* announced changes in the antarctic region and gave the following information.

In the past all antarctic prefixes were grouped into Zone 13. However, recent exploration from Australia, New Zealand, South Africa and South America into the antarctic land mass should be recognized, and Zones 12, 13, 29, 30, 32, 38 and 39 have now been extended to converge at the south pole. Stations will be credited to one of these zones, with the exception of KC4AAA located at the pole which can count for any one of the seven. Questions regarding the zone location of a particular antarctic station should be directed to the WAZ Award Manager (Leo Haijsman, W4KA, 1044 Southeast 43rd Street, Cape Coral, Fla, 33904, USA).

The Andalucia Award

For confirmed contacts/reception reports with stations in the Spanish province of Andalucia. European applicants require 20 EA7s in Sevilla, six each in Malaga, Cordoba and Grenada, four in Cadiz and Huleva, and two each in Jaen, Almeria, and EA9 Ceuta and Melilla. Those outside Europe need 10, 3, 2,

and I respectively. QSOs must have taken place after 1 January 1974, have been on any bands between 3·5 and 28MHz, and on any modes. Applications should be certified by national societies' award managers and be sent (with 10 ircs) to Delegacion URE, Award Manager, Box 479, Sevilla, Spain.

Worked All SM-WASM

European applicants need to work two stations in each of the eight Swedish call areas, non-Europeans one in each of SM1-SM7 and SM0. All QSOs must have been made since the second world war and may have been on any bands/modes. QSLs, with full QSO details or a list of QSOs (certified by a national society award manager—G3KDB in the UK) plus 11 ircs, should be sent to SSA Diploma Manager, SSA, Ostmarksgatan 43, S-123 42 Farsta, Sweden. The award is in the form of a small cloth.

Worked All SM Laens (WASM II)

Class A for amateurs in LA, OH, OZ and SM, Class B for all others. All contacts must have been since 1 January 1953. Class A need proof of two-way contact with each of the 25 laens on two different bands, Class B on one band only. A certified list of QSL cards plus seven ircs should be sent to WASM II Manager, SM6ID, Karl O. Friden, Morup 1084, 311 03 Langas, Sweden.

Wool City Award

To celebrate the 100th anniversary of the Principality of Liege. Belgian and other European stations need 14 points, others eight. These are acquired by working GDV (amateurs of Verviers and surroundings) members since 1 January 1980. A phone QSO is worth one point, a cw two, and the same station may be worked twice (once on each mode) within 24 hours for credit. QSOs with ON5PL count double. Listeners may apply on the same basis using confirmed reports. Send certified list plus seven ircs to Noel Faux, ON6FN, PO Box 12-B-4880-Spa Belgium.

Band reports

After the excitement of the past few months, G8KG's monthly summary is very much shorter this time and reads as follows: "Solar activity in March was comparable with the lowest months in 1979, which were May and June. The monthly average of the 2,800MHz solar flux was 170 sfu, with the lowest daily value of 139 occurring at the middle of the month, and the high of 209 during the last week. It now looks quite likely that the official cycle peak will prove to have been in the autumn of 1979, but there remains the definite possibility that the next upsurge will take it even higher, and even if this does not happen the overall decline during 1980 is not likely to be great."

Quite encouraging still, and a reminder to give 28MHz a good work-out during 1980!

This month's information was received from the following, to whom many thanks: G2s WS, CDT and HKU, G3HB, G5JL, G5MP, G8KG, G3s AAE, GHY, GVV, IMW and KSH, GM3LYY, G3SED, G4s AXD, CQK, EHQ, ETN and GXL, G8WEE, and BRSs 17567, 31301, 36928 and 42876.

Stations listed in italics were using cw.

1·8MHz. 0400 *VE1, W1-W4, W8.* **2300** *OZ1W.*
3·5MHz. 0200 *C5AAP.* **0500** *VP9GD.* **0600** N7DF (Utah), AB0X (Ks). **0700** OX3ZM, K7SE/PJ5, TI2LL, XE, *ZL4.* **2300** K7SE/PJ5, UA9CBO, UL7LAP (near 3,640kHz).

QTH CORNER

A7XD	Mike Smedal, Box 4747, Doha, Qatar.
BV2B	Box 30547, Taipei, Taiwan.
GB2ITU	via RSGB QSL Bureau
DA1WA/HB0	Dr H. Jakobljevek, Am Weinberg 10, 6201 Wiesbaden-Auringen, W Germany.
HI6XQL	YASME Foundation, Box 2025, Castro Valley, Calif, 94546, USA.
J5AG	via SM3CXS, J. Svensson, Berghemsv 11, 86021 Sundsbruk, Sweden.
K5VT	Vince Thompson, 4028 Perlita -Apt 4, Los Angeles, Calif, 90039, USA.
TY9ER	via DL8DC, Rudolf Lux, Lindenweg 16, D-6686 Eppelborn, W Germany.
VK6HD	M. E. Bazley, 8 James Rd, Kalamunda, WA 6076, Australia.
VK9XT	via VK3OT, S. R. Gregory, Box 622, Hamilton 3300, Vic, Australia.
VP2EES	via K4TVE, W. D. Wallace, 152 Drawdy Lane, Brunswick, Ga, 31520, USA.
VP2EEU	via WA4ZSX, V. Le Pierre, 2618 Jericho Ct, Tucker, Ga, 30084, USA.
VP2EEV	via K8ND, J. A. Meass, 4410 Norwell Dr, Columbus, Ohio, 43220, USA.
VS5RP	R. E. Parkes, PO Box 43, Tutong, Brunei.
VS5SR	S. Roberts, PO Box 43, Tutong, Brunei (or via G8EWV).
VP8SB	via G3ZMF, 10 Meadow Walk, Walton-on-the-Hill, Tadworth, Surrey KT20 7UG.
YV0USB	via YV1TO, J. Stradiotto, Box 3, Punto Fijo, Falcon, Venezuela.
ZK1CA	via ZL2UW, R. Naulls, 14 Miriona Grove, Paekakiriki, New Zealand.
3B9AE	Moossa Atchia, 7 Naprier Broom St, Beau Bassin, Mauritius.
9A1ONU	(Contest QSOs) via I4ZSQ, Box 2073, Bologna 40100, Italy.
9U5DS	via ON5TO, O. Timmermann, Boterbekerweg 8, 8200 Brugge, WV, Belgium.

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

7MHz. 0100 *VP9IB.* **0500** *CM, VP9GD, W6-W7.* **0600** *FP8AB,* VE7WJ, *XE2CKA.* **0700** *VP1A* (QSL to WB0TNY), *W7MB, ZB2EO, 5T5BZ.* **2200** *EC7CH, ZB2EO.* **2300** VE5RU, *VP2KAJ, ZD8OM.*

14MHz. 0400 *5W1BZ.* **0500** C5ABK. **0700** FO8s DO, FU, W6ENK/KH4, VK9NS/VK2 (Lord Howe Is), VK9XT, YI1BGD. **0800** KC4USV, KH6, W6, ZL, 3D2BM, 5W1BP. **1600** FB8XY, FH8CL, *5W1BZ.* **1700** JT1s AN, BG, W6ENK/KH4, 3B9AE. **1800** FH8CM, *JT1BM, 5V4GE,* 9Q5MA. **1900** *J28CB, KC6BS, KL7PJ,* KX6PP, *VP2KAH,* 4K1A. **2100** P29EJ, *W5JMM/SU,* VK9XT, VK2,4,5,6, VP2KAL (QSL to WB8LDH). **2200** *J5AG,* TA2KS (QSL to G8SCP), *VU2BK.* **2300** CE0AC, CE0ZG, TI9RT, *W7.*

21MHz. 0000 VP1KI, VR6TC. **0800** JW2CF. **0900** H44JB, JA, KL7, VK9XT. **1000** WA4CEH/KH8. **1100** ET3PG, J28AZ, TR8GM, VK9NI. **1200** P29MF, (QSL to G4CHP), TU2JD, 4U1UN. **1300** KL7IRT. **1400** *HI6XQL,* W6-W7. **1500** EL7I (QSL to DL2GA). **1600** EP2TY, FR7AI/T, VP9HZ/MM (in Arabian Gulf), *3B8FA.* **1700** *HS1AMC, J5AG, 3B7CF.* **1800** 4S7DX. **1900** HC8GI, *HI6XQL,* HS1ABD, *KH6IJ,* 4S7DJ. **2100** HD0E, HI6XQL, KL7H (QSL to W3HNK), *PP0MAG,* 4M3AGT (QSL To YV3AJ). **2200** *CX5RV.* **2300** A4XIU, 5N2AEC.

28MHz. 0600 AH2E. **0800** AH8A, FK8CR, JA, UA0, VK9XT, 4S7DX. **0900** HL9UG, JA, EI5V/OD5, VK, ZL, 5W1BZ, 9Q5GB (QSL to W7KTI). **1000** A4XID, AL7AP, H44CB, JW8FG, NL7A, 9A1ONU. **1100** AP2SA, J5AG, H44s LW, PT, WB3LUL/KH2, P29s, VS5MM, VS6EG, ZL, *9K2DR,* 9N1MM. **1200** AH2E, JT1WG. **1300** D4CBC, FB8XY, VP5WJR, 4U1UN. **1400** *C5AAP, PP0MAG,* VE8RB, VP9s, W6-W7, ZF1GC. **1500** *HZ1HZ,* VP2VGB (QSL to K7SE), W6-W7, *6Y5YM.* **1600** *HI6XQL,* HSs 1ABD, 1BG, OX3RF, P29NLS, VE5-VE7, VK9XT, VP2E, VP8NO, VR6TC. **1700** FO8DO, HH5CB, HS1WR, *KL7CYL,* ZF1AK, ZS2MI, 5N0DOG. **1800** CT2YB (QSL to AG1K), KH6, KL7, *VP2VEG,* VP8s QG, ZV, W7, 7X4AN (QSL to DJ2BW), 9Y4TAM. **1900** KH6, KL7. **2000** KH6s HE, IBA, KL7Y, UA0KAU (Zone 19), VP8JB, VY1BF, W1-W0. **2100** CE0ZG, FG0UQ/FS (QSL to W3HNK), NL7A, VY1s AL, AT. **2200** K2F-J/PJ5, SU1AL, VK2s (LP). **2300** VK3.

As always, many thanks to all correspondents, and also to the writers of the following for news items extracted: *CQ Magazine* **(W1WY)**, the *Ex-G Radio Club Magazine* **(W3HQO)**, *DX Bulletin* **(K1TN)**, the *Long Island DX Bulletin* **(W4UL/W2IYX)**, *DX News Sheet* **(Geoff Watts)**, *Long Skip* **(VE3FRA)**, and *DX'press* **(PA0TO)**.

All items **to reach G3FKM** no later than **30 May** for **July** issue, and by **27 June** for **August** please. □

HF propagation study

Predicted hpf + luf in megahertz for May 1980

	00	02	04	06	08	10	12	14	16	18	20	22
Suva (s)	2000	1800	2000	2300	2300	2400	2500	2500	2500	2500	2400	2200
Wellington (s)	2100	2100	2300	2400	2500	2600	2600	2200	2000	1900	2500	2200
Osaka	2112	2113	2413	2514	2616	2616	2715	2714	2913	2712	2512	2212
Hong Kong	2312	2313	2614	2716	2918	2918	3016	3014	3112	2908	2706	2308
Sydney (s)	2314	2317	2619	2721	2921	2918	2915	2713	2310	2006	2004	2308
Moscow	2004	1804	2105	2307	2409	2509	2509	2509	2608	2505	2303	2203
Bangkok	2310	2312	2814	3017	3019	3118	3117	3214	3311	3008	2705	2507
Singapore	2410	2312	2814	3017	3119	3218	3216	3313	3410	3107	2805	2506
New Delhi	2405	2307	2810	3012	3114	3215	3215	3312	3409	3106	2804	2504
Perth	2411	2314	3018	3221	3323	3321	3517	3315	2711	2506	2103	1906
Teheran	2404	2405	3008	3210	3312	3413	3512	3511	3609	3305	2902	2602
Colombo	2405	2408	3012	3215	3317	3418	3516	3514	3611	3306	2903	2603
Bahrain	2504	2505	3008	3310	3513	3514	3713	3612	3709	3405	3002	2802
Cyprus	2404	2305	2606	3008	3211	3312	3412	3411	3509	3205	2903	2703
Aden	2705	2707	3110	3512	3715	3816	4016	4014	3911	3608	3205	3004
Seychelles	2900	2700	3000	3500	3800	3900	4100	4000	4000	3500	3300	3000
Mauritius	2900	2300	3000	3600	3800	3900	4100	4200	4000	3700	3400	3100
Nairobi	2804	2905	3008	3611	3814	3915	4115	4313	4110	3706	3303	3002
Malta	2104	1904	1904	2406	2609	2710	2911	2810	2809	2706	2503	2303
Salisbury	3104	2705	2506	3711	3815	4016	4316	4315	4213	3907	3502	3202
Cape Town	2900	2000	1500	3500	3800	4000	4300	4400	4300	4000	3600	3100
Lagos	3205	3003	3002	3307	3813	3915	4315	4415	4314	4108	3604	3204
Suva (l)	3200	3100	3000	3100	3100	2900	3200	2200	2000	1900	3600	3200
Gibraltar	1902	1702	1702	1804	2106	2206	2407	2407	2306	2305	2202	2002
Ascension	3205	3103	3003	2508	3814	3816	4117	4418	4316	4011	3605	3205
Wellington (l)	3100	3000	2900	2800	2600	2200	1900	1900	1600	1900	3500	3300
Dakar	3206	3104	3004	2508	3813	3816	4116	4417	4316	4011	3606	3206
Las Palmas	2704	2603	2402	2305	3008	3210	3411	3412	3411	3409	3207	2906
Falklands	2007	1904	1704	1608	2114	2819	3822	4022	3921	3917	3613	3009
Rio de Janeiro	3106	3004	2904	2608	2213	3517	3819	4020	3919	3916	3612	3209
Buenos Aires	3106	2803	2704	2307	1812	3017	3620	3821	3820	3817	3514	3209
Sydney (l)	3012	2810	2509	2708	2910	2413	2118	2221	2022	1720	3017	3215
Lima	3000	2700	2500	2500	3000	2500	3300	3500	3500	3500	3500	3200
Barbados	3004	2602	2402	2405	2909	3012	3115	3316	3316	3414	3412	3208
Bogota	2900	2500	2200	2200	2800	2900	3000	3200	3300	3300	3400	3100
Jamaica	2800	2400	2200	2100	2500	2700	2900	3000	3000	3200	3200	3100
Bermuda	2800	2400	2100	2100	2400	2700	2900	3000	3000	3100	3300	3100
New York	2508	2206	2006	1808	2010	2412	2514	2615	2715	2814	2912	2910
Mexico	2500	2200	2000	2000	2400	2200	2700	2800	2800	2900	3000	2800
Montreal	2410	2109	2008	1710	2012	2314	2515	2516	2615	2714	2813	2811
Denver	2200	2000	1900	1700	1700	1800	2100	2300	2500	2500	2500	2500
Los Angeles	2000	1900	1800	1900	1700	1700	2000	2400	2500	2500	2600	2400
Vancouver	2000	1800	1800	2000	2000	2000	2000	2000	2200	2200	2500	2300
Iceland	1609	1408	1408	1709	1910	1910	2011	2011	2011	2011	2110	1809
Honolulu	2000	1800	1800	2000	2300	2300	2500	2200	2500	2400	2400	2200
Fairbanks	2000	1800	1800	2000	2300	2100	2100	2000	2000	2000	2000	2000

First two digits are hpf, last two luf. LUF 00 indicates data not available.

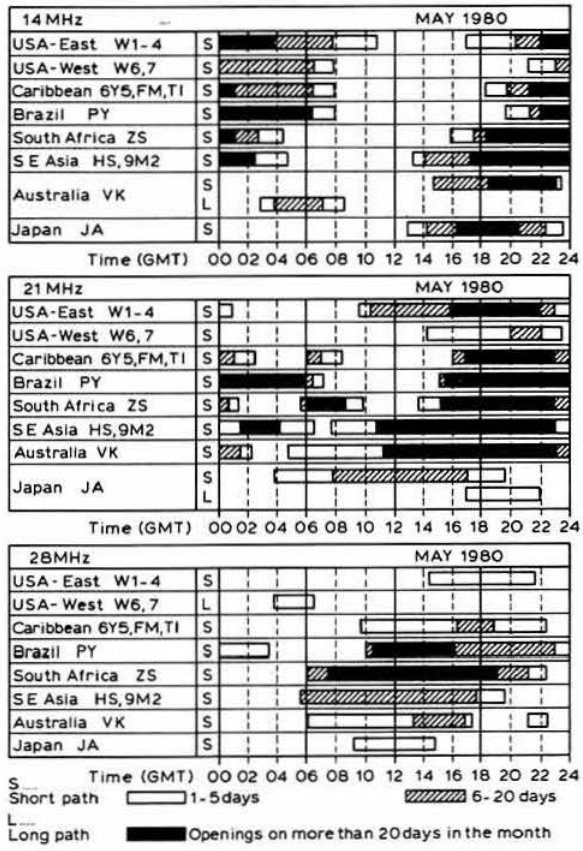
Propagation predictions

Summer conditions prevail in the ionosphere in May. In the northern hemisphere day-time frequencies are noticeably lower compared with winter, and the night-time frequencies also drop because of the shorter nights. The low day-time frequencies will be most pronounced on **28MHz**, and traffic with North America may only be possible on favourable days during a few afternoon and evening hours. This worsening condition will not be so noticeable in traffic with Africa and South America because the F2 mufs do not show any noticeable reduction in equatorial regions in the summer.

In contrast, the night-time frequencies will be higher than in winter, and this will lead to considerable improvement of dx conditions on **144MHz** during the night. Short-skip conditions usually start in May and they will facilitate contacts with Europe on **28** and **21MHz** with good results, but these conditions will be very sporadic. Changes of dx conditions on **21MHz** will be less severe, with traffic with eastern North America being possible on favourable days during the afternoon and evening, although it will most probably be best in the evening. The start of winter in the southern hemisphere will influence traffic with South Africa, with a break in traffic between 0200 and 0700; absorption is usually too high on this path during the middle of the day.

On **14MHz**, dx will first be possible with Asia and Australia in the afternoon, and later with North, Central and South America as well; traffic will be possible throughout the night until just after sunrise. With Australia, traffic will be possible during the afternoon and the first half of the night via the eastern path, and during the night-time to sunrise via the western path.

DX will be possible on **7MHz**, mainly when the whole path lies in darkness, but static and QRM will interrupt traffic. During the day this band will be most suited to local QSOs. Signals will be stronger, especially at midday, than on **3·5MHz**, although that band will provide good local traffic, and there will be no interruption by the dead zone in the second half of the night.



The provisional sunspot number for February 1980 was 159-3. The daily figures from the Swiss Federal Observatory show that the major sunspot activity was concentrated in the first and last weeks of February.

The predicted smoothed sunspot numbers for June, July and August are 140, 138 and 136 respectively.

CATALOGUE RECEIVED

Z & I Aero Services Limited. This two-volume catalogue covers the extensive range of items handled. This includes transmitting and receiving valves, magnetrons, klystrons, cathode ray tubes, semiconductor devices, test equipment and passive components. The range of transmitter valves includes such types as the QV06 40A and the type TY2 125. For those interested in the maintenance of older television and audio equipment, Z & I Aero Services offer a special package of 100 valves.

For further information please contact John Nightingale at the address below. The catalogue is obtainable by sending a postal order for 30p to Z & I Aero Services Ltd, 44a Westbourne Grove, London W2 5SF. Tel 01-727 5641/2/3, ext 27.

your opinion

NEW HF BANDS AND CONTESTS

The Editor
Radio Communication

Sir—As three additional hf bands are to be available to us in the foreseeable future, might it not be possible to shift all possible contests to these bands exclusively at weekends, leaving them free for general use at other times.

At the moment it is almost impossible to conduct a QSO on practically any hf band during 40 out of 52 weekends of the year, due to the existing band planning which allows contests to take over all available frequencies: to the exclusion of all other traffic.

At this early stage it should be possible, either by legislation, or by rational band planning, to achieve some degree of order to enable non-contestants to at least be able to keep their skeds, if nothing else.

B. S. Sutherland, G3IES

The chairman of the HF Contests Committee replies:

The ways in which the new frequency allocations are used will be determined by recommendations from IARU following discussions between member societies at their regional conferences. Additionally, some countries may decide to introduce their own licence restrictions. The only new band which is likely to be available, in the near future, is 10MHz, and as this allocation is only 50kHz wide it is likely that the amateur community will decide to voluntarily restrict operations in some way or other. The likelihood of them deciding to recommend that these very narrow allocations be used for contests is very remote.

Despite Mr Sutherland's remarks, there are only about 10 weekends of the year when major contests, of the type to which he refers, take place. None of these is multi-mode. Many of the remaining minor events attract only limited support. Many restrict the portions of the bands to be used; most run for only 24 or 36 hours, and many are single-band only. Is Mr Sutherland sure that his complaint is not really that he cannot rely on having exclusive use of the same sked frequency at the same time each week?

D. J. Andrews, G3MXJ

PCB TECHNIQUES

The Editor
Radio Communication

Sir—I read with interest the article by Cliff Sharpe, G2HIF, in your December issue concerning pcb techniques for the amateur. Being professionally engaged in electronics I have had access to all of the techniques described, but for the amateur who is not producing a lot of boards these methods suggested by the author can be expensive.

The method of drawing directly onto the copper board is passed over in the article as being suitable only for one-offs and low density. This conclusion is obviously reached from efforts with the ubiquitous Dalo pen. However, this is not the only or by any means the best pen available. For some time now I have been drawing directly onto the copper board using a Rotring Foliograph drafting pen, filled with "etching" type ink. These pens are available with a wide range of nib sizes, and I find 0·3, 0·5 and 1·0mm line-width nibs suitable for most layouts. As the pens are refillable and the nibs are replaceable, they last indefinitely. All the Rotring accessories are available from most good office suppliers, but note that the pvc-based etching ink can only be used in certain types of pen (eg the Foliograph). I find that with a good pen, as described above, the following pcb production technique gives very good results at a modest cost, ie under £10 for a basic kit of pen, ink, pcb, ferric chloride etc.

Method

1. Draw an accurate 1:1 master of the track layout; this is best done on good quality tracing paper, viewing the board from the components side. The drawing is then turned over to produce a view from the track side of the board. If several boards are needed, photocopies of the track side view are taken.

2. Clean and de-grease the copper board. Then stick the master or photocopy to the board with Sellotape.

3. Carefully spot all the hole centres with a sharp centre punch, then remove the artwork.

4. Drill through all the holes and remove burrs; drilling at this stage enables the second side tracks to be easily positioned when making double-sided boards. Use a piece of 0·1in Veroboard as a template for dil ics.

5. Join the "dots" using the drafting pen filled with special ink; use of a ruler at this stage greatly enhances the appearance of the finished board. Use the artwork as a guide as to which dots to join.

6. Leave the ink to dry for a few minutes before etching in ferric chloride, as usual.

7. Rinse the board and remove the ink with nail varnish remover, or Vim and a wet cloth.

The above method has been used by G8MCY for some time, and the only improvement made has been to use rub-down pads for the occasional large dil ic. Otherwise the method has been very successful, considering the cost.

M. Dannatt, G8MCY

G2HIF replies

I am quite sure Mr Dannatt's method of producing one-off pcbs has much to commend it. However, as I have no personal experience of the materials he recommends, I would not like to comment further.

In my article I was careful to say that the methods and materials I described were not necessarily the best, nor the only ones available to the amateur. Indeed, if the subject was to be covered in every detail, the already lengthy article would have to be expanded into a book.

It is true that I make only brief references to one-off techniques. By their omission I do not imply that they are necessarily unsuitable or unsatisfactory for amateur use. The many variants of these techniques are, in fact, well proven, well known and very popular. They merit, therefore, no more than a passing reference in an article which aims to show that professional practice can be adapted for amateur use without any serious reduction in the standard of the final product.

As an electronic engineer, I frequently have to modify experimental circuits during their development on pcbs. If the entire artwork had to be redrawn after each circuit change, I am quite sure that the cost of producing a final board would be prohibitive both in time and money for the amateur and professional alike.

The requirements of the constructor are not necessarily the same as those of the design engineer. As radio amateurs we are a little of both, and we are fortunate in being able to choose the diy techniques which are best suited to our particular needs.

Cliff Sharpe, G2HIF

HF RECEIVER PERFORMANCE

The Editor,
Radio Communication

Sir—We were very interested to read the review by G3SJX of the Trio TS120V transceiver in the December issue. We were, however, somewhat surprised at the third-order intermodulation characteristics of the receiver, which we do not feel measure up to the sort of performance expected of today's hf receivers. As a comparison, for a similar level of intermodulation product, we append the table below listing comparative figures for other receivers.

TS120V	+46dBμV for 0·1μV	G3SJX figures
FT7B	+52dBμV for 0·1μV	G3SJX figures
HW101	+69dBμV or 0·1μV	
Swan 100MX	+65dBμV for 0·1μV	
FT101	+58dBμV for 0·1μV	Measured by DJ2LR in *Ham Radio*
Racal RA1772	+77dBμV for 0·1μV	Claimed figures
HF marine specification	+59dBμV for 0·1μV	Published requirements
KW2000A	+57dBμV for 0·1μV	

Although the RA1772 figures are difficult to emulate, the performances of the HW101 and FT101 indicate that perhaps the more modern equipments are not as good as one would hope.

James M. Bryant, G4CLF
Peter E. Chadwick, G3RZP

AN INEXPENSIVE HIGH-Z ACCURATE TRANSISTOR VOLTMETER

The Editor
Radio Communication

Sir—It is suggested that readers should note that an instrument constructed in accordance with the article in the May 1979 issue of *Radio Communication*, as amended by the note in the November issue, will not necessarily meet the 2·5 per cent accuracy referred to in the article.

Further, the information published under "QTC" in the November issue—amending the calibrator with its unjustifiable accuracy claim—is incorrect. The words "Remove the Avo, and" must be deleted for "the voltage across R1 will be 100mV, ±1·25%", and the same claim in the previous paragraph to be accurate statements.

T. Lyell Herdman, G6HD

raynet

P. Balestrini, G3BPT *

The Society's "green book" gives the terms of reference of the emergency communications manager as:
1. The manager to assume responsibility for co-ordination of all forms of emergency communications by radio amateurs in the UK.
2. To be responsible, in conjunction with the Telecommunications Liaison Committee, for direct liaison with the Home Office and the Home Office radio regulatory department regarding conditions under which emergency communications can be provided.
3. To be responsible for the provision of suitable statements and papers for use on behalf of the Society nationally and internationally.
4. The manager to be directly responsible to Council and to be a member of the Raynet Committee but preferably not the chairman of that committee.

The co-ordination function is clearly carried out in conjunction with the Raynet Committee, and the emergency communications manager is currently surveying emergency communications provided by member societies of IARU Region 1 to establish if possible, a common approach to frequency and operational problems. At the time of writing, replies have been received from France, Cyprus, Norway, Italy, Malta and Switzerland. The full results and conclusions will be published in due course.

During the past 12 months there has been a continuous increase in the membership of Raynet (now running at around 3,200) coupled with a corresponding increase of enquiries to the emergency communications manager as to "how, when, and where" Raynet members, and radio amateurs at large, can provide communications for our user services, either disaster related or non-disaster related.

I therefore provide for the attention of all radio amateurs, Raynet members or not, a definitive statement of the regulations covering message handling under all circumstances:
1. Under the Amateur Licence para 1 (c), radio amateurs are permitted to use their station as follows:

> "to use the station as part of the self training of the licensee in communicating by wireless telegraphy, during disaster relief operations conducted by the British Red Cross Society, the St John Ambulance Brigade, the emergency county planning officer, or any police force in the United Kingdom, or during any exercise relating to such operations, for the purpose of sending to other licensed amateur stations such messages as the licensee may be requested by the said society, brigade, county planning officer or police force to send, and of receiving from any other licensed amateur station such messages as the person licensed to use such other licensed amateur station may be requested by the said society, brigade, county planning officer, or such police force to send".

2. Under a *letter of authorization* from the Home Office (held by the RSGB emergency communications manager), *Raynet* is allowed to participate at county shows and similar functions . . .

> ". . . we had considered the request that the Radio Amateurs' Emergency Network (Raynet) should be allowed to extend the scope of its activities and, because we see certain advantages in having a healthy, well-controlled organization such as this, we could agree in principle to its participation at county shows and similar functions . . ."

3. Under a *letter of authorization* from the Home Office (held by the RSGB emergency communications manager), *Raynet* is allowed to provide communications to the shore during oil pollution emergencies . . .

> ". . . these communications will be made at the request of the emergency planning officers and will be limited to within two miles offshore. Please note this does not permit Raynet participation in any oil pollution *exercises* on the sea".

4. For (2) the emergency communications manager requires notice of at least one month before the event, giving the title, location and duration of that event, together with a copy of the letter from the user service requesting Raynet assistance and the name of the responsible Raynet officer and his Raynet group. Subject to these items being satisfactory the emergency communications manager will issue written permission.

Under no circumstances will permission be given for motor rallies, motor cycle scrambles or similar events. These are specifically excluded.

It is hoped that the above information will help controllers and members in their deliberations with the user services when considering "non-disaster" events. It is appreciated that refusal causes disappointment, but refusal is far better made at the outset rather than after prolonged correspondence with "higher authority"!

Thank you all for your continued interest in Raynet and community service, I wish you every success in any future operations.

* "Merrivale", Willow Walk, Culverstone, Gravesend, Kent.

obituaries

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

Mr R. G. H. Baker, ZL2BHB/G3IRB
Dick Baker died on 26 February. Originally licensed as G3IRB, he obtained his ZL callsign when he emigrated to New Zealand in 1973. He was a keen and active radio amateur in the Ealing area, and was always willing to give help to newcomers.

Mr M. Dilworth, G4FEW
Malcolm Dilworth died on 10 March. Although not regularly heard on the air, he was valued by the Bury RS, of which he was a member, as one of its "behind-the-scenes workers", and had been the club librarian for two years.

Mr A. R. Low, GM3GUI
Alex Low died on 12 March. He was a life member of the RSGB, and also a member of Dundee Kingsway Technical College RC. Until his death he was active on the hf and vhf bands.

Mr A. Meadows, G3TQK
Mr Meadows, who died on 19 February, was very active on 1·8 and 3·5MHz. Despite being a "white stick" operator, he was always ready to encourage newcomers and young people interested in taking up amateur radio.

Mr W. O'Brien, EI6N
Bill O'Brien died on 28 January. His callsign was one of the original single-letter allocations and, until prevented by ill-health, he was active on most bands.

Mr C. F. Newton-Wade, VK4QW, RS38089
Mr Newton-Wade, who died on 3 March, aged 84, had been a member of the RSGB for many years, and was born in Shepton Mallet, Somerset. He was a friend of Mr Kemp, who was involved in the first Marconi transatlantic tests.

He was operational in London from 1912 to 1914, then as NWX in Jesselton, Sarawak, before returning to Portsmouth as 5PC in 1923. He returned to Jesselton as VS4A until 1932; was ZC5NW in Sandakan, North Borneo, and VK2AXW in Sydney, NSW, in 1955–8. He was with the TVQ9 station from the commencement of television in Queensland until his retirement. He was operational with the Queensland Coral Coast Amateur Radio Net until a few days before his death.

Mr G. T. Peck, MBE, RS15402
Geoffrey Peck, who died on 12 March, aged 76, was president of the Mid-Thames Radio Direction Finding Club. He was well known for the hamfests he organized while technical director of Ernest Turner Electrical Instruments at High Wycombe. His long interest in df started in 1928, in competitions organized by the Slade Radio Society, and until three years ago he was the RSGB national organizer for df contests. He was the only RSGB member to have been awarded the Founders Trophy on two occasions in recognition of his services to amateur radio.

Mr H. W. Powell, GW3HUM
Mr Powell died on 17 March. He had not been active for many years due to illness.

Mr A. Robinson, G3MDW
Arthur Robinson died on 24 February. He was particularly interested in JOTA, for which he had the special callsign G3MVH, was a supporter of top band a.m. working, and enjoyed dx and the local late-night top band nets.

He helped to form the Northern Heights ARS in 1961, and was both its secretary and treasurer for over 15 years. He was also associated with the RAIBC for some years. Despite being seriously disabled he was able to fulfil an ambition and visit Stew Perry, W1BB, whose long association with Arthur and the NHARS led to the production of the W1BB type/slide lectures.

Mr J. W. Russell, G2ZR
John Russell, who died on 6 January, had for many years been a QSL Bureau sub-manager, before being forced to retire in late 1979 due to ill-health. He was a keen radio amateur until his death.

Mr J. Sheldon, RS41897
John Sheldon died on 22 February. He became interested in amateur radio about two years ago, and was an avid swl. He had begun the RAE course, but was forced to abandon it due to ill-health. He was a member of the Walsall ARC.

Mr A. P. H. Shepherd, G4EUP
Pip Shepherd died on 18 February, aged 59. He was an active member of the South Manchester RC, and was regularly to be found on the 3·5MHz net.

Mr J. L. Twatt, GM3CCK
John Twatt, who died on 14 February, aged 69, was a well-known and respected amateur in the Orkneys. He was always willing to aid young people beginning in amateur radio, and was well known on 3·5 and 432MHz.

Mr H. J. Wadley, G8LV
Harry Wadley, who died in November 1979, was frequently heard on phone, although his main interest was in cw. After the first world war he manufactured the Wadleyphone. His amateur licence dated from 1923, when he also took out foundation shares with the BBC. During the last war he was a prominent voluntary interceptor. He was active on the hf bands until his death.

Mr P. R. Whitacker, G3ZHN
Paul Whitacker died on 21 March. Although he had not been very active recently, due to illness, he had many friends on 3·5 and 21MHz, and quite a few amateurs owe their success to the help he was able to offer.

We have also been advised of the deaths of:

Mr G. W. Airey, RS18680, on 8 March;
Mr F. T. F. Booth, RS35061, in January;
Mr T. D. Bridgman, G3YHL;
Mr M. Carlile, RS41385, in June 1979;
Mr J. J. Managhan, G5SB, on 11 August 1979, aged 72;
Mr H. B. F. Powell, G8CFN, in late November, 1979.

Mobile rallies calendar

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

18 May—Northern Mobile Rally. Victoria Park Hall, Keighley. Open from 11.30am.–5.30pm. Talk-in stations will be operating on 144MHz fm S22 and 432MHz fm SU8. There will be trade stands, children's films, and bar and refreshments will be available. Details from G8DFZ, QTHR.

18 May—Mid-Ulster RSGB Group Parkanaur Rally. Trade stands, bring and buy stall, and many attractions for all the family. Further details from B. Edmondson, GI8RGW, tel Armagh 524453, after 7pm.

25 May—Plymouth Radio Club Rally, Tamar Secondary School, Plymouth, Devon. The route will be well signposted. Talk-in and demonstration stations will be on hf, 144 and 432MHz, special callsign GB2PRC. There will be trade stands, raffles, lucky dip, programme prize, Raynet, Devon Emergency Volunteers, and rtty, plus demonstrations of various kinds. Further details from G4GWJ, QTHR.

25 May—East Suffolk Wireless Revival, Foxhall, Nr Ipswich, Suffolk. All usual attractions, plus improvements, as well as transceiver clinic, antenna testing range, trade stands, and a special event station, GB4SWR, which will be set up on 24 May to operate on the next day. Further details from Jack Toothill, G4IFF, QTHR.

1 June—Hull & D ARS Mobile Rally, Hull University. Would traders please contact G8EAH, QTHR, for details of discounts for advanced booking. Further details nearer the date.

1 June—Sussex Mobile Rally, Brighton Racecourse, Brighton, Sussex. Free car parking, close to main buildings. There will be talk-in stations on 432, 144 and 3·5MHz, and a special QSL card will be available to callers at the station, which will be using a special GB callsign. Attractions will include the usual trade stands in covered accommodation (most of the well-known traders will be present), and demonstrations by specialized groups covering subjects such as Raynet, amateur television, rtty, satellite communications, microwaves and repeaters. It is also planned to have a working amateur radio station to interest the more uninitiated. There will be dog handling and gymnastic displays, police and Post Office stands, a bring and buy stall, lucky dip, yl stall, and lucky programme draw. A free mini-bus will take people to and from Brighton Beach.

This rally is a first for Sussex, and it is intended to make it an overwhelming success. For further details contact the hon sec, Sussex Mobile Rally, 7 Dale Crescent, Patcham, Brighton, Sussex BN1 8NT, tel Brighton 693655 ext 2266 (office hours)

1 June—East Anglia Radio Amateurs Picnic, East Anglian Transport Museum, Nr Lowestoft. Further details from G3LYX, QTHR.

8 June—Elvaston Castle Mobile Rally, Elvaston Country Park, five miles south east of Derby on B5010. Talk-in by GB2ECR on 144 and 432MHz. All the usual attractions, including family entertainment. Admission free. Car parking charge (by local authority) 30p. Organized by Nunsfield House Radio Group, Derby. Further details from I. Cage, G4CTZ, tel Derby (0332) 71875.

15 June—RNARS Mobile Rally, HMS *Mercury*. 10am to 5pm. All usual trade stands and many attractions for the family. Further details from Wally, G4DIU, QTHR, tel 0705 479464.

29 June—Longleat Mobile Rally, Longleat Park, Warminster. Trade stands, RSGB bookstall, bring and buy stand, plus the facilities of Longleat Park for the family. Special event station GB3LMR will be operating on vhf and hf from Friday 27 June, with talk-in on S22. Special Longleat QSL cards will be sent as acknowledgement. Further details from G4FRG, QTHR.

13 July—Upton Mobile Rally, Upton-on-Severn, Worcs. Further details from G8NSL, QTHR, tel Worcester 620507.

13 July—The Knowlsley Safari Park Rally, which was to have been held on this date, has been cancelled due to clash of date with the Upton Mobile Rally.

20 July—Cornish RAC Mobile Rally. The Technical College, Cambourne, Cornwall. Further details from G4BHD, QTHR, or G3VGO, QTHR, tel Truro 864255.

20 July—RAIBC Picnic, Broadlands, Romsey, Hants. Further details from G4COM, QTHR, tel Fair Oak 3017.

27 July—Scarborough ARS Mobile Rally, Technical College, Scalby Road, Scarborough. Further details from G4JAQ, 43 Broadlands Drive, East Ayton, Scarborough, N Yorks YO13 9ET, tel Scarborough 862638.

3 August—RSGB National Mobile Rally, Woburn Abbey. Details from N. Miller, G3MVV.

10 August—Derby Radio Rally, Lower Bemrose School, St Albans Road, Derby. Open at 11am. Admission and parking free. All the usual attractions. Details from Jenny Shardlow, G4EYM, QTHR, tel 0332 56875.

24 August—Torbay ARS Rally. Further details from Mrs Ged Coker, c/o G4FCN, QTHR, tel Ipplepen 812117.

7 September—Vange ARS Mobile Rally, Nicholas School, St Nicholas Lane, Basildon, Essex. Details from G4FMK, QTHR.

7 September—Telford Amateur Mobile Rally, Telford town centre, Salop. Excellent indoor venue, with full facilities as previous years. Further details from G3UKV, tel Telford 55416; G8DIR, tel Shrewsbury 64273; or G8UGL, tel Telford 584173; (all QTHR).

