September 1980

radio communication

journal of the Radio Society of Great Britain

RALLY VIEWS—Longleat (top), Cornish RAC (bottom)

Ken Alford, G2DX, one of the RSGB's oldest members, with Phil Revill, G3ZZR (*Photo:* G4AJD)

The RAIBC caravan with Geoff Perkins, G3VIJ, at the counter (*Photo:* G4AJD)

Among the trade stands in the Camborne Technical College

A STAR IS BORN
ANOTHER FIRST FROM Catronics

70cms SYNTHESIZED TRANSCEIVER

PHILIPS TYPE FM321

THE 70 cms REVOLUTION ★ ★ JOIN

Catronics are proud to announce the availability of the world's first 70cms 40 channel FM mobile transceiver in the UK. Especially made to our own specification by Philips—Europe's largest manufacturer of Radiotelephone equipment.

Just look at its star packed features:

- ★ Full 40 channel coverage RBO to SU39
- ★ Direct LED display of channel number
- ★ Electronic Channel change up or down from front panel
- ★ Remote Control channel change on microphone
- ★ 3 position squelch control for ease of operation
- ★ "Nominated Repeater Position" may be preprogrammed to your local Repeater channel for instant access
- ★ Crystal controlled Toneburst operates in Repeater Mode
- ★ Receiver sensitivity 0.3μV for 12dB SINAD
- ★ Transmitter output power 5W minimum, gives typically 25W e.r.p. with Jaybeam U5 mobile antenna
- ★ Supplied complete with mobile mounting bracket, microphone with P.T.T. and channel change, operating manual etc

The Philips FM321—We want you to have the best—£215.22 + VAT = £247.50

ASK YOUR AMATEUR RADIO DEALER FOR A DEMONSTRATION

Lowe Electronics Ltd, Matlock
Stephens-James Ltd, Leigh
Booth Holdings, Bath
Waters & Stanton, Hockley

Access

BUY FROM YOUR DEALER OR DIRECT FROM SOLE IMPORTERS:
CATRONICS LTD, DEPT P9, COMMUNICATIONS HOUSE,
20 WALLINGTON SQUARE, WALLINGTON, SURREY. 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.
(DEALER ENQUIRIES ALSO WELCOME)

BARCLAYCARD VISA

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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,
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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.

APPROVED TRIO DEALER

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

APPROVED TRIO DEALER

£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 frequencv).

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

APPROVED TRIO DEALER

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

APPROVED TRIO DEALER

£298.00 inc VAT

THIS PRICE INCLUDES DC KIT FITTED

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

APPROVED TRIO DEALER

£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

APPROVED TRIO DEALER

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

NEW! TS770E

2 metre and 70 cm MULTIMODE

£763.00 inc VAT

The only dual band high performance transceiver available today. The TS770E 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 TS770E 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 TS770E.

Fitted with repeater shifts of 600KHz for 2m, 1·6MHz and 7·6MHz for 70cm. Repeater shifts are automatically correct for the band in use, even on the memory channels.

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

APPROVED TRIO DEALER

THE COMPLETELY NEW APPROACH TO VHF/UHF

LOWE ELECTRONICS Ltd

FX1

STATION WAVEMETER

£28 inc VAT

The Lowe FX-1 wavemeter is a totally new instrument which will form a necessary part of every amateur station. Covering the range 700kHz to 250MHz in seven bands, the FX-1 has high sensitivity meter indication, amplified LED indicator, and audio output for headphone monitoring of the signal. A separate antenna terminal is also provided for connection of an external pickup antenna if it is required.

The set of seven coils are all enclosed in protective sleeves, and the coils for the ranges 42-110 and 83-250MHz are of printed construction for real stability. The tuning dial is easy to read and is colour coded to match the coils. The complete coil set is housed inside the unit so you should never encounter the irritating situation when the coil you need has been mislaid.

Housed in a rugged metal case measuring 176 × 74 × 65mm, the FX-1 is a good looking, high performance wavemeter and should certainly be in every amateur radio station.

CNA1001 ANTENNA TUNER £129.95 inc VAT

The new CNA1001 antenna tuner from Daiwa has already changed the whole concept of antenna tuning in the amateur radio station. No longer do you have to fiddle with this control and that control in order to reach a match condition, simply push a button and let the tuner do it for you.

The CNA1001 incorporates a sensitive reflected power detector which monitors SWR all the time. At the first push of the operate button, a motor driven gearbox drives the load and match variable capacitors through their entire range in overlapping small increments seeking a correct match. When matching is achieved, the motor drive stops and that's that. The CNA1001 needs only a small sniff of RF to work on (typically 5 watts) so you needn't worry about blowing up your PA, and it covers all the current and future amateur bands from 3-30MHz, includes switching for two antenna systems, a 10 watt (50 watt 1 minute) dummy load and best of all includes a CN620 cross needle power and SWR meter.

The CN620 section measures power from 0-200W in two ranges and reflected power from 0-40W together with the unique Daiwa cross pointer SWR system. All this in one compact unit requiring only 12V dc to drive the tuning motors.

CNA1001 Specification

SWR/Power meter.	Frequency range	3-30MHz
	Line impedance	50 Ohms
	Power ranges Forward	20/200 Watts
	Reflected	4/40 Watts
	Meter accuracy	± 10% of full scale
	Power rating	500W pep
	Input power for auto tune	1-10W
Tuner	Frequency	3·5,7,10,14,18,24,28MHz
	Input impedance	50 Ohms
	Output impedance	10-250 Ohms
	Operate time	45sec maximum

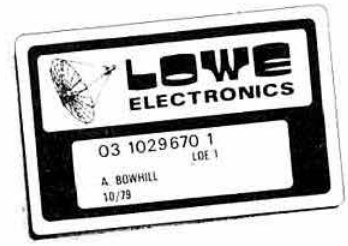
Size 225 × 90 × 245mm Weight 3·6kg Dummy load 10W (50W 1 minute)
Outputs for two antenna systems SO239 connectors

SOLE DISTRIBUTOR
LOWE ELECTRONICS · MATLOCK

AUTHORISED DEALERS IN THE UK

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

VOTED "MY FAVOURITE TRANSCEIVER" BY RADIO AMATEURS WORLDWIDE

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 its 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 .....

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! £168 inc VAT

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

THE ICOM SIDEBAND PORTABLES

IC-202S
£169 inc VAT

IC-202S

The IC-202S is a very well designed 2m SSB portable. It offers: 3W pep output on USB, LSB and CW. * Large Battery capacity (HP11 type) or Nicads if you wish * A special VXO circuit to provide smooth tuning and crystal stability needed for SSB operation on 2m. * Each of the four 200 kHz band positions allows operation anywhere in 2m. (Supplied with 144–144·2 and 144·2–144·4) * Top of the band Oscar xtals available for "cross-pond working" * It has a DC socket and SO239 sockets for mobile or base station working, barefoot or as a prime mover. * Mobile mounting brackets, Nicad packs, chargers, cases all available options. You must agree, a very versatile well proved rig.

IC-402
£242 inc VAT

IC-402

The 70cm twin of the 202S having very similar features, covering the frequency range of 432–435·2 MHz.

BARCLAYCARD VISA

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Access

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 1W 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

ICOM

DAVE
G4ELP

DON'T WORRY—WE GUARANTEE ALL SOLID-STATE RIGS INCLUDING PA's

ICOM IC251E
£479 inc

AFTER YEARS OF SUCCESS THE IC-211E HAS NOW BEEN REPLACED BY THE IC-251E. NOT JUST A FACELIFT, BUT A NUMBER OF IMPORTANT DEVELOPMENTS HAVE BEEN INCORPORATED.

MICROPROCESSOR CONTROL—CPU control with Icom's original programs provides various operating capabilities. No backlash dial controlled by Icom's unique photo-chopper circuit. Band edge detector and Endless System provides out-of-band protection. No variable capacitors or dial gear, giving problem-free use. The IC-251E provides FM, USB, LSB, CW coverage in the 144 146MHz frequency range. Thus the IC-251E can be used for mobile, DX, local calls, and satellite work.

MULTI-PURPOSE SCANNING—Memory Scan allows you to monitor three different memory channels. Program Scan provides scanning between two programmed frequencies. Adjustable scanning speed. Auto-stop stops scanning when a signal is received in all modes.

DUAL VFO's—Two separate VFO's can be used either independently or together for simplex operation, and any desired frequency split in duplex operation.

CONTINUOUS TUNING SYSTEM—Icom's new continuous tuning system features a luminescent display that follows the tuning knob movement and provides an extremely accurate readout. Frequencies are displayed in 7 digits representing 100MHz to 100Hz digits.

Automatic re-cycling restarts the tuning at the bottom of the band when the top is reached—and vice versa. Quick tuning in 1kHz steps is available, and fine tuning in 100Hz steps in the SSB and CW modes, and 5kHz steps and 1kHz steps in the FM mode, is provided for trouble free QSO.

EASIER OPERATION AND LIGHTER WEIGHT—The most compact, lightest weight all-mode 144MHz transceiver. First to use a pulse power supply in communication equipment, for lighter weight. 50mm-diameter large tuning control knob for smooth and easy tuning. Trouble-free controlling knobs for both receiving and transmitting. LED indicator for transmit and receive modes.

MOST SUITABLE FOR BOTH FIXED AND PORTABLE STATIONS—Built-in 240V ac and dc power supplies. Convenient Dial Lock switch for mobile operation. Easy carry handle. Effective Noise Blanker. IC-SM5 high quality stand microphone is suitable for fixed station operation. Powerful audio output 1·5 watts at 8 ohms, for easy listening even in noisy surroundings.

OUTSTANDING PERFORMANCE—The RF amplifier and first mixer circuits using MOS FETs and other circuits provide excellent Cross Modulation and Two-Signal selectivity characteristics. The IC-251E has excellent sensitivity demanded especially for mobile operation, high stability, and with Crystal Filters having high shape factors, exceptional selectivity.

The Transmitter uses a balanced mixer in a single conversion system, a band pass filter and a high performance low-pass filter. This system provides distortion-free signals with a minimum spurious radiation level.

MODES—USB, LSB, CW and FM. 10 watts output.
SENSITIVITY—
CW and SSB—Less than 0·25 microvolts for 10dB S + N/N
FM—More than 30dB S + N + D/N + D at 1 microvolt or
Less than 0·3 microvolts for 20dB noise quieting.

IC-251E Price £479 inc.

IC-251E Typical Technical Characteristics: General numbers of semiconductors: Transistors 99, FETs 12, ICs 37. Diodes 132. Frequency coverage: 144 146MHz (easily extended to 148MHz at no extra charge). Frequency resolution: SSB 100Hz steps FM 5kHz steps. 1kHz steps with TS button depressed. Frequency Control: Microcomputer based 100Hz step Digital PLL synthesizer Independent Transmit-Receive Frequency Capability. Frequency Readout: 7 digit LED 100Hz readout. Frequency stability: Within ±1·5kHz. Memory channels: 3 channels, any inband frequency programmable. Usable conditions: Temperature: −10°C to +60°C (14°F to 140°F). Operational time: Continuous. Antenna impedance: 50 ohms unbalanced. Power supply requirement: 13·8V DC ±15% (negative ground) 3A max or 240V AC ±10%. Current drain (at 13·8V dc): Transmitting, SSB (PEP 10W). Approx 2·3A. CW, FM (10W). Approx 2·3A FM (1W). Approx 1·0A. Receiving. At max audio output. Approx 0·6A. Squelched. Approx 0·4A. Dimensions: 141mm (h) × 241mm (w) × 264mm (d). Weight Approx 5·0Kgs. Transmitter Output power SSB 10W (PEP). CW 10W FM1 10W (Adjustable). Emission mode: SSB (A3J USB LSB). CW (A1). FM (F3). Modulation system: SSB Balanced modulation. FM Variable reactance frequency modulation. Max frequency deviation: ±5kHz. Spurious emission: More than 60dB below peak power output. Carrier Suspension: More than 40dB below peak power output. Unwanted sideband: More than 40dB down at 1000Hz AF input. Microphone: 1·3K ohm dynamic microphone with built in preamplifier and push to-talk switch. Operating mode: Simplex, Duplex. (Any inband frequency separation programmable). Receiver Receiving system: SSB, CW Single conversion superheterodyne. FM Double conversion superheterodyne. Receiving Mode: SSB A3J. USB/LSB CW (A1), FM (F3). Intermediate Frequency: SSB, CW 10·7MHz FM 10·7MHz, 455kHz. Sensitivity: SSB, CW Less than 0·25 microvolts for 10dB S + N/N. FM more than 30dB S + D/N + D at 1 microvolt. Less than 0·3 microvolts for 20dB Noise quieting. Squelch sensitivity (FM only): Less than 0·4 microvolts. Spurious response rejection ratio: More than 60dB. Selectivity: SSB, CW More than ±1·2kHz at 6dB point Less than ±2·4kHz at −60dB point Fm More than ±7·5MHz at −6dB point. Less than ±15MHz at −60dB point. Audio output power: More than 1·5W. Audio output impedance 8 ohms.

FROM THANET OF COURSE

ICOM DOES IT ALL!

We are proud to announce the imminent arrival of ICOM's new 9-band HF Transceiver—

the IC-720 Price less than £700 inc VAT (PSU extra)

SPECIFICATIONS

General:

Frequency coverage:	
Receive:	0·1-30·0MHz
Transmit:	1·8-1·999MHz 3·6-4·099MHz 6·9-7·499MHz 10·0-10·499MHz 13·9-14·499MHz 17·9-18·499MHz 20·9-21·499MHz 24·8-25·000MHz 28·0-28·999MHz 29·0-29·999MHz
Temperature Limitation:	−10°C − +60°C
Antenna Impedance:	50Ω
Power Requirement:	13·8V DC, negative ground, ±15%
Current Drain:	Min audio output 0·9A. Max audio output 1·2A. Transmit: SSB 16A, CW, RTTY 20A, AM 14A
Dimensions:	111 (H) × 241 (W) × 311 (D) mm.

Transmitter

Emission Mode:	CW (A1), RTTY (F1), SSB (USB/LSB), AM
Output Power:	100W continuous (AM 40W)
Modulation System:	SSB, AM Balanced Mod. CW, RTTY reactance Mod.
Spurious Output:	More than 60dB below peak power output
Harmonic Output	More than 60dB below peak power output
Carrier Suppression:	More than 40dB below peak power output
Unwanted Sideband:	More than 50dB down at 1000Hz AF output
Microphone Imp.	1·3KΩ, dynamic with built-in pre-amp.

Receiver

Receiving system:	Superhetrodyne, with continuous bandwidth control.
Receiving Mode:	A1, A3J (USB/LSB), A3, F1
Intermediate Freq.:	1. 39·731MHz 2. 9·0115MHz 3. 10·750MHz 4. 9·0115MHz
Sensitivity:	Less than 0·25 micro-volts for 10dB S+N/N
Spurious Response Rejection Ratio:	More than 60dB
Selectivity:	SSB, CW, RTTY more than 2·3kHz at −6dB, Less than 42kHz at −60dB CW Narrow (Option) More than 500Hz at −6dB, Less than 1·5kHz at −60dB, AM. 3kHz at −6dB, less than 18kHz at −60dB
Audio Output:	More than 2 Watts
Audio Impedance:	8Ω

THANET ELECTRONICS LTD

143 RECULVER ROAD, HERNE BAY, KENT. Tel: 02273 63859

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AFTER SALES SERVICE !

(NEW FT480 2m SSB transceiver in stock)

FRG7
RECEIVER
£189 inc. VAT
0·5-30MHz
Securicor Delivery £4.50 extra

FRG7000
RECEIVER
£339 inc. VAT
Digital readout
0·2-30MHz
Securicor delivery £4.50 extra

FT707 (10W) £472 inc. VAT
FT707 (100W) £499
12v DC transceiver
80-10 metres
plus New bands!
Free Securicor delivery

FT101Z £546 inc. VAT
FT101ZD £628 inc. VAT
160-10M transceiver
230v AC operation
Free Securicor delivery

HERE'S A REAL BARGAIN!

HAMS' 'FRIEND FOR LIFE'
VSWR/POWER/
FIELD STRENGTH METER
3MHz-150MHz
£11.95 inc. VAT. P&p 50p.

There really is no excuse for not owning this little instrument. It's a combined SWR meter, power meter and field strength meter covering the HF and VHF bands 3-150MHz. It tells you all the things you should know about your antenna and power output for optimum performance. For example you can find out whether your feeder matches your aerial, whether your aerial is resonant on the desired frequency, the bandwidth of your antenna, the power output of your transceiver, true VSWR and reflected power, and field strength—just the thing to check that the hand-held you have is actually radiating! It will never date, it needs no power supply (other than rf power from tx) and at £11.95 there really is no excuse for not owning one. So why not send today for your 'Friend for Life'—he's waiting for you!

DenTron . . .
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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

DenTron
MT3000A
3kW ATU

Combines:
Antenna selector
RF power meter/VSWR
Dummy load (250W)
ATU 160-10m
Matches anything to anything!
(Includes coverage of new bands)

£275.00 inc. VAT

CLIPPERTON "L"

160-10 METRES
2kW INPUT

£495 inc. VAT

Free Securicor delivery

The Clipperton 'L' amplifier is a completely self-contained unit covering all amateur bands and uses 4 × 572B tubes. Forced air cooling ensures long tube life and makes it ideal for contests, RTTY, SSTV etc. This linear was used in the famous Pacific Clipperton expedition and as sole authorised UK Importers, our stock comes direct to us from the factory in the USA.

WATERS & STANTON ELECTRONICS

18/20 MAIN ROAD, HOCKLEY, ESSEX. Tel: (03704) 6835

£99.95

FOR A HANDHELD?
YES . . . AND INCLUDING NI-CADS & AC CHARGER

PALM II £99.95* inc.vat
PALM IV (70cms) £159* inc.vat

Both units come complete with all accessories and fitted S20, 22/SU20 plus 600kHz and 1·6MHz shifts. Extra channels £3 each.

* If xtal controlled toneburst not required please deduct £10.

SAE FOR LEAFLETS

FDK

VHF PRODUCTS

12 MONTHS WARRANTY PARTS & LABOUR

Send SAE for full details

FDK VHF TM56B MONITOR

CHANNEL SCANNING
230VAC/12VDC

The TM56 is one of our most popular models, combining great performance with modest price. The TM56B has the basic receiver design of our mobiles and includes its own 230 volt AC supply, plus external 12v DC input. 12 fixed channel positions are included, plus 4 autoscan positions. Any one of the Autoscan channels can be cancelled. Amateur band and marine band versions available fitted 10 channel and 9 channel respectively. **New reduced prices of £79.00 for either model**

MULTI-3000 2m ALL MODE £395 inc VAT

FM POCKET MONITOR

2m AMATEUR BAND or MARINE VERSIONS

- ★ 8-Channel scanning
- ★ Individual channel lockout
- ★ AC mains battery charger
- ★ Ni-cad battery pack
- ★ Telescopic whip
- ★ 'Fly lead' antenna
- ★ Mobile mounting bracket
- ★ Manual/Auto scan
- ★ Metal case
- ★ Squelch control

£69 inc. VAT
FREE DELIVERY
(Fitted S20/21/22)

This is a delightful little receiver that enables the user to continually monitor the 2 metre band when away from the base station or mobile unit. Robustly constructed in a metal case, this is certainly the most sensitive receiver for portable use we have come across. Up until now we have been very disappointed with both the construction and the performance of many pocket monitors, particularly with cheaper ones. Certainly in this day and age you get what you pay for. Therefore, we can promise you that you will not be disappointed with this one. If you should not happen to be totally satisfied with this unit and you return it to us in good order, we promise to refund your money—we can't be fairer than that!

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FDK MULTI-700EX

2m 25W OUTPUT
+ PRIORITY SCANNING

COMPARE THE PRICE **£199 inc VAT**

- Full coverage of the 144–146MHz band with facilities for 12·5kHz steps anywhere in the band.
- Large four digit LED frequency display tuned in 40 × 25kHz steps in each 1MHz range.
- A specially designed five stage helical-resonator assembly together with the latest dual-gate MOSFET front end ensures excellent cross-modulation characteristics.
- Built-in crystal controlled automatic tone-burst with ±600kHz shift for repeater operation and optional + 1·6MHz shift for use in conjunction with FDK/MUV-430A UHF transverter.
- Four additional priority channels-two diode matrix programmable in 12·5kHz steps and two crystal controlled for any frequency between 144–146MHz.
- Channel scanning of two chosen channels either synthesizer/matrix or matrix/crystal.
- Continuously variable RF output control from 1–25 watts.
- Advanced PLL technology provides good stability with low spurious output; integral power supply noise filter eliminates vehicle line noise and an automatic protection circuit protects the RF output power module against poor SWR, open or short circuit.

£199 inc VAT

MOBILE SAFETY MICS

We have a shipment of safety mics due in by the time you read this advert. The model 202S clips onto the lapel and comes with gear lever control box at £20.95. Also coming is model 202H which has a neck band and boom plus gear lever control box, incorporating up/down frequency control and tx/rx switch. £29.95. These mics suit all transceivers except the ICOM IC255.

FDK VHF/UHF FACTORY FRESH IMPORTED DIRECT BY US

FDK MULTI-750E

2m (& 70cm) ALL-MODE

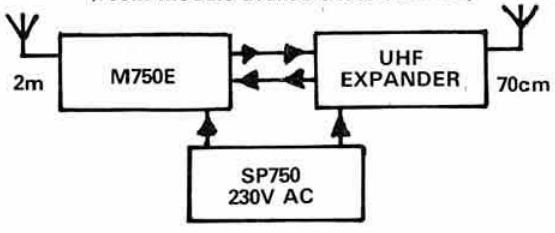
AMAZING VALUE **£299 inc VAT**

- Simple and smooth VFO control gives either 100Hz or 5kHz steps on both FM and SSB modes for optimum convenience.
- The large green fluorescent display tube gives full frequency readout to 100Hz and provides safe and clear readout for both night and day operation.
- Standard features include noice-blanker, RIT control with switch, RF attenuator gain control, automatic crystal controlled tone-burst, high and low power switching and remote up/down frequency control microphone unit.
- Compare its compact size and light weight, its smart appearance and comprehensive front panel controls. Simple and reliable operation is made possible by employing advanced solid-state and logic techniques.
- A dual VFO is employed for the selection of two independent frequencies anywhere in the band. This also enables split frequency operation, particularly useful when used in conjunction with the optional "UHF-EXPANDER" transverter.

For normal repeater operation a pre-programmed shift is selected by front panel selector.

M750 BUILDS INTO A 2m & 70cm PACKAGE

(70cm module available late summer)



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TRIO

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24 HOUR DELIVERY— —FROM THE PEOPLE YOU CAN TRUST

ALL PRICES INCLUDE 15% VAT

TRIO TS120V £347
TS120S £432

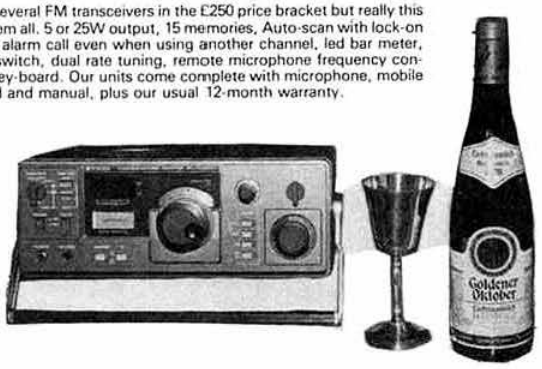
SOLID STATE RIG RELIABLE AT LAST

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.

TR7800
25W FM £268 inc VAT

NEW FM TRANSCEIVER

We've looked at several FM transceivers in the £250 price bracket but really this little unit beats them all. 5 or 25W output, 15 memories, Auto-scan with lock-on or pause, priority alarm call even when using another channel, led bar meter, reverse repeater switch, dual rate tuning, remote microphone frequency control, front panel key-board. Our units come complete with microphone, mobile brackets, DC lead and manual, plus our usual 12-month warranty.



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

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NEW TRIO TR9000

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.

2 METRE FM/SSB/CW
MOBILE OR BASE ONLY
£345 inc VAT

NEW TS770E
2m/70cm IN STOCK £763
NEW TR7800
2m FM-25W IN STOCK £268

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.

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'Such nice people'

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OTHER PARCELS – Parcel Post or British Rail
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PLEASE PHONE FOR QUOTATION ON ANY ITEMS NOT LISTED
COMPETITIVE PRICES ON ALL YAESU ITEMS

TRIO

TS820S 160-10m transceiver 200w digital	£791.00 (4.50)
TS820 160-10m less digital	£669.00 (4.50)
SP820 External speaker	£37.95 (1.50)
TS520SE 160-10m transceiver 200w	£437.00 (4.50)
SP520 External speaker	£17.25 (1.50)
VFO520S External VFO	£98.90 (4.50)
TS120S 80-10m Solid state 200w	£432.00 (4.50)
TS120V 80-10m Solid state 10w	£347.30 (4.50)
PS20 AC PSU (TS120V)	£44.85 (3.75)
PS30 AC PSU (TS 120S & TS 180S	£85.10 (3.75)
MB100 Mobile mount	£17.00 (1.00)
AT120 3-30MHz ATV	£55.00 (2.00)
AT200 1-8-30MHz ATU	£82.80 (2.00)
MC50 Desk microphone (Super!)	£24.15 (1.50)
MC30S Noise cancelling hand mic	£13.80 (0.50)
TR7600 2m FM + RM76	£220.00 (4.50)
TR2300 2m FM portable 80ch	£166.75 (4.50)
MB2 Mobile mount (2300)	£17.25 (1.00)
TS180s 160-10m solid state transceiver	£679.00 (4.50)
TS770E 2m/70cm transceiver	£763.00 (4.50)

YAESU – FULL RANGE STOCKED

AMAZING VALUE 4 amp PSU

We've bought a quantity of really superb 4amp 12v power supplies at a super price. These are fully protected and have a transformer 50% larger than anything similar. Send for yours today. **£22.95** inc. VAT. Carriage £1.50

MICROWAVE MODULES (NEW PRICES)

MMT 432/28-S transverter	£136.75 (N/C)
MMT 432/144 R transverter	£173.50 (N/C)
MMT 144/28 transverter	£99.00 (N/C)
MMC 144/28/30 converter	24.90 (N/C)
MMC 144/28 LO converter	£26.90 (N/C)
MMC 70/28 converter	£24.90 (N/C)
MMC 70/28 LO converter	£26.90 (N/C)
MMC 432/28 S converter	£29.90 (N/C)
MMC 432/144 S converter	£29.90 (N/C)
MMC 1296/144 or 28 converter	£32.00 (N/C)
MMC 28/144 10m up converter	£24.90 (N/C)
MMD 050/500mHz counter	£69.00 (N/C)
MMA 144 2m pre-amp	£14.90 (N/C)
MMD 600P 500mHz pre-scaler	£23.00 (N/C)
MML 144/40W linear amplifier	£69.00 (N/C)
MML 144/100w linear amplifier	£142.50 (N/C)
MML 432/100w linear amplifier	£228.00 (N/C)
MML 144/25w	£48.30 (N/C)
MML 432/50w	£113.75 (N/C)

DENTRON

MLA 2500 160-10m 2Kw linear	£699.00 (N/C)
MT3000A 3Kw 160-10m tuner	£275.00 (N/C)
Clipperton 'L' 160-10m linear 2kW	£459.00 (N/C)
JR Monitor 160-10m tuner 300w	£59.95 (N/C)
W-2 160-10m PEP SWR meter	£59.95 (N/C)
HF 200A Transceiver 1kW 80-10m linear 240v	£399.00 (N/C)
GLA1000B	£295.00 (N/C)

VHF MONITOR Rx's

TM56B 12v/240 AC auto scan 10ch's	£79.00 (N/C)
TM56B Marine model 9ch's	£79.00 (N/C)
SR9 12v DC Marine model	£46.00 (N/C)
Extra xtals	£2.45 (N/C)

FDK

Multi 3000 2m All mode	£395.00 (N/C)
Multi 750 2M FM/SSB/CW	£299.00 (N/C)
Multi 700EX 2m 25 watts	£199.00 (N/C)
Multi Palm II 2m hand held special package	£99.95 (N/C)
M-11/Q16 xtals	£5.00
Palm II xtals	£3.00
Multi-Palmsizer 2m synthesised 40 channel hand-held	£149.00 (N/C)
Multi Palm IV 70cms	£159.00 (N/C)

AR

AR240A Synthesised hand portable	£168.00 (N/C)

MIZUHO

2m SSB 1 watt portable	£135.00 (N/C)
Extra xtals	£3.00

NAIGAI

2200 2m 500w PIP linear	£429.00 (N/C)

ADONIS MICROPHONES

AM802G Compressor 3 outputs	£59.95 (N/C)
AM502G Compressor 1 output	£39.95 (N/C)

ASP MOBILE ANTENNAS

201 2m ¼ wave	£3.50 (1.00)
2009 2m 5/8th wave	£9.25 (1.00)
677 2m 5/8th wave deluxe	£14.95 (1.00)
452 70cms colinear	£8.25 (1.00)
667 70cms colinear deluxe	£17.95 (1.00)
Magnetic base and cable	£8.50 (1.00)
"No-hole" boot mounts	£3.75 (0.50)

JAYBEAM (HF)

TB 3 ele 2kW Beam	£155.00 (2.00)
VR3 Triband vertical	£39.00 (2.00)

HF ANTENNAS

HQ 1 20 15 10m mini quad	£96.50 (2.50)
C4 20 15 10m vertical	£48.50 (2.00)
Mosley Mini beam 600W 10 15 20	£99.00 (2.00)
Mosley 20 15 10m mini beam 600w	£99.00 (2.00)
Mosley 2kW version	£129.00 (2.00)
TA32 600 watts 20 15 10m	£89.00 (2.00)
TA33 600 watts 20 15 10m	£133.40 (2.50)
Hy gain 14 AVQ 40 10m	£60.00 (2.00)
Hy gain 18 AVT WB 80 10m	£87.00 (2.25)
Mosley TD3JR 20 15 10m dipole	£35.00 (1.00)
Mosley RD5 SWL ham dipole	£36.30 (1.00)
EL 40X 80 40 Mini dipole	£27.50 (1.00)
HF5 5 band vertical	£41.50 (1.00)

VHF ANTENNAS (JAYBEAM)

4Y 4M 4el yagi	£17.20 (2.00)
C5 2M 5db colinear	£40.00 (2.00)
5Y 2M 5el yagi	£10.25 (1.50)
8Y 2M 8el yagi	£13.25 (1.50)
10Y 2M 10el yagi	£28.40 (2.00)

All prices include VAT at 15%
Carriage costs shown in brackets

ELECTRONIC KEYERS £29.95

Yes, it's true, this little unit has all the features you would expect from something costing a lot more. Built-in paddle, dot memory for easy sending, semi- or fully-automatic switch settings, variable speed control, LED indicators, etc. It matches all modern transceivers and comes complete with instructions and can be either self-powered from HP7 cells or external DC supply.

ANTENNAS (contd)

PBM10/2M 10el parabeam	£33.60 (2.00)
PBM14/2M 14el parabeam	£40.80 (2.50)
5XY/2M X'd 5 element	£20.70 (1.50)
8XY/2M X'd 8 element	£25.80 (2.00)
10XY/2M X'd 10 element	£34.30 (2.00)
Q4/2M 4el quad	£21.50 (1.50)
Q6/2M 6el quad	£28.50 (2.00)
D5/2M 5 over 5	£18.30 (1.50)
D8/2M 8 over 8	£24.85 (2.00)
SVMK vertical Kit	£6.60 (1.25)
UGP/2 Ground plane	£9.35 (1.25)
HO/2M 2m halo	£4.25 (0.75)
HM/2M Above with 24" mast	£5.05 (1.00)
C8/70cm 8db colinear	£45.40 (2.50)
D8/70cm 8 over 8	£20.45 (2.00)
PBM18/70 18 el parabeam	£24.75 (2.00)
MBM/48 70 el Multibeam	£28.20 (2.00)
MBM88/70 88 el Multibeam	£37.50 (2.00)
8XY/70 8 el X'd yagi	£31.05 (1.50)
12XY/70 12 el X'd yagi	£38.50 (2.00)
D15/1296 15 over 15	£30.95 (1.50)

ACCESSORIES

9502 rotator	£43.50 (2.00)
KR400 rotator	£105.80 (2.00)
AR40 rotator	£59.80 (1.50)
Stolle 2030 rotator	£55.00 (1.50)
Stolle 2010 rotator	£50.00 (1.50)
Stolle 2050	£40.75 (1.50)
SWL ATU	£16.50 (0.75)
Shure 444 microphone	£27.50 (0.75)
Shure 201 microphone	£11.75 (0.75)
Shure 526T microphone Type II	£36.35 (0.75)
Hand morse key	£10.50 (0.50)
MM202S Safety microphone	£20.95 (0.50)
50ohm balun	£11.25 (0.50)
UR67 per metre	£0.69 (0.05)
UR43 per metre	£0.22 (0.03)
5 core cable per metre	£0.30 (0.03)
HP3A high pass filter	£3.00 (0.20)
Drake low pass filter	£18.40 (0.75)
TV1 ferrite rings	£0.35 (0.05)
Plastic antenna insulators	£0.30 (0.05)
Twin SWR meters 3-150mHz	£12.95 (0.50)

MONDAY – SATURDAY 9 5·30 **WATERS & STANTON ELECTRONICS** EARLY CLOSING WED 1·00pm
WARREN HOUSE, 18/20 MAIN ROAD, HOCKLEY, ESSEX **Telephone (03704) 6835** **Telex 897406**
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AGENTS: – G3PWJ (03844) 77778 G3WRA (0432) 67864 GW8THL (05542) 53839 G3XTX (0708) 68956 GM3GRX (0324) 24428

Western

Western FOR GENERAL COVERAGE RECEIVERS

TRIO R-1000 £289

The newest on the general coverage scene. Full coverage 200kHz to 30MHz with digital frequency readout and clock/timer. Switched selectivity for optimum performance and other features making it a joy to use and first-class value for money.

YAESU FRG-7 £199

The well established, budget-priced favourite. Covers 500kHz to 30MHz continuously; mains, battery or 12V dc operation. A first-class receiver at a price that won't break the bank.

Western FOR HF TRANSCEIVERS

FROM TRIO—KENWOOD

TS120-S A really popular solid-state mobile (or base) transceiver. Small in size but big on features and performance. Digital readout, IF shift to beat the QRM, VOX and CW break-in keying are all standard. 100 watts RF out on all bands 80 to 15m, slightly lower on 10m. Outstanding value in the HF field.

TS-180S/DFC The truly de-luxe solid-state HF transceiver. Full band coverage, 160 to 10m, with allowance for adding new WARC frequencies. Digital Frequency Control (DFC) and 4 memories allow for full operating flexibility. RF power control, digital readout, VOX and compressor are all fitted as standard. Try one today!

TS-820S Trio's well-proven base station transceiver for those who prefer valve PAs. In use world-wide, tried and respected, this is one of the classics among transceivers. Full coverage 160 to 10m; 6146Bs in the PA for years of dependable service, factory-fitted digital readout, IF shift control. Top Trio quality as always.

FROM YAESU MUSEN

FT-101Z (ZD) Latest in a famous line, but what an improvement! Full band coverage, IF width control for superior selectivity, excellent performance and Yaesu's well-known quality. ZD model has digital readout built-in, both models in excess of 100 watts RF out (lower on 10m). Try our price for size!

FT-707 Truly christened the "Wayfarer". Yaesu's new solid-state rig goes anywhere, base or mobile, and has all the facilities of the bigger rigs. Digital readout, IF width and other features. This is the HF rig you Yaesu lovers have been waiting for—ALL THE NEW WARC BANDS FITTED!

Western FOR VHF/UHF TRANSCEIVERS

ICOM and FDK ALSO AVAILABLE

TRIO

TR-7625 A fully synthesized, 25 watt 2m FM mobile with all the up-to-date features you need. Remote control feature using optional RM-76 microprocessor unit.

TR-9000 The one everyone is talking about! A complete 2m multi-mode transceiver in a size you normally imagine an FM only box! SSB/CW/FM, 25 or 12·5kHz channels on FM, 100Hz tuning steps on SSB/CW (and FM if you wish). Search and scan modes, 5 memories, repeater shift, tone access. This is the one that makes all the others obsolete!

TR-2400 Trio ingenuity in your hand! Fully synthesized, microprocessor-controlled 2m FM hand portable transceiver. Ten memories, scan, tone access, keyboard frequency, entry with continuous LCD readout—it's all there! Includes battery pack and charger—good value in a portable!

YAESU

FT-720RV Yaesu's new modular approach to 2m FM mobile. A 10-watt transceiver module with separate remoteable control head for maximum freedom of vehicle mounting. Fully synthesized, including scan and memory facilities.

FT-720RU The 70cm counterpart to the FT-720RV. Similar modular concept, using the same control head (FT-720R). Ten watts output on 70cm FM, 25kHz channels. One control head can be used (with optional S-72 switch unit) to operate two rigs (one on 2m, one on 70cm).

FT-227RB Fully synthesized 2m FM mobile, 10 watts up/down scanning from microphone, full band coverage, tone-burst and four memories.

ALL LISTED PRICES INCLUDE VAT AT 15% AND CARRIAGE

HAVE YOU GOT YOUR Western CREDIT CHARGE CARD YET?

SPECIAL OFFERS !

Yaesu CPU-2500RK	Reduced to £299
Yaesu FT-301D Transceiver (ex-demo)	£599
Drake SPR-4G/C Receiver	£375
Alda 105 5-band Transceiver	£399

All new except where noted. VAT INCL.

WHILE STOCKS LAST

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

Lee Electronics Ltd

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.

YAESU FRG7

The **FRG 7** needs no introducing, this low price Receiver must be one of the best buys around. The unit covers 500kHz to 30 MHz in four ranges using the famous Barlow Wadley Loop technique. The unit operates from 100-240V AC or 12V DC (batteries can be used with the optional battery holder)

£198.00 inc VAT. Carriage **£3.00**

We have just made a new batch of our own Digital Readout. This can be fitted inside the set or mounted externally to give a very accurate read out.

£39.95 inc. VAT and Postage

The **Trio R1000** uses the latest techniques to produce a truly remarkable Receiver covering 200 kHz to 30 MHz in 30 bands. Excellent selectivity is obtained by 12, 6 and 2.7 kMz filters, the 2.7 kHz filter producing a shape factor better than 1:2, 6:60dB. Accurate frequency readout is achieved by a 5 digit Display, the unit operates from 100-240V AC and 12V DC.

£289.00 inc. VAT. Carriage **£3.00**

★ Plus FREE headphone with any receiver purchased ★

TRIO R1000

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

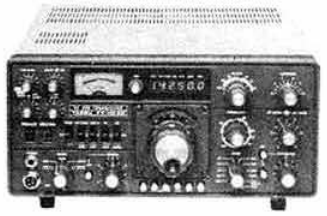
BARCLAYCARD VISA

AMATEUR RADIO EXCHANGE

By and large this spirit of co-operation is there and spreading, but wouldn't it be nice if the amateur who bought his rig in the Highlands of Scotland could be sure that it would be serviced with a smile in the Dales of Derbyshire. . . . Then, the only reason for coming to OUR shop would be to have a cup of Brenda's coffee!

HF . . . THE BEST OF BOTH WORLDS

YAESU FT-101ZD



New rigs with new names and numbers come and go, but the YAESU 101 series goes on and on. For, of all the many transceivers we sell, no othe: gives so little trouble or needs so little servicing.

Our 101ZD's come complete with cooling fan and microphone and even have AM facility! So if you're looking for a de-luxe HF transceiver with all the important features at a sensible price, look no further and phone to see how sensible.

ICOM IC-720

At last ICOM's long awaited new HF rig. We have all heard the good news—general coverage receive, 100kc—30MHz, amateur band transmit (including all the new bands) and for those who might wish to consider commercial applications it can also be made to transmit over its entire range.

AND the best news of all is the price (including power supply) **£775** inc. VAT

★ **JUST LOOK AT OUR PRICE!** ★

STAR OFFER

TRIO R-1000 (P&P £3) **£289** inc VAT

STAR OFFER

★ **JUST LOOK AT OUR PRICE!** ★

Our latest synthesised scanning receiver, the fantastic new SX-200 from Japan.

★ Scans VHF and UHF bands in both AM and FM modes throughout its frequency ranges, 26 to 88MHz, 108 to 180MHz and 380 to 514MHz ★ 16 memories ★ Memory bank programmable to scan frequencies in any band ★ Display automatically reverts to time/day/date ★ 2-speed scan ★ 3 watts audio out ★ Sensitivity 0·5 μv 20dB S/N ★ Supplied with AC mains adaptor for 12V operation.

SX-200 £240 inc VAT (p&p £3)

2 NORTHFIELD ROAD, EALING, LONDON W13 9SY. Tel: 01-579 5311

So easy for Overseas Visitors—Northfields Station is just seven stops from Heathrow on the Piccadilly Line—or phone your order and let us deliver it to you at the Airport.

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

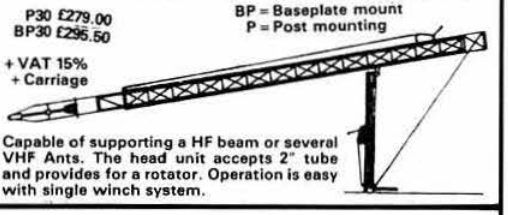
80-85-100-120' and MOBILES PRICES ON APPLICATION

NEW '30ft': 10ft SECTIONS

P30 £279.00
BP30 £296.50

BP = Baseplate mount
P = Post mounting

+ VAT 15%
+ Carriage



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

SMC

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

SMC-HS

INTERCHANGEABLE ELEMENT MOBILE ANTENNAS

SMC HS Mobile antennas, tabulated below, features an in-built PL259M connector which mates with the SO239M of the cable assembly (fits a $\frac{5}{8}$" hole in car body or the cast chromed gutter mount) or the magnetic base (recommended for smaller antennas only). This arrangement is ideal for easy removal (element change, car wash and anti-vandal), tests and portable operation.

MODEL	BAND	GAIN	TYPE	POWER	LENGTH	PRICE
20SE	14MHz		($\frac{1}{4}\lambda$)	100W	1·72m	£12.00
15SE	21MHz		($\frac{1}{4}\lambda$)	130W	1·72m	£10.00
10SE	28MHz		($\frac{1}{4}\lambda$)	100W	1·27m	£10.00
4E	70MHz	0dB	$\frac{1}{4}\lambda$	150W	1·03m	£6.50
2NE	144MHz	3dB	$\frac{5}{8}\lambda$	150W	1·30m	£5.50
78F	144MHz	4·5dB	$\frac{7}{8}\lambda$	100W	1·75m	£10.00
78B	144MHz	4·5dB	$\frac{7}{8}\lambda$	150W	1·72m	£11.00
258	432MHz	5·5dB	$2\times\frac{5}{8}\lambda$	100W	0·94m	£10.00
358	432MHz	6·3dB	$3\times\frac{5}{8}\lambda$	100W	1·36m	£12.50

SMC78B 'BALL'	BASE COIL	BASE COIL 'FOLDED' STATE
		

All models have a locking fold-over joint except the SMC78B which has an in-built ball (in case the cable assembly is fitted askew).

CABLE ASSEMBLY	GUTTER MOUNTING	MAGNETIC BASE
		
SMCSOCA	SMCGCD	SMCSOMM
C/w 4M RG58 & PL259 plug SMCSOCA . . £3.00	Adjustable, cast, chrome SMCGCD . . . £3.00	c/w 4M RG58 & PL259 plug SMCSOMM . £6.50

Carriage, £1.00 complete antennas, or £0.50 for accessories – any quantity

NB: Prices do NOT include VAT (15%)

SOUTH MIDLANDS COMMUNICATIONS LTD

OSBORNE ROAD, TOTTON
SOUTHAMPTON SO4 4DN

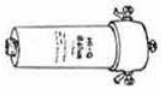
SMC

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

Communications Ltd

SMC FOR ALL YOUR STATION REQUIREMENTS

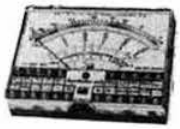
YAESU



HF BALUN TRANSFORMER
1:1 Ratio, 3-40MHz, SO239 (UHF) Socket
5½ × 1½" D. 7½ozs. "Hang up type"
High power handling
H1Q (Post free of charge) **£10.00**

2M LINEAR AMPLIFIER
12V; Switch SSB/FM, Low noise pre-amp
B108 80W out 10W drive **£105.00**
B3016 160W out 30W drive **£142.50**
B1016 160W out 10W drive **£165.00**
RC1 Remote unit, 18' cable **£15.00**

WATT METERS
In-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 f.o.c.) **£14.15**

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 £0.50) 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**

MORSE CODE KEYS
HK707 straight key **£8.00**
HK710 straight key **£25.70**
BK 100 mechanical bug **£15.00**
MK701 single lever **£16.00**
MK706 squeeze paddle **£13.40**

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 £0.50) **£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 **£100.00**
MMT144/28 2cm, 10m 1F 10W out **£86.00**
MMT432/28.S 70cm, 10m Satellite **£119.00**
MMT 432/144R 70cm, 2m, Repeater **£151.00**
MMT 1296/144 23cm, 2m 1F 1-3RF **£160.00**

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 ½λ 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
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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 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 Tuner	£63.00	MR7 Rack Mount Cabinet	£11.50	YM35 Scanning Microphone	£11.00

FT107M

FT107M SOLID STATE TRANSCEIVER

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	£12.50
FP107E AC PSU Extnl.	£92.50	SP107 External speaker	£24.00	144-148 2m module	£88.50	YM36 Mic. noise cancel	£11.75
FP107 int. AC PSU	£85.00	FTV107(2) Transverter	£181.50	50-54 6m module	£68.50	YM37 Mic. Hand	£7.50

FT901DM

FT901DM THE SUPERB PERFORMER

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, ½µV 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 reader	£395.00	PAN KIT Mod kit	£47.00	70-74 4m module	£75.00	SP901 External speaker	£24.00

FT101ZD

FT101ZD PERFORMANCE AND ECONOMY

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 & YC7B

FT7B MOBILE AND BASE TRANSCEIVER

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

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Communications Ltd

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YAESU

FT480R NEW 2M MULTIMODE

The FT480R is a 12V, 10W revolutionary high performance multimode (USB, LSB, CW, FM) transceiver. The "single knob" microprocessor controlled synthesizer tuning is simply superb. On SSB switchable; 10Hz (yes 10Hz), 100Hz and 1kHz steps and on FM 1kHz, 25kHz (or 12·5kHz) and 100kHz steps are provided on the dual VFO's. Tuning may also be accomplished from the microphone up/down button, press for one step, hold down for ½ second and the scanner operates over the band or just the four memory channels The memories are simply programmed by a "write in" push button and contents are "kept alive" as long as a DC supply is provided to the set. Any one of the memories may be used as a priority channel when the set is dial controlled, it checking the designated frequency every five seconds. The very sensitive transceiver is fitted with all the features one would expect on the 1980 Yaesu radio, very bright digital display and string LED meter, receiver offset, tone, F set (clears all digits of the operating frequency below the step frequency in use) ±600kHz offset, any split with the dual VFO's, satellite control (disables RIT etc and allows slow scanning on Tx to eliminate doppler shift on Listen Through) etc. – all at a very affordable price.

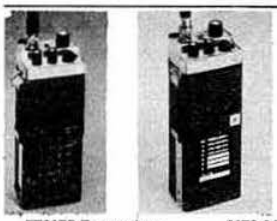
FT720R NEW 'REMOTABLE'

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
E72L 4m cable £23.50
720RV Transceiver 10W 2m £148.00
720RVH Transceiver 25W 2m £153.00
720RU Transceiver 10W 70cm £180.00

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 £2.25
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

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

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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 feature packed, operational ease is assured by use of a "custom microprocessor.

Digital frequency synthesis provides full band coverage in 12·5kHz or 25kHz steps. "Single knob" frequency selection is by an optically coupled encoder. A dialling speed switch (increases tuning steps) facilitates rapid QSY's.

A 10 slot memory with Ni-Cad back-up, provides 10 duplex (plus +600kHz shift) and/or 5 semi-duplex channels, making the 2025 as easy to use mobile as a crystal controlled transceiver. One memory is semi-dedicated to "priority" and programmable when the 2025 is dial controlled.

The 2025 embodies the best non-lockout scanner. It scans occupied or empty channels and a flick switch enables immediate transmission. The scanner works on the memories and across any selected portion of the band (scan limits are defined by two of the memories).

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 15 pole ceramic filter in the second provides excellent selectivity.

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. The PA is impervious to breakdowns under infinite VSWR.

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.

NEW LOW PRICE £225.00 INC. VAT!!

INCLUDING VAT AND SECURICOR DELIVERY

Direct from the Importers or from any of those dealers listed below:

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The national society representing all UK radio amateurs

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

GENERAL MANAGER AND SECRETARY
D. A. Evans, G3OUF

EDITOR
A. W. Hutchinson

ANNUAL SUBSCRIPTION RATES

UK corporate: £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).*

RSGB NEWS BULLETIN SCHEDULE

INTENDED RECEPTION AREA	NORMAL READER	RESERVE READER	LOCAL START TIME
Frequency: 3,640kHz. Mode: SSB			
NE Scotland	GM3HGA	GM3VEY	1130
Frequency: 3,650kHz. Mode: SSB			
SE England	G2MI	G4ARZ	0900
Midlands	G2CVV	G8QZ	0930
SW England/Wales	G8ML	G3JFH	1000
N Ireland	GI3GAL	GI3SXG	1030
NE England	G5VO	G3MCF	1100
E Scotland	GM4CUZ	GM4FLP	1430
Frequency: 3,660kHz. Mode: SSB			
Central Scotland	GM3TCW	GM3ULP	1130
Frequency: 7,047·5kHz. Mode: AM			
UK	G3LEQ	G2CVV	1100
Frequency: 144·250MHz. Mode: SSB. Horizontal polarization			
SW from Midlands	G3BA	G3KQF	0930
NE from S Devon	G3CHN	G3PBV	1000
NW from Manchester	G3SMT	G4IAL	1000
NNW from Cleveland	G4JJB	G8FTZ	1000
W from Carlisle	G8DVD	G8OAU	1030
SE from Lincoln	G8OFQ	*(Vacancy)*	1030
SW from London	G3FZL	G3IIR/G3VAG	1030
S from Aberdeen	GM8GHV	GM3ZBE	1030
W from Bristol	G4CJZ	G8NNU	1100
W from Bangor, Co Down	GI3TLT	GI3SXG	1130
Frequency: 145·525MHz (S21 FM). Vertical polarization			
Jersey	GJ8KNV	GJ4ICD	0930
Cornwall	G2ABC	G3NPB	0930
Hampshire, north	G8CKN	G3PZN	0930
Suffolk	G3ZNU	G4FSG	0930
Leeds	G3SPX	G3PSM	0930
Co Down	GI3WEM	GI4DOR	0930
Edinburgh	GM4EHO	GM4JFS	0930
E Cornwall/S Devon	G3ZYY	*(Vacancy)*	1000
Londonderry	GI2DHB	GI4AHD	1000
London	G3FZL	G3IIR/G3VAG	1000
Birmingham	G3PWJ	G3BA	1000
Lincolnshire	G8OFQ	*(Vacancy)*	1000
Tyneside	G4FUT	G3WNR	1000
Glasgow	GM4HCO	GM4CXM	1000
Elgin	GM4ILS	*(Vacancy)*	1000
Southampton	G8LVC	G8ADM	1030
E Sussex coast	G8SC	G3ZFE	1030
Bristol	G4CJZ	G8NNU	1030
Manchester	G3LEQ	G3JWK	1030

QTC
amateur radio news

RSGB Council elections
Members are reminded that full information regarding the forthcoming elections for the 1981 RSGB Council was published on page 809 of the August issue of *Radio Communication*.

QSL Bureau
The QSL Bureau manager reports that too many oversized cards are passing through the bureau—many are, in fact, larger than the envelopes used by some G amateurs to collect their cards—and most of them have to be folded to be sent overseas. He also says that some members are not yet sorting their cards alphabetically by prefix, and by call area in the case of the USA, and he asks for their co-operation, as by doing this they will assist in the efficient running of the bureau.

RSGB groups
From 1 October 1980 RSGB groups can register with the Society on payment of an annual fee of £7.50. There will be a number of advantages for groups who register, including more direct contact with the Society. An information sheet is available from the membership services officer at RSGB HQ on receipt of an sae.

Exhibition news
The date of the **Amateur Radio Retailers Association exhibition** at Leicester this year has been changed from 24–25 October to 6–8 November.

Following the destruction by fire of the great hall of Alexandra Palace in which the **RSGB exhibition** has been held for the past few years, the Society is seeking an alternative venue in the London area for next year's exhibition.

Radio Regulations
The Home Office has published, through HMSO, a volume entitled *Revised International Table of Frequency Allocations and Associated Terms and Definitions*. This contains the decisions of WARC 79 and is available from HMSO and usual suppliers at a cost of £8.50 net.

It is anticipated that the revised Radio Regulations will be available from the ITU early in 1981.

Exemption from licensing
The Home Secretary has announced that users of model control equipment, metal detectors and pipefinders will shortly be freed from the need to have their equipment licensed.

At present there are about 93,000 model control licences in force, and about 150,000 licences for metal detector equipment. In exempting the equipment from licensing regulations, a simplified form of the existing conditions will be used so that frequency and power output requirements will remain unchanged.

Region 4 representative
The result of the ballot for a representative for this region was:

Mr M. Shardlow, G3SZJ ..... 170 votes
Mr A. Wright, G4EPN ..... 98 votes

There were 25 invalid votes.

Mr M. Shardlow, G3SZJ, was therefore elected as representative for Region 4.

SAEs to the Channel Islands
British postage stamps are not valid on the Channel Islands and self-addressed envelopes sent to the islands should carry Channel Islands stamps or be accompanied by an international reply coupon (irc) obtainable at any Post Office.

IRCs from any country are valid anywhere, and once purchased will defray return postage irrespective of any change in postage rates. Two ircs are needed for airmail reply. Although nominally available within any member country of the Universal Postal Union, ircs are seldom on sale in Eastern Bloc countries.