28 September—Harlow & D ARS Mobile Rally, Nettleswell Comprehensive School, Harlow, 10am. Details from P. Turner, G4IJE, Gladwin Cottage, The Street, Sheering, Bishops Stortford, tel Sheering 482.

contest news

February 432MHz Fixed Contest results

The number of contestants was down on last year, no doubt due to the bad weather and to active stations not sending in their logs. The main activity was in the south, tailing off to a line from the Mersey to the Humber. Conditions varied from well below average to rock bottom with occasional ducting on a broad front of E-W direction. Normal signals from the Continent into East Anglia were virtually non-existent. Power used, antenna system and dx in kilometres are quoted to illustrate the use of QRO under difficult propagation conditions.

In addition to his 427 and log, J. Burden, G3UBX, in YM40G, submitted a most interesting set of print-outs on best dx/time, hourly scoring, percentage points per QSO, contact scoring, direction and number of contacts centred on his QTH. The adjudicator's analysis shows ESE to SE between 1000 and 1100 to have provided the highest contact/points scoring rate, but 1400-1500 gave the best points per QSO rate.

Certificates go to the winners and runners-up in the two sections. Thanks to G5DS for his check log. *G8ACJ*

MULTI-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Pwr	Ant	Km
1	G3NNG	630	105	ZL23	200	21Y	–
2	GJ41CD	423	41	YJ70	400	21Y	613
3	G8LGL/A	416	69	YN47	180	18Q	315
4	G8NDT/A	400	96	ZN64	120	18Y	312
5	G8GXE	167	65	ZL48	150	19Y	276

SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Pwr	Ant	Km
1	G4BEL	416	80	AM51	400	88E	386
2	G3XDY	352	59	AM76	250	21Y	444
3	G3UBX	316	68	YM40	300	2×88	376
4	G3DY	311	59	ZM40	300	21Y	425
5	G4CQR	298	81	ZL49	100	2×21Y	422
6	GD2HDZ	270	24	XO68	400	18Y	440
7	G8DKK	245	65	ZL08	50	21Y	372
8	G6GN	232	35	YL48	40	21Y	–
9	G3YTE	225	55	AL13	150	48E	425
10	G3WHK	202	68	ZL49	100	2×88	420
11	G8FMG	154	51	ZM78	300	21Y	346
12	G8KAX	148	52	AL32	35	20Y	431
13	G3PBV	128	16	YK32	50	2×10Y	371
14	G3ZOI	124	44	ZL38	–	19Y	–
15	G8OPR	103	21	ZL63	100	18Y	262
16	G5UM	100	37	ZM35	10	14Y	260
17	G8GLQ	94	18	YL48	400	48E	275
18	G8BKK	89	39	AL52	2½	46E	150
19	G3BPM	87	43	ZL48	50	80E	190
20	G4IZL	75	25	YN58	10	48E	220
21	G4HFO	62	10	YK03	10	48E	335
22	G3LXY	50	22	ZL09	50	8Y	108
23	G4GGV	43	29	ZL37	40	46E	144
24	G8CTT	41	24	AL41	10	46E	130
25	G8RNM	40	29	ZL39	10	2m6Q	105

Cumulative Training Contests results

The first series of cumulative training sessions/mini-contests, held in January, seems to have been well received by all those who took part. Analysis of the logs shows that nearly 100 different stations were active in one or more of the eight sessions. Of this number, 34 sent in logs for checking, and many of these covered activity in three or more of the periods on both the 3·5 and 1·8MHz bands. Clubs were not very well represented, although Stockport managed to get eight of their members on the air during the 3·5MHz sessions and four during the 1·8MHz periods. Edgware were next with three members on the air for both bands.

Most entrants sent in letters or wrote comments on their log sheets. A number of useful suggestions were made and these will be considered at an early meeting of the HF Contests Committee. Almost everyone said that they enjoyed the sessions and asked for a repeat. There were complaints about lack of activity and many thought that there had been insufficient pre-event publicity, and that there should have been some incentive, such as a certificate, to encourage more entrants, particularly on 1·8MHz. While a few operators asked for longer or shorter sessions, most seemed to think the dates, timing and length of sessions were about right.

Unfortunately publication space precludes the listing of all the comments, but the following are typical:

"I would like to thank the RSGB for the best idea in years. Apart from its declared purpose, the short activity periods enabled those amateurs, who, for a variety of reasons, are unable to spend 24 hours on the air for a conventional contest, to take part. Please organize another set of periods soon" — *GW3SB.*

"Enjoyed the activity periods very much in this my first attempt at anything approaching contest operation. Please do it again" — *G4GLC.*

"For a new op, the cumulatives are a good idea to help us G4s to get our feet wet. Enjoyed them very much and thank the experienced lads who QRSd for me when I lost my cool. Please, please let us have some more of these practice sessions" — *G4--- (anon by request).*

The HF Contests Committee is very grateful for all the comments and thanks everyone who took part. *G6LX*

3·5MHz

Callsign	Total score (best two sessions)	No of sessions	Club
G3WPF	98	2	Stockport
G3JKS	91	2	
G4HIU	91	2 (+1·8MHz)	Stockport
G4GLC	89	2	
G4DDL	88	4	Bracknell
G3NOM	85	3 (+1·8MHz)	Stockport
G4BUO	83	4 (+1·8MHz)	
G3YMC	82	4 (+1·8MHz)	Bracknell
G3SNX	81	2 (+1·8MHz)	Stockport
G3NKS	80	4 (+1·8MHz)	Cheltenham
G3GC	80	4 (+1·8MHz)	Edgware
G3FYE	80	2 (+1·8MHz)	Stockport
G3TVW	78	4 (+1·8MHz)	
G6LX	78	2	SRCC
GW3SB	73	2	
G3OLU	59	3	
G4IAL	56	2	Stockport
G3SJE	54	2 (+1·8MHz)	Edgware
G3BPM	54	2 (+1·8MHz)	
G3AWR	52	4	
G4ECI	50	2	Stockport
G4FPA	49	2 (+1·8MHz)	
G2HLU	49	4	
G4HVC	47	2	
G3ZDW	46	3	Lincoln
G3SVL	45	2	
G4HMD/A	36	2 (+1·8MHz)	Edgware
G4HXB	28	2	Stockport
G4IVJ	11	1 (+1·8MHz)	Bromsgrove
G4GFO	Check log	1	

1·8MHz

Callsign	Total score (best two sessions)	No of sessions	Club
G4BUO	74	3 (+3·5MHz)	
G3GC	73	3 (+3·5MHz)	Edgware
G3SJE	69	3 (+3·5MHz)	Edgware
G3YMC	67	2 (+3·5MHz)	Bracknell
G3SNX	64	2 (+3·5MHz)	Stockport
G4CNY	61	4	
G3BPM	58	4 (+3·5MHz)	
G4HIU	51	2 (+3·5MHz)	Stockport
G4FPA	49	2 (+3·5MHz)	
G4HMD	43	2 (+3·5MHz)	Edgware
G3TVW	34	3	
G3VPS	33	2	
G4HFT	31	2	
G3NOM	30	1 (+3·5MHz)	Stockport
G3NKS	17	2 (+3·5MHz)	Cheltenham
G3FYE	15	1 (+3·5MHz)	Stockport
G4IVJ	9	1 (+3·5MHz)	Bromsgrove
G6LX	Check log	1 (+3·5MHz)	

RSGB SSB Field Day/IARU Region 1 HF Phone Field Day 1980 rules

During the past two years or so, discussions have taken place within IARU Region 1 with the aim of producing a common set of rules for hf field days. The principal reason behind this was the idea that if all competing stations operated under the same conditions national results could be directly compared and a results table covering the whole of Region 1 could be published. A secondary reason was the move to develop and expand the separate ssb field days organized by DARC and the RSGB into a more co-operative event similar to the cw field day (ie NFD) which currently commands widespread support throughout Europe.

A set of rules for an hf phone field day, formulated by representatives from DARC, RSGB and USKA (the Swiss national society), has been

endorsed by the Region 1 Executive Committee for use in 1980 prior to formal adoption by the next IARU Region 1 Conference in 1981.

The set of rules is essentially a framework of standard conditions which, as far as possible, slotted into existing field day rules. In the case of the RSGB, the major change since last year involves the scoring system, which under the new IARU rules is designed to encourage contacts between competing portable stations within Region 1. The only other significant alteration is to the restricted section, where entrants are now limited to 200W p.e.p. input, which corresponds to the power rating of many popular, commercially available transceivers.

The RSGB HF Contests Committee fully supports the move towards common rules within Region 1 (indeed it could be argued that it sowed the seed for such a move), and it firmly believes that the new rules set out below will have a wide appeal. Comments are very welcome, and should be included with the logs or addressed to: The Chairman, HF Contests Committee, c/o RSGB HQ.

1. Eligible entrants. Members or groups of members of the RSGB located in the British Isles.

2. The general rules for RSGB hf contests, published in the January 1980 issue of *Radio Communication*, will apply.

3. Period. 1500gmt Saturday 6 September to 1500gmt Sunday 7 September.

4. Sections.

(a) Open. Multi-operator, maximum licensed power. Equipment: one transmitter and one receiver, or one transceiver, plus an additional receiver if desired. Antenna: no restriction.

(b) Restricted. Multi-operator, 200W p.e.p. input maximum. Equipment: only one transmitter and one receiver, or one transceiver. Antenna: only one antenna may be used which must be a single element such as a dipole, long wire, W3DZZ, or trapped vertical, having not more than two elevated support points. No part of the antenna may be higher than 15m above ground level.

Notes (these apply to both sections).

(*i*) Stand-by equipment is allowed, but it may not be connected at the same time as the main equipment.

(*ii*) The use of support points for antennas from permanent buildings or structures is not permitted.

5. Location. Each portable station must operate from the same site for the duration of the contest and may not be located in a permanent building or use public mains supply.

6. Power. Power for all equipment may be derived only from a portable generator on the site, accumulators, or batteries.

7. Installation. No equipment or antennas may be installed or erected on the site prior to 24 hours before the start of the contest. This does not apply to the storage of equipment.

8. Contacts. Phone only in the 3·5, 7, 14, 21 and 28MHz bands.

9. Contest call and exchange. Call "CQ Field Day". Exchange RS plus serial number starting with 001.

10. Scoring.

(a) QSO with a fixed station in IARU Region 1 ..... 2 points

(b) QSO with any station outside IARU Region 1 ..... 3 points

(c) QSO with a portable or mobile station in IARU Region 1.... 5 points

See Appendix for list of IARU Region 1 countries.

11. Multiplier. Each DXCC country worked on each band gives one multiplier.

12. Final score. The total points scored on all bands is to be multiplied by the total number of different countries worked on each band to give the final score (ie total QSO points × multiplier = final score).

13. Logs. Separate logs are required for each band, together with a check list showing the countries worked on each band. Log sheets are to be headed: date/gmt; station worked; RS and serial number sent; RS and serial number received; operator; new country/multiplier; points. RSGB HF Contest Log Sheets should be used.

14. Declaration. Logs must be accompanied by an RSGB HF Contest Cover/Summary Sheet with the declaration signed by the person responsible for the contest entry.

15. Address for logs: RSGB HF Contests Committee, PO Box 73, Lichfield, Staffs, WS13 6UJ.

16. Deadline for logs: postmarked not later than the Monday 15 days after the end of the contest.

17. Awards. The leading station in the Open Section will receive the Northumbria Trophy. The leading station in the Restricted Section, and the entrants placed second and third in each section will receive certificates of merit. Certificates will also be awarded to the stations submitting the leading check log from each continent.

IARU Region 1 will award certificates to the top 10 stations in each section in the combined results table.

Appendix

IARU Region 1 countries include those in Europe, Africa, USSR, Mongolia, ITU Zone 39. For a precise definition refer to the RSGB *Amateur Radio Operating Manual.*

HF NFD 1980

The HF Contests Committee regrets that due to a reduction in the time available for checking logs this year, the adjudicators will not be able to meet the deadline for publication in the September issue of *Radio Communication*. Results should be available from RSGB headquarters by the middle of August, and groups wishing to receive a copy should enclose a stamped addressed envelope with their entry.

21/28MHz Telephony Contest 1980 rules

TRANSMITTING SECTION

Licensed amateurs and swls throughout the world are invited to take part in this contest. Log and cover sheets may be obtained from: RSGB, 35 Doughty Street, London WC1N 2AE. UK members should enclose a large stamped, self-addressed envelope.

The general rules for RSGB hf contests, published in the January 1980 issue of *Radio Communications,* will apply.

1. Eligible entrants. British Isles: RSGB members only.
Rest of world: All licensed amateurs.

2. Period. 0700gmt to 1900gmt on 12 October 1980.

3. Section. Single-operator only.

4. Bands. 21MHz and 28MHz only.

5. Exchange. RS plus serial number starting at 001.

6. Scoring.

(a) British Isles stations for a contact with a station in the rest of the world will score three points. The RSGB countries list will apply with VE, VK, W/K/N/A, ZL and ZS call areas counting as countries for this purpose.

(b) Stations in the rest of the world for a contact with a station in the British Isles will score three points.

British Isles stations may not work each other for points or multipliers, and stations in the rest of the world must only contact stations in the British Isles.

7. Multipliers. The total number of countries contacted on 21MHz *added* to the total number of countries contacted on 28MHz, then multiplied by the total of points scored on the two bands.

Multipliers for the rest of the world stations will be the total number of different G prefixes worked on 21MHz *added* to the number of different G prefixes worked on 28MHz, then multiplied by the total of points scored on the two bands.

British Isles prefixes are: G2, G3, G4, G5, G6, G8, GD2, GD3, GD4, GD5, GD6, GD8, GI2, GI3, GI4, GI5, GI6, GI8, GJ2, GJ3, GJ4, GJ5, GJ6, GJ8, GM2, GM3, GM4, GM5, GM6, GM8, GU2, GU3, GU4, GU5, GU6, GU8, GW2, GW3, GW4, GW5, GW6 and GW8. Contacts with GB stations will not count for points or multipliers.

8. Logs. Log sheets to be headed: Date/gmt; station worked; RS and serial number sent; RS and serial number received; multiplier; points claimed; separate logs are required for each band. *Summary sheet showing multipliers worked on each band must be submitted.*

9. Declaration. Each log must be accompanied by the following declaration: "I declare that my station was operated in accordance with the rules of the contest, and in accordance with the requirements of my amateur radio licence." The declaration must be signed and dated.

10. Address for logs. RSGB HF Contests Committee, c/o M. Harrington, 123 Clensham Lane, Sutton, Surrey SM1 2ND, England.

11. Closing date for logs. British Isles entrants should ensure their entry is received by 12 November 1980. Overseas entrants should submit their entries to arrive not later than 1 December 1980.

12. Awards. The Whitworth Trophy will be awarded to the leading British Isles entrant overall, and the Powditch Trophy will be awarded to the leading British Isles entrant on 28MHz. Certificates will be awarded to those placed second and third overall. Certificates will be awarded to those placed first, second and third in the rest of the world.

RECEIVING SECTION

Rules as transmitting section except as superseded below.

1. The general rules for RSGB hf receiving contests, published in the January 1980 issue of *Radio Communication,* will apply.

2. Eligible entrants. British Isles: RSGB members only.
Rest of world: All swls.

3. Scoring. British Isles swls should log only overseas stations in contact with British Isles stations participating in the transmitting section of the contest.

SWLs in the rest of the world should log only British Isles stations in contact with overseas stations taking part in the transmitting section of the contest.

Points scored by all swls will be as in the transmitting section.

4. Multipliers. As transmitting section.

5. Logs. Log sheets to be headed: date/gmt, callsign of station heard,

RS and number sent by station heard, callsign of station being worked, bonus points, QSO points. *A summary sheet showing multipliers heard on each band must be submitted.*

NOTE: In the column headed "Station being worked" the same callsign may only appear *once* in every *six* contacts logged.

6. Declaration. Each log must be accompanied by the following declaration: "I declare that this station was operated within the rules of the contest and I do not hold a transmitting licence in any country of the world."

7. Address for logs. As transmitting section.

8. Closing date for entries. As transmitting section.

9. Awards. The Metcalfe Trophy will be awarded to the leading British Isles entrant. The Powditch Receiving Trophy will be awarded to the leading British Isles entrant on 28MHz. Certificates will be awarded to those placed second and third overall. Certificates will be awarded to those placed first, second and third in the overseas section.

RSGB European Meteor Scatter Contest rules

1700gmt 11 August to 1700gmt 12 August 1980

Covering the 144 and 432MHz bands.

All entries and checklogs to VHF Contests Committee, c/o Mr C. Sharpe, G2HIF, 20 Harcourt Road, Wantage, Berks OX12 7DQ.

The following general rules, published in the January 1980 issue of *Radio Communication,* will apply: 1, 2, 4b, 5a, 6a, 10a, 13-22.

Additional rules

(a) All operators in the British Isles must be members of the RSGB or have a membership application in progress.

(b) All contacts must be made via the meteor scatter mode of propagation.

(c) On each band, the scoring is at 1pt per km with a multiplier of two for each new QTH locator (big square) worked. On 432MHz an additional total multiplier of 15 will apply. The final score will be the sum of the scores for the two bands.

(d) The contest exchange shall consist of:
- (*i*) both callsigns;
- (*ii*) a standard two-figure ms report;
- (*iii*) the first two letters of the QTH locator, eg ZL.

(e) Conventional (IARU) operating procedures will be used.

(f) Log keeping. Entrants must keep their own logs in accordance with licence requirements. The following information shall be recorded on the contest log:
- (*i*) date and time of start of QSO;
- (*ii*) date and time of finish of QSO;
- (*iii*) callsign of station worked;
- (*iv*) report sent;
- (*v*) report and locator received;
- (*vi*) number of bursts and pings received;
- (*vii*) points and multiplier claimed.

(g) Contacts must take place directly upon the band in use, without recourse to any other communication medium. There is, however, no objection to scheduled contacts being arranged.

DF Qualifying Event Rugby

Date: 1 June 1980.
Map: OS Sheet 152, 1:50,000 series, Northampton and Milton Keynes.
Assembly: 1300bst for start at 1320bst.
Location: Salcey Forest, ngr 812 509.

Competitors requiring tea are asked to notify Mr D. E. Newman, Haynes House, 78 High Street, Whittlebury, Towcester, Northants NN12 8XJ; (Tel 0327 857 350), by 25 May.

DF Qualifying Event Chelmsford/Colchester

Date: 15 June 1980.
Map: OS Sheet 168, 1:50,000 series, Colchester and the Blackwater.
Assembly: 1300bst for start at 1320bst.
Location: Layer Breton Heath, ngr 944 187.

Competitors requiring tea are asked to notify Mr D. Brocks, 30 Rowan Drive, Heybridge, Maldon, Essex; (Tel 0621 55707), by 8 June.

DF Qualifying Event Burton-on-Trent

Date: 29 June 1980.
Map: OS Sheet 128, 1:50,000 series, Derby and Burton-on-Trent.

Contests calendar

10-11 May	USSR "M" *(Rules in May issue)*
11 May	WAB CW *(Rules in March issue)*
11 May	DF Qualifying Event Mid-Thames *(Rules in April issue)*
18 May	10GHz Cumulative *(Rules in May issue)*
24-25 May	CQ WW WPX CW *(Rules in March issue)*
24-25 May	Ibero-American *(Rules in April issue)*
25 May	144MHz Low Power *(Rules in April issue)*
1 June	70MHz and SWL *(Rules in April issue)*
1 June	DF Qualifying Event Rugby *(Rules in May issue)*
7-8 June	NFD *(Rules in February issue)*
15 June	DF Qualifying Event Chelmsford/Colchester *(Rules in May issue)*
22 June	WAB (Phone) *(Rules in March issue)*
22 June	10GHz Cumulative *(Rules in May issue)*
28-29 June	Summer 1·8MHz *(Rules in May issue)*
28 June	AGCW-DL *(Rules in April issue)*
29 June	DF Qualifying Event Burton-on-Trent *(Rules in May issue)*
1 July	Canada Day *(Rules in May issue)*
5-6 July	VHF NFD *(Rules in April issue)*
13 July	DF Qualifying Event Salisbury
20 July	3·5MHz Field Day
20 July	WAB CW *(Rules in March issue)*
20 July	10GHz Cumulative *(Rules in May issue)*
3 August	144MHz QRP and SWL
5 August	DF Qualifying Event South Manchester
11-12 August	Meteor Scatter *(Rules in May issue)*
16 August	10th SARTG WW RTTY
17 August	70MHz Trophy and SWL
17 August	DF Qualifying Event Slade
24 August	10GHz Cumulative *(Rules in May issue)*
31 August	WAB VHF *(Rules in March issue)*
6-7 September	SSB Field Day *(Rules in May issue)*
6-7 September	144MHz Trophy and SWL
14 September	DF Final Dartford Heath
21 September	10GHz Cumulative *(Rules in May issue)*
27 September	AGCW-DL *(Rules in April issue)*
4-5 October	432/1,296/2,304MHz and SWL
12 October	21/28MHz *(Rules in May issue)*
19 October	21MHz CW
19 October	70MHz Fixed
November-December	432/1,296MHz Cumulative
2 November	144MHz CW
8-9 November	Second 1·8MHz
7 December	144MHz Fixed

Assembly: Top of Buttermilk Hill, approximately 8 miles NW of Burton, ngr 108 282.

Competitors requiring tea should notify Mr R. Parsons, School House, Newborough, Burton-on-Trent; (Tel 028 375 496), by 22 June.

Summer 1980 1·8MHz Contest rules

1. The general rules for RSGB hf contests, published in the January 1980 issue of *Radio Communication,* will apply.

2. **When.** 2100gmt Saturday 28 June to 0100gmt Sunday 29 June.

3. **Eligible entrants.** All radio amateurs licensed to use 1·8MHz. Multi-operator or single-operator entries will be accepted. There will be two sections:
   - **(a)** British Isles stations (single- or multi-operator);
   - **(b)** Overseas stations (single- or multi-operator).

4. **Contacts.** CW(A1) only in the 1·8-2MHz band. County code (three letters), as published in the January 1980 issue of *Radio Communication,* must be sent by all British Isles entrants after the report/serial number. Overseas entrants will only send report/serial number.

5. **Scoring.**
   (a) British Isles stations. Three points for each contact, with a bonus of five points for the first contact with each new British Isles county, and for the first contact with each new country outside the British Isles.

(b) Overseas stations. Three points for each contact with a station in the British Isles (not EI), with a bonus of five points for the first contact with each new county.

6. Logs. Column 5 to be headed "Code received". The county code as sent must be shown on the top of each log sheet. Entries must be addressed to the RSGB HF Contests Committee, c/o R. S. Unsworth, 105 Clarendon Road, Hazel Grove, Stockport SK7 4NS.

7. Awards. The winner, and second and third placed entrants in each section will receive a certificate of merit.

10GHz Cumulative Contest rules

0900–2000gmt 18 May, 22 June, 20 July, 24 August, 21 September. All entries and check logs to: VHF Contests Committee, c/o Dr C. W. Suckling, 31 Oakwood Road, Chandler's Ford, Hants SO5 1LW.

This contest will be a cumulative event, with three activity periods to count towards the final score. Entrants unable to be active for three periods are strongly encouraged to send in logs as a record of their activity, but will not be eligible for an award. Such logs will be included in the table of results.

During each activity period a station may change location once (see general rule 5b). For the purposes of the contest, the "location" is defined as any point within 5km of a fixed point. Contestants may start from a new location for each activity period.

To stimulate activity abroad on these dates, entries to this contest will be accepted from stations outside the UK, whether or not they are RSGB members. Stations operating inside the UK must list on their cover sheet the national grid references of all sites used.

Awards will be made to the winner, the runner-up, the leading fixed station operating from his home QTH, the leading non-UK entry, and to the highest-placed station who has not won an award before in this event.

Except where modified above, the following general rules for vhf/uhf/shf contests, published in the January 1980 issue of *Radio Communication*, will apply: 1, 2, 3, 4b, 5b, 6a, 7b, 9b, 10b, 11a, 12–22.

RADIO—a hobby for the 'eighties . . . a schools evening

by T. WEATHERLEY, G3WDI*

The Lowestoft & District Radio Club meets at the local teachers' centre and it was, perhaps, this fact which encouraged the club to organize and run a "schools evening" to introduce local school students to the varied aspects of amateur radio.

Central to our discussions was the conviction that, to be effective, such an evening must be meaningful to the outsider, and something more than a rig in a smoke-filled room was required if the evening was to be a success. The teachers' centre is housed in an old Victorian school building and contains plenty of space, and we had at our disposal a large hall and two adjoining rooms. The centre is well equipped for its primary purpose, and display panels etc were available, as was a video recorder and associated large-screen tv. We thus had ample facilities at our disposal to illustrate the many aspects of amateur radio.

Planning

Our first move was to discover what aspects of the hobby were covered by members' own wide-ranging interests, which included hf and vhf/uhf operating, rtty, sstv, Oscar, construction, weather satellites and vintage radio. We also had contacts with someone interested in dxtv, and G2BCX the "antenna king".

Content was, therefore, not going to be a problem, but there were other considerations, and the following guidelines helped our detailed planning:

1. The audience to be invited;
2. The presentation must appear professional;
3. A sense of occasion to be generated;
4. Sensible local publicity to be sought.

The education system adopted in Suffolk is to organize schools on a first, middle and high school basis. We decided that our initial approaches would be to the high schools, inviting them to encourage some of their older students to come along. There was some discussion as to the form the invitation should take, and an explanatory leaflet was devised in the form of a letter from the club chairman outlining the purpose of the evening, and illustrated with suitable cartoons drawn by G3GNK. Ten of these leaflets, together with an explanatory letter, were to be sent to the heads of science of the five local high schools; the package to include a stamped addressed envelope for return of the names of students who might attend.

Our attention then turned to the method of presentation. While it would have been impressive to have mounted an illustrated lecture on the lines of the Royal Institution Christmas lectures, it was quickly agreed that such a lecture would be quite impossible. What was required was a general introduction to the hobby, coupled with separate presentations of its different aspects. It was thought that the "Open Door" programme on tv would make an excellent introduction, and that the main hall at the centre could be divided into bays to illustrate club members' particular interests. A working station or stations could be set up in another room on the ground floor.

On arrival the students would be divided into two groups; one to watch the "Open Door" programme, while the other was escorted around the exhibition area. A guide would explain what was going on or being displayed in each area. The two groups would then interchange and the process be repeated. This was to be followed by coffee, and individuals be given the opportunity to return to areas of interest for further information.

On arrival each student was to be given a folder, and each exhibition bay would have a leaflet about the aspect of the hobby on display. Copies of *How to become a Radio Amateur* would also be available. The leaflets were to be specially written for the occasion or copied from *Radio Communication* by permission of the editor. In the event we only reproduced the excellent introduction to teleprinters which appeared in the February 1977 issue ("RTTY what is it?" by J. B. Hodgson, G3YKB, on behalf of BARTG); other information was specially written for the occasion.

RSGB HQ told us that the "Open Door" programme was available on video tape and that we could have it on the date it was required; they were also able to provide us with further hand-outs about the hobby.

It was thought prudent to take out insurance cover for the evening, and a local broker was able to provide excellent cover for a premium of £10.

As to publicity, invitations to attend were sent to the county science adviser, the area education officer, the local newspaper, and "Round about East Anglia".

Throughout our preparations we kept the head of the teachers' centre fully informed; without his active support and encouragement it would have been impossible for us to proceed on any scale. It was a great act of faith on his part to allow an outside organization a free run of the centre, even though two members of the club were in the education service. Through him we were provided with everything we needed to mount the exhibition, and his advice and encouragement were invaluable. G8JBD is a photographer, and he was able to produce a number of very large photos which formed the basis of our exhibition. Approaches were made to the Post Office who readily agreed to provide posters of satellite communications, and British Aerospace promised some satellite photos. One member was able to borrow for us a week's set of TIROS-N weather pictures. Members, of course, promised to provide gear of various ages and complexity. We had access to the premises on the night before the event to begin arranging the exhibition, and during the following day we were invited to come at any time.

These arrangements were the result of two club evenings spent discussing the event; the evenings being separated by about six weeks to let ideas mature and for enquiries to be made.

These then were our ideas. How did they work out in practice.

The first part of this report was written prior to the event so as not to be coloured by hindsight. The second part was written two days after the event.

*16 Beverley Court, Carlton Colville, Lowestoft, Suffolk.

Preparation

It took about four hours to mount the display material, and this was greatly helped by the premounting of some of the material on black paper. The centre provided staple guns, and these were invaluable. The material promised by the Post Office was caught in a dispute at Peterborough and did not arrive in time, neither did the material from British Aerospace. On the credit side the Home Office were pleased to supply 50 copies of *How to become a Radio Amateur,* and the video cassette from the RSGB arrived in plenty of time. The back-up slide/tape lecture did not. Next year we will allow even longer for material to process through the postal system.

Although there were plenty of power points around, we still found it useful to have a number of multi-outlet socket strips available. The working teleprinter was a great attraction, and a chance contact with G3WMQ resulted in his providing us with a picture tape to run on the tape printer. The homebrew slow scan survived the journey and was fed from a cassette recorder. I am sure G3WW will be pleased to know that the picture of him in 1909 that he sent to me on 144MHz some years ago brought "Ahh's" from some of the young ladies present!

It was not possible to establish the stations until the day of the event. The vhf stations caused no problems; once a dipole was poked out of a top window we were all set. Not so with the hf station, however, as we could not mount a loaned trap vertical to best advantage, The result was that although stations were heard, the antenna did not put out signals as it should have done and no contacts were made.

The event

Our approaches to the schools met with a very patchy response. Of the five high schools approached, only three replied. Between them they only provided 12 students instead of the 30 hoped for, although as a bonus one school did provide two of the science staff. One of our members works in a girls' private school and he brought along a minibus full of interested girls. Phone calls to two local middle schools gave much better results, and in future years these will be approached first. In all we had over 30 students in the 13–17 age range, two teachers and a couple of interested dads. The area education officer spent an hour with us, as did the head of the teachers' centre, and both remarked on the range and diversity of the material on display. The local newspaper promised a photographer who did not arrive, and the BBC were very interested but phoned on the day to say they were not.

The evening progressed much as planned, and the two members escorting the groups found that 15 was about as large as could easily be managed. We were able to provide sturdy folders for information sheets, and this seemed to ensure the sheets were taken away. The thrill of a live contact intrigued the audience, and the contact on 144MHz between G3XSK and G3YDZ was a model. It was full of "jargon" to be explained, and when we requested to QSY to GB3NB we found it was free. The special call GB2LRC was a useful introduction to the licensing requirements.

Conclusion

It is hoped that these notes will encourage other clubs to put on schools evenings. We in the Lowestoft club are aware that in many ways we have a unique meeting place, but we are sure that an approach by a local club to a teachers' centre or local school would be well received. The club would be pleased, if asked, to help any other club with advice based on our experience.

The schools evening was a club effort, and all members contributed to it. We hope that our enthusiasm was evident to our audience, who might now want to take up "RADIO—a hobby for the 'eighties". □

G3GNK pointing out various exhibits on the homebrew equipment stand (right) and explains the 144MHz station operated by G3XSK (below). Photos: G8JBD

RSGB SLOW MORSE PRACTICE TRANSMISSIONS

Alterations and additions to this list should be sent to the organizer, Mr M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.

Sundays

Clock time	Callsign	MHz	Mode	Town
0900	G3WNR	1·975	A1/A3J	South Shields, T & W
		144·225	A1/A3J	
		145·250	F2/F3	
0915††	G3LEQ	slant polarized to west-north-west		Knutsford, Cheshire
		1·950	A2/A3	
		29·250	F2/F3	
1015	G3CGD	1·875	A1/A3	Cheltenham, Glos
1030	G3OHM/A	144·180	A1/A3J	Birmingham
1100	G2FXA	1·910	A1/A3/A3J	Stockton-on-Tees
1100	G3XJJ	3·535	A1/A3J	Northampton
1130	G3BLS	1·960	A1/A3	Osney, Oxford
1200	G3HVI	144·750*	A2/A3	Stoke-on-Trent, Staffs
1800	G3WNR	144·725*	F2/F3	South Shields, T & W
		144·250	A1/A3J	
		145·250	F2/F3	
1815††	G3LEQ	slant polarized to west-north-west		Knutsford, Cheshire
		1·950	A2/A3	
1830	GM4HIG	3·550	A1/A3J	Aberdeen
1900	GW3WSU / GW4GSH	145·250*	F2	Barry, S Glam
1930	G3LDW	144·160*	A1/A3J	Halesowen
2030	G3ZDW	144·220	A1/A3J	Swinderby, Lincs
		horizontal, omni-direct		
2100	G4EWK	144·850	F2	Burton-on-Trent, Staffs
		to south-west		

Mondays

Clock time	Callsign	MHz	Mode	Town
1045	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1300	G3VHE	3·525	A1	Swindon, Wilts
1330	G3VHE	145·350*	F2	Swindon, Wilts
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen, Lancs
	G4CGT	145·525	F2	
1830	GM4HIG	144·250	F2/F3	Aberdeen
		horizontal to south-west		
		145·550* vertical	F2/F3	
1900	G3VHE	145·350*	F2	Swindon, Wilts
1900	G3ZRZ	1·975	A1/A3	Blackpool, Lancs
1900	G4BNV	144·250	A1/A3J	Ottery St Mary, Devon
		horizontal east/west		
1930	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1930	GI3SXG	144·100	A1/A3J	Newtownards, Co Down
2000	G3GWI	145·475	F2/F3	York
2030	G3ASR	1·875	A1/A3J	Harrow, Middlesex
		144·175* vertical	A1/A3J (lsb)	

Tuesdays

Clock time	Callsign	MHz	Mode	Town
1045	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1830	G4CWN	144·100	A1/A3J	Stoke-on-Trent, Staffs
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen, Lancs
	G4CGT	145·525	F2	
1900	G4RS	3·565	A1/A3J	Catterick, N Yorks
		145·525*	F2/F3	
1930	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1930	G3ZYY	145·550	F2/F3	Saltash, Cornwall
		vertical to east		
2030	G3IRM	1·975	A1/A3	Bury St Edmunds, Suffolk
2030	G4FFC	144·390	A1/A3J	Pertenhall, Beds
		horizontal to south		
2030	G3OHM/A	144·180	A1/A3J	Birmingham
2030	G3KGU	1·915	A1/A3	Theydon Bois, Essex
2100	G4EWK	144·850	F2	Burton-on-Trent, Staffs
		to south-west		
2200	G3AWL	144·110	A1/A3J	Easington, Co Durham
		to south		

Wednesdays

Clock time	Callsign	MHz	Mode	Town
1045	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen, Lancs
	G4CGT	145·525	F2	
1900	GW3WSU / GW4GSH	145·250*	F2	Barry, S Glam
1900	G2ABC	145·250	F2/F3	Truro, Cornwall
1900	G3ULY / G4EXD	1·960	A1/A3J	Culgaith, Cumbria
		145·475*	F2/F3	
1930	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1930	G3ZYY	145·550	F2/F3	Saltash, Cornwall
		vertical to east		
2000	G3SWP	144·180*	A2/A3J	Doncaster, S Yorks
2015	G3WVJ	1·845	A1/A3	Staines, Middlesex
2100	G3HVI	144·750*	A2/A3	Stoke-on-Trent, Staffs

Thursdays

Clock time	Callsign	MHz	Mode	Town
1045	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen, Lancs
	G4CGT	145·525	F2	
1900	G4BNA	3·590	A1	Swindon, Wilts
1900	G3BLS	1·960	A1/A3	Osney, Oxford
1900	G3ZRZ	1·975	A1/A3	Blackpool, Lancs
1900	G4RS	3·565	A1/A3J	Catterick, N Yorks
		145·525*	F2/F3	
1930	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1930	G3ZYY	145·550	F2/F3	Saltash, Cornwall
		vertical to east		
1930†	G3ASR	1·875	A1/A3J	Harrow, Middlesex
		144·175* vertical	A1/A3J (lsb)	
2000	G2ACZ	1·808	A1	Mablethorpe, Lincs
2030	G3ZDW	144·220	A1/A3J	Swinderby, Lincs
		horizontal, omni-direct		
2100	G4EWK	144·850	F2	Burton-on-Trent, Staffs
		to south-west		

Fridays

Clock time	Callsign	MHz	Mode	Town
1045	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	
1830	G4CRI	3·525	A1	Helston, Cornwall
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen, Lancs
	G4CGT	145·525	F2	
2000	G3WQK	144·750	F2	Hailsham, Sussex
2030	G3ZDW	144·220	A1/A3J	Swinderby, Lincs
		horizontal, omni-direct		
2200	G3AWL	144·110	A1/A3J	Easington, Co Durham
		to south		

Saturdays

Clock time	Callsign	MHz	Mode	Town
0915††	G3LEQ	144·250	A1/A3J	Knutsford, Cheshire
		145·250	F2/F3	
		slant polarized to west-north-west		
		1·950	A2/A3	
1045	G3RAF	3·550	A2	Locking, Avon
		144·025*	A2	

* Omni-directional
†First and third Thursday in each month
††Until the end of May

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 15 May for the July 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; 1, 15, 29 May, 12, 26 June. Ainsdale Scout HQ. Full details from G2CUZ.

Blackburn (East Lancs ARC)—First Thursday in each month, 7.30pm. YMCA, Blackburn. Sec F. Hill, G3YWH.

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

Bolton (B&DARS)—First and third Wednesdays in each month. Horwich Leisure Centre, Victoria Road, Horwich, Bolton. Sec John Debney, G8RWY, 2 Coverdale Avenue, Heaton, Bolton.

Bolton (Edbro RC)—Details from sec, c/o Edbro Ltd, Lever Street, Bolton.

Bolton (BTCARC)—newly affiliated club. Will the hon sec please supply RRI with details of the club.

Bury (BRS)—Tuesdays, 7.30pm. Second Tuesday in each month (Main meeting). Mosses Community Centre, Cecil Street, Bury. 13 May (DF Techniques), 10 June ("Electronic traffic control systems", by G8SMB). CW Practice—"natter and noggin". Club projects include film of club activities, construction of hf linear, and a microprocessor project called "Crumpet". New publicity officer, Chris Marcroft, G4JAG, 24 Lancaster Avenue, Ramsbottom, Bury. Visitors always welcome.

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 first Tuesday in each month. YMCA, Chester. New sec, from whom further details can be obtained, D. Cutts, tel Gresford 3344.

Colne (Rolls Royce ARC—Barnoldswick)—newly affiliated club. Will the hon sec please supply RRI with details of the club.

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

Eccles (E&DARC)—Tuesdays, 8.30pm. White Swan, Worseley Road, Swinton. CW class each week. Sec Chris Harrison, G8KRG, 15 Cockey Moor Road, Starling, Bury BL8 2HD. tel 061-797 0031.

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

Liverpool (L&DARS)—Tuesdays, 6 May (Junk Sale), 13 May (HF Field Day preparation), 20 May ("North American travels", by G3YBH), 27 May (RRTY lecture, by G4HSF), 3 June (HF Field Day arrangements), 10 June ("Some further thoughts on propagation—was Marconi right?", by G3IOR (RSGB Slide/Tape Lecture)), 17 June ("LF, dx and simple antenna", by G3PEZ), 24 June (VHF NFD preparation), 1 July (Surplus sale), 8 July (Local clubs' get together—all welcome). 8pm Conservative Association Rooms, Church Road, Wavertree, Liverpool. Thursdays 8.30pm. G3AHD cw practice session on 144·250MHz. Hon sec, A. L. Neilson, G4CVZ, tel 051-220 5470. Visitors and new members most welcome.

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 (UoLARS)—Lunchtimes. Shack in Reilly Building, open any time. Callsigns G3OUL and G8JUL active 1·8 to 432MHz. Would prospective members please contact Paul Broadhurst, G8LGL, UoL, 2 Bedford Street North, Liverpool L7 7BD.