New clubs
The **Marconi Radio & Electronics Club** was formed on 29 May 1980 at Marconi Space & Defence Systems Ltd, Portsmouth. Present membership is about 100, and the callsign G4JMR has been obtained. Enquiries should be addressed to the secretary, Mr V. G. Scambell, G3FWE, 52 Freshwater Road, Cosham, Hants.

The **Airesford Wireless Club** was formed on 21 May 1980, and any local amateurs who are interested in joining are invited to contact the club's chairman, Mr R. F. Farley, Badgers, The Dean, Airesford, Hants SO24 9BH.

The **Vale of White Horse Amateur Radio Society** was formed at the end of June by radio amateurs in the area bounded by Swindon, Newbury, Oxford and Wallingford. Membership is open to swls, candidates for the RAE, licensed amateurs, and to anyone with an interest in radio propagation. Meetings are being held at the White Hart Inn, Harwell, on the first Monday in each month at 7.30pm. Further information from Alan Lovegreen, 16 Church Lane, Wallingford; or Steve Prior, Box Tree, Minster Lovell, Oxford OX8 5RZ.

VERON "Day for the amateur"
The Dutch national society is again organizing a "Day for the amateur" and "Amrato" exhibition, and this year's event will take place at the RAI-Congress centre in Amsterdam on 8 November. Throughout the day the programme will include such items as the nomination of the "Amateur of the year", a d-i-y contest, lectures, and features of interest to radio amateurs.

Further information from J. Hordijk, PA0AJE, Francklaan 5, 4837 CR BREDA—Netherlands.

Old-timers' telephony and cw event
For the sixth year in succession RAOTA and the Dutch Old Timers Club have arranged an activity period for the first Monday and Tuesday in October to enable old-timers in both countries to keep in touch. The event will commence at 0830gmt on 6 October and will run until 1530gmt on 7 October. There will be no fulltime co-ordinators, but PA0DK (on 3,600kHz) and

Region 15 ORM and dinner

Deer Park Hotel, Antrim

20 September 1980

ORM commences at 2.30pm

Dinner, 7.30 for 8pm

Dinner tickets: £6.50
Overnight accommodation available
Further details from RR15 or ARs, all QTHR

A mobile rally will be held from 12 noon on the following day in the Castle Grounds, Antrim.

PA0PN (on 7MHz cw or ssb) will be available for information; similarly G2PT will be QRV on 3,600kHz (ssb) or 7,025kHz (cw).

Propagation on 7MHz may be as good as last year, and hence this band may become the busier of the two. Although this event is arranged for old-timers (licensed for 25 years or more) anyone wishing to join the event will be welcome.

Welsh Amateur Radio Convention

Oakdale Community College
Blackwood, Gwent

10am–5.30pm, 28 September 1980

Trade exhibition **Convention radio shack**
TV display **RSGB stand**
Raynet **Bring and buy stand**

LECTURE PROGRAMME

- Colour/sound film on OE6XG/A's 1979 dxpedition to the Red Sea islands
- Colour/sound film on ON5FF's vhf expedition to Andorra and the Scilly Isles
- New ARRL film *The World of Amateur Radio*
- Tape/slide talk with off-air recordings of the 1979 Welsh Contest Group's entry in the 1979 CQ WW Phone Contest–7th in the world

Talk-in from 9am on S22. Take exit 27 off the M4

Admission 50p at the door **Refreshments**

Full information from B. Davies, GW3KYA, 16 Vancouver Drive, Penmain, Blackwood, Gwent NP2 0UQ. Tel 0495 225825

Snippets

Mr W. James, G6XM, area representative for the Swindon area, has resigned.

Mr G. R. Jessop, G6JP, QTHR, is looking for a copy of *Wireless World,* Vol 7, April 1919–March 1920. Can anyone help?

Mr P. Balestrini, G3BPT, RSGB President, has received a bound volume of RSGB Council minutes for 1924, and wishes to thank the anonymous donor.

Mr R. Lyons, G4JWV, of Lodge House, St Lawrence College, Ramsgate, Kent CT11 7AE, wishes to contact licensed amateurs and swls who have some connection with the college with a view to starting a net.

BATC Convention

Post House Hotel

(On A46 near M1 junction 21)

Leicester

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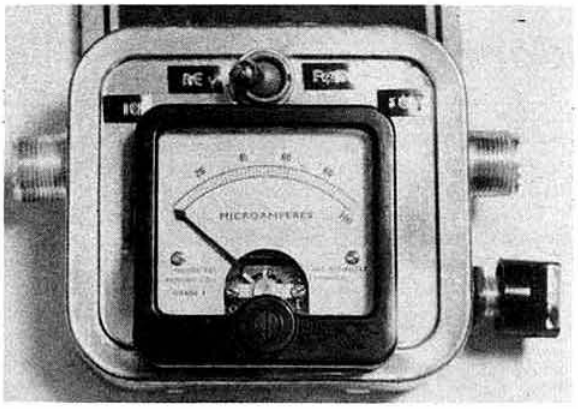
A compact hf vswr meter and a useful atu

by LOUIS VARNEY, G5RV, CEng, MIEE, AIL*

The vswr meter

The vswr meter described in this article was designed for compactness, together with reasonable accuracy of measurement, as it forms part of a hand-carried station consisting of a Trio TS-120S with its PS30 ac psu. Many types of vswr meter have been described in various radio journals in the past, but the author feels that certain facts have not been sufficiently stressed and that, in some cases, this may result either in failure of the device to give reasonably accurate results, or in considerable loss of time while the constructor finds out the hard way what is wrong and its solution.

After some initial tests of several circuit configurations, it was decided to use the well-known "Monimatch" principle. By the use of a convenient type of semi-air-spaced coaxial cable a very neat, mechanically and electrically stable, coupling arrangement was obtained for forward and reverse current sampling. This makes use of 20cm of 75Ω low-loss (semi-air-spaced) 5mm o/d coaxial cable; the polystyrene insulation between the inner and outer conductors being extruded so as to have a number of longitudinal holes surrounding, and parallel to, the centre conductor. Through each of two of these holes, on opposite sides of the centre conductor, is threaded 25cm of 26swg enamel-covered copper wire. These two wires, which should be of exactly equal length, form the forward and reverse current coupling loops shown diagrammatically in Fig 1, which is conventional *except* that when calibrating the unit it was found that the usually recommended values of R1 and R2 were quite unsuitable. The values of R1 and R2 in Fig 1 may need to be varied to suit individual conditions of construction and mounting of the components. In particular, if the type of coaxial cable used in the vswr meter is not exactly the same as that specified, it may be found necessary to experiment with higher or lower values for these resistors. The graph, Fig 2, shows the effect of varying these values when the vswr meter is working into a previously checked 1:1 vswr 75Ω non-inductive resistor load. It should be noted that the resistor values are *measured* values for matched pairs. This precaution is important when the normally available ±20 per cent tolerance carbon resistors are used.



Front panel view of vswr meter

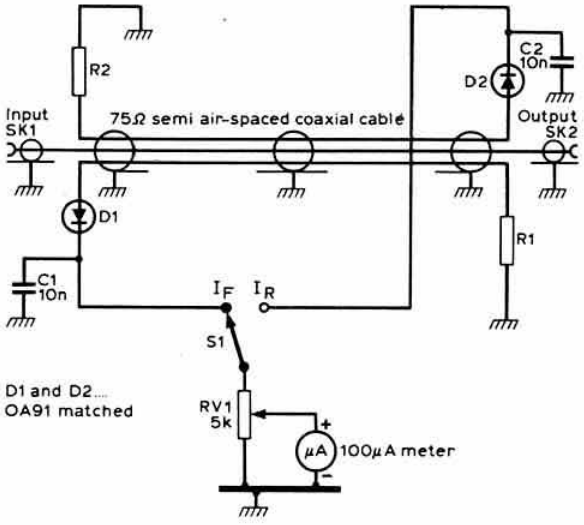


Fig 1. Circuit diagram of Monimatch vswr meter using 75Ω semi-air-spaced coaxial cable to contain forward and reverse current sampling loops

Construction

The meter was constructed in a 2oz tobacco tin, but any suitable small metal box will serve equally well. The placement of the components is not critical but all leads, especially those to the two by-pass capacitors C1 and C2, should be as short as possible. When soldering the two OA91 diodes and the resistors R1 and R2 into the circuit, care should be taken to grip the lead being soldered in the jaws of a small pair of pliers

*82 Folders Lane, Burgess Hill, West Sussex RH15 0DX

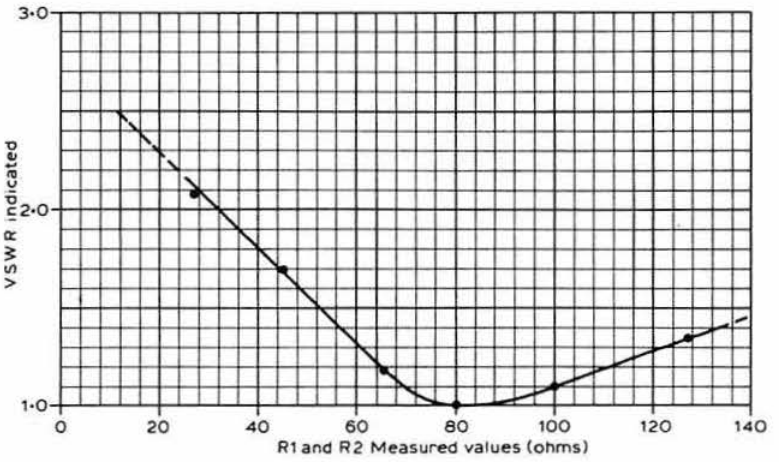
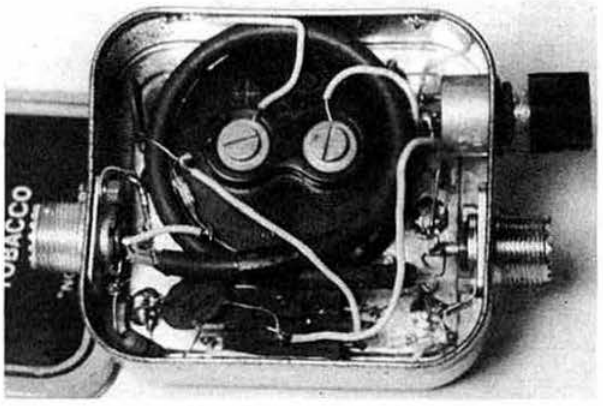


Fig 2. Graph showing effect of varying the value of R1, R2 in Monimatch vswr meter using a known 1:1 vswr 75Ω resistive load



Rear view of vswr meter

which will act as a heat sink to prevent damage to these components by possible over-heating. The 20cm of coaxial cable is formed into a single turn loop of approximately 4·5cm i/d, and is mounted against the rear of the microammeter. Except for the miniature sensitivity potentiometer RV1, all components are standard size. If a miniature slide switch is used for S1, it would be possible to mount this and RV1 on the front of the box above or below the microammeter. The circuit is shown in Fig 1, and the photographs show construction details.

Performance check and calibration

The meter should first be checked for equality of coupling and sensitivity of the forward and reverse current sampling loops and associated diodes. This is done, preferably on 28MHz, by first connecting the transmitter output to the left-hand (input) SO-239 coaxial socket, and a 75Ω non-inductive resistor dummy load to the right-hand (output) socket using 75Ω coaxial

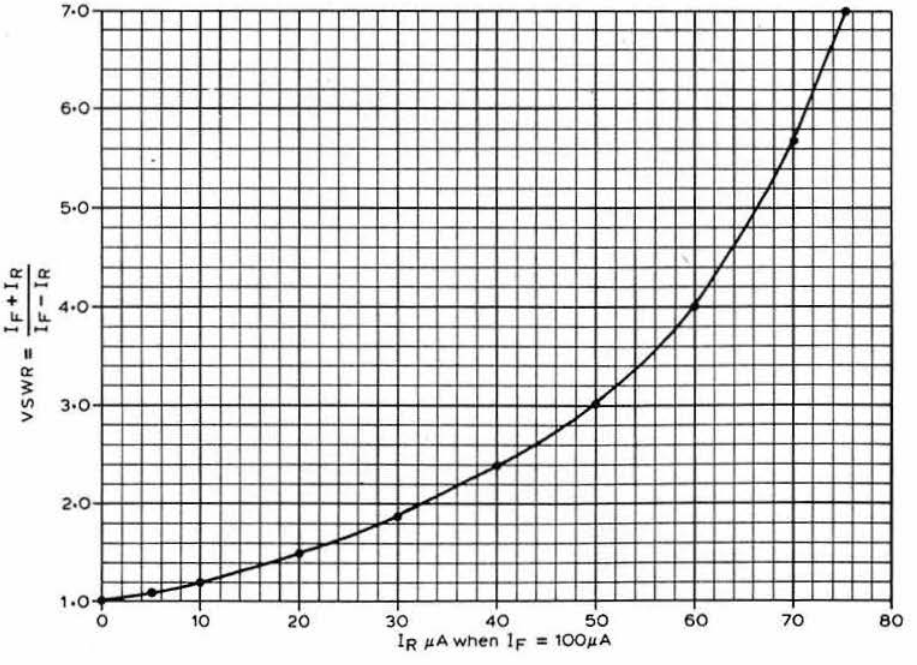


Fig 3. Calibration curve of a typical Monimatch vswr meter

cable. With S1 in the forward current position and RV1 set near maximum sensitivity, the transmitter output is adjusted to give full-scale reading (100μA) on the meter. This will permit the use of a dummy load of low power rating, as coupling balance check may be carried out at low power. The switch is then placed in the "reverse" position when the meter reading should be 5μA or less, indicating an acceptable load match. The transmitter output coaxial cable is then connected to the right-hand (output) SO-239 socket, and the 75Ω load to the left-hand socket. The normal "forward" position of the switch will now indicate "reverse" current and vice-versa. Ideally the magnitudes of these two current readings should be identical to those obtained in the first test position. In practice, however, some divergence in readings will almost certainly be noted. If the vswr meter has been carefully constructed and R1, R2 and D1, D2 well matched, the forward current values should not differ by more than about 5 per cent and, provided the 75Ω load is non-reactive, the reverse current indication should be virtually zero in each test position. If this is not so, the value of R1 and R2 should be changed until a 1:1 vswr indication is obtained.

It should be borne in mind that such an instrument as that described is not intended to be capable of *precise* measurements of vswr but, nevertheless, will be capable of ensuring that the vswr conditions seen by the transmitter output circuit are well within acceptable limits. Calibration of the instrument is simple: $\text{vswr} = \frac{I_f + I_r}{I_f - I_r}$. Fig 3 is a graph of this function, from which it can be seen that as long as the reverse current reading is less than 33μA (for a forward current of 100μA) the vswr as seen by the transmitter output circuit will be less than 2:1, which is a generally accepted value even for solid-state output power amplifiers employing toroidal non-adjustable output circuits. Of course, a reverse reading of 10μA or less will produce a glow of satisfaction!

The instrument described was designed for use in 75Ω coaxial systems, but if 50Ω operation is desired it is only necessary to change the value of R1, R2, while working into a 50Ω non-reactive load, until a vswr indication of 1:1 is obtained. Strictly speaking, the Z_o of the short length of coaxial cable used in the vswr meter should also be 50Ω but, in practice, the error caused by using 75Ω coaxial cable in the meter has been found to be negligible. Of course, the coaxial cable from the transmitter to the vswr meter, and from the meter to the 50Ω load or to the atu (if used) and the antenna/feeder system, must be 50Ω type.

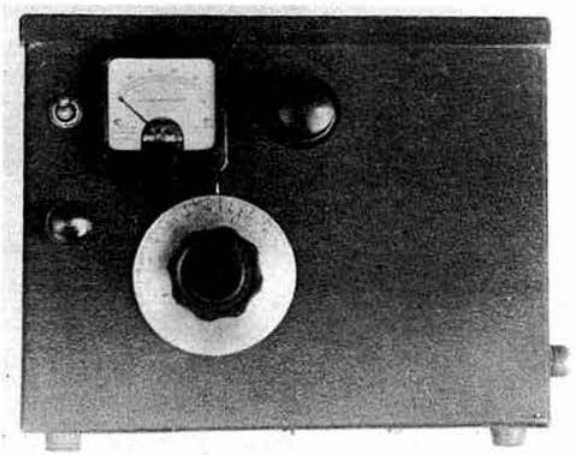
A five-band atu with built-in vswr meter

The author has been requested so many times to provide information on a suitable atu for use with the G5RV antenna that it is felt that the following description of a well-tried and flexible unit would be welcomed.

The circuit

Fig 4 shows the circuit arrangement of the atu suitable for 50 or 75Ω coaxial input and 75 to 600Ω balanced (twinlead or open-wire feeder) output. An end-fed λ/2 or long-wire antenna can also be connected to a suitable tap on one side of L1 (found by trial and error for optimum transmitter loading). A vswr meter, electrically similar to that described above, has been incorporated into the atu for convenience, but of course, this could form a separate unit, enabling it to be used either in conjunction with the atu or separately when using an antenna fed with coaxial cable.

An important feature of the atu is the provision of a swinging link coupling coil. It has been found that this, together with careful adjustment of C on each band, enables a vswr of virtually 1:1 to be obtained on the coaxial cable from the transmitter to the atu on all bands from 3·5 to 28MHz. This is particularly important when an lpf is used for tvi prevention. While the atu could be constructed with a set of switched coils, each with its separate link coil adjusted for optimum vswr, the author prefers the more efficient, if slightly less convenient, plug-in coils with a common swinging link coil. It will be noted (Fig 4) that the moving vanes of the split-stator variable capacitor C are left "floating" and its shaft is insulated from the metal box. This enables the centre-tap of L1 to be earthed, together with the aluminium box, to provide static discharge. If it is desired to earth the moving vanes of C, the centre-tap of L1 *must* be left "floating". The layout of the components is not critical but the connections between C and L1 should be of 14swg wire and be as short and symmetrical as possible.



Front panel view of atu

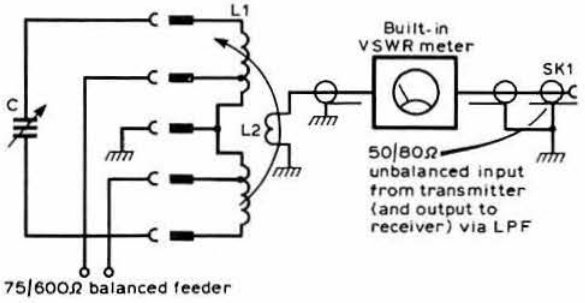
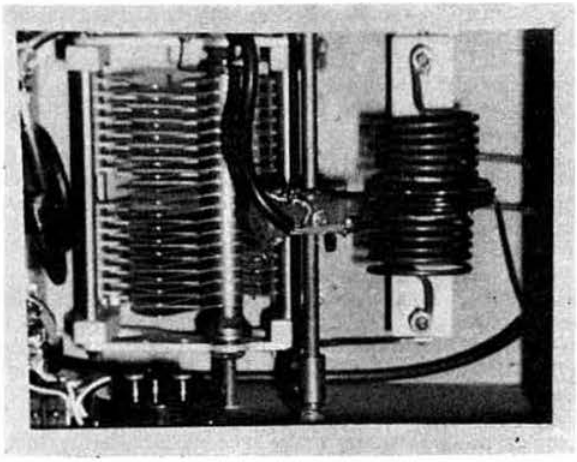


Fig 4. Circuit diagram of atu for 3·5 to 28MHz



Interior top view of atu

Construction of the four-turn swinging link (L2) assembly is simple. A block of any suitable insulating material about 3·5 by 1·5 by 1cm is drilled as shown in Fig 5 to slide onto the 63mm (0·25in) diameter brass shaft, and is fitted with a 6BA screw tapped into the shaft to fix it to the latter. The link coil is attached to this block by soldering its ends to the two 4BA solder tags fitted to the block with two 4BA bolts and nuts. The brass shaft is supported at front and rear of the box by brass bushes, and longitudinal movement is prevented by two brass collars fitted with set-screws. An 0BA spring washer located on the shaft between the front collar and the front bush allows smooth movement of the link coil without slip.

The appearance of the atu may be seen from the photographs of the front panel and of the interior looking from the top of the box with the lid removed. The box measures 23 by 18 by 18cm and is constructed of 18swg aluminium. The lid, which has a 1cm lip all round, is a push-fit on the box. The incorporated vswr meter consists of a length of Paxolin board measuring approximately 15 by 4·5cm fitted with appropriate solder tags or anchor pins to which the OA91 diodes, by-pass capacitors C1 and C2, terminating resistors R1 and R2, and the current sampling coaxial cable are soldered and thereby supported. In this case, 28cm of 5mm o/d coaxial

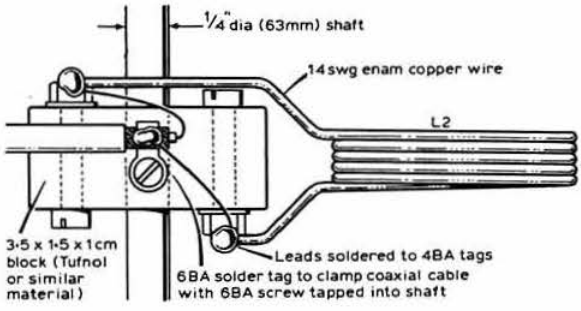


Fig 5. The four-turn swing-link assembly. The 6BA solder tag used to secure the link-coil end of the coaxial cable is insulated from the outer braid by the exterior polyvinyl insulation of the coaxial cable. The link coil coupling shaft is "earthed" to the case at each end by the brass bushes used to support it. No ill-effects have been noted

Components list

VSWR METER

C1, 2	10nF ceramic disc
R1, 2	Measured, matched, 80Ω (nominal 91Ω) carbon 0·5W (Spiral cut HS resistors (eg metal oxide) could also be used)
RV1	5kΩ linear carbon potentiometer
D1, 2	OA91 (matched)
S1	SPDT toggle or slide switch
SK1, 2	SO-239 coaxial
Meter	100μA dc
Cable	75Ω semi-air-spaced coaxial cable (Radiospares 5mm o/d, Cat No 388-215 (see text)

ATU

C	Split-stator variable 150 + 150μF, vane spacing 2mm
L1	**3·5MHz:** 17 + 17t 14swg enam copper wire c/w on 63mm o/d Paxolin former. Feeder taps 6t on each side c/t **7MHz:** 8 + 8t 14swg enam copper wire c/w on 63mm o/d Paxolin former. Feeder taps 3t on each side of c/t **14 and 21MHz:** 6 + 6t 10swg bare copper wire, self-supporting, 38mm i/d. Turns spaced wire diameter. Feeder taps 2t on each side of c/t. **28MHz:** 4 + 4t 10swg bare copper wire, self-supporting, 38mm i/d. Turns spaced wire diameter. Feeder taps 1t on each side of c/t.
L2	Swinging link coupling coil, 4t 14swg enam copper wire, self-supporting, 38mm i/d c/w.
SK1	SO-239 coaxial.

Coil base and socket assemblies home-made if unobtainable on market or from junk box.

cable was used to provide extra sensitivity for possible QRP operation. For this arrangement, it was found that the optimum value of R1, R2 for a 75Ω system was 80Ω. These two resistors were, in fact nominally 91Ω ±20 per cent, but were selected by trial and error and then found to measure 80Ω each. The microammeter, 5kΩ potentiometer RV1, and the toggle switch S1 are all located conveniently on the front panel of the atu box.

The two self-supporting atu coils (28 and 14/21MHz) are wound with 10swg bare copper wire, leaving a gap of about 13mm in the centre to allow the swinging link coil to enter. The 7 and 3·5MHz coils are wound with 14swg enamelled copper wire on Paxolin formers 6·3cm o/d and 12·5cm long which have a 13mm wide slot cut to a depth of about half their diameter at the centre of their length to allow the link coil to enter fully. The first seven turns on each side of the centre tap of the 3·5MHz coil, and the first four turns on either side of centre of the 7MHz coil should be wound along with a length of string or cord of about the same diameter as the wire. This facilitates scraping off the enamel at every turn for seven turns on either side of centre for the 3·5MHz coil and four turns on either side for the 7MHz coil, so that the feeder-tap connections can be soldered to the appropriate turn on each side of centre, as found by trial and error, to achieve optimum transmitter loading and the best vswr. The string may then be removed before brushing on clear nail varnish or coil dope to seal and fix the coil windings.

The feeder tap positions given in the components list are suitable for use with the version of the G5RV antenna using an open-wire feeder (impedance unimportant) measuring 84ft from the output terminals of the atu to the centre feedpoint of the antenna. In this case the 34ft open-wire matching stub is not required. This type of feeder gives minimum loss on all bands. The length quoted permits parallel tuning of the atu coils on all bands, which is convenient. If other feeder systems are used, the optimum feeder tap positions must be determined by trial and error to produce the lowest possible vswr on the coaxial cable between the transmitter and the atu.

The performance of the incorporated vswr meter should be checked (as described for the separate vswr meter) before connecting it into the atu circuit.

Operation

Having plugged in the correct atu coil for the band in use, set the link coil *fully in* for 3·5 or 7MHz operation, but only about *half-way in* for 14, 21 or 28MHz. Before attempting to adjust the unit on transmission, tune C, while listening on the frequency to be used, for maximum receiver noise. Then, with reduced transmitter power, switch to transmit and adjust RV1 to give full-scale meter reading with S1 in the forward position. Then switch to reverse and carefully re-adjust C for a minimum reading. Slight re-adjustment of the link coupling coil angle and of C will result in the lowest possible vswr, and this should be virtually 1:1 on all bands. Mark the settings of C and the link coil angle for the centre frequency of each band so that, when changing bands, optimum settings can be selected in a matter of seconds. The gauges of wire used for the coils, and the vane spacing of the variable capacitor, permit use of the atu with output powers of at least 400W p.e.p. with an ample safety margin.

Advantages of an atu

The author is aware that many amateurs prefer not to use an atu because it introduces an additional control requiring adjustment. However, it also brings with it several advantages which may not always be appreciated. These are:

(1) About 20dB of *extra* transmitter harmonic suppression.

(2) Optimum transfer of energy from transmitter to the feeder/antenna system where this does not comprise a *correctly terminated* coaxial feeder.

(3) Assurance of correct impedance termination for the lpf, where used.

(4) Useful pre-selection for the receiver input circuitry.

(5) Efficient unbalanced to balanced system coupling *capable of working into a reactive load*†.

Provided that the atu is well designed and constructed, it will introduce negligible power loss, say five per cent, compared with a *perfectly matched* feeder/antenna system which does not require its use.

The author uses this atu with a G5RV multi-band antenna which is fed with 84ft (25·6m) of open-wire feeder, measured from the atu output terminals to the centre of the 102ft (31m) flat top. The use of o/w feeder provides the lowest possible losses in transferring power to the antenna, especially on 21 and 28MHz. This particular length of feeder is used for two reasons; it allows the antenna to be located clear of the house and at a reasonable height of 35ft (10·7m) above ground; and it also permits parallel tuning of the atu on all bands from 3·5 to 28MHz. The alternative arrangement of a (non-critical) length of 75Ω twinlead and the 34ft (10·36m) o/w or 29·5ft (9m) 300Ω ribbon matching stub may also be used with very good efficiency. However, the use of coaxial cable feeder from transmitter to matching stub is not recommended for two reasons:

(1) It introduces an unbalanced to balanced circuit condition into the antenna system which tends to produce a current flow on the outer surface of the coaxial cable braid, resulting in radiation from it which may increase chances of tvi to nearby television sets.

(2) Because of the inevitable standing waves on the feeder on all but the 14MHz band for the full size, or 28MHz for the half-size G5RV antenna, the resultant power loss will be significant on 21 and 28MHz in the first case, and on 14 and 21MHz in the second case, with lengths of coaxial feeder greater than about 50ft (15m).

In conclusion, the author wishes to acknowledge the suggestion of Ron Kingstone, G4HHB, for the use of the special coaxial cable in the vswr meters described. □

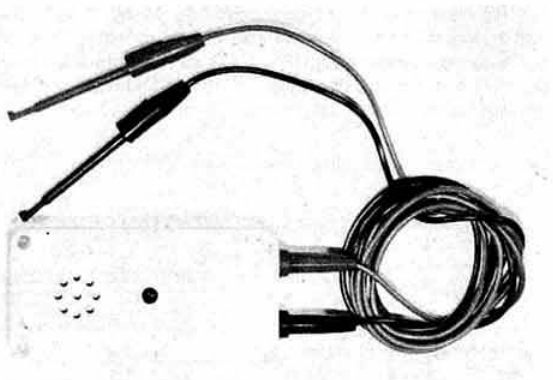
†It should be noted that a *balun* will not cope with a *reactive* load

NEW PRODUCT

Wailer CT continuity tester

A new audio tester for checking the continuity of low dc voltage circuitry, called Wailer CT, has been introduced by Welwyn Tool Co Ltd. The low open-circuit voltage of 15V, and 2mA short-circuit current, make the tester suitable for most semiconductor circuitry, and its ability to accept external voltages of either polarity without damage extends its application to the automotive industry. Its use is restricted to intermittent operation, however, and the unit should not be left connected. When employed for continuity testing of dead circuits, the device emits a low-level audio note when external circuit continuity is established. If the circuit under test includes an active power source not exceeding 15V dc, and the polarity agrees with the tester's load polarity, a louder audio note is emitted and a red indicator neon lamp is illuminated. Should polarities be opposed, the tester remains quiescent.

Housed in a small unbreakable ABS plastic case with two 4mm sockets at one end to accommodate test leads, the unit has a 1·5V internal power source, and as it is in series with the test leads no on/off switch is required. Wailer CT is provided with two 1·2m test leads which are each terminated in a 4mm plug at one end and a test probe at the other. Overall dimensions are 50 by 105 by 25mm. Further information from the Welwyn Tool Co Ltd, Stonehills House, Welwyn Garden City, Hertfordshire. Tel Welwyn Garden 29121.



Wailer CT continuity tester

HF antennas: a practical application of the VK2ABQ

by G. N. DALE, G3PZF*

Introduction

Since the first account in "Technical Topics" *(Radio Communication* January 1974) and republished in *Amateur Radio Techniques,* of the work by Fred Caton, VK2ABQ, on a simple beam for the 14, 21 and 28MHz bands, a number of modifications have been suggested in later articles. In order to take advantage of the sunspot maximum the author constructed a beam for 21 and 28MHz following the original design, and this has been in service for the past year.

Construction

By eliminating the 14MHz band, the dimensions of the antenna are reduced considerably, permitting the use of readily available materials and keeping weight to a minimum. The basis for construction was a spider consisting of two crossed pieces of 1·25 by 1in softwood (Fig 1). Supporting arms were 8ft bamboo canes which are easily obtainable from garden stores; the canes taper from 0·625 to 0·75in at the thick end to 0·5in or less at the tip. The arms were secured to the spider with aluminium "U" straps, and bolted through with 2BA screws. The radiating elements consisted of 16-gauge stranded wire; hard-drawn copper wire might have given slightly more rigidity but was not available. The wire was passed through holes drilled in the supporting arms and secured with adhesive tape. The two driven elements were connected by a 19in length of twin lead (Fig 2). The actual joints were made on a small piece of tag strip, but in order to protect the solder from corrosion these were enclosed in plastic containers of the type supplied with 35mm film cassettes. These have the advantage of having a tightly fitting lid of soft material which can be cut with a lino knife where a slot is needed for entry of the twin lead. The order of assembly is to pull the twin lead through the lid, pull the elements through holes cut in the side of the container and out of the mouth, solder the connections, and fit the lid while pulling the elements back through their holes until the tag strip is comfortably sited in the container. The joint which occurs in the 28MHz element also requires a coaxial socket mounted in the base of the container. Alternatively, the coaxial cable can be taken in through a hole in the base and soldered directly to the tag-strip. The position for cutting the elements at the two sides was determined with the aid of a gdo, as described in the "Technical Topics" item, but this was found to be within 1in of their centres and not critical.

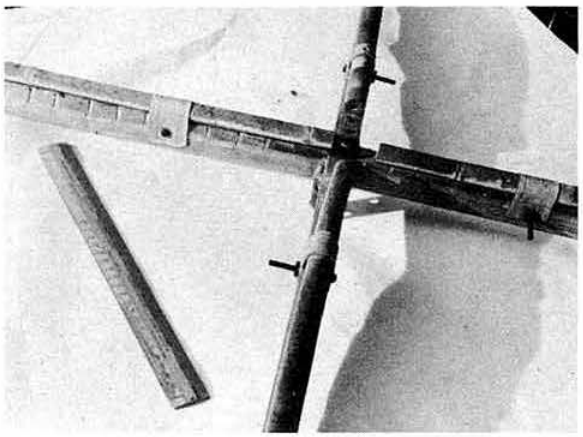


Fig 1. Centre of the spider showing how canes are secured to the wooden cross-pieces

Durability

The apparent flimsiness of construction is counteracted by the flexibility of the bamboo canes, which tend to droop with the weight of the wire, but the present beam was mounted at 24ft and within 15 months the only damage sustained was a break at one end of the twin lead. Choice of wire can be important here, and twin household 5A flex has the necessary thickness.

Performance

Although both the 21 and 28MHz bands tuned satisfactorily with the aid of an atu (the feeder having been cut to a multiple of $\lambda/2$ at 28·5MHz) detailed observations were made only on 28MHz. Ground-wave measurements over five miles gave a front-to-back ratio of 16dB. Subsequently a torroidal balun

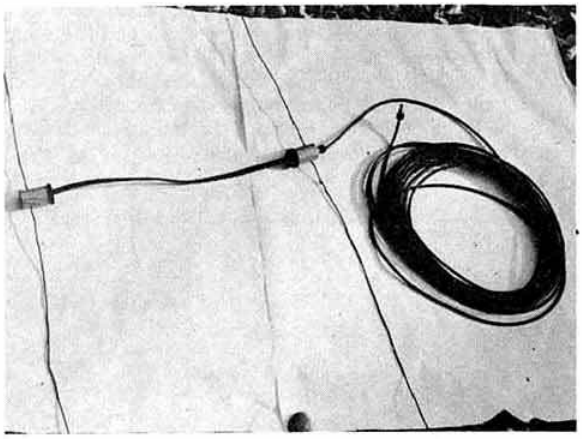


Fig 2. Connections between the radiating elements and the twin lead, the solder joints being protected by plastic 35mm film cassette containers

*16 Palfrey Close, St Albans, Herts.

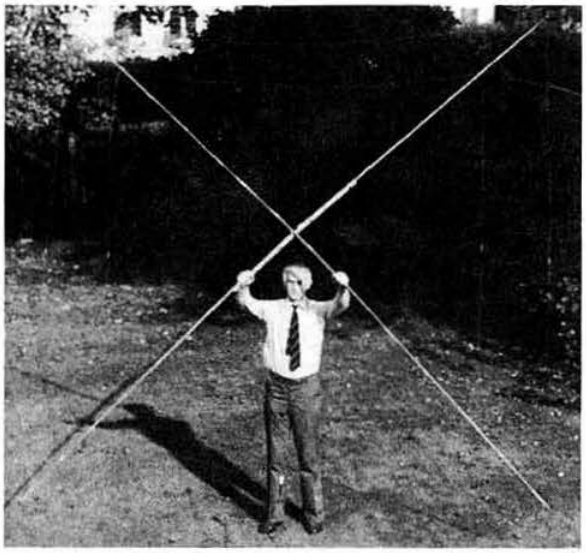


Fig 3. General view of beam illustrating manageable dimensions when built for 21 and 28MHz only

was fitted, which gave an improved swr on 28MHz (better than 1·5:1 at the chosen frequency) but this made a satisfactory match on 21MHz unobtainable. On-the-air results over a period have shown this design capable of producing signals very nearly equal to a conventional beam in comparable circumstances.

The antenna described above has since been replaced with a full-sized, two-element monoband beam for 28MHz using tubular elements, and this has provided the opportunity for direct comparison. In view of the fact that at 28MHz the antenna is working in reverse, with the 21MHz driven element acting as a director backed by two parasitics, the conventional radiation pattern for a Yagi array can hardly be expected. The VK2ABQ has a less pronounced null on the sides, which is no doubt associated with the folding back of the elements.

Conclusions

The author would recommend this design for any station where ease and speed of construction and limitations of space are prime factors. The principal cost involved is that of the wire. The VK2ABQ would also have advantages for portable station use, since by following the suggestion in the "Technical Topics" item of using conduit pipe for the spider, the antenna could be quickly assembled and dismantled. □

Installation of vhf antennas on an hf mast radiator

by G. B. PACKER, G3UUS*

WHERE space is limited and it is intended to operate on both hf and vhf, it is convenient to combine both antenna systems on the same mast. However, a snag occurs when simultaneous operation of hf and vhf is required, such as waiting for a call on 144MHz fm while working on hf; if the vhf coaxial cable remains connected, it effectively earths the hf vertical. This will do no more in practice than modify the mast radiator's impedance, but it will set up large circulating currents in the shack, which will probably trip the squelch of the fm receiver and be detected in the af stages.

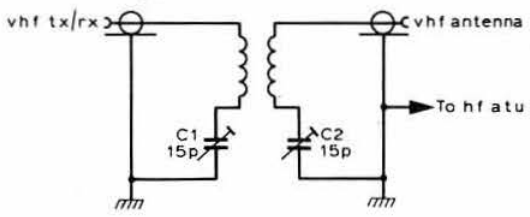


Fig 1. The close-coupled series-tuned circuits

Other applications come to mind, such as using the hf receiver to listen to WWV while checking the frequency of a 144MHz beacon or repeater. Oscar use would also be possible if the vertical was for 28MHz.

This article describes how to achieve this simultaneous operation.

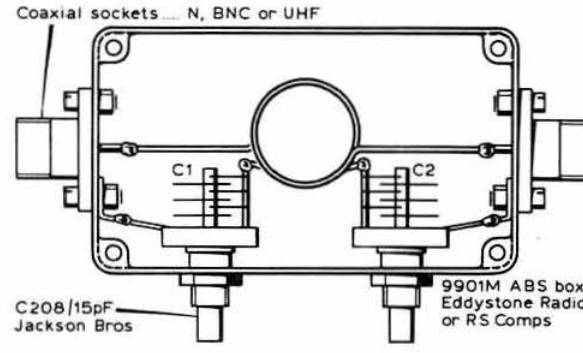


Fig 2. Coaxial breaker

* Bridge End Barn, Soutergate, Kirkby-in-Furness, Cumbria.

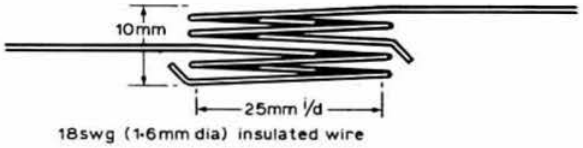


Fig 3. Coil details

The coaxial breaker

This consists of two series-tuned circuits closely coupled together (Fig 1) and constructed within a small plastic project box. Figs 2 and 3 show the general arrangement, but small variations are possible to suit other variable capacitors and enclosures. Using widespaced variable capacitors several hundred watts may be coupled.

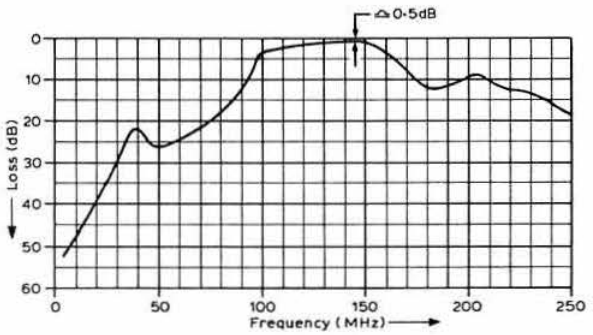


Fig 4. Loss of coaxial breaker against frequency

The effective capacitance across the box is around 5pF and hence has little effect on the operation of the antenna at hf.

The response of the coaxial cable breaker is shown in Fig 4. On 144MHz, about 0·5dB loss is exhibited, which is probably not noticeable, except by the most demanding dx operator.

The cable breaker

If a rotator is also in use with a vhf beam this unit will also be required. It is constructed in a similar plastic project box and consists of a small ferrite core wound with 20t of 20swg

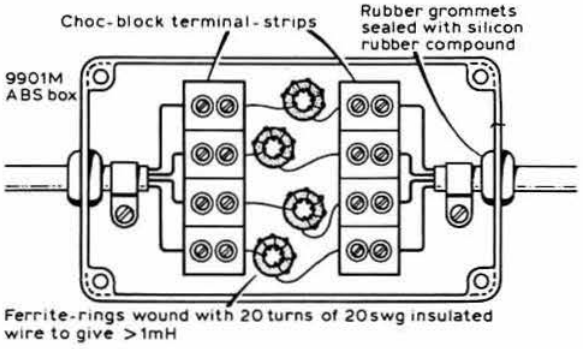


Fig 5. Cable breaker

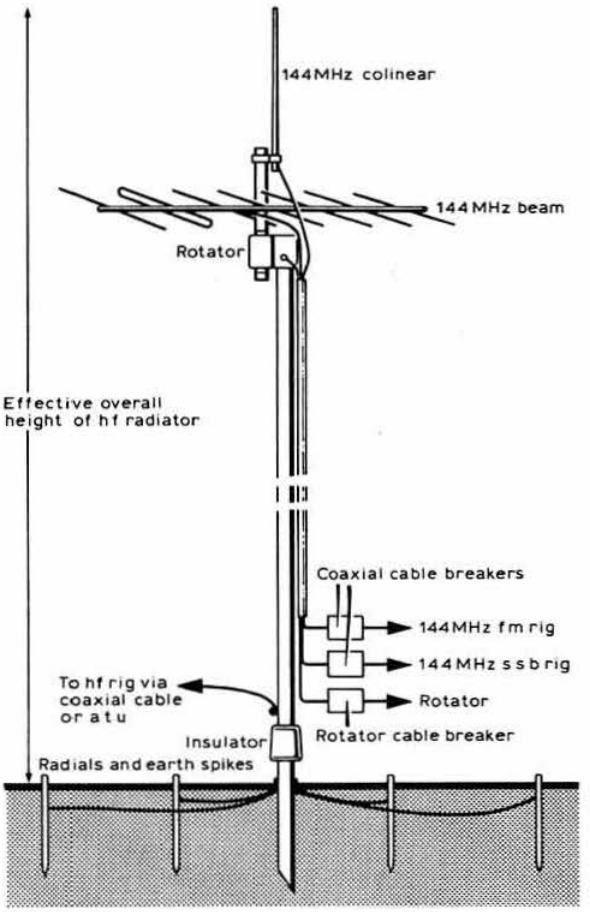


Fig 6. Typical installation using coaxial and cable breakers

insulated wire inserted in each of the rotator cable leads (Fig 5). Care with moisture proofing should be taken as most rotator cables have mains supply present on them.

Typical installation

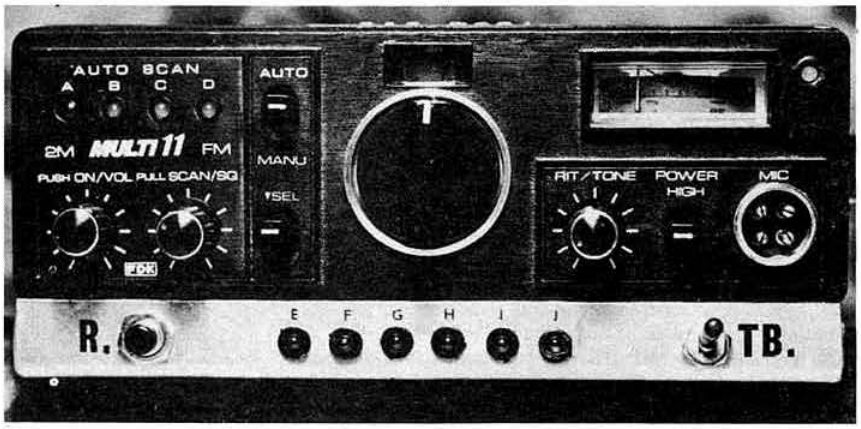
Fig 6 shows a typical installation using both the coaxial and cable breakers. The boxes should be mounted as near to the base of the mast as possible, perhaps on a short adjacent post, and protected from the weather. It is suggested a polythene food box be used for this purpose, the cable entries being sealed with silicon rubber. Ensure all cables enter from below to prevent water seeping in.

No information is given here as to the construction of the mast radiator as this has appeared in articles and handbooks in the past, save that it should have an insulator capable of taking the weight of mast and vhf array (including rotator if used) and this should stand the power in use at hf. It can be fed either directly (if a $\lambda/4$) or via an atu if required.

Note that if a vhf beam is used it will tend to act as a "capacitance hat" and hence lower the resonant frequency of the mast radiator. This can produce much better results on the lower frequency bands such as 1·8 and 3·5MHz. □

Ten-channel scanner/pause control for the FDK Multi-11 transceiver

by J. MITCHELL, GI8MOA*



Front view of the aluminium bracket with the l.e.ds etc fitted under the facia panel

WITH the growing number of repeaters and general 144MHz activity the author found it necessary to "extend" the scanning facility of the Multi-11, and the units described will allow the transceiver to monitor an additional six channels. When the squelch opens on any of the scanned channels the receiver will remain paused for a predetermined time and will then continue the scanning process. The scanner/pause control circuits are built as two separate units, allowing one or both to be fitted inside the rig. The pause control has proved very useful, especially when repeater crystals are loaded in the scanning sockets.

Circuit description

Pause control

The pause control circuit employs a 555 timer ic operating in the astable mode (Fig 1). When the squelch circuitry opens, ie when a signal is received, the noise amplifier develops a voltage which is fed via R3 to the base of TR3 causing it to turn "hard on"; its collector voltage falling to almost 0V. This in turn causes TR2 to go "hard off"; its collector going high via R5 to Vcc. This voltage at TR2 collector is used to supply the 555 timer and to start the timing sequence. RV1/R4 and C2 set the mark/space ratio of the waveform at pin 3, with RV1 and C4 giving the required pause time; the value of RV1 is selected to give some convenient pause time, say 10s.

R1/R2 are required to keep TR1 fully conducting during the "no signal" condition, allowing the scan to proceed. During time t1 (Fig 2) pin 3 of the 555 is held high keeping TR1 "hard on". After the 10s period pin 3 goes "low", bringing the base of TR1 down and causing the transistor to go off. It is during this period that the scanning oscillator will change state, and will then select channels in turn until an engaged channel is sensed.

Ten-channel scanner

The heart of the scanner circuit (Fig 3) is the CD4017 cmos decade counter/divider ic. The pin diagram for the device is shown in Fig 4(c), with the pin functions indicated. The scan oscillator pulses are fed to pin 14, the device advancing one count on each positive-going pulse edge. This means that nine of the 10 outputs are "low", with the remaining output high at any given time. Pin 15 is the reset input, and if taken high clears the counter to zero and sets the "0" output terminal high. This facility enables a predetermined frequency such as the calling channel to be selected instantly, a feature which has

*26 Argyle Street, Londonderry BT48 7JG.

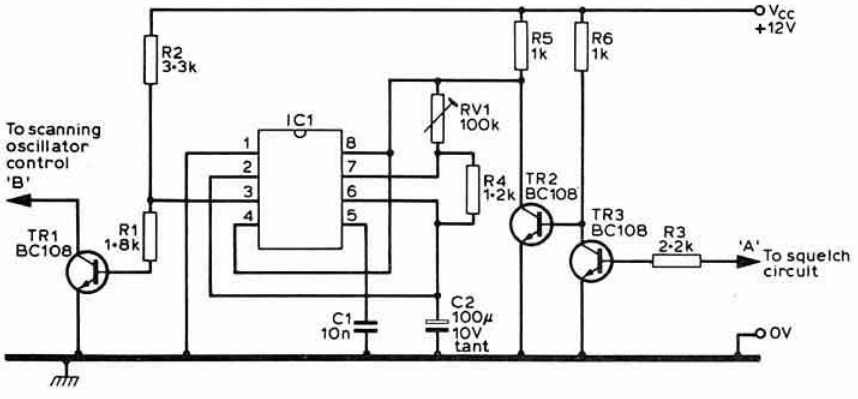


Fig 1. Pause control circuit diagram. RV1 can be a small skeleton-preset or a fixed value resistor

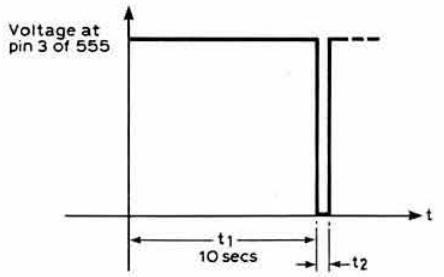
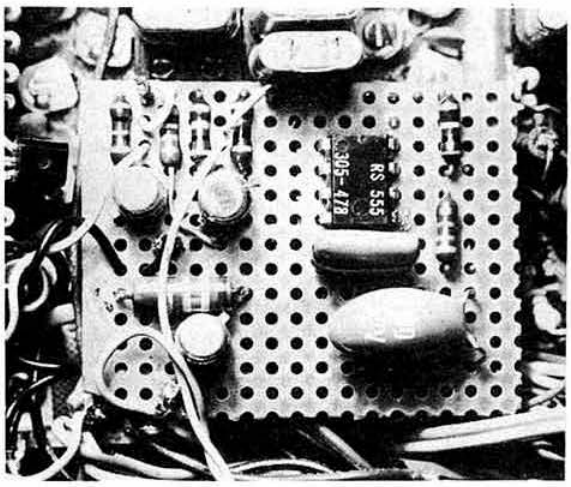


Fig 2. Voltage waveform at pin 3 of the 555 timer in the pause circuit



Top view of pause board

proved especially useful in night-time mobile operation. Outputs of the device are taken via current-limiting resistors to the bases of TR2–TR11 which serve both as inverters and current sinks for the channel indicating l.e.ds. The collector loads are connected to a diode switching arrangement and are individually connected to the crystals to be sequentially scanned.

Construction

Construction of the two boards can take any convenient form, plain matrix Veroboard (measuring 55 by 35mm) being used in the prototype. Component layout for the pause control is not critical as ample space is available. The scanner board is more complex to construct, because of the large number of components and the physical size of the three ics on a relatively small board. Care should be taken when handling the CD4017 as this is a cmos device, and it is for this reason that an ic socket is strongly recommended. The CD4017 supply rails should be rf decoupled using ferrite beads. Using CA3046 transistor arrays instead of discrete transistors helps to reduce errors in

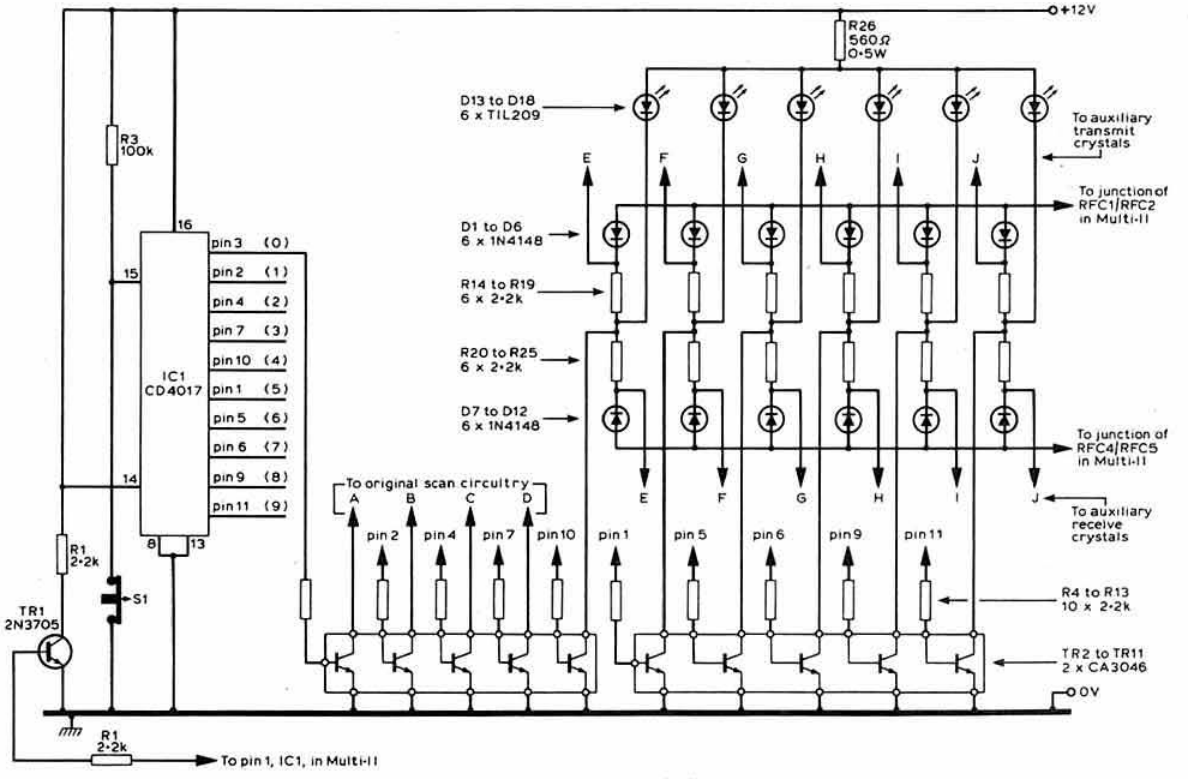


Fig 3. 10-channel scan circuit diagram

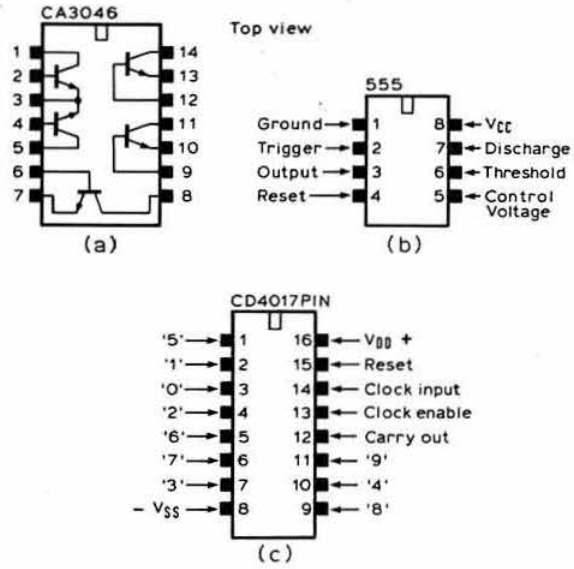


Fig 4. The ics, with pin functions etc, used in both projects

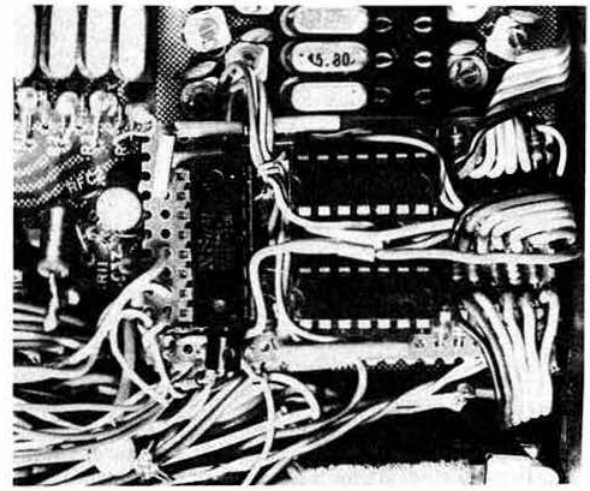
the construction process and also saves space. Both boards can be held in place by using double-sided tape.

Interfacing

Pause control

Complete accessibility to the rig is effected by the removal of four screws at the corners of the lower circuit board, the component board being hinged back on its own wires to a vertical position. The board can then be held in this position by a length of pvc tape taken around the rig. The next step is to locate TR45 and TR46 (lower component board). Using a solder sucker or similar device remove the emitter lead-out wires of both transistors from the component board. The two emitters are strapped together and then connected to point "B" (collector of TR1) on the pause board.

Now locate R130 (lower board, immediately adjacent to TR46) and connect a length of wire to its "feed" side, this being connected to point "A" (R3) on the pause board (Fig 5). A supply to feed one or both boards may be picked up on the top component board, front left, where a small three-terminal tag strip (carrying Vcc and earth) is conveniently supplied.



Top view of completed scanner board showing general layout of ics etc

The pause control can now be tested by lowering the bottom component board back into the rig, putting in a couple of board retaining screws, and applying power to the transceiver. RV1 can now be adjusted (if a preset is used) to give a convenient pause time on receipt of a signal.

Scanner

Six-way ribbon cable is used to connect the scanner board to the auxiliary transmit crystals to be scanned, as is also the case for the receive crystals. The existing wires on the 12 auxiliary crystal sockets must be disconnected and "taped up" before connection of the ribbon cables, which should be as short and direct as possible. Next, locate the four-channel scan switching logic (lower board). Pin 1 of IC1 (SN7473N) is the "clock" pin, which must be connected to R1 on the scanner board (Fig 3).

The four coloured wires which are connected to pins 3, 6, 8 and 11 of IC2 (SN7438N) on the track side of the component board are disconnected, and reconnected in the correct sequence to the collectors of TR2 to TR5 on the scanner board. This means that the four-channel scan switching logic is no longer used, but removal of the chips from the board is unnecessary. Next, with reference to the top component board, locate the junction of RFC1/RFC2, or alternatively the com-

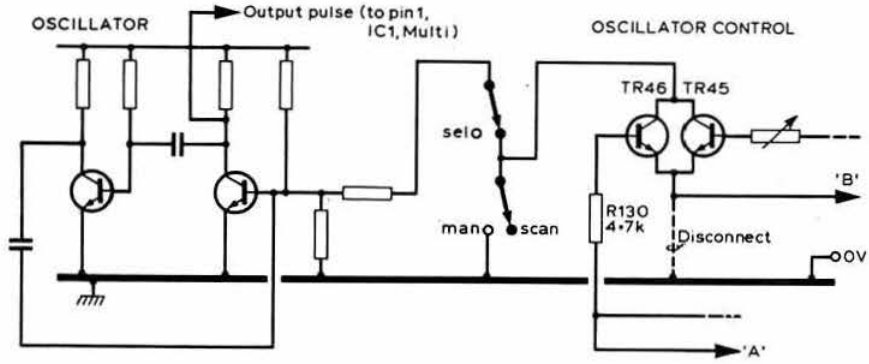
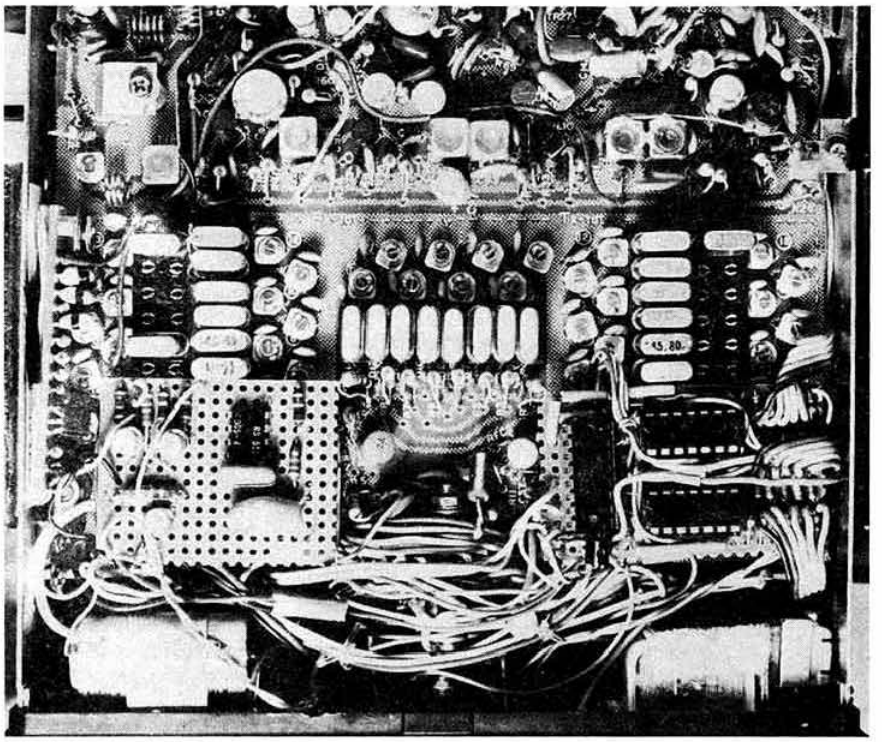


Fig 5. Multi-11 scanning oscillator/control circuit and method of interfacing pause circuit



General view of both units fitted in the Multi-11 transceiver

monned anodes of D6 to D9 (adjacent to the centre bank of the transmit crystals), and make a connection from here to the commonned anodes of diodes D1 to D6 on the scanner board.

Now locate the junction of RFC4/RFC5, or the commonned anodes of diodes D10 to D13 (adjacent to the centre bank of the receive crystals), and make a connection from here to the anodes of diodes D7 to D12 on the scanner board. Finally the power supply to feed the scanner board is taken from the same points as that for the pause control. This completes the interfacing.

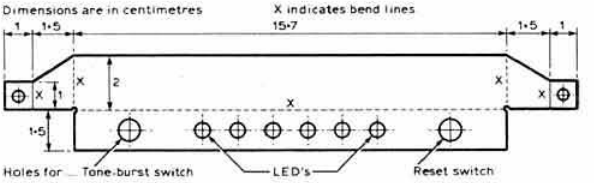


Fig 6. Bracket of 18swg aluminium with location of l.e.ds and switches

Components list

PAUSE CONTROL

R1	1·8kΩ	C1	100nF
R2	3·3kΩ	C2	100μF 10V tant
R3	2·2kΩ	TR1, 2, 3	BC108 or similar
R4	1·2kΩ		
R5, 6	1kΩ	IC1	555 timer
RV1	100kΩ		
All resistors	0·5W 5%		

10-CHANNEL SCANNER

R1, 2, 4–25	2·2kΩ	TR1	2N3705
R3	100kΩ	TR2–11	2-off CA3046 transistor arrays
R26	560Ω	IC1	CD4017 decade counter/divider
All resistors except R26	0·125W 10% 0·5W		
D1–12	IN4148 high speed switching	S1	Normally closed; push to break, release to make
D13–18	TIL209 red l.e.ds		
Socket	(1) 16-pin ic low profile		
Socket	(2) 14-pin ic low profile		

Mounting the l.e.ds, switches etc

Seven-way ribbon cable is used for the l.e.d. connection. One core supplies 12V to the l.e.ds via the current limiting resistor which is located beside them. The channel indicators are mounted on an aluminium bracket (Fig 6) underneath the front facia panel by means of small nuts and bolts located at each corner. A few drops of epoxy resin glue may also be used to give added strength. The reset switch (S1) is also located on the front panel along with the extra toneburst switch, which permits the toneburst generator to operate when the rig is in the scan mode. The switch is connected in parallel with the existing one (which forms one section of the auto-manual switch). The seven-core ribbon cable and the toneburst and reset switch wires are taken outside the Multi-11 by "bending" a small section of the lower case front lip to allow the wires to be connected to the l.e.ds etc on the aluminium panel. □

Travelling wave tube amplifiers

by HUGH GRIFFITHS, G4CNV*

Introduction

In the past few years, several amateurs have employed travelling wave tubes (twts), colloquially known as "twits", as microwave power amplifiers. The main attraction of these devices is their very high gain (30–60dB), linear characteristics and 1–2 octave bandwidth. They are quite widely used professionally, but are still rather scarce in amateur circles. This article describes a little of the theory of twts, and explains how to use them, in the hope that more amateurs may be able to acquire and use these fascinating components.

The history of the twt goes back to the second world war, when research into radar devices and techniques was at a particularly intense level. The twt was invented in the Nuffield Laboratory Physics Department, Birmingham University (also the birthplace of the cavity magnetron) by Rudolf Kompfner. He was seeking an alternative which had a better noise performance than the klystron, and in a 1946 paper he explained his reasoning.

"One of the main reasons for the lack of sensitivity of the klystron as an amplifier is the inevitable energy exchange between the electron beam and the electric field in the rhumbatrons (resonators) . . .It was therefore a very inviting thought to use the signal in the form of a travelling electric field (instead of a stationary one) and utilize the energy exchange between the travelling field and electrons which travel at about the same velocity."

In December 1943 the first tube gave a gain of about 8dB at a 9·1cm wavelength, with a 13dB noise figure. The work was later transferred to the Clarendon Laboratory, Oxford. Much of the mathematical analysis of twt operation was developed by John R. Pierce, of Bell Labs [1], and in 1947 Kompfner joined Pierce to continue twt research.

Nowadays, twts are by far the most widely-used of microwave tubes, and are employed extensively in communication and radar systems. They are especially suited to airborne applications, where their small size and low weight are valuable. Satellite communication systems are another extremely important application, for the same reasons.

*"Beggars' Roost", Plaisters Lane, Sutton Poyntz, Weymouth, Dorset DT3 6LQ.

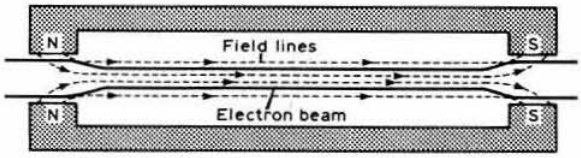


Fig 2. The focussing of the electron beam by the magnetic field

Recognition

Practical travelling wave tube amplifiers (twtas) have applications in both receiver and transmitter systems, and come in all shapes and sizes, but they all consist of three basic parts—the tube, the tube mount (which includes the beam focussing magnets) and the power supply.

When used as receiver rf amplifiers they are characterized by high gain, low noise figure and wide bandwidth, and are known as low noise amplifiers (lnas). These usually come with tube, mount and power supply in one integral unit, with no external adjustments to make—just input socket, output socket and mains supply connections. A typical lna has an octave bandwidth (eg 2–4GHz), 30dB gain, 8dB noise figure, and a saturated power output of 10mW, within a volume of 2in by 2in by 10in.

Transmitter twtas are naturally somewhat bulkier, and often have the power supplies as a separate unit. Medium-power tubes have outputs of up to about 10W, while high-power tubes deliver several hundred watts. Such tubes have gains of the order of 30 or 40dB, and bandwidths of up to an octave. The major manufacturers of twts are EMI-Varian, Ferranti, EEV, Hughes, STC, Litton, Raytheon, Siemens, Watkins-Johnson and Thomson-CSF.

Construction

The features of a typical twt are shown in Fig 1. The electron beam is provided by an electron gun which is very similar to those used in crts, though the beam current is much larger. Electrons from a heated cathode are accelerated towards the anode, which is held at a high positive potential with respect to the cathode, and a proportion pass through a hole in the anode to produce the beam. Some tubes have a grid between the cathode and anode, at a few tens of volts (adjustable) negative with respect to the cathode, the function of which is to control the beam current. The electron beam travels down the tube, inside the helix, to the collector, which is maintained at a high voltage referred to the cathode. The helix is also held at a high potential, but the helix current is low because of the beam focussing.

As is shown in Fig 2, this focussing is achieved by a magnet (either a solenoid electromagnet or permanent magnets) round the outside of the tube. An electron with a component of velocity perpendicular to the magnetic field lines experiences a restoring force tending to bring back its direction parallel to the field lines.

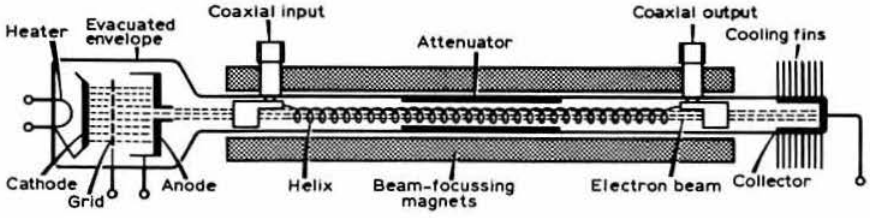


Fig 1. The essential features of a typical travelling wave tube

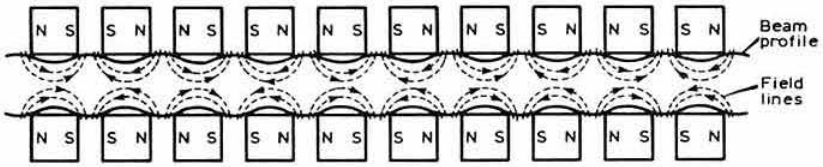


Fig 3. Periodic permanent magnet focussing

Fig 4. The geometry of the helix

To achieve good focussing by this method requires a very large magnetic field, which can mean a bulky, heavy magnet. However, the arrangement usually employed is called periodic permanent magnet (ppm) focussing, in which a number of toroidal permanent magnets of alternating polarity is arranged along the tube, as is shown in Fig 3; this figure also shows the contour of the beam. This arrangement reduces enormously the required weight of magnet (under ideal conditions by a factor $1/N^2$, where N is the number of magnets used). The alternative method, solenoid focussing, is generally only used in high-power earth station twts, where size and weight are unimportant.

The input to, and output from, the helix are via coaxial connectors, or occasionally via waveguide. In practice, it is impossible to provide a perfect match at these transitions, especially over a wide bandwidth, so an attenuator is used to prevent the energy reflected back down the helix causing instability. This usually takes the form of a resistive coating on the outside of the central portion of the tube, though a physical discontinuity in the helix is also used in some cases. The attenuator reduces the rf input signal, as well as any reflected signal, to nearly zero, but the electron bunches set up by the signal are unaffected.

The helix itself is a fairly delicate structure, and must be provided with adequate thermal dissipation to prevent damage. In medium-power tubes, the helix is often supported on a beryllia or alumina substrate, but for high-power twts, alternative slow-wave structures are employed (eg coupled cavities), though usually at the expense of bandwidth. In this form, the twt resembles a klystron amplifier.

Theory

The essential principle of operation of a twt lies in the interaction between an electron beam and an rf signal. The velocity, v, of an electron beam is given by:

$$v = \sqrt{\frac{2eVa}{m}}$$

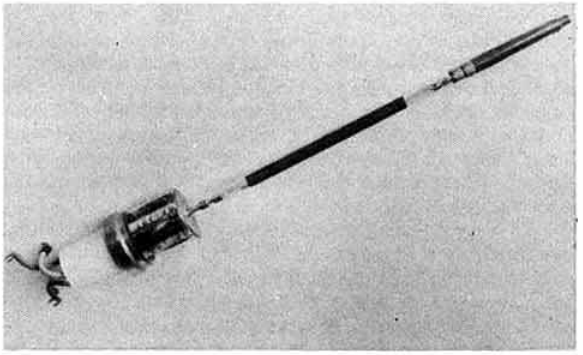
where V_a = accelerating anode voltage
e = electron charge = $1{\cdot}6 \times 10^{-19}$C
m = electron mass = $9{\cdot}1 \times 10^{-31}$kg

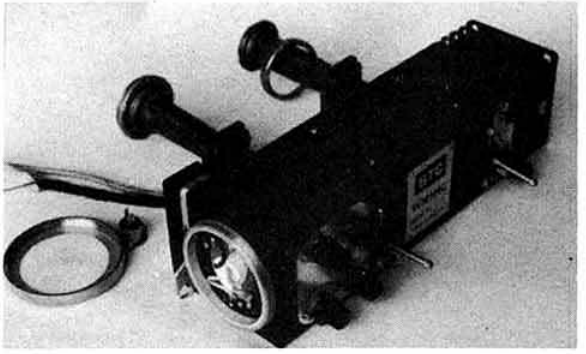
An anode voltage of 5kV gives an electron velocity of $4{\cdot}2 \times 10^7$ ms^{-1}. The signal would normally travel at c, the velocity of light (3×10^8 ms^{-1}), which is much faster than any "reasonable" electron beam (relativistic effects mean that the electron mass actually increases as its velocity approaches c, so that achieving electron velocities approaching c is a complicated business). If, however, the signal can be slowed down to the same velocity as the electron beam, it is possible to obtain amplification of the signal by virtue of its interaction with the beam. This is usually achieved using the helix electrode, which is simply a spiral of wire around the electron beam.

Without the helix, the signal would travel at a velocity c. With the helix, the axial signal velocity is approximately $c \times \frac{p}{2\pi a}$, where a, p are shown in Fig 4, so the signal is slowed by the factor $\frac{p}{2\pi a}$. Note that this is independent of signal frequency. The signal travelling along the helix is known as a slow wave, and the helix is referred to as a slow-wave structure. The condition for equal slow-wave and electron-beam velocities is therefore approximately

$$\frac{cp}{2\pi a} = \sqrt{\frac{2eVa.}{m}}$$

The interaction between the beam and the slow wave takes the form of "velocity modulation" of the beam (ie some electrons are accelerated and some retarded) forming electron





(Left) A 10W-output X-band (10GHz) travelling wave tube by STC (the tube is about 11in long). Compare this with Fig 1. (Right) The same tube in its mount. Note the controls for adjusting the focussing and the waveguide input and output

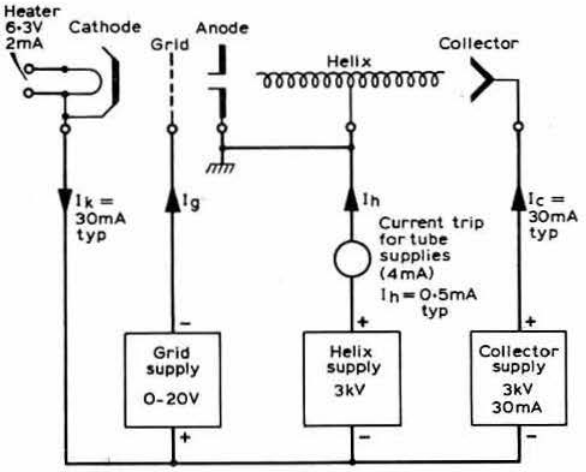


Fig 5. Power supply arrangements for a typical travelling wave tube amplifier

bunches within the beam. The beam current therefore becomes modulated by the rf signal, and the bunches react with the rf fields associated with the slow wave travelling down the helix, resulting in a net transfer of energy from the beam to the signal, and consequent amplification. Since there are no resonant structures involved in this interaction, amplification is obtained over a wide bandwidth. In fact the principal factors which limit bandwidth are the input/output coupling arrangements.

It should also be mentioned that it is possible to construct an oscillator, utilizing the so-called backward wave, whose energy travels in the reverse direction to the electron beam. These tubes are known as backward wave oscillators (bwos) and have the advantage of a very wide tunable range (an octave or more). They have been used extensively in swept frequency sources (sweepers), but are rapidly being displaced by Gunn diodes and, more recently, transistor sources.

Operation

The power supply arrangements for a typical twt are shown in Fig 5. The voltages and currents given are for a 10W output tube, but the alignment details apply to almost all tubes.

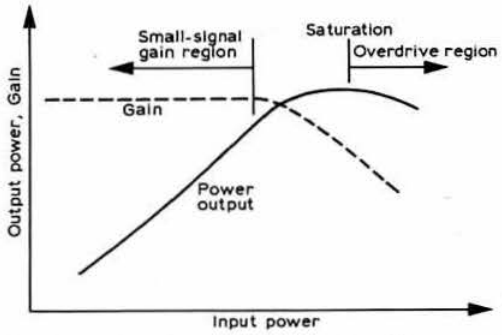


Fig 6. The transfer characteristic of a travelling wave tube amplifier

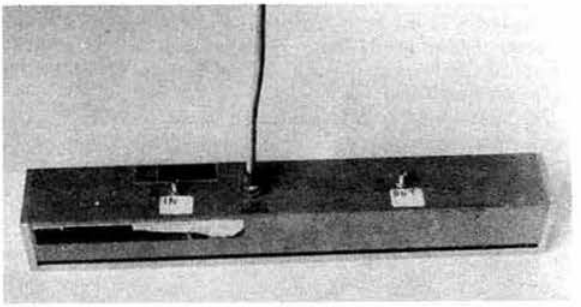
However, manufacturers' data regarding electrode voltages and tube operating conditions should always be referred to before running any particular tube.

It is very important that a suitable matched load be connected to the output of the amplifier, as the power reflected from any mismatch at the output is dissipated in the helix and can burn it out. For the same reason the antenna must be properly matched.

The beam current is controlled by the grid-cathode voltage. In modern twts, the beam focussing is preset and no adjustment is necessary, but if the focussing is adjustable the tube should be run initially at a low beam (collector) current, and the beam focussing magnets adjusted for minimum helix current. The helix voltage should also be set for minimum helix current.

With the tube running at its specified collector current, rf drive can be applied. The collector current will hardly change, but the helix voltage should be set for maximum output consistent with not exceeding the tube voltage or helix current ratings. If the focussing is adjustable this should be readjusted for minimum helix current, since the rf drive will defocus the beam slightly.

As the helix is fragile and will not dissipate more than a certain power without damage, the helix current should be metered, and a current trip incorporated to cut the power supplies to the tube if the helix current becomes excessive. The eht supplies to the tube should be well smoothed, since ripple will phase-modulate the output and give a rough note.



A Watkins-Johnson X-band low-noise amplifier (10mW output, 38dB gain)

If the collector dissipates more than about 100W it may be necessary to use a blower to cool the collector end of the tube. Typical efficiency of the twta is about 10 per cent, though some modern tubes may reach 40 per cent. The transfer characteristic is essentially linear (Fig 6), which permits the tube to be used to amplify ssb—one of its great advantages in an amateur context. As the input is increased, however, the amplifier saturates. There is no harm to the tube in operating at saturated output power, except that amplification is no longer linear, although if appreciable harmonic power is generated this may be reflected at the output transition and damage the helix through overdissipation.

The output from the amplifier can also be amplitude-modulated by a signal on the grid, but the attendant phase modulation is quite high; this method is not normally used to produce a great depth of modulation, other than to operate the twt in the pulsed mode. This is because at some voltages between maximum and minimum output, beam interception by the helix occurs, which causes excessive helix dissipation unless the transitions are rapid.

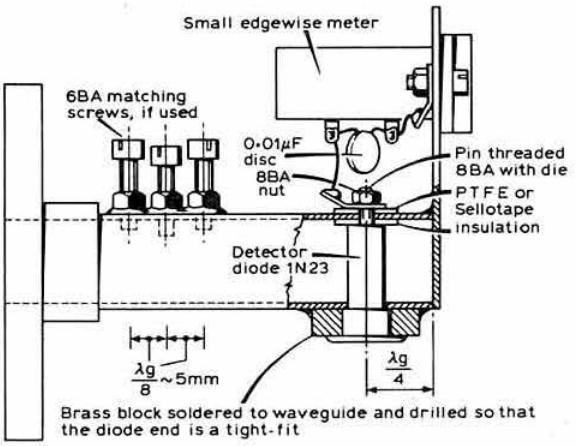
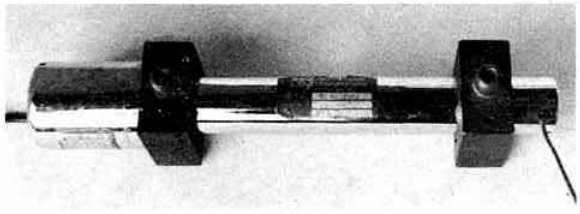


Fig 7. A simple 10GHz power monitor

Phase modulation is obtained by varying the helix voltage over a small range. Typically, ±100V from 2kV nominal helix voltage will give 2rad phase shift, with 1-2dB reduction in output, which occurs because the gain is very sensitive to cathode-helix voltage.

It is very useful to include some permanent form of power monitor of the output from the amplifier. This can conveniently take the form of a directional coupler and diode detector. Fig 7 shows a simple 10GHz version of a detector/power meter, which is extremely versatile. In its simplest form the detector uses a small cheap edgewise meter, which can be calibrated roughly. A more accurate detector can be made by replacing the meter with a suitable socket (bnc) and connecting the detector across a suitable multi-range milliammeter. The calibration chart plots percentage full-scale deflection of the meter *vs* incident power (Fig 8). Matching screws, if fitted, are adjusted to match the detector and then locked securely in position. Note that the calibration is strictly correct at only one frequency, and is somewhat dependent upon meter resistance. The dynamic range of this power meter can be vastly extended using a calibrated variable attenuator, or directional coupler. Suitable WG16 directional couplers are described in [2].

It is most important that anyone contemplating generating more than a few milliwatts of power at microwave frequencies should make sure they understand potential radiation hazards. Power densities are greatest in open-ended waveguide or around dish feeds, and especial care is required in these regions. The diode detector of Fig 7 should be used to check around flanges and lengths of flexible waveguide, both of which can become leaky without showing external signs of damage.



An S-band (2-4GHz) travelling wave tube and mount

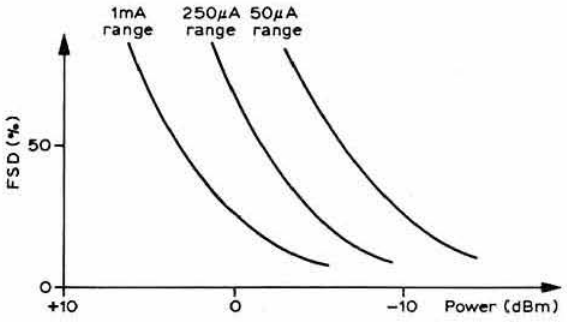


Fig 8. The form of the calibration chart for the power meter

Conclusion

The problem unfortunately still remains that twts are very difficult to acquire. Nevertheless, their high power output, high gain, and ease of operation make them the ideal way to run power at frequencies above about 4GHz, where conventional tubes like the 2C39 run out of steam, and they represent practically the only way to run high-power ssb.

It is relatively easy to generate the 1mW or so of ssb at microwave frequencies required to drive most twts [3], which will produce over 1W of power. This, in conjunction with high-gain antennas, permits advantage to be taken of tropospheric scatter as a reliable propagation mode, and takes amateur microwaves from hilltop-to-hilltop operating to the serious pursuit of dx over non-optical paths.

References

[1] *Traveling Wave Tubes,* J. R. Pierce. Bell Lab Series. D. Van Nostrand (1950).
[2] *VHF/UHF Manual,* 3rd edn, p8, 14. RSGB Publications.
[3] "Microwaves", *Radio Communication* January, April 1979.

Acknowledgement

The author is indebted to his colleagues on the RSGB Microwave Committee for their advice and assistance, in particular G3YGF, G3JVL and G3RPE. □

NEW IC HANDBOOK

A new booklet, primarily for professional radio engineers, is now available from Plessey Semiconductors. The *Professional Radio Applications Handbook* has design and application details covering most uses of the full range of Plessey radio linear circuits and high-speed dividers. It also gives details of how to build synthesizers for various applications.

An updated short-form catalogue has also been issued. This brochure covers the full range of consumer, linear, digital, power control and mos circuits, high-speed dividers, the novol logic family and all SAW products. Also included are package diagrams, lists of agents and distributors, and current BS9000 approvals.

Both booklets are available from: The Publicity Office, Plessey Semiconductors, Cheney Manor, Swindon, Wiltshire SN2 2QW; tel 0793 36251.

technical topics

Pat Hawker, G3VA

ARE the micros taking over? From time to time we have commented, a trifle apprehensively, at the way some enthusiasts seem bent on taking the human operator right out of amateur radio and leaving all the fun to the chips. The automatic, pre-programmed cw contest contact is almost old-hat; the unattended rtty terminal that copies all messages sent to a specific callsign is not unknown; a recent *QST* describes an automatic phone-contest machine. The trends are clear and have led Roy Hartkopt, VK3AOH, to pen a plaintive warning about "Amateur Radio - 1980":

I've got a new transceiver,
It's synthesized of course,
It sends all modes and rtty,
And generates good morse.

It's got a micro in it,
Which calls and logs them too,
It prints the QSL cards,
There's nothing left to do.

And so I'll lock the shack up,
And let it have a ball.
While I'll go weed the garden,
It won't need ME at all!

Buying surplus 813 valves

To anyone prepared to ferret out a couple of surplus 813 high-power tetrodes—still available, if you are lucky, at knock-down prices—a "full-power" hf linear need not prove an unduly costly exercise: see for example the classic grounded-grid 813 linear amplifier fully described in *Radio Communication Handbook* (5th ed), Vol 1, pp6, 122-6, or a basically similar but single-band design by Bill Orr, W6SAI (*Ham Radio Horizons*, May 1980, pp47-51).

W6SAI admits that only last year in *Ham Radio* (June 1979) he warned amateurs of the hazards of buying secondhand transmitting valves and pointed out the advantages of investing in new ones with factory warranty. But various readers have told him of their successes with flea-market 813s—that rugged old warhorse that can survive much abuse and whose only real drawbacks are the energy it eats up in its 50W heater and its physically larger size than modern high-perveance ceramic valves. From personal experience, the only time I can actually remember an 813 failing was when one jumped out of its socket on a bumpy trip from Paris to Brussels in October 1944, though that is not to say that the linearity always remains good once the emission begins to drop. W6SAI recommends that when seeking out surplus 813s it is a good tip to look for one with the American "JAN" (Joint Army-Navy) markings, old though these may be.

He also gives useful advice on how to get at least some advance idea of the quality of a bargain-offer 813 (applicable to most high-power valves):

(1) Examine it. Turn it upside down and tap it. Do you see strands of wire rolling around inside the glass? If so, it probably indicates a broken filament. Hold it to your ear and tap it. Do you hear any metallic, jangly noises? If you do, it may be a broken filament or grid wire.

(2) Using an ohmmeter, check the filament for continuity. Check for an open circuit between the other electrodes, using the high-resistance scale on an ohmmeter.

(3) Examine the glass for minute hairline cracks around the anode cap and filament seals. A magnifying glass helps. Do not buy a valve that shows such a crack. Examine the glass envelope for cracks, bubbles or blemishes.

At this stage, W6SAI continues, if the results of these simple, on-the-spot examinations are satisfactory, you might take a chance and buy. Two more informative tests need to be run, but these require equipment you are not likely to have with you:

(1) Test the vacuum with a "high pot" (megger) tester, which is a simple device generating 20 to 30kV at a few microamperes. The eht supply of a tv set can provide a substitute. One terminal is attached to a filament pin and the other to the anode, or held next to the glass envelope of the valve. If it is "gassy" (having a minute air leak), the space between the electrodes will glow bright blue. Such a valve is useless (a common fault with old power valves such as the 807 etc).

(2) Note that this is a destructive test for a bad valve. Simply apply normal filament voltage. A good valve will glow properly. A valve with poor vacuum will quickly fill up with a white

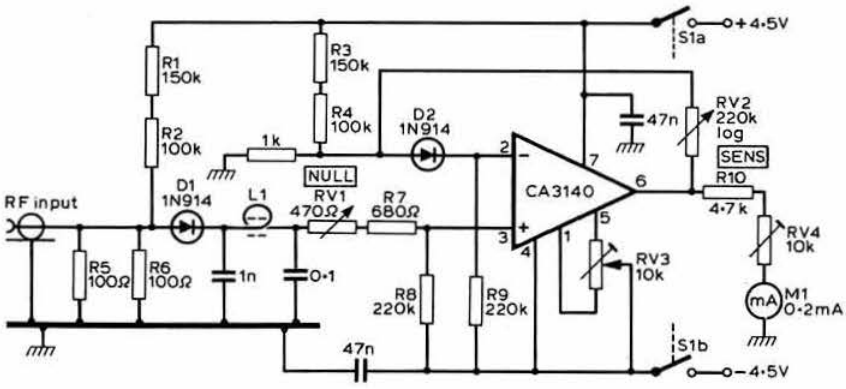


Fig 1. LA8AK's microwatt rf power and field-strength meter. C1 and C2 are the 1nF and 0·1μF capacitors respectively

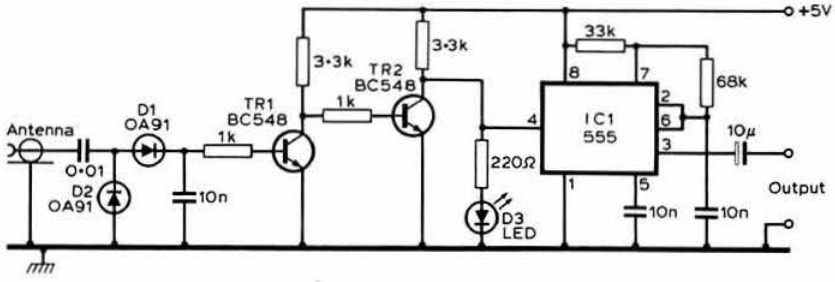


Fig 2. 2-500MHz rf-actuated cw monitor for use with equipments not fitted with sidetone generator

smoke created by oxidation of the thorium layer on the filament. Such a valve is useless.

Finally there is really no substitute for an operational test. Check that it works and that the current measurements correspond roughly with those of a valve you know is good. W6SAI provides a word of warning: "Beware of surplus or second-hand valves for which the claim is made that they have been tested. Valve testers for transmitting valves do not exist outside the industry and it takes considerable expertise to test fully a high-power transmitting valve". For an 813 in ssb linear amplifier service, cathode-driven grounded-grid, the characteristics and typical operating conditions for a single valve are: Filament 10V, 5A. Output capacitance 14pF. DC anode voltage 2·5kV, zero-signal anode current 30mA, maximum current 225mA. Maximum signal total grid current 50mA. Anode load impedance 6,000Ω; driving impedance 270Ω; dc input power (p.e.p.) 560W; useful output power 340W; maximum signal driving power 14W. For a 40-year-old valve this is still quite an impressive set of characteristics, provided that you do not want to use it much above 30MHz!

Simple microwatt meter

The value of microwatt power and/or field-strength meters for the testing and practical development of vhf/uhf equipment was well indicated in the recent item (*TT* August) on G3HBW's overtone crystal oscillator/multipliers. Even without accurate calibration, such a device can prove extremely useful when aligning filters and making simple level measurements etc.

That indefatigable Norwegian experimenter, Jan Martin Noeding, LA8AK, sends along the circuit diagram (Fig. 1) of a microwatt meter which, although very simple, has proved its value at vhf and hf, and is thought to be usable up to about 500MHz. The most critical components are D1, R5, R6, C1 and C2. LA8AK also points out that it is important, in order to avoid the false resonances that can occur when two capacitors are connected in parallel, to include the inductor L1, which in practice needs consist of only just one turn of wire through a ferrite bead. The problem of capacitors in parallel is something that one seldom needs to worry about for band-limited (ie tuned) equipment, but can prove unexpectedly serious for wideband equipment.

Because silicon diodes are most linear as rectifiers when there is a bias current of 10–20μA, the two resistors R8, R9 are incorporated. The resistors R1 to R4 are used to neutralize the "offset" voltage at the input to the CA3140 op-amp (which has mosfet input devices). RV1 is used to equalize the inputs to the device so that the op-amp "sees" the same resistance at pins 2 and 3—and gives fine zero adjustment when the instrument is in use. RV4 is adjusted for full-scale deflection of the meter when the output of the ic is approximately 2V. A log-type potentiometer is essential for RV2, which is used to calibrate the sensitivity. It is also important that the two diodes, D1, D2 (which can be 1N914, 1N916 or similar, or hot carrier diodes) are matched so that they have identical forward voltage drops when no input signal is present. To make the instrument as sensitive and as temperature-stable as possible these two diodes should be mounted close together, although it was not found necessary to use silicone grease to reduce thermal resistance.

A sensitivity limit of −50dBm has been achieved by LA1TN by using a higher supply voltage and a bipolar-type op-amp (741 or similar), but LA8AK recommends the CA3140 (or CA3130 with compensation) as providing the best choice for minimum current drain, permitting the use of two 4·5V lantern batteries. Bi-mos op-amps, however, are not good with very low input signals, and in practice a sensitivity limit of about −40dBm (50Ω) is achieved with the arrangement shown. Maximum input is about +20dBm. The instrument can be directly calibrated if a suitable signal generator is available, but is useful for comparison purposes even without this.

A number of other microwatt rf power meters have been described: for example, *Ham Radio* December 1977 by WA4ZRP, and *Electron* July 1978 by PA0JOZ. Both LA8AK and LA1TN have constructed the PA0JOZ design (*Amatør Radio* February 1979) and have found it capable of measuring signals below −50dB (50Ω), while above −20dB it is quite linear; however, this design uses at least five ics and a fet and represents a considerably more complex instrument than the one outlined by LA8AK.

Self-contained cw monitor

A number of the popular vhf/uhf rigs can be used on cw but have no sidetone facilities to allow the operator to monitor his outgoing transmission. A small, untuned monitor that will pick-up and respond to a local transmitter anywhere between about 2 and 500MHz appears in the Swedish journal *QTC* (No 5 1980, p169) as shown in Fig 2. The rf signal is detected in the voltage-doubler arangement of D1, D2 and then dc amplified and used to trigger a 555 ic.

Gasfet preamp for 432MHz

During the past couple of years the wonders of gasfet amplifiers have been increasingly recognized and utilized by those seeking extremely sensitive receivers for moonbounce and similar weak signal modes, even although—as Peter Carey, ZE5JJ, points out in "A very low noise preamplifier for 432MHz" (*Radio-ZS* March 1980)—"almost before one has constructed a new preamplifier using the most exotic device available, there is another which is better!"

Nevertheless any amplifier that can for long satisfy such an experienced moonbouncer as ZE5JJ must be something special

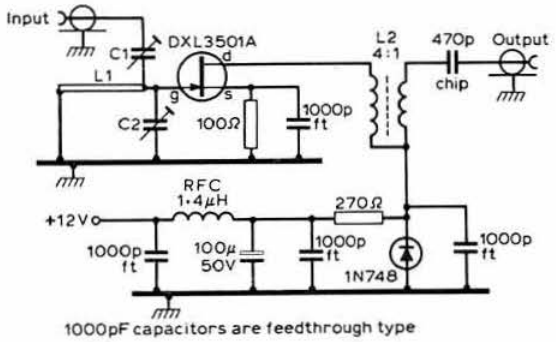


Fig 3. State-of-the-art very low noise 432MHz preamplifier for moonbounce and similar weak-signal modes using Dexcel DXL3501A gasfet

and is most unlikely to become obsolete before it can be completed! And clearly he is enthusiastic about the gasfet preamplifier shown in Fig 3, based on a design by W6PO and using a Dexcel DXL3501A gasfet originally developed as a medium-power microwave amplifier/oscillator (it is capable of delivering up to 65mW of linear rf at 8GHz). As a low-noise preamplifier, the noise figure is just under 0·5dB at 432MHz and 0·9dB at 1·3GHz.

The design is unusual in having a very high-Q input-tuned circuit using strip-line technique. The output circuit comprises a 4:1 toroidal untuned step-down transformer, yet the gain at 432MHz is about 18dB. The zener diode regulator holds the drain voltage down to about 4V (this is a critical value best determined by experiment and careful adjustment); optimum voltage can be expected to be between 3·5 and 4·5V according to the individual device. A G4COM-type alignment aid is recommended for setting up; it should also be noted that the best noise figure occurs with C2 tuned slightly off the point of maximum gain (about a quarter or half turn away). The toroidal transformer uses a 3/16in toroid of Q1 material and "great care must be exercised when winding since the toroid is very fragile". L1 consists of a 1·94 by 0·6in copper strap 0·171in above ground plane.

ZE5JJ states: "A standard Eddystone or STC die-cast aluminium box is necessary to house the amplifier, which is built up on a double-sided pcb on to which all components are mounted. The original layout called for SMA coaxial connectors—these are unobtainable here in ZE and so standard type-N Amphenol connectors are used (do *not* use bnc types since these introduce noise due to poor connection). Experience in building uhf amplifiers has confirmed that it is most unwise to use low-grade cheap capacitors. A capacitor which introduces excessive inductance is most undesirable, particularly when source by-passing is employed. Tuning capacitors which are unstable in varying temperatures or are affected by humidity are similarly ill-advised. It is recommended that Erie coaxial bypass capacitors and Johanson trimmer capacitors (1–16pF) be used: I cannot stress this point too strongly".

Sun noise tests showed an improvement of 2·5dB over an amplifier using an NE24406 gasfet, and ZE5JJ details other very impressive results. He does not indicate the price of the Dexcel device, although this is unlikely to be low: remember this is a state-of-the-art amplifier and *not* the sort of thing to stick in front of the average black-box in order to get better reception from the local repeater!

The HB9 multiband delta loop

An easily-built delta loop antenna of modest dimensions which puts maximum current along the highest span, requires no tuning or switching for operation on any of the existing bands from 7 to 28MHz, and which has no traps or stubs etc, clearly

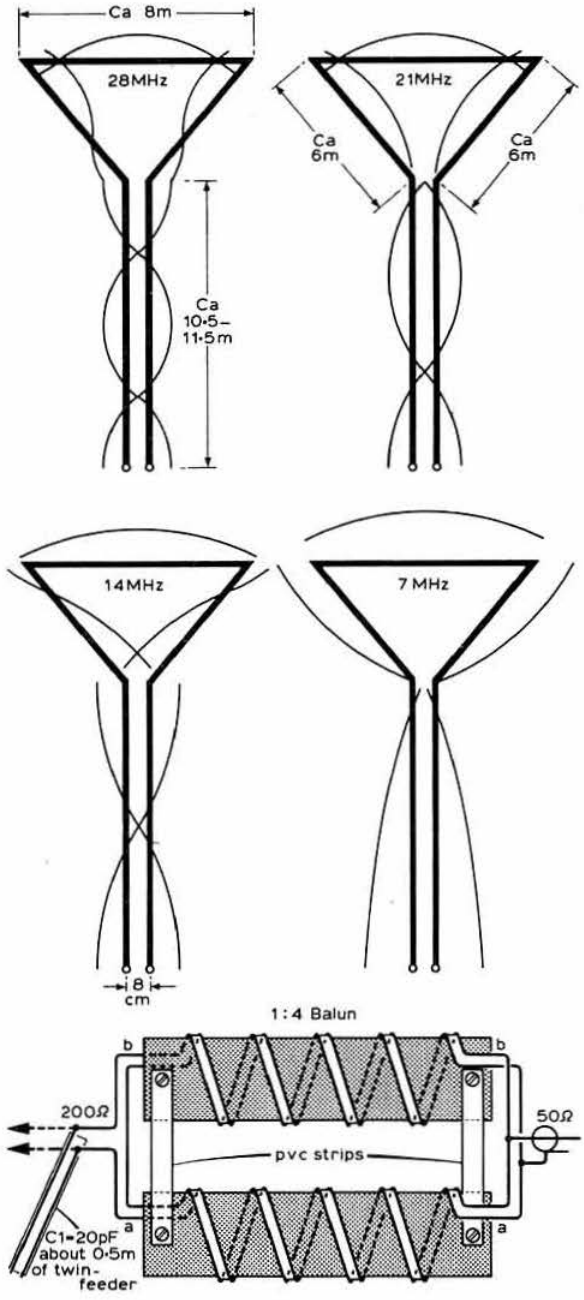


Fig 4. The HB9 multiband delta loop antenna for 7 to 28MHz operation, showing current distribution and suitable balun transformer

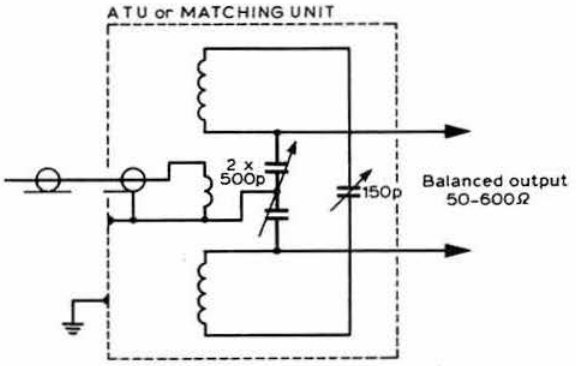


Fig 5. A pi-type atu providing balanced output suitable for the HB9 loop antenna in place of the wideband balun. Ganged-capacitor setting determines output impedance as in conventional unbalanced pi-network

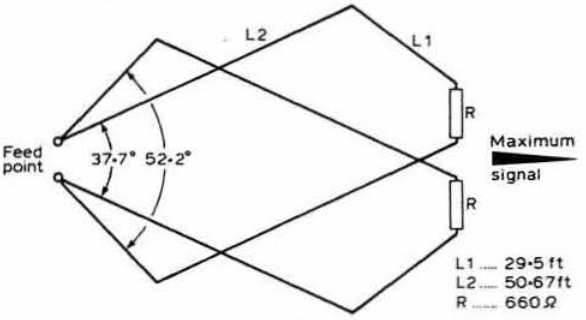


Fig 6. 144MHz nested rhombic antenna briefly noted in *r.f. design* and claimed to be capable of 27dB (ref dipole) gain. For transmission the non-inductive resistors must together be capable of dissipating about one third of the total output power (appreciably less for ssb and other low duty-cycle modes). A form of non-inductive resistor sometimes used for rhombics consists of a length of "lossy" 600Ω feeder (resistance wire) terminated by a low-wattage 600Ω resistor

adds up to an attractive proposition. All these features appear to be offered by a design by Willi Richartz, HB9ADQ, which has been published in *cq-DL* and also in the Swiss *Old Man* No 5, 1980: Fig 4. In effect the wire delta loop comprises an 8m top, with two sloping 6m sides (ie 20m perimeter) and is fed from a 10·5 to 11·5m length of 600Ω open-wire feeder that presents a compromise 200Ω impedance to a 1:4 balun transformer into 50Ω coaxial feeder, with a 20pF capacitor formed from twin-feeder to compensate for the inductive component on some bands. Constructional details of the broadband, air-cored balun are given in the German text: it appears to consist of two lengths of 7·5m of twin-feeder wound to form bifilar coils on two 30cm pvc formers with a diameter of 6cm held together with plastic strips.

For those who may not be keen on this type of balun, it should prove possible to feed the open-wire line directly from any suitable atu that provides balanced output of between about 100Ω and 600Ω. An arrangement which I have used successfully for conventional folded-dipoles with 300Ω feeder is shown in Fig 5, and this will also reduce harmonic output etc, particularly if the coupling coil is made in the form of the coaxial-type Faraday screen.

144MHz nested rhombic

Several years ago I got into something of an argument with some of our leading vhf/uhf exponents by suggesting in print that effective radiated powers approaching 100kW were becoming feasible for amateur stations even when operating fully within the terms of the British licence. The opposition claimed that a limit of a little over 10kW, as then being achieved by a number of British amateurs, was an altogether more realistic figure.

To reach 100kW would involve an antenna gain of significantly more than 20dB (ref dipole), ie a power gain of well over 100 times and very low transmission-line losses. Very few Yagi-type antennas can provide a gain of more than about 13dB on 144MHz and about 16dB on 432MHz. My reply, I seem to recall, was that a rhombic fixed array, with open-wire (cut-out 300Ω line) feeders, was by no means impossible on 144MHz or 432MHz, and should be capable of bringing erp at least close to the 100kW figure, even without one of those special 1kW permits that are (sometimes) issued for moonbounce and similar experiments. But I do not think either side truly convinced the other!

Since then I have noticed a Russian design for a *rotary* uhf rhombic for tv reception, though the size was probably not sufficient to provide very high gain (one British tv antenna firm claims a 21dB gain on Band 5 for one of the Continental-type complex Yagi structures). And recently, among the antennas in the series of *r.f. design* articles referred to in *TT* (August 1980), there was included the nested-rhombic design shown in Fig 6. It is claimed that this design, essentially a pair of staggered coplanar rhombics with a common feedpoint, has a gain on 144MHz of 27dB (ref dipole) or, in other words, a power gain of 500 times! The design is stated to be broadband, to have low vertical angle radiation, and with lower sidelobes than a conventional rhombic. Unfortunately very little practical information is given other than that it is fed by 300Ω balanced line, is mounted "12·29ft" above ground, and has vertical and horizontal beamwidths of 5·5° and 8·5° respectively. Although the articles include an extensive list of references, the original source of this particular design is not obvious; and the curious height dimension of "12·29ft" looks like a literal conversion from a metric dimension of 3·7m, since I cannot believe that the height is critical, certainly not to one hundredth of a foot! I seem to recall that an Australian amateur did a lot of experimental work on 144MHz moonbounce using rhombics, and this may have been the source of this design.

Simple "circular" polarization

Several years ago (*TT* July 1973, and subsequently in *ART*) an appreciation of the advantages of using circular polarization on hf and vhf was given, emphasizing that cp can provide a more uniform coverage of vhf transmissions in both built-up and wooded areas (as well as permitting good results when working to either fixed or mobile stations), and a significant reduction of fading on any ionospheric-reflected signals. The views of DC0MT and G3JVQ/DJ0BQ on this subject were well expressed in *VHF Communications* (Vol 5, No 2, May 1973) which presented an ingenious system, including baluns and 90° phasing section, for feeding crossed Yagi arrays (see *ART*).

In practice, true circular polarization is very difficult to achieve due to unbalance between the elements brought about by the effect of the mast or nearby objects, and even for the

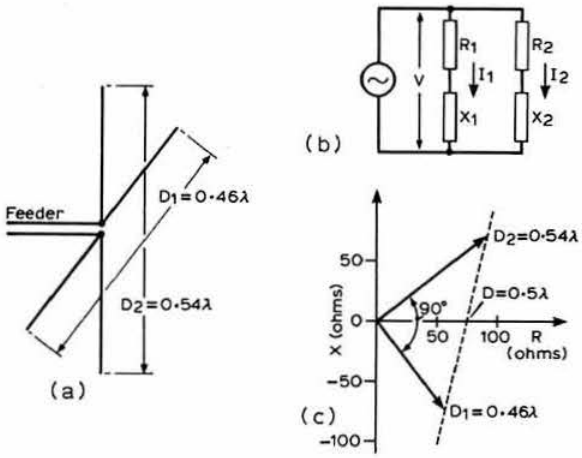


Fig 7. (a) Russian technique providing simple elliptically-polarized crossed-dipole antenna element which dispenses with phasing stub; (b) equivalent circuit of dipole feed points; (c) crossed dipole impedance plot

professional antennas used in vhf/fm broadcasting the preferred term is now "mixed" or "elliptical" polarization. Elliptical polarization implies that there is a major and a minor axis, ie the horizontal and vertical components are not equal. One suspects that there can be few amateur crossed-Yagi designs that produce other than elliptically-polarized signals; if this is so then it seems rather pointless to spend too much time and effort on trying to make the two feeds precisely 90° out of phase.

VK3AUI in *Amateur Radio* (June 1980, p31) draws attention to an article by K. Khachenko in the Russian journal *Radio* (July 1979). This indicates that by accepting that an antenna need produce only elliptically-polarized signals, you can still obtain many of the advantages of cp signals, yet it becomes possible to eliminate entirely the phasing section. Two crossed dipoles fed at a common point will satisfy this condition if the elements are cut so that the terminal impedance of one is inductive and that of the other capacitive; the currents in each dipole will then differ by approximately 90°. The Russian system is shown in Fig 7, with the dipole lengths 0·46λ and 0·54λ (note these figures are with respect to an *electrical* 0·5λ dipole, ie not taking into account the correction for end-effect so that, in practice, one element would be 0·46 × 0·95λ). Theoretically, as indicated in Fig 7(c), this would imply that the two polarization components would differ in the order of 0·85 and provide virtually equivalent results to a true cp signal. In practice the components would tend to differ by rather more than this due to the various unbalancing effects of masts etc. The technique would seem applicable above about 28MHz (or possibly 21MHz if high supports are available).

DX and the simple antenna

In *TT* September 1979, pp831-2, it was noted that the long path between the UK and Australia remains extremely reliable throughout the sunspot cycle and, because it is mainly a "darkness" route, almost independent of the day-to-day variations in hf propagation conditions. Further, it was suggested that the chordal hop signals involved can be launched satisfactorily at such (morning) times even from antennas providing a *high angle of radiation*.

I was reminded of these comments by receiving a most interesting letter from Ron Fisher, VK3OM, a regular contributor to *Amateur Radio*, who writes:

"Over the past three years or so, I have worked nearly 500 different British stations on 14MHz ssb. About a year ago I got the idea that some data on the antennas used by these stations might prove interesting, and I began noting in my check list the type being used. Below are the results summarized from the 147 new stations contacted since then, divided into eight general types:

Antenna type	Total No	Percentage
Dipoles (incl G5RV, trap dipoles, Zepps and five indoor dipoles)	55	37·5
Ground planes and trap verticals	32	21·7
Three-el or larger tri-band beams (only two larger)	30	20·4
Two-el tribanders (incl five minibeams)	10	6·8
Wire beams (mostly two-el incl delta loops and one VK2ABQ)	6	4·1
Monoband beams (three and four-el)	5	3·4
Quads (Four two-el, one three-el)	5	3·4
Mobile whips	4	2·7

"Apart from a few skeds kept with regular stations, my contacts with British stations are quite at random, but all on long path. It is interesting to observe that some of the more consistent stations use dipoles; these are not necessarily the strongest signals, but often the difference between them and the strongest G signals heard at the same time is small, perhaps 1 to 1½S-points. The indoor dipoles were usually S5-6, but a couple managed S7. All my contacts are of reasonable length as I like to find out something about the fellow to whom I am speaking. My own equipment is a TS820S transceiver with FL-2100 linear and three-element monoband beam at about 50ft with a good location for the long path to the UK."