Macclesfield (M&DRS)—Second Tuesday in each month, 7.45pm. For details of venue and programme contact Mary Roberts, 15 Park Brook Road, Macclesfield, tel Macclesfield 24383.

Manchester (M&DARS)—Wednesdays, 7.30pm. Morse practice most evenings, lecture on third Wednesday in each month. Newton Heath Community Centre, 203 Droylsden Road, Newton Heath, Manchester. New sec John Dent, G8OWY, 76 Lynwood Grove, Audenshaw, Manchester. Club station G3HOX active on hf and vhf.

Manchester (South Manchester RC)—Fridays, 9 May ("Test equipment for radio amateurs", by Dr D. Yorke, G4JLG), 16 May (AGM—8pm prompt), 23 May (Discussion evening on cb), 30 May ("Microprocessor system development", by T. Winter, G4AOK), 6 June (to be arranged), 13 June ("A home-built colour tv", by K. Maddocks, G4JDD). 20 June ("A 2m linear amplifier", by J. Heath, G4IRB), 27 June (Progress discussion on direct conversion receiver club project), 4 July (Mid-Summer df contest) 8pm. Informal meetings, Monday 8pm. Sale Moor Community Centre, Norris Road, Sale. Hon sec, D. Holland, G3WFT, 32 Woodville Drive, Sale, tel 061-973 1837. Visitors always welcome.

Manchester (UoMISTRS)—Wednesday afternoons, cw classes if required; Thursday evenings. The radio shack. UMIST Union bar. Prospective members please contact M. P. Doig, G4CQZ, UMIST RS, UMIST Union, PO Box 88, Sackville Street, Manchester M60 1QD. G3CXX/G8FOT active on 1·8/144MHz and, in the near future, on 432MHz/1·3GHz.

North Western Repeater Group—Third Thursday in each month (informal), 8pm. Globe Club, Willows Lane, Accrington, Lancs. Details from sec. G3RXH.

Ormskirk (OARC)—Tuesdays, 8.30pm. "Over 60's" Hut, Liverpool Road (opposite Christ Church). For details contact either G4HDU, tel Aughton Green 423062; or sec G4IGX, tel Ormskirk 75546. Club interests include vhf, uhf, hf, rtty, contests, film and slide shows.

Penrith (Eden Valley RS)—Third Thursday in each month. Two Lions Hotel, Great Dockray, Penrith, Cumbria. Sec G4HYJ, *Herald* office, 14 King Street, Penrith, Cumbria. Full programme. Visitors welcome.

Preston (PARS)—New venue and new sec. 1 May ("Microprocessors", by G. Wimblett), 15 May (to be arranged), 29 May (Final NFD arrangements), 12 June (to be arranged), 19 June (Foxhunt), 26 June (Final VHF NFD arrangements). From April 1980 the club will meet alternate Thursdays at St Mary Magdalene Church Hall, Farringdon Lane (Ribbleton Lane), Preston. New sec George Earnshaw, G3ZXC, QTHR.

St Helens (SH&DARC)—Newly affiliated club. Thursdays, 7.45pm. YMCA, North Road, St Helens. Hon sec Paul Gaskell, G8PQD, 131 Greenfield Road, St Helens, tel St Helens 25472. Club net Sundays 11.30am, 145·575MHz (S23). The club hopes to be operating a special event station at the Rainshill Steam Trials on 24-26 May, callsign GB2RST has been applied for.

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 G8JCL, c/o M43 at above address.

Stockport (SRS)—Second, third and fourth Wednesdays in each month. 14 May (Talk by G3NUQ), 21 May (Natternight), 28 May (Pre-NFD discussion) 8pm. Club net 3,692kHz—11am Sundays (SRS International). Blossoms Hotel, Buxton Road, Stockport. Hon sec, G3FYE. June 1980 is the diamond jubilee of SRS with founder member Bill Banks, G2ARX, as president of the society.

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)—First Thursday in each month, 8pm. Grappenhall Community Centre, Grappenhall, Nr Warrington. 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)— First and third Thursdays in each month; Shevington Conservative Club, Shevington, Wigan. Details from G4EHK, tel Appley Bridge 3320.

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. Hon sec G3DLF.

Wirral (W&DARC)—Second and fourth Wednesdays in each month. 14 May ("Japanese morse", by G3CSG), 28 May ("Women's lib and the law", by G. Walker), 4 June (Liverpool police HQ visit), 11 June (Natter-night and Bring and Buy Stall), 18 June (Visit to Air Traffic Control, Speke Airport), 25 June (DF hunt) 8pm. Sports Concourse, West Kirby, Wirral. Hon sec I. D. Brooks, G8PMW, 59 Mosslands Drive, Wallasey, L45 8PF.

Will all club representatives please note that the deadline in the heading to "Club News" *is* critical.

REGION 2—RR D. S. Smith, G4DAX, Red Roof, Goathland, Whitby, North Yorks YO22 5AN. Tel Goathland 333.

Bradford (UoBARS)—Thursdays, 7.30pm. N10, Main Building. Sec G8GOV, 30 Moorfield Drive, Baildon, Shipley, West Yorks. Net frequency 145·275.

Denby Dale (DD&DARS)—Second and fourth Wednesdays in each month, 7.30pm. 12 June (Talk on repeaters, by G4EZV), 10 July (Talk on equipment, by G4MH). Pie Hall, Denby Dale. Sec G3FQH. Visitors always welcome.

Doncaster (DMIoHEARC)—Details from sec Robert Lane, G4AWU, Kelston, Doncaster Road, Bawtry, Doncaster, S Yorks. Club call G3UER.

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

Halifax (Northern Heights ARS)—Wednesdays, 7.45pm. 4 June (Visit to Oxenhope Research Station), 18 June (Secretary's lecture, G8NUC), 2 July (VHF NFD planning meeting). Bradshaw Tavern, Bradshaw, Nr Halifax. Sec G8NUC.

Hornsea (HARS)—Wednesdays, 14 May (Whitsun social), 21 May (Visit to Atwick gas terminal, 8pm. NB—maximum number of visitors, 20), 28 May (Film), 4 June (NFD briefing), 11 June ("Policing with electronics", by Chief Inspector Dawson), 18 June (DF hunt), 25 June (Film), 2 July 8pm. New venue, The Mill, Mill House, Attic Road, Hornsea. New sec Mrs J. Heathershaw, G4CHH.

Hull (H&DARS)—Fridays, 8pm. RAE classes are held at 9pm each Friday. Kingston Community Centre, Fountain Road, Hull. Sec G8GLM, 27 Trafford Road, Willerby, Hull HU10 6AJ.

Hull (HUR&ES)—Tuesdays, 1.15pm. Room 313b, University Union Building, Cottingham Road. Enquiries to G8RPZ. All amateurs welcome.

Leeds (White Rose RS)—Wednesdays, 8pm. Moortown Rugby Football Club, Moss Valley, Alwoodley, Leeds 17. Sec G4DZI.

The White Rose Radio Society's new home, at the Moortown Rugby Club, Leeds, was officially opened by the Lord Mayor of Leeds, Councillor Mrs Christine Thomas, on 12 December 1979. With the growth of the society since its formation as the Pudsey Radio Club in 1962, its previous home at Armley, which it had occupied for 13 years, became cramped, and in 1977 a new venue was sought.

The Moortown Rugby Club was more than willing to accommodate the society and help to provide a shack/workshop and the use of its amenities, and work on the shack commenced in 1979. The shack is approximately 30 by 12ft, has a large workbench along one wall and separate hf and vhf operating positions at one end. Outside, the shack is complemented by a 60ft mast with tribander plus an 8-over-8 for vhf.

Leeds (LUUARS)—Tuesdays, 8pm. Union Annexe (second floor), Woodhouse Lane. All new students welcome. Sec G4CNG, 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.

Pontefract (P&DARC)—Enquiries to P. Butterfield, tel Pontefract 71071. Sec G4DTO, 43 Red Hill Drive, Airedale, Castleford, Yorks.

The hf operating position in the White Rose RS shack being manned by G3FCW (l) and G3WSZ. *Photo:* G4HSZ

Scarborough (SARS)—Mondays, 7.30pm. Scarborough Cricket Club, North Marine Road, Scarborough. Sec G4JAQ, tel 862 638. All visitors welcome. Talk-in by arrangement.

Sheffield (SARS)—Third Monday in each month, 8pm. Sheaf House Hotel, Bramell Lane, Sheffield. Sec G4APV, 321 Fulwood Road, Sheffield S10. Visitors and swls particularly welcome.

Sheffield (British Steel Corporation ARS)—Wednesdays, 7.30pm. Tinsley Sports and Social Club, Bawtry Road, Sheffield. Details from G3XSI, tel Sheffield 51417.

UK FM Group (Northern)—4 May, 1 June, 6 July. Sec G8PLJ. Do you use GB3NA? Your subs or donations would help support the service provided by this repeater.

Wakefield (W&DARS)—Second and fourth Tuesdays in each month. 7.30pm. Holmfield House, Thornes Park, Wakefield. Sec Andrew Walker, G4ARH, tel Horbury 274607.

York (YARS)—Fridays (except third in each month), 7.30pm. United Services Club, 61 Micklegate, York. Sec G3WVO.

REGION 3—RR H. S. Pinchin, G3VPE, 61 Cole Bank Road, Hall Green, Birmingham B28 8EZ. Tel 021-777 1320.

Birmingham (Midland ARS)—20 May ("Old timer's story" by E. C. Naylor Strong, G2RQ), 17 June ("RTTY" by Gerry Farrance, G3KPT), 8pm. Room 110/118, University of Aston, Gosta Green, Birmingham. Sec G8BHE, tel 021-422 9787.

Members of the White Rose RS with the Lord Mayor of Leeds at the opening ceremony of their new shack. L to r: G4FKS, G4DWD, G3FLF, G3WSZ (chairman), the Lord Mayor, G4DZI, G4EZI, G8SWJ, G4DXA, G4IDJ and G3PSM. *Photo:* G4HSZ

Birmingham (Slade RS)—First Friday in each month, 7.45pm. The Committee Room, Church House, Erdington, Birmingham. Sec G4FGF.
Birmingham (South Birmingham RS)—Thursdays (HF night on the air), Fridays (Construction and morse classes), 7.30pm. 4 June ("Air control and navigation" by Ken Parkes, G8AIR), 2 July (Surplus sale), 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G4GZI, tel 021-427 7104
Birmingham (UoBARS)—Thursdays during term, 8pm. Tuesdays (RAE classes), 7pm. Morse classes as required, lunch-time. Students' Union (above stage). Sec G8HTH. Club stations G3IUB and G8IUB. University and non-university visitors welcome.
Bromsgrove (B&DARC)—14 March (AGM), 11 April (Members' construction competition), 9 May (Raynet talk), 8pm. Avoncroft Art Centre, Bromsgrove. Sec G4HFP, tel Stourport (02993) 3818. Visitors welcome.
Burton-on-Trent (BoT&DARS)—Wednesdays, 8pm. Stapenhill Institute, Main Street, Stapenhill, Burton-on-Trent. Sec G3ACR.
Cannock Chase (CCARS)—First Thursday in each month (Formal); other Thursdays (Informal); 8pm. Bridgetown War Memorial Club, Union Street, Bridgetown, Cannock. Sec G4IDK, tel Penkridge (078571) 2067. Visitors and new members welcome.
Coventry (CARS)—Fridays, 8pm. Baden Powell House, 121 St Nicholas Street, Radford, Coventry. Sec G8SEQ. Visitors welcome.
Coventry (CTCARS)—Mondays, 7pm. Winfray Annexe of the college. Sec G8ISJ.
Coventry (U 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.
Kidderminster (K&DARC)—Mondays (Informal), 9.30pm. Bellman's Cross, Shatterford. 13 May (HF night on the air—pre-arranged contact with twin town Husum, Germany), 22 May (Skittles night at Titton Inn, nr Stourport, 7.30pm. Local AR clubs welcome—tickets £2.30 from G8AKX), 27 May ("Practical hints on vhf receivers" by Paul Dowie, G8PZT), 10, 24 June, 8 July, 8pm. Aggborough Community Centre, Hoo Road, Kidderminster. Sec G4ILQ, tel Kidderminster (0562) 4930.
Lichfield (Chad RC)—Alternate Wednesdays, commencing 21 May, 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.
Malvern Hills (MHRAC)—Second Tuesday in each month, 7.30pm. The Star, Cowleigh Road, North Malvern. Sec G8JAO, tel Malvern (06845) 63270.
Mid-Warwickshire (MWARS)—First and third Mondays in each month, 8pm. 61 Emscote Road, Warwick. Sec G8RZR, tel Warwick (0926) 496453.
Redditch (RRC)—Second and fourth Thursdays in each month, 8pm. WRVS Centre, Ludlow 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, 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec G3UDA. New members welcome.
Solihull (SARS)—20 May (Members' construction contest), 17 June, 7.30pm. The Manor House, High Street, Solihull. Club net (G3GEI), Fridays, 9.30pm on 1·96MHz. Sec G4BBT, tel 021-743 7277. Morse classes available. New members and 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 G8ORU. New members welcome.
Stoke-on-Trent (SoTARS)—Thursdays, 7.30pm. 2a Racecourse Road, Oakhill, Stoke-on-Trent. Sec G4CWN.
Stourbridge (SARS)—19 May, 2 June (Constructional evening), 16 June, 7 July (Constructional evening). 7.45pm. Library, Longlands School, Brook Street, Stourbridge. Sec G4IEB, 7 Hanbury Hill, Stourbridge, West Midlands DY8 1BE, tel Stourbridge (03843) 2006.
Stratford-upon-Avon (SuA&DARC)—No regular meetings but occasional events. Help always given to new amateurs and swls. Chairman/sec G3OOQ, tel Stratford (0789) 5973.
Sutton Coldfield (SCRS)—12 May ("Integrated circuits" by James Bryant, G4CLF), 9 June ("Air traffic control" by D. R. Gunson), 23 June (Natternight), 7.30pm. Central Library, Sutton Coldfield. Sec G8TUR, tel 021-353 2061.
Tamworth (TARS)—Second and fourth Mondays in each month, 7.30pm. White Lion, Lichfield Street, Tamworth. Other Mondays (Informal). Club shack. Sec G4FZN, tel Tamworth (0827) 69708. Club net Wednesdays 145·375MHz, 9pm. Visitors welcome.
Telford (T&DARS)—Wednesdays, 7.30pm. Phoenix Centre, Webb Crescent, Dawley. Sec G3UKV, tel Telford (0952) 55416. Visitors welcome.
Walsall (WARC)—Alternate Wednesdays, commencing 28 May, 8pm. Forest Community Centre, Forest School, Hawbush Road, Leamore, Walsall. Sec G4GKC, tel Walsall (0922) 31675.
Willenhall (W&DARS)—Alternate Wednesdays, commencing 28 May. Three Crowns, Stafford Street, Willenhall. Sec M. P. Batchelor, 19 Newlands Close, Willenhall, West Midlands WV13 2DQ. New members welcome.
Wolverhampton (WARS)19 May (Club project discussion and progress report), 26 May (no meeting), 2 June (Home built gear competition), 9, 16, 30 June, 7 July, 8pm. Neachells Cottage, Danescourt Road, Stockwell End, Tettenhall, Wolverhampton WV9 9PH. Sec G8EDG, tel Wolverhampton (0902) 763617.
Worcester (W&DARC)—7 and 14 May (Visits to electronic telephone exchange), 2 June ("What is Raynet?" by Brian Jones, G8ASO), 7/8 June (HF NFD at Kempsey Common), 7 July (Preparation for Upton rally—helpers please attend), 13 July (Upton rally), 8pm. Old Pheasant, New Street, Worcester. Sec G4EKG, tel Evesham (0386) 41105. New members and visitors welcome.

REGION 4—RR *(post vacant).*
Following information is latest received.
Derby (D&DARS)—Wednesdays, 7.30pm. 7 May (Bring and buy sale), 14 May (Video show), 21 May ("Oscar from the ground up"—by G3AAJ of AMSAT-UK), 28 May (2m df practice), 4 June (Junk sale), 11 June (Natternight), 18 June (Some developments of BR vehicles), 25 June (Barbecue—Drum Hill), Tuesdays and Thursdays (Morse classes) 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM.
Derby (Nunsfield House ARG)—Fridays, 7.30pm. Nunsfield House, Boulton Lane, Alvaston, Derby. Sec Ian Cage, G4CTZ.
Glenfield (Leicestershire Raynet Group)— Monthly. County Hall, Glenfield. Further details from M. G. Barker, G8CAC.
Grimsby (GARC)—First and third Thursdays in each month, 8pm. Alexandra Club, Cleethorpes.

Steve Hodgetts, G4FAE, winner of the annual construction contest for the Derby & D ARS Founder Members Trophy, with his homemade 144MHz transceiver

Members of the Lincoln Short Wave Club in the Battle of Britain Hangar, RAF Coningsby, during a visit on 12 February

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.
Leicester VHF/UHF Group—Contact G4FZL.
Lincoln (LSWC)—Second and fourth Wednesdays in each month. 14 May (Final arrangement for NFD), 28 May (AGM). Lincoln Corporation Social Club, Waterside South, Lincoln. Sec G4JES, 4 Horner Close, Brant Road, Lincoln.
Loughborough (LFARC)—Fridays, 8pm. Brush Sports and Social Club, Fennel Street, Loughborough. Sec G8BUB.
Mansfield (MARS)—First Friday in each month, 7.30pm. New Inn, Westgate, Mansfield. Sec G4AAH, 233 Southwell Road, Mansfield.
Matlock (Derwent Valley ARS)—First Monday in each month, 7.30pm. Chatsworth House, Matlock Training College, Chesterfield Road, Matlock. Sec S. Boller, G8VEF, c/o Lowe Electronics Ltd.
Melton Mowbray (MMARS)—Third Friday in each month, 7.30pm. 16 May ("Aspects of television and sound broadcasting", by G4ASE), 19 September (AGM). St John Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK.
Nottingham (ARCoN)—Thursdays, 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham. Sec M. C. Shaw, G4EKW.
Nottingham (Trent Polytechnic RS)—Mondays, 7pm. Ninth Floor, Newton Building. Sec P. M. Bond, G8TIS, via Students' Union.
Nottingham (NURC)—Tuesdays and Thursdays, 1pm. Shack behind Union Shop. Sec C. Coleman, G4HCW. Theatrical Mechanics, extension 2146.
Scunthorpe (SARC)—Tuesdays, 7.30pm. The Hobbies Centre, Franklyn Crescent, Scunthorpe. Sec J. Stace, G4FUH.
Spalding (S&DARS)—2 May (Preparation for Tuliptime Rally), 6 June ("UK101 computer", G4DDI). Penchbeck Teachers Centre, Spalding. Sec G. C. L. Parker, G4CMK, 33 Beech Avenue, Bourne, Lincs.

The RR would be pleased to hear from all club secretaries in the region, either by post or telephone.

REGION 5—RR *(post vacant).*
Following information is latest received.
Bedford (B&DARC)—First Wednesday in each month. Other Wednesdays (Informal). Club shack, Ravensden. Sec G8PZZ.
Cambridge (C&DARC)—Meeting place in course of change. Contact sec G8JKV for information.
Cambridge (CUWS)—Mondays. Queen's Bar. Details from Adrian Langford, G8PQP, St John's College.
Corby (CARG)—Fridays, 7.30pm. Hightrees Scout Centre, The Nook, Corby. Sec G8MLA.
Dunstable (DDRC)—Fridays, 8pm. Chews House, 77 High Street South, Dunstable. Sec G8ASP.
March (M&DRAS)—Tuesdays, 7.30pm. 2 Grays Lane. Sec G8GNE.
Northampton (NRC)—Thursdays, 8pm. Kingsthorpe Community Centre, Thornton Park, Kingsthorpe, Northampton. Details from sec I. P. A. Scott-Iversen, 35 Milverton Crescent, Abmington Park, Northampton.
Peterborough (GPARC)—Fourth Thursday in each month, 7.30pm. Southfields Junior School, Stanground, Peterborough. Sec G4FDF.
Peterborough (PR&ES)—For details contact G3EEL.
Shefford (S&DARS)—Thursdays, 8pm. Church Hall. Hon sec G4DAQ.
St Neots (Foster Cambridge RC)—Tuesdays, 8pm. Foster Cambridge Ltd, Howard Road, Eaton Socon, St Neots. Details from P. Dineen, 5 Reynolds Drive, Little Paxton, St Neots.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HP13 7EA. Tel Penn (049481) 4240.
Banbury (BARS)—Last Friday in each month, 7.30pm. St Paul's Church Hall, Warwick Road, Banbury. Sec G. Reason, G4EBF, tel Croughton (0869) 810794.
Bracknell (BARC)—For details of current activities contact D. Sargeant, G3YMC. tel Bracknell 21006.
Burnham Beeches (BBRC)—Second Monday in each month, 7.30 for 8pm. Hedgerley Village Hall, Hedgerley, Nr Slough, Bucks. Sec Janie Britton, tel Windsor 61723. New members, visitors and swls welcome.
High Wycombe (Chiltern ARC)—John Hawkins Ltd, Victoria Street, off Oxford Road (A40), High Wycombe. Further details from sec W. Catterall, G4IWC, 78 Fairacres, Prestwood, Great Missenden, Bucks, tel Great Missenden 4504.
Maidenhead (M&DARS)—First Thursday and third Tuesday in each month. Red Cross Hall, The Crescent, Maidenhead. Sec P. J. Patrick, G3TWG, tel 06285 25275.
Mid-Thames RDF Club—Club competition, the Gage-Tyler Cup, will be held on 16, 30 April, 4 June, 30 July and 3 September at 7.30pm. Further details from sec C. Gage, Lowfield House, Bolter End Lane, Lane End, High Wycombe, Bucks HP14 3NB, tel High Wycombe (0494) 881842.
Newbury (N&DARS)—Second Tuesday in each month. Newbury Technical College. Details from sec G8LTD, tel Newbury 46078.
Newport Pagnell (Milton Keynes ARS)—8pm. Lovatt Hall, Newport Pagnell, Bucks. For further details contact sec D. White, G3ZPA, Rose Cottage, Whaddon Road, Shenley Brook Road, Milton Keynes MK5 7AF, tel Shenley Church End 310.
Oxford (O&DARS)—Second and fourth Wednesdays in each calendar month, 7.30pm. Civil Service Social Club, Marston Road, Oxford. New sec J. G. Bright, G4HJL, 22 Westfield Road, Long Wittenham, Abingdon, Oxon OX1 4RF.
Oxford (OURS)—Wednesday evenings during term. Further details from Simon Pike, G8KRD, Brazenose College.
Reading (RARC)—Details from sec Chris Young, G4CCC.

REGION 7—RR D. A. G. Pedder, G3LFX, 97 Elgar Avenue, Tolworth, Surbiton, Surrey KT5 9JS.
Addiscombe (AARC)—Tuesdays, 9.15pm. Prince of Denmark, 152 Portland Road, South Norwood. Sec G3SJX, tel 01-656 9054. New members and visitors most welcome.
Ashford (Echelford ARS)—Second Monday and last Thursday in each

The wedding on 29 December 1979 at Shellingford, near Faringdon, Oxon, of Ann Perkins, G8NVI, and Michael Stevens, G8CUL. L to r: G8NRP, G4CXJ, G8BBD (groom's brother), G3NNG (best man), G8CUL, G8NVI, G8NRL (groom's mother), G8LZU (G8NNG's daughter), G8CVS, and G8NRK (groom's father). *Photo:* June, G4CXJ/xyl

month, 7.30 for 8pm. The Hall, St Martin's Court, Kingston Crescent, Ashford, Middx. Sec G8LEL, tel Byfleet 46847.

Bexley Heath (North Kent RS)—8pm. St Mary's Institute, 2 North Cray Road, Bexley. Sec G3VFD.

Coulsdon (CATS)—Sec A. R. Bartle, G6HC, tel 01-684 0610.

Cray Valley (CVRS)—First and third Thursdays in each month, 7.30 for 8pm. Christchurch Centre, High Street, Eltham, London SE9. For details of morse classes run by the club contact sec G4FUG.

Croydon (Surrey Radio Contact Club)—First and third Wednesdays in each month; 7 May ("VK6-land", by Ted Jones, G3EUE), 7.30pm. TS Terra Nova, 34 The Waldrons, Croydon. Sec G4FFY, tel 01-642 9871.

Crystal Palace (CP&DRS)—Third Saturday in each month, 8pm. Emmanuel Church Hall, Barry Road, London SE22. First Tuesday in each month (Open house). Members' QTHs. Sec G3FZL.

Guildford (G&DRS)—Second and fourth Fridays in each month, 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec G4BHQ, tel Guildford 76375.

Guildford (U of Surrey E&ARS)—Informal meetings, lunch-times during term. lower bar, Union House, G8AHK is active on vhf, and G3IGQ on hf. Skeds and QSOs always welcome. Sec G8MIO, tel Guildford 71281.

Kingston (K&DARS)—Second Wednesday in each month, 8.15pm. For details contact Sec R. Pellatt, RS41392, tel 01-399 8113.

New Cross (Clifton ARS)—Fridays, 8pm. 225 New Cross Road, London SE14. Details from R. A. Hinton, 42 Sutcliffe Road, Welling.

Redhill (Reigate ATS)—Third Tuesday in each month, 8pm. Constitutional Centre, Warwick Road, Redhill. First Tuesday in each month. Marquis of Granby, Hooley Lane, Redhill. Sec G3XSZ.

Sutton & Cheam (S&CRS)—16 May ("Home computing" by Graham Cluer, G4AVV), 30 May (Junk sale), 13 June ("Synthesizers" by Terry Giles, G4CDY). For meeting details contact hon sec G. W. Brind, G4CMU, tel Burgh Heath 54497.

Thames Ditton (Thames Valley ARTS)—4 March (AGM), 1 April (Junk sale), 6 May (Caernarvon Trophy and talk), 3 June (NFD arrangements), ("CW contest techniques", by Roy Steverson, G3JEQ), July (Technical film show). Giggs Hill Green Library, Giggs Hill Road, Thames Ditton. Sec G3ZNW.

Tolworth (Decca ARG)—First Thursday in each month, 8pm. Decca Sports and Social Club, Kingston Road, Tolworth. Sec G3NFV, tel Leatherhead 72587.

Wimbledon (W&DRS)—Second and last Fridays in each month, 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon. Sec J. W. Todd, tel 01-540 9031.

RR7 would be *very pleased* to receive clubs' entries before the copy date published at the beginning of "Club News".

REGION 8—RR D. N. T. Williams, G3MDO, Seletar, New House Lane, Thanington, Canterbury, Kent. Tel 0227 66586.

Brighton (B&DRS)—8pm prompt. 47 Cromwell Road, Hove. Details of future events from the new sec, J. A. Trimmer, 7 Dale Crescent, Patcham, Brighton BN1 8NT.

Burgess Hill (Mid-Sussex ARS)—Alternate Thursdays. 1 May (VHF/UHF Forum), 15 May ("Metal Detectors", by Reg Moores), 12 June (14th Anniversary Rally at Clayton Mills), 26 June (SWLs evening), 10 July (Construction contest and sale of equipment). 7.30pm. Marle Place Further Education Centre, Leylands Road, Burgess Hill. Details from the sec, Jack Brooker, G3JMB, tel Hassocks 4965.

Canterbury (East Kent RS)—1 May (PO interference talk, by G8IYN), 5 June (to be confirmed). Further details from G3MDO.

Chichester (C&DARC)—Details of future events from J. Chinn, 5 Shrubbs Drive, Middleton-on-Sea, Bognor Regis PO22 7SL, tel 2335.

Crawley (CARC)—2 May (Annual dinner). For future information please contact the new secretary D. L. Hill, G4IQM, tel 0293 882641.

Dartford (DHDFC)—Second Friday in each month. Scout House, Broomfield Road, Dartford. Details from Jeanette Maggs, 25 Leybridge Court, Eltham Road, Lee, London SE12.

Dover (South East Kent YMCA ARC)—7 May (Natternight), 14 May ("Power stations Part 2", by G8PIN), 21 May (HF night, CQ USA), 28 May ("The other sw listeners", by G4IOT). Further details from G8KEN.

Eastbourne (Southdown ARS)—First Monday in each month. Details from R. Jeffries, G8KQN, 84 Mill Road, Hailsham, Sussex BN27 2HU; or pro G3LFZ.

Gravesend (GRS)—Mondays, 7.30pm. Windmill Tavern, Shrubbery Road, Gravesend. Details from G4GML.

Hastings (HE&RC)—Fridays. 479 Bexhill Road, St Leonards-on-Sea, Sussex. Third Wednesday in each month, 7.30pm. West Hill Community Centre, Croft Road, Hastings. Details of events from G4FET.

Horsham (HARC)—First Thursday in each month. Parish Rooms, The Causeway, Horsham. Details of future events from A. C. Wadswirth, G3NPF.

Kent Repeater Group—The group is responsible for GB3KR (Dover) and the proposed GB3KN (Mid-Kent), and for 432MHz repeaters GB3CK (Charing), GB3EK (Margate), GB3NK (Wrotham), and GB3SK (Folkestone). Information leaflet and membership details from G3XDV.

Maidstone (MYMCAARS)—Fridays; first and third in each month devoted to the beginner; 7.30pm. Y Sports Centre, Melrose Close, Loose, Maidstone. Details of events from sec J. A. Hastie, tel Medway 251387.

Medway (MARTS)—Details of events and venue from G4EVY.

Sussex Repeater Group—Information from G4EFO. Treasurer G4GNX, 38 Elphick Road, Newhaven.

Tunbridge Wells (West Kent ARS)—Alternate Fridays. 9 May

(Construction contest), 23 May (Informal), 6 June (HF/VHF NFD final arrangements). Adult Education Centre, Monson Road, Tunbridge Wells. Tuesdays following the Fridays (Informal) at Drill Hall, Victoria Road. Details from Brian Castle, G4DYF, tel 0732 56708.
Worthing (W&DARC)—Tuesdays, 8pm. Adult Education Centre, Union Place, Worthing. Details from G8MSQ.

REGION 9—RR H. W. Leonard, G4UZ, 4 Start Bay Park, Strete, Dartmouth TQ6 0RY. Tel Stoke Flemming 505.
Camborne (Cornish RAC)—First Thursday in each month. 1 May ("Synthesized homebrew 2m transceiver", by G3OCB), 5 June ("You and your test equipment", by G3VWK), 20 July (Mobile rally at Cornwall Tech College). 7.30pm. SWEB Clubroom, Pool, Camborne. Cornish net weekdays 10am on 3·715 MHz and on Sundays 11am on 3·682MHz. Visitors most welcome at club meetings. Full details from Spencer, G3VGO, tel Devoran 864255.
Exeter (EARS)—Second Monday in each month. 29, 30 and 31 May (Special event station for Exeter 1900 festival—all bands). 7.30pm. Community Centre, St Davids Hill, Exeter. Full details from Jack Bawden, 232 Exwick Road, Exeter EX4 2BA.
Exeter (EUARS)—Sundays, 2.30pm. Full details from Julian Corben, G4EXT, c/o "Devonshire House", Stocker Road, Exeter EX4 4PZ.
Exmoor (ERC)—Second and fourth Thursdays in each month, 7.30pm. "Loughrigg", East Street, South Molton. Full details from Dave Stone, tel North Molton 377.
Exmouth (EARC)—Alternate Wednesdays, 7.30pm. Rolle College, Exmouth. New hon sec Mrs J. Nicholson, 35 Hollymount Close, Symonds Farm, Exmouth, tel 77263.
Newquay (N&DARS)—Alternate Wednesdays, 7.30pm. Treviglas School, Newquay. Full details from Ted, G3YJX, tel Wadebridge 2772.
North Devon (NDRC)—Second Wednesday in each month, 7.45pm. Pilton Community College, Barnstaple. Fourth Wednesday, 7.30pm. Bideford School, Abbotsham Road, Bideford. New chairman is G5HD. Full details from George, G4CG, tel Barnstaple 3683.
Plymouth (PRC)—Alternate Mondays, 7.30pm. New venue, Physics Lab, Tamar Secondary School, Paradise Road, Stoke, Plymouth. 25 May (Mobile rally at Tamar School with special call GB2PRC), 7 June (Special event station GB400D on Drake's Island to celebrate Plymouth 400 Festival). Full details from John, G4GWJ, tel Plymouth 338417.
Plymouth (PPARS)—During term time listening facilities available on 3·5–28MHz and on 144 and 432MHz for 24 hours every day. For further details contact the Amateur Radio Society, Plymouth Polytechnic Students Union, Drakes Circus, Plymouth.
Saltash (S&DARC)—First and third Fridays in each month, 7.30pm. Burraton Toc-H Hall, Saltash. 16 May (An outdoor meeting to activate the club call G8SAL on 2m). Visitors most welcome to club meetings. Full details from R. S. Pridham, G4BVB, tel Gunnislake 832891.
Torbay (TARS)—Every Friday with a special meeting on last Saturday of each month. GB3TR on R2 is now operational. 7.30pm. Bath Lane, rear of 94 Belgrave Road, Torquay. Full details from Mrs Ged Coker, c/o G4FCN, tel Ippleton 812117. Torbay net Mondays, Wednesdays and Fridays at 10.30am on 3·756MHz and on Saturdays at 10am. Visitors most welcome to club meetings.

RR9 will be running a bookstall at the Plymouth, Cornish and Torbay Rallies this year.

REGION 10—RR *(Post vacant).*
Barry (BCoERS)—Thursdays, 8pm. Teachers Centre, Weycock Cross, Five Mile Lane, Barry, South Glamorgan. Details from GW8OPK.
Blackwood (BARS)—Fridays, 7pm. Oakdale Community Centre, Oakdale, Blackwood, Gwent. Details from GW8UCQ, 2 The Alders, Oakdale, Blackwood.
Bridgend (B&DARC)—Second Wednesday in each month, 7.30pm. NCB Social Club, Tondu, Bridgend. Details from sec GW4BDV.
Cardiff (CRSGBG)—Second Monday in each month, 7.30pm. 12 May (Heavy duty low voltage power supplies", by GW3NWS), 9 June (Constructors contest), 14 July (Surplus sale). Pantmawr Inn, Pantmawr Estate, Cardiff. Details from GW3GHC.
Loughor (LAR&EC)—Every second Monday, 8pm. Loughor Boating Club. Further details from sec T. Griffin-Thomas, GW8TYS, 77 Castle Street, Loughor, Nr Swansea, W Glam, tel Swansea 893392. All amateurs, enthusiasts and swls welcome.
Merthyr (Hoover ARS)—Mondays, 7.30. Hoover Social Club, Pentrebach, Merthyr. Details from GW3RNC.
Newport (NARC)—Mondays, 7.30pm. Adult Education Settlement, Brynglas Road, Newport. Details from GW4HYZ.
Newtown (PARC)—Thursdays, 7.30pm. College of Further Education, Newtown, Powys. Details from GW4DWX.
Pembroke (PRSGBG)—Last Friday in each month, 7.30pm. Defensible Barracks, Pembroke Dock, Dyfed. Details from sec GW3XJQ.
Port Talbot (British Steel Corporation ARS)—Thursdays, 7.30pm. BSC Sports and Social Club, Margam, Port Talbot. Details from GW4ESV.
Rhondda (RARS)—Every other Thursday, 7.20pm. Transport Employees' Club, Porth. Details from GW3PHH.
Sully (S&DSWC)—Mondays fortnightly, 7pm. Sully Bowls and Social Club, 58 South Road, Sully, Cardiff. Details from David Hughes, 13 Nailsea Court, Sully.
Swansea (SARS)—Thursdays, fortnightly. 1 May, 15 May etc, 8pm. Technicians Common Room, 2nd Floor, College House, Swansea University. Details from GW4HSH.
Swansea (UCoSRS)—Thursdays, during term, 7.30pm. Room 801, Applied Science Building, University College of Swansea. Details from Tim Davies, c/o Dept. of Electrical Engineering.

REGION 11—RR P. H. Hudson, GW3IEQ, Silhill, Dinas Dinlle, Caernarvon.
Bangor (UCoNWARS)—Thursdays, 7.30pm. Small Lecture Theatre, School of Engineering Science, Dean Street, Bangor.
Conway Valley (CVARC)—Second Thursday in each month. 8 May (Visit to Anglesey Radio), 12 June (AGM and NFD discussion), 10 July (144MHz DF hunt). 7.45pm. The Quaries, Llandulas, Colwyn Bay.
Rhyl (R&DARC)—Fourth Thursday in each month. Ambulance Station, Coast Road, Rhyl. Other Thursdays (On the air on 144·00MHz), 8pm. Newcomers and visitors welcome.
Towyn (T&DARC)—Newly formed club. More details from hon sec GW8SYX, Merion ARS, tel 0654 710402.

REGION 12—RR F. Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR.
Aberdeen (ARS)—Fridays, 7.30pm. 80 Guild Street, Aberdeen (next to Station Hotel immediately adjacent to railway station). Sec GM4BKV. The club now has a print board service from your own artwork.
Dundee (Kingsway TCARC)—Tuesdays; 6.30pm, morse practice, 7–8pm arranged lectures, 8–8.15pm coffee, 8.15–9pm any other business and discussions. Programme details from sec GM8RDU.
Elgin (Moray Firth RS)—First Wednesday in each month, external venue. other Wednesdays, within Elgin Technical College. Due to small membership the arrangements may be varied. For full details contact GM4IAO or GM3KHH.
Invergordon (Easter Ross RC)—Every Wednesday evening. 100 High Street, Invergordon. Details from sec GM4DKL.
Inverness (ITCARC)—Every second Wednesday, 6.45pm. Room C30 Sec W. Lee, 36 Old Mill Road, Inverness.
Kirkwall—Members now meet on a few occasions during the year to discuss various aspects of amateur radio. Information from GM3IBU, tel Kirkwall 3232.
Perth (P&DARG)—First and third Tuesdays in each month. Room M1/15, Perth College of Further Education. Chairman GM8JCR. Details of programmes from sec Ian McLaren, GM8RYZ, 75 Viewlands Road West, Perth.
Shetland (Lerwick RC)—Wednesdays, 7.30pm. "Annsbrae House". Information from sec GM4BBL. Visitors always welcome. It is anticipated that a move will be made to new premises in Lerwick sometime during the coming year.

RR12 would be pleased to hear from club secretaries regarding club programmes. Please note the closing dates for information at the beginning of this feature. Lack of information from clubs may in the future result in those clubs not being mentioned in "Club News".

REGION 13—RR A. B. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH. Tel Kirkcaldy (0592) 200335.
Berwick-upon-Tweed (B&DARS)—First and third Fridays in each month, 7.30pm. Avenue Hotel, 122 Marygate, Berwick-upon-Tweed. Details from sec GM8IIO.
Borders Repeater Group—This group was set up to administer the two 144MHz repeater projects GB3BT (Berwick-upon-Tweed) and GB3SB (Scottish Borders). For details contact GM8MJV, tel 031-663 203.
Dalgety Bay (Marconi Space & Defence Systems ARC)—Open to employees and ex-employees of the company. Tuesdays, 7.30pm.