These results thus provide further confirmation of the view that on long-path chordal hop transmissions the angle of radiation is not of prime importance; in such conditions the benefits

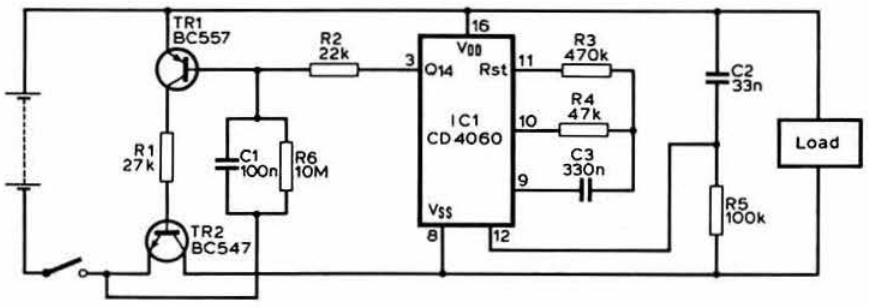


Fig 8. Automatic switch-off circuit to prevent battery-operated test equipment etc being left switched on by mistake. This arrangement by ZL2APE disconnects the instrument (load) after about 9min with a negligible leakage current

of a beam array tend to be limited to the forward power gain, which is seldom, in practice, more than about 4–5·5dB. The fact that some 60 per cent of VK3OM's ssb contacts were with British stations using simple antennas, including indoor dipoles and mobile whips, should encourage more amateurs to feel that a beam array is not an absolutely indispensable adjunct to a modern hf station!

Automatic switch-off circuit

Jim Parnell, ZL2APE, will strike many chords of memory by his opening remarks to an article "Automatic switch-off circuit" in *Break-in* January–February 1980, pp19–21:

"All users of battery-operated test equipment will know how frustrating it is to find that batteries are flat because an instrument was not switched off the last time it was used." He presents a simple timer arrangement that automatically disconnects a load (such as a small test unit) from its battery, or other power source, after a pre-determined time. With the load disconnected, the drain on the battery drops to well under 1μA. Then, to switch the unit on again, the battery switch has only to be turned off and then on again.

The circuit diagram is shown in Fig 8. The ic device is a 14-stage cmos counter/oscillator, and this determines the time the instrument remains "on". Oscillator frequency is determined by R4, R5, C3, and with the values shown is about 30Hz; this is then counted down by 16,384 times with the result that after 9min "Q14" of the ic goes "high"; this switches TR1 off, in turn switching TR2 off, leaving only leakage current through R6 (10MΩ) still flowing. TR2 must be capable of carrying the load current; if this requires the use of a power transistor it may be preferable to use a Darlington-pair type of device in order to reduce the current through R1 which governs the base current. For light current loads R1 should be 10 to 15 times the load resistance.

ZL2APE also suggests some other possible variations, but generally notes that this should prove a non-critical unit to build and set up.

A tip for FT250/FT200 users

Dr D. J. Newman, G4GLT, offers a tip for users of such equipments as the FT250 and FT200 transceivers which have an audio output valve (6BM8/ECL82) and use the recommended 600Ω impedance headphones. He notes that although the audio output transformer has a 600Ω output, in at least some models this is not used and the phone socket is connected to the 8Ω winding. This, he believes, results in the output valve not being correctly loaded and can shorten its life. G4GLT makes the suggestion that users should check their equipment, and then either use lower impedance phones or re-wire the socket to the 600Ω winding. I must admit to having some slight doubts whether this type of mis-match would cause premature valve failures; for many years it was by no means unusual to find low-impedance phone sockets intended for use with the old 2,000Ω and 4,000Ω high-impedance headphones.

Feedback

The drawing of the pass transistor (TR2) of the low drop-out voltage regulator (Fig 19 of *TT* June/July page 647) was wrong. The 2N6726 is a *pnp* type with the *emitter* connected to the input voltage and the *collector* to the 5V regulated line.

Filter with tv crystals

Some time ago we reported in *TT* (June 1977, p448) DL1AN's use of cheap "colour tv" (4433·619kHz) crystals to form very-low-cost ladder filters. Peter Poole, G3ENV, draws attention to a note by R. J. Harris, G3OTK, in *New Electronics* 29 April 1980, p56, who has put this idea to good use: Fig 9. With six tv crystals he obtains a very effective ssb filter having a 6:60dB shape factor of 2 and with good ultimate rejection, suitable for use in a lower sideband generator.

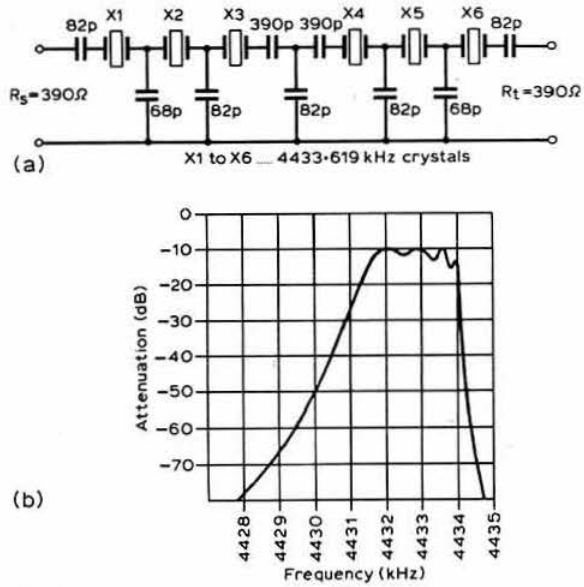


Fig 9. Crystal ladder filter formed from low-cost "colour television" crystals providing effective filter for a lower sideband generator (Crystals for NTSC 525-line television are 3579·545MHz)

Getting down to things!

Amateurs, of course, should always be willing to tackle do-it-yourself earth-moving projects: putting in antenna supports; laying earth mats; hammering in earth rods; digging in radials etc. So, apparently, is one Chris Culver, a part-time student in Sheffield. According to *The Guardian* newspaper, Mr Culver decided to put up his own garage, but ran into a few small problems even before he had finished the foundations. He:

Sliced through a power cable, blacking-out the neighbourhood—*four times;*

Chopped through a gas main, cutting off supplies to a neighbour's home—*four times:* and

Struck a sewer, blocking it and causing rats to appear—*four times.*

Mr Culver is reported to have said: "I admit I have bitten off more than I can chew. But I always do and I will get there in the end". Just where he will get to is not clear, but his next project is a d-i-y swimming pool in the backyard—so far he has weakened a 20ft-high retaining wall, the local council has had to shore it up and has threatened him with a £10,000 bill.

Goodness knows what will happen if Chris Culver takes up amateur radio. Meanwhile, there is perhaps a moral in the story for all of us. There are more things buried in the back garden than any one man dreams of! □

microwaves

Charles Suckling, G3WDG *

A power supply/modulator for the GDO33 24GHz oscillator

An increasing number of stations are becoming active on the 24GHz band, most of them using the Plessey GDO33 Gunn oscillator. This oscillator requires a supply of approximately −5V at 250mA, in contrast to most low-power 10GHz oscillators in use which require a positive supply at a somewhat higher voltage. Thus a different power supply is required for the GDO33. G4CNV has supplied details of a suitable design, which is in current use by a number of stations.

The circuit is shown in Fig 1, and one of its features is the inclusion of a current limiter, which makes the power supply short-circuit proof. Tone modulation is provided by a cmos oscillator followed by a simple RC filter. The microphone amplifier was designed for use with a crystal microphone, but should be suitable for most other types. In the unlikely event of more gain being required, the 330Ω resistor in the emitter of the microphone amplifier should be bypassed with a 10μF capacitor.

AFC inputs of either sense are provided, but if a negative earth i.f. strip is used, some form of level translator will be necessary. No connections are made to these inputs if the afc facility is not required.

A pcb layout for the power supply/modulator is shown in Fig 2, and the component layout in Fig 3. Double-sided copper-clad board should be used, the top surface being left copper covered to act as an earthing plane. A number of components are mounted externally, these being the tone/audio selector switch, the TIP2955 transistor (mounted on a heatsink, such as the diecast box used to house the power supply), the microphone gain potentiometer and the output voltage setting potentiometer. The latter should be of the 10-turn variety for ease of tuning, since the available range of output voltage (3·5–5·5V) will tune the oscillator over almost 100MHz.

If the rest of the equipment has a negative earth, it will be necessary to run the GDO33 power/modulator from a separate source, such as another battery. A convenient alternative would be to use a small inverter (with a very well-smoothed output), running from the main +12V supply, to produce the −12V. Any suitable designs for this would be most welcome.

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

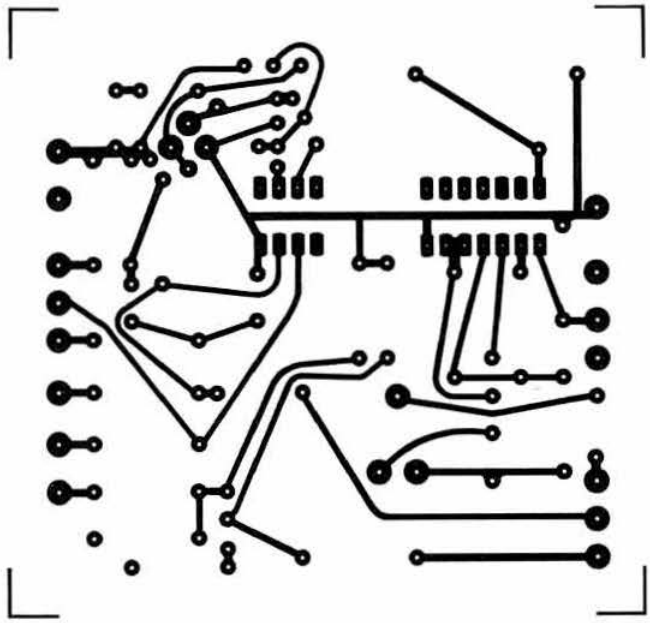


Fig 2. PCB layout for GDO33 psu (copper track side)

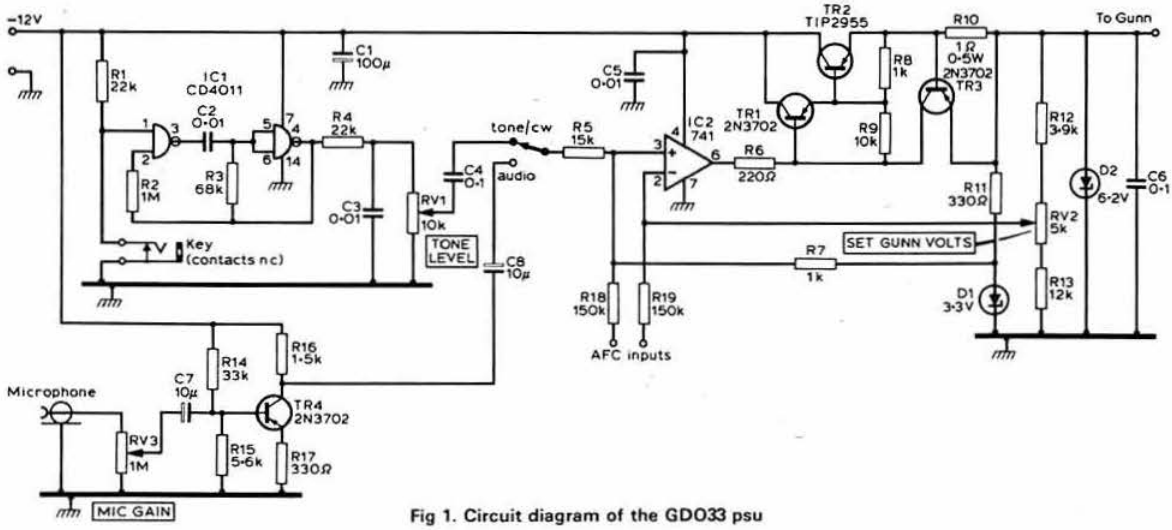
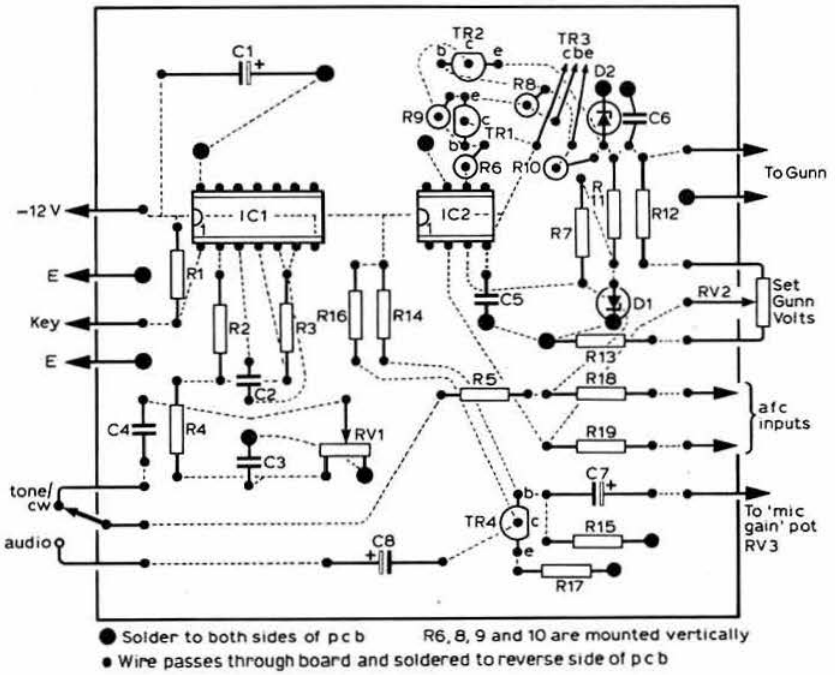


Fig 1. Circuit diagram of the GDO33 psu

Fig 3. Component layout for GDO33 psu



Calculating bearings and distances from national grid references

The determination of accurate beam headings is one of the factors crucial to successful operation on the higher microwave bands, where antenna beamwidths tend to be very small. Setting antennas to the calculated bearings is equally important of course, and will be the subject of a later discussion.

Two basic methods can be used for determining beam headings. The most obvious is simply to draw a line on a map between the stations' locations, and measure the angle of this line relative to north. However, this suffers from the drawback that a complete set of fairly detailed maps must be available. Also it is often inconvenient to use this method under portable conditions.

An alternative method, which is finding increasing favour, is to calculate beam headings using the stations' national grid references (ngrs). It is sufficiently accurate for most purposes for paths up to a few hundred kilometres. The method is quite easy to use, and after a few sample calculations have been done to gain familiarity, it should take no more than a minute or two to do.

National grid references are expressed, in their full form, by two letters followed by a six-digit number, eg SZ710992. The method of determining site ngrs is described fully on the Ordnance Survey 1:50,000 series maps. Before such references can be used in the calculations, they have to be converted to a slightly different form. The numerical part of the ngr is split into two three-digit numbers, and both are divided by 10. Thus the above ngr yields 71·0 and 99·2. The first number is called the "eastings", denoted E, and the second is the "northing", N. The ngr letters are converted to E and N values using Table 1. SZ thus becomes E = 400, N = 0. These numbers are added to the E and N values previously determined from the numerical part of the ngr to give a full numerical ngr of E = 471·0, N = 99·2. As a second example, an ngr of SE215435 converts to E = 421·5, N = 443·5.

Table 1.
Conversion data for ngr letters to numerical form

Square	E	N	Square	E	N	Square	E	N
HP	400	1,200	NR	100	600	SP	400	200
HU	400	1,100	NS	200	600	SS	200	100
HY	300	1,000	NT	300	600	ST	300	100
NA	0	900	NU	400	600	SU	400	100
NB	100	900	NX	200	500	SW	100	0
NC	200	900	NY	300	500	SX	200	0
ND	300	900	NZ	400	500	SY	300	0
NF	0	800	SC	200	400	SZ	400	0
NG	100	800	SD	300	400	TA	500	400
NH	200	800	SE	400	400	TF	500	300
NJ	300	800	SH	200	300	TG	600	300
NK	400	800	SJ	300	300	TL	500	200
NL	0	700	SK	400	300	TM	600	200
NM	100	700	SM	100	200	TQ	500	100
NN	200	700	SN	200	200	TR	600	100
NQ	300	700	SO	300	200	TV	500	0

Beam headings may now be calculated as follows: the location of station No 1 is defined as E = E1 and N = N1, and that of station No 2 as E = E2, N = N2. The differences between the two stations' ngrs are then found, as

$$\Delta E = E2 - E1$$

and

$$\Delta N = N2 - N1.$$

Note whether ΔE and ΔN are positive or negative, and, using tables or a scientific calculator, find the angle whose tangent is $|\Delta E/\Delta N|$, where the | | sign means take ΔE/ΔN as a positive number, even if it is negative. If this angle is denoted as θ, then the beam heading to be used by station 1, b, is related to θ by the following four conditions:

(i)	$b = \theta$	if ΔE +ve and ΔN +ve
(ii)	$b = 180 - \theta$	if ΔE +ve and ΔN −ve
(iii)	$b = 180 + \theta$	if ΔE −ve and ΔN −ve
(iv)	$b = 360 - \theta$	if ΔE −ve and ΔN +ve.

(Continued on page 914)

4-2-70

John Morris, G4ANB*

Repeater news

Licences have been issued for nine of the vhf Phase 4 repeaters listed last month. These are GB3AY (R2), GB3BP (R6), GB3BT (R2), GB3FF (R4), GB3LD (R3), GB3LY (R0), GB3SB (R0), GB3SS (R0) and GB3VT (R1). The other five proposals are still with the Home Office. One of the newly-licensed units, GB3BP, became operational on 8 July on Ch R6 from its site near Crawley, Sussex. This brings the number of operational repeaters on 145MHz to 35, with another 18 at various stages along the pipeline. The Repeater Working Group is now starting to process proposals for vhf Phase 5.

The 432MHz repeater network continues to grow, with 66 units operational and another 12 licensed but not yet on the air. The Repeater Working Group is making progress with the preparation of uhf Phase 5, which now includes 16 proposals. The plan for GB3HD has been dropped from this phase, as Huddersfield is already adequately covered by the West Yorkshire repeater, GB3WY, on channel RB10.

Site changes for GB3HO, near Horsham, and GB3NX, near East Grinstead, have been approved. GB3NM (Ch RB6, near Nottingham) was struck by lightning on 26 June, and is expected to be off the air for some time. GB3ST (Ch RB2, Stoke-on-Trent) has also suffered from storm damage. GB3WL, the west London repeater on R1, has been off the air for maintenance work, but is expected to return to service shortly. GB3MH on the Malvern Hills, which normally operates on Ch R3 went off the air on 28 June due to a receiver fault.

Many requests have been made for a map showing all of the vhf and uhf repeaters in relation to major roads. The Repeater Working Group is investigating the possibility of producing this. In the meantime, the best source of up-to-date information on the status of the network is the *UK Repeater List*, which is available from RSGB Publications (Sales).

Links have been established between the IRTS vhf manager, EI6AS, and the RSGB vhf manager, G3BA, to co-ordinate repeater channel planning in the two countries and so reduce co-channel interference.

Beacon news

GB3EM, the 432·91MHz beacon at Emley Moor in Yorkshire (locator ZN32b), was taken out of service during the winter when ice on the antennas caused the transmitter to produce spurious outputs. The hardware has now been modified to overcome this problem, but switch-on is being delayed until a remote control unit can be built. Turning the present hardware on and off involves a 1,000ft climb up the transmitter mast, which is hardly to be recommended given the original cause of the problem. GB3EM normally runs 50W erp from an 8-over-8 Yagi on a beam heading of 150°, but it is unlikely to be back on the air before the autumn.

Barry Titmarsh, GM8SAU, is continuing with his plans to establish a 144MHz beacon in the Hebrides. The callsign GB3WIL has been proposed. This unit could be very useful as an auroral indicator, replacing GB3LER, which is off the air at the moment. GM8SAU is deciding on the best beam heading for the beacon, the choice being between south-east and towards Canada. Aiming the beam across the northern Atlantic would provide a complement to the high-power beacon run by VE1EI from Nova Scotia, which was reported in February. This could provide an excellent opportunity for some very interesting long-term experiments on extended propagation of vhf at high latitudes.

GB3NEE in Tyne and Wear (locator ZO12a) was turned off just before Easter. When it moves to its new frequency of 144·935MHz it will be less than 200kHz away from the input of the GB3TW repeater, with which it shares a site. However, an attempt will be made to run both units from the same site when the beacon is ready to come back on the air.

A spare transmitter has been provided for the Angus beacon, GB3ANG, on 144·975MHz (locator YQ35c).

Progress with the new Cyprus 70MHz beacon, 5B4CY, continues apace. At the last report the completed unit had been flown to Cyprus and was sitting in the Customs and Excise shed awaiting clearance.

ZB2VHF beacon—help needed

Chris Smith, G3UFS, has written to *4-2-70* from West Sussex asking for details of the transmissions of the Gibraltar beacon, ZB2VHF, on 70MHz. This beacon operates on 70·26MHz, but only when its keeper, ZB2BL, is in the shack, as it is old valve equipment and not very reliable. If the callsign has a long dash after it, ZB2BL is listening on the beacon frequency for calls. However, he advises that it is better to call on 28·885MHz, as he always monitors this frequency while in the shack. He operates by keying the beacon itself, and is cw-only at the moment, although it is hoped that a.m. will soon be available as a stopgap.

The callsign ZB2VHF is also used by the beacons on 50·035 and 144·145MHz, which run continuously. The task of moving all three beacons to a new and better site on top of The Rock is in hand; it is hoped that this will provide an opportunity to modernize the 70MHz unit, and perhaps to move it to a less-congested part of the band—somewhere between 70·10 and 70·15MHz has been suggested. An appeal has been made for suitable solid-state hardware to form the new beacon. Alternatively a new crystal for the present unit is needed. A multiplication factor of six is used, so a crystal between 11·68 and 11·69MHz is required. Any reader who can help with fresh hardware or a replacement crystal is asked to contact the VHF Committee, either directly or via your scribe.

Another 70MHz beacon which is suffering the effects of old age is GB3SX, at Crowborough in Sussex, which operates on 70·685MHz. After many years of sterling service the transmitter needs to be replaced by a more modern and reliable unit, and an appeal has also been made for help with this.

Portable plea

The main objective of groups who head for the hills and exotic locations during contests is to score as many points as possible. At the same time they have a responsibility to provide QSL cards for the stations who provide those vital points. A *cri de coeur* from Ken Willis, G8VR, to the vhf awards manager quotes the case of club stations ". . . that enter a contest and sit in some exotic and choice rare location, proceed to give umpteen people their first ZZ square, and then totally ignore the

*120 Whitehorns Way, Drayton, Abingdon, Oxon OX14 4LQ.

subsequent pleas for confirmations". He has written to one such club half-a-dozen times with no effect. He goes on to say: "In a group situation nobody is concerned solely with confirmations. If they have no intentions at all of confirming their contacts they ought to make it clear at the outset. Alternatively, perhaps they could appoint a QSL officer for the particular period."

G8VR accepts that there is no obligation to provide QSLs. Even so, it is only fair that groups who travel to rare locations in order to attract contacts should reciprocate by providing confirmation where needed—especially as the leading lights of many of the more successful contest groups are themselves very keen on chasing dx.

50 and 70MHz from Wales

John Baker, GW3MHW, of Bontnewtdd near Aberystwyth, has written to *4-2-70* with details of his exploits on these two bands. During last winter he made over 400 crossband contacts from 28·885MHz to 50MHz, working all of the USA call areas on the way. He mentions that a certificate is advertised in the magazine *CQ* for working all 10 call areas, and that this can be suitably endorsed with the crossband details. On 70MHz John runs a pair of DET12s to a six-element Yagi, at about 850ft asl. Despite having the Cambrian mountains at up to 2,500ft asl running from the northeast to the southeast, he runs a daily sked at 8pm on 70·205MHz with G2AOK, and often with G3LIT who runs only 5W. GW3MHW is always on the lookout for other stations, and runs a net on 3·718MHz at 8.30am. Keen 70MHz operators are welcome to join in, and John is always pleased to run skeds. He also occasionally gets up to his excellent alternative location, which is 1,200ft asl, "on the top of a small mountain".

John's letter comments that activity on 70MHz did fall to a very low level around 1975–6, but that things are really picking up rapidly again, both by old-timers coming back, and by new calls appearing on the band. For a long time GW3MHW was the only fixed station in Wales active on 70MHz, but now at least half-a-dozen regularly use the band.

Pirate operation on 144MHz

G4GLM reports that after receiving QSL cards for hf contacts he never made, the trouble has spread to 144MHz. A sad feature of this is that a white-stick operator has now found that what would have been a very good dx contact is invalid.

What is a contact?

Vernon Boldy, G8SVG, whose sporadic-E contact with HG8ET on 10 June was reported last month, has described a curious sequence of events following an earlier, incomplete QSO. At 1600gmt he heard YU2CBE calling "CQ" on 144MHz, and replied giving callsigns, report and locator, but heard nothing more from the Yugoslav station. Later, while operating the station of a friend, G4JRI, on 14MHz, he was called by YU2RYN, who asked Vernon if he knew G8SVG! YU2RYN explained that he had worked G8SVG by sporadic-E while operating the club station, YU2CBE. Vernon was understandably amazed by this coincidence, but rightly explained that he had received no report, and so the contact was not complete. Nevertheless, YU2RYN insisted on being told Vernon's address, and has since sent a QSL card direct.

This happening prompts a reminder of the definition of a contact. For a QSO to be complete, both stations must copy from the other *both* callsigns, a signal report, and an acknowledgement that the other station has done the same. An interesting side effect of this definition is that it is possible for the participants to be unsure until later confirmation is received as to whether the contact is indeed complete, as no confirmation of reception of the other station's acknowledgement is required. To demand this would rapidly lead to an infinite regression, which would, to say the least, be time consuming. *Somebody* has to make the final transmission. This is one of the reasons for transmitting strings of "rogers" at the end of a meteor scatter contact. These strings effectively mean "I have received everything from you, including an acknowledgement of your reception of both callsigns and a report from me".

While on this subject it is appropriate to emphasize that contacts through repeaters are not valid for RSGB awards. The logic behind this ruling is that a person talking through a repeater is in contact with the repeater site, and not the distant station. Listener members have a special responsibility to ensure that all cards submitted for vhf/uhf awards refer to contacts made directly, and not through a repeater. Transmitting members who receive listener reports for contacts through repeaters should return them with a polite note pointing this out.

CW contact periods

Bill Scarr, G2WS, of Weston-super-Mare, is concerned at the waste of time suffered by cw operators on 144MHz due to the absence of any co-ordination of effort in establishing contacts, and has come up with an idea to help ameliorate the situation. He comments that 144MHz workers are naturally on the lookout for good conditions, but the majority pay scant attention to the band when conditions are obviously poor. Few cw operators are prepared to spend hours calling "CQ" when there is little chance of a reply, and some method of increasing the chances of a contact when conditions are only average or poor is needed.

Bill's suggestion is for a "contact period" of 15min, *every day*, starting at 8pm. The idea is that cw operators should concentrate their efforts on calling and listening during this period whatever the conditions. G2WS points out that anyone can work when conditions are good, but it is reliability of contact under any conditions that really counts. He is sure that the results of adopting an activity period would be surprising, and that much more fruitful activity would be achieved in the cw section of 144MHz.

The idea certainly seems worthy of being tried, and should form a useful supplement to the long-established cw activity periods which run every Monday evening from 2000gmt. Your scribe certainly intends to be among those having a quick listen around 144·05MHz at 8pm each evening, and putting out a call if nothing is heard.

50MHz sporadic-E

The sporadic-E openings on 50MHz have been continuing. The beacons in Cyprus, Gibraltar and Italy were regularly audible in the Midlands, southern England and Dublin from 24 to 30 June. The signals were appearing as early as 0900gmt and continuing until 2200gmt. On 30 June all three beacons could be heard between 1840 and 2050gmt. During the preceding weekend the French Guiana beacon, FY7THF, on 50·039MHz was heard between 1730 and 1945gmt.

A report from N3AHI of what is believed to be multiple hop sporadic-E on 50MHz was passed on by David Evans, G3OUF. At 2230gmt on 15 July the 50MHz Gibraltar beacon was copied

at 5/9+ in the W1 call area of the USA. At 2300gmt K1DH telephoned the beaconkeeper, ZB2BL, who appeared on the air and worked K1DH, W1QXX, WB1FUB, WA1UQC, K2MUB and N3AHI. No signals were received by the American stations from the GB3SIX beacon, or from EI2W, who came on the air in response to a telephone call.

144MHz sporadic-E

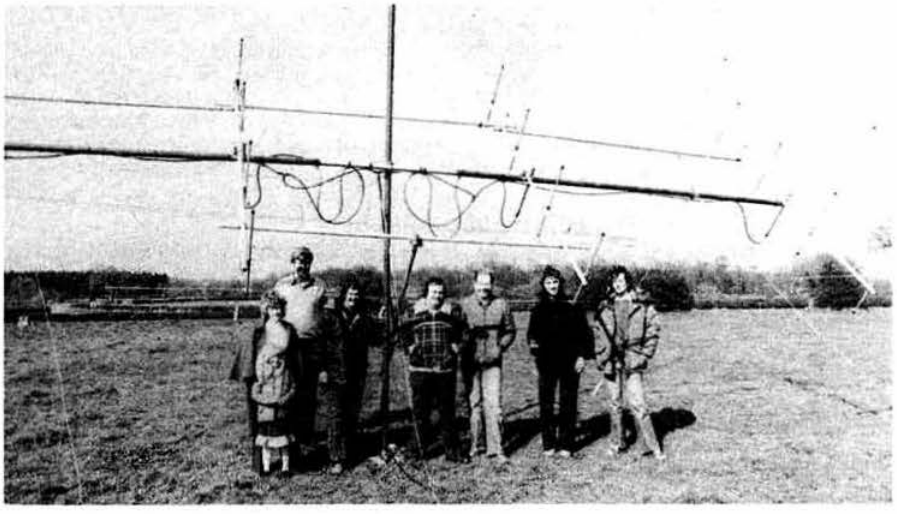
The preparation of this issue of *4-2-70* seriously hampered your scribe's attempts to operate during the excellent sporadic-E openings on 144MHz on 11 to 13 July—or perhaps it was the other way around. Scanning the band to see who is working whom is definitely an activity incompatible with trying to work the dx oneself. Many amateurs were alerted to the possibility of an opening on 144MHz by the state of fm broadcast Band 2 on 11 July. From about 1645gmt Swedish stations were heard and worked from the south of England. G4ANB managed only an incomplete contact with SM6LMH in locator GQ25c before the "E" disappeared from the band at 1657gmt. At 1840gmt the band came to life once again, with EA5 and EA6 stations being heard and worked with good reports. The most interesting callsign on the band was 9G1JX/EA5, who exchanged 5/9 reports with many G stations from 60km north of Alicante. At about 1900gmt the sporadic-E rapidly dropped from the band again.

With the forewarning of the previous day, careful attention was paid to the state of Band 2 on 12 July. This vigilance was rewarded at about 1745gmt when many Italian stations became audible on 144MHz. Dave Crisp, G8IXG, in Reading had a contact with I0AKP (GB locator square) at 1747gmt, and was one of the many UK operators to contact IT9TDN (HY68b). Geoff Grayer, G3NAQ, near Newbury, worked I2KSX/8 (HY40h) at 1754gmt and IT9TDN at 1759gmt, before signals faded at about 1800gmt. A hiatus of an hour was broken when G8IXG worked DK8FY/I8, who was 100km south of Naples, at 1859gmt. At 1904gmt Dave surprised I8CVS and I8DWE (both stations in locator HA13c) by breaking into their local QSO, and proceeded to work both stations. At 1914gmt G3NAQ worked I0JCO (GB12c) before the band once again closed down for the night.

The opening on 13 July began by following a very similar pattern to that of the day before. 144MHz opened up at 1708gmt with many southern Italian stations coming through at good strength. Between 1709 and 1720gmt G3NAQ worked IT9JHA (HX59e), IW9HAL (HX77a), I2KSX/8 (HY40h) and I0LYL (GB23c). A contact with I0SSW (GB13h) was broken before it could be completed by the abrupt fade-out at 1721gmt. During the same period, Ian White, G3SEK, in Didcot, worked IT9TDN, I0LYL and IC8EGO (HA32g), while G8IXG worked IC8TRA (GA30a) and I2KSX/8. As the furore on the band settled down after the break at 1721gmt, G4ANB decided that the opening looked as though it would turn into a repetition of the previous day, and so settled down to chat to "G" stations and see what had been worked, while waiting for the second phase to begin. Accordingly, a "CQ" call was sent out on 144·3MHz at 1727gmt, and was immediately replied to by IC8EGO. In the next few minutes G3SEK worked I8REK (HA locator square), and G3NAQ made contacts with IC8EGO, I8NOK (HA12h) and IW0HAL (GC41d) before the sporadic-E finally dropped below 144MHz at 1741gmt.

The first event to reach 144MHz on 11 July produced many contacts between the UK and Sweden, and seems to have been at its best in southwest England. G3CHN, who puts out one of the most consistent signals from Devon, was heard working many Swedish stations. Bill Scarr, G2WS, in Weston-super-Mare worked a good piece of dx on cw at 1645gmt, when he received a 5/9/9 report from SM0FUB (locator IT69j). Stations worked from the UK during the second opening between 1840 and 1900gmt on the same day include CT4AIF (VB locator square), 9H1BT and 9H1FL. A report has also reached your scribe that contacts were made between Spain and Israel during the day, but no detailed information has yet been received.

The rapidity of the rise and fall and the intensity of the signals during sporadic-E came as a surprise to many of the newer operators who have only recently been welcomed to 144MHz. Dave Coomber, G8VYZ, in Horsforth, near Leeds, worked EA5FN at 1845gmt on 11 July, using 25W of fm on S20 into a colinear at 420ft asl. This was the first sporadic-E opening for G8VYZ, and his first simplex contact with a station outside the UK! Dave was dubious about the authenticity



L to r: G3TEY, G3ZSS, G4DDK, G8BHH, G3XBY, G3ONP and G3WOH with the 80-element colinear with which they conducted eme tests near Stafford. Thirteen stations were heard

of the contact at first, but checks with local amateurs convinced him of its probable validity. Jim Rabbitts, of Friern Barnet, London, has written a detailed and interesting letter describing his activities during the 144MHz openings, but unfortunately omitting his callsign. Jim heard several Italian stations in GB and HY locator squares, and was fascinated by his first experience of sporadic-E. Unfortunately his 3W of rf from an IC202S to a four-element indoor Yagi failed to penetrate the pile-ups. On the following day his perseverance was rewarded by good contacts with 9H1FL (locator HV13a) at 1700gmt, and I2KSX/8 (HY40h) at 1740gmt.

Reports are still coming in about this series of sporadic-E openings, and it will take a little time for them to be collated, and for the exact duration and extent of the openings to be determined. It is already clear, however, that a serious contravention of Murphy's Law has occurred, as these openings appeared against all experience at a weekend, when most operators were actually available to work the dx.

Preamplifier application note

An engineering approach to the use of preamplifiers is the title of a new application note from Mutek Ltd. It points out that amateur vhf/uhf receivers have traditionally been designed for the lowest possible noise figure, usually by employing a relatively large amount of front-end gain. Compared with the hf bands the level of external noise picked up by a vhf antenna is very low, and until relatively recently it was quite difficult to make a receiver which would detect enough external noise to make this the limiting factor in system sensitivity. In the past this approach was adequate in most circumstances. That large amounts of gain before the mixer also reduced the system dynamic range was relatively unimportant. The growth in popularity and use of vhf and uhf mean that this is no longer true.

With the development of modern low-noise mosfets such as the 3SK88 for 144MHz, and ultra-low noise bipolar transistors such as the NE64535 for 432MHz, it has become possible to produce receivers which can detect several decibels of external noise. While this is obviously rather gratifying, it is questionable whether such performance is really needed, except perhaps for eme work. A better approach is to use these very quiet devices to minimize the amount of front-end gain needed to achieve a given noise figure. For example, it is possible to show that there is very little point in having a system noise figure of less than 2·5dB on 144MHz. To reach this with a typical black box exhibiting a noise figure of 8dB would require a preamplifier with a gain of 10dB, and a genuine 1dB nf, or one with a gain of 15dB, and a 2dB nf. The quieter, lower-gain unit will clearly result in better strong signal performance, assuming that the amplifier itself is not subject to strong signal effects. This is reasonable, as it is usually the mixer which first succumbs to overload.

These points and others are covered in detail in the application note, ANO2/80, which is available free of charge from Mutek Ltd, PO Box 23, Abingdon OX14 4TG, on receipt of an sae.

Listener award

Bob Treacher, BRS32525, of Eltham in south London, has been issued with FMD Receiving Certificate No 34 for 144MHz. This was the first listener claim to be submitted for over two years. Bob concentrated on sending reports to stations heard during contests, with 23 of the 40 cards submitted being from portable stations. He puts a lot of detail into his reports, invariably stating who was being worked at the time a particular station was heard. Most recipients consequently found his reports of great value, and rewarded him not only with their QSL cards but also with words of thanks and encouragement. One station commented "Info of this nature is always of great use . . . nice to hear of swls such as yourself listening on 2m", while a remark on another card often seems to be equally true for transmitting and receiving stations: "It's always the nearest counties that one gets confirmed last, isn't it!"

Bob's next targets are the 144MHz Senior and the 432MHz awards. In each category he will be in rare company, as only three 144MHz Senior and five 432MHz Standard awards have been claimed to date.

His and hers awards

Jackie, G8RZO, and John, G8RZP, Brakespear of Langley, near Slough, have achieved what must be a first of some kind. They submitted a double entry for the 4-2-70 Award for working 10 countries and 40 squares on 144MHz; dated 16 June for G8RZO, and two days later for G8RZP. Each award was won quite independently of the other, by their separate unaided efforts. Not long afterwards they sent in claims for the FMD 144MHz Standard, and the vhf awards manager entered into the spirit of things by issuing certificate Nos 549A and 549B.

A remarkable claim from George Gullis, G8MFJ, of Avebury on the Wiltshire Downs, contained forms for the FMD Standards on 144 and 432MHz, and for the 10 countries and 40 squares on 144MHz award. The job of checking the cards was made easier by there being no overlap between the two sets of QSLs submitted for the 144MHz awards. George has been sent certificate Nos 458 and 150 in the 144 and 432MHz FMD series, plus No 19 for the squares.

The race for the first Squares Award on 432MHz has ended with three being claimed in rapid succession. Mike Lee, G3YVF, of south Essex, Phil Johnson, GJ8KNV, and Peter Burden, G3UBX, of Wolverhampton, have been sent certificates Nos 1, 2, and 3 respectively for working six countries and 30 squares.

Other recent awards include 432MHz FMD Standards No 151 to Geoff Grayer, G3NAQ, and No 152 to Tony Collett, for his operations as G8GXE/P. 144MHz 40 + 10 Awards went to G8GGP and G8GNE in June.

AGCW DL vhf/uhf cw contests

These Saturday evening cw contests, which have in the past attracted several UK entrants, run every year as follows:
Third Saturday in March, 1900 to 2300gmt, 432·00 to 432·15MHz;
Fourth Saturday in June, 1900 to 2300gmt, 144·01 to 144·15MHz;
Fourth Saturday in September, 1900 to 2300gmt, 144·01 to 144·15MHz.

They are open to all European amateurs, according to the terms of their licence, and the last event in 1980 will be on 27 September. Single-operator entries only are allowed. There are three classes, according to the output power of the station: (A) less than 3·5W, (B) less than 25W, and (C) more than 25W. The contest report is RST, QSO number (starting at 001)/class/QTH locator, eg 559005/C/ZL24e. Scoring: for a contact between Class A and Class A, 9 points; A–B, 7; A–C, 5; B–B, 4; B–C, 3; C–C, 2. Contacts with stations who do not

send a complete contest report count one point each. Multiplier points: each big QTH square worked counts one; each DXCC country worked counts an extra five. The final score is the sum of QSO points times the sum of multiplier points. Contacts via artificial reflectors, transponders and repeaters do not count for points. Duplicate contacts must be clearly marked in the log. Output class and location may not be changed during one contest, although this is allowed from one contest to another.

Each contest is evaluated separately, as is each output class. Logs should be sent to Edmund Ramm, DK3UZ, PO Box 38, D-2358 Kaltenkirchen, Fed Rep of Germany. They should be postmarked not later than the last day of the month following that of the contest, ie 31 October for the September event.

Claimed first on 70MHz

Russ Stewart, G8BHH, had an interesting telephonic experience while trying to contact your scribe to inform him of a probable "first" on 70MHz. The message finally got through, thanks to the good offices of Nadine, the wife of G3SEK. On 7 July G4IDG (locator YM40a) had a crossband QSO with OE8NTK (locator HG32e). G4IDG was operating on 70MHz, with OE8NTK replying on 28MHz. The 3min-long contact started at 1813gmt. This is believed to be the first UK to Austria contact using 70MHz. Does any reader know of a prior claim? □

Microwaves

(Continued from page 909)

As an illustration of the method, the beam heading for station No 1 at SE215435 to use when working station No 2 at SZ710992 will be calculated. The E and N values for these are given above. Thus $\Delta E = 471{\cdot}0 - 421{\cdot}5 = 49{\cdot}5$, and $\Delta N = 99{\cdot}2 - 443{\cdot}5 = -344{\cdot}3$, and $|\Delta E/\Delta N| = 0{\cdot}144$. Therefore $\theta = \tan^{-1} 0{\cdot}144 = 8{\cdot}2°$. Since ΔE is positive and ΔN is negative case (ii) above applies, so the beam heading = $180 - 8{\cdot}2 = 171{\cdot}8°$. Further examples which may be used for practice are: beam heading from ST260977 to SP115364 is 65°, from SU373616 to SY614876 is 226° and from SU717204 to SS295756 is 283°.

When the beam heading for station No 1 to use has been found, that for station No 2 (the back bearing) can be found without a second full calculation. The back bearing is either (a) the original bearing − 180, if the original bearing is greater than 180°, or (b) original bearing + 180, if the original bearing is less than 180°.

All these bearings are of course relative to grid north, which differs by several degrees from both magnetic and true north. If bearings are required relative to these, corrections must be applied to the calculated bearings. The magnitudes of the corrections vary from place to place, and are given on Ordnance Survey maps.

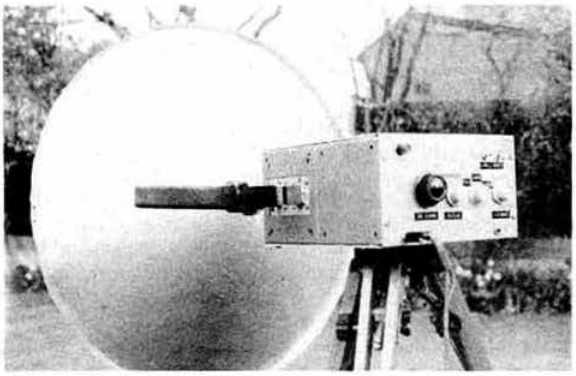
The ΔE and ΔN values used above may also be used to calculate the distance between the two stations, using the formula

$$\text{distance (in km)} = \sqrt{(\Delta E)^2 + (\Delta N)^2}.$$

As an example, the distance between SZ710992 and SE215435 is found to be 348km.

Photo feature

This month the photograph is of G3AYJ's 10GHz equipment. The complete transmitter/receiver assembly is mounted on a tripod, together with the 2ft dish antenna. A novel feature of his equipment is the manual "push-pull" changeover system visible at the side of the unit. The antenna is connected to a piece of flexible waveguide which terminates in a short length of "old English" waveguide. This can be pushed onto short lengths of WG16 which protrude from the box and are connected to the separate transmitter and receiver assemblies. Old English waveguide has internal dimensions of 1·000 by 0·500in and so is a very good fit over WG16.



G3AYJ's 10GHz equipment

On transmit, G3AYJ uses a fixed tuned Gunn oscillator on 10,070MHz, and a fully tunable receiver, using the G3WDG/G3RPE design (*Radio Communication*, June 1978). This feeds a 40673 mosfet i.f. preamplifier, followed by Mullard LP1185/1186 modules and audio amplifier. A G8AGN power supply/modulator is used to drive the Gunn oscillators.

Forthcoming round tables

Free tickets are now available for the round table meeting to be held at the Post Office Research Centre, Martlesham Heath, on 19 October, from John Garrett, G3RHP, Church Farm House, Otley, Ipswich, Suffolk (tel Ipswich 654712 (work), Helmingham 403 (home)). The meeting will begin at 1030am, and the provisional programme includes a brief "open forum" session by members of the RSGB Microwave Committee, a discussion/demonstration of narrowband 10GHz techniques and results, information on the GB3BPO 1·3GHz beacon and its associated propagation experiments, and a demonstration of "fin-line", which is a pcb technique for producing mixers, filters, amplifiers etc in waveguide. There will also be a good opportunity to test equipment: facilities will include a spectrum analyzer, frequency counters, power meters, sweep oscillators and noise figure measuring equipment (28 or 144MHz i.f. input). Food and drinks will be available at lunchtime. For further information contact G4FSG (see *Microwaves* August).

A round table meeting will be held at Sheffield University on 11 October, and one of the main discussion points will be on 24GHz equipment. Further details may be obtained from G8AGN. □

A look at Oscar 7 telemetry

by NICK WHYBORN, G4JNX*

Introduction

In October 1978, about four years after its launch, Oscar 7 began to show signs of ailing: the battery voltages became erratic; while in Mode B the telemetry often became garbled; the Mode B transponder would occasionally break out into spurious oscillation; and reports started to come in of the satellite going dead when it passed into the earth's shadow. These problems were obviously symptomatic of a fault in the satellite's power systems. A similar malfunction had apparently caused the demise of Oscar 6, when cell after cell in its battery had gone short-circuit, resulting in an ever-decreasing battery voltage. Eventually the voltage fell below the minimum necessary to operate the electronics and Oscar 6 went dead.

In the spring of 1979 it seemed highly likely that Oscar 7 would end its life in much the same way. However, the summer came and the satellite entered a period of continuous sunlight; this, it was hoped, would extend its life by taking some of the strain off the failing battery. Now, in 1980, the satellite is still working, if somewhat erratically. To try to find out what was happening on Oscar 7 Pat Gowen, G3IOR, and the author have collected telemetry since August 1979 and the results and conclusions are presented below.

Observations

The morse code telemetry system used by Oscar 7 consists of 24 channels, each of which carries information about one spacecraft parameter. The 24 channels are transmitted sequentially in six lines of four. Each channel is transmitted as a three figure number. The first digit is the line number, 1 to 6, the last two being the information or data count. To convert the data count into meaningful units there are formulas for each channel.

The first channel, called 1A, measures the total array current and has been faulty for many years.

The next four channels carry information about the current from each of the four arrays of solar cells which supply the satellite with power. One panel is placed on each of the four sides of the satellite, there being no cells on the top and bottom. From their positions on the satellite it is obviously impossible for the panels on opposite sides to receive direct sunlight simultaneously. However, on many occasions it was noted that the telemetered currents from opposing arrays were both large. This may be due to the satellite rotating rapidly, but this seems unlikely, since any rotation would tend to be damped out by the earth's magnetic field. The telemetered values for the array currents vary somewhat erratically between successive frames of telemetry.

The next channel, 2B, relates to the power output of the 435MHz to 145MHz transponder. When the satellite is in Mode B, 435/145MHz on, the telemetry indicates a reasonable power output of 2 to 4W. In Mode A the telemetry indicates an output of full-scale, about 8W, which is obviously incorrect.

Channel 2C transmits the time as indicated by the satellite's internal clock. During many passes the time changed randomly, although on passes where the satellite was not being used, especially when in Mode A, the clock appeared to function normally.

The next three channels (2D, 3A, 3B), correspond to battery charge/discharge current, battery voltage, and battery half-voltage respectively. The battery is a 6Ah nicad type. The battery half-voltage is the voltage of a point halfway up the battery string; in a normal healthy battery it should be half the full battery voltage. In most of the recordings the full voltage was about 14V, which is normal, but the half-voltage is now only about 1·8V. The charge-discharge current was typically within ±40mA; this corresponds to a charge time of 150h, which is a very low rate. Charge-discharge currents of 10 times this value would be normal for this system.

Channel 3D measures the battery temperature, typically in the recordings this remained fairly constant at 34°C over a period of several weeks. Comparing this with the telemetered temperatures for the baseplate, and +X and +Z panels of 31°C to 38°C and 29°C to 35°C respectively, we can see that the battery is not unduly hot. This is in direct contrast to the case of Oscar 6 where the battery temperature rose dramatically due to excessive power drain and overcharging [1].

Channels 4B, 5A, 5C represent the temperatures of the 145/29MHz pa, the 435/145MHz pa, and the modulator. These depended upon which mode the satellite was in, ie when the 144/29MHz repeater was on, channel 4B indicated a temperature of about 55°C, and 35°C when it was off. Similarly with the other two channels when the Mode B transponder was on. This is of course only to be expected. It was also noted that when the Mode A transponder was being heavily used its pa was about 6°C hotter than normal, which indicates that the telemetry was functioning normally, at least in Mode A.

Channel 5B, the 144/29MHz pa emitter current, was also shown to be dependent upon mode and the degree of loading, being about 0 to 35mA in Mode B and between 60 and 150mA in Mode A. Channel 6A relays information about the 29MHz power output: in Mode B it normally registered zero; however, in Mode A the output registered between 160 and 920mW. The output seemed to be related to the observed loading or usage of the downlink, but attempts to change the telemetered output by transmitting carriers of up to 200W erp on the uplink were unsuccessful. The reason for this failure is not apparent, as the passband was clear at the time and in such a situation the transponder should have been well loaded. There was no indication of loading in any of the other relevant channels, but perhaps the author was not using enough power.

Of the remaining channels the only one of interest is the telemetry calibration channel number 6D. When the telemetry is working normally this should read 50 ±2. However, during passes when the telemetry was relaying anomalous readings 6D was frequently within the tolerance range and occasionally would be way out of range, yet the rest of the telemetry would appear to be sensible. Of course when the satellite was very heavily loaded and the telemetry was sending rubbish, channel 6D was also affected.

On many occasions while in Mode B and being heavily used, the telemetry fails completely, and the satellite beacon transmits the same number for each of the channels in one line. This sequence of numbers is normally repeated on successive

*"Kinberlin", Southwood Road, Beighton NR13 3AB.

frames, occasionally changing one of the numbers. From observations when the telemetry was functioning normally it would seem that failure occurs when the battery voltage falls below about 10 to 11V. It is also apparent that as the voltage falls the number of anomalies occurring increases dramatically. These anomalous readings become apparent by comparing successive frames of telemetry, they are not confined to any particular channel, and are characterized by a reading which is way out of the normal operating range of the channel.

Conclusions

It would appear from the above observations that the satellite is now working almost entirely from its solar cells, as it goes dead when it passes into the earth's shadow [2]. In Mode B the power system can hardly supply enough current for the satellite to work, whereas in Mode A, where the solar cells can supply all the necessary current, the satellite functions properly. The power drain in Mode B is more than the solar panels can supply on their own.

The telemetered battery voltage fluctuates by about 1V in Mode B, which indicates poor regulation under heavy loading. This is what is to be expected from the battery charge regulator on its own. The on-board charge regulator has two functions: first, it limits the charge current to safe values (less than 1A), and second, stops the battery voltage from rising above about 15V. So when the satellite is in Mode B the transponder tries to draw more than the regulator will supply and the voltage drops. As the loading changes the voltage varies. In Mode A, on average, the current required will be supplied by the regulator, but occasionally the peak current may exceed 1A and be accompanied by a momentary drop in battery voltage. This would probably explain the anomalous telemetry readings, since under such a drop in supply voltage the telemetry may not function properly, with the consequent corruption of the channel being relayed at that time. The poor supply regulation would also account for frequency modulation of the beacon and transponders which has been observed.

At first the author thought that perhaps some of the cells in one half of the battery had gone short-circuit, and that the cells in the other half were being overcharged to bring the full battery voltage up to about 14V. However, in view of the lack of any signs of large charging currents or an elevated battery temperature this now seems unlikely. The second possibility is that something has gone open-circuit or high-resistance in the battery. This would explain the lack of regulation and the absence of charging currents. If the fault occurred in the upper half of the battery then it is feasible that the lower half would gradually discharge, giving a very low battery half-voltage as indicated by the telemetry.

As to the causes of any such battery failure, one can only speculate. Perhaps as a result of large current drains over Europe, thermal cycling has broken a connection in one of the cells. Who can say? We will probably never know the truth, unless someone goes and takes a closer look!

If the above hypothesis is correct then it seems likely that Oscar 7 will be with us for some time to come, until, that is, some other fault occurs.

References

[1] "The University of Surrey AMSAT Telecommand Centre", M. Sweeting, G3YJO. *Radio Communication* June 1978, p499.

[2] "Oscar Seven Plays Elusive", Gregory Roberts, ZS1BI. *Oscar News* Summer 1979, pp21-3. □

oscar news

Spacecraft information

Oscar 7 continues in operation powered by its solar cells. The spacecraft will remain in daylight until later in the year and will usually be found in Mode B. Due to failure of the batteries, Oscar 7 will seldom be usable when it is in darkness.

Oscar 8 continues in normal operation in Modes A and J.

Mode	Oscar	Uplink (MHz)	Downlink (MHz)	Antenna Beacon	Antenna polarization	Telemetry
A	7	145·85–145·95			lh circular	
A	8	145·85–145·95			lh circular	
A	7		29·4–29·5		linear	
A	8		29·4–29·5		linear	
A	7			29·502	linear	cw
A	7			435·100	lh circular	cw
A	8			29·502	linear	cw
B	7	432·125–432·175			rh circular	
B	7		145·975–145·925		rh circular	
B	7			145·972	rh circular	rtty
J	8	145·9–146·00			rh circular	
J	8		435·10–435·2		linear	
J	8			435·095	rh circular	cw

Oscar 7 period [min/orbit] = 114·9521. Angle of inclination [deg/orbit] = 28·7374.
Oscar 8 period [min/orbit] = 103·2407. Angle of inclination [deg/orbit] = 25·8103.

A typical orbit for Oscar 7 is No 26,680 on Sunday 14 September, the equatorial crossing time and longitude is 0820utc and 198°W. The spacecraft will be heard 29min later on a bearing of 018° as it crosses the northern horizon. It will reach its maximum elevation angle of 53° at 0900 on a bearing of 290°. Oscar 7 will leave over the southern horizon at 0910 on 225°.

Orbit No 12,906 on Monday 15 September for Oscar 8 crosses the equator northbound at 1953 at a longitude of 353°W. The spacecraft will be heard 7min later on a bearing of 178°. Maximum elevation will be reached at 2008 on a bearing of 277°. The spacecraft will go over the northern horizon 22min after crossing the equator on a bearing of 341°.

Orbital calendars covering the quarter July, August and September are obtainable for £1.27 post paid from the secretary of AMSAT-UK, R. J. C. Broadbent, 94 Herongate Road, Wanstead Park, London E12 5EQ. A further calendar covering the last quarter of 1980 will also be available at the end of September.

Failure of the Ariane L02 launch

Disappointment was in store for those who attended the Ariane L02 launch on 23 May 1980 at the Guiana Space Centre (Kourou, French Guiana). After a countdown interrupted by minor incidents and a meteo hold, the launch finally took place at 1429·39ut. After a normal light-up of the four L140 engines of the first stage, irregular combustion in engine D occurred after the first few seconds of flight. The sequence of events was as follows:

Ho + 3·3s: launcher liftoff.
Ho + 4·4s: all four engines function nominally up to this instant.
Ho + 4·4s to Ho + 6s: chamber pressure of engine D begins to fluctuate by ±4 bar, finally oscillating at an amplitude of ±11 bar at a frequency above 1,000Hz; on the films, this anomaly shows up as a yellow colouring. The mean chamber pressure remains nominal.
Ho + 6s to Ho + 28·3s: engine D is once again nominal.

Ho + 28·3s to Ho + 28·45s: recurrence of chamber-pressure oscillation of ±7 bar on engine D, showing up in the same way on the films.

Ho + 28·45s to Ho + 63·8s: pressure of engine D once more nominal. A temperature sensor on the propulsion bay records a linear rise from + 24°C to 56°C.

Ho + 63·8s: the temperature in question rises sharply to 100°C, and the chamber pressure of engine D falls simultaneously to 10 bar. The vehicle experiences a powerful roll torque.

Ho + 63·8s to Ho + 104s: the flight-control system succeeds in maintaining the launcher in the nominal trajectory plane. The roll rate reaches 60°/s.

Ho + 104s: fall in chamber pressures of engines A and B, hitherto completely nominal; engine C continues to function nominally.

Ho + 108s: fall in chamber pressure of engine C and destruction of launcher, probably initiated by the breaking of a structural connection as a result of considerable general stresses. Consequently the self-destruct system fitted to each tank operates.

A number of theories attributing the irregularity either to the engine or to the environment have been put forward. The initial cause of the malfunction of engine D is still to be determined by means of a thorough study of the various recordings and films available and a comparison with the data collected during the first Ariane flight in December 1979. Engine D was recovered on Monday 16 June at about 5km south of Îles du Salut, off French Guiana. Together with the propulsion elements of the other engines which were also recovered, it has been subjected to thorough inspection at the SEP facilities at Vernon, France.

This failure does not call the continuation of the programme into question. When the cause of the engine failure has been identified and the necessary corrective steps taken, the programme authorities will conduct the other two qualification firings. Under the promotion series, six Ariane vehicles are currently being manufactured and will be used for placing in orbit the satellites Marecs B, Sirio 2, Intelsat V, Exosat, ECS and Telecom 1A.

Raynet contribution to a moorland night-hike

At the request of the Red Cross search and rescue organization, the North Staffordshire Raynet Group was asked to assist at this exercise.

The main objective of the night's expedition was that young people of from 12 to 18 years of age from local Scout and youth organizations should negotiate three separate routes across the North Staffordshire moors using map and compass only. Along these routes were 11 strategically-placed check points which were manned for a 12h period by at least two Raynet members. There was also one group held in reserve, and another manning a home station, 18 miles away, with telephone facilities in case of emergency.

The young people were divided into groups of 4 to 7 members and when a group reached a check point Raynet provided valuable information on their condition to the control centre. Each group's progress was monitored at the control centre, and if a group failed to report in it was easy to determine their last known location.

All proceeded as planned until at 3.30am when five girls from Cheadle Youth Club failed to arrive at their next check point. After a 30min wait they were declared lost en route, and the Red Cross search and rescue personnel commenced a search of the relevant area, with one Raynet member communicating to base. All check points continued to be manned until 6am, when the remaining hikers had completed their routes. All Raynet members, under the supervision of the Red Cross search and rescue control centre, then proceeded systematically to search the whole of the relevant moorland area. With the aid of Raynet's high-speed communication back to base, areas were quickly reported clear and parties diverted to search other localities; an operation which had taken many hours instead of a few minutes on previous night hikes. At 6.30am the five girls were found some four miles from their intended route, and this information was transmitted immediately back to base and the search called off, the whole exercise being prolonged by only one hour.

Chris Taylor, the night hike organizer, said "The radio operators contributed a great deal to the success of the night hike, without them it is quite possible that Cheadle would be in Carlisle by now."

Raynet members taking part were: G3COY, G8JBZ, G8KXM, G8SDX, G8SWU, G8JTU, G4ITE, G4GOC, G4HTP, G4CHG, G3HLC, G3TJP, G4DQB, G8NFG, G4EJD, G8WGI, G4EJM, G8NFL, G3USF, G4DVN, G3SLX and five swls.

G8NFL

BOOK REVIEWS

Questions & Answers on Amateur Radio by Fred Judd, G2BCX. Published by Newnes Technical Books, 110 pages (soft covers) in compact 6¼ by 4¼in pocket size. Price £1.75.

To divulge a trade secret: many years ago I "ghosted" a book for this long-established series on a (non-electronics) subject about which I knew nothing—using the proofs from another book, cutting them up and pasting them down in selected segments, to each of which I added a (hopefully) suitable "question". It took me almost a week, but the book went through several editions so I assume that other people as well as myself learned a little from the exercise!

So I approached a *Q & A on Amateur Radio* with some trepidation. I need not have worried: Fred Judd has written a presentable little book with a fresh touch that will give the beginner an introduction to the hobby, tell him about the UK licence examinations, a bit about fundamentals, hf and vhf equipment, antennas, operating procedure etc, and a list of equipment suppliers.

As far as it goes most of the information would be useful to a newcomer (unless he already has a copy of *A Guide to Amateur Radio*) though it only barely skims the technical side: a single paragraph covering all types of modulation is, for example, almost the only reference to ssb, and even the use of (and reason for) a bfo to receive ssb does not appear to be mentioned. And one can see how myths arise when one finds such dogmatic statements as "it is very important as far as transmission lines are concerned that the standing wave is very low" and "a standing wave . . . would cause the line to radiate". Come on Fred, you must have used resonant lines at some time or another—and probably wasted less power in them, with less unwanted radiation, than with many a "matched" feeder!

G3VA

Practical Antennas for the Radio Amateur by Robert M. Myers, W1XT. Published by Scelbi in the USA. Obtainable from RSGB Publications (Sales); see current price list.

This book lives up to its name and contains a lot of constructional details for antennas in the hf spectrum. It represents excellent value for the beginner. It must be remembered that it is aimed primarily at the North American market, and consequently the chapter on beam headings only applies to that continent. Dimensions for 7MHz antennas do not go below 7·1MHz. A chapter which lists all the antenna and associated equipment information that has been published in *QST, CQ, 73* and *Ham Radio* magazines for a number of years makes an excellent reference section.

J.B.

Looking ahead

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. (See August issue.)

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.

5 October—BATC Convention, Post House Hotel, Leicester.

18-19 October—Jamboree on the Air.

6-8 November—Amateur Radio Retailers Association National Amateur Radio Exhibition, Granby Halls, Leicester. **(NOTE DATE CHANGE.)**

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

swl news

Bob Treacher, BRS32525 *

The tables

Let me assure *MOTA* readers that this is not a takeover, but G3ALI, G3GIQ and G3MCS have all asked for their all-time countries scores to be added to our table to complement those of G3KMA, who has also taken the trouble to up-date his. It is pleasing to know that so many licensed members read the page and want to be involved. We hope that this will encourage a few more, so that the table is fully representative and shows the scores of the best UK dxers, licensed or not. The next all-time table will appear in December.

To save space, the 1980 table is not published in its entirety this time. With so few updates, the space can be utilized for more news.

Looking forward

September is traditionally the month when the summer cobwebs begin to blow away. There are less distractions to keep people away from the hobby, and the bands are normally showing more signs of life. It is also the start of the autumn dx season which includes several major contests. NFD on 6–7 September provides swls with the opportunity to help out with their local society's entry, either logging, check-logging, or generally giving support when it is needed. NFD is followed by the WAE Contest. The ssb event takes place over the weekend of 13–14 September. Although there is no swl section, it is useful practice to see how many stations can be logged to improve your speed and understanding of callsigns. The QTC system used in this event is unique and also provides an opportunity to copy details of 10 QSOs in around 30s—certainly good practice. For those who have had little experience of contests, why not have, say, a period of 1h during a peak USA opening during the contest on 21MHz and see how many stations you can log, with the full QSO details, in that time. Your scribe would be interested to hear of anyone who does try. No prizes for the winner, but your knowledge of contest operation will improve unquestionably. For those who do not like contest style operation—yes, there are some—the Jamboree-on-the-Air event on 18–19 October may be something for you. Many special event stations will be active—many this year using the still rare GB4 prefix—mainly on the lower frequency bands, the object being to contact as many other Scout stations as possible. The majority will have special QSL cards available.

Early October will see the VK/ZL contests. SWL sections are included and a certificate is available for the leading listener in each of G, GD, GI, GJ, GM, GU and GW. How about putting your experience in the WAE Contest to good use by entering this one? Also in early October we have our own 21/28MHz ssb event. This 12h test has been favoured by good conditions and large scores over the past few years and we are keeping our fingers crossed for this year. If you want to improve your reception technique, why not have a go?

*79 Granby Road, Eltham, London SE9 1EH

All-time countries table

Station	28	21	14	7	3·5	1·8	Total	Mode
G3KMA	293	310	320	233	173	40	1,369	ssb/cw
BRS17567	265	304	349	163	224	33	1,338	ssb/cw
BRS25429	247	291	322	214	217	45	1,336	ssb
BRS32525	247	289	311	208	238	38	1,331	ssb
BRS25901	252	290	321	191	195	22	1,271	ssb
BRS35943	232	274	297	198	218	30	1,249	ssb
A8808	214	247	287	133	153	42	1,076	ssb/cw
G3MCS	262	276	298	120	98	18	1,072	ssb
BRS8841	210	241	301	133	154	10	1,049	ssb/cw
G3ALI	180	199	296	162	184	0	1,021	ssb/cw
G3GIQ	263	283	302	26	14	20	908	ssb/cw
RS42604	206	213	180	138	112	21	870	ssb
A9191	144	187	232	72	95	11	731	ssb
ARS41426	161	163	145	87	104	28	688	ssb/cw
BRS20185	150	151	196	45	48	6	596	ssb
ARS41386/GJ	129	146	140	53	38	5	511	ssb

1980 hf countries table

(Top 10 placings only)

Station	28	21	14	7	3·5	1·8	Total	Mode
RS42604	179	174	130	114	108	17	722	ssb
BRS43475	118	153	192	86	74	10	633	ssb
ARS8841	113	133	184	88	83	0	601	ssb/cw
BRS35943	97	97	93	76	85	5	453	ssb
ARS42503	55	123	125	98	50	0	451	ssb
BRS18529	37	80	133	52	51	15	368	ssb
BRS41992	50	61	125	42	12	0	315	ssb
BRS40705	94	82	67	45	22	0	310	ssb
BRS20185	81	85	94	20	27	2	309	ssb
BRS43273	96	75	74	26	13	0	284	ssb

July feedback

With so few contributions this time, an overall assessment of conditions is not feasible. However, it seems that if you were willing to monitor the bands closely, some choice dx was available. Fernando da Noronha was activated in mid-July by PY1YCW signing PY0YCW; QSL via PY1AA. He was reported on the higher frequency bands, and also had a good signal on 3·5MHz ssb at around 2230. There has also been activity from 5V7 and TY9 courtesy of W4MGN who is conducting a tour of Central and Western Africa. Other stops are scheduled to include XT2, TZ, C5 and 6W8. Cards for 5V7HL should go via WB2KXA, and those for TY9ER via N2OO. This information relates only to the operations from these callsigns by W4MGN. The June 1980 *IDXF Newsletter*, sent courtesy of N2CW, provides some interesting information regarding the recent 9M6MU expedition. The group made 19,934 QSOs in six days of which only 4,085 were with Europe. No contacts were made with Europe on 3·5MHz and only 30 on 7MHz.

Conditions to the Pacific are reported to have been good, with stations audible via both short and long paths. N6HR/KX6, AH8A and AH0A have been good signals, along with numerous stations from KH6. VR6TC is reported to sked WA2DXJ at 2300 on 21,350kHz on Tuesdays.

According to Robert Small's log, 21MHz has also provided KS6DV, HS1AMM, VS6PP, YC6HZ and DU1EFZ. On 14MHz he logged VE2FMD/TY2, VK9CCT and W0WWB/KH0, while on 7MHz VP8QG was a new country. Several reporters also mention G3JKI/5A. We will have to wait and see whether ARRL accept this activity for DXCC credit.

Bob Tough, ORS43382 passes on the latest news from his QTH in the German Federal Republic. He mentions hearing a maritime mobile station, WA9DJQ/MM, whose signal he considered to be the strongest he has heard to date.

Michel Delvaux, ARS42503, reports a number of interesting dx stations and, in particular, mentions KH6IHZ/AM travelling at 27,000ft between IS0 and EA.

Dave Whitaker, BRS25429, has been QRT due to an enforced spell in hospital. All is fine now and he reports his 200th confirmation on 7MHz. It has taken him 18 years to complete

the double of 200 countries confirmed on 7 and 3·5MHz. Can anyone beat that? He also has 326 confirmed from 332 heard all time.

Apologies

In a recent issue your scribe mentioned that Mount Athos had not been activated between 1972 and 1980 but, alas, he was wrong! G3XTT and Robert Small have informed me that SV1GA/A was active in 1975, and SV1DC/A and SV1JG/A were active in 1979. Sorry!

While on the subject of apologies, a letter has been received from K. M. Jones, ORS43936, who writes from Malawi. It seems that in the May issue, mention was made of a QSL being received from 7Q7BC. It is pointed out that amateur transmission is totally illegal at this time in 7Q7. Perhaps we should put the matter straight by saying that Brian Russell actually received the card for a heard QSO in 1973.

144MHz

Continuing to give the vhf swls a mention, if we have enough interest, the VHF NFD provided many strong stations, although reports of really exotic dx are scarce. Some of the choicer dx included EI2VGN/P (WN69j); EI1AA/P (WM19e); GM3KJF/P (XO19a) and OZ1CPC/LX (DK square). Keep these reports coming and we hope there will be some good sporadic-E and tropospheric openings to report soon.

Finale

Copy for the November issue should reach your scribe by 22 September. □

RAE Courses 1980–1

(See also August issue, pp806–7)

Amersham. Amersham College of Further Education, Art and Design, Stanley Hill, Amersham, Bucks HP7 9HN. Theory, Tuesdays 7–9.30pm; morse, Thursdays. Enrolment early September. Further details from Mr L. E. Fishburn at the college, tel Amersham 21121.

Birmingham. Harborne Hill Adult Education Centre, Birmingham. Enrolment 10 September. Fee: about £16. Tutor: Frank Fear, G8CVR. Details from G8CVR, QTHR.

Birmingham. Perry Common Adult Education Centre, off College Road, Birmingham 23. Tuesday evenings. Enrolment 7.15–8.15pm, 9 September. Fee: £6 per term. The centre is now an approved examination centre. Details from Great Barr Institute, Handsworth Wood Adult Education Centre, Church Lane, Birmingham B20 2HH, tel 021-554 4028.

Borehamwood. De Havilland College, Elstree Way, Borehamwood, Herts. Mondays, 7–9pm, commencing 15 September. Enrolment 8–9 September, 7–8.30pm. Details from G. L. Benbow, G3HB, QTHR.

Brentwood. Brentwood Adult Education Centre, Bishops Hill, Rayleigh Road, Hutton, Brentwood, Essex. Wednesdays. Enrolment 7pm, 9 September. Details from centre, tel Brentwood 2188593.

Burgess Hill. Marle Place Adult Education Centre, Leylands Road, Burgess Hill, W Sussex RH15 8JB. City and Guilds course 765, tutored by Dr R. C. Lock. Tuesdays, 7.30–9.30pm. Commences 23 September. Further details from the centre, tel Burgess Hill 6355.

Bury. Bury Technical College. Thursdays, commencing early September. Details from C. Marcroft, G4JAG, tel Ramsbottom 2168.

Canterbury. Canterbury College of Technology, New Dover Road, Canterbury, Kent, tel 66081. Details from course tutor, G3LCK, at the college.

Chester. Chester College of Further Education. Thursdays, 7–9pm, commencing 25 September. Details from either the college, or P. L. Stevens, G3SES, QTHR.

Chingford. Friday Hill House, Simmons Lane, Chingford, London E4. Enrolment at first night of course, Thursday 18 September. Enquiries to A. Foss, G8EAY, tel 01-500 6034.

Chingford. Chingford Community Centre. Morse classes will commence in September. For details tel 01-804 9373.

Cove. Oak Farm School, Cove. Thursdays, 7.30pm, beginning 18 September. Enrolment the week before at the school. Morse proficiency course, beginning 16 September at Cove School, St Johns Road, Farnborough, tel Farnborough 42397. Details from Mrs P. A. Green, Cove School.

Crawley. Sarah Robinson School, Ifield, Crawley, West Sussex. Thursdays, 7–9pm, starting 25 September. Enrolment, 8 and 9 September. Further details from R. Scrivens, G3LNM, tel Crawley 22540.

Derby. Allestree Adult Centre, Woodlands School, Allestree, Derby. Tuesdays, 7pm, commencing 23 September. Details from the Centre Principal, Mr B. Dobson, St Helens House, King Street, Derby DE1 3EE, tel Derby 31111, ext 404.

Dudley. Dudley College of Technology, The Broadway, Dudley, W Midlands DY1 4AS. Tuesdays, 6.30–8.30pm. Enrolment commences 2 September. For details contact the college, tel Dudley 53585.

Exeter. 3 Palace Gate, South Street, Exeter. Enrolment and commencement, 30 September at Palace Gate. Details from G. W. Draper (public relations officer, Exeter ARS), 1 Carlyon Close, Heavetree, Exeter EX1 3AZ.

Grafton. Holloway Institute. Mondays 7–10pm, commencing 15 September. Enrolment 8–12 September. Lecturer B. C. Bond, G3ZKE, tel 01-485 7065 for details.

Harrow. Harrow College of Further Education, Hatch End High, Headstone Lane, Harrow. Wednesdays, 7–10pm, commencing 8 October. Enrolment at Nower Hill School, Saturday 27 September, 10am–3pm. Details from D. T. Busby, G4HFL.

Hemel Hempstead. Dacorum College, Marlowes. Wednesdays, 6pm, commencing 24 September. Enrolment 6 September. Further details from course organizer C. Burke, G3VOZ, tel Hemel Hempstead 833300.

Highbury. Highbury Manor Adult Education Institute, De Beauvoir Branch, De Beauvoir School, Tottenham Road, N1 4BW. RAE courses especially designed for those who have failed the examination. Fully equipped workshop and amateur transmitting station, two tutors and an instructor in morse code. Monday–Thursday, 7.30–9.30pm, commencing 17 September. Enrolment 8 September, at the school. Details from Senior Tutor, F. Barns, G3AGP, at the school.

Huddersfield. Shelley High School, Shelley, nr Huddersfield. Commencing 30 September. Enrolment 15–22 September. Details from course organizer G3SDY, tel Kirkbureton 2905.

Knottingley. Knottingley High School, Knottingley, W Yorks. Enrolment 8 September. Details from A. E. Ashby, G3HCW, QTHR.

Nottingham. Arnold and Carlton College, Digby Avenue, Mapperley, Nottingham. Wednesdays, 7–9.15pm, commencing 17 September. Enrolment 8–10 September, between 2–8pm. Fee: £12.45. Course tutor A. Lake, G4DVW. Details from the college, tel 0602 876503.

Paddington. Paddington Evening Institute, Amberly Road, Paddington. Mondays and Thursdays, 7–9pm, commencing 15 September. Enrolment 8–12 September, 6–9pm. Details from D. T. Busby, G4HFL.

Southampton. Glen Eyre Further Education Centre. Mondays, 7pm, commencing 22 September. Enrolment 9 September, between 6.30–8pm. Further details from John, G8CQY, QTHR, tel Southampton 769483.

Southampton. Southampton Radio Club, The Clubroom, City Engineer's Yard, Kent Road, Portswood, Southampton. Course begins Friday 5 September, 7.30pm. Details from J. R. Compton, G4COM, QTHR, tel Fair Oak 3017.

Stockton-on-Tees. Stockton-Billingham Technical College, Oxbridge Avenue, Stockton-on-Tees, Cleveland TS18 4QA. Mondays, 6.30pm (and also Tuesdays if there is enough demand). Enrolment on 2–3 September. Further details from J. Ross, Science Department, Stockton-Billingham Technical College, The Causeway, Billingham, Cleveland TS23 2DB, tel 0642 552101.

Stretford. North Trafford College, Stretford. Enrolment from 1 September. For details tel F. Delaney, G4GKT, on 061-872 3731, ext 45.

Turnford. East Herts College, Turnford. Mondays, 7–9pm, commencing 22 September. Enrolment 8 September. The fee will be less than £20, which will cover the May examination. If there is sufficient demand the college may also act as examination centre for the December 1980 RAE. Further details either from J. Sleight (Chairman Cheshunt & DRC), G3OJI, QTHR, tel Ware (0920) 4316, or the college, tel Hoddesdon 66451, and ask for Mr J. France.

Wakefield. Wakefield Technical College, Margaret Street, Wakefield, commencing September. Details from R. Price, G3VID, 36 Hadleigh Rise, Pontefract, W Yorks.

Walsall. (Amended information.) Broadway North Centre, Walsall. Enrolment 15–16 September, between 6.30–8.30pm. Fee: £4 per term. Special attention will be paid to the objective testing techniques which are required by the multiple choice type examination. Further details from F. Fear, 185 Longwood Road, Aldridge, W Midlands, tel Aldridge 52706, evenings.

the month on the air

John Allaway, G3FKM *

The writer is always receiving results of hf contests from other societies, and almost without fail is struck by the extremely low entry from the British Isles. Just before the deadline for this issue, the results of the 1980 Bermuda Contest arrived, listing the calls of 15 British stations but at the same time bearing the calls of 55 stations in the German Federal Republic. The proportions in other competitions are often worse than this and it really would be interesting to know why this is so.

N4CC is very anxious to trace the operator of VS9PJV—Hal Parker—who was on the air from Perim Is in 1971. Would anyone with information please contact G3FKM?

Please note that the deadline for information to appear in the December *MOTA* is now 28 October—not as published in January 1980 *MOTA*.

DX news

VR4AA has been off the air for several years but now has a TS520 and vertical antenna and his new callsign H44AA.

There seems to have been some piracy of the WA2FIJ/KH5 callsign, and only contacts between 0330 on 8 January and 1700 on 10 January 1980 can be confirmed.

Father Dave, CE0AE, has been on an extended visit to the USA and will not be back on Easter Is until October. Another operator, using the name Mike, has been heard using the callsign CE0AC and asking for direct QSLs to Easter Is.

Fr Danny, P29CC, has returned to Papua New Guinea, and a new amateur in the area, P29RY, is often to be found near 14,235kHz after 1200.

Capt Stan Ridgway, G3TZQ, was one of the British force which went to Efate in the New Hebrides in June. He was issued with the callsign YJ8SR, and he had a Plessey Clansman PRC320 and dipole antenna but hoped to erect a quad later. He gave his favourite frequency as 28,020kHz and was hoping to contact as many UK stations as possible. YJ8GG is also active and asking for QSLs to his home call G8JUZ.

The appearance of G3JKI/5A on the bands caused quite a stir in late June. QSLs were promised via F6CYL, and there is a rumour that Arthur may appear on the scene again later in the summer.

D68AP has returned from France and is now back in Moroni. He is to be found near 14,255kHz after 2000, but also occasionally uses the 14,305–14,315kHz area.

Long Island DX Bulletin mentions that K5LBU/ST0 now has a schedule at 0400 on 21,275kHz, as well as the one at 1200 on 28,750kHz. His equipment is battery powered and he asks for QSLs via KC4CD. Hans, ST0RK, is now in Thailand and trying to obtain operating permission.

QRZ DX has produced a comprehensive list of VQ9 calls heard during the past year. Currently active are VQ9CI (the Diego Garcia ARC), VQ9DM (K7ABX), VQ9JP (WB0OEF), VQ9JW (KA3EVN), VQ9TT (WD9HNB) and VQ9WE (N8ARW). VQ9JC (WB7DOZ/DU) is listed as occasionally active. Inactive are K4GMH/VQ9, and VQ9s DH, DS, JJ, KJ, KK, PC, PR, RF, RL, RM, TC, TR and WJ. VQ9CI acts as QSL bureau but of course cannot handle cards for any previous Seychelles Is VQ9 callsign holders. VQ9CI's address is NSF, APOSF, Cal, 96685, USA.

A7XE returned to Germany in mid-June but should be back in Qatar by now. A7XGI has been very active on cw and asking for QSLs via DL2MY—he is Roland, DK3GI.

VK9XW, on Christmas Is, is frequently to be found around 14,250kHz at 1000 and on Saturdays from 1500.

LU7XP will be the callsign of a station on Isla de 25 Mayo (Antarctica) after 21 January next. CE9AT is now back on the S Shetland Is. Those prepared to take part in "list" operations may like to know that callsigns of those wishing to contact LU1ZA (S Orkney Is) are collected by 11AGC on 14,260kHz around 1600 and then passed to LU1ZA on 14,290kHz at 2100.

News from overseas

G4DXC has written to say that the Rev Paul Williment, G3TXW, is now in Kuching, Sarawak, where he is licensed as 9M8PW. At the beginning of July he was awaiting acceptance of his equipment by the authorities—it appears that they have only had to deal with the FT101 range so far. 9M8PW's address is the House of the Epiphany, PO Box 347, Kuching, but QSLs should be sent via G4DXC (see "QTH Corner"). Paul has been invited to join the council of the Malaysian AR Transmitting Society, and says that he hopes to be able to maintain interesting contacts—after all radio is about communication!

Two British operators are presently at the Chilean base on King George Is and will stay until the end of October. They occasionally get on the air from CE9AF but have no fixed operating habits. They have told G4DSE that they operate early mornings on 7 and 14MHz mainly into the eastern USA and S America, and at other times favour 21MHz. SSB is the mode used.

During the DARC meeting in Friedrichshafen at the end of June, your scribe (left) had the pleasure of meeting Shozo Hara, JA1AN, president of JARL; and Esteban Castaner, EA3BD, president of URE (right)

*10 Knightlow Road, Birmingham B17 8QB

Information on the Botswana ARS has been supplied by the Johannesburg branch of SARL. A list of callsign holders dated 24 March shows some 30 calls and a special callsign—A22GTF—allocated to the Gaborone Trade Fair, and there are about 10 non-licensed members of the society. The calls listed are A22s AB, AT, FA, GJ, PG, BX, JH, RK, TL, AG, SM, DK, SR, DN, FL, BW, SS, PS, ED, GV, GW, DW, BB, DR, PE, AY, CG, MA, AJ and BP. More information is available from the secretary, D. W. Harris, A22BX, Post Bag 0060, Gaborone, Botswana.

G3ZHI recently visited Morocco and while there met CN8BX and CN8BD. Both are keen users of Oscar, and as QSL cards are very expensive G3ZHI has taken on the task of QSL manager for Rachid, CN8BD. Ian feels that this is one thing that those of us in the more developed countries can do to help the less fortunate, and a way to say "thank you" for the great hospitality which is usually received from overseas amateurs when visiting their countries.

G4BWP is now in Kuwait and should be there for about five months. He says that A4XIU originates from Halifax, and A4XIH from Sutton in Cambridgeshire. The latter has been reissued with his G3KER call. Both stations look for UK contacts, particularly with stations located in their home areas. QSLs for A4XCA, A4XIH, and A4XIU (as well as for G4BWP's 9K call—not known at the time of writing) should now be sent via G4GIR.

The *W6GO QSL Manager List*

This is an excellent and most useful list of nearly 5,000 stations and their QSL routings—including the full QTHs of the main QSL managers, and direct addresses for some of the more sought-after stations. It is produced (and regularly updated) by Jay and Jan O'Brien, W6GO and K6HHD, in California, but may be obtained in the UK from Brian Russell, BRS33915, 163 Halton Road, Runcorn, Cheshire WA7 5RJ. The price is £1 or US$3 or eight ircs for overseas airmail delivery.

Dxpeditions

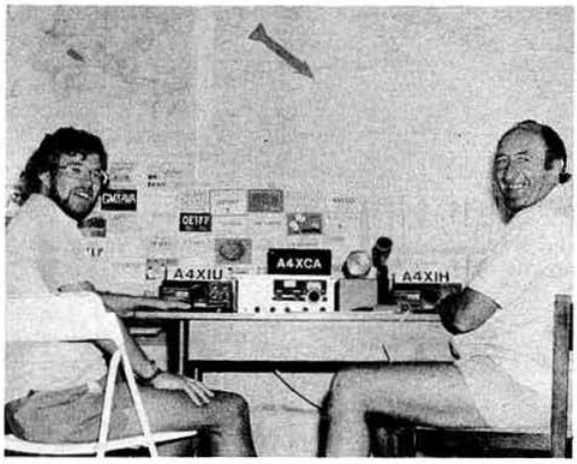
According to *Long Skip* ZL1AZV and ZL1AMO should operate from Tonga between 23 and 26 August, and again from 7 to 13 September. This will be at the end of a tour which was planned to include visits to Niue (ZK2) and Samoa (5W1) as well as Tonga. QSLs for ssb contacts should be sent to ZL1AVZ, and for cw QSOs to ZL1AMO. The same source mentions a forthcoming trip by DJ0FX around the Pacific commencing in November; plans are afoot to stop at FW, KS6, 5W1, A35 and FO, and most activity will be on cw.

C5ABV may be in Malawi late this year, and hopeful that he may be able to obtain operating permission through his United Nations contacts.

John, KP2A, is believed to have left the equipment which he used during his CR9A activity from Macao for use by DU2KK during the CQ WW DX Contest in October.

Jim Smith, P29JS, is reported to have received approval from the Australian authorities for his planned expedition to Heard Is and has the callsign VK0JS. It is understood that landing permission has been granted provided that stringent rules are observed. The activity may take place at the end of this year or early in 1981, and will hopefully last long enough to satisfy the large demand.

DJ6SI, DL2WI, DJ5RT and DJ7YP expect to leave Cologne for Juan de Nova on 9 September—callsigns to be used were not known at the time of writing. The QSL cards for earlier FR7/G operation will take some 300 man-hours to complete!



Brian, A4XIU, (left) and Arthur, A4XJK/G3KER, in the shack of A4XCA—the Thurmrait ARC. (*Photo:* A4XIU)

VK2BJL is rumoured to have hopes of visiting KH5, KH5K and ZM7 in the not too distant future. Also rumoured is activity from HK0AA (Bajo Nuevo) and HK0AB (Serrana Bank) commencing 10 September.

According to *Long Island DX Bulletin* ZD7HH and ZD7SE will visit ZD9 for six days during January or February 1981.

10MHz

A press release from IARU Region 3 Association says that DU1JE, IARU Liaison Officer for PARA (the Philippine Amateur Radio Association), has advised that the Philippine administration has been contacted about the new hf amateur allocations gained at WARC 1979 and that the band 10·1 to 10·15MHz will be released to DU amateurs on 1 January 1982. It is believed that this is the first announcement by an administration that the band will be made available on that date.

Hong Kong beacon

The HARTS had for sometime been considering provision of a 28MHz beacon in Hong Kong as part of the international beacon project co-ordinated by Alan Taylor, G3DME, for IARU. Land and accommodation in the territory is at a premium and for a long time proved to be a stumbling block. However, the arrival of Geoff Smith (G4AJJ, A9XBD, and now VS6GS) who had installed the 28MHz beacon A9XC in Bahrain solved the problem, as Geoff works for Cable & Wireless Ltd—who in the past have very kindly supplied sites for the A9XC and 3B8MS beacons.

Cable & Wireless Ltd generously agreed to a beacon being installed at their Cape D'Aguilar hf transmitting station, and the project also received the blessing of the Hong Kong Post Office (Telecoms Division) which issues amateur radio licences. Approval was also granted by the Civil Aviation Department.

The beacon transmitter was built by Klaus Goebel, VS6FX, and consists of a modified a.m. Meteor 5000CB transmitter. After the alterations had been made the unit had a stability of

better than two parts per million. It was installed on its site on 28 June by VS6FX, VS6GS and VS6CZ, and was switched on at 0800. The callsign VS6HK is being sent every 3min on cw on 28,290kHz. Transmitter power is 4W output radiated by a trapped λ/4 top-loaded omni-directional ground plane antenna (with 0dB gain). Reports would be welcomed and should be sent to HARTS, PO Box 541, Hong Kong.

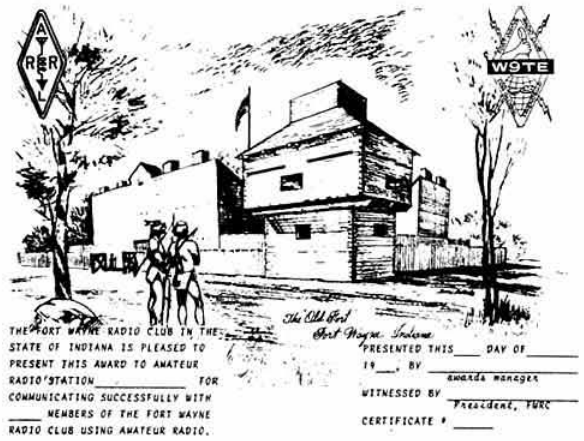
Welcome

The following new members from outside the UK were enrolled during June: A9XCX, CT4IB, EA3AIR, LU9CN, PY1BCZ, SV1LY, VK2AYK, VK5NDN, VS5JM, VS6AG, ZB2GK, and 5B4JE. Listener members include C. J. Dixon (DL), F. J. Ross (JY), C. W. Edwards (PY), C. G. Pfaff (VK), K. Thevarajah (9M), and P. Gillen and F. O'Dowd (EI).

Awards

The Fort Wayne RC Certificate

Requires contact with at least five members of the club since 1 January 1979. There are no mode/band restrictions. Send a list of members worked giving call, name, date worked, time, and band to Fort Wayne Radio Club, PO Box 15127, Fort Wayne, Ind, 46885, USA. The list must be certified by two other amateurs or an official of a radio club. The certificate is free, but if airmail delivery is required please enclose two ircs.



The Fort Wayne Radio Club Certificate (see text)

Worked All New Zealand (WAZL)

Requires contact with at least 35 of the 45 branches of NZART. Cost is NZ$0.50 or three ircs.

New Zealand Award

Requires 35 ZL1 contacts, 35 ZL2, 20 ZL3, 10 ZL4, and one QSO with a New Zealand Territory (eg Chatham Is) since 8 December 1945. Cost is NZ$0.60 or three ircs.

New Zealand Counties Award

For contacts with at least 20 different ZL counties. Special check sheets are available from NZART for one irc.

Antipodes Award

This is a new award issued by NZART and requires contact with at least three stations in the general antipodes continental area of the applicant (eg Europe to ZL). The *whole of the applicant's station*—receiver, transmitter and antenna—must be home-built and be of amateur design and construction which the operator has personally developed and constructed (commercially made kits are not eligible). Apply, with certified statement that rules have been observed and four ircs, to NZART Awards Manager, Jock White, ZL2GX, 152 Lytton Rd, Gisborne, New Zealand.

Worked All Pacific

Contacts required with 30 different countries in Oceania. This award costs NZ$1 or five ircs. For each of these awards applications should be sent (certified list *not* QSL cards) to ZL2GX (see above).

The BYLARA Award

Reference to this award made in the June/July issue of *Radio Communication* omitted the starting date for eligible QSOs—this is 29 April 1979. Apologies for any inconvenience caused.

Contests

VK/ZL/Oceania Contest 1980

1000 4 October to 1000 5 October (phone)
1000 11 October to 1000 12 October (cw)

All bands 3·5 to 28MHz. Contacts with VK/ZL count two points, with other Oceania stations one point. The multiplier is the sum of VK/ZL call areas worked on each band added together. Exchanges consist of RS/T plus serial QSO number (from 001). Logs must show date, time, callsign of station worked, number sent and received, and each new multiplier should be underlined. A separate log sheet should be used for each band, and a summary sheet indicating callsign, name and address in block letters, equipment details, and for each band QSO points and total of VK/ZL call areas worked on that band. A signed declaration that all rules and regulations have been observed must also be enclosed and the entry must be posted to NZART Contest Manager, ZL2GX, 152 Lytton Rd, Gisborne, New Zealand, to arrive no later than 31 January 1981.

Certificates will be awarded to top all-band entries (phone and cw) and others will be issued for lower placings if the entry justifies this. Listeners may enter and must log date, time, and callsigns of VK/ZL stations heard, with callsigns of stations being worked, RS/T of the VK/ZL station, number sent by the VK/ZL, and band on which heard. Scoring same as for other section, but phone and cw is combined as one contest for the listener category. Jock White, ZL2GX, asks for all logs, however modest, to be submitted please.

YL Anniversary Party

1800 15 October to 1800 16 October (cw)
1800 5 November to 1800 6 November (phone)

This is open to all lady operators, and only members of the YLRL are eligible for cup awards. Copies of rules are available from G3FKM (sase please).

The CQ WW DX Contests

0000 25 October to 2400 26 October (phone)
0000 29 November to 2400 30 November (cw)

All bands 1·8 to 28MHz. Exchanges consist of RS/T plus *CQ* zone number (UK is in zone 14). One point is earned for a

QTH CORNER

A35YY	via K5YY (see ZK2YY).
A4XCA, A4XIH, A4XIU	via G4GIR, I. C. Frith, 13 Rye Crescent, Cople, Bedford MK44 3TJ.
C31IR	via F6AUS, S Soulet, Les Hautes-Rivieres De St-Eanne, 79800 La Mothe St-Heray, France.
C31SY	via G4IGZ, PO Box 4, Nelson, Lancs.
C31VI	via G8VAL, PO Box 4, Nelson, Lancs.
CN8BD	via G3ZHI, 9 Grove Terrace, Maltby, Rotherham, Yorks.
F0EUR	via G4IGZ (see C31SY).
F0FSD	via G8VAL (see C31VI).
H44JB	Box 481, Honiara, Solomon Is.
H44SH	Box 258, Honiara, Solomon Is.
PY0SOB, PY0YCW	via PY1AA, LABRE, PO Box 2353, ZC Oo, 20000 Rio de Janeiro, Brazil.
TA1HIA	PO Box 3, Cevizli, Istanbul, Turkey.
VK9/VK0	QSL Bureau now c/o N. R. Penfold, 388 Huntriss Rd, Woodlands, WA 6018, Australia.
VS5LH	PO Box 1580, Bandar Seribegwan, Brunei.
YJ8SR	via G3TZQ, S. E. Hunt, 51 Green St, Milton Malsor, Northampton NN7 3AT.
ZK2YY	via K5YY, S. Hutson, Box 5299, Little Roack, Ark, 72215, USA.
ZL3MA/C	via WB8WMS, A. E. Byers, 1590 Arlington NW, Warren, Ohio, 44483, USA.
5N9GM	Box 1488, Kaduna, Nigeria.
6O0DX	via I2YAE, G. Broggini, V. Dante 14, 21022 Azzate, Italy.
9M8PW	via G4DXC, H. Rennison, Riverdale, Beckfoot Lane, Bingley, W. Yorks, BD16 1LX.

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

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contact with a station in one's own continent and three for contacts with all others. Stations in one's own country may only be worked for multiplier credit, and no QSO points claimed. The multiplier is the total of DXCC countries and *CQ* zones worked on each band (added together for multi-band entries). There are three entry categories: (a) single-operator single- or multi-band, (b) multi-operator multi-band (single transmitter), and (c) multi-operator multi-band multi-transmitter. In category (c) only one signal may be radiated on each band at any time. Entrants should use separate log forms for each band and follow the layout of the official form (with 40 QSOs per page). Log and summary sheets may be obtained from *CQ* by sending a large self addressed envelope and ircs to the sponsors CQ WW DX Contest Committee, 14 Vanderventer Ave, Port Washington, LI, NY, 11050, USA. A small quantity is available from G3FKM, and RSGB hf contest log sheets closely resemble the official *CQ* variety! Entries should be posted before 1 December for the phone section and by 15 January for the cw event.

Scandinavian Activity Contest

1500 20 September to 1800 21 September (cw)
1500 27 September to 1800 28 September (phone)

3·5 to 28MHz. Stations may be worked on each band for credit. Exchanges consist of RS/T plus serial QSO number (from 001), and European stations count one point per QSO with Scandinavian stations. The multiplier is the total of Scandinavian call areas worked on each band added together—eligible prefixes being LA/LB/LG/LJ, JW, JX, OF/OG/OH/OI, OH0, OJ0, OX, OY, OZ, SJ/SK/SL/SM and TF. There are single-operator, and multi-operator single- and multi-transmitter sections (the last must use a separate series of numbers on each band). Following IARU recommendation, contest activity should be confined to the areas 3,505–3,575, 7,005–7,040, 14,010–14,075, 2,010–21,125 and 28,010–28,125kHz (cw), and 3,600–3,650, 3,700–3,290, 7,050–7,100, 14,150–14,300, 21,200–21,350 and 28,400–28,700kHz (phone). Use separate log sheets for each band and include a summary sheet showing scoring, name and address in block capitals, and a signed declaration that all rules and regulations have been observed, and post before 15 October to: SSA Contest Manager, Peter Arninge, SM0GMZ, Granovagen 20 7, S-151 64 Sodertalije, Sweden.

In the 1979 event **G3TTJ** was world eighth in the single-operator phone section with 32,968 points. Other UK entrants in the same section were GW3GXR (16,863), G4CVZ (11,368), GW3LAD (8,120), G8VF (7,504), G3NT (4,602) and G4EDR (1,484). In the cw section **GW3HCL** was leading UK station with 23,529 points, followed by G3SGQ (17,018), G2GM (16,428), GW3NYY (7,595) and G6NK (3,234).

Results of the **1980 Bermuda Contest** have been received and the lucky UK winner is G4DSE who scored 532,740 points. Other British scores were as follows: G3VPW (484,560), G3VOF (267,930), GI4ELQ (102,600), GI4ISR (72,080), G3TKF (56,140), G2FXQ (16,290), G4FJT (13,190), G4HQN (7,370), G4GFH (5,680), G3XPM (4,360), G3OGQ (2,205), G4JBH (2,115), G3ESF (1,215) and G3NT (1,200). No less than 55 West German stations participated, the highest scorer being DK9WB (383,295).

Band reports

G8KG, having returned from a well-earned rest, has offered the following: "After the high peak in April and May, solar activity declined somewhat in June and appears to be levelling off in July, but still remaining above the levels of a year ago. It is interesting to note that, using values corrected for the varying distance of the sun from the earth, July was the sixth month of the cycle in which the highest daily solar flux reached or exceeded 250 sfu. The first of these was of course November 1979, which is the only one to have passed the 300 (and 350) threshold.

"The three-month mean sunspot numbers for February to May were 149, 151, 158 and 168 respectively, and plotting these on Fig 1 on p834 of *Radio Communication* September 1979 shows Cycle 21 well clear of Cycle 18 and not far below Cycle 19 at the corresponding time. It is probable but not certain that May was a subsidiary peak and that the trend will now be slowly downwards, though further subsidiary peaks are likely. The prospects for the hf bands in the 1980–81 dx season look good and some good transatlantic conditions on 50MHz can be expected, particularly from late October to the end of the year, though we shall be lucky if these are as good as in the corresponding period last year."

Your scribe is most grateful to the following for sending in information for this section: G2s BON, HKU, G3s AAE, GIQ, GVV, IGW, KSH, LPS, NWG, SED, SJH, GM3YOR, GW4BLE, GM4CHX, G4s DSE, EHQ, GM4ELV, RSs 17567 and 31301, and Philip Aliband.

Italics indicate that the station was using cw.

3·5MHz. 0000 PY0YCW. **0100** VO1.

7MHz. 0000 *CX5RV, EA9GK, PP0MAG, UA0ACJ, UK1PAA, ZB2EO, ZD8KM, 5Z4YV, 8Q7AR.* **0500** *VP2VGP, G4EKF/5N8.* **0800** *N5VV, W7ZI.* **1800** *JA3YBF.* **2000** *7X5CN.* **2100** *DJ1US/ST3, ZD8TC.* **2200** *A4XVK,* TR8DA, YB0WR, 5N0BCD, *5Z4YT, 8Q7AW.* **2300** CT3AB, JY5MM, LU, *OX3CO,* ST2SA, DJ1US/ST3, VK6s, 6T1YP, 6W8IH, 4K1A.

14MHz. 0000 *DK6NN/C6,* VK6 (SP). **0700** HC8s EE, KA, HV2VO, KH6, KL7, ST2FF/ST0, VK9ZG, VK0KH. **0800** H44CF, TY9ER, VY1BR, 4B4MDX. **0900** G3JKI/5A, VS5TX, YI1BGD. **1100** VK9ZG, 5W1CR. **1200** KC4AAA, ZL4PD. **1600** *JT1BE, BM, UA0YAD, 3B8AS.* **1700** SU1ER. **1800** *A7XGI, AL7Z, S8AAW.* **1900** *FR7BX, HS1ABD, 4K1A, 5X5FS* (EI9G), *9U5DS.* **2000** *A22GD, A7XE,* SU1BA, VK9CCT, 5V7HL. **2100** VE1AL/1, *UP0L 24* (QSL via UA1ABY). **2200** *JT1AU,* 4U1UN. **2300** OE5GML/YK.

21MHz. 0000 CE3TJ, VK7TJ (LP). **0400** *CO, HS1ABD, KH6.* **0500** *HC8II, TA1UA.* **0600** 6O0DX. **0700** FO8s EW, FO, GL, HC8EE, *KA6HI-Q/KH3,* WA5PHD/KL7, 3D2FL, *5W1BZ.* **0800** JA, KH6, W4PYH/KH8, KL7, T2AAA, VK, ZL, 3D2CS, 5W1BZ, *5W1CS* (QSL to K4YY). **0900** A35YY, FR0FLO, ST2FF/ST0, T2AAA, ZK2YY, 3D2CC. **1000** T3AC, *UA1PAL,* VE8RCS, YJ8NPS, 6T1YP. **1100** H44LW, 9N1MM. **1200** H44JB, T3AC, VP9AD. **1300** H44SH, ST2FF/ST0, VS5DD. **1400** AP2MQ, J27CC, P29JS, *VE1AI/1, 8Q7AY.* **1500** *HM1JJ, KH6JCW,* 9V1UH. **1600** *A7XGI,* VS5SR, W6-W7, *3B8CF, 9V1TL.* **1700** KH6IBA, OX3HA, S79MC (QSL to N4NW), VS6CZ, *VQ9JW,* YB6JA, 5H3AA. **1800** CE9AF, HC8EE, VS5DD. **1900** A7XD, XT2AY, *4U1ITU.* **2000** HC8s *GG,* KA, *KH6IJ,* N6HR/KX6, ST2SA, VP8QG, VQ9DM (QSL to K1BZ), 6W8JI (QSL to WA4VDE). **2100** FM7AV, *HS1ABD,* OD5HQ (QSL to DJ9ZB), YI1BGD, *DF5FM/5N0.* **2200** DF3NZ/ST, VK2s, *VK3XB,* W6s, ZD8TC, 8Q7AY. **2300** HC8KA, VR6TC, W6, W7, W0.

28MHz. 0000 HH2VP, W1, W2, W3, and VK (until 0130), 7X4AN. **0600** JA, VS6CZ, ZL, ZS6RU. **0700** 6O0DX. **0900** VK6FO, 5V7HL. **1200** ST2FF/ST0, 6T1YP, 9K2BE. **1300** KG4WM, XT2AW. **1400** WP4ADA, ZS3C, 6W8HL. **1600** HS1ABD, ZP5RG. **1700** CE1BLL. **1800** PP0MAG, N4ZC. **2100** VO2 (S9+ on 10 July—double sporadic-E?). **2200** CE1CKA. **2300** ZL4BO (LP).

Thanks to all who contributed to this month's column and also to the authors of the following news sources: *Long Island DX Bulletin* **(W4UL/W2IYX),** *DX News Sheet* **(Geoff Watts),** *Long Skip* **(VE3FRA),** *DX'press* **(PA0TO),** *CQ Magazine* **(W1WY),** the *Ex-G Radio Club Magazine* **(W3HQO),** and the *DX Bulletin* **(K1TN).**

Please send all material for the November issue **to reach G3FKM** no later than **3 October** and for **December** by **28 October —please note that this is slightly earlier than the date for December given in January 1980** *MOTA.* □

HF propagation study

Predicted hpf + luf in megahertz for September 1980

	00	02	04	06	08	10	12	14	16	18	20	22
Suva (s)	1600	1400	1600	2300	2700	2900	3000	2900	2500	2700	2100	1900
Wellington (s)	1600	1500	1800	2500	2900	3100	3200	2800	2300	2200	2000	1700
Osaka	1611	1512	1812	2513	2915	3214	2913	2511	2110	1908	1708	1709
Hong Kong	1610	1512	2013	2816	3317	3516	3614	3111	2708	2606	2105	1707
Sydney (s)	1613	1516	2019	2820	3320	3517	3513	3109	2706	2205	2105	1708
Moscow	1403	1203	1204	2205	2607	2808	3008	2907	2906	2604	2003	1603
Bangkok	1709	1511	2213	3116	3518	3718	3815	3711	3608	2906	2305	1807
Singapore	1708	1610	2313	3216	3719	3818	3914	3711	3707	3005	2304	1906
New Delhi	1703	1606	2309	3212	3714	3814	3913	3710	3106	2604	2303	1903
Perth	1910	1714	2317	3421	3922	4020	4016	3511	3408	2505	2105	2107
Teheran	1903	1704	2306	3409	3911	4012	4112	3909	3905	3104	2403	2102
Colombo	1904	1707	2311	3415	3917	4017	4115	3911	3707	3205	2504	2104
Bahrain	2103	1804	2206	3509	4012	4113	4212	4010	4006	3204	2603	2203
Cyprus	2003	1703	1705	3107	3510	3711	3711	3709	3707	3105	2503	2103
Aden	2304	1906	2208	3611	4114	4215	4415	4212	4208	3406	2804	2404
Seychelles	2600	2000	2100	3700	3800	3800	4000	3800	4200	3200	2900	2300
Mauritius	2500	2100	2100	3600	4100	4000	4000	4200	4200	3500	2900	2600
Nairobi	2603	2103	2106	3510	4114	4215	4414	4412	3708	3605	3003	2603
Malta	1603	1502	1402	2205	2708	2909	3009	2909	3007	2605	2203	1803
Salisbury	2703	2303	2205	3510	4115	4017	4016	4414	4311	3706	3103	2802
Cape Town	2800	2300	1900	3100	4000	4300	4400	4500	4300	4000	3200	3000
Lagos	2904	2703	2303	2907	4012	4314	4314	4514	4412	4108	3304	3003
Suva (l)	2900	2800	2300	2800	3100	2700	2500	2400	1900	2400	3400	3000
Gibraltar	1502	1402	1202	1503	2204	2505	2506	2505	2605	2403	2002	1702
Ascension	2904	2803	2403	2307	3813	4215	4316	4417	4215	4110	3404	3004
Wellington (l)	2800	2700	2300	2200	2200	2000	1700	1700	1500	2500	3000	3000
Dakar	2700	2500	2000	2307	3711	4113	4014	4214	4213	4011	3406	2902
Las Palmas	2303	2102	1802	1904	3207	3609	3610	3611	3610	3506	3103	2603
Falklands	2706	2604	2305	2207	2212	3618	4022	4123	4122	4017	3612	3008
Rio de Janeiro	2705	2604	2304	2107	2511	4116	4019	3820	3718	3814	3610	3007
Buenos Aires	2705	2604	2204	2106	2410	3615	4020	4021	4020	4016	3612	3008
Sydney (l)	2613	2311	2110	1908	2808	2413	2119	1923	1724	1921	2918	3015
Lima	2600	2300	2100	1800	2700	2400	3900	3800	3800	3800	3700	3000
Barbados	2503	2202	2002	1803	2106	3610	3814	3715	3715	3813	3609	3006
Bogota	2400	2100	1900	1700	2300	2600	3800	3600	3600	3700	3600	3000
Jamaica	2300	2000	1800	1600	2200	2400	3600	3500	3500	3500	3500	3000
Bermuda	2300	2000	1800	1600	1800	3100	3600	3500	3400	3500	3600	3000
New York	2106	1906	1606	1506	1507	2410	3213	3314	3314	3312	3210	2708
Mexico	2100	1800	1500	1400	2100	1900	2800	3300	3300	3300	3200	2600
Montreal	2109	1808	1508	1508	1510	2412	3114	3215	3214	3213	3110	2609
Denver	2000	1700	1400	1300	1500	1500	2200	2700	3100	3100	3000	2500
Los Angeles	2000	1700	1400	1300	1600	1500	1600	2500	3000	3000	2900	2400
Vancouver	1900	1600	1500	1500	1900	1600	1700	2100	2200	2400	2600	2200
Iceland	1208	1008	1008	1207	1909	2109	2209	2310	2210	2209	1909	1508
Honolulu	1700	1500	1400	1700	2400	2000	2000	1700	2100	2800	2500	1900
Fairbanks	1700	1500	1500	1900	2100	2100	2300	2400	2400	2400	2300	1900

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

Propagation predictions

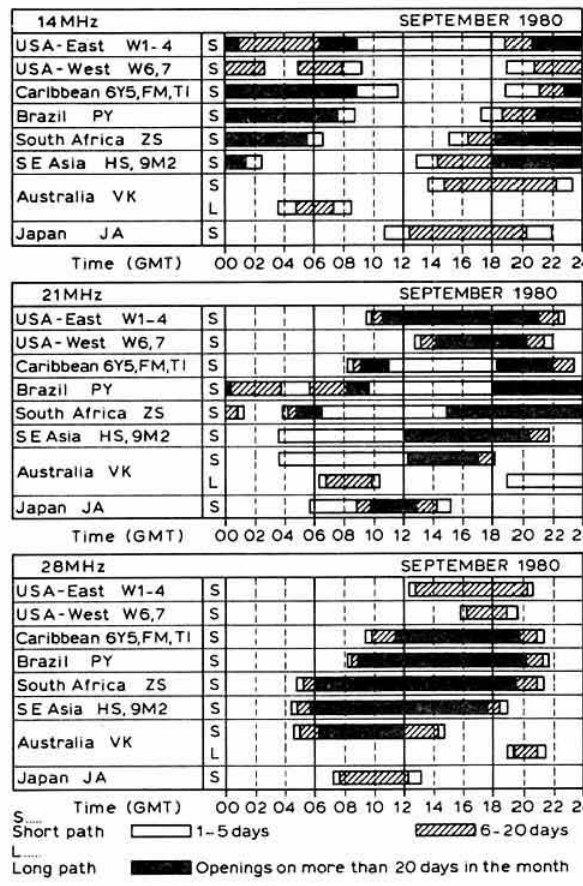
During the summer months the F2 mufs are relatively low, but from September onwards they will steadily increase, and dx conditions on the hf bands will improve to reach their maximum during October and November. Conditions will therefore improve considerably in the coming months, especially on **28** and **21MHz.** On favourable days traffic with North America will be possible during September, and towards the end of the month this will improve considerably. While conditions for traffic with South America and Africa will show little improvement on last month, traffic with Central America and Australia will be greatly improved.