MSDS Social Club, Hillend Industrial Estate, Dalgety Bay, Fife. Details from GM3YND, tel Dalgety Bay 822678.
Dunfermline (DARS)—Second Wednesday in each month, 7.30pm. CCTV Studio, Pittencrieff School, Maitland Street, Dunfermline. Details from GM3CIG.
Edinburgh (E&DARC)—Tuesdays, 7.30pm. City Observatory, Calton Hill, Edinburgh. Details from GM3RFQ.
Edinburgh (Ferranti Recreation Club AR Section)—Membership is restricted to company personnel. Details from GM8JKG, tel 031-441 5684. Visits by other clubs by prior arrangement.
Edinburgh (GB3ED Repeater Group)—GB3ED is a 432MHz repeater situated at Napier College, Edinburgh, and operating on channel RB14 (output 433·350MHz, input 434·950MHz). Details of group meetings from GM3GBX, tel 031-447 2611.
Edinburgh (Heriot Watt UARC)—Open to persons attending any of the city's universities or colleges. Wednesdays, 2pm. Aerial Laboratory, Top Floor, Mountbatten Buildings, 31-35 Grassmarket, Edinburgh. Informal get-togethers, 7.30pm. University Bar, Riccarton Campus, Currie, Midlothian. Details from GM4EAU, tel 031-443 5061.
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. 22 May (DF hunt), 12 June (AGM), 26 June (Forward planning), 7.30pm. Room 3, Cannonball House, Lawnmarket, Edinburgh. Details from GM8BJF, tel 031-447 5527.
Glenrothes (G&DARS)—Wednesdays and third Sunday in each month. 18 May (EGM), 7.30pm. Provosts Land, Leslie, Fife. Details from GM4HBG, tel Glenrothes 771057.
St Andrews (U of St Andrews R&ES)—Details from Physics Department, North Haugh, St Andrews.

REGION 14—RR C. W. Tran, GM3WOJ, 21 Richmond Avenue, Dumfries DG2 7JS.
Ayr (AARG)—Two Sundays in each month. 4, 18 May, 1 June. No meeting in July or August. 7.30pm. Community Centre, Wellington Square, Ayr. Details from Sec GM3THI.
Dumfries (D&GREC)—First and third Mondays in each month. 19 May (RSGB slides lecture), 16 June (Talk by J. McVicar, GM8GEC). 7.30pm. Cargenholm Hotel, Dumfries. Details from sec C. Rodgers, GM8TKA, 5 Elder Avenue, Lincluden, Dumfries.
Falkirk (Stirlingshire ARG)—Details from sec GM4DGT.
Glasgow (West of Scotland ARS)—Fridays. 7.30pm. 22 Robertson Street, Glasgow. Details from sec GM4JDU, 3 Kelso Avenue, Paisley. This club is the host for this year's Scottish Amateur Radio Convention and dinner dance on 13 September. Details later.
Greenock (G&DARC)—Tuesdays and Fridays (RAE Course). 7.30pm. 22 Inverkip Street, Greenock. Details from sec Mr Watson.
Helensburgh (HARC)—First and third Wednesdays in each month. 7.30pm. Clyde Street School, Helensburgh. Details from GM4FEO.
Motherwell (Mid-Lanark ARS)—Third Friday in each month. Other Fridays informal meetings, club station, etc. 18 May (Foxhunt), 30 May ("TV information systems" by GM3ULP, 7.30pm), 14 June ("GM3PXK's 19th Birthday Party", trade stands, junk sale, etc. 11am start. Talk-in on S22, RSGB Repeater Working Group open meeting at 2pm. All welcome). Wrangholm Hall Community Centre, Jerviston Street, Motherwell. Details from sec GM4FKD.
Stevenson (Ardeer RCARS)—Thursdays. 8 May (RTTY demonstration), 15 May (Bring and buy sale), 29 May ("Ham radio old and new" by GM6RV). 7.30pm. Ardeer Recreation Club, Stevenson. Details from sec GM8BOM.

REGION 15—RR I. J. Kyle, GI8AYZ, 2 Galgorm Gardens, Ballymena, Co Antrim BT42 1BA. Tel 0266 2024.
Ballyclare (East Antrim ARC)—Newly formed club. Details from GI4BWM or GI8DMX, both QTHR.
Ballymena (BRC)—Fridays, 8pm. 86 Old Cullybackey Road. Annual radio rally on 21 September, Castle grounds, Antrim. Sec GI4HCN.
Bangor (B&DARS)—First Friday in each month, 8pm. Redcliffe Hotel, Bangor. 22 June (Mobile rally, Castlewellan Forest Park). Sec GI4AAM.
Belfast (BRSGBG)—Third Wednesday in each month, 8pm. 90 Belmont Road, Belfast. Details from GI3USS.
Belfast (CoBYMRC)—Tuesdays, 7pm; Saturdays, 2.30pm. 12 Wellington Place, Belfast. Sec Paul McTaggart, 14 Thirlmere Gardens, Belfast BT15 5EF.
Belfast (Queen's UoBRC)—Tuesdays during term, 7pm. Morse and RAE tuition available. Queen's University, 37 Fitzwilliam Street, Belfast. Sec GI4FVM.
Dromore (Lagan Valley ARS)—Second Monday in each month, 8pm. Scout Hall, Mossvale Road, Dromore, Co Down. Details from AR GI4GDV.
Londonderry (North West Ireland ARS)—First Monday in each month, 7.30pm. Technical College, Strand Road, Londonderry. Sec GI8MOA.
Mid-Ulster (MURSGBG)—First Sunday in each month. GI4BAC's QTH. Mobile rally, Sunday 18 May, Parkanaur, nr Castlecoulfield, Co Tyrone. Details from GI8RJW or GI8TAX.
North Ulster (NURSGBG)—Now reconstituted. Details of meetings from GI4HVI, GI8JTS QTHR.

As new clubs and groups are being formed in the region, would any members who have information about them please contact RR15.

An ORM will be held on Saturday 20 September, in the Antrim area. Full details in the next "Club News". Members who have topics for discussion please write to RR15 *well* in advance so that an agenda may be prepared.

REGION 16—RR M. S. Appleby, G3ZNU, 45 Cedar Avenue, Kesgrave, Ipswich IP5 7HA. Tel Ipswich (0473) 622559.
Braintree (B&DARS)—First and third Mondays in each month, 7.30pm. 19 May ("Coastguard communications", by Mr F. L. Bird). Braintree Community Centre, Victoria Street, Braintree. Details from Dave Boniface, G3ZXX.
Bury St Edmunds (BSERS)—Third Tuesday in each month, 7.30pm. Red Cross Headquarters, Mustow House, Eastgate Street, Bury St Edmunds. Details from John Munro, 29 Angel Hill, Bury St Edmunds.
Chelmsford (CARS)—First Tuesday in each month, 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details from A. Mead, G8KQE, 9 Abraham Drive, Silver End, Witham.
Colchester (CRA)—Thursdays, fortnightly, 7.30pm. 1 May (Arrangements for NFD and Anglian Mobile Rally), 15 May ("Radio control of model aircraft", by Don Cardy), 12 June ("UHF broadcast transmitters", by Graham Barrell, G3TKQ), 26 June ("The electronic organ", by David Carter, G8SOI). Colchester Institute, Sheepen Road, Colchester. Details from Frank Howe, G3FIJ.
Felixstowe (FARC)—Tuesdays, 8pm. 13 May (A Victorian lantern slide show, by Dave Robinson), 24 June ("13V 20A power supplies", by G4FBV and G3WDR). Felixstowe Ferry Golf Club. Details from John Hobin, G3XIX.
Great Yarmouth (GYRS)—Last Thursday in each month, 7.30pm. 67 Southdown Road, Great Yarmouth. Details from Tony Besford, G3NHU.
Harlow (H&DRS)—Tuesdays, 8pm. Mark Hall Barn, First Avenue, Harlow. Further details from hon sec A. C. Keeble, G4HPU.
Harwich (H&DRA)—Thursdays, 7.30pm. Harwich Adult Education Centre. Details from sec Tony Free, G4EYE.
Haverhill (H&DRS)—Fridays, 7.30pm. Steeple Bumpstead Road, Haverhill. Further details from Chris Kitchener, G8IMI, tel Haverhill 2852, evenings.
Ipswich (IRC)—Second and last Wednesdays in each month during school term time, 8pm. 14 May (Initial discussion and planning for VHF NFD, Ipswich Carnival and SSB Field Day), 11 June (Report on East Suffolk Wireless Revival, 1980, and discussion of forthcoming events), 25 June ("Submarine cables, and the use of fibre optics", by Dave Monro), 2 July (Final preparations for VHF NFD, Carnival and SSB FD). Morse classes also available. Handford House, Ranelagh Road, Ipswich. Details from Jack Tootill, G4IFF.
Loughton (L&DARS)—Fridays, fortnightly, 8pm. 16 May ("Video recorders—the VHS system", by Ted Harrison, G8NPF), 13 June (subject to be arranged). Loughton Hall, Rectory Lane, Loughton. Details from John Ray, G8DZH, tel 01-508 3434, evenings.
Lowestoft (L&DARC)—Fridays, 7.30pm. 9 May ("Post Office Datel Service" and "Engineers in communications", PO films), 23 May (Visit to USAF Base at RAF Bentwaters). Meetings are at North Suffolk Teachers' Centre, Lovewell Road, Lowestoft. Details from Paul Godfrey, G8JBD.
Martlesham (MRS)—First Wednesday in each month, 7.30pm. 7 May ("High power amplifier clinic", by John Nelson, G4FRX, of Cambrian Electronics). PO Research Centre, Martlesham Heath, Ipswich. Visitors always welcome but must first contact Simon Garrett, G4EVN.
Norwich (Norfolk ARC)—Wednesdays, 7.45pm. Crome Community Centre, Telegraph Lane East, Norwich. Details from Peter Forster, G3VWQ.
Southend (S&DRS)—Fridays, fortnightly, 8pm. Church Hall, Sir Walter Raleigh Drive, Rayleigh, Essex. Contact sec G3YOA.
Stowmarket (S&DARS)—First Monday in each month, 7.30pm. Red Cross Hall, Stowmarket Railway Station. Details from Ray Preston, G8MYE.
Thurrock (TARC)—First and third Tuesdays in each month, 8pm.

Grays Park Hall, Orsett Road, Grays. Morse tuition available. Details from sec G3KMD. Club net on 144MHz S21/22, on second and fourth Tuesdays in each month, 8pm. New members and visitors welcome.
Vange (VARS)—Thursdays, 8pm. Main Hall, Barstable Tenants' Community Association, Long Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon SS14 1TE.

REGION 17—RR H. G. Cunningham, G8FG, 235 Station Road, West Moors, Wimborne, Dorset BH22 0HZ. Tel Ferndown (0202) 876018.

Basingstoke (BARC)—Third Wednesday in each month, 7.30pm. Chineham House, Popley, Basingstoke. Sec, G4HTM, tel Basingstoke 23421.
Basingstoke (UK FM Group Southern)—First Wednesday in each month; May (Talk on Chalk Pit Museum by Ron Ham), 7.30pm. Chineham House, Popley, Basingstoke. PRO Jan Payne, tel Aldershot 26108 .
Bournemouth (BRS)—First and third Fridays in each month, 8pm. Dolphin Hotel, Holdenhurst Road, Bournemouth. Sec Bob Freeth, G4HFQ, tel New Milton 618092.
Chippenham (C&DARC)—Tuesdays, 7.30pm. Sheldon School, Hardenhuish Lane, Chippenham, Sec P. J. Tuck.
Fareham (F&DARC)—First and third Wednesdays in each month, 7.30pm. Porchester Community Centre, Room 9. Sec David James, G8GRV, tel Titchfield (03294) 45977.
Farnborough (F&DRC)—Second and fourth Wednesdays in each month, 7.30pm. Railway Enthusiasts' Club, Access Road, off Hawley Lane (near M3 bridge), Farnborough. Sec Ivor Ireland, G4BJQ, tel Farnborough 43036.
Guernsey (GARS)—Tuesdays and Fridays. Details from sec GU8KUT, PO Box 100, St Peter Port, Guernsey.
Horndean (H&DARC)—Second Thursday in each month, 7.30pm. Merchiston Hall, Horndean. Sec S. Jenkins, G4CHO, tel (0705) 591788.
Jersey (JAEC)—Details from sec, tel 0534 23249.
Jersey (JARS)—Sundays, 10.30am. Fridays, 8pm. Le Hocq Tower, St Clement, Jersey. Sec R. H. Ford, Sanaldi House, Plat Douet Road, Bagot, St Saviour, tel 0534 31131.
Poole (PARS)—Last Friday in each month, 7.30pm. Poole Technical College. Sec Phil Ciotti, G3XBZ, 214 Rossmore Road, Parkstone, Poole.
Portsdown Hill Repeater Group—Repeater going QRT for re-engineering prior to fitting at a new site. Sec G8GNB.
Portsmouth (P&DRS)—Wednesdays, 7.30pm. Portsmouth Community Centre, Malins Road, Buckland, Portsmouth. Sec G3JZV.
Salisbury (SR&ES)—Tuesdays, 7.30pm. Salisbury Activity Centre, Wilton Road. Sec G2FIX, 74 Victoria Road, Wilton, Salisbury.
Southampton (SUARC)—Tuesday evenings. Also informal meetings every lunchtime in the clubroom, Old Union Building. Sec A. C. Talbot, The Radio Club, JCR Post, The University, Southampton.
Southampton (SRSGBG)—Wednesdays. The Clubroom, Kent Road. 7.30pm. AR J. R. Compton, G4COM, tel Fair Oak 3017.
South Dorset (SDRS)—First Tuesday in each month, 7.30pm. Lecture Hall, South Dorset Technical College, Newstead Road, Weymouth. Sec John Nailer, G4CFY, tel 0305 5411.
Swindon (S&DARC)—Alternate Wednesdays, 7.45pm. Clubroom, Oasis Leisure Centre. Sec K. Clinch, G8OQY, 13 Pound Piece, Ashbury, Swindon.
Winchester (WARC)—Third Saturday in each month. The Scout Log Cabin, Stockbridge Road, Winchester. First Friday in each month (Informal). Crown Hotel, North Walls, Winchester. Both at 8pm. Sec Peter Simpkins, G3MCL, Lawn End, Park Road, Winchester.

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

Durham (DURES)—During term. Physics Dept, Science Site, Durham University. Forthcoming events include a film/talk "Man in Space", by Lt/Commander Nicoll, RN (Plymouth). Details of this and other events from G3ZJY, G4FOP, or sec Miss E. Dean, Collingwood College, Durham. External members welcome.
Easington (EAR&EC)—Tuesdays and Thursdays, 7.30pm. Easington Village Workmen's Club. RAE and morse tuition if required (the club has a good pass record). Details from sec G4GXI. All welcome.
Great Lumley (GLAR&EC)—Wednesdays, 7.30pm. Great Lumley Community Centre. Sec G4DWM.
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)—For details contact G4GWB.
Newcastle upon Tyne (Tyne & Wear Repeater Group)—Arts Common Room, Claremont Tower Block, Newcastle University. Sec G4DOB, tel Newcastle 744444.
South Shields (SS&DRS)—Fridays, 7.30pm. Trinity House. Old and new members welcome. Sec G8BQF, 67 Lauderdale Avenue.
Tyneside (TRS)—Mondays, 7.30pm. The Community Centre, Vine Street, Wallsend. Morse tuition can be arranged. Sec G8OFA, 69 Rectory Lane, Blaydon-on-Tyne. New members welcome; club equipped for multiband operation.

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

Barking (BR&ES)—Weeknights Monday-Friday. Westbury School, Westbury Road, Ripple Road, Barking. 12-13 July (Dagenham Town Show). Further details from sec Alan Sammons, G8IZN. All are welcome.
Central London (Post Office HQ ARC)—Third Thursday in each month (Lectures), 5.30pm. Location varies. First Thursday in each month (Bar socials), 12-2pm. Central London. For specific details of this group, for members of PO only, contact P. H. J. Houseago, G8SGB, tel 01-388 6161 ext 202 or 204.
Cheshunt (C&DRC)—Wednesdays. 7 May (RAE/natter night), 14 May (Natter/RAE de-briefing), 21 May (Junk sale), 28 May (Natter/exhibition/cw), 4 June (Broxbourne Common—vhf portable station, Broxbourne School Fete), 11 June (Natter/cw), 18 June (Talk by P. Essery, G3KFE, of *SW Magazine*), 25 June (Natternight), 8pm. Church Room, Church Lane, Wormley, Herts (off the A1170 Cheshunt to Broxbourne Road). Further details from ASR Jim Sleight, G3OJI, tel Ware 4316, or G8LNM, QTHR.
Chingford (Silverthorn RC)—7.30pm. Friday Hill House, Simmonds Lane, Chingford E4. Hon sec Chris Hoare, G4AJA, tel 01-529 2282. All are welcome to attend any meeting.
Chiswick (Acton, Brentford & Chiswick RC)—Latest news—venue was burnt down. RF? Meetings now held in Chiswick Town Hall, London W4. 20 May ("My visit to HXH Land", by G3CCD), 17 June ("ZL Land", by ZL1BEP). 7.30pm. Committee Room, Town Hall, W4. Hon sec W. Dyer, G3GEH, QTHR.
Ealing (E&DARS)—Tuesdays, 8pm. Northfields Community Centre, Northfields Road, London W13. Hon sec E. Batts, G8LWY, 27 Cranmer Court, Richmond Road, Kingston Upon Thames. All welcome.
East London (ELRSGBG)—Third Sunday in each month up to and incl May, then Sept to May 1981. 18 May ("Early days of amateur radio, by G3AMF and G2MI). 3pm. Wanstead House, The Green, Wanstead, E11. Hon Sec G3PKQ, QTHR, tel 01-558 2928. All welcome.
Edgware (E&DRS)—Second and fourth Thursday in each month. 8pm. 8 May (to be arranged). 22 May (Construction contest/NFD), 7 & 8 June (NFD at Copthall Playing Fields, NW4), 12 June (to be arranged). The Watling Centre, 145 Grange Hill Road, Burnt Oak, Edgware. Further information from G3MNO, D. Lisney, tel 01-907 1237, or any committee member. Slow morse classes held on first and third Thursday of month at 7.30pm. All welcome. Edgware Net, Monday, 10pm local time, on 1·875MHz.
St Albans (Verulam ARC)—Fourth Thursday of each month. 22 May ("Direction finding", by E. Mollart), 26 June ("1GHz and above", by SW Herts VHF Group). 8pm. Jubilee Centre, Catherine Street, St Albans, Herts. Hon sec A. Clarke, G8MAE, QTHR, tel 0442 64751.
Shelburne (SRC)—Thursdays, 7pm. Shelburne Youth Centre, Hornsey Road, London N7. RAE courses available. Hon sec T. C. Clark, G4BZW, tel 01-249 1843. Sec would be pleased to hear from any prospective members. The club has a 2000E transceiver, and G5RV for licensed members to use.
Southgate (SRC)—Second Thursday in each month. 15 May ("It could happen to you", first aid, by G3CRO), 12 June ("Video recording", by David Stone, G8NGF), July ("Microprocessor control of slide projectors", by John Fitch, G8EWG), after tea break a quiz. 7.45pm. The Scout Hut, Wilson Street, Winchmore Hill Green N21. Sec John Fitch, G8EWG, tel 440 7353. All newcomers welcome.
South West Herts UHF Group—The building of GB3BH (1·3GHz/beacon/repeater) is progressing, and the group's 10GHz beacon, GB3SWH, is now operational. Reports are requested from as many amateurs as possible to evaluate GB3SWH's catchment area. Talks can be arranged for interested groups. Contact hon sec G8BBE.
Stevenage (S&DARS)—First and third Thursdays in each month; 8pm. Senior Staff Canteen, Site B, British Aerospace, Gunnels Wood Road, Stevenage. Information from Peter Byrne, G8MCV, tel 0438 64624; or net Mondays, 7.30pm. 145·550 fm, or ASR Trevor Tugwell, G8KMV, QTHR.
West Drayton (LT District Line ARC)—Thursdays, 6pm. DLAA Sports Ground, Park Place, Gunnersbury Avenue W3. (Bar). This club requires the attendance of former members, who lost interest, to enable

A photograph taken at the RSGB Bristol Group AGM held on 28 January 1980. Among the guests was Zone D Council member Les Hawkyard, G5HD. The 1980 committee, in the front row, l to r, are: R. Thompson, G3TKF; G. Short, G8GLQ; E. Halliday, G3JMY, vice-chairman; B. L. Goddard, G4FRG, hon secretary; A. A. Uppington, G2BAR, chairman; D. R. Stone, G8FNR, hon treasurer; E. J. Davis, G3SXY; D. Iles, G3COP; and R. Foot, G4BKU

the club to survive. It would also like the assistance of local amateurs who could give talks on any radio topic. Hon sec R. Ball, G8JEB, tel 01-422 0414. Club net 144·250 ssb, 2000-2100 local.

REGION 20—RR G. Mather, G3GKA, 8 Hills Close, Keynsham, Bristol. Tel Keynsham 61625.

Bridgwater (HPSSARS)—Second Monday in each month, 7.30pm. YMCA, Nr St John Ambulance Hall. Further details from G4ETN.

Bristol (BARC)—Tuesdays, 7.30pm. The University Settlement, Barton Hill, Bristol 5. Sec G8KGE.

Bristol (BRSGBG)—Last Monday in each month. 7-9.30pm. Small Lecture Theatre, Queens Building, University Walk, Clifton, Bristol. Hon sec G4FRG.

Bristol (North Bristol ARC)—Fridays, 7.30pm. Self help enterprise, Braemar Crescent, off Braemar Avenue, Northville, Bristol, RAE and morse classes. 11 May (Toghill Mobile Picnic), 2pm. Toghill Picnic Area, half-mile from junction of A46/A420 on Bristol side. Hon sec G2HDG.

Bristol (Shirehampton ARC)—Fridays, 7pm. Twyford House, Shirehampton. Hon sec G4GTD. HF and vhf station all modes, lectures and films, df hunts etc, planned for 1980. RAE and morse classes in progress. New members welcome.

Cheltenham (CARA)—First Thursday (formal) and third Friday (natter night) of each month at 7.30-8pm. The Old Bakery, Chester Walk, Clarence Street (rear of public library). Hon sec G4ILI, tel Cheltenham 43891. All visitors welcome.

Gloucester (GARS)—Thursdays; first Thursday in each month (society business followed by a talk), remaining Thursdays (activity nights with G4AYM in operation), 7pm. Chequers Bridge Centre, Painswick Road, Gloucester. Hon sec G3MA.

North Avon Repeater Group—Provisionally GB3AA at Alveston, Avon. Group meets on an *ad hoc* basis. Further information from G8NNU.

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

Yate (Y&DARC)—First Friday in each month, 8pm. G3RQN QTH. Further details from G8LGC. All welcome including swls.

Yeovil (Y&DARC)—Thursdays (Lectures most weeks), 7.30pm. Building 101, Houndstone Camp, Yeovil (off A3088). Hon sec G3NOF. Club net 10.30am Sundays, 3·660MHz.

The Brunel Technical College RS wants new members. Contact Students' Union, Cabot House, Brunel Technical College, Bristol, or Martyn, Bristol 678467.

A talk on the Mendip repeater was given at a recent meeting of the Yeovil & D ARC by Chris Morcom, G3VEH, chairman of the RSGB VHF Committee, who is seen here with some of the club members. L to r: (back) G3VOF, G3NOF, G3XFW, G3YBY, G3VEH, G3MYM; (front) G3DSS and G4EVI. *Photo:* G8VUZ

members' ads

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB. They must be submitted on the Members' Ads order form printed in alternate issues of *Radio Communication*, or on a postcard similarly laid out. Each **must** be accompanied by a **recent** *Radio Communication* mailing label addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque for 75p (stamps not accepted) for every 40 words or part thereof. They will not be acknowledged. Those not clearly worded or punctuated will be returned. No correspondence concerning this service can be entered into.

Closing dates in 1980 for issues in brackets: **23 May (July), 20 June (August), 18 July (September), 29 August (October), 26 September (November), 24 October (December), 21 November (January), 19 December (February).**

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.

Advertisements for 27MHz equipment will not be accepted.

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

Do not post to RSGB HQ or Advertising Representative

RATE INCREASE
SEE ANNOUNCEMENT ON PAGE 474

FOR SALE

KW2000A ac and dc power packs, £200 ono. Two KW2000A mobile power packs, negative earth, £25 each. G3PHK, QTHR. Tel 0323 53233.

Redifon GR286 Mk3, fitted R2, R4, R6, R7, full manual, clean cond, toneburst, £30. Pye Cambridge AM10D, unconverted, needs attention, £15. Stella four-track tape recorder, very basic but good cond, £10. Buyer collects. G8SEC. Tel 061-861 0607.

IC215, R3-7, S20, S22, S0, S32, rev R6 rx, flexible antenna, mobile mounting bracket, switched toneburst, £125. Sealectro 11 by 20 programming patchboard, component pins, brand new, £12. G8FRL, QTHR. Tel Cambridge (0223) 64565.

FT200B, FP200, G3LLL clipper, all 10m, £225. G4EOG, QTHR. Tel Braintree (0376) 25109.

Sommerkamp FT250 tx/rx, hb psu, £190. FRG7, fine tune, £150. MMT144/28, £65. 10Y 2m Jaybeam Yagi, £5. KIM1 microprocessor, psu, several programs, including rtty, morse, £80. Cash needed towards new hf rig. G3YQB, QTHR. Princes Risboro, Bucks. Tel 084 44 6715.

FLDX/FRDX 500 comp set unused valves, rx has vhf converter, £250. Icom 202, hardly used, range of xtals, £110. G4FWT, QTHR. Tel Taunton 82007.

Old roms for CBM pet, £20. 8K dynamic rams, £35. New 110V Soundlite, £10. 1200 double balanced mixers, MC1496L, £500. New Shure Unidyne mic, £20. Groovac vacuum record cleaner, £4. Polaroid camera, £10. G3TGF, QTHR. Tel Orpington 26802.

Drake MN4C atu, swr, power meter, mint cond, no reasonable offer refused. Lewis. 73 Lomond Road, Springbank, West Hull, North Humberside.

Trio TS500 tx/rx, 80-10m 2X6146B pa, full wkg order, handbook, as new cond, inc PS500, orig boxes, £165. Datong compressor, £30. SEM auto hf pre-amp, £10. Codar PR40 preselector, data, as new, £14. Shields. G3OIH, QTHR. Tel Blackburn (0254) 62411, 10am-6pm, 886007 after 6pm.

Trio 2200G, auto toneburst, inbuilt pre-amp, channel, S-meter light, rechargeable nicads, mains charger, carrying case, mobile mounting brackets, 12V dc supply lead, mic, xtalled 19 channels, S0, S3-7, S14, S18-23, R0, R3-7, helical antenna (BNC), £90. G4FFY, QTHR. Tel Ray 01-642 9871. TR2200G as above less pre-amp, spare telescopic antenna, xtalled R0, R3, R5-7, RR0, RR5, RR7, S20-23, £150. Pair PF1 70cm pocketphones, rechargeable nicads, xtalled RB14, spare pair for SU8, mains charger, rx audio amp, £70. Signal generator, Airmec 201 30kHz-30MHz, £50. Piano accordian £200. Various household items, lampshades, radiators, electric fires, plugs, sockets, 5A-15A and continental etc, offers. Tel John 01-647 1978.

Katsumi electronic keyer, EK150, as new, any trial, £30. G3HRU, QTHR. Tel Leeds 677178.

Yaesu FT7 tx/rx, Yaesu FL110 linear, both six months old; mint cond, orig packing, instruction books, £330, will consider separating. Heath HW17A a.m. tx/rx, unmodified, dc-dc converter for HW17A, offers. Will deliver over reasonable distances. G8CAL, QTHR. Tel 0906 273525.

GLA1000 linear, six months old, prime cond, £200. PM2000 p.e.p., swr, meter, £20. ST5B Catronics t/u 170/450Hz shift, £30. Pair 4250A plus bases, £20. LT tranny, £5. GM3XMZ, QTHR. Tel Sumburgh 60314.

Quartz 16, fitted 18 channels, six repeater, 12 simplex, comp box, instructions, £110. Yaesu FT220, all mode 2m pre-amp, repeater shift, timeout, instructions, £195. G4IHF, QTHR. Tel Rochdale 40877.

HW100, comp with psu, manuals, £150 ono. Belcom FS1007P, 2m fm scanning tx/rx, 13chs fitted, as new, £100. BC221 comp with charts, integral psu, offers. G4AWD, QTHR. Tel 01-359 1004, evenings.

Swop: 1963 Triumph Tiger Cub, requires rebuild, for amateur bands rx, must be good cond. Tel Ray, 0778 345032.

Hudson AM108III 4m mobile, xtalled, professionally realigned on 70-26MHz, includes handset, rf connecter, photocopied handbook, performance figures, £18 ono. G3YEK NOT QTHR (Wembley). Tel 01-903 0720, evenings.

18AVT/WB 80-10m vertical antenna, good cond, £30: or will swop for 432/28-30 conversion. G8TMR. Tel Liverpool (051) 523 2483, evenings.

Pye Europa 70cm mobile solid-state tx/rx, fitted R2, SU8 xtals, ASP base station, co-linear antenna, mint cond, £100. G4DTA, QTHR.

FL 110 linear 12V, 200W, 80-10m, new, unused, quad detectors, suitable Cambridge, quantity Pye Ranger and base manuals, *Radio Communication,* Jan '62-Aug '71, *Radio tv and Servicing,* Hawker, Vol 1-6 to 1960, offers. GW8OKR, QTHR. Tel Cardiff (0222) 67151.

FT101 Mk2 cw filter fan, matching ext vfo, ext spkr, orig packing, £400. Drake SSR1, vgc, instruction, service manuals, £145. Europa 'B' 30/2m, unused, £100. Yaesu YO100, as new, £130. Solartron CD1212 wideband, dual plug-ins, manual, £120. FT101 Mk2 spec cw filter fan, matching vfo spkr, vgc. Tel 0873 5380.

Equipment deceased amateur: hf/vhf txs, as new, ancillary equipment, test gear, sae list. Buyer collects or pays carr. G2YS, QTHR. Tel Rickmansworth 76864.

Collins 30L1 linear, spare set of 811A valves, £350. Collins 32S1 transmitter, 516F2 psu, spkr, £250. KW160 atu, £35; all as new cond, in perfect wkg order. G3KDH, QTHR. Tel Tring 3505.

Shack update enables sale: FDK2015 fm synthesized 2m, £200 ono. FT277, as FT101, fan, spare new pa valves, £220 ono. KP202, charger, nicads, case, helical, xtal toneburst, £65. G4AEU, QTHR. Tel Southampton 23458, daytime; 772812, evenings.

Power supply unit, built for pair 4CX250s, all supplies conservatively rated, 19 × 8 × 8in, £40. Carr extra. GW8AWM, QTHR. Tel 04955 2254.

TR2200GX, S20-22, R0, R4-5, nicads, charger, psu lead, carrying case, orig packing, used little, vgc, £115. Heath HW32A, HP23A ac psu, revalved, vgc, £75. G3SMV. QTHR.

144MHz a.m. tx, 40W input, QQV03/20A pa, needs mod transformer, £20. Mod transformer, £5, or free with tx. ICs, all brand new, two SL610C, six SL612C, £2 ea. Two SL640C, £3.50 ea. TDA1200, £1. Offers welcome. G4FKA, QTHR. Tel 0438 59019.

Pye Westminster 2m fm mobile, six channel, S0, S18, S20-22, R5, £50 ono. G8GNB. Tel 0329 41456.

FT101E, mint cond, manual, 350Hz 8-pole filter, YF30HC1 ac/dc leads, mic, orig packing, MFJ 16010 atu, Heath HM15 swr meter, DPKB104, 14, 21, 28MHz, vertical 20yd hd feeder, comp stn, lump sum, £525. G3URG, QTHR.

Trio TS700, vox, £300. Property of G4FDX. G8TLU. 7A Meadow Road, Toddington, Dunstable, Beds LV5 6BB. Tel Graeme, Toddington (05255) 2760.

Multi 800D, scanner, additional remote display, 1-25W, £230. SWR meter, type SWR50, new, £9. G3MCL, QTHR. Tel Winchester 65814.

Heathkit SB104A, all solid-state tx/rx, digital readout, 80-10, 200W, matching p/supply, spkr unit, cw filter installed, immaculate cond, £375. G3XKF NOT QTHR. Tel Aylesbury (Bucks) 748256.

Drake TR4, RV4 remote vfo, AC4 psu, vgc, BC221, calibration book, hb psu, £300 ono. Wkg STC l/mw broadcast rx CC1926, amplion horn ls, offers. G3ONU, QTHR. Tel Garston (Herts) 76344.

Drake R4B rx 160m-10m, extra bands, in first class cond, £250 ono. GM8BOV, QTHR. Tel 031-331 2755.
Drake T4X, R4B, MS4, spkr, AC3 psu, all mint, several spares incl new finals mic, several valves, mains transformer xtals, in daily use, any trial, £520. Will separate spkr, £15. G5FH, QTHR. Tel 0425 25974, evenings.
KW2000, ac power supply, good cond, £115 ono. G4HNF, QTHR. Tel Salisbury 6408.
W15U, 12W pa, fitted RB0, 2, 4, 10, 14 (tx only), scanner, comp, £75. AR240, ac, dc power supplies, helical, £135. Tel Cambridge 892352.
HW32A 20m tx/rx, ssb, hb, psu, £60. G3LWL, QTHR. Tel Wincanton 33204.
Trio 7010, 2m, ssb, tx/rx, orig packing, handbook, un-mod, Jaybeam, 10-el, 2m, £140 ono. G8JDH, QTHR. Tel 01-650 5465.
Hellschreiber type MS_3, Dr Jng. Rudolf Hell apparatus, offers. Kelsall. G4FM. Birch House Cottage, Cockerham, Lancaster. Tel 0524—65272, daytime.
FT101E, cw filter, speech processor, 240V ac, 12V dc, Yaesu 844 desk mic, hand mic, phones, all leads etc, manual, mint, boxed, £475. Prefer buyer collects. G4FXG, QTHR. Tel Poulton-le-Fylde 883461.
5DEP31F 'scope tube, Hitachi, brand new, unused, £15. Defty. 119 Westmorland Rise, Peterlee, Durham.
FT227R memorizer, no mods, £170. Microwave Modules conv, 144–28, £17. IC21 24ch tx/rx, separate rx vfo, £120. Halo for 2m, £3. Collaro studio record turntable, £4. G8CZH, QTHR. Tel 01-859 1852.
Trio 9R59D, gen coverage rx, good cond, mods: fm i.f. strip; front panel control on function switch; £40. MMC28-144, new, in box, £15. P. Children. G8MDY, QTHR Upminster, Essex.
KW2000A, ac supply, October service, one year guarantee by KW, new pa, filter, vgc, Technical Assoc speech compressor, all handbooks, £199 ono. G3WUD. Tel 01-902 7211.
AR8516L RCA rx, mint cond, cabinet, spare valves, many other spares, manual, superlative general coverage rig, has Collins mechanical filter as orig fitting, £200. G3KQR, QTHR.
Drake TR4C, matching psu, vfo/spkr, recently serviced and realigned by Radio Shack, £435. G3LMH, QTHR. Tel 0962 881644.
Microwave Modules MMT/432/28 transverter, £70. Honest FC5M 50MHz frequency counter, £30. Clare Pendar KB3 ASCII keyboard, £25. All as new. G3AAV, QTHR. Tel Leeds (0532) 751100.
Hilomast NK12 pneumatic, telescopic to 40ft, £250. G4GCA, QTHR. Tel Welwyn Garden 25257.
KW Viceroy Mk3, matching psu, 10–80m ssb, cw, a.m. tx, 180W p.e.p., manual, circuit, £70 ono. Prefer buyer collects. G4GYO, QTHR. Tel Northwood (09274) 21732, weekends.
Eddystone communication rx, model 680X, amateur and broadcast bands, mint cond, buyer inspects, collects, £75. Hunting. 22 Northgate, Oakham, Leics. Tel 2685.
Video monitor, 14in Philips EL8114, solid-state, service h/book, picture, but has fault, £17. Mu-fax tx, K400B, £20. Storno 600, £110. Tel 01-648 5895, office hours.
RX type 45, £10. BC221, £15. Panda 120V, £10. 504, £7. 348, £6. 1191, £1. Walter Vignoles megger, £8. Cowlgill, £5. 3in 50V Selsyns, ANAPA1, TA33Jr, £30. Heathkit grid dip, £10. Mk III suitcase, B2 coils, other gear, keys. G2CMK, QTHR. Tel Norwich 45457.
Pocketfone PF1 tx/rx, on 70cm, £25. PF1 nicads, £8. PF1 charger unit, £25. TS700 xtals: S20-23, R0, R7, £1.50 each, or the lot £8. R1475 rx, 2-20MHz, suit beginner, £15. All collect or add postage. G8EBM, QTHR. Tel Brailsford (033 528) 755.
KW2000E ac psu, Shure 201 mic, KW110 Q-multiplier, manual, spare pas, £265. 22in Mullard A56120X colour tube, c/w scanning coil assy, used for short period, £20. G4GSE, QTHR. Tel Swanley 64486.
Atlas 210X, digital readout, noise suppressor board, mint cond, one of last models made, £475. B. Sykes, G2HCG. 52 Marine Drive, East New Milton, Hants BH25 7DX. Tel 0425 617090.
MMV1296 23cm varactor tripler, £24. G3LLL FT101 NBFM units, rx and tx boards, £30. Yaesu SP401 spkr, £10. G3OHC, QTHR. Tel 021-308 2512.
Trio TR7200G, 2m, fm, 10W, xtals; S0, R1-7, S8, S20-22, S10, mic, auto toneburst, car mounting bracket, in makers orig box, vgc, £135. G3ZZX, QTHR. Tel Burgess Hill 41004, after 6pm or weekends.
B40, £30. 88 set, £3. 31 set for spares only, £1. TF995A/2, 2-200MHz signal generator, requires attenuator, £6. Elliott VM1020 for spares, £5. 703A low band base tx, £5. TK18 tape recorder, £10. Tel Southport (0704) 24760, or 77613.
Uniden 2030 12ch, on 2m, 10W, toneburst, exc cond, £110. Shack clearance items incl uhf base, chimney, 4CX250B, 2C39 valves, vidicons, etc. G4FDR NOT QTHR. Tel Stourport-on-Severn 6970.
Speech processor, based on pcb rfc/m by Datong, exc cond, £25 ono. Frequency agile filter FL1 by Datong, £50 ono. G2FSA, QTHR. Tel Ashtead 74733.
Yaesu FR101 rx, matching spkr, purchased, £553, August 1979, many more items of the late swl B. Moloney. Offers. Contact G8UVW. Tel 059 84 377, or G8BXO, QTHR. Tel 07695 3382, evenings.
MMC 432/28 converter, £14. Trio JR599 custom special rx, matching SP599 spkr, £160 ono. Delivery extra. G8AYY, QTHR.
HW101 10–80m tx/rx, Heathkit psu, spkr, two years old, £250. AR22R rotator, £25 ono. *Wanted:* Ham M rotator. G3SRZ, QTHR. Tel Par (0726) 813375.
Two 4m fm handhelds, Ultra 4B6s, nicads, handsets, orig blueprint circuits, xtals for 70·26, 70·355, 70·375, in wkg order, £69. Old *Wireless Worlds*, 1942–48, £1 each. G3SLI, QTHR. Tel 07344 79850.
HW7, manual, £25. MM 144MHz converter, 2–4MHz i.f., £12. Sentinel top-band converter, 14MHz, i.f., £10. GI3NZZ, QTHR. Tel Kilkeel (069 37) 62564.
Get on 70cm cheaply: MMT 432/28 transverter, £70; QM70 432/28 switched converter, £23; 2m Sentinel auto pre-amp, £13; all guaranteed. G4JJ, QTHR. Tel Barnsley 203704.
TH3JR tribander, CD44 rotator, both defective after five years, trap or traps corroded, limit switch scratchy, wholly replaced and repairs not attempted, mechanic's opportunity, packaged for collection with every detail incl manuals, £25. G2RO, QTHR Devon. Tel Kingsbridge 580616.
FT101 Mk2, 160–10m fan, mic, a.m., filter, ac/dc leads, manual, vgc, £295. Jaybeam 6-el quad, £12. G4FCR, QTHR. Tel Solihull (021) 745 5868.
Eddystone 730/4 gen cov rx, electrically ok, but dial broken, repairable, £65. 145MHz linear and pre-amp by Modular Electronics, 10W input, 40W output, £35. Durst F30 enlarger, £40. GM4AWA, QTHR. Tel 073881 2815, home, 0738 21241, extn 238, office.
FRG7 Mk III, analogue, ssb 2·1 mech filter, a.m., Murata 4kHz filter, Gilfer USA mod, Yaesu, separate spkr, battery holder, orig packing, exc, £165, no offers. QM70, 144/28, as new, £12. 144/TT, Slim Jim, as new, £12. SEM Sentinel auto/hf pre-amp, as new, £10. Codar No 6, multiband rx, young swl, as new, £10. Two old Codar T28c, 80/40 rx, wkg ok, £8 each. Buyer collects. D. Mathews. SW London. Tel 01-876 7868.
QRT Clearance: FT101E tx/rx, £400. FL2100B linear, £250. Y100 monitorscope, £100. SP101 spkr, £10. KW109 high power Supermatch, £100. Drake tv 3300, low-pass filter, £10. Weston PM2000, p.e.p./swr meter, £40. Cambridge noise bridge, £5. All in mint cond. AR40 rotator, controller, unused, £25. CSC 100MHz counter, unused, £40. Tech TE15, grid dip meter, unused, £15. Buyers to collect. Telomast, 30ft, comp with rigging, extra sections, high power W3DZZ, Balum, 75ft app, UR67 coaxial, 15ft chimney mast, brackets, the lot £50. Buyer to dismantle, take away. G3DTX, QTHR. Tel Little Chalfont 3108.
Yaesu FT101ZD, fan, mic, two months old, £575. 14AVQ/WB, £40. G5CZU, Tel Cesar, 01-997 5758, after 7pm.
CT436 double beam 6MHz 'scope, leads, manual, very good order, £90. Pye Cambridge FM10P, battery box, mic, 5/8 mag mount, 6ch, tuning meter, SD306, xtal toneburst, £60. 70cm Starphone, mic, circuits, £50. G3OGM, QTHR. Tel 02514 29553.
TRS80 16K, level II, comp Tandy system, monitor, cassette, modified for UK tv, incl modulator, all handbooks, learning level II, many tapes, current cost over £600, offers around £495. G4FMD, QTHR. Tel Malcolm, Great Dunmow 3119.
Gone mobile: FT200, orig packing, £150. Eddystone 730/4, £80. Europa 2m transverter, £50. All with handbooks. R1155, psu, spkr, £25. 14AVQ, 33ft coaxial, £25. 2m 8-el beam, free first caller. Buyer collects. G3TJC, QTHR. Tel 0274 582781.
Trio 7500, 80 channels, 2m fm tx/rx, exc cond, in maker's box, comp mic, mobile mount, handbook, used only as battery powered base station, incl post £190. Securicor extra. G8PEW, QTHR. Tel 0493 67980.
KW Viceroy MkIII, Lafayette HA350, both good cond, exc signals, £110. Will deliver reasonable distance. G3WUZ, QTHR. Tel 0278 76277.
Eddystone communications rx, EC10 Mk2, mains unit, unmarked, mint cond, manual, £130 ono. New 2m 2·5W cw tx, transistor, unused, manual, £15 ono. Cash sale. Buyer collects. G3FK, QTHR. Tel 07257 436.
Five Nixie tubes, new, unused, side viewing type, £1, plus postage. Grampian DP4 dynamic mic, unused, in box, £5, plus postage. *Wanted:* Urgently, manual for telequipment type D31, oscilloscope. GW8EQJ, QTHR. Tel Chester 671994, after 6pm.
IC202 xtalled for Oscar, carrying case, nicads, charger, vgc, orig packing, £150. G4DVB, QTHR. Tel Brian, Gravesend 66347.
TR2200G, handheld, S0, S16, S20-23, R0, R4-7, R5 input, nicad pack, charger, carrying case, mobile mount, handbook, vgc, reliable, £100. 10W amp, £15. G4FEA, QTHR. Tel Farnborough (0252) 49481.
Uniden 2030, 2m fm solid-state tx/rx, vgc, 10W output, 12 channel capability, call channel, fitted six repeater, four simplex channels, handbook, boxed, comp with homebrew psu, prefer buyer collects, £110 ono. G4GIG, QTHR.
Constant voltage battery charger, 13·5V, 3A, £19. Bench power supply, 0–30V dc, 0–25V ac, 5A, £20. 4m converter, 28MHz i.f., specifically for FR101, £8. Varactor tripler, 144/432, 20W, £6. 0–99dB switchable attenuator, 50Ω, £18. S. M. Sherratt, 32 Springfield Way, Cranfield, Beds MK43 0JN.