There will only be a slight improvement of conditions on **21MHz** compared with last month, and it will not be as noticeable as on **28MHz.** Traffic with western North America and Australia will be certain.

The **14MHz** band will remain a night-time dx band even though traffic with North America may be interrupted from time to time. As dusk falls earlier in the northern hemisphere as the season advances, the best time for dx will be before midnight.

The **7MHz** band will remain ideal for local traffic during daytime without the dead zone. As the season advances the chances for dx will increase while the longer part of the path lies in darkness. Distances covered will increase on **7** and **3·5MHz** compared with the summer months. Interruptions by the dead zone will only occur infrequently on **3·5MHz** during the latter half of the night.

The provisional mean sunspot number for June 1980 from the Swiss Federal Observatory was 157·2. Sunspot activity was reasonably evenly distributed throughout the month. The predicted smoothed numbers for October, November and December are 136, 134 and 131 respectively.



obituaries

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

Mr A. Reid, VK3AHR

Alan Reid died in February. He was first licensed in the 1920's as 3HR when a schoolboy. Later, in Australia, he concentrated on 10MHz, pioneering VK ssb with his own designs for phasing rigs. He was well known in AWA, and during the war years carried out valuable work with radar for the forces. He was known for his friendliness and help to other amateurs.

Mr W. E. Russell, G5WP

"Rusty" Russell of Guildford died on 29 May, aged 71. He was well known on the dx bands for many years, and was a very enthusiastic and long standing participant in BERU contests. He was one of only two G stations ever to win the event overall and was G winner on no less than nine occasions. He served on RSGB Council from 1944 to 1945. In latter years he was mainly active on 3·5MHz. In particular he worked dx with his many friends in ZL during the early morning.

We have also been advised of the death of:
Mr C. Trinnock, G3NHC.

your opinion

THE KITEFLIERS

The Editor,
Radio Communication

Sir—It will be remembered that Marconi used a kite to support his antennas from time to time, but in rather more recent times—in fact on three occasions within the last few years—antennas supported by kites flown by the Cornwall Kitefliers have proved of interest. The most notable occasion was the Poldhu celebrations of the first two-way across the Atlantic, when a replica of the Marconi kite was in fact flown for some hours in adverse weather conditions, and provided support for an antenna on 3·5MHz.

On 4 May this year the club was asked to put on a station with the specific intention of contacting a similar station using kite-supported antennas at Old Warden, the local club involved being the Dunstable Downs Club. The Cornish end was situated in a field not 100 yards from the Goonhilly dishes, and more than 30 contacts were made on 7MHz during a three-hour period.

Other clubs may wish to consider linking up with local kitefliers, and if they would like to be put in touch with suitable local clubs, perhaps they would get in touch with Mr N. Werner Lawrie, Longstone Lodge, Aller, Langport, Som. He represents European kitefliers. Alternatively, Mr John Sweetman, Mah-Jong, Shortlanesend, Truro, Cornwall, will be able to give rather more local information.

Mr Sweetman told me that he is hoping that there may one day be a kitefliers equivalent of JOTA, so how about being in on the start of "International Kite supported Antenna Day"?

Ron A. Ledgerton, G2ABC

AMATEUR RADIO IN HOSPITAL

The Editor,
Radio Communication

Sir—Provided permission is obtained in advance, there is usually no objection to the use of amateur radio transmitting equipment by licensed operators during a spell in hospital. However, there are certain rules that must be observed apart from obtaining permission in the first place. Small 144MHz equipment is the obvious choice, except in cases where the stay in hospital may be for a very considerable time, eg in a hospital or home for the handicapped.

Permission for use of radio or, indeed, any electrical equipment, should be obtained as much in advance as possible from the unit administrator and/or district works officer c/o the hospital concerned.

This is important in hospitals where sensitive electronic equipment is in use; for example, life support systems. It is vital that radiation, however low, cannot cause interference. Tests with respect to this are absolutely essential, and hospital staff will normally be willing to co-operate. It is also essential that any equipment connected directly to a mains socket (usually available at bedsides) meets electrical standard safety regulations. This aspect can be checked by an appropriate member of the hospital staff. Provided such equipment takes negligible power from the mains, eg a small charger unit for a portable battery-operated 144MHz hand-held, or low-power mains-operated transceiver there may be no charge for electricity consumed. Check on this.

The following conditions concerned with actual operation are recommended:

Use lowest transmitting power possible. Your hospital may not be too far from a repeater station.

Have regard for other patients by using an earphone for listening (or mic/earphone) and keep voice level to a minimum when talking.

Close down immediately if asked to do so.

The writer is indebted to senior staff members of the Norfolk & Norwich Hospital, Norwich, for guidance on the above.

F. C. Judd, G2BCX

Contests calendar

6–7 September	IARU Region 1 VHF/UHF/SHF (VHF Section) *(Rules in June/July issue)*
6–7 September	SSB Field Day *(Rules in May issue)*
6–7 September	144MHz Trophy and SWL (*Rules in June/July issue*)
7 September	Bulgarian DX *(Rules in August issue)*
13–14 September	2nd International (28MHz portable) *(Rules in August issue)*
13–14 September	European DX (Phone) *(Rules in August issue)*
13–21 September	12th BARTG VHF/UHF *(Rules in August issue)*
14 September	RSGB Region 1 VHF *(Rules in August issue)*
14 September	DF Final Dartford Heath
20–21 September	Scandinavian Activity (cw) *(Rules in September issue)*
21 September	10GHz Cumulative *(Rules in May issue)*
27 September	AGCW-DL *(Rules in April issue)*
27–28 September	Scandinavian Activity (phone) *(Rules in September issue)*
4–5 October	432/1,296/2,304MHz and SWL
4–5 October	IARU Region 1 VHF/UHF/SHF (UHF/SHF section) *(Rules in June/July issue)*
4–5 October	RSGB UHF *(Rules in August issue)*
4–5 October	VK/ZL/Oceania contest (phone) *(Rules in September issue)*
5, 12, 19 October	Grafton Top Band *(Rules in September issue)*
10, 18, 26 October	432/1,296MHz Cumulative *(Rules in August issue)*
11–12 October	VK/ZL/Oceania contest (cw) *(Rules in September issue)*
12 October	21/28MHz *(Rules in May issue)*
15–16 October	YL Anniversary Party (cw) *(Rules in September issue)*
19 October	21MHz CW *(Rules in June/July issue)*
25–26 October	CQ WW DX (phone) *(Rules in September issue)*
26 October	70MHz Fixed *(Rules in August issue:* **Note change of date***)*
26 October	Shefford & D ARS Transmitting and Receiving (Section 1) *(Rules in August issue)*
1 November	Shefford & D ARS Transmitting and Receiving (Section 2) *(Rules in August issue)*
2 November	144MHz CW
3, 11, 19, 27 November	432/1,296MHz Cumulative *(Rules in August issue)*
5–6 November	YL Anniversary Party (phone) *(Rules in September issue)*
8–9 November	Second 1·8MHz
29–30 November	CQ WW DX (cw) *(Rules in September issue)*
7 December	144MHz Fixed
7–8 February 1981	7MHz (Phone) *(Rules in August/September issues)*
28 February–1 March 1981	7MHz (CW) *(Rules in August/September issues)*

contest news

Commonwealth Contest 1980 results

AWARD WINNERS

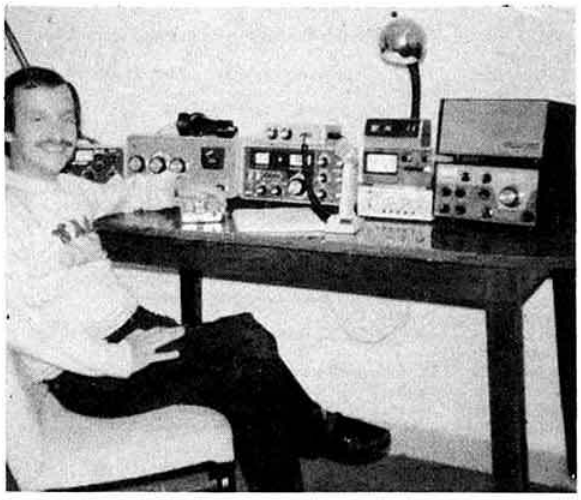
Senior Rose Bowl ..... L. Sawkins, VE7CC
Junior Rose Bowl ..... J. Morris, 9H1EL
Col Thomas Rose Bowl ..... A. J. Slater, G3FXB
Receiving Rose Bowl ..... E. W. Trebilcock, BCRS195

BAND LEADERS

3·5MHz home GW3NYY
7MHz home G3IGW
7MHz overseas VK3APN
14MHz home G3PVA
14MHz overseas VK6AJ
21MHz home G4AZN
21MHz overseas ... ZL1AMO
28MHz home G3MZV
28MHz overseas ZE3JO

How the leaders made their scores

	QSOs/bonus							
	3·5	7	14	21	28	TX	RX	Antennas
VE7CC	16/15	101/49	204/45	177/42	170/52	No details given		
9H1EL	38/12	92/22	189/53	156/44	220/36	FT101	FT101	3·5:inv vee 7:inv vee HF:3-el beam
VE5RA	10/10	81/35	152/38	207/40	108/45	HW101 SB220	HW101	3·5: slopers 7:4-el 14:5-el 21:6-el 28:5-el
G3FXB	12/10	77/43	114/60	90/56	67/48	T4XC	R4C	3·5:dipole 7:slopers 4-el beam HF quad-Yagi
G3FPQ	28/19	67/43	77/53	87/52	53/44	IC701	IC701	3·5: verts 7:5-el fixed HF: 5-el Yagis



In second place overall, Jeff Morris, 9HIEL/G3YDR

Russ Coleston, VK4XA, who led the Australian entry this year

The sunspot maximum years continue to produce conditions which favour stations in the northern hemisphere. Many entrants commented on the good conditions on all bands between Canada and Europe, and on the problems affecting contacts between these areas and Africa, Australia and New Zealand.

With a total of 668 contacts and 203 bonuses, Lee Sawkins, VE7CC, retains the Senior Rose Bowl for a second year. The Junior Rose Bowl remains in Europe, going to Jeff Morris, 9H1EL, who amassed 695 contacts, the highest total of any entrant. Al Slater, G3FXB, keeps the Col Thomas Rose Bowl yet again (his eighth successive win) and after some years absence G3FPQ returns to the tables in fourth place overall.

Without doubt the key to the Commonwealth Contest is bonus points, and those obtained on the lower frequency bands seem to achieve special importance. It is interesting to compare the way in which stations in various parts of the world assembled their scores. Analysis of the winner's log reflects the excellent openings to Europe that enabled VE7CC to build up his score. The 28MHz band produced 112 contacts in 4·5h, and 14MHz 130 contacts in 5h. For the Europeans who spent much of the night scratching for extra bonus points, VE7CC's lower frequency bands list makes interesting reading, especially on 7MHz where he worked VK2, 3, 4, 5, 6, 7, ZL1, 3, 5W1, VP9, ZD8, C5 and VP8!

The leading UK stations consolidated their positions with considerable emphasis on the lower frequency bands. Both G3FXB and G3FPQ used fixed multi-element beams on 7MHz, a factor which may well have been worth more on reception than on transmission. The choicer prefixes appearing in their logs for this band included VE1-7, VP8, VP9, VK2,3,4,7, ZD8, ZK1, ZL1,2,3, 5B4, 5W1 and 8R1. Several G stations including G3FPQ took advantage of the early evening short-path opening to VK on 3·5MHz. G3FPQ's bonus list for this band includes C5, VE1,2,3, VK3,7, VO, ZB2, ZD8, ZL2,4 and 9H1.

9H1EL seems to have successfully resisted the temptation to merely work the always adequate supply of UK stations available on all bands, and he ensured a sufficient supply of bonus points to push himself into second place overall.

Examination of the VK/ZL logs shows a somewhat different perspective of the contest. VK4XA's log for 7MHz shows that the bulk of activity took place during the Australian early evening period between 0600 and 1030gmt with openings to the mid-Pacific, VE1,4,5 and 7. This tendency to lower frequency bands operation in the evening (as opposed to the bulk of European activity during the night) is reinforced in the logs of ZL2BR and ZL2TX.

In the single-band sections the only band attracting any significant number of entries was 14MHz. Overseas, VK6AJ had 127 QSOs and 51 bonuses to give him top place, while at home G3PVA's FT101Z and 2-el quad produced 100 QSOs and 57 bonuses. The overall single-band leader was ZL1AMO who scored 301 contacts and 56 bonuses to give him the lead on 21MHz.

Eric Trebilcock, BCRS195, in his 39th "BERU" comes out top this time in his yearly rivalry with Ron Thomas, BRS15822. Eric found 163 stations with 131 bonuses against Ron's 167 and 120.

Comments concerning the rules in last year's write-up produced a considerable amount of reaction. The overwhelming feeling is that the rules should be retained in their present form. It is clear that much of the attraction of "BERU" is its uniqueness as a contest—the need for

something more than sheer quantity of contacts—and the test of the overall station and operator. Equipment, antennas, propagation knowledge, experience and of course stamina, are tested to a level not reached in many events. There are no plans for any rule changes in the immediate future. Needless to say, comment on any aspect of the contest is always welcome.

Comments

"May not be high in the ratings—but it was all worth while just to work 5W1BZ on 7MHz"—*G3PEK*.

"I feel that to change the nature of 'BERU' would destroy the friendly rivalry that this contest has generated over the years"—*G3DYY*.

TRANSMITTING SECTION

Posn	Callsign	Points
1	VE7CC	7,293
2	9H1EL	6,734
3	G3FXB	6,112
4	G3FPQ	5,692
5	VE5RA	5,691
6	G3MXJ	5,679
7	VE2WA	5,615
8	VE1MX	5,525
9	5W1BZ	5,383
10	VE6KW	5,190
11	G4CNY	5,050
12	G3DYY	4,880
13	ZL2BR	4,860
14	VO1AW	4,820
15	VK4XA	4,813
16	G5RI	4,790
17	VE4VV	4,783
18	VK2BPN	4,750
19	G3PDL	4,570
20	VE1AIH	4,465
21	G6CJ	4,459
22	VE3DAP	4,295
23	VK3MR	4,268
24	G3PEK	4,255
25	ZD8TC	4,203
26	9J2BO	4,120
27	VE6LU	3,986
28	ZL2TX	3,895
29	C5AAP	3,778
30	ZB2CJ	3,610
31	G2QT	3,510
32	G3XTJ	3,505
33	G3SJE	3,325
34	VE5JQ	3,295
35	G5MY	3,220
36	GM3OXC	3.175
37	VK7BC	3.140
38	G3ESF	3,125
39	VK3ZC	3,105
40	G4DUW	3,070
41	G3KSH	3,000
42	G3AGF	2,980
43	5B4IF	2,923
44	VK2AQF	2,920
45	G3GC	2,850
46	ZB2EO	2,835
47	G3NKS	2,655
48	G3VDL	2,615
49	VK2GW	2,600
50	G3VW	2,550
51	G2HLU	2,530
52	VK3AEW	2,523
53	VK3XU	2,320
54	G3EBH	2,290
55	G3JJG	2,280
56	VK7RO	2,273
57	ZL1HV	2,270
58	VE2DZE	2,250
59	G4FHF	2,145
60	VK3YK	2,120
61	VE3JKZ	2,075
62	VK3RJ	2,055
63	††ZL1AMO	2,027
64	VE1ANU	1,990
65	P29EJ	1,873
66	G4COU	1,850
67	G5ND	1,805
68	VK7CH	1,770
69	VK7RY	1,680
70	GM3PPE	1,670
71	†VK6AJ	1,643
72	G3JKY	1,615
73	†G3PVA	1,614
74	GW2DPD	1,600
75	G4BUO	1,575
76	VK3VF	1,570
77	††VE7BS	1,531
78	G3APN	1,530
	VK4LV	1,530
80	VK3XX	1,490
81	G3XTT	1,485
82	G3AWR	1,475
83	VK6FS	1,470
84	VK3XB	1,465
85	G2AJB	1,455
86	9V1TL	1,430
87	†GW3MPB	1,285
88	G8QZ	1,270
89	VK5BS	1,260
90	**VK3APN	1,210
91	VK3FC	1,200
92	VK5KL	1,145
93	G8DI	1,130
	VK2GT	1,130
95	G6NK	1,120
96	VK3YL	1,090
97	G3UYM	1,070
98	†††G3MZV	1,065
99	VK1UD	1,025
100	VK3KS	1,018
101	††ZL2MM	1,010
102	††G4AZN	975
103	**G3IGW	858
104	†††ZE3JO	840
105	VK5HO	813
106	VK3CES	796
107	VK5RG	795
108	G3OLU	780
109	VK3BDH	670
	†VK6RU	670
111	VK1GG/2	665
112	†††VK4XJ	640
113	VK1SU/2	635
114	VK7ZO	540
115	VK6RZ	510
116	G2GM	500
117	VK2BDU	456
118	†††G5DF	430
119	††VK3ABA	380
120	G3ILO	350
121	*GW3NYY	305
122	C5ACW	290
123	†††VK4SF	265
124	VK3SV	250
125	VK3CT	240
126	††VK3AMD	125
	G2BLA	125

*3·5MHz single band
**7MHz single band

RECEIVING SECTION

Posn	Callsign	Points
1	BCRS195	3,435
2	BRS15822	3,250
3	BRS39097	2,810

†14MHz single band
††21MHz single band
†††28MHz single band

Check logs form G2QY, G3WP, VE3BUU and VK7RD are acknowledged with thanks.

VK7BC who is always in great demand for bonus points during the contest

"What a pleasure to hear the dx old-faithfuls year after year"—*G2HLU*.

"G/VE conditions excellent. 14/21MHz poor for Africa"—*ZE3JO*.

"Conditions good, but can't judge when to sleep"—*VK7BC*.

"Enjoyable. Well disciplined. Sensible rules"—*VK2BPN*.

"Retain existing format, allow separate G bonuses"—*VK3APN*.

"Sunday boring. Would have preferred VS6 pile-up to JA!"—*9H1EL*.

"Involved with 'BERU' now for 30 years—still the premier event in my contest calendar"—*G3FXB*.

"Enjoyable weekend renewing old friendships and making new ones"—*VK3YL*.

"7MHz poor, but glad to work ZB2CJ"—*VK4LV*.

"Disturbed to hear a G4 say that he had no time to waste on a weak signal. Hope he stays a minority!"—*ZL1HV*.

"Real thrill to work VP8AI on five bands. Back to ZL1AIZ for '81"—*5W1BZ*.

"Infuriating to hear VK/ZL working strings of Gs which were completely inaudible here"—*9V1TL*.

"My first contest. Thoroughly enjoyed it. Extremely impressed by courtesy extended by all the stations I contacted"—*VE3CES*.

"Missed three hours due to a bee which got into the shack and stung me on the foot!"—*ZL2TX*.

"Can't compete with the 1kW stations with large antenna farms. How about a 150W power limit?"—*ZL2BR*.

"Good conditions warrant longer contest period"—*G2QT*.

"Look forward to catching the leaders next year"—*G4CNY*.

"One of the pleasures I get from this contest is that I usually make a QSO with G3MXJ!"—*P29EJ*.

G5WP

It would be inappropriate to close without noting the death of "BERU" stalwart "Rusty" Russell, G5WP, in May 1980. Rusty, perhaps the most consistent "BERU" entrant ever, will be particularly remembered for his lower frequency band operations. He was the only UK station since the war to win the "BERU" Senior Rose Bowl. His signals will be missed.

G3MXJ

7MHz Contests 1981 rules—addition

Please make the following addition to the rules published in the August issue: **Rule 5-Phone.** Entrants in the phone contest are not permitted to contact stations transmitting outside the Region 1 allocation (7,000 to 7,100kHz). This includes the USA of course.

7MHz Contests 1980 results

Most comments received by the adjudicator showed agreement with the changes made by the committee for the 1980 contest. It is indeed heartening to see a marked improvement in the number of logs received from British Isles stations in the phone section. Apart from this particular section however, entries were down on those received for the last 7MHz contest in 1978.

Conditions were generally good as can be seen from the list of dx worked by the leading entrants. The highlight for some in the cw section was undoubtedly QSOing 5W1BZ, who worked 10 G stations. The standard of log keeping was generally good with one or two exceptions, the main criticism being that some entrants still try to claim for duplicate QSOs. One entrant in particular should familiarize himself with the countries list, as UP, UB, UO5 and UQ are in Europe and only count five points!

The winner and runner-up in the phone section, G3TSL and G3SEM/A, were well in front of the third placed entrant. The UK listening section was won yet again by BRS32525. GD4BEG wins the G6QB Trophy and winners and runners-up in the other sections will be awarded certificates.

The equipment used by the leading entrants was as follows:

	TX	Antenna
G3TSL	TS5205-SB220	2-el beam
G3SEM/A	FT901DM-Homebrew linear	Delta loop
GD4BEG	Homebrew tx-R4C	2-el switched Yagi GP-Bi-square-1λ sloper
G3FXB	T4XC-R4C	4-el fixed wire Yagi 2 slopers

The dx worked and where the leading entrants made their points:

G3TSL: UA9, ZL, UJ, JA, 6W8, HK, YV, PY, CO, OX, TG, TI, LU, CE, HC (44 multipliers, 1,921 points)

G3SEM/A: UA9, UJ, EA8, VU, PY, YV, CT3, OX, CO, 9K, TI, HI, XE, HC, ZF1, 5B4, ZL (43 multipliers, 1,827 points)

GD4BEG: JA, UJ, VE1, 2, 3, 6, VP2K, ZD8, KL7, T1, UA9, VK3, 6, ZL1, W1 through 0, YV, 5B4, 5W1, 8R1, VP2A, UG, UL, PY, OY, KV4, HP (64 multipliers, 4,447 points)

G3FXB: CO, JA, KL, OY, PY, T1, UA9, UG, UJ, UL, VO, VE1, 2, 3, 6, VK3, VP2A, VP2K, W1 through 0, XE, YV, ZD8, ZL1, ZL2, SW1, (59 multipliers, 4,472 points).

G3KDB

BRITISH ISLES SSB TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	G3TSL	84,524	11	G4DUW	13,225
2	G3SEM/A	78,561	12	G4APL	13,200
3	G4ADD	45,500	13	G3XTT	11,825
4	GU3YIZ	38,228	14	G3VLX	4,734
5	G4FNL	34,590	15	G3SWX	3,500
6	GM3PIP	23,188	16	G4DIB	1,656
7	G2QT	21,896	17	G4BYY	1,250
8	G5CMX	17,108	18	G3KSH	935
9	G4EQI	15,617	19	G3NKS	600
10	GW4HBK	13,639	20	G4IXE	360

REST OF WORLD SSB TRANSMITTING

Posn	Callsign	Points
1	UW9WK	4,440
2	UJ8JGJ	2,625
3	CO2DC	2,400
4	UA9CBO	650
5	JA2BAY	135

BRITISH ISLES SSB RECEIVING

Posn	Station	Points
1	BRS32525	49,600
2	BRS15822	7,200
3	ARS40323	3,200

REST OF WORLD SSB RECEIVING

Posn	Station	Points
1	UA9-154-1501	1,665

EUROPE SSB RECEIVING

Posn	Station	Points
1	UB5-067-1512	1,000
2	UA3-122-862	880
3	UB5-068-494	819

Check logs acknowledged with thanks from HA2KRA, PI1GOE, NL6305.

EUROPE SSB TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	OR6JG	10,634	21	G4HWZ/PA	870
2	EI7CC	7,360	22	LZ2KKZ	700
3	DL6AX	6,600	23	OK3YK	672
4	OR6RL	6,480	24	OK1KZ	560
5	UP2OU	6,272	25	PA0CF	558
6	UP2BAO	5,460	26	OH7NW	553
7	UB5IFN	3,330	27	OZ4HW	550
8	HA4KYB	2,800	28	HA5KKG	532
9	HA0KDA	2,510	29	YU3TCM	392
10	EA2QU	2,400	30	HA4YH	275
11	UK3YAB	2,030	31	OK1AXB	220
12	OK2PBM	1,830	32	OH5LE	205
13	PA0COR	1,755	33	YU7SF	192
14	OZ7GW	1,520	34	PA0INE	175
15	OZ6XR	1,440	35	UA3EAL	150
16	DK6EI	1,400	36	LA2GN	135
17	DL3FAK	1,281	37	YU2RJZ	105
18	HA2KRZ	1,274	38	OK1KCF	90
19	DL3WB	1,200	39	UO5OGX	50
20	HA5KFL	952			

BRITISH ISLES CW TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	GD4BEG	284,608	16	G3XKQ	64,395
2	G3FXB	263,848	17	G3AGF	56,616
3	G4CNY	250,803	18	G3XTT	43,212
4	G3XKR	208,940	19	GW3NYY	24,256
5	G4FAM	203,100	20	G3APN	22,770
6	G3PDL	189,718	21	G4CCQ	20,104
7	G4BUO	188,820	22	G5CMX	17,145
8	G3RFS	150,594	23	G3HLF	14,560
9	G4FNL	144,612	24	G3KSH	14,337
10	G3UFY	130,101	25	G3NKS	14,053
11	G5PQ	102,067	26	G4APL	7,656
12	G3ESF	93,345	27	G3WP	4,000
13	G4DUW	88,995	28	G3AWR	3,185
14	G3IGW	73,790	29	G3LDI	936
15	G3DCZ	71,192	30	G3ILO	540

REST OF WORLD CW TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	YV1OB	10,300	11	VP2AZE	3,255
2	UJ8JAS	8,950	12	AF2L	3,240
3	UA9FGJ	8,865	13	UA9FGO	2,580
4	VE1MX	8,100	14	UG6GAI	2,400
5	UA9CAL	6,885	15	PY4BYI	1,710
6	UL7PA	6,705	16	ZL2TX	1,320
7	UA9CFV	5,180	17	VK3APN	1,250
8	K7UR	4,280	18	W3MR	1,200
9	VO1HP	4,025	19	VE2DZE	860
10	K2JT	3,600	20	5W1BZ	540

EUROPE CW RECEIVING

Posn	Station	Points
1	LZ2-F-166	5,760
2	OK2-20282	1,962
3	YU1-RS-302	1,120
4	UB5-060-643	1,071
5	YO2-12261-CS	828
6	DL-H33-1703271	30

EUROPE CW TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points
1	DJ8IZ	6,890	22	SP2ASJ	3,660	43	UO5OWC	2,464	64	DK4HD	1,665	85	HA8VB	1,068
2	OZ1W	6,799	23	UQ2GFM	3,600	44	RZ2BA	2,457		HA3MQ	1,665	86	OH7NW	1,050
3	HA0MJ	6,747	24	DF4QW	3,560	45	PA0VLA	2,440	66	UC2WBJ	1,640	87	UA1QBM	1,032
4	DJ0UP	6,175	25	PA3AMA	3,553	46	UB5QBC	2,320	67	HA2MJ	1,638	88	OH6NG	1,000
5	EI7CC	6,045	26	HA5NK	3,460	47	UP2BAS	2,304	68	OH2BSA	1,608	89	HA3PT	994
6	PA0XAW	5,472	27	YU7SF	3,330	48	DL9UY	2,250	69	PA0DIN	1,600	90	SP5GKN	980
7	YU4VOY	5,368		UB5IFN	3,330	49	UQ2PP	2,220	70	YU3TCM	1,575	91	UP2BDX	938
8	OZ1FAO	5,340	29	YU7NGO	3,160	50	UP2AW	2,124	71	PA0INE	1,506	92	YO3BWK	918
	OZ5MJ	5,340	30	YU2BOP	3,150	51	OK1KZ	2,052	72	UA3XBN	1,491	93	YO6ANZ	840
10	EI2CA	5,292	31	HA1TJ	3,114	52	EI0CS	2,040	73	YO2CGZ	1,398	94	YO3ABL	825
11	DL9CE	5,076	32	OK1PH	2,904	53	YU4VHA	1,989	74	EA2CR	1,365	95	YO4BBH	810
12	DL1OO	4,626	33	UP2BAO	2,862	54	HA3MY	1,944	75	DK9BR	1,360	96	HA5KFL	756
13	EI5DI	4,290	34	YO9HP	2,860	55	EA7AAW	1,864	76	PA0PHK	1,350	97	OK1KCF	750
	OZ4HW	4,290	35	UB5UGF	2,780		DL1PB	1,864	77	UO5OGX	1,337	98	OZ1GHQ	650
	HA3HZ	4,290	36	OZ1CCB	2,700	57	HA3HE	1,856	78	HA4YQ	1,304	99	HA5JK	630
16	UB5DAX	4,200	37	DF9SI	2,682	58	YO2BMK	1,800	79	OZ1EHL	1,269	100	YO5BRZ	625
17	HA0MK	4,130	38	UB5UCY	2,637	59	UB5ZDF	1,764	80	UB5JIQ	1,155	101	HA1YG	618
18	RZ5UWG	4,110	39	PA0CF	2,592	60	UB5RCA	1,750		SP5CJQ	1,155	102	EA5TX	500
19	UB5LI	4,070	40	HA0KLF	2,502	61	SP1KRU	1,715	82	OK3TDN	1,120	103	UB5LR	450
20	HA4YG	3,993	41	HB9DX	2,500	62	OK1AHQ	1,704		SP5JTR	1,120	104	YO9AGI	372
21	OK1DMM	3,880	42	EA3PI	2,472	63	PA0JPA	1,692	84	UQ2GDM	1,085	105	OK1AEH	220

EA2IA—disqualified for log inaccuracies.

REST OF WORLD CW RECEIVING

Posn	Station	Points
1	UF6-014-90	2,340
2	UL7-028-161	1,475

BRITISH ISLES CW RECEIVING

Posn	Station	Points
1	BRS15822	36,290

Check logs received with thanks from: G3HB, G3MXJ, HA7KPL, HA8CQ, PA2DXY, PA0FKP, PA0HOP, OK1DMS, OK1MZO, SP9BAL, UA3EAL, UA6LDF, UK1AAF, UK5IAZ, UO5OCA, UO5ODA.

70MHz Contest 1980 results

The re-introduction of a 70MHz contest in June was welcomed by the 29 entrants. The majority of these agreed with the timing of the event, but some would have liked more time to work more of the 115 stations which are known to have been active.

Tropospheric propagation was only fair for most of the event, with deep QSB present at times. In some areas this was aggravated by high solar noise, as sporadic-E propagation became established to the south and east of the UK. Some stations, however, were rewarded by a contact with Gibraltar (QTH locator square XW64) in the form of ZB2BL; unfortunately he was not able to spend much time on the band.

Congratulations and certificates go to the winners and runners-up in each section.

G3VPK

SINGLE OPERATOR, FIXED STATION SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	GM3WOJ	422	42	YP72	G3WMR	475
2	GD2HDZ	308	34	XO68	G4FKI	415
3	G3WHK	271	51	ZL49	GM3WOJ	470
4	G3PWK	229	39	AM42	GM3WOJ	390
5	G3NPI	216	42	ZM52	GM3WOJ	–
6	G4HMG	185	45	ZL38	GD2HDZ	375
7	G4ENB	168	36	ZL08	GM3WOJ	410
8	G3PGN	151	35	AL22	G3FDW/P	380
9	G3BPM	147	34	ZL48	G3FDW/P	375
10	G3WMR	145	27	AL41	GM3WOJ	475
11	G4FKI	137	33	AL31	GD2HDZ	420
12	G3COJ	133	7	ZL37	ZB2BL	1,746
13	G4AEZ	130	30	ZL30	GM3WOJ	435
14	G3PJX	113	27	ZL69	G3FDW/P	402
15	G5UM	105	25	ZM35	GM3WOJ	302
16	G4GDG	103	29	AL22	G3FDW/P	380
17	GM4DIJ	94	12	YP04	G4ERP/P	470
18	G2VJ	89	21	ZM42	GM3WOJ	315
19	G3WFM	72	24	ZL30	GW4ALE/P	270
20	G4HZC	62	16	ZM25	GM3WOJ	316

OTHER STATIONS SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	GW4ALE/P	730	80	YM04	ZB2BL	1,925
2	G3FDW/P	618	64	YO29	GJ3YHU/A	625
3	G4ERP/P	586	80	ZL01	ZB2BL	1,808
4	G4BVE/P	438	68	ZN61	GJ3YHU/A	434
5	G3PFM/P	360	52	YK09	GM3WOJ	471
6	G3UKV/P	392	60	YM28	GJ3YHU/A	387
7	GW3XBY/P	327	39	YM12	GM4DIJ	347
8	GM3TAL/A	1	1	YQ73	GM4DIJ	20

RECEIVING SECTION

Posn	Station	Points	QSOs	QTH	Best dx	Km
1	BRS15822	121	33	ZL40J	G3FDW/P	374

144MHz Low Power (May) 1980 results

The comments with the logs for this contest indicated that the restriction of power to 25W p.e.p. output was extremely popular. Many competitors commented that it was nice to be able to hear stations without the usual "splatter" and several groups found themselves within yards of each other and still able to operate effectively.

Most stations commented that conditions were poor but, despite the low power, some quite reasonable contacts were made. An aurora added interest for many operators.

The leading portable station, GW3NNG/P, was using a 16-element antenna 20ft above ground from a QTH 2,907ft asl. The runner-up, GW4ERP/P, used two 14-element arrays at 45ft above ground, the QTH was 1,840ft asl. Of the portable entries, 11 were single operator.

The fixed station section winner, G8OEC, used 10W to a 12-element "ZL Special" at 30ft from a QTH 490ft asl. Runner-up, G4DEZ, used a 16-element array at 45ft from a QTH 60ft asl. Seven fixed stations were multi-operator.

Check logs are acknowledged from G2HIF/P, G3AHD, GB4MF, G8MFE, G8WEE, BRS32525. These were found most useful.

G3LCH

FIXED STATION SECTION

Posn	Callsign	Points	Locator	Best dx	Km
1	G8OEC	1,318	AL67	DF8KV	409
2	G4DEZ	1,229	AL34	GM8FHQ/P	503
3	G4CYA	1,216	ZN43	DF1JC	612
4	G8OPR	917	ZL63	GM3OBC/P	568
5	G8SZF	910	YM30	F0CRI/P	458
6	G8EYC	864	ZL50	DF1JC	483
7	G8MKX	779	ZL70	GM8KAP/P	503
8	GJ8SBT	756	YJ70	G8KMY/P	485
9	G4ARI	727	ZM24	GJ8SBT	393
10	G3WHK	709	ZL49	GM8HVB/P	565
11	G8HRO/A	615	ZL79	DJ8PB	490
12	G8IUB	605	ZM41	PA0ERW	522
13	G8IFT	557	YM50	GM8MNG	390
14	G8RXK	527	ZL28	G3WKF/P	345
15	G8TZE	502	YM80	G8CSA/P	270
16	G8NKW	499	AL66	G8MUI/P	354
17	G8NWM	485	ZM19	GJ8SBT	417
18	G4CLB	477	ZL37	F6DHL	410
19	G8NQN	428	ZN21	G4BWH/P	340
20	G8OQV	422	ZK04	G4BZD	–
21	G8ETB	407	ZL37	G8CSA/P	360
22	G8SUF	368	ZM35	G3WKF/P	356
23	G8LYC	360	ZL50	G8GPO/P	328
24	G8GGG	335	ZL24	G8CSA/P	326
25	G3ORX	325	YL49	G8CSA/P	335
26	G8PNM	309	ZN52	G3BDQ	320
27	GM8MNG	306	YP16	G8AXZ/P	536
28	G4DDL	303	ZL47	G8MUL/P	285
29	G8RGE	295	ZL66	G8CSA/P	385
30	G8VFV	273	ZN24	G4BWH/P	335
31	G8OMI	237	ZM41	G8CSA/P	235
32	G4AGQ	209	ZL66	F1CVE/P	273
33	G8TZJ	192	YN07	G4IFT	342
34	G8TVG	182	ZP73	G8JVM	375
35	G8PJL	106	ZL36	G8GPO/P	310
36	G8SIX/A	102	YK09	–	–
37	G8CDW	96	ZL30	–	–

PORTABLE SECTION

Posn	Callsign	Points	Locator	Best dx	Km
1	GW3NNG/P	3,105	YL03	DF1JC	730
2	GW4ERP/P	2,606	YN75	DF1JC	717
3	G4BWH/P	2,292	AK12	GM8FBQ/P	555
4	G8RZO/P	2,159	AL56	GM4IGS	585
5	G8MJD/P	1,974	ZN46	F1DRR	537
6	G8CSA/P	1,920	YO45	G4DZO/P	455
7	G8GLQ/P	1,906	YL57	DF1JC	663
8	GW6SW/P	1,761	YM05	DF1JC	711
9	G8SDS/P	1,707	YK28	DF1JC	660
10	G3FJE/P	1,593	ZM79	DF5AI	715
11	G4AAQ/P	1,579	ZN61	F1ANH	465
12	G4IGZ/P	1,393	YO55	G4BWH/P	456
13	G8OCT/P	1,377	ZM73	GM4JCM/P	480
14	G4HRO/P	1,307	ZN71	F6EYM/P	454
15	G8NQP/P	1,293	YK10	GM8KAP/P	475
16	G8RMA/P	1,223	AK12	DB5KS	481
17	G8KMY/P	1,218	AN61	GJ8SBT	474
18	G3LTY/P	1,188	AL55	G8CSA/P	–
19	G3VRE/P	1,145	ZL52	–	–
20	G8LVS/P	1,161	ZL18	GM4JCM/P	540
21	G4DAR/P	1,143	YM40	OR7HP	470
22	G8GXE/P	1,063	ZL26	GI8ULK/P	475
23	G4DZO/P	1,049	AK11	DF1JC	481
24	G4HSS/P	1,046	YN67	GI8TDT	446
25	G8GPO/P	1,022	ZO46	G4JTY/P	425
26	GM8BJF/P	996	YP20	SM7FMX	937
27	G8ODR/P	974	ZL08	GI8ULK/P	489
28	G4CZZ/P	938	ZL06	GM8HVB/P	510
29	G8LHC/P	886	YL06	ON7RB	440
30	G8BJG/P	884	AL51	EI2CA/P	475
31	G4ITF/P	872	ZK05	G3YRH	430
32	G8TGM/P	861	ZK07	G3YRH	456
33	G3XJM/P	807	ZL77	F6DHL	413
34	GW8BBK/P	793	YL15	PE1BWX	610
35	G4INL/P	787	ZL01	PE1BWX	525
36	G8SRC/P	780	ZL32	GM8HVB/P	529
37	G8RCZ/P	767	YK13	GM8BDX	552
38	G8NDP/P	752	ZL10	GM8FBQ/P	442
39	G4CWS/P	751	AL53	–	–
40	G4JTY/P	727	YK17	G8GPO/P	418
41	G4FOX/P	689	ZM26	GM8BJF/P	357
42	G3WKF/P	686	XK56	G4HRO/P	–
43	G3XWZ/P	667	ZN62	G4JTY/P	255
44	GI8ULK/P	620	WO11	G8RCZ/P	490
45	G3WIR/P	446	ZL38	G8CSA/P	365
46	F0CRI/P	443	ZI07	G8MJD/P	496
47	GM8HVB/P	349	XQ80	G3WHK	588
48	G4JNT/P	331	ZK05	G8MJD/P	330
49	G8EZD/P	279	YM48	–	–
50	G8HHQ/P	150	YK43	G8MJD/P	371

144/432/1,296MHz Contest (May) 1980 results

The strength of the comments on the 427 cover sheets left the VHF Contests Committee in no doubt about most contestants' reaction to a three band/one callsign event. Small groups complained bitterly that they required too much equipment to be competitive while the larger groups were frustrated because they were not able to make full use of their operators. In spite of this almost universal opinion, there were the few who claimed equally emphatically that the limitations of one callsign actually added an enjoyable new dimension to vhf contests.

Several large groups pointedly marked their disapproval of the rules by concentrating their resources on a single band for the duration of the contest. This was contrary to the real objectives of the event and utterly negated any advantages an experienced operator might have had in being able to choose the optimum times for working each band.

It became necessary, therefore, to normalize the scores in categories according to the number of bands worked; the highest scoring stations on each band and in each category receiving 1,000 points. Only in this way was it possible to ensure that a station operating on all three bands would be assured of a winning score.

A short sporadic-E opening on 144MHz boosted the above average conditions during the early hours of the Sunday morning and best dx well in excess of 1,000km was worked by several stations scattered throughout the country. High scoring dx was also worked on the other bands, although few stations actually exceeded 500 and 350km on 432MHz and 1,296MHz respectively.

As these results go to press, few of the Es contacts have been confirmed by QSL cards but as a sufficient number of stations either heard or worked some of the dx, it is reasonable to accept the opening as being genuine. However in view of the rumours circulating, an element of doubt must remain until the cards are received. If only to help the adjudication on future occasions, it would be helpful if contestants would not only log the callsigns of the "dx that got away" but also record the beam heading. In this context, a check log which lists dx stations and QTHs heard can be more useful to the adjudicator than a log of actual QSOs.

All five winning stations are to be congratulated upon their decision to operate on all three bands despite any opposition they might have had to the single callsign. Certificates will be sent to these stations.

G2HIF

MULTI-OPERATOR SECTION

Posn	Callsign	Score	QTH	Bands	Points	QSOs	Best dx	Km
1	G5MW/P	2,154	AL43	144	187	123	GI4BAC/P	530
				432	967	84	DC0IL/P	465
				1,296	1,000	40	PE1BXA/P	375
2	G3LCH/P	1,930	ZN71	144	731	410	DK6RP/P	1,191
				432	1,000	103	PE0HJK/A	562
				1,296	199	14	GW3OXD/P	120
3	G4JAR/P	1,787	YK21	144	726	302	OK2KRK	1,469
				432	804	54	PA0EZ	654
				1,296	257	8	G5MW/P	322
4	G3ZIG/A	1,635	AM27	144	631	278	DK3UZ	584
				432	598	49	F1ANH	425
				1,296	406	16	PA0EZ	262
5	G4DZO/P	1,313	AK11	144	313	209	OK3KCM/P	1,408
				432	1,000	80	GD2HDZ/P	484
6	G3AMW/P	1,302	ZN18	144	1,000	407	DK7WA/P	713
				432	194	19	PE0MAR/P	373
				1,296	108	4	PA0EZ	421
7	G6UT/P	1,225	AL21	144	1,000	504	DK3UZ	690
				432	225	23	PA0WMN	300+
8	G3OHM/P	1,184	YM50	144	274	256	PA0ASL	460
				432	473	64	F6KBF/P	330
				1,296	437	26	G4JAR/P	230
9	G3VCP/P	1,152	AL62	144	195	228	PE0IPP/A	440
				432	957		PE1BXA/P	405
10	G3LRS/P	1,145	ZM36	144	465	297	DF4KI	350+
				432	331	49	PE0MAR/P	346
				1,296	349	21	PE0MAR/P	346
11	G4IRN/P	1,067	ZN61	144	225	157	PA0PKD	568
				432	842	80	ON7LOR/A	507
12	GW8BHH/P, G3PIA, GW3WOH/P	1,000	YM44	144	1,000	649	OE6MGG	1,472
		1,000	ZL34	432	1,000	174	DK0TU/P	750
		1,000	YM44	1,296	1,000	26	G3XDY	303
15	G8VWA/P	936	ZL26	144	336	279	DB1BP	553
				432	374	60	PE1BXA/P	525
				1,296	226	17	GW3WOH/P	175
16	GW3OXD/P	933	YM54	144	284	195	F1BBD	530
				432	470	46	F6KBF/P	355
				1,296	179	9	G8GP	235
17	G4BWG/P	892	AL45	144	892	598	DK3UZ	650+
18	G4BVY/P	867	YM79	144	306	264	OR6YB/A	499
				432	380	50	F1BEG/P	509
				1,296	181	12	G5MW/P	209
19	G8SKG/P	815	ZN68	144	315	206	DF7OQ/A	532
				432	500	35	DK1QH/P	620
20	GI4BAC/P	812	WO70	144	460	179	F1FLN/P	725
				432	352	18	G3OSS	480
21	G6HH/P	773	AK13	144	773	528	OK1OAG	953
22	GW3UBX/P	694	YM44	432	694	119	F1BEG/P	580
23	G3YMD/P, GI4GVS/P	689	AL76	144	689	481	DK3UZ	667
		689	XO11	144	310	169	PE0MAR/P	800
				432	379			
25	G8JUL	622	YN46	144	290	229	PA0GNT	622
				432	379	26	F6KBF/P	453
26	G4APA/P	621	ZL15	144	621	542	DF7OQ/P	604
27	G3WRS/P	595	ZO46	144	595	389	DK1AQ/P	724
28	GW8WDC/P	565	YN65	144	520	456	GM8AOB	542
				432	45	6	G8VWA/P	250
29	G3ZQM/P	561	YO20	144	561	391	DK0DB/P	758
30	G3EFX/P	560	ZL06	144	560	556	F1ETW	603
31	G4ILI/P	528	YL20	144	311	285	F1EZQ/P	648
				432	217	21	F6KBF/P	300
32	G8FAB/P	494	ZL53	144	494	476	F1ERA	729
33	G8MPQ/P	474	ZL18	144	120	130	GI4BAC/P	442
				432	354	42	ON7WR/A	350
34	G4FJK/P	396	XJ05	144	396	211	DF9ND/P	976
35	GW3WNA/P	380	YL05	144	380	388	DB1BP	1,348
36	G8KMK/P	349	ZN42	144	317	198	DB1TP	860
				432	32	14	G8PXB/P	75
37	G4JQU/P	346	ZL53	432	433	73	PA0EZ	474
38	G3SFG/P	301	ZL29	144	301	379	GM8STB/A	590
39	G3XVA/P	275	ZN61	144	275	311	DL9GS	655
40	GW3VKL/P	235	YL25	144	235	217	PA0WRC/P	750
41	G8JNV/A	213	ZM10	144	213	223	F1ANO/P	505
42	GW4BRS/P	210	YL25	432	210	41	F6KBF/P	450
43	G4IAQ	169	ZM24	144	169	326	PA0KVD	475
44	G8VYK/P	142	AL33	144	142	159	DC0HN/P	490
45	G3YZD/P	133	ZN61	432	133	45	F6KBF/P	395
46	G8KJF/P	119	ZL30	144	119	183	—	—
47	G4IRB/P	92	ZN61	144	92	131	PE0MAR/P	428
48	G8LVQ	88	ZN13	144	88	118	F1DPU/P	475
49	GW8EQJ/P	70	YN72	144	70	77	F1KBF/P	460

RECEIVING SECTION

Posn	Station	Score	QTH	Bands	Points	QSOs	Best dx	Km
1	BRS32525	2,000	AL41	144	1,000	171	GI4GVS/P	505
				432	1,000	30	F1BEG/P	325
2	BRS15822	521	ZL40	144	521	94	GI4BAC/P	490
3	RS43706	469	ZK10	144	469	65	G3ZQM/P	481
4	BRS26003	374	YO23	144	374	33	PE0MAR/P	570

Log from RS41733 accepted as check log only (stations logged more frequently than once every 20 contacts).

SINGLE OPERATOR SECTION

Posn	Callsign	Score	QTH	Bands	Points	QSOs	Best dx	Km
1	G8IFT	2,596	YM50	144	1,000	77	PA3ARA/A	553
				432	596	38	PE0MAR/P	420
				1,296	1,000	13	G8BFX	132
2	G3XWZ	1,850	ZN66	144	171	22	PE0MAR/P	330
				432	1,000	53	F1BEG/P	495
				1,296	679	6	G3ZIG/A	150
3	G8IEM	1,511	ZK05	144	511	73	PA0LGJ	431
				432	1,000	16	ON7WR/A	372
4	G3PBV	1,144	YK32	144	361	33	OR6YB/A	587
				432	783	11	F6KBF/P	381
5	G8NQP	1,009	ZL71	144	999	140	GM8BDX	522
				432	10	1	G4JQU	–
6	G4ARI	1,000	ZM24	144	1,000	163	PA3ARA/A	497
	G4FSG	1,000	AM77	432	1,000	28	F1ANH	374
8	G8ART	971	ZM45	144	31	1	PE0MAR/P	300+
				432	91	8	G5DS	120
				1,296	849	9	GW3WOH/P	150
9	G8TAK	911	ZL50	144	911	164	GI4BAC/P	484
10	G4HFO	593	XK56	144	206	20	F1FTB/P	490
				432	387	5	F1DPX	350
11	G8KMG	581	ZL10	144	581	114	OR6CP	364
12	G8LXY	568	ZL09	144	106	36	PE0MAR/P	307
				432	462	15	PE1BLE/P	200+
13	G3ORX	542	YL49	144	542	64	PA0WRC/P	525
14	G8RGE	534	ZL66	144	534	74	DK0AN/A	495
15	G4AGQ	445	ZL66	144	445	101	PA0LGJ	407
16	G8OMI	357	ZM41	144	357	60	F1FLN/P	415
17	G8TZJ	119	YN07	144	119	22	G4APA/P	257

Check logs acknowledged with thanks from: G5DS; G8RXK; G8VAX/P.

BARTG Spring Contest results

This hf teleprinter contest was again well supported and, reversing the trend of recent years, more UK stations took part—nearly half the UK stations noted in various logs supported the event. In the single-operator section the following 12 G stations (with positions) were listed among the 105 entrants: 10, G3HJC; 30, G4FLM; 47, G2PB; 60, G3GGL; 64, GW3EHN; 68, G3RDG; 75, G4HYD; 85, G4IPZ; 86, G3YJQ; 91, G4EEV; 94, G4HJD; and 98, G4EDR. In the multi-operator section, of the 22 entrants, G3ZRS came second, and G3UUP was fourth. There was one UK entrant in the listener section, T. Musson, who came fifth out of nine entrants.

During the contest, rtty activity took place in Alaska, Australia, Austria, Belgium, Bulgaria, Canada, Canary Islands, Czechoslovakia, Denmark, England, Finland, Fiji, France, German DR, German FR, Ghana, Greece, Holland, Hungary, Isle of Man, Israel, Italy, Jersey, Japan, Liberia, Lithuania, Mexico, New Caledonia, New Zealand, Nigeria, Northern Ireland, Panama, Philippines, Romania, Russia (E), San Marino, Sardinia, Scotland, Solomon Is, South Africa, SW Africa, Spain, Sweden, Switzerland, Sudan, Surinam, Swaziland, Tasmania, Transkei, USA, Venezuela, Wales and Yugoslavia.

BARTG 1st Spring VHF/UHF Contest results

Thanks to all those who braved the elements and atrocious conditions, reportedly the worst for many a year, and made this first spring vhf contest a success. There was a reasonable number of entrants for the operating sections but none for the swl section. The quality of some logs left some room for improvement, and all UK entrants will be sent a copy of the BARTG standard vhf/uhf log sheet and RSGB Form 427 as it is much easier to cross check standard forms. These forms are also available on receipt of an sae from G8CDW or G8APB (both QTHR).

Sixty UK and 25 continental stations were active. For those concerned, a multiplier scoring system would have made little difference to the positions in both sections; the system used is to encourage further activity on little-used bands on the "use or lose" premise.

Comments from logs

"We worked all we heard—not many"—*G3VYV/P.*

"Can we have 23cm—it would add a new dimension to the contest and activate a band not usually used for this mode—*G3UUP.*

"Worst conditions from this site for 15 years including continuous 70mph northerly gale"—*G3GGL/P.*

"Lots of interference from fm mobiles locally on 144·60MHz (presumably not operating afsk)"—*G8MAF.*

G2AAN—Grafton Top Band Contest rules

1. General RSGB hf contest rules apply.
2. **Eligible entrants.** Any Class A licensee, home station only.
3. **Period and dates.** 2100 to 2300 local time on 5, 6, 19 October 1980.
4. **Sections.** 5 Oct a.m., 12 Oct cw, 19 Oct ssb.
5. **Frequency.** 1·8-2·0MHz.
6. **Contact call and exchange.** Callsign, RST plus serial number.
7. **Scoring.** One point per contact.
8. **Address for logs.** Contest secretary C. Newberry, 20A Second Avenue, London NW4.
9. **Closing date for logs.** Postmarked not later than 3 November 1980.
10. **Awards.** Certificates will be awarded to leading station and runner-up in each section. G2AAN winner certificate to highest combined score in any two sections.