2m mobile Kyokuto, digital readout, synthesized scanner, 40 channels, toneburst, repeater shifts, 10W, Sentinel 48W/A, magnetic roof mount, 5/8 whip, tx 800 channels, rx 1000 channels, 5kHz steps, £200. G3LYT, QTHR. Tel 0406 362501.

Collins KWM2 tx/rx, late model, orig packing, 516F2 psu, manuals, spare valves, perfect cond, £500. G3YHX, QTHR. Tel Walsall 27719.

KW202 rx, two-and-a-half yrs old, one owner, £180. KW204 tx, vox, £200. Immac, fb, pair 444 mic. G4FXI, QTHR. Tel Aylesbury 21542.

Very unusual: National Panasonic RF5000 rx, totally new, sealed cond, transportable, used only by G5NX/MM on pleasure voyages, covers 400kHz–30MHz, cw, ssb, fm, marine, b'cst, two spkrs, separate built-in rx covers, 76–108MHz, cost Australian $440, asking £160. Please write for more info. Uniden, model 2030 2m tx/rx, 11-channel mobile, comp with clip-on antenna, mic, all parts, as delivered new, used little, total cost, £193, asking £126. Neaverson. G5NX, QTHR. Lakeside, Cumbria LA12 8AT. Please do not telephone.

HRO-MX 50kHz 30MHz, comp with all general coverage coils, psu, handbook, three spare valves, £40. Texas TI51 Mk 3 programmable scientific and statistical calculator, charger, manual, ten months old, £23. G4AEV, QTHR. Tel Tewkesbury 293047.

KEN KP202, S20–23, R6, R0, helical whip, nicads, charger, £85. GW3YTJ, QTHR. Tel 0633 63578, after 6pm.

FT227RA, fitted amateur radio exchange 25kHz scanner, four memories, full remote control, as new, £225. G4JLU. Tel Dave, 01-349 1122, daytime.

Icom 202S 144·0–144·200, 145·8–146, mint cond, £145. Going QRO. HW7 tx/rx, £30. BC221 frequency meter, £12. G4GBR, QTHR. Tel 0228 61120.

KW2000B, exc cond, comp with ac power supply, manual, £195. G4IBG, QTHR Hove. Tel 0273 731391.

Yaesu FT101ZD, fan mic, two months old, air tested only, as new, in box, must sell, offers around £570. G8TCI, 80 Lakeside Road, Ash Vale, Aldershot. Tel Aldershot 28961.

Radiomobile 108SR, mw/lw radio, stereo cartridge player, comp with spkrs, leads, instructional installation leaflets, mounting bracket, assorted cartridges, £50. Automatic electric antenna, needs mast, £10. Both ono. 14 Abraham Drive, Silver End, Witham, Essex. Tel Silver End (0376) 83947.

Yaesu FT202R handheld, S20–23, R2–3, c/w case, etc, helical ant, nicad cells, NC1 charger, £110. SSM Europa 2m transverter, ant, c/o relay, all cables for FT200, £45. G4EDR, QTHR. Tel 0723 513734.

HW101 hf tx/rx, mint cond, comp with HP23A psu, SB600 spkr, handbook, £250. G3PAX, QTHR. Tel Worthing (0903) 40513.

J310 fet, 2m pre-amp, neutralized cascode circuit, stabilized chip capacity, £10. G8GML, QTHR.

Two Trio TR7500, each with PS6 ac psu, synthesized tx/rx, 144–146MHz, bought August 1979, one unused, other not used/m, £175 ea, ono. Garex NR 56VFI, 144MHz, fm rx, xtals for S20–25, R4–7, vfo, £35. Pye Cambridge single chan, 70MHz, a.m., £15. Pye Cambridge six channel, xtals three chan, 70MHz a.m., £25. KW1000 linear, new 572s, vgc, £125. Prefer buyer collects, carriage extra. Stevens, 1 Priory Court, Barley Lane, Goodmayes, Essex IG3 8XN. Tel 01-599 0197.

FDK Quartz 16, fitted S16, S20–23, R0, R3–7, RR0, RR7, xtal t/burst, mobile mount, orig packing, vgc, £130 ono. Matching FDK vfo, 600kHz repeater shift, exc cond, £50 ono. G8RZA, QTHR. Tel 01-500 1495.

Daiwa coupler, model CL22 for bcl, £10. QM70 2m converter, ideal for FRG7, £10. G8SJG, QTHR. Tel 574 4323.

Set of one QQV06-40A, one QQV03A-20A, four QQV03-10 valves, all ex-equip, believed ok on emission, the lot £5 ono. 12 Motorola 2N2076 germanium power transistors, 150W, 60V, 15A, data, no duds, the lot £3.50. 15pcs 0C28, 29, 35, 36, ge power transistors, all long pins, no duds, £5 for the 15. All plus p&p. Seven Newmarket NKT404, lot £2. GM8JFZ, QTHR. Tel 03552-30860, 7pm onwards.

FTDX401 450W, appearance as new, £245. Avo 8 Mk5, brand new, sealed box, £80. Marconi H4000 mobile tx/rx, 100W ac dc psus, capable operation all bands, bargain at £90. G4BG, QTHR. Tel Salisbury 5379.

Bound *RSGB Bulletins,* vols 28–42 incl, bound *SWM* vols 10–22 incl, *Newnes Radio & TV Servicing,* Vols 1–5, and 1955–66 incl, 3cm wavemeter, offers. GM3NJF, QTHR. Tel 0770 2285.

Microwave Modules transverters; 144/28, £65; 432/28, £70. Belcom LA106 2m linear amp, built-in 13V psu for driver, £150. Trio TR2200G 2m handheld tx/rx, 12ch, nicads, charger, case, £99. Poulter, G3WHK, 119 Aragon Road, Morden, Surrey. Tel 01-330 5795, after 6pm.

FT101E, as new, property of the late Sqn Ldr John Davies; best offer over £400., Taunton ARC, QTHR. Tel 0884 40283.

Yaesu FT200, and FP200 psu, cond as new, £280. Eddystone 888 rx, additional pre-selector, Q-multiplier, noise limiter, making a first class rx, exc cond, £75. G3GNM, QTHR. Tel 01-907 3733.

Eddystone 770R, best offer. Heath stereo rx, pair spkrs, £40. Grundig TK23L reel to reel, offers. Avo 40, CT82 noise generator. Tel 0473 79186.

IC22A, xtalled for R3–7, S0, S20–24, as new, £110. G4FYL, QTHR. Tel Bedford (0234) 67304.

Four Motorola MDA9522 100V, 6A silicon bridge rectifiers, the lot £2. Jackson 4 × 500pF ganged tuning cap, b/new, £2.50. Jackson pa tuning cap, 150pF, silver plated, b/new £2.50. Three sub min tuning caps, 2 × 160pF, b/new, air spaced, three for £1.50. Pye Vanguard 12V–400V, 200mA converter, transformer, pair switching transistors, circuit, £3. All plus p&p. GM8JFZ, QTHR. Tel 03552 30860, 7pm onwards.

Xtals, ½in pins, 5–100MHz, 2–50MHz, 4–35MHz, 4–89·3MHz, 2–5MHz, 1–20MHz, 2–6·317MHz, 1–6·525MHz, 1–10·467MHz, 1–10·461MHz, 1–10·470MHz, 1–10·473MHz, 1–10·479MHz, 2–10·70MHz, 1–11·0MHz, 1–0·450MHz, £1.60 each, incl postage. G3MDH, QTHR. Tel Ringwood 77431.

Standard C432 hand portable 2½W, RB0, RB2, RB14, 433·2, 435·0, nicads, case, toneburst, additional mic, £125. SF1 Starphone uhf hand portables, battery, details, from £35. 4CX250B base and valve, £10. Carriage extra. *Wanted:* 89·74MHz xtal. G8ENI NOT QTHR. Tel Cheslyn Hay (0922) 415374.

Hi-Gain TH3 Mk3, BN86 balun, used one year, boxed, £90. 4m Magnum converter, plugs into FT101 series, spare valves, 4-el Jaybeam, £80. 4m Jaybeam, 4-el phasing harness for two Yagis, £12. G3SPJ, QTHR. Tel 01-311 8405.

Commodore Pet 8K, good cond, under one year old, comp with manuals, monitor, various games programs, £435 ono. G8ILB, QTHR. Tel Stockton-on-Tees (0642) 561452, after 6pm.

RTTY 7E printer, 240V ac, £30. Rectifier, 66B, 160–80 + 80, £20. Rectifier, 26B, 80 + 80, £10. Woden transformer, potted PTM131, i/p 0–250V, 350–0–360, 250mA, 4V, 3A, 4V, 8A, 6·3V, 6A, 2V, 2A, £8. All first class. G8PIT. Tel Poole (Dorset) (0202) 707013.

Trio QR666 gen cov rx, 170–400kHz, 540kHz–30MHz, 87–109MHz, exc cond, mains lead, batt lead, manual, orig packing, £100 ono. Reason for sale, bought R1000. Laws, 7 Seys Close, Cowbridge, S. Glam. Tel 04463 3212, evenings.

30W 80/10 cw tx, Geloso vfo, £25. TCS12 rx, 1·5/12MHz, £10. Two BC454 command rxs, 1·5/3MHz, 6–9MHz, £6 each, or £10 together. QRP 160/80 cw tx, £10. G3OAZ, QTHR. Tel Basingstoke 65126.

Yaesu FRG7 communication rx, as new, no mods, manual, fine tuner, £145. Tel D. Burden 01-589 2050, evenings (an swl who knows where his towel is!)

Trio TS520S, new, mint, boxed, £400. Two Jaybeam 6-el 2m beams, £6 each. G3UGL, QTHR. Tel 0234 750050.

Telford TC10 2m multimode tx, perfect cond, used little, £75 ono. G3YED, QTHR. Tel Stratford-upon-Avon 297845.

Yaesu FT501, FP501, 500W, p.e.p., as new, digital freq counter, going uhf, £450 ono. 20ft 2in steel mast, 6ft ground post, hinge up-down, £10. Belling 2m 6-over-6, £5 + carr. G3JNY, QTHR ('79). Tel Leeds 863058.

FB ham's station, KW2000, KW600, TA32, rotator indicator, cables, G8KW ant, Z-match dummy load, swr meter, BCC69, 2m, a.m., £375. Consider offers separate items. Buyer calls, inspects, collects. G3CPS. Tel Eastbourne (0323) 643172.

Drake R4B, T4XB, AC4, psu, MS4 spkr, all perfect, extra xtals, £475. SB200, £250. Drake R4A, £185. Lafayette fm rx, 152–174MHz, 240V ac, £30. AM25 Vanguards, clean, ok for spares, £5 each. Control units, cables etc, sae GM3BQA, QTHR. Tel 0875 2519.

Approx 100 BCY42 silicon small signal transistors, all long leads, good, the lot, £2.50. Soviet made type U4313 high sems multimeter, in case, taut-band, rugged movement, used little, £7. Three B7A bases for 6–40A/3–20A etc, £1.50. Set of two PL509, one PY500A, one GY501, for valved colour tvs, abs new, boxed, lot £3 ono. All plus p&p. GM8JFZ, QTHR. Tel 03552 30860, 7pm on.

FT200/FP200, good cond, £225. G3VEH, QTHR. Tel Radstock 34866, weekends.

FT250/FP250 tx/rx, 160–10m, all 10m xtals, 250W p.e.p., mic, swr meter, good cond, but minor fault so £225. G3YHF, QTHR. Tel Chris, 021-551 1291.

Pye Cambridge dash mount mobile, fully converted for 2m, xtals for six channels, fm demodulator, toneburst, £35. Offers for two low-band unmodified Pye Bantams. G3RHR. Tel 0423 504292.

Pye Cambridge AM10D mod for fm xtalled 145, S20, S21, R3, R5, £55 ono. Pye Bantam HP1 fm, xtalled 145, S20, R3, £30 ono. TS1000 fm monitor rx S0–S24, R3–R7, comp, helical, nicad, charger, as new, £55 ono. G8GCU, QTHR Sussex. Tel Hailsham 842024.

NR56VF1 rx, comp with mobile mounting bracket, modified for portable operation, internal batteries, carrycase, strap, S20–S23, S0, R0–5, vfo 144–146, psu, helical, £50 ono. *Wanted:* QRK for tx/rx. Tel Darren Riggs, Gosport 83700, after 7pm, weekdays, anytime weekends.

Trio R300 gen cov rx, good cond, no mods, £150 ono. G4HFV, QTHR. Tel 0753 41324, after 7.30pm.

Yaesu vfo FV400S, £30. XF9B filter, both xtals, unused, £25. 3·7kV transformer, £25. Eddystone 898 dial, £5. 160-10m tx, ssb, needs attention, £8. 160-10m rx, Electroniques coil pack, needs attention, £10. G4BRT, QTHR. Tel Milton Keynes 562264.

FT200, FP200 ac psu, audio filter, mic, £235. 2m Europa transverter, interval antenna relay, £50. 4m Magnum transverter, as new, £75. Comp station, switching unit for instant change, 2m, 4m, or hf, £340. G2VJ, QTHR. Tel 021-706 0744.

Pye Cambridge 2m fm, 4 channels (ledex), £45. AR88D, modified, £25. 2m 8-0-8 ant, £5. 100W 2m Pye tx, £20. 3W 70cm Pye tx, £8. 6ft 19in Imhof rack, £8. Lots more, sae for list. G4BRT, QTHR. Tel Milton Keynes 562264.

FT101, fitted fan, cw filter, matching spkr, rf processor, exc cond, £330. MM 144/28 transverter, £75. G8JZU, QTHR. Tel Norwich 720071.

Honda generator, extra quiet model EM300, as new, used only two hours, 240V, 12V, spares list, workshop manual, now over £240, bargain, £160. Europa 28/144 transverter, antenna c/over, cables for FT101B, now £146, bargain, £60. G2FKO, QTHR. Tel Bideford 2964.

Icom IC280E, 144MHz fm tx/rx, microprocessor controlled, 80ch, as new, in box, mobile mount kit, £210. Icom IC202 portable, exc rig, good cond, £120. 20W lin/rf amp, bolts on to back of 202, £15. G8DVK, QTHR. Tel Abingdon (0235) 834328, evenings.

FDK multi 2700, 18 months old, very good cond, fitted rx pre-amp, £400 ono. GW8VHI. Tel Britton Ferry 814202, after 6pm.

FT221R, D suffix, £325. KW Viceroy, £80. 12AVQ, brand new, £40. G8OFQ. Tel Lincoln (0522) 26399.

UGP 2m ground plane, £5. LP30 low-pass filter, £4. 80Ω dummy load resistor, £4. *Wanted:* KW dummy load, KW low-pass filter. G4ILA. Tel 051-652 1309.

MMT144/28, £75. FR50B, 160m, full 10m, £75. Buyer collect. G4IKY, QTHR. Tel 0438 724283.

FT101/I 160m fan, internal Yaesu rf/processor, front control VK Blob mixer, 8-pole filter, mods, professional std, immac cond, one owner, £320. PAs 6JS6/C, £5 new. C. Way, 8 Stratford Place, Eaton Socon, St Neots, Huntingdon, Cambs. Tel Huntingdon 213361.

Trio TR7500, mobile mount, exc cond, only nine months old, £185. Joystick vfa, atu, £16. G8TCV, 134 The Bassetts, Cashe's Green, Stroud, Glos. Tel Stroud 78432.

Yaesu FR101DD, immac cond, dig r/out, 1·5-30MHz, 2/4m, convs, spkr, SP101, service manual, £395. Drake SSR1, as new, 0·5-30MHz, no mods, operators manual, ideal swl, £130. Both with orig packing. Tel Leyton (London) (01-556) 2969, after 6pm.

Shack clearance: To fund my home computing, Pye T55AM Westminster series transistorized tx, 4KC160M final, three spares, modified for 2m fm, using W15FM parts, matching psu/modr, each occupies 7in of 19in rack, handbooks, mod data, but needs setting up, £50. All above must be collected. Pye fm Westminster, long boot model, DG Mosfet front end, toneburst, control gear, cables, spkr, mounting frame, handbook, 5/8λ whip, special 8-pole i.f. filter, 6chs fitted, £75 plus carriage. Homebrew 13·8V 2m pa, 25W in, 75W out, 8·5A, boxed, big heatsink, no ae relays, £30+c. Similar, incl relays, £40+c. Various Westminster spares. Nice keyboard (16×1), £5. 100+ TTL, £10. Other ics incl mpus, memory, etc. Transformer, 2×4·5V, 12VA, RS, £2. 2N6082, new, £4. 4U rack/case, £5. Many other items, no rubbish! Try me before paying full dealer price! A. Andrews, G8AVR, QTHR. Tel Templecombe (Somerset) (0963) 70587, after 6pm and weekends.

Property of the deceased G8RMH: FT221R, set 11 xtals, dig freq meter, 8-el X-Yagi, rotator, control gear, multi-cable, coaxial, 5/8 whip, mobile ant, £460 ono. Drake TR4C, 14AVQ, coaxial, £350 ono. Tel Chapel End (0203) 394397.

Creed tape perforator, £7.50. Creed tape reader, £7.50. Telegraph distortion measuring sets, £20 each. Pye Vanguard low band, £55. Murphy B40C, £65. Murphy B40D, £70. Cossor 425 line tv wobbulator, £5. All plus carriage. Hogan. Tel Swimbridge 489/789, for further details.

FT101 workshop manual, £7.25. Mobile mounting tray/FT101, £9.50. New FT101 output ic STK401, £2. G3LLL rf processor for FT101/B, £25. FT101 filter XF30A, £13.50. Katsumi audio filter SSB101, £20. Eddystone EC10, £36. C. Way, 8 Stratford Place, Eaton Socon, St Neots, Cambs. Tel Huntingdon 213361.

FT101 MkII, mic, £320. TS520, £290. TS700, £290. IC202, £115. All in vgc, carr extra or buyer collects. G3GVV, QTHR. Tel Tonbridge 353360.

FT101E cw filter, exc cond, comp with mic, leads, £350. R. Bannister. G4GPX, QTHR. Tel Lancing (Sussex) 3893.

TS700, unmarked, some xtal channels, £280. EC10 Mk1, £50. Transverters: MM432/144R, £135; MM432/28; £65. Converters: MM1296/28-30, £20. MM144 dual output pre-amp, £8. 12XY/70cm, circular phasing harness, £26. Q6/2M, £16. PBM18/70CM, £12. G8FUO NOT QTHR. Tel Windsor 61723, evenings.

Trio 9R59DS gen cov rx, good cond, £48. G8IZW, QTHR. Tel Luton (0582) 27906.

KW Atlanta, outboard vfo, PS & Shure 444 mic, late G3TQK equip, £215 ono. Buyer collects. G3KUG, QTHR. Tel Walsall 614438.

Trio 2200G S19-23, S0, R3-7, 144·85, case, mobile mount, vgc, £110. SB 2m Mizuho 144·2-144·4 helical antenna, as new, £125. PSU, 12V, 1A, £11. G8VEA. Tel Bexhill (Sussex) (0424) 216516.

Sentinel 144MHz pre-amp, £7. Telford 144/28MHz converter, £10. MM 432/28MHz converter, £20. Cambridge i.f./disc board, £5. Cambridge hb/rf board, £5. R216 19/157MHz, scruffy, £45. Pye 8TC3003 rxs, various, £5 each. Carriage extra. Buyers collect large items. G4IOT, G8PXS, QTHR. Tel Folkestone 76063.

Marine antenna, C & S Antennas Ltd, 156-164MHz, glass fibre cover, brackets, £24.50. PA module, 40W, 12/16V dc, 140-175MHz MCP Electronics MV·30, £28. Exciter, 1·6-25MHz, ex ST·710, Swedish marine tx, solid-state, c/w, 30+, 2MHz, xtals, £20. G3JMJ, QTHR. Tel 0732 863467, after 7pm.

Hewlett Packard advanced scientific programmable calculators, HP97, mag-cards, b/new, cost £513, sell £350. HP25, new, many books, sell, £50, or swop above for motor bike, etc. PF1, tx/rx, nicads, charger, RB4, £28. Peter Turner, G8TSY. Tel Mildenhall 713011, 9am-5pm.

FT101ZD, filter, fan, FC901, new, boxed, Shure 444 mic, unable to continue cw for hf, works QTH relocated, £730. No offers please. G8UZB. Tel Nettlebed (Henley-on-Thames), 641261.

Recording tape, 10½in dia, bulk reels, ¼in wide, super quality magnetic tape, enough for four 7in reels, £3.50. 10½in dia reels, ¼in wide, suitable for video, £3. 7in reels, ¼in tape, £3.20 for two. All p&p incl. Transverter MMT 144/28, £65. Trio VFO30G, 2m vfo 144-146MHz, repeater shift, £50. 813 valve, ceramic holder, £5. Standard C146A 5-channel 2m fm handheld, charger, helical, etc, £70. All plus carriage. *Wanted:* MSF clock. Thruline elements, hi-power vhf/uhf. Termaline, Thruline. G3AZI, QTHR. Tel 0772 37815.

Trio AT120 antenna tuner, compact size for mobile or main station, £39. G-whips 10-80m, hd base, new, unused, £32. G2KF, QTHR. Tel 072-681 2337.

FRG7, £160. Heathkit GD125 Q-multiplier, £10. APR47, tuning units, 38-320MHz, £50. RA1B rx, £15. Wisam low band, £15. R109 on 2m, requires alignment, £5. 9in Pye monitor, £5. Cossor 108AA4 on 4m, £3. Tel Southport (0704) 24760/77613.

FTDX401, vgc, used little, spare pa tubes, £320, FV401, £60. RF clipper, boxed, rfc/m, £22. Elliott 8-hole tape reader, 500 chars, £30. WG10 circulator, other bits, couplers etc, offers. *Wanted:* Frequency agile filter, any cond. Tel Chelmsford (0245) 66776.

Pye Cambridge AM10D, fm, mods, 6ch, switched, toneburst, two repeaters, four simplex, very clean cond, £55. Carr extra. Trio 9R59DS general coverage rx, very clean cond, as new, £45. Carr extra. G4BQJ, QTHR. Tel Warrington 35330.

Trio JR599 cs rx, 160-10m, 2m, 6m, all modes, MM vhf pre-amp, £160. Uniden 2030 fm tx/rx, 10W, 12 channels fitted, spare xtals, mobile mount, boxed, handbook, £95. G4ECI. Tel 061-439 3831.

IC245E multimode synthesized 2m tx/rx, eight months old, comp with automatic toneburst on duplex, RM3 microprocessor keyboard controller, both units, £390. Jaybeam Q4 2m quad antenna, new, boxed, £15. G8EUF, QTHR. Tel Harrogate 69011, evenings.

Tektronic 551 oscilloscope, CA plug-in, £190. 1A6 diff amp, £100. Nelson Ross If spectrum analyzer, plug-in, £150. Marconi OA1094A/S spectrum analyzer inc If unit, £75. Solartron w/b amp, CX1215, plug-in, £20. Tel Plymouth (0752) 775375.

Bearcat 4/6 hand scanner, 30-50, 145-164, 450-512MHz, xtal R5, S20, £50. Eddystone 770R rx, £75. Standard CV110 vfo, 828, £35. Telford 144/28MHz converter, £10. Burns fmdi fm, det mod, manual, £6.50. G4AFY, QTHR. Tel Kidderminster 63358.

FT200/FP200, mint cond, xtals, fitted all 10m, spare, unused pa valves, buyer collects or pays carriage, £265 ono. GI4DOR, QTHR. Tel Belfast 610007.

XF92A ssb xtal filter, 9MHz, 8·9985, 9·0015 xtals, £15. For G4FAW synthesizer: xtals: 6·4, 66·2, 65·9, 71·2, CD4059, £15. All items brand new. Yaesu spkr to match FT101E, £15. G3SFV, QTHR. Tel Market Harborough 64827.

Trio R1000 rx, only few weeks old, £260. Yaesu FRG7000 rx, digital, £270. Yaesu FRG7 rx, digital readout to 100Hz, perspex cover, £160. Bearcat 220FB rx, 20 channel xtal-less scanner, aircraft, marine, amateurs, public services, £190. Trio CO1303D 75mm 5MHz scope, three months old, £80. HR0 5T rx, table model, 13 coil packs incl 4 b/s, stabilized psu, AR88 spkr, £60. Tel Bulls Green (Herts) 219.

SE1 1·6MHz xtal filters, (ssb), incl xtal, £8. 4CX250 b/m valves, ex-equip, £5 ea. Pair Celestion HF1300 Mk2 tweeters, new, boxed, as used in Spendor BC1, Rogers export monitor, etc, £10 the pair. Tel Stocksfield 3449, after 4pm.

Palmsizer synthesized handheld 2W, leather case, manufacturers' guarantee till December 1980, £120. G8UFV. Tel Worthing (0903) 503254.

FT221R 2m multimode tx/rx, pre-amp, handbook, £320. G8MLC, QTHR. Tel Cowes 293038, after 7pm please, or Sat, Sun pm anytime.

Trio 2200G, 6ch, nicads, charger, £75. Drake SSR1 rx, £80. Microwave Modules 1,296/28 converter, £10. G3NQK. Tel Weybridge (0932) 41405.

Yaesu FT7 hf tx/rx, two months old, in perfect cond, all accessories as supplied, all 10m xtals, £300, plus carriage. G3KLF. Tel Fareham 236906, weekends or evenings only please.
Versatower 25-80ft telescopic tilt-over, incl all fittings, base, exc cond, hardly used, ready to transport, £275 ono. Tel 01-578 4484, after 6pm.
IC240, only five months old, comp with a.s.p. 5/8 whip, leads,mount, in orig carton, £165 ono. G8JKP, NOT QTHR. Tel Colin, 01-876 6543, evenings.
FT221 2m all mode tx/rx, as new, in orig packing, £275. FT200 hf tx/rx, FP200 psu, in exc cond, £250. IC215 2m fm portable, channels R1-9, S10, S12, £125. G8IRJ, QTHR. Tel Steyning (0903) 814089.
NRS6 2m rx, vfo, 12 channels xtalled, R3, R5-7, £30 ono. G8RJI. Tel Wormbridge 413.
IC245, mint cond, £280 ono. Cushcraft 11-el Yagi, never used, £12 ono. G4COA, QTHR.
Heathkit dc psu, HP13B, £25. AR88 S-meter, new, £8. AR88D range switch assembly, two, offers. KW lpf, £5. Carriage extra. GM3GFO, QTHR.
Valves: new, two 6KD6, 6GK6, 7360; used but good, three 6GK6, four 6BA6, two 6CB6, 6BE6, two 6BZ6, 6AK5, 6AH6, 12AT7, spares for FT560, FT401, etc, £18 inc post. G3GQR, QTHR.
Update forces sale faithful duo, FR100B, FL200B, rx 160-10, tx 80-10, good cond, £95 each. B41 lf rx, £15. G3JQQ, QTHR. Tel 0225 314331.
Belcom linear amplifier, £110. FM Pye tx, 90W, mic, needs attention, £35. Pye Compact radiotelephone, xtals for lw, good wkg order, offers. Tel 01-590 3993.
Yaesu FTDX401, later model, a.m. mode, exc cond, cw filter fan 560W p.e.p., 80-10m matching spkr, manual, comp set spare valves inc new pas, £300. Reason for sale, gone 901DM range. G4EME, QTHR. Tel Eccleshall (Staffs) 85069, after 7pm or weekends.
Datong a.s.p., used very little, £45. Small Smiths radial fan, new, unused, suit hb linear, etc, £8. All p. paid. Tel 0463 41211.
Trio TR2200G, S20-22, R0-7, nicads, charger, toneburst, £100. G3HTJ. Tel Thornbury 414262.
FRG7, built-in digital readout, £200. TA33JNr beam, £50. HF5R vertical 10-80, £30. DP KB103 40/80 vertical, £25. Weston 5-way coaxial switch, £7. AR40 rotar, £40. G3BQH, Rose Lawn, Weston Lullingfields, Shrewsbury. Tel 0939 260428.
Datong Universal rf speech clipper, in immac cond, on/off l.e.d. fitted, comp with operating instruction leaflet, lead for plugging into tx front end mic socket, only £30 comp. G4EME, QTHR. Tel Eccleshall (Staffs) 85069, after 7pm please.
Clearout of new and little used equipment: 1C211E, new unpacked, £495; SB104, SB640 kits, £395; TS120V, £330; FTDX400, spare pas, etc, mint, £255; Memo 512 memory keyer, £47; 4CX250Bs, £4 each. P. Barry, G3RJS/MM. Tel 01-878 5442.
KDK 2016E 1000ch 144MHz fm mobile, base rig, four months old, under guarantee, mobile mount, memories reverse repeater 1 or 15W output, mag mount mobile antenna, comp stn, £200 ono. G8TXH. Tel 051-639 8708.
Collins 51J4 rx, in matching cabinet, 540kHz-30·5MHz in 30 one MHz bands, permability tuning, double and triple conversion, four selectivity positions down to 200cps, product detector L & C filter fitted professionally, spare valves, manual, good cond, only £200. G4EME, QTHR. Tel Eccleshall (Staffs) 85069, after 7pm.

WANTED

Large binoculars, 20 by 80 or similar, ex-tank, battleship, etc, preferably with mount. Valves for Eddystone 840C rx: UAF42 (4); UCH42; UL41; UY41. GM4MF, QTHR. Tel Falkirk 24832.
Hallicrafters SX28A, AR88D/LF, or similar, w.h.y? By young swl for rebuild to orig spec, wkg cond pref, manuals, gen acces, hro coils, psu. Ellis, 5 The Gables, Haddenham, Aylesbury, Bucks. Tel Haddenham 291203, after 6pm.
For the National Wireless Museum, pre-war tx, rx, valves, components, spkrs. Old QSL cards, radio books, magazines, ccts. Collection arranged. Please contact hon curator, G3KPO, QTHR. Tel Shanklin 2586.
CT212 handbook or circuit to purchase or copy. G8HEV, QTHR. Tel 03272 3964.
4m tx/rx, or 2m ssb tx/rx, in exchange for Standard 828m, 10W, 12ch, 2m, fm rig, comp with mic, carrying case, mobile mount, 5/8λ whip. G4HIY, QTHR. Tel Lincoln (0522) 720414.
TW communicator, 2m. G4CNB, QTHR. Tel 0621 782388.
Manual for Marconi CR150 rx, for purchase of loan for photcopying. Will pay postage. P.S. Burgess, 3 Andrew Way, Lowestoft, Suffolk NR33 8PY. Tel Lowestoft 66072, weekends or evenings.
Drake MN2700 atu. Redman. G4HBP, Ploughmans Piece, Thornham, Norfolk. Tel 322.
Accommodation for undergraduate student engineer for period of employment with Racal, Reading, June-October 1980. S. Phillips, G4EYR, 16 Stuart Drive, Hitchin, Herts SG4 9QB. Tel Hitchin (0462) 35388.
Datong audio filter, model FL1. HF atu, preferably covering top band. PA for Trio 2300. 10, 15, 20m beam. G4INX. Tel Chester 374584.
Philips portable radio, rx type 90RL290, for spares, frequency changer, transformer. G6JY. Tel Newcastle upon Tyne (0632) 810400.
Belcom LA106, 2m pa. Say, G8TUA, 37 Partis Way, Bath. Tel 0225 21711.
Heath SB640 external vfo. 6HS6, 6AUG valves. GI3NZZ, QTHR. Tel Kilkeel (069 37) 62564.
Vibroplex bug key. G3HAA, QTHR. Tel Southport (0704) 26764, evenings only.
18AVT/WB vertical Hustler mobile antena, comp. 2kW linear. ATU Drake separates. GW8OKR, QTHR. Tel Cardiff (0222) 67151.
Rxs: BC314; BC969; BC344; R389; RAX1. Electronic multimeter type CT471C, handbook for adaptor frequency range No 1. Passfield, 144 Gilmore Road, Lewisham, London SE13. Tel 01-318 5290.
Trio SP5D spkr, 70cm rx or converter, 28MHz or 4MHz i.f., Codar PR30X preselector. A. Kelly, 8 Green Slade Crescent, Bromsgrove, Worcs. Tel 021-445 2088, or P. Shaw, 021-445 2842, after 6pm.
Omega antenna noise bridge, type TE701 or TE702, handbook. G3PVA, QTHR. Tel 646 3738, after 6pm.
KW107 or KW109. G3PEC, QTHR. Tel 01-570 7152.
HP electronic counter, type 5245L, w/shop manual and/or handbook, and/or circuit diagram. Buy or borrow. G8PCB, QTHR.
Information on GEC boot mount, mobile RC650M, all letters answered, can photocopy and return plus costs etc. G8NND, QTHR. Tel Dave, 0283 813520.
Morse perforator paper tape, 15/32in wide or info on source of supply, no longer available from Creed. Has anyone facilities for slitting wider tape to 15/32in? Morse keyboard perforator, reader. G2FKO, QTHR. Tel Bideford 2964.
FV101B remote vfo for '101. GM4DZX, QTHR. Tel 041-959 4455, after 6pm, or weekends.
Atlas 215 and 206 digital vfo. *For Sale:* New Danameter, 2000A high quality digital multimeter with ac current shunts, in leather case, £85. Seavoice RT1000, full set channels, marine whip, mount, 50ft coaxial, £270. G3TJY, QTHR. Tel 0202-622 142.
Heathkit SB620 Scanalyzer, SB200 linear, consider faulty ones. General coverage vhf rx, not channelized, 30-200MHz approx. Any gen circuits etc, for Mullard modules: LP1169; LP1171; LP1173; PL00; etc. G3IKR, QTHR. Tel Inkberrow (0386) 792542.
In-line wattmeter, hf. Bug key, prefer Vibroplex or similar. G4AKX, QTHR. Tel 0606 76538, evenings.
KW E-Zee match or KW107, nicads for Bantam. Peter de Man. Tel 010-31-1717-6033, after 6pm.
Spkr and earphones for AR88D, must be orig, in vgc. J. Allan, 40 Park Road, Stanford-le-Hope, Essex. Tel 74301.
Borrow/buy circuit diagram, handbook, etc, for Heathkit valve, V/M type, IM13U. 19in rack cabinet, min height 36in, good cond only. Harrison, G3SNH, 202 Whitegate Drive, Blackpool. Tel 0253 64394.

Special event stations

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

GB2AJF, 3 24 May
This station will form part of the celebrations to commemorate the 50th anniversary of Amy Johnson's historic flight to Australia. The Amy Johnson Festival will be held on Paull airfield, eight miles east of Hull. Further details from G4CMT, QTHR.
GB2AP and GB2APN, 8 10 May
Two talk-in and demonstration stations will be operational at the RSGB National Amateur Radio Exhibition at Alexandra Palace. For details contact G3ZKE, QTHR.
GB2UOL, 17 May
The University of Leeds department of electrical and electronic engineering will hold an open day to demonstrate some of its work, and this station will be included in the day's activities. Details from Mr G. B. Lockhart, G3NQZ, Department of Electrical and Electronic Engineering, University of Leeds, Leeds LS2 4JT.