SINGLE-OPERATOR SECTION

		144MHz					432MHz						
Posn	Callsign	Points	Contacts	Best dx	Distance	% band leader pts	Points	Contacts	Best dx	Distance	% band leader pts	Overall % points	QRA
1	G8LWY	41	13	G3GGL/P	192	35·7	13	/	G3NNG	90	100	135·7	ZL49J
2	DC1ZN/P	115	15	DD0ZY	221	100						100	FJ19B
3	GI8HXY	20	4	G3VYV/P	296	17·4	9	3	GM3KJF	125	69·2	86·6	WP78J
4	G3GGL/P	80	14	G8SAV	210	69·6						69·6	YN47D
5	G4ARI	62	14	G3VYV/P	165	53·9						53·9	ZN24J
6	G8MAF	12	6	G3YIV	66	10·4	4	2	G4ARD/A	53	30·8	41·2	ZL40A
7	G4IOG	21	7	G4ARD/A	112	18·3	2	2	G3YKB	20	15·4	33·7	AL54A
8	DL8VX	25	9	DJ8EA	222	21·7						21·7	EN59E
9	G3HJC	14	8	G4BP/A	56	12·2						12·2	ZN18D
10	G8CDW	10	6	G3YIV	66	8·7						8·7	ZL30D
11	G4HJD	5	3	G4BP/A	60	4·3						4·3	ZN19F

MULTI-OPERATOR SECTION

1	G3NNG	123	19	G8OSW	361	100	46	8	G3VYV/P	272	100	200	ZL23F
2	G8DVR/P	121	21	G3YIV	330	98·4	43	7	G3YIV	330	93·5	191·9	YN38A
3	G4ARD/A	70	18	G8DVR/P	220	56·9	44	10	G3VYV/P	256	95·7	152·6	ZL08H
4	G3VYV/P	119	17	G3UUP	311	96·7	25	3	G3NNG	272	54·3	151·0	YO79C
5	G3UUP	81	23	G3VYV/P	311	65·9	15	9	G3NNG	89	32·5	98·5	ZL39E
6	GW4FOX/P	90	14	G4BP/A	249	73·2	8	2	G8DVR/P	114	17·4	90·6	YM25E
7	G4BP/A	47	13	G3NNG	300	38·2	1	1	G3PEJ	6	2·2	40·4	ZO58E

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 18 September for the November issue.

Club secretaries are QTHR unless otherwise stated.

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

Ainsdale (AARC)—Thursdays, fortnightly: 4 and 18 September, 2, 16 and 30 October. 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, third and fourth Wednesdays in each month. Horwich Leisure Centre, Horwich, Bolton. Sec Alan Hartley, G8PRH, tel Bolton 46023.

Bolton (BTCARC)—newly affiliated club—no other details available.

Bolton (Edbro RC)—Details from sec, c/o Edbro Ltd, Lever Street, Bolton.

Bury (BRS)—Tuesdays, 7.30pm. Second Tuesday in each month (Main meeting). Mosses Community Centre, Cecil Street, Bury. 9 September ("Commercial micros and basic programming", by G8TMS), 14 October (Construction competition). The club has arranged for an RAE course to run from the first Thursday in September at Bury Technical College, 7pm to 9pm. For details contact either Bury Technical College or the club's publicity officer. The club continues to expand both in membership and activities. Publicity officer—C. Marcroft, G4JAG, 24 Lancaster Avenue, Ramsbottom, tel Ramsbottom 2168.

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. Sec D. Cutts, tel Gresford 3344.

Colne (Rolls Royce ARC—Barnoldswick)—First Wednesday in each month. Rolls Royce Sports and Social Club, Barnoldswick, 8pm. CW class every Monday, 7.15pm. Future plans include a rally in 1981 and the setting up of a club station and necessary antennas. Hon sec, L. Metcalfe, G4IEX, 1 Park Avenue, Salterford, via Colne, Lancs.

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: 2 September ("LF, dxing and simple antennas", by G3PFZ), 9 September (Surplus sale), 16 September ("CW operating techniques", by G3XSN), 23 September ("Expedition to St Pierre and Aniquelon Island", by W1PFA/FP8BH—RSGB tape/slide lecture), 30 September (Pre-AGM), 7 October (35th AGM), 8pm. Conservative Association Rooms, Church Road, Wavertree, Liverpool. G3AHD cw practice sessions, Thursdays, 8.30pm, on 144·250MHz, all welcome to call in or listen. Hon sec, A. Neilson, G4CVZ, tel 051-220 5470.

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. Sec J. Dent, G8OWY, 76 Lynwood Grove, Audenshaw, Manchester. Club station G3HOX active on hf and vhf.

Manchester (MUARS)—Wednesday afternoons and most lunchtimes in the radio shack (Manchester University Union, top floor). CW and RAE classes etc available. G3VUM active on hf, rtty, etc. Also with UMIST on Thursday evenings in UMIST union bar! Visitors always welcome. Details from J. Lenartowick, G8ROZ, c/o Radio Society, Manchester University Union, Oxford Road, Manchester 13.

Manchester (South Manchester RC)—Fridays: 5 September (Mystery lecture), 12 September ("Introduction to thyristors", by Trevor Hopkins, G8TYY), 19 September (Contest for club df shield), 26 September (Surplus equipment sale), 3 October (Discussion on homebrew v commercial equipment), 10 October (Scott hi-fi equipment demonstration by D. C. Holland, G3WFT), 17 October (Club quiz), 24 October ("History of thermionic valves", by Dr D. Yorke, G4JLG), 31 October ("Visit to W and VE", by W. R. Parkinson, G3FNM), 7 November (Annual dinner, Bowdon Hotel, Altrincham), 8pm. Informal meetings, Mondays, 8pm. Sale Moor Community Centre, Norris Road, Sale. Hon sec, D. C. Holland, G3WFT. Visitors and new members 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)—Alternate Thursdays. St Mary Magdalene Church Hall, Farringdon Lane (Ribbleton Lane), Preston. Hon sec G. Earnshaw, G3ZXC.

St Helens (StH&DARC)—Thursday, 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).

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, 8pm. Blossoms Hotel, Buxton Road (corner of Bramhall Lane), Stockport. Club net 3,692kHz, 11am, Sundays. SRS International, 28·430MHz, 10am, Sundays. Hon sec, G3FYE.

Thornton Cleveleys (TCARS)—First and third Wednesdays in each month, 8pm; morse practice from 7.30pm. St John Ambulance Hall, Fleetwood Road North (next to 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)—This club has amalgamated with ICLRC and now meets every Wednesday, 7.30pm. ICL Sports and Social Complex, Newton Park, near Winsford. Facilities comprise a meeting room, classroom, shack and canteen. New members should note all club members *must* be associate members of ICL Sports and Social Club and membership is limited. For details please contact M. Barry.

Wirral (WARS)—First and third Wednesdays in each month, 7.45pm. Sports and Recreation Centre, Grange Road West, Claughton, Birkenhead. Hon treasurer G. O'Keeffe Wilson, 20 South Drive, Upton, Wirral, Merseyside.

Wirral (W&DARC)—Second and fourth Wednesdays in each month, 8pm. Sports Concourse, West Kirby, Wirral. 14 October (Visit to Greenall Whitley Brewery, Warrington, 7.30 pm). Hon sec I. Brooks, G8PMW, 59 Mosslands Drive, Wallasey.

Quite a number of the above entries are "repeats". Would the various club/society reps like to update RR1 on future programmes, changes in secretary and/or venue etc. *RR1.*

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. Pie Hall, Denby Dale. Sec J. Clegg, G3FQH, has written to tell me that the club has decided to hold a rally next year at Shelley High School, Shelley, nr Huddersfield, on Sunday, 5 July. Give Jack a shout if you are interested.

Doncaster (DMIofHEARC)—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. Bradshaw Tavern, Bradshaw, Nr Halifax. Sec, Marcus Topham, G8NUC, is interested in education and visual aids. If you need a hand in his line for your club, give him a ring.

Hornsea (HARS)—Wednesdays, 8pm. The Mill, Mill House, Attic Road, Hornsea. Sec Mrs J. Heather Shaw, G4CHH. See also Scarborough.

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. Club net, 8pm, 3·750MHz, Thursdays. Next year's White Rose Rally will be held on 12 April at West Park Girls High School. Note that in your diaries!

Leeds (LUUARS)—The club is no longer active and looks as if it will remain this way for some time. Details from G4HGT or G4GVN, QTHR.

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

Pontefract (P&DARC)—The new club premises are in use. Details from sec, G4DTO, 43 Red Hill Drive, Airdale, Castleford, Yorks. Good beer served at this club, I enjoyed my visit. *RR2.*

Scarborough (SARS)—Mondays, 7.30pm. Scarborough Cricket Club, North Marine Road, Scarborough. On Friday, 12 September, the club will entertain Hornsea ARS for the second round of the G3GBH Trophy Contest. It is intended as a social occasion to remember an amateur who helped many to get their tickets. The questions are set by independent authorities, hospitality is provided alternately, and the best team wins (or has up to now). On Friday, 18 October, prior to JOTA, local Scouts, Cubs and Guides have been invited to a film show on amateur radio. An exhibition will be held during JOTA itself. The club has asked for GB4PB for this event.

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)—5 October, 2 November, 7 December, 7.30pm. Royal Hotel, Church Street, Barnsley. Sec G8PLJ.

Wakefield (W&DARS)—Alternative Tuesdays, 8pm. Holmfield House, Denby Dale Road, Wakefield. 9 September ("Microprocessors and home computers", by G4CPC), 23 September (Natter nite), 7 October (Mystery lecture, by G4BLT), 21 October ("Moonbounce, meteor scatter and auroras", by G4DZU, G4CMV and G4IDR), 4 November (Pie and peas supper at Rose and Crown Inn, Methley, 8pm). Sec Rick Sterry, G4BLT, tel Wakefield 255515.

York (YARS)—Fridays (except third in each month), 7.30pm. United Services Club, 61 Micklegate, York. Sec G3WVO.

Well, a little more news input this month. Five clubs have been in touch. Ask your sec whether he wrote. *RR2.*

Region 2 area and club representatives meeting

On 14 June, a meeting for all Region 2 area and club representatives was held at the HQ of Wakefield ARS to discuss regional policy and problems.

The following clubs were represented: Leeds White Rose RS, Denby Dale & DARS, York ARS, Pontefract ARS, Scarborough ARS, UK FM Group Northern, Northern Heights ARS and Wakefield ARS. Area reps from Bradford, Scarborough, Leeds, Harrogate, York, Wakefield and Pontefract were also present. The RR took the opportunity to pass on a lot of HQ information and a number of answers to questions raised at the last meeting.

Some general points raised

It seems that there are still a number of mobile amateurs being pulled up by the police in mistake for cb operators, as this is a particular problem in W. Yorks. It was felt that the new 10MHz allocation should be limited to telegraphy only.

G8NUC informed the meeting that it was hoped that there would be a regular 10min amateur radio spot on Pennine Radio in the autumn.

RR2 was asked to raise the question of clashing contest dates, in particular 6 and 7 September, with the Contest Committee. G4ATZ raised the matter of a vhf repeater to fill in the gap between GB3NA and GB3TW.

Prices and pricing of RSGB books drew quite a bit of discussion and RR2 was asked to convey a number of points to HQ on this subject.

There was about 3hr of discussion and the RR was asked to put a number of resolutions to HQ and Council.

The concept of a regular regional meeting seems to be popular, and RR2 was very encouraged by the difficulty he had in bringing the meeting to a close! His thanks to Wakefield Club for the use of their HQ, and to Margaret Croft, G4JAQ, for taking the minutes.

Was your club represented?

REGION 3—RR H. S. Pinchin, G3VPE, 61 Cole Bank Road, Hall Green, Birmingham B28 8EZ. Tel 021-777 1320.

Birmingham (Midland ARS)—23 September ("VHF aerials", by Ron Rew, G3HAZ), 21 October (AGM), 8pm. Room 110, University of Aston, Gosta Green, Birmingham. Sec G8BHE, tel 021-422 9787.

Birmingham (Slade RS)—First Friday in each month, 7.45pm. The Kingsbury Road Community Centre, 75 Kingsbury Road, Erdington, Birmingham B24 8QH. Sec G4FGF, tel 021-770 3474.

Birmingham (South Birmingham RS)—Thursdays (HF night on the air), Fridays (Construction and morse classes), 7.30pm. 1 October ("RTTY on a vdu", by Gerry Farrance, G3KPT), 12 November (AGM), 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G4GZI, tel 021-427 7104

Birmingham (UoBARS)—28 September (Freshers' fayre—demonstration station—visitors welcome). Thereafter, lunchtimes and Thursdays during term, 7.30pm. Tuesdays (RAE classes), 7.30pm. Club room, second floor Students' Union (above shop). Sec G8VNC.

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, tel Coventry (0203) 598186. Visitors welcome.

Coventry (CTCARS)—Mondays, 7pm. Winfray Annexe of the college. Sec G8ISJ.

Coventry (UoWARS)—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. 16 September (AGM), 30 September (Talk by Stourbridge Repeater Group), 14 October (Film night), 28 October, 11 November, 8pm. Aggborough Community Centre, Hoo Road, Kidderminster. Sec G4ILQ, tel Kidderminster (0562) 4930.

Lichfield (Chad RC)—Alternate Wednesdays, commencing 24 September, 8pm. The Naval Club, Burton Old Road, Lichfield. Sec G4ESK.

Lichfield (LARS)—First Monday and third Tuesday in each month, 8pm. Swan (bar), Lichfield. Sec G4JKQ, tel Ibstock (0530) 60396.

Malvern Hills (MHRAC)—Second Tuesday in each month, 7.30pm. The Foresters' Arms, Wilton Road, Barnards Green, 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 G8DIQ, tel Shrewsbury (0743) 55870.

members and visitors welcome.
Solihull (SARS)—16 September ("Plessey integrated circuits", by James Bryant, G4CLF), 21 October (AGM), 7.30pm. The Manor House, High Street, Solihull. Club net (G3GEI), Fridays, 9.30pm on 1,960kHz. 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)—15 September (Direction finding), 6 October (Constructional evening), 20 October, 3 November (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)—22 September (Natternight), 13, 27 October (Natternight), 10 November, 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)—17, 24 September, 1, 8 October ("Nuclear fusion", by Mr I. Pollard of Culham Laboratories), 15, 22, 29 October, 5, 12 November, 7.30pm. Phoenix Centre, Webb Crescent, Dawley. Sec G8INA, 16 Selkirk Drive, Sutton Heights, Telford, Salop TF7 4JE. Visitors welcome.
Walsall (WARC)—Alternate Wednesdays, commencing 17 September, 8pm. Forest Community Centre, Forest School, Hawbush Road, Leamore, Walsall. Sec G4GKC, tel Walsall (0922) 31675.
Willenhall (W&DARS)—Alternate Wednesdays, commencing 17 September, 8pm. Three Crowns, Stafford Street, Willenhall. Sec G4FAP. New members welcome.
Wolverhampton (WARS)—15 September ("VHF/uhf equipment for the amateur", by S. Jewell, G4DDK), 29 September (Natternight), 6 October (AGM), 13, 20 October ("Wolverhampton uhf repeater GB3WN", by G4JLI and the repeater group), 27 October (Members' annual film and slide show), 3, 10 November, 8pm. Neachells Cottage, Danescourt Road, Stockwell End, Tettenhall, Wolverhampton WV6 9PH. Sec G8EDG, tel Wolverhampton (0902) 763617.
Worcester (W&DARC)—22 September (AGM—free buffet), 6 October ("Check your spec—hf", by Roger Allan, G3TQZ), 3 November, 8pm. Old Pheasant, New Street, Worcester. Sec G4EKG, tel Evesham (0386) 41105. New members and visitors welcome.

REGION 4—RR M. Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ.

Derby (D&DARS)—Wednesdays: 3 September (Junk sale), 10 September (Deviation), 17 September ("How I began", by Fred Ward, G2CVV), 24 September (Film show), 1 October (Junk sale), 7.30pm. Tuesdays and Thursdays (Morse classes) 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.
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. 11 September (Visit), 25 September (Hobbies for all, station erection), 9 October (AGM), 23 October (Junk sale or film show), 8pm. Alexandra Club, Cleethorpes. Sec R. Scarlett, G4HZF.
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. 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. 1 September (144MHz df event). 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. 19 September (AGM). St John Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK.
Nottingham (ARCoN)—Thursdays, 7.30pm. 4 September (Forum and preparation for SSB Field Day), 11 September (Junk sale), 18 September (Activity night and post mortem on field day), 25 September ("Construction techniques", by G8RYK), 2 October (Forum), 9 October ("Nascom", by G4IJX), 16 October (Activity night), 23 October (Natter night), 30 October (RSGB films or video). Sherwood Community Centre, Mansfield Road, Nottingham. Sec M. 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)—Penchbeck Teachers Centre, Spalding. Sec G. C. L. Parker, G4CMK, 33 Beech Avenue, Bourne, Lincs.

Presentation of a world time clock to Roger Hyde, G3ZDW, on his retirement as Lincoln Short Wave Club's contest manager. L to r: G3ZDW; Mike Wells, G4JES, club secretary; and Roger Hunt, G3PVU, club chairman. *Photo:* G8VGF

L to r: Tom Douglas, G3BA: Fred Ward, G2CVV; and Jack Anthony, G3KQF, at the dedication of the memorial clock to G3FGY, past-chairman of Derby & D ARS and RR4

REGION 5—RR R. E. G. Kendall, G8BNE, 19 Willow Green, Needingworth, Huntingdon, PE17 3SW. Tel St Ives (0480) 67538.

Bedford (B&DARC)—First Wednesday in each month. Other Wednesdays (Informal). 8pm. Club shack, Ravensden, Bedford. Sec G8PZZ/G4JTJ, tel 0234 47818.

Cambridge (C&DARC)—Fridays, 7.30pm. Coleridge Community College, Radegund Road, Cambridge. For information contact sec G8JKV, tel Swavesey 31120.

Cambridge (CUWS)—Mondays. St John's College bar. Details from Chris Budd, G8OPB, St John's College. Meet members at Societies Fair, Kelsey Kerridge Sports Hall on 7-8 October.

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 (SN&D ARC)—Recently formed club. Alternate Mondays, 7.30pm. 15 September (Junk sale). Ernulf Community School, Eynesbury, St Neots. Details from Paul Herrod, G8TQI, tel St Neots 74642. New members very welcome.

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)—First Thursday in each month, 8pm for 8.15pm start. St John Ambulance, Serena HQ, Slough. Contact Janie Britton, tel Windsor 61723.

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: 4 September (Talk on the North Thames Gas radio telephone system, by Les Dibben), 16 September (Talk: "Three centimetres", by G8AZU), 2 October (Grand junk sale—all welcome), 7.45pm. Red Cross Hall, The Crescent, Maidenhead. Sec J. Patrick, G3TWG, tel Bourne End (06285) 25275.

Mid-Thames RDF Club—The last part of the club competition, the Gage-Tyler Cup, will be held on 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 Wednesday in each calendar month, 7.30pm. Civil Service Social Club, Marston Road, Oxford. New sec C. Marshall, G4IOK, 9 Mountfield Drive, Whitney, Oxon, tel Whitney 4867.

Oxford (OURS)—Wednesday evenings during term. Further details from Simon Pike, G8KRD, Brazenose College.

Reading (RARC)—Details from sec Chris Young, G4CCC.

Clubs and club secs in my region, please update your news and send it to me. *RR6*

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

Following information is latest received.

Addiscombe (AARC)—Tuesdays, 9.15pm. 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 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, 7.30pm. 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)—For meeting details contact hon sec G. W. Brind, G4CMU, tel Burgh Heath 54497.

Thames Ditton (Thames Valley ARTS)—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.

Following information is latest received.

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, 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)—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)—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)—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 F. Donovan, G4ALD, 4 Rembrandt Drive, Northfleet, Kent DA11 8NG.

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. 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: 4 September ("Test gear", by G3OCB), 2 October ("Model control", by G3XFL), 7.30pm. SWEB Clubroom, Pool, Camborne. Cornish net weekdays 10am on 3·715MHz 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, 7.30pm. Community Centre, St Davids Hill, Exeter. Full details from Vic, G8VKK, 56 Springfield Road, Exeter EX4 6J4.
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. 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. Full details from George G4CG. Tel Barnstaple 3683.
Plymouth (PRC)—Alternate Mondays: 1 September (Activity night), 15 September ("Teleprinters", by G3YJQ), 29 September ("My visit to the USA", by G8MLI), 7.30pm. Physics Lab, Tamar School, Paradise Road, Plymouth. New hon sec is Trisha Day, c/o G3ZYY, tel Saltash 5913.
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: 5 September ("Home constructed test equipment", by G8NSP), 7.30pm. Burraton Toc-H Hall, Saltash. Visitors always welcome at club meetings. Full details from R. S. Pridham, G4BVB, tel Gunnislake 832891.
Torbay (TARS)—Every Friday with special meeting on last Saturday of each month. 7.30pm. Bath Lane, rear of 94 Belgrave Road, Torquay. Full details from hon sec, Hugh Davies, G4DZH, tel Paignton 523063. Torbay net Mondays, Wednesdays and Fridays at 10.30am on 3·756MHz and on Saturdays at 10am. Visitors most welcome at club meetings.

REGION 10—RR P. A. Jones, GW4HAT, 68 Pastoral Way, Tycoch, Swansea SA2 9LY.
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. 8 September (Pocketphone clinic, Bill O'Neil), 13 October (AGM, and talk by Council member Bob Barrett, GW8HEZ). 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)—The BSC Port Talbot ARS will be holding their Christmas social evening on Tuesday, 9 December, at the Baglan Bay Hotel and will commence at 7.30pm. The club meets as usual each Thursday at 7.30pm. BSC Sports and Social Club, Margam, Port Talbot. Details of the social, etc, can be obtained from hon sec 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, 8pm. 4, 18 September, 2 October (AGM), 16, 30 October. Technicians Common Room, 2nd Floor, College House, Swansea University. Club net each Sunday 1000gmt, 28·530MHz, net controller, GW4BIQ. Details from club sec 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.

The new RR10 thanks all members for their support in the recent election and would be pleased to receive clubs' contributions before copy date as shown 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 11—RR P. H. Hudson, GW3IEQ, Silhill, Dinas Dinlle, Caernarvon.
Following information is latest received.
Bangor (UCoNWARS)—Thursdays, 7.30pm. Small Lecture Theatre, School of Engineering Science, Dean Street, Bangor.
Conway Valley (CVARC)—Second Thursday in each month. 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 144MHz), 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 TC ARC)—Tuesdays, 6.30pm. Electrical Laboratory, Kingsway Technical College, Dundee. All amateurs welcome. Programme to be prepared after summer recess. Further 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, at Annsbrae House. All amateurs welcome to visit the club which is active under the callsign GM3ZET on 144MHz fm and on 3·5MHz on club nights. Sec GM4BBL.

RR12 requires up-to-date information from club secretaries as soon as possible. Failure to update may result in the club entry being withdrawn from this column.

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)—Details of summer programme from GM8BJF, tel 031-447 5527.
Glenrothes (G&DARC)—Wednesdays and third Sunday in each month. 21 September (AGM), 19 October, 16 November, 21 December, 7.30pm. Provosts Land, Leslie, Fife. Details GM4HBG, tel Glenrothes 771057.
St Andrews (UoStA 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. Meetings restart in September. 7.30pm. Community Centre, Wellington Square, Ayr. Details from sec GM3THI.
Dumfries (D&GREC)—First and third Mondays in each month: 15 September (Lecture: "70cm and microwaves", GM4DIJ and GM8BJF), 6 October (Visit to radar station), 20 October (Junk sale and quiz), 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 I. McGarvie, GM4JDU, 3 Kelso Avenue, Paisley.
Greenock (G&DARC)—Tuesdays and Fridays (RAE course). 7.30pm. 22 Inverkip Street, Greenock.
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. 7.30pm. Wrangholm Hall Community Centre, Jerviston Street, Motherwell. Details from sec GM4FKD.
Stevenson (Ardeer RCARS)—Thursdays, 7.30pm. Ardeer Recreation Club. Details from Sec GM8BOM.

All RSGB members resident in Region 14 are invited to our Region 14 ORM to be held on Saturday 13 September, 1980, at Bellahouston Palace of Arts, Glasgow. This is the venue of the Scottish Amateur Radio Convention on that date, hosted this year by the West of Scotland Amateur Radio Society.

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)—For details contact club sec GI4HCN.
Bangor (B&DARS)—First Friday in each month, 8pm. Redcliffe Hotel, Bangor. 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. Details from GI8RJW or GI8TAX.
North Ulster (NURSGBG)—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. Members who have topics for discussion please write to RR15 as soon as possible.

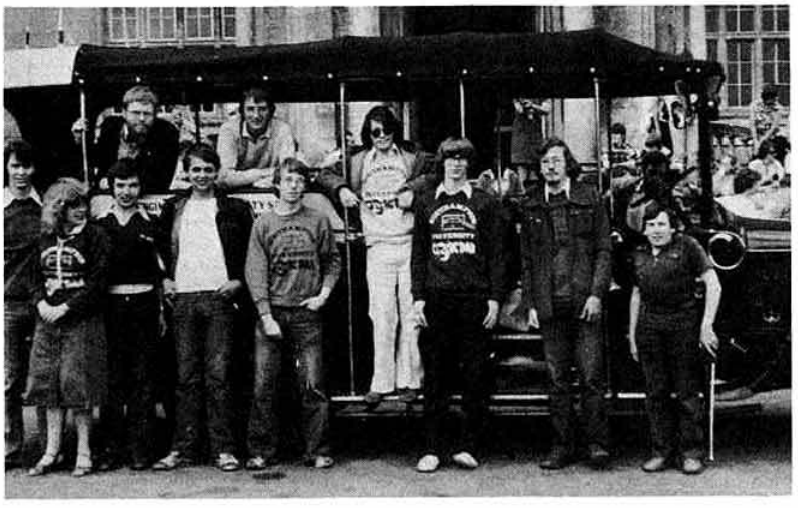
REGION 16—RR M. S. Appleby, G3ZNU, 45 Cedar Avenue, Kesgrave, Ipswich IP5 7HA. Tel Ipswich (0473) 622559.
Braintree (B&DARS)—First and third Mondays in each month, 7.30pm. Braintree Community Centre, Victoria Street, Braintree. Details from Dave Boniface, G3ZXX, 131 Humber Road, Witham.
Bury St Edmunds (BStERS)—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. 2 September (Home computers), 7 October (AGM and junk sale). The club will also be holding a df hunt on 21 September, and on 12 October, with the Colchester club. Events start at 2pm at Galleywood Common, behind the church. Morse classes are also available at the club. Details from Andrew Mead, G8KQE.
Colchester (CRA)—Thursdays, fortnightly, 7.30pm. Colchester Institute, Sheepen Road, Colchester. Club is also holding a df hunt on 26 September, starting at 7.30pm at Fordham Heath, ngr945 264, and on 12 October with Chelmsford club, as above. Details from Frank Howe, G3FIJ.
Felixstowe (FARC)—Tuesdays, informal, 8pm. 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, 7.30pm. Handford House, Ranelagh Road, Ipswich. 10 September (Initial planning for ESWR '81), 24 September (Surplus equipment sale), 8 October (Planning for Jamboree on the Air). Morse classes also available at club. Details from Jack Tootill, G4IFF, 76 Fircroft Road, Ipswich.
Loughton (L&DARS)—Fridays, fortnightly, 8pm. Loughton Hall, Rectory Lane, Loughton. 5 September (Informal and arrangements for the "Rainbow and Dove" field weekend), 19 September (Lecture, subject to be announced). Details from Barry Capon, G8UBH, 180 High Road, Loughton.
Lowestoft (L&DARC)—Fridays, 7.30pm. North Suffolk Teachers' Centre, Lovewell Road, Lowestoft. 12 September (AGM). Details from Paul Godfrey, G8JBD.
Martlesham (MRS)—First Wednesday in each month, 7.30pm. 1 October (Visit by John Wilson, G3PCY, of Lowe Electronics). Visitors always welcome but must first contact Simon Garrett, G4EVN, PO Research Centre, Martlesham Heath, Ipswich.
Norwich (Norfolk ARC)—Wednesdays, 7.45pm. Crome Community Centre, Telegraph Lane East, Norwich. Details from Andrew Kiddle, G4HVC.
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 Jim Lowe, G8SCB, 22 Bluebell Grove, Needham Market.
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, 7.30pm. Chineham House, Popley, Basingstoke. Chairman Mike Payne, G3ZRM, 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)—Second Wednesday in each month. 7.30pm. The Quennevais, Communicare Centre, St Brelade's, Jersey. Hon sec Mrs M. Smith, 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 operational on RB2. Group net on GB3PH, Mondays at 7.30pm. Sec G8GNB, tel Titchfield (03294) 41456.
Portsmouth (P&DRS)—Thursdays, 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. The Lecture Hall, South Dorset Technical College, Newstead Road, Weymouth. Sec G3ZGP.
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.
Following information is latest received.
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)—Monday-Friday. 7.30pm-10pm. Westbury School, Westbury Road, Ripple Road, Barking, Essex. Morse on Tuesdays. Club reopens 1 September, 1980, 18 September (Talk by member of RSGB Contest Committee), 23 October (FM Group on repeaters), a film show



Members of the Southampton University ARC at the Longleat Rally, with the 1929 Dennis bus "the toastrack" which carried them safely between Southampton and Longleat. L to r: G8VDK, Christine, G8RBW (above), G8HHQ, G4BWQ (above), G4JTY, G4HQU, G4IWB, G4JNI, G4GHU, G8VTA and G4JNT who was also the photographer

in November, 18 December (Christmas party). All welcome, all details from A.Sammons, G8IZN, tel 01-594 2471.

Central London (Post Office HQ ARG)—For Post Office members only. For details contact J. A. Clarke, Room 134, Cardinal House, Farringdon Road, London EC1M 3ND.

Cheshunt (CDRC)—Wednesdays: 3 September (Natter/cw), 10 September ("Fire comms", by Mr Parker of the Herts Fire Service), 17 September (Natter/cw), 24 September ("Audio modules", by D. Bastin). This club has again started its own RAE course at East Herts College for the exam in December 1980. Club meets at the Church Room, Church Lane, Wormley, Herts. Hon sec G8BVL, tel Waltham Cross 32198, or Jim, Ware 4316.

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)—Meetings now held at Chiswick Town Hall, London W4. Please contact hon sec W. Dyer, G3GEH, 188 Gunnersbury Gardens, Acton, W3, tel 01-992 3778.

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)—Next meeting 21 September 1980. Hon sec, R. Holmes, G3PKQ, tel 01-558 2928, or K. Thompson, G3AMF, tel 01-989 9224.

Edgware (E&DRS)—Second and fourth Thursday in each month. 8pm. 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 Thursdays in each month at 7.30pm. All welcome. Edgware net, Monday. (It is well worth visiting this club if only to get the newsletter, *RR19.*)

Harrow Weald (RSH)—Fridays, 8pm. Harrow Arts Centre, High Road, Harrow Weald. Sec G4AUF, tel 01-868 5002. New session of lectures starts in September.

Havering (HDRS)—Wednesdays, 8pm. Fairkytes Arts Centre, Billet Lane, Hornchurch. Further details from sec, A. Negus, tel Upminister 24059. All welcome.

St Albans (Verulam ARC)—New meeting days and new venue. Main meetings on fourth Tuesday in each month: 23 September ("How black is your box", by G3UFB), 28 October (to be announced), 25 November ("On a desert island", by G3UFB), 16 December (AGM/social), 7.30pm. The Charles Morris Memorial Hall, Tyttenhanger Green, nr St Albans, Herts. Hon sec A. Clarke, G8MAE, tel 0442 64751. (Another club with a fine newsletter service to members, *RR19.*)

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)—A sponsored amateur radio station was held in March and a cheque for £789.13 was presented to the Mayor of Enfield for a tail-lift ambulance for handicapped children. Good show chaps! Meetings are held on second Thursday in each month: September ("Hi-fi", by P. Ostwind), October (Film show), 7.45pm. Scout Hut, Wilson Street, Winchmore Hill Green, N21. All welcome. Information from R. Selby, G4DRI (publicity officer), or J. Fitch, G8EWG, tel 0440 7353.

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 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.

It is hoped to organize a regional meeting during late 1980 if there is sufficient demand. Would ARs, club secs, and others please make *written* comment asap. Thanks. *RR19.*

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ.

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. 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.

POETS' CORNER

Ode to (some) telephony operators

We all get issued callsigns, of which we're justly proud,
With strict instructions how to use when talking to the crowd.
The callsign must be used in full each time we're on the air,
With a phonetic alphabet to help us "get it there".

But there are those among us—some "oldies" most offend—
Who leave the prefix off the front, and only use the end!
Apart from being sloppy, this is illegal too,
And contravenes the licence (if you care to read it through).

So when you're in that local net, and chatting to your mates,
Remember all your listeners—the impression it creates:
And set a good example, chaps; it's really done with ease—
Just quote your callsign fully, and act professional, please!

'3HBT—Sorry!—GM3HBT

The G8 lament

I know the code from A to Z,
Ask me any digit,
And I'll reply, straight from my head,
dit dah to dah dah dit dit.

Each night with newly gathered will,
Before the set I sit,
My pen is poised the page to fill,
But dahs sound just like dits.

The only way from G8-land
To lands across the ocean,
Is to bend your head to hf bands
Till you've slowed that dah dit motion.

G8HZJ

Special event stations

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

GB4MAM, 30 August–26 September
The Mosquito Aircraft Museum will use the station as part of the re-union for second world war RCAF and USAF Mosquito Squadron members at the museum at Salisbury Hall, London Colney, nr St Albans. Details from D. E. E. Purchese, G3LXP, QTHR.
GB2PYE, 1–30 September
The station will be part of the Pye Ltd Sports and Social Club annual Sports and Hobbies Exhibition. Details from J. R. Crellin, G3LYX, c/o Pye Amateur Radio Club, Pye Ltd, Oulton Broad, Lowestoft, Suffolk.
GB3ITZ, 20 September
The station will be part of the Royal Air Force Sealand open day, when the base's radio club will be open and active. Details from F. A. Lamb, GW8RET, QTHR.
G2NM, 21 September
This station will be operating at the last QTH of the late Gerald Marcuse, whose callsign it uses. Operation will be on 3·5MHz and vhf. It will be situated at Tidewaters, Bosham, where it will be operated by Chichester and District ARC. Details from S. Talbot, G8FCX, QTHR.
GB2UB, 27–28 September
This demonstration station will be active at the University of Birmingham Freshers' Fayre, the introductory weekend for new students. Operation on hf and vhf. Details from G4HLX, QTHR.
GB3RN, 4–31 October
The station is to be operated to cover both the RNARS AGM and the Jamboree on the Air, and will be situated on *HMS Mercury*, Leydene, Petersfield, Hants. Details from M. Puttick, G3LIK, QTHR.

The following special event stations will be operating during the 1980 Jamboree on the Air, taking place on 17–19 October:
GB2HSG, 10–19 October, by the 2nd Hanworth Scout Group, at All Saints Church, Uxbridge Road, Hanworth. **GB2JAM**, for Wirral District Scouts at West Wirral Scout HQ, Royden Park, Wirral, Merseyside. **GB2WSB**, for the World Scout Bureau, at Appleton Laboratory Amateur Radio Club, Hut 20, Appleton Laboratory, Ditton Park, Slough SL3 9JX. **GB4RSR**, by the Rotherham Scout Group from The Barn, Church Lane, Morthen Road, Wickersley, S. Yorks. **GB2AVS**, at the Ardnavally Scout Activity Centre, 109 Milltown Road, Belfast 8, Northern Ireland. *18–19 October only:* **GB2HRS**, by the Holyrood Scouts at their HQ in Castlereagh Street, Barnsley, S. Yorks. **GB2KDS**, by Kyle District Scouts at the 60th Ayrshire Scout Group HQ, Wellington Lane, Ayr. **GB4SSG**, by Speedwell Venture Scouts and Ranger Guides at Hartley Venture Scouts and Guides HQ, Larkfield, Hartley, Kent. **GB4RHU**, by Rhu Venture Scouts at the Scout Hut, Cumberland Road, Rhu, Dumbartonshire. **GB4HSG**, by Haverhill Scout Group at its HQ, Colne Valley Road, Haverhill, Suffolk. **GB2SVS**, by Shrewsbury Venture Scouts, Sea Scout HQ, Smithfield Road, Shrewsbury, Shropshire,

Mobile rallies calendar

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

7 September—Vange ARS Mobile Rally, Nicholas School, St Nicholas Lane, Basildon, Essex. Details from G4FMK, QTHR.
7 September—Telford Mobile Rally. Telford New Town Centre Malls, Shropshire (exit 12, A5 off M6; A442 from N or S; M54 from W). 11am opening. Talk-in via GB3TRG on S22, 144MHz ssb, SU8/SU20. Over 40 stands plus flea market. Usual attractions, including free coach service to the Ironbridge Gorge Museum nearby. Full catering and licensed premises on site. Unlimited parking. Further details from G8DIR, tel Shrewsbury 64273, G8UGL, tel Telford 584173 or G3UKV, tel Telford 55416. All QTHR.
14 September—Bucket and Spade Party, The Regency Hall, Saundersfoot, commencing at 11am. Talk-in will be on S22, R7 and RB4. Refreshments will be available, including a licensed bar. Further details from GW3XJQ, tel Carew (06467) 610.
21 September—Peterborough Mobile Rally. Opens at 10.30 at Walton School, Mountsteven Avenue, Peterborough. All the usual trade stands and bring and buy. Talk-in available on 144MHz, S22, 432MHz on SU8 and via GB3PB, RB10. Further information from G8OUU, QTHR, tel 0780 740456.
21 September—Ballymena RC Mobile Rally. Castle grounds, Antrim. For details contact I. J. Kyle, GI8AYZ, 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.
5 October—Great Lumley Amateur Radio & Electronics Society Annual Mobile Rally, Community Centre, Great Lumley, Nr Chester-le-Street, Co Durham. Talk-in on S22, special callsign GB3GLR. All usual attractions, bring and buy. Details from G8HPW, QTHR.

MEMBER'S AD ORDER FORM

FOR SALE ☐ WANTED ☐ (Tick as appropriate)

- **See Members' Ads page for conditions of acceptance.**
- **Not more than 40 words, including name, address, etc, for £1.**
- **Do not forget to include remittance and a *Radio Communication* mailing label.**
- **Please write in block capitals, or type.**

Licensed members are asked to use their callsign and QTHR, meaning that their address in the current *RSGB Amateur Radio Call Book* is correct. BRS and A members will, of course, have to provide their name and address.

I enclose cheque/PO for .....
to cover the cost of this advertisement.

Signed .....

Date .....

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 £1 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: **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

FOR SALE

Free 40ft Versatower with QTH detached bungalow, 3/4 bedrooms, 17ft lounge diner, kitchen, integral garage, separate bathroom, w/c, gardens front and rear, planning permission for 60ft tower, £27,500 ono. Hamilton, G4IAV, 329 North Road, Atherton, Manchester M29 0RE. Tel 0942 870954.

JV6PV4500, used little, portable video recorder, monochrome, camera, 9in Sony, batt/mains, monitor/rx, rechargeable battery, power unit/charger, 10 used once only tapes, rf converter, all leads, £550. P. S. Bush, 41 Waverley Road, Bristol BS6 6LT. Tel 0272 44688 or 43932, daytime.

FL2100 linear, good cond, £230. FT101 fm adapter, G3LLL, unused tx board, £6. RX unit, plug-in, £20. *Wanted:* spares for W15AM, W15FM, W15U. Remote control box for Pye Westminster. G4BLH, QTHR. Tel 0282 695904.

TF1041 vtvm, £20. GEC miniscope, spare tube, £25. Drake low-pass filter, TV3300, new, £10. TS175/V 85-1000MHz, like BC221, £36. TS174/V, 20-250MHz, like BC221, £36. Scope tubes, various transformers, meters. G4DVH, QTHR. Tel 0229 54466.

Bearcat 220FB rx, 20-channel xtalless scanner, amateurs, marine, aircraft, public services, cost £241, mint cond, used little, £180. Yaesu FRG7 rx, digital readout to 100Hz, coverage 0·5-29·9MHz, no gaps, mechanical filter included but not fitted, Perspex cover, mains/battery, cost £290, mint cond, £160. Trio CO1303D scope, 75mm, 5MHz, virtually unused, cost £130, bargain at £75. Tel Bull's Green (Herts) 219.

FTDX560, £240. Drake MN2000 atu, £100. Heath SB610 monitorscope, £40. Yaesu freq counter YC355D, £100 ono. SD306s, £1 each. *Wanted:* Drake T4XB. G4DED, QTHR. Tel 086-75 2215.

FT227R tx/rx, £170. KW Atlanta 500W p.e.p. tx/rx, ac/dc psu, £200. Pair Pocketfones, working RB10, nicads, £30. G3YQU, QTHR. Tel Leeds 862585, daytime.

TR7200G fm mobile, fitted 19 channels: R0-8, S10-11, S13-16, S20-23, exc cond, comp with mount, orig packing etc, £95. G8PHI. Tel Redcar 0642 481216.

Star ST700 tx, perfect cond, £80. Buyer collects. *Wanted:* Drake T4XC or B, AC4 p/s. G2UZ, QTHR. Tel Leeds 784074.

FT101, all options, FV101, SP101, G3LLL clipper, swr bridge, manual, all vgc, prefer buyer collect, the comp station, £425. G4FUW, QTHR. Tel Otley 464184, after 7pm.

Pye Cambridge, dashmount, going on 2m, a.m./fm, 9-channel tx, tuneable rx, S/rf meter, toneburst, manual, circuits, £55. QQV0320A, £4. 2m/70cm varactor tripler, £8. 70cm 6dB mobile whip, mount, £7. RCA 22W 70cm power module with data, £15. Pye handset, £2.50. Boom mic, £1. 70cm anode lines for QQV0320A, £1. G4BLT, 1 Wavell Garth, Sandal Magna, Wakefield, West Yorks WF2 6JP. Tel Wakefield 255515.

Hammarlund SP6003X6 rx, 0·54-54MHz vgc; KW Viceroy Mk 1 tx, the pair £120 ono. G3VWP. Tel Bill, 01-834 5824.

Datong morse tutor, £27. Eddystone rx, 0-30MHz, £75. Nicad pack for FT207R, £5. MM transverter MMT432/144R, £95. Joystick System "J", £20. Mirage B108 2m amplifier, 80W out, never used, £70. Philips PM3230 twin beam scope, 0-10MHz, £50. Advance sig gen type D1, 9MHz and up, £20. G8PYQ, QTHR. Tel Erith 37710.

Icom IC245 fm/ssb, synthesized 2m tx/rx, 144-148MHz, toneburst, mic, mobile bracket, orig packing, £310 ono. IC3PE matching psu/spkr, 12V, 3A, £45. Stolle 2050 rotator, cable, £30. BC221 wavemeter, charts, smart, £15. SWR bridge, £7.50. 8-el Yagi, coaxial, £5. G4DFS, QTHR. Tel 0226 790043.

BC221, psu, good cond, £20. FR100B, as new, Eddystone 840C, as new, £65 each. Marine r/t, 24V dc, six channels, £75. W15AM, £50. WS19 psu spares available, sae. *Wanted:* W15FM hi band, handbook, F30AM, HW8, exchange considered. G3DVF, QTHR. Tel Alnwick 602487.

KW Viceroy Mk3, RME amateur bands rx, good order, £95. *Wanted:* 6HF5 or 6KD6 valves. G3YOC, QTHR. Tel 0709 873408.

R216 rx, continuous coverage 19-157MHz, selectable cw, a.m., fm, built-in xtal calib for 1MHz and 5MHz points, matching mains psu, handbook, good cond, £115 ono. Telequipment twin beam cro type D43, 43A, 43G plug-in modules, same again without valves, with handbook, all for £35. G3VBD, QTHR.

Datong active antenna AD170, cost £42.55, as new cond, splendid where space limited, member moved to better QTH, best offer in next three weeks. G4ECH, QTHR. Tel 0146 72023.

Trio 7200G, S18-23, R0-7, R0 input, 15W output, just checked at Lowe's, £130. Hammersley, G8RRA. 28 Green Lane, Coventry.

Yaesu FT200/FP200, fan, rf atten, cw filter, all 10m, exc cond, £250. EDL432 70cm, 50W linear, £35. New Avanti λ/2 2m whip, £12. λ/4 2m helical ant, BNC fitting, £2. GM4JJJ, GM8HEY QTHR. Tel Saline 705, evenings or weekends.

Sommerkamp FTDX500 560W p.e.p., exc cond, manual, spare valves, £250 ono. AR88D S-meter, manual, perfect, £45. Buyer collects. G3ZUE, QTHR. Tel Byfleet 46744, after 7pm.

Uniden 2020 tx/rx, matching loudspkr, mic, dc power lead, accessories, £375. Homebrew 2m transverter utilizing MMC144/28LO, £50. PSU to suit, £10. Assortment of electronic components, valves, 2102 r.a.m.s, ttl, etc, send sae for details. Taylor, G4FMB, 4 Crampton Drive, Hale Barns, Cheshire. Tel 061-980-5662, after 6pm.

Atlas 210X, noise blanker, mobile mount, h/b psu, Drake W4 rf power meter, Drake TV3300 lp filter, Hustler whip 20/80m, offers. C. Baker, GM4GMR, 49 Blinkbonny Road, Falkirk, Stirlingshire.

Clearout: Hamgear P2 preselector, £3. Toneburst oscillator, £1. Heathkit gdm, £2. Tradiper gdm, £2. Rogers Ravensbourne stereo amplifier, needs attention, £6. Vernier dials, variable capacitors, several transformers, etc, £6. Buyers collect. G8GWT, QTHR. Tel 942 0969.

Auto transformer, heavy duty, multiple taps, cased weight 14lb, £4. New, boxed American valves, IA7GT, IN5GT, IQ5GT, £1. All plus postage. *Wanted:* Baragraph. G6RF, QTHR. Tel Liskeard 45459.

TR7200G, TR7010, both in perfect cond, £100 each. Datong FL1, £35. MMT 144/28 transverter, £65. Standard C146A 2m fm handheld, £60. 813 and base, £5. Copal clock, £5. For 0·25in mag-tape see May *Radio Communication*. G3AZI, QTHR. Tel 0772 37815.

Trio TS510/PS510, good cond, £160. QM70 2m high power transverter, only used once or twice, £60. Liner 2 fitted pre-amp, psu, £100. All items ono. G4HPY, QTHR. Tel Luton 27567.

TS820S, SP820, both in absolute mint cond, Securicor delivery, £700. GI3YDH, QTHR. Tel Belfast 793913.

FT277B/FT101B, well cared for, in gc, orig packing, no mods, best offer to £370. *Wanted:* FV101B. G3PCT, QTHR. Tel Chelmsford 321086.

Newnes Radio and Television Servicing, 1953-1973, comp 23 vols, over 12,000 pages of circuit diagrams, layouts, full servicing information, all makes, hundreds of models, incl car radios, tape recorders, etc, mint cond. G. Watts, 62 Belmore Road, Norwich. Tel 0603 33103.

RTTY unit, G3PLX design, KBD, uhf modulator, £126. Liner 2, various improvements, £110. QM70 144/2B Buccaneer transverter, £46. 4m pair PTC 0·25W handhelds, £10. *Wanted:* Manual or any servicing information for HP5245L electronic counter. G8PCB, QTHR. Tel Wilton (072 274) 3569.

Multi 700E, perfect, £170. Westminster W15AM midband, unmodded, £55. Microbits 8080A1, 8224, 8208, 2X8212, 8154, offers each (include data), £15 lot. 12 digit keypad, unused, £5. 17 set, £5. 52 set, £5. All ono. G8SFC, QTHR. Tel 0384 271963.

Yaesu FR50B rx, 15–80m, aux, built-in spkr, exc cond, £100. Tel 01-904 9210.

AR240 2m fm handheld portable, synthesized, 144–148MHz, nicads, charger, helical antenna, case, £135, including delivery by registered post. G8HHQ. 53, Riverside Gardens, Romsey, Hants. Tel Romsey 513650, or Winchester 822543, daytime.

Heathkit SB102, hf, ssb, as new cond, hb psu, £200. Pye W15U 10 channel, 8 fitted, tb, hot rx, £110. PF1 Compact RB2, tb, nicads, £30. 18 AVT hf vert, £35. 70cm mobile a.s.p. colinear, £10. G3VSJ NOT QTHR. Tel 09924 68052, after 6pm.

FRG7, used one hour only, £165. FT202R, S20–22, R3, R5–6, nicads, homebrew charger psu, used little, £105. 14AVQ/WB, new, unused,£45. G4AIJ. Tel Ludlow 3197.

FT227R memorizer, no mods, regulated mains power supply, mint cond, £185. G8OXO. Tel Bexhill (0424) 215619.

New Drake C4 console, comp with ac centre ant, relay box, manual, US$700. Anthony Musero, K3UKW. 1609 South Iseminger Street, Philadelphia, PA 19148, USA. Tel 215 271 8898.

FT223, 2m, fm, xtals fitted S0, S20, S22, R5–7, £100. G3PSH, QTHR. Tel 0635 62289.

Hal RVD1005 rtty vdu, (45/50/75/100) Bauds c/w tu, uhf modulator, manual, mint cond, £195. SSM1 sstv monitor, good cond, £90. GM4JYZ, ex-GM8PSM, QTHR. Tel 041-7766266, after 6pm.

NEC CQ110E tx/rx, 160–10m, ssb, a.m., cw, fsk, 160W output, mains/12V built-in psus, digital readout, cw filter, fan, all comp, used little, mint cond, £449. Joystick type J, new, unused, £39. G4BKM, QTHR. Tel Denham (0895) 834358.

Sentinel 40 pa/pre-amp, £40. Microwave Modules MMT 432/144R, linear transverter, £120. Jaybeam Parabeam PBM 18/70cm, trombone, £18. *ARRL Handbook* 1977, £3. G8KLI NOT QTHR. 6 Kendal End Road, Barnt Green, Birmingham. Tel 021 445 3260.

Yaesu FT207R, £159. PSU/fast charger, £25. Spkr/mic, £9. Spare nicad, £13. Search 9 2m fm rx, £35. Brainbank language translator, £99. English, French, German modules, £9. New, boxed, unwanted gifts. G4BKM, QTHR. Tel Denham (0895) 83458.

IC245E, RM3 controller, immac rig, in superb cond, £385. Scopex 486 scope 6MHz, £85. Sparkrite electronic ignition, £10. G8ESK, QTHR. Tel Bradford 45611.

Drake TR4C, 300W ac psu, used little, a GD could check, £400. Johnson Matchbox atu swr power meter, 275W 52Ω, £20. Kenwood low pass filter, 1kW, £15. All perfect. Carriage extra. GD3TIU, QTHR. Tel Douglas 06243417.

Trio 2200GX, £100. TR7200G, £100. TS510, PS510, E-Zee Match, £230. Avo Minor, £10. G3ZZY, QTHR.

EX1DY 32K Sorcerer, 8K basic Rompac, Nicomtech morse-rtty interface, disassembler, chess/games programmes etc, must go, £850 ono. G3PLX vdu, keyboard, psu, uhf mod, all in one cabinet, £120 ono. G4HUK, QTHR. Tel Horsham 67813, after 5.30pm.

TS120V MMT 144/28 transverter, T435 vhf thru-line wattmeter, all as new, dummy load, coupler, leads, £420. MM432/28 converter, £15. Antec 5/8 whip, £5. ASP 5/8 mag mount, £10. Mason. Tel Luton (0582) 416028, office hours only.

Icom ICRM3 computerized remote controller, cables, handbook, as new, will provide four extra memories, scan facility for Icom IC701 hf tx/rx, IC211E, IC245E vhf tx/rx, gift at £60. G3BDQ, Whitefriars, Friar's Hill, Guestling, Hastings, East Sussex.

Drake R4C, T4XC, ac psu, L4B linear, Yaesu HO10 monitor scope, all in mint cond, used very little, £700. G3RDW. Tel 021-353 7427.

TS120S, as new, £400. TX599CS, £220. Yaesu YC355D, 200MHz counter, £85. G8FXB. Tel Stock (0277) 840406, evenings.

FT101 Mk2, fitted B type filter, G3LLL rf clipper, fan, immac, handbook, orig packing, £350. *Wanted:* 101ZD. G3UZM, QTHR. Tel Exmouth (03952) 73090.

TA31JR, £25. Eddystone 898 dial, £5. 2m low pass filter, Burns FL2, £5. Electroniques QP166 (valve) Qoilpax, £10. Quad fm tuner (valve), £30. No reasonable offer refused. G3GMY, QTHR. Tel 01-449 7203, evenings.

PET2001 8K computer, built-in cassette, many games etc, documentation included, £400 ono. G3NMZ, QTHR. Tel 0582 591749, evenings, or 01-580 4468 ext 4258, daytime.

Trio QR666, 144/28 converter, £95. TM56B, 14 channels fitted, £70. Cassette deck, £20. Stereo record player, £30. Two magnetic mount whips, £18. 12V battery charger, £15. WHY? B. Ball, 3 Baildon Street, Moston, Manchester 10. Tel 061-688 4829, after 7pm.

Hilomast, type No 12/6100, 12m pneumatic, telescopic, guyed, carrying two 5-el 2m Jaybeams with az/el rotators, 50ft heliax feeder, buyer lowers and transports, £200. Telomast, 30ft with rigging, £20. 30ft 2in mast in 5ft sections, £10. Two MM converters, 144 and 432—6 to28MHz, £10 each. Teleprinter 28RO with factory handbooks, 110V, exc cond, £50. Buyer collects masts and t/p. Tel Stevens, 01-599 0197.

FT202R handheld tx/rx, six channels R0, R4, S20–23, mint cond, £75. NC1 base charger if required, £10. *Wanted:* Datong morse tutor. G8SER, QTHR. Tel Langley Mill 67846.