GB2AS, 17 May
This will form one of the attractions at the Abingdon School (Oxon) Society annual fete, which will include RAF and Army unit demonstrations and side-shows. Further information from the school.

GB2CF, 18–27 May
The Charlwood Medieval Fayre celebrates the nonocentenary of the village of Charlwood in Surrey. This will include a special event station. Details from G4AZQ, QTHR.

GB2RI, 24 May
Cardiff Rotary Club annual fete is a fund-raising event for the Samaritans in Cardiff. The station, GB2 Rotary International, celebrates the 75th anniversary of the world-wide Rotary movement, and will be looking for contacts on 14MHz from 1200 to 1700gmt. The location will be Llandaff School Playing Fields, Cardiff. More details from GW3RWX, QTHR.

GB2RST, 24–26 May
British Rail and the village of Rainhill, near Liverpool, will be celebrating the 150th anniversary of the Liverpool–Manchester Railway. The centrepiece will be the re-running of replicas of railway rolling stock which took part in the original Rainhill Steam Trials of 1829 (won by George Stephenson's *Rocket*), and there will be a cavalcade of locomotives old and modern, including the advanced passenger train.

The St Helens & DARC will be operating the special event station, from Rainhill Cricket & Tennis Club adjacent to the track, on hf and vhf/uhf. Visitors will be very welcome and all contacts will be acknowledged by a special QSL card. Further details from Paul Gaskell, G8PQD, tel St Helens 25472.

GB8CRC and GB2CRC, 29–31 May
The Cheshunt & DRC will operate these stations at the Leisure Activities Exhibition, Cheshunt School, Windmill Lane, Cheshunt, Herts. Details of GB8CRC from Mr W. G. Pooley, G8UBL, 36 Montayne Road, Cheshunt, Herts, and of GB2CRC from J. H. Sleight, G3OJI, at the same address.

GB4OOD, 1–16 June
The station will continue the celebration of Drake's 400th anniversary from Drake's Island, Plymouth. Details from Reg Taylor, "Bergamot", 9a Lower Westford, Wellington, Somerset TA21 0ON.

GB2ATN, 10 June
This station will be operational at the East Anglia Radio Amateur's Picnic, in the East Anglian Transport Museum at Lowestoft. Details from G3ZNU, QTHR.

GB2BWS, 14–22 June
Operational at the Bishop Ward School Fete at the school in Leyton's Lane, Sunbury-on-Thames, Middlesex. Details from G3WWT, QTHR.

GB2LAS, 14 June
Operational at the Lucas Annual Sports Day to be held at Moor Lane, Birmingham. Details from Brian Price, G4DDF, Lucas Electric Co Ltd, Great King Street, Birmingham B19 2XF.

GB2WFC, 21 June
This station will operate from the Wellcome Club, Dartford, Kent, during a garden party to celebrate the centenary of the Wellcome Foundation. Details from G3BAC, QTHR.

GB8SPF and GB4SPF, 28–29 June
Operational from the Surrey Constabulary headquarters, during an open weekend from 1400 to 1930 at the hobbies stand. Talk-in on S21 and 145-525. Special QSL cards. Details from Richard Hook, G8LVB, Operations Room, Surrey Constabulary HQ, Mount Browne, Sandy Lane, Guildford, Surrey.

GB2MEM, 28 June
Operating at the MEM Gala Day, to be held on the sports field adjoining the Midland Electric Works, Reddings Lane, Birmingham 11. Information from G4AEJ, QTHR.

Looking ahead

9–10 May—RSGB National Amateur Radio Exhibition, Alexandra Palace, London.

28–29 June—Jersey Radio Convention. Details from GJ4ICD, tel 0534 26788.

13 September—Scottish Amateur Radio Convention. Organized by West of Scotland Amateur Radio Society. Details from Ian McGarvie, GM4JDU, 3 Kelso Avenue, Paisley PA2 9JE.

14 September—Isle of Wight get-together, Alverstone Manor, Shanklin. Details from G3KPO, QTHR, tel 098-386 2586.

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

18–19 October—Jamboree on the Air.

24–25 October—Amateur Radio Retailers Association National Amateur Radio Exhibition, Granby Halls, Leicester.

SUGIYAMA F850

An all band (160 to 2m including 4m), all mode transceiver available at a realistic price, with a specification that includes as standard most of the options the discerning amateur considers essential for serious operation. For 2 metre FM operation, repeater shift and automatic tone burst are provided.

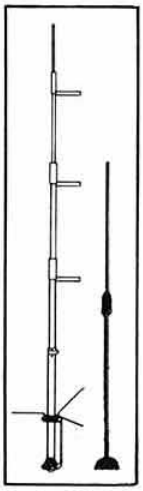
Brief Specification

- Covers all current amateur bands 1.8-144 MHz, including 4m
- All popular modes USB, LSB, car FM and AM
- Easy to read digital display
- Switched selectivity 0.4, 1.2, 1.8 and 2.4 KHz
- AC or 12V DC powered for base station or mobile/portable operation
- Built in VOX, speech processor and 25 KHz calibrator
- Power output 10 watts min SSB/CW/FM (Typical 15 watts) — 5 watts AM

LIST PRICE*— Fitted all filters £899.00 inc. VAT

432 MHz Transverter (ordered with F850) £99.00 inc. VAT

220 Watt Solid State Linear (up to 30 MHz) £80.00 inc. VAT

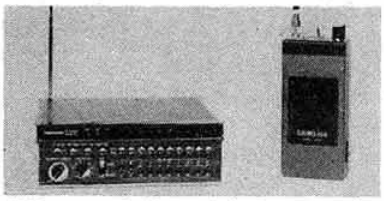


HIGH GAIN 2m ANTENNAS

KT284 — 4 Section Colinear — 11dBi 100 Watts 5.47 metres long 2.7 kg	£40.25
KT282 — 2 Section Colinear 6dBi	£21.85
KT852 — 5/8 Mobile Whip c/w Mag Mount, Cable and Plug	£17.25
KT872 — 7/8 Mobile Whip	£10.10
GCL — Gutter Mount	£3.15
C43 — Cable Assembly and Plug	£3.45

All above prices include VAT.

FM SCANNING MONITORS

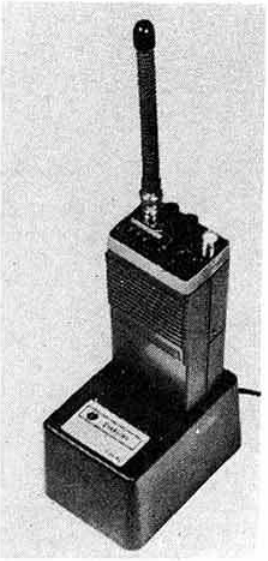


Pocket Model — 003, covers 8 Channels in 2m or marine bands. Lockout on all channels. Wide range of accessories supplied PRICE: £59.00 inc. VAT.

318 — Three Band Monitor — allows 20 Channels in 430-470 MHz, 140-175 MHz and 68-88 MHz ranges to be scanned in user programmable order. Mains or battery operation. Vehicle mount supplied. PRICE: £95.00 inc. VAT. Carriage extra on above prices.

Stock Crystals: S20, 21, 22, 23 — RO to 7 — SU 8 and 20 — RBO, 2, 4, 6, 10, 14 — MO, 6, 10, 16. PRICE: £3.00 each inc. VAT.

ZYCOMM Z5800 Hand Portable



A no nonsense synthesised rig free of gimmicks. Covers 144-148 MHz in 5 KHz steps. Simplex or Repeater Operation — High/low power (over 5 watts from internal NiCd pack).

PRICE £199.00 inc VAT c/w Desk Charger and Remote Microphone.

SAE for details of our clearance bargains.

Full range of amateur and commercial antennas and Home Office approved two way radio equipment. SAE for details.

Zycomm Electronics Ltd.

*based on exchange rate operative on 20-2-80

G3ZYC G8CNB G3NJX

47/51 Pentrich Rd., Ripley, Derby DE5 3DS Tel Ripley (0773) 44281 Telex 377466

Be ready for the new bands with the DRAKE TR-7

DRAKE PRICES

(Inclusive of 15% VAT)

R7/DR7	Receiver SSB/AM/CW/RTTY 0-30MHz	**£989.00**
TR7/DR7	Transceiver 160-10m and 1·5-30MHz receive	**£1035.00**
PS-7	Power supply for TR-7	**£207.00**
RV-7	Remote VFO for TR-7	**£132.25**
L-7	Linear 160-10m 2kW (complete)	**£874.00**
MN-7	ATU/CSWR/RF Wattmeter 250 watts	**£124.20**
MN-2700	ATU/CWSR/RF Wattmeter 2kW	**£207.00**
SPR-4	Programmable Receiver	**£460.00**
TR-4CW	(RIT) Last version of the famous Transceiver	**£496.80**
AC-4	Power supply for the above TR-4CW	**£109.25**

Securicor delivery **£4.60**

DRAKE TR-7

Designed and made by R. L. Drake Co, in Ohio USA

for details send 15p stamps or 4 international reply coupons

ACCESS **DRAKE ★ SALES ★ SERVICE** **BARCLAYCARD**

RADIO SHACK LTD. **188 BROADHURST GARDENS, LONDON NW6 3AY**

Giro Account No. 588 7151 Telephone: 01-624 7174 Cables: Radio Shack, NW6. Telex: 23718

BEARCAT 220 FB

£241.50 inc. VAT. Delivery by Securicor

FREQUENCY COVERAGE .....66 - 88 MHz FM; 118 - 136 MHz AM (Aircraft Band); 144 - 174 MHz FM; 420.45 - 512 MHz FM. This coverage includes the 70 cm; 2m; 4m FM AMATEUR BANDS. To programme this Receiver you simply punch in the frequencies you wish to monitor. To AUTOMATICALLY SEARCH MARINE FREQUENCIES YOU JUST PRESS ONE BUTTON. The Bearcat 220 FB will also AUTOMATICALLY SEARCH the entire AIRCRAFT BAND.
Power requirements: 240V AC/12v DC. Accessories included in the price are - Mounting bracket and hardware, DC cord and telescoping antenna.

UK IMPORTERS—DISTRIBUTORS

ACCESS **BEARCAT ★ SALES ★ SERVICE** **BARCLAYCARD**

RADIO SHACK LTD. **188 BROADHURST GARDENS, LONDON NW6 3AY**

Giro Account No. 588 7151 Telephone: 01-624 7174 Cables: Radio Shack, NW6. Telex: 23718

AMATEUR RADIO EXCHANGE

WHO'S FOOLING WHO?

There are some who would have us believe that the much sought-after TRIO/KENWOOD range of amateur radio equipment is manufactured not in the Land of the Rising Sun but in the Dales of Derbyshire; what is more, that these coveted products may only be purchased from one particular appointed distributor or his appointed agents.

Well, here's a little DISAPPOINTMENT for those folk, but good news for the rest of us! As the only shop in London where ALL the leading makes can be seen and tried under one roof . . . YAESU, ICOM, TRIO/KENWOOD, STANDARD, etc, etc . . . we have been able to secure large shipments of TRIO/KENWOOD equipment, fully backed by spares, so that we can give it the same high standard of before- and after-sales service that our customers have come to expect of us on everything we sell.

So, whether you're looking for a major piece of equipment or just some accessories . . . whether you're buying, selling or just browsing . . . Brenda and Bernie invite you to 'phone or call in to discuss that new rig you've been promising yourself. Try it out in the shop. Compare it with the others in its class, because that's the only way you'll know that what you're investing in is really right for you. So, come to the shop where they care . . . and have a cup of Brenda's coffee too!

THE ICOM PAIR . . .

IC-260E

Here it is, ICOM's latest 2m synthesised mobile, the IC-260E all-mode transceiver with microcomputer enabling it to scan either between two programmed frequencies or just the memories, two VFOs (used independently or together in tracking mode), and many other features. Altogether, an amazingly sophisticated package, as is its twin, the IC-255E for FM only.

IC-255E £255 inc VAT IC-260E £369 inc VAT

. . . THE STANDARD PAIR

Two new high-performance mobiles at very competitive prices. The C-7800, for 70cm operation, is fully synthesised with five memories, two-speed scan from mic etc, etc, and the C-8800 is the matching unit with the same features covering the 2m band in 5kH or 25kH steps.

C-7800 £275 inc VAT

C-8800 £250 inc VAT

C-8800

. . . AND WHAT ABOUT THESE?

YAESU's latest hand-held, the FT-207R, microprocessor controlled, synthesised, with four memories, 2·5W output, LED frequency display . . . and TRIO's answer, the TR-2400, with 10 memories, LCD readout etc. Each has so much to offer, so try them both here and see which is right for you.

FT-207R £199 inc VAT

TR-2400 £210 inc VAT

See us at ELVASTON CASTLE RALLY JUNE 8th

CLOSED WEDNESDAY, BUT USE OUR 24-HOUR ANSAFONE SERVICE

EASY TERMS UP TO 2 YEARS

Access

CREDIT SALES BY TELEPHONE

BARCLAYCARD VISA

INSTANT HP FOR LICENSED AMATEURS

RETAIL PREMISES Open MON-SAT 9-5.30.

THE HIGH STREET
HANDCROSS
W. SUSSEX
0444 400786

Bredhurst electronics

ALL PRICES INCLUDE VAT & CARRIAGE

CALLERS WELCOME MON-SAT 9-5.30.

TRIO TR-9000

This brand new multimode from Trio must be the 2m winner for 1980. It is a complete multimode rig the same size as normal FM car transceivers. It has channel scan on FM in 12·5 or 25kHz steps, with momentary pause on signals, and an automatic search mode on SSB. Also included are features such as 5 memories, RIT, noise blanker and dual VFOs.

The rig can be tuned up and down the band either from the panel knob or via the up/down buttons on the microphone, thus permitting safer operation while driving.

All this for only £365 inc VAT and carriage

TRIO TS-520SE

This rig is the latest in the famous TS520 series. It is identical to the TS520 except that the 12V DC supply and the socket for the matching Trio transverter have been deleted. However, provision is now made for switching in an optional narrow CW filter.

If you are looking for the best value ever in home station HF transceivers, this has got to be the choice.

£437 inc VAT and carriage

MICROWAVE MODULES EQUIPMENT

We are also stockists of the excellent Microwave Modules range of converters, transverters and linears.

If you have a 2m transceiver, why not extend your coverage to the exciting 4M band with an MMT 70/144 transverter, ready for when the G8 licence is extended down to cover this band. Or maybe a MMT 432/144 to give you full 70cms band coverage.

The MML 144/25 linear amplifier gives 25W out for 3W drive, or approx 10W from a 1W input. At £48.30 it is considerably cheaper than other alternatives, and it also gives you an excellent receiver preamp to pep up your receiver.

See the full MM range at our showroom or write for details.

ACCESS ● BARCLAYCARD ● INSTANT H.P. ● PART EXCHANGE

Lee Electronics Ltd

LEE LEE

COME AND SEE THE EXCITING STANDARD RANGE ON OUR STAND AT ALEXANDRA PALACE

(OUR SHOP WILL BE OPEN AS NORMAL)

C7800 70cm FM Mobile

The C7800 is one of the most advanced mobile 70cm transceivers available covering 430-439·975MHz, a full 10 MHz, in 25kHz steps. Tuning is accomplished either by the main tuning control or with the Up/Down control on the mic. A MHz button is provided to step the frequency up by 1MHz at a time to save hours of knob twiddling. Su20 is available at the touch of a button, two repeater offsets are supplied 1·6MHz and 4·6MHz for European use.
Just look at the features— ★ Digital readout ★ Easy to read display ★ Five programmable memories ★ Scanning of the band in 1MHz or memories stopping on inuse or vacant channels ★ Two speed scan rate ★ Tone burst ★ L.E.D. power and S meter 10W RF output ★ Back-up for memories ★ Spare button on front for user's use ★ at **£239.50** + VAT carriage free.

C8800 2m FM Mobile

The C8800 is a matching unit to the C7800 with the same features covering the 2m band in 5 or 25kHz steps (this is switchable from the rear panel). S20 and S22 are pre-programmed and available at a touch of a button, the unit has a 3 position RF gain to attenuate strong signals such as repeaters. Provision is made for two repeater offsets (600kHz is fitted as standard) at **£219.50** + VAT carriage free.

The Amazing New C800

This 10-channel scanner out-performs many of its rivals due to its highly sensitive front end and excellent filtering. A one channel 50Mw transmitter is incorporated that's ideal for local use. Controls include squelch, volume, autoscan and manual channel stepping. The unit comes complete with channels S20, R1, R2, R7, ni-cads, charger, helical antenna and wire antenna. Price **£69.95** + VAT carriage free.

LEE ELECTRONICS LTD
400 EDGWARE ROAD, LONDON W2
Tel: 01-723 5521. Telex: 298765

Nearest Tube: Edgware Road or Paddington main line.
HP ★ Part exchanges welcome

Buy it with Access

BARCLAYCARD VISA

Lee Electronics Ltd

LEE LEE

Londons Leading Stockists Of:

STANDARD YAESU ICOM FDK KDK MICROWAVE MODULES LUNAR SST SHURE HI-MOUND CDE STOLLE TELECOM ANTENNAE J-BEAM SWAN KATSUMI ETC.

OSKER BLOCK RANGE

SWR200B swr/power meter covering 3-200MHz 50/75 Ohm power range 3-30MHz, 20/200/2kW, VHF 2/20/200W **£34.95** plus VAT. P&P 50p.

SWR300 swr/power meter 3-30MHz (2m and 70cm with adaptors) power range 20/200/2kW with SPC-2B 20/200W at 2m with SPC07A 2/20W at 70cm. Respective prices **£39.95, £14.95, £18.95** plus VAT. P&P 50p.

SWRVVV meter body only, covers 144/432MHz with adaptors SPC-2B and SPC 07A, **£19.95** plus VAT.' P&P 50p. Adaptors as SWR300.

HI-MOULD KEYERS

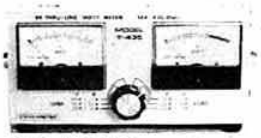
HK707 Straight Up/Down keyer	**£8.75**
BK100 Semi auto/mechanical bug	**£15.55**
HK702 Up/Down keyer on marble base	**£19.50**
MK702 Manipulator	**£19.50**
MK704 Squeeze paddle	**£12.50**
MK705 Squeeze paddle on marble base	**£19.50**

PLUS VAT. P&P 50p

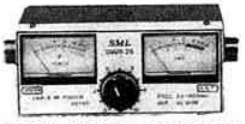
PX402 13-8V DC 3 amp continuous 4 amp max fully stabilized power supply with overload protection **£19.95** plus VAT. P&P £1.

JVL MK2

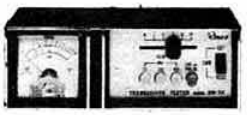
Base VHF/UHF antennas. These antennas are made to very high standards from the finest quality anodised aluminium; collapsible and ideal for portable or fixed use. Power handling 350W:
JVL144 6dB gain 2m colinear **£29.95** plus VAT. P&P £1.50; **JVL433** 6dB gain 70cm colinear **£29.95** plus VAT. P&P £1.50.



T-435: VHF/UHF swr and power meter with 2/20/120 watt through line power measurement **£29.95** plus VAT. P&P 75p.



SWR25: This ever-popular twin SWR and Power meter covers 3-5-150MHz at **£10.50** plus VAT. P&P 50p.



UH74 SWR & power meter switchable HF, 2m & 432MHz with remote head at **£14.25** + VAT and 50p P&P.

HELICAL ANTENNAS

2m with BNC	**£3.85** each
2m with PL259	**£3.85** each
2m for IC215, Trio 2200 Gx, standard C146A	**£3.50**

All + post 25p + VAT

DL-30 Dummy load 25W DC-150 MHz **£5.50** plus VAT. P&P 25p.
T-80 80W Dummy load DC-500 MHz **£19.95** plus VAT. P&P 25p.
T-150 150W Dummy load DC-500 MHz **£28.50** plus VAT. P&P 25p.

CT-1 Coax Toggle 3 SO239's **£5.75** plus VAT. P&P 25p.
CT-2 Coax Toggle 2 SO239's 1 PL259 **£5.95** plus VAT. P&P 25p.

LUNAR LINEAR AMPLIFIERS

2M10-80P 2m 10W input 80W Output with 9dB gain pre amp	**£127.00**
2M10-150P2M 10W input 150W Output with 9dB gain pre-amp	**£182.00**
2M3-150 2m 3W input 150W Output with 9dB gain pre-amp	**£182.50**
2M25-150P2M 25W input 150W Output with 9dB gain pre-amp	**£160.00**

+ VAT. P&P £1.

SST ANTENNA TUNERS

SST1 Random Wire Tuner	**£22.00**
SST2 Coax Wire Tuner	**£26.75**
SST3 Impedance Match unit	**£13.50**

+ VAT. P&P 75p

MK-1024

As EK-150 but with four memories each capable of storing 256 bits making a total of 1,024 bits. This can be recalled separately or in sequence for one long message. **£117.50** plus VAT. P&P £1.

EK-150

A semi- or fully-automatic squeeze keyer producing dots and dashes in the precise ratio required for perfect code. The speed is adjustable from 0-60wpm. Power inputs 110/ 240V AC or 9-14V DC. **£65** plus VAT. P&P £1.

MICROWAVE MODULES

TRANSVERTORS

MMT 144/28 Transvertor	**£79.00**
MMT 28/144 Transvertor	**£79.00**
MMT 432/28S Transvertor with Oscar shift	**£119.00**
MMT 432/144R Transvertor	**£151.00**

VARACTORS

MMT 1296 23cm Tripler	**£30.00**

CONVERTORS

MMC 432/28S for Oscar	**£28.00**
MMC 432/144S for Oscar	**£28.00**
MMC 70 4m convertor	**£19.00**
MMC 70 LO 4m convertor	**£20.00**
MMC 144 2m convertor	**£19.00**
MMC 144 LO 2m convertor	**£21.00**

FREQUENCY COUNTERS

MMD 050/500MHz Counter	**£60.00**
M500P 10 Prescaler	**£20.00**

LINEAR AMPS

MML 144 25W	**£39.11**
MML432 100W	**£220.00**
MML144 80W	**£120.00**
ATV435/51 convertor	**£28.00**
MMC1296/144/28	**£30.00**
MMC156/28 Marine	**£20.00**
MMC28/144 up convertor	**£19.00**
MMA 144/28 Pre-amp	**£13.00**

All 2m convertors can be supplied with IF outputs of 2-4-12-14-18-28MHz 70cm models with IF outputs of 28-14-18- or 144MHz.

WE HELP YOU WHERE IT HURTS

Pretty pictures are fine . . . Journals these days are packed full of them—Trouble is they're so repetitive . . . Same Gear . . . Same Price . . . Even the same dialogue! Check now, you'll see what we mean—Only the address is different!! The question is—What do they cost you?

The quality of sales and service comes down to overheads, you know it and we know it—Simply stated, use it one way and you can't use it the other—So that's why we're at this end of the Mag—No pretty pictures here; only value for money deals—In a nutshell that's our aim—TO HELP YOU WHERE IT HURTS—In your pocket! For example look at our HP deal—A real super saver—The best ever offered to Radio Amateurs, so if you're looking for easy payments—Look no further—Our deal is aimed TO HELP YOU WHERE IT HURTS and we know WHERE IT HURTS—In your pocket! Ask the Amateurs who've bought from Amcomm—They'll tell you—First Class Service—Absolutely No Quibble Guarantee—Express collection and return guarantee service—Average Repair Time 48 hours—Top Trade Ins—That's where our overheads go—No pretty visuals, just top deals and service TO HELP YOU WHERE IT HURTS—In your pocket!

Yaesu FT 901DM	**Yaesu FT 101ZD**	**Yaesu FT 225RD**	**Yaesu FT 7B**	**Yaesu FT 101Z**
Cash Price £920.80	Cash Price £670.20	Cash Price £557.76	Cash Price £432.12	Cash Price £575.76
Deposit £352.00	Deposit £240.00	Deposit £216.00	Deposit £168.00	Deposit £234.00
12 monthly repayments of £47.40	12 monthly repayments of £35.85	12 monthly repayments of £28.48	12 monthly repayments of £22.01	12 monthly repayments of £28.48
Yaesu FT 107M/107E	**Yaesu FRG 7000**	**Yaesu FT 207R**	**Standard 8800**	**Standard 8700**
Cash Price £862.04	Cash Price £377.04	Cash Price £199.60	Cash Price £252.00	Cash Price £275.08
Deposit £335.00	Deposit £150.00	Deposit £91.00	Deposit £99.00	Deposit £109.00
12 monthly repayments of £43.92	12 monthly repayments of £18.92	12 monthly repayments of £9.05	12 monthly repayments of £12.75	12 monthly repayments of £13.84

MAIL AND TELEPHONE ORDERS? . . . Well our competitors are terrific at this—We just do our best. That means if we have your order before Midday it leaves before 4.00, no parcel post—Everything First Class Mail or Securicor (not Jaybeam or Hygain) because we know you want it NOW. If we're short on stock (almost never) we'll ring you, if you can't wait we'll recommend another dealer to you. So whatever you're after, check the glossies then call the "Try Harder People" at Amcomm.

The opportunity is below—Try us once and we'll prove it—Cash or Terms we're with you—TO HELP YOU WHERE IT HURTS—In your pocket!

★ Check our Mail Order list in last 3 Radcomms. Prices haven't changed.
★ If you need pretty pictures send us 25p and we'll send you a bundle—in colour too!
★ Other low charge deals available over 18 & 24 months. Call us with your requirements and we'll tailor a deal for you.

WE HELP YOU WHERE IT HURTS (PART II)

If you're an HF man you'll love this—We've a fair number of them arriving during the last week of February—A rather big, rather special purchase and all the benefits being pushed out to you—Before you look down we'll anticipate your question and say "YES THERE IS A CATCH!" a small one.

YAESU FT 101ZD £615.00 inc. VAT

Carriage £8.00

So what's the catch? Well the rigs on offer above have no AM facility—Otherwise the same as the top price units—All are unopened, factory fresh and carry our fully comprehensive guarantee—We've quite a number coming but not enough to meet the demand—So get on the phone before they vanish and WE'LL HELP YOU WHERE IT HURTS—In your pocket!

JAYBEAM—HYGAIN—BANTEX—AMTECH—CUSHCRAFT—SWAN—ATLAS
and 50 other major lines—all ex stock.

AMCOMM

AMCOMM SERVICES

194A NORTHOLT ROAD, SOUTH HARROW, MIDDX. Tels: 01-864 1166 & 01-422 9585

OPENING HOURS: Mon-Sat 9.00-5.00 Sunday 12.00-3.00

YAESU

WARD ELECTRONICS

FOR TRIO

SOHO HOUSE, 362-364 SOHO ROAD
HANDSWORTH, BIRMINGHAM B21 9QL
Telephone: 021-554 0708 OPEN TUES-SAT

TS120S 80-10m Transceiver. All Solid State Compact and with Digital Readout, IF Shift, VOX, Sidetone. An ideal modern transceiver at an unbeatable price. **£432.40**

R1000 General Coverage Receiver 200kHz-30MHz Digital Readout. **£298**

TR2300 Portable FM Transceiver 144-146MHz 25kHz steps. **£166.75**

TR2400 Hand-held FM Transceiver 144-146MHz 5kHz steps. 10 memories. **£210.45**

DM800 GDO 700kHz-250MHz **£51.75**

HS5 Communications Headphones **£21.85**

Lowe SRX30 Receiver 500kHz-30MHz **£178.00**

TS180S 160-10m Transceiver. All solid-state **£679.65**

PS30 Mains PSU **£85.10**

AT180 Antenna Tuner **£95.45**

SP180 Matching speaker with selectable audio filters **£36.80**

APPLE II Microcomputer **£799.00**

So much space could be devoted to this item and still only scratch the surface of what it has to offer. Suffice it to say that handbooks are available separately from £5.75.

Additionally if you would like to see an Apple II at evening or weekend ring Tony Dewsbury G4CLX on Kidderminster 851255

NEW ADDITION TRIO TR9000

With features that mean it must be the ideal 2 metre multimode. **Price about £345**

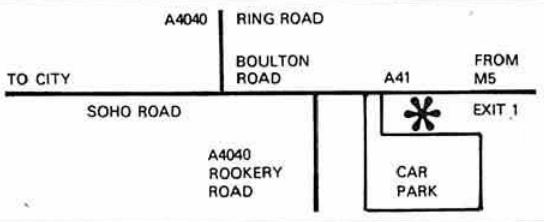
DAIWA ACCESSORIES

Including the new **Daiwa Automatic atu at £130.**

ALL PRICES SHOWN INCLUDE VAT AT 15%

WARD ELECTRONICS

SOHO HOUSE (First floor) 362-4 SOHO ROAD
HANDSWORTH, BIRMINGHAM B21 9QL
Tel: 021-554 0708 OPEN TUES-SAT



J. BIRKETT

25 THE STRAIT, LINCOLN Tel: 20767

UHF POWER AMPLIFIER MODULE 50MW input; output 2·5 Watt 420-480 MHz out. 13 Volt 50Ω Type BGY 22C @ **£12.50** each.
BLY34, 2 WATT, 13 Volt, 175MHz TRANSISTORS @ 75p.
HF-VHF POWER TRANSISTOR Type 587BLY SSB-FM, 27 to 80MHz, 40 Watts, 28 Volts, with data @ **£3** each.
BLY55 175MHz, 4 Watt, 13 Volt, with data @ **£2.50.**
BLY97 24 Volt, 175MHz, 4 Watt, with data @ **£3.**
BFR64 470MHz, 13 Volt, 3 Watt, with data @ **£4.**
SPECIAL SUB-MIN CERAMIC TUBULAR TRIMMER 0·5pf to 3pf @ **15p.**
HP HOT CARRIER DIODES 5082-2800 @ **40p** each.
RF TRANSISTORS 2N918 @ **25p**, AF239, 2N5179, 2N5180 @ **50p.**
EDDYSTONE TRANSMITTING VARIABLE 30+30pf (60pf) @ **£2.20.**
X-BAND GUNN DIODES with data @ **£1.65.**
VHF-UHF STRIPLINE FET 2N4417 with data @ **£2.20.**
FERRITE BEADS FX1115 @ **15p** doz. ¼" long beads @ 6 for **10p.**
VHF CURRENT CONTROLLED SWITCH 20 to 500MHz with data @ **£1.65.**
HFC600 8-DIGIT 600MHz FREQUENCY COUNTER @ £123.

Please add 20p for post and packing on UK orders under £2.
Overseas postage charged at cost.

MARCO TRADING

BC107/8/9	**10p**	BF182	**29p**	BF263	**30p**	2N3055	**48p**
BC182/3/4	**9p**	BF115	**32p**	BFY90	**90p**	BT106	**£1.10**
182L/3L/4L	**10p**	BF262	**30p**	BFY50	**20p**	1N4007	**7p**

- Resistors: ¼W at 40C, 1/3W @ 70C. 5% Tolerance, High stab. Low noise. E12 Series, ie 2·2Ω, 2·7Ω, 3·3Ω, 3·9Ω, 4·7Ω, 5·6Ω, 6·8Ω, 8·2Ω, 10Ω etc, **2p** each, 10 mixed for **15p**, 1,000 mixed in 100s **£8**
- Special Development Pack: 10 of each value, 2·2Ω to 2M2 (730 resistors) **£6.**
- Rotary Pots: Log and Lin 4K7 to 2M2, **27p** each.
- 0·1W Pre-Sets: 100Ω to 1M Vertical and Horizontal. Only **6p** each.
- 400m/W Zener Diodes: 2V7 to 30V. **8p** each, 100 (Your mix) **£6.**
- Sub. min. toggle switches 250V 2A; SPST **56p**; SPDT **62p**; DPDT **68p.**
- Milar capacitors, 100V 10%; 1000pt-0·47mfd, **6p** each.

SANYO AUDIO AMPLIFIER (STK015) 10 watts 8Ω. Brand new, only **£2.50** (With free spec sheet).

Send 25p stamps for our latest catalogue. (Wholesale prices upon request). Please add 15% VAT to all orders plus 25p postage/packing and write to: **Marco Trading, Dept RC6, The Old School, Edstaston, Wem, Shrewsbury SY4 5RJ.** Tel: (098472) 464/465. Export add NO VAT, only postage air/sea at cost.

STEPHENS-JAMES LIMITED

TRIO R-1000

TR-9000

APPROVED TRIO DEALER

TRIO TS-120V

TRIO TS-7625

TRIO PRICES								
Full Range of Accessories Available	TS820	£791.20	AT180	£95.45	TL922	£672.75	TR2300	£166.75
	SP820	£37.95	TS120S	£432.40	TS520SE	£437.00	TR2400	£210.45
	TS180S	£679.65	TS120V	£347.30	SP520	£17.25	TR9000	£340.10
	SP180	£36.80	TL120	£128.80	TR7625	£246.10		

YAESU
FRG7 Receiver £214.00

DRAKE
TR7 Transceiver and AC PSU £1,022.00
MN7 Antenna Matching Unit £127.50
Other Drake equipment available to order.

S.T.E. MILAN
AA¹ Audio Module £4.95
AD4 FM Discriminator £5.00
AT23 C.C. FM Transmitter £50.00
AR20 C.C. FM Receiver £50.00
AG10 Tone Burst unit £4.50

ARAC102. 28-30MHz and 144-146MHz
FM-SSB-CW Receiver £107.50

STABILISED POWER SUPPLIES
Model 122 12-6V 2·5A £15.66
Model 122s 10-15V 2A Single Meter £22.50
Model 125 10-15V 5A £28.00
Model 153S 4-20V 3A Dual Meter £31.00
Model 156S 4-15V 6A Twin Meter £40.00
Model 1210S 4-20V 10A Twin Meter £88.00
Model 1220 13·5V 20A £95.00
Maximum ratings quoted.

MICROWAVE MODULES
MMC144/28Lo 2m Converter £24.15
MMC432/28S 70cm Converter £29.90
MMC432/144S 70cm Converter £29.90
MMC1296/28 23cm Converter £32.00
MMC1296/144 23cm Converter £24.15
MMV1296 23cm Tripler £39.50
MMDO50/500 500MHz Freq. Counter £69.00
MMT432/28S 70cm Transverter £136.75
MMT432/144R 70cm Transverter £173.50
MMT144/28 2m Transverter £90.75
MMA144 2m Preamp £14.90
MML144/100 2m Linear Amplifier £142.50
MML144/25 2m Linear Amplifier £48.30

TRANSCEIVERS AND RECEIVERS
SRX30 Solid State Receiver £178.00
Sky Ace aircraft band hand held receiver £49.00
Swan 100MX Transceiver & AC PSU £600.00
R512 Aircraft Band Scanning Receiver £138.00
Digital Flight Scan Airband Receiver £230.00
SR9 2m FM Receiver £46.00
FDK TM56B FM Scanning Receiver £109.00
AMR217B 2m Scanning Receiver £120.75
Bearcat 220FB Scanning Receiver £241.50
Standard C8800 FM Transceiver £252.00
Philips FM321 Mobile Transceiver 70cms £247.50

HY-GAIN
12AVQ 10-15-20m Vertical Antenna £43.13
14VQ/WB 10-15-20-40m Vertical £60.38
18AVT5WB 10-15-20-40-80m Vertical £87.40

VARIOUS ANTENNA
HF5 vertical 10-through 80m £41.40
Discone 5 Antenna 50-480MHz £36.80
C4X 10-15-20m Vertical £43.00
HQ-1 Minibeam Tribander £96.76
Complete range of JAYBEAM HF AND VHF-UHF Antennas, send 15p for catalogue and price list.

TECHNICAL ASSOCIATES
MULTIFILTER New receiver filtering system. The complete answer to interference and bandwidth problems. Unit contains a peak notch filter and band pass filter £51.80
SWL Preselector £27.25
Crystal Calibrator £23.00

G-WHIP. Mobile Antenna Range
Tribander Helical 10-15-20m £23.00
LF Coils for above £6.56
LF Telescopic for coils £3.00
Standard Basemount £4.20
MultiMobile 10-15-20m £26.45
Coils for above £6.56
Extendarod £10.93
Flexiwhip 10m £16.00
Coils for above £6.56

SWL TUNING UNITS
MK2 Covers 550kHz to 30MHz £28.00
Designed and manufactured by us. Fifty switchable tunable positions, will match any antenna to your receiver. Now in use in over 50 countries. Ideal for use with QRP transmitters. Price includes VAT and postage on this unit.

SECONDHAND EQUIPMENT
Due to the fact that our secondhand equipment stock changes daily and our adverts are in press weeks before publication we are not publishing a list. A S.A.E. will bring you an up-to-date list or please phone. Good clean equipment wanted and spot cash will be paid. All secondhand equipment carries a three-month guarantee.

Shop Hours: Mon to Fri 9.30am to 5.30pm
Saturday 9.30am to 4.30pm
ACCESS and Barclaycard facilities
HP terms arranged. Part exchanges always welcome. Good clean equipment bought for cash. Items sold on a commission basis
We are located on the A574. Turn at the Greyhound Motel on the A580 (East Lancs Road) and we are about ¼-mile on right. No parking problems at any time.

STEPHENS-JAMES LIMITED
47 WARRINGTON ROAD
LEIGH WN7 3EA
ENGLAND
Telephone (0942) 676790

Complete Audio/Tuner Kits

Mk III FM Tuner series

Carriage for Mk III tuner £3 inc

The Mark III series FM tuner has been updated, and now includes a centre zero tuning meter as standard. The instruction manual has been meticulously revised, enabling easy assembly by constructors of various levels of experience - a preview copy may be purchased for £1.00.

Mark III A series 'Reference series' tuner modules .....£171.35 inc.
Mark III B series 'Hyperfi' modules, with switched IF BW, pilot cancel decoder .....£198.95 inc.

A matching synthesiser unit will be made available later this year, and can be retrofitted to either version. All versions include digital frequency readout/clock, VU deviation meters, 6 preset stations, 10 turn pot manual tuning, toroidal PSU, output level adjustment, 110/240v AC input. Full alignment service available.

Power Amplifier

Style and performance - with a real 'belt and braces' PSU design.

After a couple of preview comments, it seems that many of you are waiting to hear about the matching HMOSFET power amplifier for the Mk III tuner. Well, it's out at last - complete with twin toroidal PSUs for comfortable 80W RMS per channel, over 100W peak, but limited by thermal shutdown of the HMOS. 10W-100W log LED output peak indicator, DC offset protection and switch-on pause relay. AC or DC input coupling, direct or relay protected output terminals. The works.
Only one version of this item: Complete kit .....£178.25 inc. Carr. £5.

Preamplifier

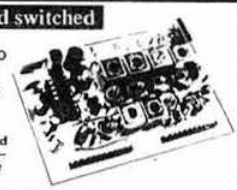
More features and facilities, thanks to DC switching and control design

Previewing the most comprehensive audio preamplifier yet..... DC switching of 7 inputs, plus two tape in/outs. 2 low pass, 2 high pass active filters, genuine volume related loudness, 1dB channel matching, with DC volume, balance, bass and treble controls. Suitable for bus/remote control, tape dubbing, switched monitor etc. 80dB S/N+, THD .75dB or better. Pluggable PU equalization boards, tone control override. Price for complete unit about £149 ex VAT.

Radio/Audio/Communications Modules

LW-MW-SW-SW DC tuned and switched

91072 All switching of bands by a single pin to gnd. Varicap tuned, with LO output for synth. MW/LW version or MW/LW plus 1 or 2 SW bands
MW/LW: £15.58 +1SW £16.73



VHF Tunerheads

Europes largest stock range for broadcast and communications. Probably also the world's — details in the catalogues and PL. Specials are also supplied in the region 30-220MHz.

Pilot Cancel PLL Stereo decoders

944378:2 £26.45

Again, Europe's widest range of stereo decoders including pilot cancel PLL types. The pic shows the 944378 - pilot cancel including post decoder 26/38kHz filtering and muting preamp output

Switched bandwidth FM IF strips

Broadcast FM IF strips for all occasions, including the new 911225 - with diode switched narrow filter option, ultra linear phase ceramic filters, 84dB S/N, and 0.04% THD (40kHz deviation). Plus usual things like AGC, AFC, dev. mute, level meter drive. £23.95 (supplied in screen can with 0.1 edge connection system) Also the 7230 hyperfi series - as the 911225, but with slope controlled AFC that operates in conjunction with signal level - and an extra IF amp stage for DXing.

Various digital frequency displays

The World's largest range of receiver DFMs is now joined by the DFM7 (shown) - and L shaped version of the DFM3 with remote display mount connector possibility . 1kHz SW resolution with 455kHz or 10.7MHz offsets, 100Hz res up to 3.9999MHz, and VHF to 299.99 MHz in 10kHz steps : £41.75

Semiconductors

Radio/Communications ICs

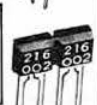
FOR COMPLETE LISTINGS — SEE OUR NEW PRICELIST

CA3089E	2.11	HA1197	1.61	SD6000	4.31
CA3189E	2.53	CA3123E	1.61	TDA4420	2.59
HA1137W	1.95	TDA1072	3.09	MC1330P	1.38
HA11225	2.47	TBA651	2.53	MC1350P	1.38
HA12412	2.81	TDA1090	3.51	KB4412	2.24
KB4420	1.95	TDA1220	1.61	KB4413	2.24
TBA120S	1.15	TDA1083	2.24	KB4417	2.53
KB4406	0.80	TDA1062	2.24	MC3357P	3.16

SL1610	1.84	SL1626	2.80
SL1611	1.84	SL1630	1.86
SL1612	1.84	SL1640	2.17
SL1613	2.17	SL1641	2.17
SL1620	2.50	SL6600	4.31
SL1623	2.80	SL6640	3.16
SL1624	3.77	SL6690	3.68
SL1625	2.50	MC1496	1.44

VARICAP DIODES.....
A section from our PL:

BA102	0.35	16:1 ratio AM tuning	
BB204	0.41	KV1215 9v triple	2.93
BB105	0.41	KV1211 9v dual	2.01
BB109	0.31	KV1225 25v triple	3.16
MVAM2	1.93	BB212 9v dual	2.25



POWER MOSFETS

100W PA's made simple

Since pioneering the 100W complementary MOSFET technique - Hitachi have developed a range of output devices and drivers that ought to revolutionise opinions and attitudes towards the design of all LF amplification systems. We have a new 48 page application note (£1.50 incl and complete sets of parts, modules and now the new complete PA system (see above).

2SK133	120v N-ch 100W MOSFET	£6.33	2SJ48 Pch complement	£6.33
2SK135	160v N-ch 100W MOSFET	£7.29	2SJ50 Pch complement	£7.39
PA101B	Kit for 100W MOSFET PA less Heatsink £16.10. (£23 inc heatsink/bkt)			

ULTRA LOW NOISE PU PREAMPLIFIER

The HA12017 is the last word in PU preamps, and general low noise audio design. It is an SIL IC, with 86dB S/N in RIAA configuration, 10v RMS output capability, 0.002% typ THD at 10v RMS output (imagine the overload margin !!). It comfortably supercedes discrete circuit designs in terms of price/performance, and takes the art beyond the TDA1042's capabilities. (Replaces HA1457) £1.80 each - or an RIAA application PCB with two ICs for £5.75. Complete with Rs&Cs £9.95.

Radio Control ICs

We have various RC ICs, including NE544 NE5044, and two new ones from OKI

KB4445 - 4 channel dig.prop. FM TX IC. 30mW out (amplifyable) £2.30 inc
KB4446 - 4/5 ch. dig. prop FM RX IC. Suits KB4445 or RCME syst. £2.65.
KB4445/6 pair: £4.75. New 8 page data sheet 35p + SAE. More RC ICs in list

CMOS, LPSNTTL, TTL, MPU: Listings in the new pricelist.

Most CMOS is available in low volume - also LPSN. Standard linears and TTL OK.

Things like ICM7216B, ICL8038, 8080A, 6800P, 270B, NE555,NE556, etc

Coming Soon.....

Contain yourselves, RF fans ! Not yet ready for a full launch until autumn, but previewed here:

SSB transceiver system : 10kHz to 1000MHz !!

A modular VLF to UHF SSB TX/RX system at last. With the correct first mixer, the basic PCB covers 10kHz to 1000MHz - using LO fed from ext. source (Our 2 IC Mullard synth for instance) and RF PA for TX OP. 0.2uV basic sensitivity in HF. Typ cost for HF synth SSB RX will be less than £200. Add an RF PA for full TRX for another £50. See one in our foyer, and marvel.

Components

Crystal Filters

Most popular types are available ex-stock, and in quantity.

10.7MHz	25kHz Channel spacing 8pole	£16.67
	12½kHz "	£17.82
	2.4kHz SSB	£19.78
	Monolithic dual roofing filter	£2.30
34.5MHz	1.3dB loss, 80dB stopband HF first filter in synth. RX	£36.80
RC XTALS	FM pairs (no spilts)	£3.74
	AM pairs "	£3.57
USB/LSB	Xtals for 10.7SSB filter	£2.88 ea

Piezo Sounders

The most efficient warning sounders yet

The latest thing in electro-acoustic efficiency. 1mA of drive from CMOS will give an SPL of 83dB - 10v RMS drive from CMOS uses 3mA for 100dB SPL at 4.8kHz (88dB at 1.65kHz)
The data sheets shows various drive circuits, and give full specifications with regard to broadband responses and power consumption etc. 1 off 44p inc. 100 off 28.75p (25p ex vat)

Keyboard switches and caps

From the world's most widely used switch manufacturers - ALPS - come the biggest and best range of keyswitches, and data entry keyboard switches. The SCM81101 is shown here, with the KT5 2-part cap (with clear top, to enable easy fitting of your chosen legend. Other types are available with built in LED, 90° mounting etc.
SCM81101 : 17p, KT5 : 16p - or 29p/pair

LCD CLOCKS
LCD DVM

Clocks use 1.5v at 15uA only. DVM 9v/1mA

CM161: 7mm LCD 12/24hr, alarms etc £11.44 each
CM172: 13mm, 12hr, alarms,timer etc £14.32 each
CM174: 13mm, 12hr, min/sec stopwatch £14.32 ea
DVM 176: ICM7106 based LCD 3½digit £22.36 each

WHAT's NEW at AMBIT

NEW PRICELIST/SHORTFORM:- 28 pages, FOC with A5 SAE pse

Bigger print than our recent one page list - and vastly extended

If you still need convincing to invest £1.60 in the cats, be mean and get this first.

POWER MOSFET APPLICATIONS HANDBOOK by HITACHI :

£1.50 each - or free with pairs of HMOS and the PA101B.

Everything you should know about HMOSFET devices theory and applications.

Please send an SAE with all enquiries. Phone orders by ACCESS - but minimum £5 Callers welcome

CATALOGUES 60p ea., all three for £1.60 PRICES SHOWN HERE INCLUDE VAT POST/PACKAGE CHARGE NOW 35p

ambit
INTERNATIONAL

200 North Service Road, Brentwood, Essex

TELEPHONE (STD 0277) 230909 TELEX 995194 AMBIT G POSTCODE CM14 4SG

O/WO PLEASE - Commercial MA terms on application Goods are offered subject to availability, prices subject to change - so please phone and check if in doubt.

Parts 1-3 AMBIT catalogues 60p ea, or £1.60 the lot.

muTek limited

rf technology from G4DGU

One of the more overworked adjectives in the amateur radio advertising vocabulary is 'professional'. We've sworn never to use it in our advertising despite comments from satisfied customers that our equipment is somewhat more professional than much of the opposition. In fact, we consider the challenge involved in the design of our amateur radio equipment to be at least as great as that presented by our professional work. Read on!

FT221/225GT front-end board.
Our list of customers for this board is beginning to look like a 'Who's who' of the 144MHz contest world! We use a modern ion-implanted mosfet (3SK88) driving a diode ring mixer via a properly designed filter. A great deal of care has been taken to ensure that the ring is properly terminated: this is essential for good performance. A mosfet post amplifier follows the mixer and interfaces an additional 6-pole crystal filter. After the filter two separate mosfet if amplifiers drive the existing if amplifier strips.

Two small, easily reversible, modifications are needed to the transceiver: we supply fitting instructions which at least one customer has described as 'just like a Heathkit!' **£53.87**

1.3GHz transverter system
Our system consists of a series of properly designed pc modules which are supplied in a fully aligned and tested state for assembly into your own system. Obviously, if you just want a black-box system, then you'll go elsewhere, but we consider that 23 is still a band where 'box-ops' are in the minority, and that this state of affairs is likely to continue. By using our system you can build your own very high performance transverter, which won't become obsolete as the technology advances:

Low noise amplifier:	**£30.81**
Gain block:	**£11.15**
Bandpass filter:	**£6.75**
Mixer – local oscillator. (1.3GHz in-144MHz out)	**£22.60**
384MHz source (the clean one!)	**£18.25**

At the time of writing this advertisement we have several other modules under development, including a linear transmit mixer, a dual directional coupler, a 5W linear amplifier strip and a very low noise crystal oscillator for 10GHz transverters. Give us a ring or write!

144MHz preamplifier
We are making this preamp in response to a considerable demand from those people who are unable to fit a complete replacement front-end to their rigs. Fitting a preamp *will* degrade dynamic range, however, we have designed ours to minimise the effect. By using a very low noise mosfet it is possible to reduce the insertion gain of the preamp to a minimum whilst still maintaining the system noise figure at a level which ensures that externally generated noise is the factor limiting receiver sensitivity.

Unlike many of the preamplifiers currently available we have also incorporated a bandpass filter, thus minimising problems due to out-of-band responses. The preamp is available in both boxed and unboxed versions with facilities for masthead relay control and an internal attenuator for gain setting. Ask us for a data sheet!
Unboxed: **£10.79** Boxed: **£17.72**

Kungsimport antenna combiners
Very nicely manufactured in aluminium, with N connectors as standard fittings these combiners make the electrical side of antenna stacking almost a doddle! We get bored with telling people to ask for data, but please do!

2-144N	**£26.75**	4-144N	**£29.75**
2-432N	**£23.50**	4-432N	**£26.50**
2-1296N	**£23.50**	4-1296N	**£26.50**

Carriage: £1.50 for 144MHz models, £1.00 for others

TVI filter Still very available: **£1.80**

NEC rf and microwave semiconductors
We've been expanding our range of NEC devices over the last few months. Additions include the **NE21936** (an 8GHz f_t, 1.1dB nf transistor for 432: 1.8dB on 1.3) at **£3.74**, the **ND4692** (X-band 7dB cartridge mixer diode) at **£3.51**, and the **NE12683** gasfet at **£26.08**! Don't forget that we also have the **NE02137 (£1.91)**, **NE57835 (£6.73)**, **NE64535 (£15.05)**, **NE73432E (£0.97)**, **3SK88 (£1.73)**, **3SK74 (£0.60)**, **ND4991 (£0.40)** and we'll help you learn to use them!

Data on request: SAE appreciated. CWO. Please add 50p p&p unless stated, and then VAT. Tnx!

muTek Ltd, PO Box 23, ABINGDON OX14 4TG (0235) 831330

IQD

FREQUENCY STANDARD, MARKER & CONVERTER CRYSTALS
5·0, 10·0, 10·7 & 38·66667MHz 18U **£2.70**; 1·0MHz 6U or 33U **£2.95**; 100·0kHz 13U or 34U, 116·0MHz 18U **£3.00**; 455·0kHz 6U **£3.50**; 200·0kHz 6U **£3.70**; 1·0MHz hi-stab 6U **£4.25**; 10·0MHz hi-stab 36U **£6.00**

CRYSTAL FILTERS
Super selective 250Hz 8-pole CW filters for FT-101, FR-101, FT-301, TS-520, TS-820, FT-901 & FT-101Z **£25.50** each, and (9MHz types with appropriate carrier crystals):
9MHz SSB 6 pole, BW 2·5kHz at −6dB and 5kHz at −60dB **£20.50**
9MHz SSB 8 pole, BW 2·4kHz at −6dB and 4·3kHz at −60dB **£24.00**
9MHz CW 5 pole, BW 500Hz at −6dB and 2·2kHz at −60dB **£22.50**
9MHz FM 8 pole, BW 12kHz at −6dB and 21·6kHz at −60dB **£24.00**
10·7MHz FM 8 pole, BW 7·5kHz at −3dB and 17·5kHz at −70dB **£24.00**
10·7MHz FM 8 pole, BW 15kHz at −3dB and 35kHz at −70dB **£24.00**
21·4MHz FM 8 pole, BW 15kHz at −3dB and 50kHz at −80dB **£25.20**
455kHz CFU series ceramic filters, various bandwidths in stock **£1.50**
TBG-2 crystal tone-burst generator **£8.00**

PLEASE ADD 15% VAT. POST FREE

INTERFACE QUARTZ DEVICES LTD
29 Market Street, Crewkerne, Somerset, TA18 7JU
Tel: (0460) 74433 Telex: 46283 inface g.

MOSLEY

WE ARE THE ANTENNA PEOPLE

TOWERS
ROTATORS
COAX
ROPES

SOME ANTENNAS

Mustang	3 elements, 10, 15 and 20 metres.....	**£145.00**
TA-33 Jr.	High Power model incl. Balun 3 elements, 10, 15 and 20 metres.....	**£132.00**
TA-33 Jr.	3 elements, 10, 15 and 20 metres.....	**£116.00**
TA32 Jr.	2 elements, 10, 15 and 20 metres.....	**£78.00**
TA31 Jr.	Rotary dipole, 10, 15 and 20 metres.....	**£50.00**
ELAN	3 elements, 10 and 15 metres.....	**£93.00**
TD-2	Trap Dipole 40 and 80 metres.....	**£40.00**
TCD-2	Trap Dipole 40 and 80 metres compressed	**£50.00**
V-3 Jr.	Trap Vertical 10,15 and 20 metres.....	**£35.00**
Atlas	Trap Vertical 10, 15, 20 and 40 metres....	**£60.00**

SWL ANTENNAS

SWL-7	Dipole 11, 13, 16, 19, 25, 31 and 49 metres	**£35.00**
RD-5	Dipole 10, 15, 20, 40 and 80 metres.....	**£35.00**
Orbit	Vertical 11, 13, 16, 19, 25, 31 and 49 metres.....	**£55.00**

Prices correct at time of going to press

MOSLEY ELECTRONICS LIMITED
Administrative Address only
196 Norwich Road, New Costessey, Norwich NR5 0EX
(All antennas available ex works, carriage and VAT extra)

Send for HANDBOOK containing full range of Antennas and technical information, 28 pages **80p**. *Refundable upon purchase of Antennas.*

GET SET FOR SUMMER!

ICOM®

IC215E 2m FM 3 watt 12 chs	£162.50
IC202S 2m SSB 3 watt portable	£199.00
IC240 2m 22 ch's 10 watts	£193.00
IC280E 2m FM 80 ch's 10 watts	£250.00
IC211E 2m All mode transceiver	£549.00
IC255E Superscan 2m FM 25 watt	£255.00
IC260 All mode 2m scan mobile	£369.00

VHF MONITOR Rx's

TM56B 12v/240 AC auto scan 10 ch's	£106.00
TM56B Marine model	£115.00
SR9 12v DC Marine model	£48.00
Extra xtals	£2.45
Bearcat 220 synth Rx, 66-88MHz, 118-136MHz, 144-174MHz, 420-45-512-45MHz 240V or 12V DC	£251.50

FDK

Multi 3000 2m All mode	£495.00
Multi 800D 2m 25 watts	£289.00
Multi 700E 2m 25 watts	£195.00
Multi Palm II 2m hand-held special package	£99.95
M-11/Q16 xtals £5.00 Palm II xtals	£3.00
Multi-Palmsizer 2m synthesised 40 channel hand-held	£149.00
Palm IV 70cms	£159.00

PHILIPS

FM321 £247.50
70cms mobile synth

BIRCH SUPERSCAN for IC240.
144·5 to 146MHz Repeater Lockout.
Will scan 70cms with MM Transverter.
Not the cheapest but ONLY **£59.00** (N/C)

G4AKB using an IC-215 from BHB
Photo: F. Smedley G3VJJ

Booth Holdings Bath

* ALL PRICES INCLUDE VAT AT 15% *

Windsor (075 35) 51767 After 7pm for G8DPH (A. Booth)

Access

* NO CARRIAGE ON ALL RIGS *

Bristol (0272) 712730. After 7pm for G3XOD (R. Horsman)

6 Golf Club Lane, Saltford, Bristol BS18 3AA

Telephone Answering Service on Saltford (022 17) 2402. **After 7pm for G3NXU (B. Booth)**

GAREX (G3ZVI)

VHF RECEIVERS SR-9 MkII for 2-metres FM with 144-146MHz full coverage VFO, also 11 xtal controlled channels, ideal for fixed, /P and /M use. Built-in LS, 12V DC operation, **£47.15.** Xtals **£2.60** each.
MARINE BAND version, same spec. 156-162MHz **£47.15.** Xtals **£2.95.**
MAINS PSU for above, 13·8V regulated **£11.95.**
HF12 POCKET VHF FM RECEIVER 12ch xtal controlled. 4MHz bandwidth in range 140-175MHz. With nicad and charger, **£57.95.** Amateur and marine xtals in stock, prices as SR-9. Wide range available.
AMPLIFIER MODULE new fully assembled 6W IC unit 12V dc low imped. (4-8Ω) in and out for extn speaker amplification. With cct. **£2.75.**
Integrated circuits: 723 (TO5), **75p;** SN76660, **75p;** CD4001AE, **25p;** NE555, **55p;** 709 (TO5), **30p;** 741 (DIL 8), **30p;** 7410, **25p;** 7472, **25p.**
Resistor Kits. E12 series, 22Ω to 1M, 57 values, 5% carbon film, ¼W or ½W (please state). **Replenishments available.** Ratings at 70°C.
Starter pack, 5 ea value (285) **£3.10.** Standard pack, 10 ea (570) **£5.55.**
Mixed pack, 5 ea ¼W + ½W (570) **£5.55.** Giant pack, 25 ea (1425) **£13.60.**
PL259 UHF Plugs + reducer **75p** each, 5+: **67p.**
SO239 UHF Socket panel mtg **60p** each, 5+: **50p.**
NICAD RECHARGEABLES—physically as zinc carbon: AA(U7) **£1.30;** C(U11) **£3.35;** PP3 **£5.55. ANY 5**+: less 10%; **ANY 10**+: less 20%.
Slide switches, min, DPDT **20p** ea; 5+: **16p;** 10+: **14p.**
GAREX FM detector and squelch conversion ready assembled with full fitting instructions. Tailor made, easy-fit design for AM Cambridge, replaces squelch board with minimum of other modifications, **£5.75.**
Transistor Vanguard (AM25T) version (modified squelch), **£6.35.**
LARSEN 70cm 5dB COLLINEAR MOBILE AERIALS
420-440MHz. Whip and coil only, **£7.90.**
420-440MHz with lug to fit hinge base (eg REVCO), **£8.48.**
420-440MHz with adapter to fit ASP base, **£8.48.**
420-440MHz complete with hinged base (½in hole), **£11.50.**
420-440MHz complete with snap-in base (½in hole), **£11.00.**
420-440MHz complete with LM base (½in hole), **£10.60.**
450-470MHz versions of above-same prices.

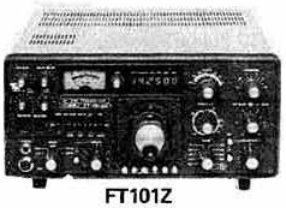
AUTHORISED DISTRIBUTOR OF REVCO AERIALS

PRICES INCLUDE UK POST & PACKING & 15% VAT.
ACCESS INTERBANK BARCLAYCARD TRUSTCARD

GAREX ELECTRONICS, 7 NORVIC ROAD, MARSWORTH, TRING, HERTS HP23 4LS MAIL ORDER ONLY
Phone 0296 668684. Callers by appointment.

YAESU MUSEN

FT-101Z
FT-901
FRG-7000
FT227RB
FT-7B



FT-101ZD
FRG-7
FT225RD
CPU-2500R
FT207R

FT101Z

All ex-stock and FREE SECURICOR DELIVERY

APPOINTED JAYBEAM DISTRIBUTOR FOR NORTH WALES
ASP MOBILE ANTENNAS. SEM PRODUCTS STOCKED
FULL RANGE OF AMIDON TOROIDAL CORES IN STOCK

W2AU CUBICAL QUAD SPIDERS. Aluminium 2" Boom	£32.00
BOOMLESS CUBICAL QUAD SPIDERS. Aluminium	£32.00
W2AU BALUNS Built in lightning arrester 1:1 & 4:1	£14.37
BALUN KITS Toroidal Core. 1:1 or 4:1 LF Unit	£4.85
As above but for HF use	£6.00
COPPER AERIAL WIRE 14 swg Hard Drawn 140'	£8.84
Same as above, 70'	£5.34
12V at 3AMP POWER SUPPLIES	£20.00
SEM Z MATCH. Will handle 1kW	£45.00
LOW PASS FILTER. Nye-Viking 2-3MHz	£19.50
MULTIMETERS ME-221	£17.00
FERRITE RINGS Mullard FX 1588 for TVI/AFI	£0.67

All prices include VAT and carriage
PL259, SO239, REDUCERS, COAX, ROTATORS, ETC, ETC, ETC
Please send a Stamped Addressed Envelope with all enquiries

TMP ELECTRONIC SUPPLIES

Britannia Stores, Leeswood, Mold
Clwyd CH7 4SD
Tel: Pontybodkin 846 (035287)
Business hours: 9.30-5pm Mon, Wed, Thurs, Fri; 9.30-1pm Tues & Sat

NORTHERN COMMUNICATIONS

AMATEUR ★ COMMERCIAL ★ MARINE

YAESU • FDK • ATLAS • DENTRON • STANDARD • JAYBEAM
NAG • ASP • SWAN • G-WHIP • MM • CDE • SEM

CUSHCRAFT Power & Performance ANTENNAS

ATV3	Vertical 10/15/20	(a)	£ 35.40
ATV5	Vertical 80/10m	(b)	£ 76.00
A144/7	7-element 10·5dB Yagi 144MHz	(a)	£ 24.95
A144/11	11-element 11·3dB Yagi 144MHz	(a)	£ 27.35
A144/11	11-element 13dB Yagi 144MHz	(b)	£ 27.85
214B	14-element 15dB long Yagi 144MHz	(c)	£ 45.00
A3219	19-element "Boomer" 16·5dB long Yagi 144MHz	(c)	£ 64.00
ARX2	Ringo Ranger 6dB Vertical 144MHz	(a)	£ 26.50
AR10	Ringo Ranger vertical 10 metres	(a)	£ 22.00
A10/3	3-element Yagi 7·6dB 10 metres	(b)	£ 52.00
A15/3	3-element Yagi 7·6dB 15 metres	(b)	£ 72.00
A20/3	3-element Yagi 7·6dB 20 metres	(c)	£139.75
ATB34	3-band HF Yagi 7·5dB 10/15/20 metres	(*)	£235.75

*Prices include VAT, *carriage extra. (a) £1.00 (b) £2.00 (c) £3.00*

OR Our very own 2-metre 12-element **ZL SPECIAL**

ZL12	13dB gain from a 10' 6" long, split boom	(a)	£ 28.75
ZL8	New 10dB 8-element portable version	(a)	£ 17.50

BARCLAYCARD

Buy it with Access

Swan 100MX HF Transceiver—Now at a price you can afford

80-10-metre Solid state, compact HF rig for mobile and fixed operation. 235 watts input. Send for details of this amazing rig! Limited period offer, including VAT **£450.00**
Mains PSU also available.

Standard Mobiles are here!

C8800 2-metre FM Mobile, the best value around, in its price range. Superb list of operating features and an excellent performer, too! (We're convinced—drop in for a demonstration) **£252.45**
C7800 70 centimetres FM Mobile—a no compromise rig, at a sensible price. All the features of a good 2-metre unit in a purpose-designed package for UHF **£275.45**

FDK—Multi 700EX & 750EX

In the very best traditions of FDK the new M700EX (2m FM 25 watts) and M750EX (2m Multimode Mobile SSB/FM) will be here soon to offer you the very best in 2-metre operating at economic prices. If you like the Multi 700E then you'll love the EX version! The new M750EX will make it possible to work the SSB DX, without breaking the bank! Contact us for details.
M700EX **£199.00**; M750 **£299.00**

See us at ELVASTON CASTLE RALLY JUNE 8th

BRADFORD (0274) 814218. Mon-Sat. HALIFAX (0422) 40792

VISIT OUR SHOWROOM—Thur, Fri, Sat.

303 CLAREMOUNT ROAD, HALIFAX HX3 6AW, WEST YORKSHIRE

TONNA (F9FT)

YOUR ULTIMATE CHOICE FOR 2m, 70 AND 23cm ANTENNAS

144MHz		432MHz	
4 El	£14.20	19 El	£19.00
9 El fixed	£16.56	19 El crossed	£30.14
9 El portable	£18.44	21 El	£26.43
9 El crossed	£28.75	21 El ATV	£26.43
16 EL fixed	£31.74	144/432MHz	
16 El portable	£33.72	Oscar special	£29.93
Telescopic portable mast 25ft			£24.94
Telescopic portable mast 18ft			£16.76

High quality Phasing Harness available.

NEW 23cm 23 element Yagi now available.

Carriage for above £2.60, Mainland only.

THE NEW ADVANCED TECHNOLOGY

AVANTI 'ON GLASS'

2m AND 70cm MOBILE ANTENNAS

Mounts direct on to outside of windscreen, using special adhesive, no holes to drill, vandal-proof whip, capacitively coupled through glass, complete with cable, and plug.

2 metre 3dB gain...**£16.42** 70cm 3dB gain...**£16.42**
70cm 5dB gain...**£17.79** carriage £1.00. S.A.E. for full details.

ALSO MICROWAVE MODULES, LUNAR, ROTATORS, COAX, ETC

RANDAM ELECTRONICS

4 Severn Road, Chilton, Didcot, Oxon OX11 0PW

Telephone: (0235) 834328 or 23080 (24hr answering service 23080)

S.A.E. for price list; Catalogue 30p post paid. Terms CWO—ACCESS/BARCLAYCARD, just telephone your card number. All prices include V.A.T. Caller's welcome, but by appointment only please.

SEE YOU AT ALEXANDRA PALACE

SAMSON ETM - 3C KEYERS

Professional-grade C-MOS keyers built for dependable Marine & Commercial use world-wide—Backed by Spacemark service.
Only 1μA battery idling current! **ETM-3C. £65.30**

ETM-4C MEMORY KEYER—Has ETM-3C features plus 4 memories each taking approx 22 Morse characters (switchable 4×256 or 2×512 bits). Erase/rewrite as often as needed. By just pressing a button it sends CQs etc.—once only, or repeatedly, and at any chosen speed. **£122.46**

JUNKER PRECISION HAND KEY. £37.89

BAUER SINGLE-PADDLE KEY UNIT. £11.92

88mH TOROIDS for rtty, cw, sstv, filters £1.15 each

SSB 90° AUDIO PHASE SHIFT NETWORKS, octal based.

All prices postpaid and include 15% VAT. Please send stamp with all enquiries.

SPACEMARK LTD.

THORNFIELD HOUSE, DELAMER ROAD, ALTRINCHAM, CHESHIRE (Tel: 061-928 8458)

ADD A NEW DIMENSION TO YOUR HOBBY AND YOUR ENJOYMENT WITH

ROBOT SSTV

Not the fading pictures in a darkened room of yesterday, but full brightness, non-fading, quality pictures on a normal TV. Robot's '400' Scan Convertor will enable you to receive exciting pictures from amateurs all over the world. Whether you are competitive (DXCC/SSTV is a worthwhile challenge) or just like to natter, Robot SSTV will revive the thrill of your first QSO. Ask any '400' owner

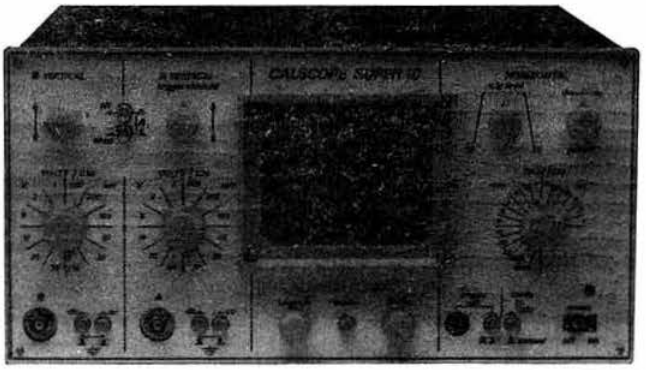
Still only £666.00 including VAT. Really excellent value

SAE please for full details.

AERO & GENERAL SUPPLIES, NANAIMO HOUSE
32 RUFFORD AVENUE, BRAMCOTE, NOTTINGHAM NG9 3JH
Telephone: (0602) 397588

Calscope-the professional Scope you've always needed

Now available from South Midland Communications Ltd. of Totton

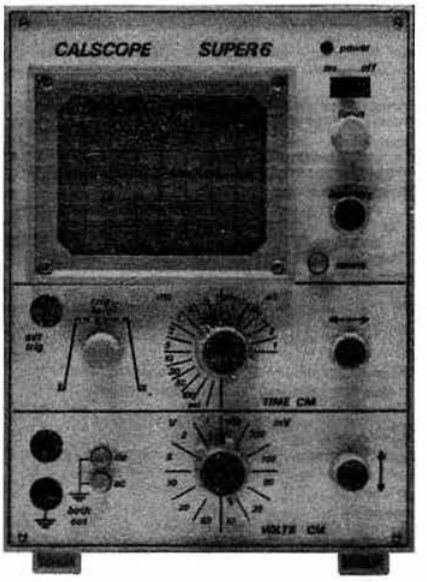


Super 10
£219.00 + VAT

This Calscope Super 10 dual trace oscilloscope is a 10MHz-3dB with 3% accuracy on time and voltage measurement. Instrument usable up to 20MHz. A truly professional instrument at a very realistic price.

Super 6
£162.00 + VAT

This Calscope Super 6 single beam oscilloscope is a 6MHz-3dB instrument usable up to 9MHz. With easy to use controls and a specification that would outclass many more expensive oscilloscopes.



Both instruments are available ex stock at the Main office (Totton) and at the Chesterfield, Leeds and Woodhall Spa branches.

SOUTH MIDLANDS COMMUNICATIONS LTD

S M HOUSE, OSBORNE ROAD
TOTTON, SOUTHAMPTON
HAMPSHIRE SO4 4DN

TELEPHONE: TOTTON (0703) 867333
CABLE: 'AERIAL' SOUTHAMPTON
TELEX: 477351 SMCOMM G

DATONG ELECTRONICS LIMITED

NEW PRODUCT ANNOUNCEMENT

MULTI-MODE AUDIO FILTER MODEL FL2

Adds knife-edge variable selectivity to any receiver.
Superb for all modes but especially for SSB.

Today's crowded H.F. band conditions demand more control of a receiver's selectivity than most receivers provide. Conventional fixed bandwidth crystal filters are quite inadequate to cope with problems such as partially overlapping SSB stations, over-modulation splatter, very close-spaced CW stations, RTTY reception through interference, heterodyne whistles.
Model FL2 offers a new high standard of performance under these critical conditions. **It gives the user full control of upper and lower pass-band edges and even beats most crystal filters for the sharpness of its pass-band edges.** It also contains a separate variable notch filter.

- *Extremely steep skirt responses from a pair of 5-pole elliptic function active filters. Gives remarkable rejection of close-spaced interference in SSB, CW, RTTY.*
- *Superb "rectangular" pass-band out-performs crystal filters for close-in interference rejection.*
- *For SSB, AM and SSTV contains independent low-pass, high-pass and notch filters. Each continuously tuneable from 200 to 3500 Hz.*
- *For CW and RTTY the filters combine to give a pass-band variable from 40 Hz to 1750 Hz, with selectable peaked or 'flat' response shape and independent control of centre frequency and bandwidth.*
- *Convenient push-button selection of operating mode, and colour coded panel labelling for ease of use.*
- *Connects between loudspeaker and receiver audio output. Two-watt power amplifier built-in.*

A new data sheet is available free on request.

Price: £78 plus V.A.T. at 15% = £89.70

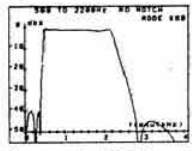
Send for free catalogue on all Datong products.

Application to SSB and RTTY
Model FL2's ultra sharp skirts wipe out "monkey chatter" interference from adjacent off-tune SSB stations (HF or LF). With minimal effect on the desired signal.
Interference rejection is superior to "IF shift" or "Pass-band tuning" techniques and of course Model FL2 works with any receiver.
The notch filter can be switched in or out as required without affecting the low and high-pass filter settings.

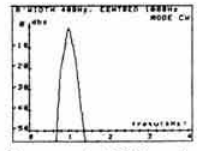
Application to CW
The main CW mode uses 12-poles of filtering to give remarkable skirt selectivity together with peaked response for easy tuning. With minimum bandwidth selected, the response is typically 40 Hz at -3 dbs and only 280 Hz at -40 dbs.
A second CW mode ("CW(2)") using 10-poles of filtering has a 'flat' response instead of peaked. This is useful for net operations.

Model FL2 requires an external DC supply of between 10 and 20 volts. It contains 21 integrated circuits and is built to high standards using close tolerance parts for the filter sections and a double sided epoxy-glass printed circuit board.

Computer simulated frequency response curves for Model FL2.



Response in "SSB" mode showing the very steep pass-band edges and the ideal "rectangular" response shape.



Response in "CW" mode. Note the remarkable skirt response.

DATONG ELECTRONICS LIMITED
Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE England Telephone: (0532) 552461

S.E.M.

P.O. BOX 6. CASTLETOWN, ISLE OF MAN. TEL: MAROWN (0624) 851277

The picture shows our SENTINEL 100, SENTINEL 40 & 30 POWER/PRE-AMPS, the PA5 & SENTINEL AUTO 2 METRE r.f. switched pre-amplifiers. As you can see the SENTINEL 100 looks like a piece of equipment, rather than a heatsink with a switch on it. The heat-sink is a big one, but it is on the back.

NEW! Two products this month

S.E.M. IAMBIC KEYER. Using the famous Curtis 8044 CMOS I.C. Need I say more? Self completing jam proof dots, dashes and spaces. Dynamic dot and dash memories, key debounce circuit (very important) r.f. immune etc, etc. Size: 4½" × 2½", front panel 2"deep. Internal PP9 battery. **£34.50.**
Use with twin or single paddle keys. We have a twin paddle key at **£13.00.**

S.E.M. AERIAL NOISE BRIDGE £20.00.

Note that we have not replaced any power transistors in power amplifiers made since January 1979.

THREE SENTINEL POWER AMPLIFIER/PRE-AMPLIFIERS
All are linear—ALL MODES—Switch straight THROUGH when OFF—R.F. switched and external switching. Highest efficiency —Receive J FET selected for 1dB N.F. and 18dB gain. Same circuit as Sentinel pre-amps—see below. 50239 sockets.

SENTINEL 30	10 times power gain, e.g. 3W IN	30W OUT **£50.00**
SENTINEL 40	4 times power gain, e.g. 10W IN	40W OUT **£66.70**
SENTINEL 100	10 times power gain, e.g. 10W IN	100W OUT **£126.50**

All ex stock. For more information see previous advertisements or ring or write. Without pre-amp **£8.00** less.

SENTINEL V.H.F. PRE-AMPLIFIERS
Our Sentinel range of pre-amplifiers use a J FET selected for 1dB noise figure and 18dB gain. A typical N.F. for a 2 metre transceiver is 7-8dB. To overcome this noise and maintain the low noise for the Sentinel, 18dB gain is required. Our tuned circuits are 18 s.w.g. (1·22mm) air spaced to give high Q for selectivity.

1. SENTINEL AUTO 2 METRE PRE-AMPLIFIER
Connects straight into transceiver lead and the r.f. switch changes over automatically between transmit and receive—any mode. See above for spec. 12V nominal. Size 2¼" × 1½" × 4". **£20.00*** Ex stock. 70cms version **£23.00*** Ex stock.
2. PA5 AUTOMATIC 2 METRE PRE-AMPLIFIER
Same performance as the SENTINEL AUTO but for 240V mains operation. SO239 or BNC sockets. Price **£28.75.** Ex stock.
3. SENTINEL STANDARD 2 METRE PRE-AMPLIFIER
Same performance but without the r.f. switching **£13.22*** 70cms version **£16.00***

PA3
Miniature 2 metre PRE-AMPLIFIER. Size 1cu inch to fit inside your transceiver. N.F. 2dB. Gain 18dB. 9-15V. **£8.00.** 70cm version **£10.00** Ex stock.

SENTINEL H.F. WIDEBAND PRE-AMPLIFIERS
2-40MHz 15dB gain. Ideal units for pepping up receivers on 15 and 10, for OSCAR reception and as an ACTIVE AERIAL. 9-12V supply. Size: 2¼" × 1½" × 3". We make the following two versions.
1. SENTINEL STANDARD H.F. PRE-AMPLIFIERS
Performance as above. **£10.00*** Ex stock.
2. SENTINEL AUTO H.F. PRE-AMPLIFIERS
Same performance as above with an R.F. switch for direct connection in your transceiver aerial co-ax. **£16.93*** Ex stock.

S.E.M. Z MATCH
Generally considered to be the most VERSATILE transmatch system. It will match aerials of 15-5000 ohms, to your equipment. BALANCED or UNBALANCED at up to 1kW. SO239 and 4mm terminals for co-ax or wire aerials. **£45.00** Ex stock.

S.E.M. FORWARD/REFLECTED POWER METER
500W, 1-30MHz. Separate pick-up unit. **£29.17** Ex stock.

S.E.M. EUROPA C 2 METRE TRANSVERTER
200W input. 2dB N.F. Plugs straight into Yaesu equipment for any mode 2 metre use. **£126.65.** Repeater shift **£12.80.**

CPS10 (To use the Europa C with other equipment. **£57.57** Ex-stock.)

CONVERTERS
SENTINEL 2 metre converter: IFs: 28-30MHz, 4-6MHz, 2-4MHz, 2dB N.F. 30dB gain. **£23.00.**
SENTINEL X 2 metre converters—same as above with internal mains supply—**£26.50.**
SEM70 70cms to 2 metres—**£23.00.**
SENTINEL 70 70cms to 28-30MHz **£20.00.**
SENTINEL TOP BAND converters **£20.80.**
All converters Ex stock.

*Prices include VAT at 15%. *Belling Lee sockets standard. SO239 or BNC* **£1.73** *extra. Please ring or write for any information. 12 months guarantee, To order: C.W.O. or credit card. Phone your credit card number for same day service. BL plugs* **25p.** *PL259 and reducer* **75p.**

Look. Write now.

VF 7401-2 2-Meter Digital Scanning Transceiver. Fully synthesized, 15 watt solid-state rig. Scanning Capability. Mobile or fixed station use.

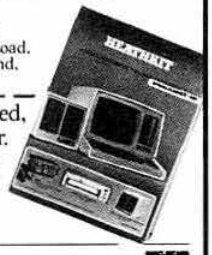
HX 1681 CW Transmitter. Full break-in CW operation. Built-in VFO. Covers 80 through 10 metres CW. Rugged 6146A finals give 100W on 80-15M, 75W on 10M.

SA 2040 2Kw Antenna Tuner. Built-in balun. Balanced or unbalanced feed. Continuously variable inductor. Eraseable front panel for writing in band settings.

Heathkit. The professional choice for the amateur radio enthusiast.

High quality kits. Easy to build. And easy on your pocket. Full details are available in the Heathkit catalogue. Send for your copy. Write now.

Heathkit Electronics Centres – 233 Tottenham Court Road, London (01-636 7349). Bristol Road, Gloucester (0452-29451). Registered in England, No. 606177.



To: Heath Electronics (U.K.) Limited, Dept (RC5), Bristol Road, Gloucester. GL2 6EE. Please send a copy of the Heathkit catalogue. I enclose 25p in stamps.

Name _____

Address _____

_____

Soldering Iron offer FREE

N.B. If you are already on the Heathkit mailing list you will automatically receive a copy of the latest Heathkit catalogue without having to use this coupon. When you receive your catalogue you will get details of this free offer.

HEATHKIT HEATH ZENITH

William Munro
(Invergordon) Limited

NEC

CQ R 700 6 Band General Coverage Receiver
CQ P 2200E 2M FM Portable/Mobile Transceiver
CQ 110E HF Bands Digital Read-out Transceiver
CQ 301 Matching Linear
CQ 201 Matching external VFO
M 110 Matching Table Mic
S 110 Matching Extension Speaker/Dig. Clock unit.

(Full Spec. Prices etc. available on receipt of your enquiry)

Sadelta Table Mic. Mod. MP22. Built-in Pre-amp and Compressor. **£37** incl VAT and Postage

Microwave Modules, SWR Meters, Power Units, 2M Antennas, Components, hardware, etc, etc.

100 High Street, Invergordon Ross-shire IV18 0DN
Telephone 0349 852351. Telex 75265

ACCESS • BARCLAYCARD • HIRE PURCHASE

HAM BAND AERIALS GALORE
at these prices

HF Band ¼-wave vertical Telescoping elements only	Prices	P.P.
10/HFV. 10-metre vertical 3 sections of tubing diameter 1" to ⅜"/¼" to ⅜"	£4.20	£1.15
15/HFV. 15-metre vertical 4 sections of tubing diameter 1" to ⅜"/¼" to ⅜"	£5.75	£1.15
20/HFV. 20-metre vertical 6 sections of tubing diameter 1¼" to ⅜"	£7.60	£1.15
Complete 300 W. Trapped vertical ¼-wave 10-15-20M. Slim line – Ready tuned traps	£25.30	£2.30

All prices include VAT. Please send 20p for literature of EZEEBUILD Antenna equipment.

UPPINGTON TELE-RADIO (BRISTOL) LTD
12-14 Pennywell Road, Bristol BS5 0TJ. Tel: 0272 557732

PICTURE THE QSL—YES!

Any photograph or line drawing of your choice can be put onto your own individual QSL cards. Simply send a black and white photograph of your rig, shack, antenna (even the XYL) together with £25.00.

In return we will supply 1,000 QSL cards with your own photograph together with your call/BRS/ISWL No in top left hand corner of card. The back of card will show usual QSL format, date, time, freq, etc. Send today photo or line drawing to:

D. L. Cole, 65 Cecil Avenue, Hornchurch, Essex
HORNCHURCH 55733

EQUIPMENT WANTED

SPOT CASH PAID FOR GOOD USED AMATEUR AND MARINE RADIO EQUIPMENT—OR—YOUR EQUIPMENT SOLD AT YOUR PRICE ON SMALL COMMISSION—NO SALE—NO CHARGE.

TEL: AMCOMM: 01-864 1166, 01-422 9585.

CLASSIFIED ADVERTISEMENTS

Classified advertisements **20p** per word, minimum **£4.00.**
Box Number £1.00 extra to wordage or minimum.
Semi-display 1/8 page (1⅞" × 3") (47 × 76mm) **£36.00**
1/12 page (1⅛" × 3") (35 × 76mm) **£27.00**
1/16 page (⅞" × 3") (22 × 76mm) **£19.00**
Please write clearly. No responsibility accepted for errors.
Latest date for acceptance—6 weeks before 1st of issue month.

All classified and semi-display advertisements must be prepaid.

Copy and remittance to: C. C. LINDSAY,
2 Leyburn Gardens, Croydon CR0 5NL. Tel: 01-686 5839.

Members' Ads must be sent to the Editor at Chelmsford.

FOR SALE

FRENCH LANGUAGE BOOKLET (German O/P) written especially for the Amateur Radio QSO etc £1.75, overseas £2.00. Mary Craven XYL/G4EQI, Grass Moor, Radford Road, Alvechurch, Birmingham B48 7DT.

ALUMINIUM QUAD SPIDERS, boomless, £18.50 pair; fibreglass quad spreaders 1" dia tube 13' 7" long, set of eight, £84.00. All including carriage, sae for details. G3ZHC. Tel: Walsall (0922) 26659.

QRM PROBLEM? Improve your HF beam F-B ratio on reception by fitting G3JKF antenna vector processor. SAE for brochure. Export enquiries invited. UK prices: processor, £79. Antenna unit, £19. Both plus VAT. Carriage included. Radmic Systems Ltd, 10 Weald Drive, Crawley, Sussex RH10 6JU.

QSL COLOUR CARDS printed to your specifications on *colour* postcards depicting your area/home town from our extensive library. Kingsley Publications, 32 Chatham St., Leicester.

QSL CARDS printed to your own specifications on white gloss cards. SAE to Caswell Press, 11 Barons Way, Woodhatch, Reigate, Surrey.

QSL AND LISTENERS CARDS. We offer quality cards, rapid turnaround and very competitive prices. SAE for samples. G3VZF, 5 The Close, Radlett, Hertfordshire.

VALVES, 6146B, 6JM6, 6HF5, 6JS6/C, 6JB6/A, 6KD6, 6GE5, 6LQ6. Over one hundred receiving valves available. SAE for list. Wilson, G4AZM, Bolton 54165.

QSL CARDS. Designed and printed to your specification. Fast competitive service. Details: Orbit (G4GQL), 41 Benton Road, Ilford, Essex IG1 4AU.

HEATHKIT HW101 new condition, spare valves, manual, £275. Box 181, RSGB, 2 Leyburn Gardens, Croydon CR0 5NL.

6800—ACCURACY—6502—HUEY calculator program for your micro, high accuracy (47-bit arithmetic), trig functions, RPN stack (X,Y,Z,T), scientific notation, number size to 10E37, extra internal memories, capability to add your own functions (requires manual), complete floating point math package, all in 2·5K bytes. Hex dump and instructions—$12US, manual with commented assembly listing—$30US (specify 6800 or 6502). WA4OSR, Mitch, c/o The Bit Stop, Box 973-E, Mobile, AL 36601, USA.

G3GJX MEMORY KEYER (Aug '79) compact d/sided pcb 123x82 glass-fibre, drilled and tinned, layout information supplied, as previously advertised, still £4.95 inc p&p. FINAL BATCH CHAPS, order while stocks last! Autocraft, 37 The Shimmings, Boxgrove Road, Guildford, Surrey GU1 2NQ.

QSL CARDS. Printed on quality coloured card. Speedy delivery. SAE for details, F. Sharpe, 10 Ascot Gardens, Belfast.

DX-AWARDS GUIDE. Rules, applications for over 60 dx awards in single booklet. Introductory price $14.95 ppd US, Canada, elsewhere add 16oz postage. Sase for sample pages. POB 1136 Welch, Ames, Iowa, 50010.

BRAND NEW YAESU FRG-7 receiver in original packing. Switched on once since new. Offers. Phone Tattenhall (0829) 70644.

YAESU FT-101 TRANSCEIVER, 10-160m, SSB, 260W p.e.p. Also KW Viceroy, 10-80m, SSB, 180W p.e.p. Both VGC. Exchange—cash. 01-346 4468.

QSL CARDS. Printed to your own specification. Letterheads, business cards, invoices etc. Competitive prices. Harwood Press, 28 Norton Lees Lane, Sheffield S8 9BD. 0742 54134.

ELECTRONIC DIGITAL THERMOMETER with 3½ digit liquid crystal display. Handheld unit in rugged metal case. Supplied with pen probe and battery. Range −50° to +150°C. Full data sae £38.50 inc. Deltec, 12 Kestrel Court, Bembridge Gardens, Ruislip, Middlesex.

70cm AERIAL KITS, HB9CV type. 5dB gain. All parts pre-cut and drilled, just solder together. £5.50 inc. Deltec, 12 Kestrel Court, Bembridge Gardens, Ruislip, Middlesex.

DIY QSL CARDS, just add your own callsign etc. 50 for £1.70, 100 for £2.75 inc p&p. Send sae for sample. Lam Electronics, 47 Golden Miller Road, Cheltenham, Glos. Tel: 0242 43891.

QSL CARDS: Postal history collector buys any quantity QSL cards pre-1950 all countries, all types, but must have stamps and postmarks and reasonable condition. Send with your price to KEN LAKE, 106 Bedford Chambers, Covent Garden, London WC2E 8HH.

MISCELLANEOUS

PATENTS and **TRADE MARKS**—Booklet on request, King's Patent Agency Ltd (B. T. King, Reg Pat Agent)—146A Queen Victoria Street, London EC4. Tel: 01-248 6161. Telex 8833805. Established 1886.

WANTED

GOOD SECONDHAND EQUIPMENT ALWAYS WANTED. Come to Amateur Radio Exchange for the best deal. 2 Northfield Road, Ealing, London W13. Tel: 01-579 5311.

ACCOMMODATION

SCARBOROUGH RALLY, JULY 27. Arrange your holiday to coincide with the rally. Family hotel near beach and town centre. Beech Holme Hotel, Cromwell Parade, Scarborough. (0723) 61757. (Eric G4HWQ).

MORSE MADE EASY BY THE RHYTHM METHOD!
FACT NOT FICTION NO, TAPE WONT WORK AS WELL
If you start RIGHT you will be reading amateur and commercial Morse within a month. (Most students take about three weeks). That's why after 25 YEARS we still use three scientifically prepared 3-speed records with which you cannot fail to learn the MORSE RHYTHM automatically, it's as easy as learning a tune. 18 w.p.m. in 4 weeks guaranteed. Complete course comprising 2 × 12" + 1 × 7" 3 speed records + books £5.50 Plus p/p.
(UK p/p 75p. Overseas, sufficient for 750 gms) Details only, SAE. or ring S. Bennett 01-660 2896. SNOOPER radar detectors, 4 yr. gtee. £74.
S. BENNETT (Box 13) 45 GREEN LANE, PURLEY SURREY CR2 3PQ

INDEX TO ADVERTISERS

SEMICONDUCTORS

BFY50 Transistors 4 for **60p.**
BSX20 (VHF osc/mult) 3 for **50p.**
BC108 (metal can) 4 for **50p.**
BC109 (metal can) 4 for **50p.**
2N3819 fet 3 for **60p.**
BC158 PNP Silicon 4 for **50p.**
741CG Op Amps 4 for **£1.00**
TIP2955 Silicon PNP 2 for **£1.50**
LM309K 5v Regulator **£1.00**

BCY72 Transistors 4 for **50p.**
BC107 (metal can) 4 for **50p.**
PBC108 (plastic BC108) 5 for **50p.**
BF152 (UHF amp/mixer) 3 for **50p.**
BC148 NPN Silicon 4 for **50p.**
BAY31 Signal Diode 10 for **35p.**
SCR400V at 3A stud type, 2 for **£1.00**
1N4148(1N914) diodes 10 for **25p.**
LM340/12 12v Regulator **£1.00**

VALVES

EZ81 new **50p.**
ECC81 new **50p.**
ECC83 new **50p.**
EF86 new **60p.**
85A2 new **80p.**

QZ06-40 ex-equip. **£10.00**
QQV03-20A ex-equip. **£5.00**
QQV03-10 ex-equip. **£1.20**
QQV02-6 ex-equip. **£2.00**
6BH6 ex-equip. **60p.**

Large Stocks of Quartz Crystals for R.T. equipment HC6U, HC18, HC25, **£2.00** each. Ring your requirements or sae for lists.

PYE WESTMINSTER PCBs ALL BRAND NEW

TX AUDIO PCB AT26838	Order Code WS0	**£8.00**
MULTI-CHANNEL OSC. PCB FOR AM & FM		
AT26812/8 10 channel Low band	Order code WS1	**£10.00**
AT26811/10 & /2 6 channel High band	Order code WS2	**£7.00**
RX MULTIPLIER PCB FOR AM & FM		
AT26808 Low band /24	Order code WS3	**£7.00**
AT26808/23 30MHz band	Order code WS4	**£6.00**
FM TX MOD DRIVER PCB		
AT26826/68 B band (will tune High band)	Order code WS5	**£15.00**
PA BOARDS WITH ALL TRANSISTORS AND HEATSINKS (screen covers not supplied)		
AT10784/10 P band (will tune Low band)	Order code WS7	**£18.00**
Low band pcb only, complete except for transistors and heatsink (for spares only)	Order code WS8	**£1.50**

1980 CATALOGUE. A selection of items below from our catalogue. The products we stock are by: Eagle, Weller, Draper, Spiralux, Knipex, Servisol, Jaybeam, Vero and Amtrod, plus many others. Books by Barnards & Babani and Newnes. Send **£1.35** and you will receive main catalogue plus four bi-monthly shortform catalogues to keep you up-to-date with prices and special offers. Main catalogue contains 140 pages. Two free **50p** vouchers with shortform catalogue.

EAGLE MA780T Electric fully automatic 6 section rectractable car aerial with built-in voltage sensor. Remote drive system makes fitting easier. Aerial length, 1,000mm, below wing 220mm, lead length 9,000mm, flexible drive link 700mm. Price **£16.95** plus VAT.

EAGLE DD7 Paging microphone impedance 600 ohm or 50 K ohms, sensitivity 2·25mV at 50 K ohms, frequency response 300-9000Hz. Desk or wall mounted. **£14.85** plus VAT.

EAGLE MULTIMETER EM50 50,000 opv. DC volts: 0-1200 volts, AC volts: 0-1200 volts, DC current 0-6A, Resistance 0-10 megohms. Price **£19.95** plus VAT.

DRAPER super-chrome ¼" square drive socket sets. 38 piece, 9 AF hexagon sockets, 3 AF bi-square sockets, 11 MM hexagon sockets, 9 BA hexagon sockets, and 6 accessories. Price **£12.75** plus VAT.

SPIRALUX metric nut spinner sets, contains 8 nut spinners 4, 4·5, 5, 5·5, 6, 7, 8, 9, 10mm. Packaged in a plastic wallet with cellulose acetate handle. Price **£7.53** plus VAT.

WELLER TCP3 IRONS 24 volt series, 3 wire power units, for application requiring earthed tip. TCP3 irons **£13.84**, PU3D power units **£24.12** plus VAT.

WELLER instant heat guns Model No.8100D **£13.21** each plus VAT.

WELLER cordless soldering irons Model No. WC100 **£25.47** plus VAT.

JAYBEAM "STEREOBEAM" VHF/FM antennas Model SMB2, folded dipole and reflector with universal clamp **£8.00** each. Full range of Jaybeam aerials and accessories available. (See 1980 Catalogue.)

ECA TVT80/80 semiconductor equivalent and data books. Data covering 12,000 transistors and more than 60,000 equivalents. 2 volumes for **£6.00** Zero VAT.

ORYX DE-SOLDER TOOLS model SR3A, desoldering pump with built-in safety guard. Price **£6.50** plus VAT.

A.C. ADAPTOR (Battery Charger) 120 vac input, 5·8 vdc at 200 mA output. USA type mains plug to 3·5 mm jack plug. Brand new and boxed **£1.25** each.

A.C. ADAPTOR (Battery charger) 117 vac input, 4·5 vdc at 150 mA output. USA type mains plug to 2·5 mm jack plug. Brand new and boxed **£1.00** each.

VARICAP TUNER HEADS, 4 button type, 22K res. with AFC switch and station indicator. Brand new **£2.00** each.

SCREWS. Pack of nuts, bolts, washers, tags, self taps etc. Mixed BA and metric. Sold by weight. **£2.00** per Kilo.

LOW VOLTAGE ELECTROLYTICS. Pack of mixed values and voltages. Approx. 150 items **£1.50.**

JAYBEAM STARBEAM UHF set top aerials. Brand new and boxed **£2.00** each.

MODERN TELEPHONES. Type 746 with dials, colour cream, used but new condition. **£8.00** each.

ERSIN MULTICORE SOLDER 3 core solder wound on a plastic reel. 20 swg. Alloy 60/40 tin lead. Available in 500 gm reels. **£5.75** each.

CHANNEL MASTER COLOROTOR aerial rotator Model 9502. Rotation speed 1 rpm, gear ratio 3200:1, 3 conductor wire for economy, pinpoint positioning to within one degree. Few only at **£45.00.** We also stock Jaybeam T.V. and Radio aerials. SAE for lists.

ISEP SLOTTED HORIZONTAL RAIL available in 9ft. lengths. **£4.00** each.

WATCH STRAPS. Black stainless steel **50p** each. Black plastic **25p** each. Watch spring bars **10p** each. Discount Quantity.

RADIOGRAM lid pumps **£1.00** each, 2 for **£1.50.**

RIBBON CABLE 19 way decimal coded, 4 metres for **£1.25.**

FERRANTI MICROSPOT CATHODE RAY TUBES Type 3H/1010. Suitable for Photographic Multi-Channel Recorder Systems. Fitted with a mounting collar and prism cemented to the faceplate, screen aluminised Phosphor P. The tubes are also fitted with mounting units type MU1053 and deflection coil type SC48A. Few only at **£55.00** each.

RIGHT ANGLED UHF SERIES ADAPTORS, PL259 to SO239 **£1.00** each.

BACK-TO-BACK SO239 SOCKETS, £1.00 each.

RADIO TELEPHONE EQUIPMENT

Pye Westminster W15AM high band and low band available. Sets complete and in good condition but are less speakers, mikes, cradles and LT leads. (sets only) **£70.00** each.

Pye Base Station F27 Low and High band, few only at **£75.00** each.

Pye Base Station F30AM Low and High band, with and without T/T. Prices from **£22.00** each.

Pye Cambridge AM10B (Boot Mount) low band, 12·5kHz, sets only, no control gear, good condition, **£20.00** each.

Pye UHF Link U450L Base Station Tx **£15.00** Rx **£15.00** or **£25.00** for the two. Sold as seen.

Pye BC14 Battery Charger for PF1 (Pocketfone) batteries, will charge up to 12 Tx batteries and 12 Rx batteries at the same time. **£15.00** each.

Pye RTC Controller units, for remotely controlling a VHF or UHF fixed station radiotelephones over landlines. **£20.00** each.

Pye PF1 Pocketfones suitable for conversion to 70cm, sets complete but less batteries, supplied with service manual. **£26.00** per pair.

PYE TELECOM Yagi aerials. 4 element, very rugged construction, 71·1MHz (Ideal for four metres). Brand new **£10.00** each.

DISGUISED MOBILE AERIALS (dustbin lids). Available in mid band and high band. Brand new **£5.00** each.

Pye Westminister W15AMB (Boot Mount) low band complete with control gear and accessories, good condition **£80.00** each.

Pye Westminister W30AM low band, sets only no control gear, complete and in good condition. **£45.00** each.

AM 10·7MHz IF PCB WITH XTAL FILTER

AT26805/10 25kHz spacing	code WS9	**£15.00**
AT26805/11 50kHz spacing	code WS10	**£10.00**
AM TX MULTIPLIER/DRIVER PCB		
AT26838/13 B band (will tune high band)	Order code WS11	**£10.00**
AT26838/14 Low band	Order code WS12	**£10.00**
TX FILTER W15AM		
AT10787/21	Order code WS13	**£4.00**
AT10787/23	Order code WS14	**£4.00**
AT10787/30	Order code WS15	**£4.00**

IC TEST CLIPS, clip over IC while still soldered to pcb or in socket. Gold plated pins, ideal for experimenters or service engineers. 28 pin DIL **£1.75.** 40 pin DIL **£2.00.** Or save by buying one of each for **£3.50.**

IC AUDIO AMP. PCB Output 2 watts into 3 ohm speaker. 12 volt DC supply. Size approx 5½" × 1½" × 1" high, with integral heatsink, complete with circuits. **£2.00** each.

NICAD CHARGER CONVERTER PCB. (Low power inverter). Size 4" × 1½" × 1" high. 12v dc supply. 60v dc output through pot on pcb for charging portable batteries from mobile supply. Only needs one BFY50/51/52 or similar transistor which can be mounted direct on the pcb pins on the board fitted with a star type heatsink (not supplied). **£2.00** each.

10·7MHz SSB XTAL FILTERS (2·4kHz Bandwidth) Low imp type. Carrier and unwanted sideband rejection min −40dB (needs 10·69835 and 10·70165 xtals for USB/LSB not supplied). Size approx 2" × 1" × 1". **£10.00** each.

LOW PASS FILTERS (Low imp type) 2 9MHz small metal encapsulation. Size 1½" × ¾" × ¾". **75p** each.

BSR AUTOCHANGE RECORD PLAYER DECKS with cue device. 33-45-78 rpm for 7", 10", 12" records. Fitted with SC12M Stereo Ceramic cartridge and styli. Brand new **£12.00** each.

XTALS FOR TV SYNC GEN. 20·25kHz for 405 line, B7G glass type. **£2.00** each.

RED LEDs (Min type). 5 for **70p.**

VIDICON SCAN COILS (Transistor type, but no data) complete with vidicon base **£6.50** each. Brand new.

UR41 ATTENUATOR CABLE. Nominal 72 ohm overall dia approx ¼", Att per 100ft; 100MHz 218dB, 200MHz 316dB, 600MHz 449dB, 3000MHz 625dB. Ideal for Rx or Low power Tx fixed attenuators. Supplied with attenuation graph. 4 metres for **£1.00.**

HIGH QUALITY RELAYS, 4 pole C/O, 3A contacts, 12V DC coil, 150 ohm. Size approx. 1" × ¾" × 1¼", with plastic covers. **80p** each or 2 for **£1.50.**

OSMOR REED RELAY COILS (for reed relays up to ¼" dia., not supplied) 10V 500 ohm coil, 2 for **50p.**

TERMS OF BUSINESS: Cheque or PO Phone or quote Access or Barclaycard No. Please add **15% VAT** on above goods. **CARRIAGE:** Packing and carriage charges for all orders under £5.00 nett invoice value add 75p. Orders over £5.00 but less than £20.00 50p. Orders over £20.00 carriage paid.
CALLERS WELCOME: Tues-Sat 9.30am-5.30pm

Access

B. BAMBER ELECTRONICS

DEPT RC, 5 STATION ROAD, LITTLEPORT, CAMBS CB6 1QE
TEL. ELY (0353) 860185

BARCLAYCARD VISA

PUBLICATIONS OBTAINABLE FROM RSGB

RSGB members *can obtain a* **10 per cent discount** *on the prices listed below* **at the time of ordering** *(excluding* Ham Radio Magazine *and* Ham Radio Horizons*). To obtain the discount, deduct 10 per cent, calculated to the nearest penny, from the total value of the order (using the latest price list) and enclose a remittance for the balance. Also enclose a recent* Radio Communication *address label as proof of membership.*

RSGB PUBLICATIONS

Technical books

Amateur Radio Awards	£3.41
Amateur Radio Techniques (6th edn)	£4.28
Amateur Radio Operating Manual	£4.96
Morse Code for Radio Amateurs	£1.28
OSCAR-Amateur Radio Satellites	£4.38
RSGB Amateur Radio Call Book 1980	£3.87
Radio Amateurs' Examination Manual (8th edn)	£2.65
Radio Communication Handbook (5th edn) Vol 1	£9.76
Radio Communication Handbook (5th edn) Vol 2	£8.50
Radio Data Reference Book (4th edn)	£3.92
Test Equipment for the Radio Amateur (2nd edn)	£4.72
TVI Manual (2nd edn)	£1.66
VHF/UHF Manual	£7.24
World at their Fingertips	£3.08

Logbooks

Amateur Radio Logbook	£2.69
Mobile Logbook	£1.12
Receiving Station Logbook	£1.78

Maps, charts and lists

Countries List/HF Awards List	32p
Great Circle DX Map (in tube)	£2.10
IARU Region 1 Beacon List	30p
IARU QTH Locator Map of Europe (wall)	£1.30
Oscar Map (in tube)	53p
QTH Locator Map of Western Europe (wall)	£1.30
QTH Locator Map of Western Europe (card for desk)	67p
UK Beacon List	30p
UK Repeater List	30p
World Prefix Map (wall)	£2.21

Members' sundries

RSGB hf contest log sheets (100)	£1.50
RSGB teeshirt (small, medium, large) (new design)	£3.38
RSGB pennant	£2.45
RSGB station callsign plaque*	£6.70
RSGB deluxe lapel badge*	£3.80
Callsign lapel badge*	£2.10
Lapel badge (RSGB emblem, pin fitting)	73p
Members' headed notepaper (50 sheets) quarto	£1.04
Members' headed notepaper (50 sheets) octavo	73p
QSL card holders	£1.11
Radio Communication back issues *(As available)*	94p
Radio Communication bound volume, 1978	£14.78
Radio Communication Easibinder	£4.12

**Delivery approximately five weeks*

Car window stickers

"I'm on the air with amateur radio" (four colours)	82p
"I'm monitoring ·5 are you?" (two colours)	66p
RSGB badge	38p

Prices include postage, packing and VAT where applicable. For air mail despatch, please ask for price before ordering. Goods are obtainable, less p & p, at RSGB headquarters between 9.30am and 5pm, Monday to Friday.

POSTAL TERMS: Cash with order. Stamps and book tokens cannot be accepted. Cheques and postal orders should be crossed and made payable to "Radio Society of Great Britain". Giro A/C No 533 5256. Please write your name and address clearly on the order.

OTHER PUBLICATIONS

Title	Publisher	Price
A course in Radio Fundamentals	ARRL	£3.10
Active-filter Cookbook	SAMS	£12.69
All about Cubical Quad Antennas	RPI	£2.90
Amateur Television	BATC	£2.28
Antenna Anthology	ARRL	£3.66
ARRL Electronics Data Book	ARRL	£3.33
ARRL Ham Radio Operating Guide	ARRL	£3.37
Beam Antenna Handbook	RPI	£4.02
Better Short Wave Reception	RPI	£3.56
Care & Feeding of Power Grid Tubes	VARIAN	£2.98
CMOS Cookbook	SAMS	£9.54
FET Circuits	SAMS	£4.46
FM & Repeaters for the Radio Amateur	ARRL	£3.88
Hints and Kinks for the Radio Amateur	ARRL	£3.26
IC OP-AMP Cookbook	SAMS	£11.82
IC Timer Cookbook	SAMS	£8.70
Int VHF-FM Guide (1980 edn) (out of print)	P&B	
Radio Amateur Callbook – DX listings	ARCI	£11.28
Radio Amateur Callbook – USA listings	ARCI	£11.67
Radio Frequency Interference	ARRL	£3.02
Radio Valve & Semiconductor Data Book	NEWNES	£4.28
RTTY the Easy Way	BARTG	£1.11
Saga of the Vacuum Tube	SAMS	£8.88
Satellite Communications	ARRL	£3.73
Simple Low-cost Wire Antennas	RPI	£3.07
Single Sideband for the Radio Amateur	ARRL	£3.70
Solid-state Basics	ARRL	£4.67
Solid-state Design for the Radio Amateur	ARRL	£6.09
Specialised Communication Techniques	ARRL	£3.49
The ARRL Antenna Book	ARRL	£4.13
The Complete Handbook of Slow Scan TV	TAB	£5.72
The Radio Amateurs Handbook (Hardback)	ARRL	£11.42
The Radio Amateurs Handbook (Paperback)	ARRL	£7.89
The Radio Amateurs VHF Manual	ARRL	£4.03
TTL Cookbook	SAMS	£8.42
Understanding Amateur Radio	ARRL	£3.87
Unique "IC" OP-AMP Applications	SAMS	£4.54
Vertical Beam & Triangle Antennas	SAMS	£4.98
World Atlas	RACI	£1.88
World Radio TV Handbook, 1980	BILL	£9.75
80m Dxing	CTI	£3.03

MORSE INSTRUCTION AIDS

Morse code cassette. Stage 1 — £3.82
(Stages 2 and 3 should be available shortly)
A series of morse records is available through the RSGB. A price list will be sent on request.

MAGAZINE SUBSCRIPTIONS

QST (including ARRL membership). One year	£11.84
Two years	£22.60
Three years	£32.85
Air mail, one year	£20.00

Subscriptions for *QST* should be sent to RSGB, 35 Doughty Street, London WC1N 2AE.

Ham Radio Magazine (per annum) (incl air delivery)	£14.00
Ham Radio Horizons	£6.00

Subscriptions and changes of address for *Ham Radio Magazine* and *Ham Radio Horizons* should be sent to: Ham Radio Magazine (UK), PO Box 63, Harrow, Middlesex HA3 6HS.

ORDER FROM: **RSGB Publications (Sales), 35 Doughty Street, London WC1N 2AE**

(Raynet supplies should be obtained from Mrs Balestrini, QTHR G3BPT.)

A. J. H. ELECTRONICS

(G8AQN)

Proprietor: A. J. HIBBERD

Tel RUGBY daytime 76473, evening 71066

Terms of Business: Cash with order, Mail order only, or Callers by appointment. S.A.E. with enquiries

Handling Charge 50p Minimum order £2.00. Official orders accepted on a strict monthly basis. **Prices now include VAT**

FULL MONEY-BACK GUARANTEE ON ALL ITEMS

FT101 FM ADAPTER (KM101)

The KENT FM Adapter is suitable for any model of the FT101, FM is selected by switching FT101 to AM then transmit and receive in the normal way, there is no need to unplug the KM101 when changing bands or modes, *no PCBs to fit inside the FT101 or holes to drill.* Just plug into existing sockets and one simple wire to fix accessible through the lid. Features include crystal controlled tone burst, crystal filter fitted for good selectivity, squelch adjustable on front of KM101, tone length, mic. gain and deviation are all adjustable internally. Rx sensitivity when used with SOTA or MICROWAVE MODULES transverters is typically better than 0·2μV for 20dB quieting. The KM101 is built into case size 185 × 115 × 40mm colour to match FT101. Many now sold to customers who have highly praised this marvellous unit; a demonstration can be given by arrangement. **PRICE ONLY £82.00** inc. VAT. **NOT SUITABLE FOR FT101 ZD.**

NEW! Is your receiver performance at 28MHz poor or maybe you have just a tired receiver, then you want one of our super PRE-AMPS designed to cover 28 to 30MHz amateur band, the gain is typically 24dB with a very low noise figure of better than 0·4dB. We use a dual gate mosfet for good cross mod, performance, two versions available (1) as a ready-built and aligned PCB or (2) assembled and built into a grey hammer finish die-cast box with BNC sockets for in and output. Prices: PCB (35 × 60mm) **£10.00**; built into box 100 × 50 × 25mm **£14.00.**

PYE SPEAKER/MICs for PF2B (PF70) hand portables new with plug **£7.00**.

MOBILE MICROPHONE with PTT switch and curly lead 600/50,000 ohm imp (remove the transformer for 600ohms) smart black matt finish plastic case, suits most rigs, NEW BOXED **£5.50.**

SF1 ITT STARPHONE battery charger modules requires 28V dc **£1.75.** leather cases for SF1 STARPHONE NEW **£4.00.**

ERIE R.F.I. SUPPRESSION FILTERCONS type 1202/052 quantity available to manufacture.

RADIOTELEPHONE MARKER OSCILLATOR UNITS small hand held device and built into Grey hammer finish die cast box 100 × 50 × 25mm. Two models available 10·7MHz & 455kHz both units have sign wave output, PRICE **£20.00** each, other frequencies made to order.

10·7MHz CRYSTAL FILTER ITT 024DE imp. 820 ohm ±3½kHz @ 3dB new unused **£7.50.**

GO1232 50 ohm miniature co-ax cable solid inner conductor 3mm dia., **£1.10p** per 10 metres, 300m **£27.00.**

FERRITE RINGS approx 13mm dia., **£1.00** per 10.

FERRITE RINGS approx 6mm dia. wound 4 turns wire easily removed, **40p** per 10.

FERRITE BEADS 4mm dia. × 3mm long, and 5mm dia. 10mm long, 10 of each per bag **25p.**

FX1115 single hole, 4½p ea. 10 for **32p.**

FX1898 six hole **11p.** 10 for **90p.**

FERRITE BALUN CORES 15 × 12 × 8mm with 2 × 5mm slot through centre, **20p** each, **£1.25** per 10.

FERRITE CUPS 12mm dia with hole to suit 5mm coil former, **5p** each, **40p** per 10.

FERRITE CORES bag of approx 100 mixed types, **70p.**

FERRITE CHOKE FORMERS 4mm dia. 12mm long with axial leads, **40p** per 10.

PYE COILS 5mm dia. 10mm sq base, 4mm dia. 6mm sq base both types with ferrite core, **70p** per 10.

COIL FORMERS 5mm dia. 15mm long, no base just drill hole and push in, very useful for converters etc. supplied with ferrite core, **25p** per 10.

COILS IN CANS 12mm sq. 5mm dia. former approx 18mm high, **50p** per 10.

TOKO 10·7MHz QUADRATURE COIL for CA3089E & CA3189E, **35p.**

TOKO 10·7MHz IFT 10mm sq. single tuned, **35p** each.

TOKO 470kHz IFT 10mm sq. single tuned **15p**, double tuned 10 × 20mm **20p.**

VIDEO CAMERA SCAN AND FOCUS COIL ASSEMBLIES transistor type, we think these are used in the PYE "SUPER LYNX" camera, takes standard 25mm vidicon, new and unused ONLY **£3.50**, two for **£6.00.**

MINIATURE NIXIE TUBE ITT 5853S side viewing character height 12mm with left and right hand decimal point SPECIAL OFFER **40p** each, **£2.50** per 10, **£5.00** per 25 with data sheet.

BLY87A 12V FM device with 9dB gain @ 175MHz, 1 watt in @ 2 metres gives 9 watts out minimum. **£4.00** with data sheet.

2N5070 30MHz SSB transistor will give 25 watt pep output with 24V supply. ONLY **£5.50.** WITH DATA.

RCA 40081 27MHz Tx. driver 75mW in gives 400mW out with 12V supply TO5 case **50p.** 2N2631 VHF driver 1 watt in @ 50MHz gives 7·5 watts out with 24V supply TO5 case **60p.**

TBA120A IF amp IC, **40p.** TAD110 am/fm IF amp, **£1.50.**

LM3900 ICs **65p.**

TRANSISTORS. BC172, BC108, BF115, BF195, BF194,A, **11p** each. MPS918 (plastic 2N918), ZTX310, **18p**, BSX20, **28p** each, BFY90 **£1.00.**

ST2110 = BSX20 etc. ft 950 MHz **18p** ea. 10 for **£1.00.**

BF576 PNP VHF/UHF RF AMP. FT 1200MHz **22p.**

FETs & MOSFETS:
E5565 = (2N3819) "N" Chan. **28p.**
2N4381 "P" chan. FET **29p.**
BF256LC "J" FET **35p.**
TIS88A "N" Chan. FET **40p.**
3N204 mosfet 24db gain @ 200MHz **£1.20.**
3SK51 eq. to 40673 **65p.**
VMP-1 power mosfet **£1.25.**

DIODES

OA79 **10p.**	1N4148 **4p.**	1N4007 **7p.**
OA90 **10p.**	10 for **30p.**	BYX94 **8p.**
OA91 **10p.**	1N4001 **5p.**	1N54A **5p.**
BA243 **25p.**	1N4004 **5p.**	

PIN DIODE HP5800-3080 **75p.**

SWITCHING DIODES up to 1,000MHz two types BA243 **20p** BA244 **25p.**

VARICAP DIODES ITT210 10pf @ 4V useable up to 1GHz, **20p**, BA111 55pf @ 2V **20p.** BB105 matched set of 4, VHF/UHF tuners, **60p** per set. BB141 Varicap diode **20p.**

STEREO CAR CASSETTE PLAYERS over 5 watts per channel output, famous manufacturers warranty returns fully overhauled and GUARANTEED by us for 3 months, controls: volume, tone, balance, fast forward and reverse, with auto eject and stop. Supplied less speakers and power lead but we do supply a power plug and circuit, bargain @ **£20.50** (negative earth only).

CAR RADIO BOARDS complete except for tuner unit, **80p.** each. inc. circuit.

CAR RADIO/CASSETTE IF amp. audio pre-amp (STEREO) I.F. freq. 470kHz. **65p.** each. inc. circuit.

MATCHING STEREO AUDIO AMP. for above IF amp. contains two TA7205p Ics **£2.25** inc. circuit.

TRIMMER CAPACITORS:

OXLEY AIRSPACED 1-15pf, 2-30pf, **25p each.**

FILM DIELECTRIC 10mm dia. 2-25pf **10p**, 4-60pf **18p.**
7mm dia. 1-10pf, 1-16pf, **12p** each.
7mm sq. 1-5pf, 1-10pf, 2-18pf, **15p** each.
PYE WESTMINSTER PA type 10-60pf, **20p.**

TETFER TRIMMER 1-10pf P.C. or chassis mounting, **28p.** each

CERAMIC 10mm dia. 2-8pf, 3-10p, 10-40pf, **15p** each

CERAMIC COMPRESSION small type 10-40pf, 10-80pf, **10p** each.

MULLARD TUBULAR 0·8-7pf bolt in type, **25p.** each.

TUBULAR CERAMIC solder in type 1-6pf, **10p** each, **75p** per 10.

RESISTORS bag of approx 250 mixed vertical and horizontal mounting pre-formed types all with long leads. These are ¼ watt carbon film resistors ideal for the constructor and experimenter, a good range of values supplied ONLY **£1.50** per bag. If you're a manufacturer then we may be able to fix you up with certain values at the right price.

DISC CERAMIC CAPACITORS bag of mixed values from 1pf to 220pf, 18 different values max. size 6mm dia. all with std length leads and made by ERIE again ideal for the constructor especially if you are a VHF man. **£1.25** per bag of approx 100.

ELECTROLYTIC CAPACITORS bag of 100 mixed axial lead types values 2MF to 1000MF, ONLY **£1.50.**

FEEDTHROUGH GLASS INSULATORS silver plated requires 3½mm hole and solder in, **60p** per 100.

FEEDTHROUGH CAPACITORS 1,000pf 500v solder in type 3½mm hole, **25p** per 10.

CO-AXIAL DISC CERAMICS 100pf ideal for UHF/SHF, bag of 20 ONLY **25p.**

BNC SOCKETS single hole fixing 75 ohm, new in sealed packets, **45p.**

BNC RIGHT ANGLE ADAPTER 50 ohm, **75p.**

BNC BULKHEAD SOCKET 50 ohm, **60p.**

SO239 UHF CHASSIS SOCKETS 4 hole fixing, **55p.**

PL259 UHF plug for UR57 etc, **58p.**

HIGH VOLTAGE DISC CERAMICS 1,000pf 1·2Kv **5p** each, **40p** per 10. 0·01 MFD 2·5Kv **6p** each.

DISC CERAMICS 1,000pf 500vw, 2,200pf 500vw both types 6mm dia. **20p** per 10. 0·047mf 30vw 10mm dia. PC mount **15p** per 10.

THE GABLES, 20 BARBY LANE, HILLMORTON, RUGBY, WARWICKSHIRE CV22 5QJ

Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, 35 Doughty Street, London, WC1N 2AE
by E T Heron & Co Ltd, Essex and London