CDE44 rotator, comp, cable, £80. Dentron MN3000A atu, 3kW, 160–10m, £250. KW-Decca 109 atu, £130. All items new, unused. G3KGM, QTHR. 66, Old Farm Avenue, Sidcup, Kent DA15 8AH. Tel 01-300 0767.

Telford TC9 fm/a.m./cw 2m tx, toneburst, transistorized, mains psu built in, stable, clean rig, now £50. G3XOI, QTHR. Tel Southend 557468.

FT101E, late model, exc cond, orig packing, £400. *Wanted:* 18AVT/WB or 12AVQ vertical ant, hf linear, good communications rx. G4IZG. Tel Worthing (0903) 41109.

AR40 rotator, 4-el 2m quad antenna, £40, or exch for B40D rx or similar. *Wanted:* Trio R599 rx with manual. J. Wright, 44 Wilmott Way, Basingstoke, Hants. Tel Basingstoke 68649.

TS520 in immac cond, never used mobile, comp with 12V dc power supply, SP520 matching spkr, manual, orig packing, £385 ono. G2DAF Mk2 rx, 898 dial in Imhoff cabinet, £45. *Wanted:* HRO Senior with bs coils. G3KAJ, QTHR. Tel Chorley 71343.

3-el 3-band spider quad, variable spacing, fantastic dx performer, incl 6ft × 2in alloy boom, 12 very strong semi-metal spreaders, 2·5lb, all loops pre-tuned, ok for 50Ω feed, selling because moving QTH, £100 ono. G4HSB, QTHR. Tel Peter, 0642 86608, after 6pm.

FL200B, HA350, both good cond, some spare valves, £150 ono, would separate. HW100, mobile power supply, HP13, fault on tx, no drive to pa, rx ok, with manuals, £150. G3OML, QTHR. Tel 01-540 2713.

Icom IC260 multi-mode, hardly used, as new cond, boxed, all accessories, £300. G8LGE, QTHR. Tel 0924 825025.

Drake TR4 tx/rx, AC4 psu, RV4 remote vfo, spkr, Electro-voice mic MN4, antenna matching network, connectors, manuals, all matching, vgc, £300. MFJ cw filter, £10. Collect or pay carriage. G4EOI, QTHR. Tel 01-648 6117.

Clear, easy to follow circuit diagram for Bearcat BC220FB rx, 75p. S. Scanlon, G8HQY, 5 Chestnut Avenue, Kettering, Northants. Tel 0536 2124.

33ft steel mast, 3½ od, comp with comprehensive carriage incl Ham IV rotor mounting plate, winch, pulley, U clamps, thrust bearing etc, reason for sale moving new QTH, sensible offers over £75. G4HSB, QTHR. Tel Peter, 0642 86608, after 6pm.

Yaesu twins FL400DX/FRS400DX tx/rx as new, all options, 2/6 meter converters, tx blower, no mods, £350 or close offer. G3FUM. Tel Highclere 253019.

Oscilloscope 13A, double-beam, probe, manual, £20. Several large scale m/c meters, dc and ac, £2 each. Mains transformer, 20V 1·5A, £1. G3ZZK. Tel 01-476 4050.

FT7, extra 10m xtals, £240. FL110 linear, £95. MM432/28S transverter, £90. MM432/50W linear, £90. Strumech electric winch (minus motor) £70. 70cm 18-el Parabeam, £15. G3WBN, QTHR. Tel 01-654 2761.

Icom 280 fm mobile, used little, 5kHz steps, 144–148MHz, no toneburst but could easily be fitted, gone multimode, £215 ono. G8CQY, QTHR. Tel Southampton 769483.

Heathkit HR1680, fb amateur bands rx, 80–10m, cw/ssb, 240V/12V, professionally built, used little, as new cond, handbook, accessories, £170. G4CZQ, QTHR. Tel Thatcham (0635) 65997, evenings.

Minitenna 2-el 15m beam, £20, or exchange for hf vertical. G3NQX. Tel Kendal (0539) 28166, after 6pm.

FT221R, fitted pre-amp, £325. Multi 700E synthesized fm mobile, £155. Datong D70 morse tutor, £40. All above mint cond, in orig packing, handbooks, accessories. Pye PF2UB handheld, xtalled RB6, two batteries, leather case, £95. Advance type 71 signal generator, 10–300MHz a.m., £55. Heathkit RF1U signal generator, 100kHz–200MHz, £45. G8HYI, QTHR. Tel 0244 880706, after 7pm.

AR22 rotator, control box damaged but working, plus 100ft of cable, £25. G4AFW, QTHR. Tel 072 885 2464.

Swan 350, comp with psu, vox, unit, Shure 275SK mic, manual, comp spare valves, vgc throughout, used little, £235 ono. Prefer buyer to test and collect. G2CLP, QTHR. Tel Bedford (0234) 68152.

TS700G 2m all mode tx/rx, £330 ono. P40 Strumech tower, no ground post, £150. 9 School Lane, Buckden, Huntingdon. Tel 811445.

Cambridge 2m fm S16–20, R6–7, toneburst, control box, mic, etc, £40. Hallicrafters SX28 rx, 0·5–42MHz bandspread, selectable i/f, xtal phasing, working perfectly, all functions, £15. Taylor valve tester, £4. AM/cw tx, 10W, homebrew, £10. G3YYG. Tel 0442 64025, after 6pm.

Trio TS510/PS510, incl Partridge vfa, Joymatch, mic, two brand new 6146Bs, £210. *Wanted:* Micro processor evaluation kit. G3VVL. Tel 0278 787069.

MK123 compact tx/rx, 2·5–20MHz, mains, 12V, dc/psu, case, spares etc, £60. BC221AK, internal psu, £15. R174/URR rx, PP308/URR, £20. Star SR200 ssb rx, £30. HW7, £30. G4FUB, QTHR. Tel Hemel Hempstead 3921.

Multi 2000 2m, fm, ssb, cw synthesized tx/rx, 10W/1W mains or 12V for mobile, fitted Modular Electronics pre-amp, nice cond, 8-el Yagi, AR30 rotator, 60ft UR67, all good, comp 2m station for £220, or your offers please. Can split, can deliver. Tel Newcastle (0632) 736752.

NEC CQR700 gen cov rx, as new but modified for mw dxing, £150. Mizuhuo 008D programmable frequency meter, gives any rx digital readout, £100. G8RDN NOT QTHR. Tel 051-531 8612.

Versatower P60, as new, ready for collection, half price bargain, unable to erect at new QTH, £200. Tel Leeds 640543.

Sinclair DM2 digital multimeter, five functions, 22 ranges, mains adaptor, £29. G-whips, 10–80m, ball mount, new, unused, £29. G2KF, QTHR. Tel 072-681 2337.

Trio JR310 amateur bands rx with spkr, £75. National Panasonic DR48 comms rx, digital readout on hf, £210. Both rxs in exc cond throughout. G8UYC NOT QTHR. Tel Aylesbury (0296) 81881.

Realistic DX160 rx, Microwave Modules 144/28 lo, Jaybeam 4-el quad, exc cond, 1978 *DX Callbook*, four years of *Radio Communication*, many other books, ideal for beginner, £75, the lot. 25 Inverclyde Road, Birmingham B20 2LE. Tel 021-554 4741.

Keithley 167 auto ranging dmm, nicads, £45. Motorcycle Cambridge on 2m, horn spkr, mic, £40. WG16, Gunns, diodes, etc, joblot, £12. 18in glass fibre dish, £5. Group/pa mic, unused, £5. Offers? *Wanted:* XF9B. G8GSQ. Tel Steve, Botley 81011.

IC202S, mint cond, used very little, £120. Modular Electronics ME202-25 linear amp, preamp, £30. Prefer buyer collects. G8MGA, QTHR. Tel Weston-super-Mare 512698.

Heathkit SB301, SB401, Datong rf speech clipper, YD844 mic, £280. 35ft Telomast, £15. Electronic drum rhythm generator, £25. Echo unit, £30. Tuac 60W amplifier, pre-amp, power supply modules, unused, £25. Blackburn, G4ACI, QTHR. Tel Upholland (0695) 622754.

TS700G, vox unit, used very little, £300 ono. Datong morse tutor, £37. Prefer buyer collects. G8LGU, QTHR. Tel Epping 73842.

KW2000E, Shure 201 mic, KW110 Q-multiplier, spare RCA 6146Bs, handbook, £235. G4GSE, QTHR. Tel Swanley 64486, after 6pm.

QM70 28–432MHz solid-state transverter, mint, £75. QM70 28–144MHz high power transverter, mint, £75. Cossor dual beam scope, spare new tube, parts manual, circuit diagram, £40. AR22 rotator, comp, £25. Set of boards, circuit diagram, two 1in Vidicons and lens for cctv camera, requires two transistors, three diodes to complete, £25. 70cm Parabeam, 10m UR67, £15. 2m 8-el Yagi, 10m coaxial, no balun box, £10. 2m 8XY, two 10m UR67, £20. All items buyers collect or carriage extra. No letters opened until 15 September. G4IDF, QTHR. Tel Worcester (0905) 20135, after 6pm, between 15–20 September.

TS120S, £395. Mobile mount, £13. MC30S mic, £10. G-whip tribander plus 80m, £28, all three months old. FL1 audio filter, £50. KP12 rf speech processor, metered, £45. Tandy rotator, identical AR30, £30. Pye AM10BVC, unmodified, £10. GEM quad, £60. CD44 rotator, £60. Versatower P60, £180. No offers. All plus carriage. G3VEJ, QTHR. Tel Burntwood 2340.

Linear amplifier 20–15–10m h/b, 500W p.e.p. input, new 2X6LQ6 in passive grid, integral psu, antenna c/over relay, spare switch positions for 80–40m, compact, neat looking, £60. AM10D tunable rx, SSM 2m converter replacing rf board, £30. Cowl gill motor, £12. TX/rx, 80–20–10m h/b, 500W p.e.p. input, circuit similar Swan 500, integral psu, spkr, new 2X6LQ6, £70. Buyer to inspect and collect tx/rx, other items carriage extra. G3KGN, QTHR. Tel Southend (0702) 77779.

Datong FL1 audio filter, perfect cond, instruction manual, £40. G4EUU, QTHR. Tel Havant 483879.

Drake 2B power transformer, £5. H/B power supply, suit HW101, rough but works ok, £7. Transformer, 230V in, 50, 75, 110V out, 1kVA, £7.50. USA swr/power meter, perfect, £15. G3CPM NOT QTHR. Tel Broadway (038 681) 852753, evenings.

TS820, superb cond, Trio 500Hz cw filter, Trio mic, new matched pair 6146Bs, driver valve, £550 ono. G3PY, QTHR. Tel Glossop 61062.

Yaesu FRG7, no mods, exc cond, £125. Mosley Mustang tribander, £65. Catronics rtty terminal, £75. Catronics vdu, modulator, both hardly used, £125. Datong auto rf processor, £50. GW4ACO, QTHR. Tel 0492 55240, evenings.

TS520, cw filter, VFO520, £395. SEM hf standard pre-amp, £7. Datong rfc/m in diecast box, £12. MMT144/28 transverter, £55. Trio LF30 lp filter, £10. TWS150 coaxial switch, one in to five out, £7. Sykes, G3NFV, QTHR. Tel Leatherhead 72587, after 6pm.

Honda portable generator, model E300E, petrol engine, a/c 50/60Hz, rated output 250W, 220V, d/c rated output 100W, 13V, very good order, £165 ono. Austin. Tel Bedford 62557.

STE Arac 102 rx, covers 144/146 and 28/30MHz fm, ssb, a.m., 12V dc, immac cond, £80 ono. Hartnell, 3 Town Mills, Wiveliscombe, Taunton, Somerset TA4 2LY. Tel Wiveliscombe 23762.

Trio TR7010, 2m ssb tx/rx, matching PS5 psu, £150. Microwave Modules 70cm-2m converter, £15. G8NXB, QTHR. Tel 01-642 1359.

AR88D, perfect cond, £55. Tandberg series 15 recorder, £45. D31R 'scope, only one beam wkg, £20. Pye stereo cassette recorder, built-in amps, type TR9116A, £15. G3HRN. Tel Newport (Salop) (0952) 811168.

Pye PF1 Pocketfones, wkg on orig freq, clean cond, cct diags, less nicads, four pairs, £15 pair or £50 the lot. SSM71 70cm pre-amp, £5. GM3SZP, QTHR. Tel 041-776 6650.

80m, 50Ω coaxial stranded core, £12. 12/24V 1kVA transformer, £10. TMK500 testmeter, £15. Lambda regulated p/s, 24V, 14A, £20. Decade resistance boxes, £3 each. Antenna c/over relay, 24V, £4. Hallicrafters S36A (BC787B), £55. G4DVH, QTHR. Tel 0229 54466.

FT101EE, only used on rx, 20h only from new, new spare outputs, all accessories, £400. HF5 vertical five band antenna HF5R radial kit, as new, £40. B. Hayward. Cornway, Ranks Green, Fairstead, Chelmsford, Essex. Tel Great Leighs 509.

Back issues *Radio Communication*, May 1976–December 1979, *SWM* 1975 and 1976, *TV* 1972 and 1978, *PW* 1964–1979, *PE* 1966–1974, 20p each plus large sae. R. Bayley, 8 Field Lane, Kemberton, Nr Shifnal, Salop TF11 9LR.

FT200, less power supply, £120, or exchange IC240 or similar. Slim Jim, as new, £9. Joystick system A, £18. Buyer collects or pays carriage. G8SJH NOT QTHR. Tel Hitchin (0462) 58728.

Standard C8800 2m fm tx/rx, mint cond, only on air for about two hours, in orig packing, £200 ono. Tel Simon, 01-515 9330, evenings, 01-626 6065, daytime.

FT401 tx/rx, comp with matching remote vfo and spkr, exc cond, orig packing, handbooks, full 560W output, fan, cw filter, any trial, £300 ono. G3UKS NOT QTHR. Tel Maidenhead 32553.

TS700, £299. FL1 audio filter, £48. SEM pre-amps, £5 each. U450L tx/rx on RB10, £29. Airtech duplexer, £12. MMCs 432/28S, £20. 144/28LO, 156/24 marine, £16 each. All boxed. 13·5V psus, £10 each. Q6/ZM, £16. 12AVQ, £26. Tel Maldon (0621) 773528, after 6pm.

TS770 2m/70cm multimode, £580. 8/8 slot-fed Yagi, £8. MM 28/144 transverter, £65. R. Benstead. G4FKB, QTHR.

SSB tx, 2m, 70cm, homebrew 12V operation, speech compression, net, cw, control box for band and rx switching, £110. Pye uhf base station U4SOL, aligned 70cm, £30. HP sampling scope, 185A, dual trace 1GHz, manual, spares, £35. G8IXK. Tel Luton 23827.

Radio and tv valves, all good wkg order, many new, boxed, 120 in total, £10. Major Megger tester, £30. Buyer collects. 1 Perryn House, Bromyard Avenue, Acton, London W3 7JD. Tel 01-749 0322.

Pye Vanguard AM25B, low band, with control gear, £30. Pye F27 base, tx, high band, (five brand new valves fitted), £30. Exchange both for cw/ssb hf multiband tx, transport arranged. G8VNI, 12 Kirkham Close, Eden Park, Chilton, Ferryhill, Durham.

House forces sale. FDK Multi 800D mobile, fitted scanner, 144 to 148, ideal for transverting 70cm up to 30W o/p, mounting leads, £200. G8PVZ NOT QTHR. Tel Farnborough 516780, evenings.

KW107 atu, £75. 18–300MHz Marconi uhf sig gen, £30. HP23A psu, £25. Avo 8, £55. Avo 40, £40. Avo Minor, £20. Taylor sig gen, £20. 1,250–0–1,250V tranny, £8. 30 note organ, ped-board, £50. HQ1 beam, £50. Beam rotator, control, £30. R/C bridge, £40. BC221 mains psu, £25. KW2000B/vfo, £325. Six various psus, 300–750V, £50. 100s valves incl 813s, 805, 807, etc, £50. Codar AT5, £35. TE15 gd meter, £20. G3GYW, 28 Lundy Close, Southend, Essex. Tel Southend (0702) 528112.

Versatower T120 40–120ft, telescopic, tilt-over, electric motorized winch, stainless steel rigging, cables, the ultimate tower, £550. Hi-Gain TH6DXX 10–15–20m, superb antenna, £125. Ham M2 heavy duty rotator. G3ORK, QTHR. Tel Hesketh Bank 2482.

FT101, mic, fan, two atus, three ma meters, two Solon irons, 54 assorted valves, few tx types, recently used by late G3DF, offers. Post only. Langley, G3ST, Langfield, Hartfield, East Sussex.

Power supply units, various, including 9V 15A, 5V 15A, 24V 5A, 180V 500mA plus 12V 3A, 180V 200mA plus 24V 2A plus 6V 3A, all at £10 each. Volstat 250V 250W, offers. Buyers collect. Patterson, 16 Norton Road, Stourbridge. Tel 2689.

Heathkit rx, GR54, manual, one valve missing, believed to be ok, offers. G3KZQ, QTHR. Tel 061-494 0276, evenings.

Modern semi-detached bungalow, two beds, part double-glazed, cen heating, det garage, immac cond, good reception area, on Hoo Peninsular, Kent, 30ft caravan at Clacton, Essex, £22,500 ono. Winton, 23 Lapwing Road, Grain, Kent. Tel Medway 272030.

Trio TR2200GX, 12 channels fitted, S20–23, R3, R5, c/w nicad cells, charger, mic, helical antenna, handbook, £110. G2FLB, QTHR. Tel 01-467 1078.

FRG7 rx, no mods, fine tune, manual, orig packing, exc cond, £150 ono. G3NRU, QTHR.

Heathkit SB301, SB401, rx in fb cond, tx wkg but requires attention, been stored in loft, £125 for both. Will not separate. Buyer collects. Tel Maesteg (Mid Glamorgan) 0656 733729.

Drake TR4 cw, ac psu, RV4C, 7075 mic, superb cond, £425 ono. Tel 0474 4694.

FT401B QRO tx/rx, cw filter, £270. FT202R handheld bm, bc, S20–22, nicads, charger, spkr, mic, six months old, £100. G4EET, QTHR. Tel 021-743 9591.

FTDX401, spkr, valves, £270. Multi 800D, scanner fitted, £260. *Radio Communication* 1974–8, £2 each, plus p & p. G4ETN, QTHR. Tel 0278 451357, after 6pm.

IC701, matching power supply, 12h use only, £675. IC251E 2m multimode, one month old, £390. CPU2500RK 2m, 800 channel, scanning, four memories, key pad mic, as new, £240 ono. G8TAF, QTHR. Tel Romford 40265.

KW2000, ac psu, mic, £120. Filters: XF9B, XF9M, TL2D5A (2·5kHz at 455kHz), TL8D14 (8kHz at 470kHz), MF455-03 (500Hz at 455kHz), all at £20. 898 dials, two, £5 each. G3WGV, QTHR. Tel 0734 733745.

Belcom FS1007P tx/rx, 16 channels scanning, 11 xtalled, rx vfo, dig clock, £100. Cambridge 2m fm, Garex board, £25. Two Solartron 523S scopes, 450V stab psus, pair, £45. Philips GM6020 μV meter, £20. *Wanted:* 2A3 valve. G8TWG. Tel 061-633 4520.

FT101 Mk1, no mods, very good/clean cond, can deliver reasonable distance, £275. G4CRE, QTHR. Tel 0909 81310.

TS700G, vgc, manual, orig packing, nearly new 5X/Y, hi-Q break, £350 ono. Prefer buyer inspect/collect or carriage at cost. G3YTQ, QTHR. Tel Fareham (0329) 234143.

FT901DM, FC901, SP901, all in immac as new cond, boxes, £900. G4DMF, QTHR. Tel John, Ilkeston (0302) 304137, evenings.

Oscilloscope, Solartron double beam CD1400, £155. Power supply, 28V 5A, £9. HF pre-amp, £5. Lorry battery, 12V, £15. Sell or swop w.h.y? G4JKP. Tel Leicester (0533) 899958.

HF5 and HF5R five band vertical antenna plus radial kit, brand new, cost £70, a superb antenna for roof or pole mounting, will accept £45. Tel Wombourne (Staffs) 896625, after 6.30pm weekdays, or all Saturday and Sunday.

Encased 63-key ASCII keyboard, crt controller board, psu, add monitor/tv for comp computer terminal, free uhf modulator if required, £90. RA1 rx, rebuilt with extra xtal filter and 7360 product detector, £30. Prefer buyer collects. G3TXQ, QTHR.

TS520 hf tx/rx, cw filter, dc psu, never used mobile, matching external spkr SP520 and VFO520, immac, £400. Nascom 1 home computer, psu, all in case, £125. G4CHD, QTHR. Tel Cheltenham 513178.

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Suitcase radios. American researcher purchases military radios built inside civilian style suitcases or other clandestine radios, any style or condition, working or otherwise, complete or incomplete. Send phone number in letter. Melton. Box 2037, Ogden, Utah, 84404, USA.

Tiger 300 cct diag and/or manual required by club station, buy or borrow. HRO coils. Secretary, 4th floor workshop, Dept of Electrical Engineering, Swansea University, Singleton Park, Swansea.

Manual for Lafeyette HA350 rx, for purchase or loan. Will pay postage. J. A. Niblock, 7 Kingsley Crescent, Bulkington, Nuneaton, Warks CV12 9PL. Tel 0203 313691.

Mumetal screen for cathode ray tube ECR30 (VCR 139A). *Radio Communication* mags for 1976, 1977, 1978. Hussey, 18 Bredon Grove, Poolbrook, Malvern, Worcs. Tel Malvern 4968.

S-meter for Hallicrafters rx SX28 Super Skyrider, amber face with rear lamp illumination. Any cond considered please. G8BIH, QTHR. Tel 0420 82739.

Any *QST, CQ, T & R Bulletins, SWMs,* ARRL books, Collins rx, tx, parts, 455 mech filter, Heathkit SB303, 104 noise blanker board (SBA104-1), p.e.p. meter, D104, 19in rack panels. *For sale:* KW1000, offers. GW3MHW, Bontnewydd, Aberystwyth, Dyfed. Tel 097 421 608.

R4C in immac cond, with all xtals, filters. MS4. Tel Egham (Surrey) 32841.

HRO long and mw J-H-G-F-E coils, if comp set, will purchase sw coils as well. Exchange Drake R4B 12·6, 40·1 and 40·6 xtals for almost any non-amateur band xtals. Karagianis, 20 Lea Road, Sonning Common, Reading RG4 9LJ. Tel Kidmore End 2085.

Power unit for B2 suitcase set, any cond. Ancillary equipment for B2, any tx or rx units. *For sale:* Racal MA79G, matching RA117, will transceive with it, will take FT7 in part exchange. G4GEN, QTHR. Tel 082 571 2205.

Switchable separate hf rf attenuator, 50Ω in, 50Ω out. Passive preselector and atu for balanced feeder, 50-600Ω. D. Mathews, S.W. London. Tel 01-876 7868.

Old QSL cards, especially those used before 1930, required for research by Britain's only serious QSL historian/collector. Please send cards for appraisal, or an initial letter to G3BDQ, Whitefriars, Friars Hill, Guestling, Hastings. Tel Pett 2262.

Heath vfo SB640, external lmo for SB series. SB620 spectrum monitor, will consider damaged or faulty SB series equipment of any type except single banders. G4GVW, QTHR. Tel Ipswich 710307, evenings, weekends.

Eddystone EA12, good price paid for mint specimen. Will collect reasonable distance. G4IQR. Tel Coventry (0203) 445880.

Drake R4C, 1977 production or later, only mint or with Sherwood mods considered. Details/price asked please. BRS12234, 16 East Parade, Rhyl, Clwyd.

One low pass filter for hf tx, two high pass filters for tvi, if possible tv sockets. One 50-80Ω carbon resistor for dummy load, 150W tx. G6BJ, QTHR.

FV200 external vfo for FT200. G4ISE. 8 Pegman Close, Guisborough, Cleveland TS14 6DL. Tel Mark, 0287 32927.

Pye fm Europas, 170-160MHz, up to seven wanted, best prices paid, must have toneburst, preferred with mobile talk-through. Encoders type ME3 or ME3A. Tel Liss (Hants) 2262.

FL50B/FR50B in mint cond, plus handbook. *Radio Communication* July/August 1975. G3FG, QTHR. Tel 01-647 3546.

KW160 or similar top band tx. Will collect reasonable distance. G4IQR. Tel Coventry (0203) 445880.

The Pye Barn Trust, a registered charity helping young, inadequate men, would be pleased to receive gifts of unwanted amateur radio equipment for their rehabilitation workshop. Tel 01-622 4870.

FT221R, must be mint, no mods. FL1 or FL2. Details and price to GW3KLU, QTHR N. Wales. Tel Mold (0352) 56745.

Ameco model PT tx/rx preamplifier. Hilomast pneumatic, PN or NK series, can dismantle and collect. Yaesu YC601 digital display unit for FT101E. G4HAF, QTHR nr Wolverhampton. Tel Codsall 3509, anytime.

Valves: 6AU6, 6BN8, 6CB6, 6CL6, 6EA8, 6GW8, 12AT7, 12AU7, 6146. Antenna traps, 2m mobile antenna. Doyle, 4 Wricklemarsh Road, London SE3 0NF. Tel 01-856 7478.

For the Wireless Museum: old transmitting gear, rxs, amplifiers, spkrs, valves, components, QSL cards, radio books, magazines, catalogues, valve tester particularly wanted. Details please to hon curator, G3KPO, QTHR. Tel Shanklin 2586.

Morse key. Old GPO heavy brass mounted. Major, Field House, Quay Lane, Kirby-le-Soken, Essex. Tel Frinton-on-Sea 6399.

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Tx: 5 Watts Rx: 12db SINAD for 0.2 uV

☆ **Special Interchangeable Long Life NiCd Cassettes**

Covers 144 — 148MHz with channels in 5KHz spacing selected by decade switches. Slide switches control simplex or repeater (European and US shifts) and high or low power operation. Low power level is adjustable be internal preset. Maximum power (5 watts nominal) may exceed 7.5 watts from NiCd cassette. Antenna has BNC connector. Desk mount charger and facility for external power. Remote microphone/speaker unit with PTT simplifies mobile or body worn operation

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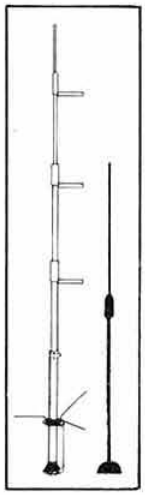
An all band (160 to 2m including 4m), all mode transceiver available at a realistic price, with a specification that includes as standard most of the options the discerning amateur considers essential for serious operation. For 2 metre FM operation, repeater shift and automatic tone burst are provided.

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 2.4 KHz filter £799.00 inc VAT
Fitted ALL filters £899.00 inc VAT

432 MHz Transverter (ordered with F850) £100.00 inc VAT



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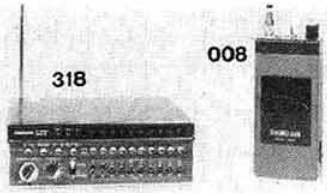
KT284 — 4 Section Colinear — 11dBi 100 Watts 5.47 metres long 2.7 kg	£40.25
KT282 — 2 Section Colinear 6dBi	£21.85
KT852 — 5/8 Mobile Whip c/w Mag Mount, Cable and Plug	£17.25
KT872 — 7/8 Mobile Whip	£10.10
GCL — Gutter Mount	£3.15
C43 — Cable Assembly and Plug	£3.45

All above prices include VAT.

FM SCANNING MONITORS

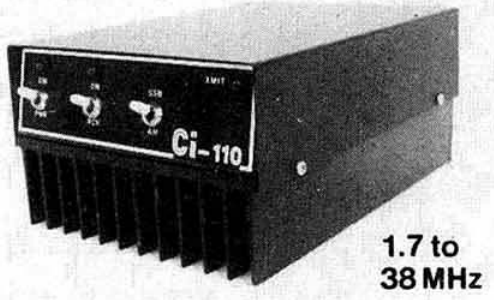


Pocket Model — 008 covers 8 Channels in 2m or marine bands. Lockout on all channels. Wide range of accessories supplied PRICE: £59.00 inc. VAT.

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.

Ci—110 Mk2 POWER AMP



A Solid State, all modes unit covering 1.7 to 38 MHz. Typical power output 130 Watts for 215 watts DC input and 4-7 watts drive (15 watts SSB). RF sensing VOX circuit. Switchable receive pre-amp. Supply requirements: 13.8V at 20A, Negative Earth. Size: 5"w x 7"l x 3"h Weight: 2.5 lbs

PRICE: £95.00 inc VAT

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POWER	30 Watts PEP input, 30 Watts DC on FM/CW
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YAESU FT-707

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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.

AGENTS: NORTH WEST—THANET ELECTRONICS LTD, GORDON ADAMS, G3LEQ, KNUTSFORD (0565) 4040.
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NORTH EAST—NORTH EAST AMATEUR RADIO, DARLINGTON 0325 55969
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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.
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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.

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Style and performance - with a real 'belt and braces' PSU design.

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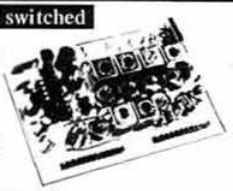
Previewing the most comprehensive audio preamplifier yet..... DC switching of 7 inputs, plus two tape in/outs, 2 low pass, 2 high pass active filters, genuine volume related loudness, 1dB channel matching, with DC volume, balance, bass and treble controls. Suitable for bus/remote control, tape dubbing, 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



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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

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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)
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Radio/Communications ICs

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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
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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

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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

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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

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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, 2708, NE555,NE556, etc

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Components

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	2.4kHz SSB "	£19.78
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R0	4.0277	8.0555	12.0833	14.9888	18.1250	44.9666
R1	4.0284	8.0569	12.0854	14.9916	18.1281	44.9750
R2	4.0291	8.0583	12.0875	14.9944	18.1312	44.9833
R3	4.0298	8.0597	12.0895	14.9972	18.1343	44.9916
R4	4.0305	8.0611	12.0916	15.0000	18.1375	45.0000
R5	4.0312	8.0625	12.0937	15.0027	18.1406	45.0083
R6	4.0319	8.0638	12.0958	15.0055	18.1437	45.0166
R7	4.0326	8.0652	12.0979	15.0083	18.1468	45.0250
S8	–	–	12.1000	14.9444	18.1500	44.8333 *
S9	–	–	12.1020	14.9472	18.1531	44.8416 *
S10	–	–	12.1041	14.9500	18.1562	44.8500 *
S11	–	–	12.1062	14.9527	18.1593	44.8583 *
S12	–	–	12.1083	14.9555	18.1625	44.8666 *
S13	–	–	12.1104	14.9583	18.1656	44.8750 *
S14	–	–	12.1125	14.9611	18.1687	44.8833 *
S15	–	–	12.1145	14.9638	18.1718	44.8916 *
S16	–	–	12.1167	14.9667	18.1750	44.9000 *
S17	–	–	12.1187	14.9694	18.1781	44.9083 *
S18	–	–	12.1208	14.9722	18.1812	44.9166 *
S19	–	–	12.1229	14.9750	18.1843	44.9250 *
S20	4.0416	8.0833	12.1250	14.9777	18.1875	44.9333
S21	4.0423	8.0847	12.1270	14.9805	18.1906	44.9416
S22	4.0430	8.0861	12.1291	14.9833	18.1937	44.9500
S23	4.0437	8.0875	12.1312	14.9861	18.1968	44.9583

SR = Series Resonance *HC25 only

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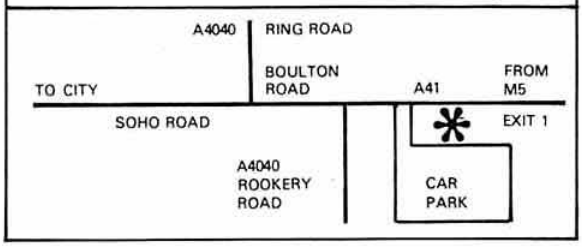

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We've been extremely amused recently by the attempts of one or two competitors to make 'measurements' of the strong signal performance of our FT221/225GT front-end board using commercially available signal generators. This displays a perhaps not unsurprising ignorance of receiver strong signal characterisation techniques.

Before we first put the board into production we went through the sums very carefully. Our conclusion was that no commercially available signal generator was good enough! We overcame this problem by applying the rf instrumentation design skills which we sell on the professional market and developing some rather special dedicated test equipment.

We've prepared a brief application note on the way in which we test the boards: if you'd like a copy, the usual SAE will bring one.

FT221/225 front-end board

Not only is this board now in use by top vhf-dx'ers and contest groups around the world—yes folks, people are interested in vhf-dx outside Western Europe—but we're starting to get interest from another group of vhf'ers altogether: the repeater builders! They have recognised that the excellent dynamic range properties can provide a 'no compromise' repeater front-end. If any bona-fide repeater group wishes to incorporate our board into their machine we'd be happy to explain the advantages.

Used for the purpose for which it was designed, it will provide significantly better all-round receiver performance than any other commercially available front-end known to us. **£53.87**

144MHz preamplifier

This preamp uses a noise-matched 3SK88 in a very carefully optimised circuit. Unlike many other 'competitive' devices we have included a proper bandpass filter with a nose bandwidth of around 2·5MHz and 50dB rejection at ±12MHz to minimise out of band strong signal problems. The use of an ultra-low noise mosfet allows the use of minimum front-end gain while maintaining the system nf at such a level that external noise limits the system sensitivity. An internal attenuator allows gain-setting, while facilities are also provided for masthead relay control.

As the proper use of preamplifiers is not altogether obvious, we've prepared an application note which is available on request.

If you have an application for an lna in the 60-200MHz region, we can supply this amplifier retuned to your frequency upon request. Unboxed **£10.79**. Boxed **£17.72**

Microwave system components

We've been expanding this product group which is essentially an extension of our 1·3GHz transverter system. This month we are confining ourselves to a listing of those modules which are available ex-stock. Ask for our new Microwave System Component data sheet.

1·3GHz low noise amplifier	**£22.72**	2·3GHz low noise amplifier	**£22.72**
1·3GHz gain block	**£11.15**	2·3GHz gain block	**£16.10**
1·3GHz bandpass filter	**£6.75**	350-400MHz source	**£18.25**
1·3GHz 144MHz mixer-lo board	**£22.60**		

Kungsimport antenna combiners

A much better approach to stacking antennas than 'phasing harnesses'. Ask for our data sheet!

2-144N	**£26.75**	4-144N	**£29.75**
2-432N	**£23.50**	4-432N	**£26.50**

Ben is also now producing a dipole/splashplate feed for 1·3GHz dishes. We've no details of price etc as we write but by the time you read this we should know.

TVI filter—'It works! Now the wife can watch Crossroads all day. (G4DZU) **£1.80**

NEC rf and microwave semiconductors

NE12683—gasfet—**(£26.08), ND4692 (£3.51), NE64535 (£10.00), NEO2137 (£1.91), NE57835 (£6.73), NE73432E (£0.97), 3SK88 (£1.73), 3SK74 (£0.60), ND4991 (£0.40).** Don't forget that we have the expertise to help you to learn to use them properly!

Data on request: SAE appreciated. CWO. Please add 50p p&p unless stated, and then VAT. Tnx!

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NEWSFLASH!

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THE FIRST INTEGRATED RTTY, ASCII, MORSE, SSTV TERMINAL

The Super Terminal has everything you need for speciality mode operation built in. Just add a standard T.V. monitor and you have full send/receive RTTY, ASCII, Morse and character generation on SSTV. This is a no compromise design, employing the powerful 8085 microprocessor, with too many broad capabilities and varied functions to list here. The demodulator employs the latest state of the art technology with separate two-tone active filters and though built in is superior in quality and performance to any external unit offered to radio amateurs today. The '800' is mains powered with a negligible consumption.

HERE ARE JUST A FEW OF ITS FEATURES:

RTTY
- ★ 72 character line (fully compatible with teleprinter stations).
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- ★ Two programmable 'here is' 64 character memories.
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- ★ 255 character transmit buffer.
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- ★ Separate narrow and wide shift discriminator.
- ★ Copies 170, 425 and 850 Hz shifts.
- ★ Crystal controlled AFSK
- ★ Transceiver transmit/receive control through keyboard.

ASCII
- ★ All the transmission and editing modes of RTTY at 110 baud with both upper and lower case characters.

MORSE
- ★ Automatic speed tracking (3-99 wpm).
- ★ Automatic morse trainer (sends random code at your chosen speed).
- ★ Built in side tone.
- ★ All editing and message memory of RTTY mode.

SSTV
- ★ Fast scan display of SSTV keyboard video.
- ★ Slow scan cursor line.
- ★ Black and white or white on black letters.
- ★ 6 bar grey scale and checker board pattern.
- ★ Fractional frame mode.

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A COMPLETE run down of all the kits and modules which are currently available is listed below. Please note that prices have changed on quite a few of the older established kits to keep pace with price increases on component parts. As the rally season is drawing to a close, now is the time to consider your new project for the winter evenings. We feel sure that you can find something in our range to interest you.

70FMO5TR. A two pcb set to give a 500mW FM transceiver for 70cms. The boards can be bought individually as and when required and both use PF1 crystals which are readily available. The TX has a modulator and limiter included and the receiver a PIN diode aerial switch, crystal filter, noise squelch and 8Ω output. Both boards are 6" long and less than 1·5" wide. Over 300 sets of these have been sold worldwide and present a simple, cheap way of getting on 70cms. They will also re-tune to most of U-Band including 459MHz.
Kit **RX £38.50** Assembled **RX £47.25**
TX £17.80 **TX £25.95**

70MCO6TR. When one channel is not enough then by adding this two p.c. set you will have 6 channels on tx/rx including a toneburst and scanner on receive. Size 6×1·1" for each board.
Kit **RX £18.60** Assembled **RX £26.05**
TX £11.30 **TX £18.10**

70PAC. A package price for the above four boards.
Kit **£82.00** Assembled **£110.00**

70FM Power Amplifiers are available to boost your TX from the following possibilities.

Code	Power	Kit	Assembled
70FM1	50mW to 500mW	£6.25	£11.25
70FM3	500mW to 3W	£11.80	£16.80
70FM5	500mW to 5W	£12.75	£17.40
70FM10/3	3W to 10W	£13.95	£18.80
70FM10	500mW to 10W	£20.90	£29.35

70PA2. A small pre-amp (1·25×1·1") giving 14dB gain using a TP393 or BFR91 device. Suitable for most equipments and has diode protection on the input.
Kit **£5.10** Asembled **£6.55**

70PA3. A higher gain pre-amp using a MOSFET (3SK88) and with PIN protection of the input.
Kit **£6.10** Assembled **£7.25**

70PA/FM10. A combined version of the 70FM10/70PA2 which fits into a small diecast box. The board has extra facilities for r.f. sensing and PIN changeover and is ideal for mobile use with either our 70FMO5TR or pocket phones, etc.
Kit **£30.80** Assembled **£39.80**

70FI6P. A TVI filter using microstrip techniques and suitable for insertion in your TV down lead.
Kit **£3.05** Assembled **£3.95**

MDO5T. Microwave drive source as reviewed earlier this year (June/July RadCom) giving 0·5W on 384MHz. The board has modulation facilities for FM, FSK and CW. We can supply 96MHz or 94·666MHz starting frequency.
Kit **£19.25** Assembled **£28.38**

MD10PA. A power booster for the MDO5T to give 10W output. Size 2·75×1·0".
Kit **£20.90** Assembled **£29.35**

MD3PA. As above but giving 3W output for the MDO5T and slightly smaller 1·75×1·0".
Kit **£11.80** Assembled **£16.80**

BPF1296. A small microstrip bandpass filter for 23cms, ideal for cleaning up your local oscillator or as an image filter.
Kit **£6.15** Assembled **£8.95**

144FM2TR. The 2M equivalent of our 70cms system which again can be built separately. The receiver has a MOSFET front end after the PIN switch and a MOSFET mixer. The 25kHz channel spacing crystal filter is followed by an FM i.f. strip with a noise squelch and then into an 8Ω output stage. The TX gives 1·5W from a BLX67 device and has a modulator with limiter included. Both boards are single channel and require only the 144SY25B to make the equivalent of most commercial rigs. Sizes are 6×1·5" for RX, 5·5×1·2" for TX.
Kit **RX £40.70** Assembled **RX £49.80**
TX £21.15 **TX £30.25**

144SY25B. A two board synthesiser to give 25kHz channels between 144-146MHz including repeater shifts. Channels are thumbwheel selected in channel number. The digital board includes a crystal controlled toneburst and out of lock inhibit. It is plated through for ease of construction. The VCO board gives outputs at either 6, 12 or 24MHz on transmit and either 5·5, 11, 22 or 45MHz on receive. A modulator is included for use with other rigs as well as the 144FM2TRS sizes. 4×3·5" (digital), 2×3·5" (VCO).
Kit **£50.95** Assembled **£69.70**

SY2T. A shortened version of the TX without modulator or oscillator especially for synthesiser use. Size 3×1·2".
Kit **£17.25** Assembled **£23.10**

144PAC. A package price for 144FM2R + SY2T + 144SY25B.
Kit **£102.00** Assembled **£135.00**

144FM10A. A simple 1W to 10W power amplifier for FM use measuring 1·75×1·0".
Kit **£12.45** Assembled **£16.15**

144FM10B. A 1W to 10W power amplifier with full automatic changeover by r.f. sensing. The board is transparent to r.f. in either direction with no power supply connected.
Kit **£22.90** Assembled **£28.90**

144LIN10A. A linear amplifier for SSB or FM use having c/o on the output only. The board requires 1W for 8W output and measures 2·25×1·5".
Kit **£17.66** Assembled **£23.35**

144LIN10B. A linear version of the 144FM10B for SSB use but retaining all other facilities.
Kit **£24.55** Assembled **£30.45**

144PA2. A general purpose pre-amp for 2M using a 3N204 MOSFET. Gain is 16-18dB and size 1·3×1·1".
Kit **£6.07** Assembled **£7.35**

144PA3. For a little bit extra this board uses a 3SK88 or BF981 device to give >20dB gain with low noise. The input has a PIN protection circuit. Size 1·4×1·1".
Kit **£6.25** Assembled **£7.50**

SY25PB. An adapter board for the old Mk1 synthesiser. This removes the 1kHz from the control lines and generally eases control circuitry and layout. The addition of this board which sits 'piggy-back' on the old one gives the old 144SY25A the same abilities as the 144SY25B. It also has a 1·6MHz shift facility for 70cms use.
Kit **£8.25** Assembled **£10.90**

SY25S70. A small board to give a 1·6MHz shift to the 144SY25B.
Kit **£3.65** Assembled **£5.95**

PROSCAN 1. A simple diode matrix memory that is user programmable for the 144SY25B. The board has a scanner included with manual override, inhibit and auto TX enable. The memory is not only for the channel selection but also mode.
Kit **£14.75** Assembled **£20.10**

TB2. A small toneburst (1·5×1·5") giving 1750Hz either gated for 500mS or continuous. The tone frequency and level are adjustable.
Kit **£3.10** Assembled **£6.05**

PT1. A small piptone for ssb transmissions at the 'over' end. This version is suitable for 12V PTT lines and requires no battery. Size 0·9×2·0".
Kit **£3.40** Assembled **£6.60**

PT2. A piptone for more modern solid state c/o rigs such as the IC211. The board requires a 9V battery but consumes very little power. (2·1×1·25").
Kit **£3.45** Assembled **£6.65**

BE1. Battery economiser for the receivers in our range. When on standby the current consumed by the RX is reduced by 90%.
Kit **£2.85** Assembled **£4.10**

REG 1. A small regulator for 1 to 1·5A demand. The nice feature of this board is the very low forward voltage drop needed for stabilisation, typically 500mV. This makes it suitable for mobile supplies on units such as our synthesiser, or handhelds, eg FT207.
Kit **£3.70** Assembled **£5.95**

SSR1. A solid state changeover relay for supplies to the 144FM2TR. A 'ground to transmit' pin gives h.t. c/o with an interlock for synthesiser inhibit lines. (1·2×0·8".)
Kit **£3.16** Assembled **£4.85**

SSR2. Details as above but with an extra output on receive to enable the PIN switch on the 70FMO5R. The board is slightly larger. (1·5×0·8".)
Kit **£3.22** Assembled **£4.90**

MPA1. Microphone pre-amp for low impedance inserts when used on our TR's, or VCO, audio strips. (1·0×1·0".)
Kit **£2.50** Assembled **£5.15**

SLF1. A slope limiting filter for ignition pulses on your receive audio. The board fits in at the volume control and has variable filtering effect on noise spikes.
Kit **£3.90** Assembled **£5.10**

SWR1. A printed microstrip directional coupler with diode detectors to give an indication of forward and reflected power. Basic directivity is 10dB but this can be improved to >20dB for accurate measurements. The kit does not include sockets or meters but just the sensing circuitry. Good for 2M and 70cms, 50W max.
Kit **£4.55** Assembled **£5.60**

BPFs. We have a range of bandpass filters for the following bands and suitable for 10-15W input.

Band	Kit	Assembled
144MHz (lumped)	£2.85	£4.85
144MHz (printed)	£2.50	£2.90
144MHz (lumped)	£2.85	£4.85
384MHz (lumped)	£2.85	£4.85

PS1. PIN switch for aerial changeover of 10W or less r.f. power. The 2M version gives 26dB isolation and 0·5dB insertion loss, the 70cms 16dB and 0·5dB. Prices are the same for either version.
Kit **£5.10** Assembled **£6.20**

That is a brief listing of the current product range as full kits. These cannot be split and sold in component parts. We do have, however, many components that are hard to get for the average amateur which include 23cms pre-amp boards and devices (NE64535), diecast boxes, chip resistors (51Ω and 100Ω), PTFE trimmers, Mullard thick film amplifiers (OM335, OM361) etc. A large SAE (A4 size) will bring you the latest lists and new projects. The range is constantly expanding and it is worth giving a call if you have a simply query on TADLEY (07356) 5324 during evenings and weekends. The above prices will be current for 1980 and include VAT at the current rate. Please include 60p on your total order for post and packing. The kits include all pcb components except crystals unless stated otherwise. Suitable boxes and external hardware is not supplied in the kit but some suitable stock is held. Any kit purchased from the range will be gladly serviced but a £2.50 cover charge would be appreciated on larger items. All items in kit form are usually ex-stock either with us or our rally agent J. Birkett of Lincoln. Assembled items unless stock will be 10-14 days from receipt of order, and will be tested and aligned to specification.

A. WOOD, G4EEE **M. P. TELKMAN, G8DCA**

GUARANTEED USED EQUIPMENT

You'll have no better chance during 1980 to buy USED EQUIPMENT—PRICES this month will be more ATTRACTIVE than at any time during the year—Believe us it really is a BUYER'S MARKET RIGHT NOW! We agree it can be a bit of a lottery when you buy secondhand—Especially if you buy private—For example flick over to the readers ads and compare the private prices with ours—Ludicrous isn't it? YOU PAY MORE TO BUY PRIVATELY! Guarantee? No Sir! You pay your cash and hope for the best—With Amcomm it's different—All used equipment we advertise has been thoroughly WORKSHOP TESTED, rectified where necessary then given a RIGOROUS AIR TEST—THEN WE GUARANTEE IT! Yes every piece we offer has its own WRITTEN GUARANTEE—and why shouldn't it? So if you like anything listed below call or write us—We'll tell you about the GUARANTEE we offer on the particular piece you are interested in.

HF EQUIPMENT

Yaesu FT101ZD Tcvr	£550.00
Yaesu FT200/FP200	£215.00
Yaesu FT101E Tcvr	£415.00
Yaesu FR101 Rcvr	£249.00
Yaesu FL101 Tx	£249.00
Yaesu FT101B Tcvr	£249.00
Yaesu FT901DE Tcvr	£675.00
Yaesu FT401DX Tcvr	£220.00
Yaesu FTDX 505 Tcvr	£220.00
Ten Tec Triton II Tcvr	£260.00
Dentron HF200 Tcvr	£350.00
Atlas 210X Tcvr	£299.00
Yaesu FL2100B Amp	£240.00
Dentron GLA 1000 Amp	£220.00
Icom 701/IC701PS Tcvr	£725.00
Decca KW2000A Tcvr	£170.00
Yaesu FT7B Tcvr	£340.00
Uniden 2020 Dig Tcvr	£365.00
Trio TS520/VFO/Spkr	£399.00
Trio TS820 Tcvr	£550.00
Trio TS120 Tcvr	£350.00
NEC 110E Dig Tcvr	£420.00
Heath HW101 Tcvr	£199.00
Swan Astro 150 Tcvr	£650.00
Icom RM3	£50.00

RECEIVERS

Hammerlund HQ170A Rx	£125.00
Yaesu FRG 7 Rx	£145.00
Trio QR666	£90.00
Plessey P155R	£425.00
Eddystone 770R Rx	£90.00
Racal RA 117 Rx	£250.00
Trio 9R59DS Rx	£40.00

etc, etc.

UHF/VHF EQUIPMENT

NAG 144XL VHF Amp	£345.00
TRIO 7010 Tcvr	£120.00
TRIO 3200 Tcvr	£120.00
Yaesu FT 227R Tcvr	£175.00
Yaesu FT 227RB Tcvr	£195.00
Icom IC 211E Tcvr	£420.00
NEC P2200E Tcvr	£100.00
FDK Multi Palm IV	£110.00
Icom IC 215	£100.00
Icom IC 202	£100.00

Incidentally—We're very fussy in the trade-in equipment we accept—NO RUBBISH! So be assured the electrical and mechanical condition of all the rigs listed for sale is excellent.

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YAESU

GEMINI COMMUNICATIONS

SOMMERKAMP TS 802 Hand portable with auto-search
80 Channels 2 Watts FM Transceiver

Another brand-new 80 channel handy transceiver specially developed for the demanding 2m VHF amateur. Accurate frequency coverage by PLL-synthesizer from 144·025-146·000MHz in 25kHz steps. Its IF is 10·7MHz with X-tal filter, MOSFET in RF—and mixer stage. Frequency stability 0·0005% between −20° and +50°C. With electronical channel selector and switchable automatic reverse scanner, also switchable to searching for occupied frequencies. Built-in repeater shift for channels R0-9 switchable, tone burst for repeater operation and 1750Hz tone call. Battery drain on stand-by position only 18mA digital channel indication and electronic receive/transmit switching. 0·5/2 Watt transmitter power selectible by high/low power switch. Receiver sensitivity better than 0·2uV. Instrument for relative transmitter power and battery indication. With combined on-off and volume control knob, squelch. Connector jacks for external antenna, 12 Volt power supply or car battery, charger, earphone (when inserted disconnects loudspeaker automatically). With 8 pin DIN jack our TS 802 operates with the telephone handset TS 1022, loudspeaker-microphone SM 5732. Big holder for 10 pieces UM 3 or rechargeable batteries. Our TS 802 in the robust and elegant aluminium die-cast is delivered with leather case and flexible rubber-antenna. Frequency range 144-146MHz. Dimensions: 230 × 75 × 40mm. Weight: 1·5Kg.
Price £172.50 including charger.

SOMMERKAMP TS 280 FM MOBILE
80 Channels 50 Watts 2m FM Transceiver

From the modern PLL technique benefits our new developed mobile transceiver TS 280 FM for the 2m amateur, which we can offer at a very competitive price. Quick and easy change of channel, also with the vehicle in motion: all 80 channels between 144MHz and 145·975MHz can be selected in 25kHz steps. All 10 European repeater channels are offset automatically and shown with correct digital readout. The final amplifier has an input of 75 Watts, there are 40-50 Watts at the antenna. For short distance contacts or for repeater operation, the power can be reduced to only 2 Watts at the flip of a switch, and all for
£199.00 including mobile mount and mic with volume control.

1 RAILWAY ROAD, BLACKBURN, LANCS.
Telephone: 51842 (Evenings: Bolton 592929 G4GHE)

YOUR SOMMERKAMP IMPORTER

SOMMERKAMP FT 207 RE
800 Channels 2 Watts 2m FM Transceiver

The entire international 2m amateur band ready to be recalled in the palm of your hand—our new SOMMERKAMP FT207 RE leaves nothing to be desired: scanner, frequency memory, touch-pad frequency selection, digital frequency readout, many different frequency shifts, tone burst, built-in rechargeable accumulator, light weight and compact, with a beautifully styled cabinet—the most modern 2m handy of the world! A 4 bit processor generates frequencies from 144-148MHz in 10kHz steps, and a slide switch adding 5kHz makes 800 channels available at 5kHz spacing. **£195.00.**

SOMMERKAMP FT 227 RAE
800 Channels 10 Watts 2m FM Transceiver with Memory Unit

A unique construction designed with the latest technical features: an optical matching generator selects like a computer the desired channel from the 800 frequencies on the entire international 2m amateur band between 143·5-148MHz. **£249.00.**

SOMMERKAMP FRG 7 HF Receiver SSB/AM **£195.00**

SOMMERKAMP FRG 7000
Receiver AM/SSB (USB + LSB) CW from 0·25-30MHz. **£349.00**

SOMMERKAMP FT 901 DM
Transceiver AM/FM/SSB (USB + LSB) CW/FSK. **£914.00**

SOMMERKAMP FT 307 CBM
Transceiver AM/SSB (USB + LSB) CW/FSK + Marine. Solid state. Complete with AC/DC PS, all filters and memory. **959.00**

NEW SOMMERKAMP FT 767 HF MOBILE (= FT 707). **£569.00**

SOMMERKAMP FT 277 ZD (= FT 101 ZD)
Transceiver AM/SSB (USB + LSB). Developed from the world's most popular amateur transceiver and with digital readout. Features included in the price are: DC/DC converter, CW filter and PA fan. **£661.00**

ALL PRICES INCLUDE VAT

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★ COMPLETE CRYSTAL SERVICE ★

PRICES SHOWN EXCLUDE VAT; UK CUSTOMERS PLEASE ADD 15%

S18 AND S19 ARE NOW ADDED TO OUR STOCK RANGE

CRYSTAL FREQUENCY RANGE USE (TX or and HOLDER) / OUTPUT FREQUENCY	4MHz-TX-HC6/U	6MHz-TX-HC25/U	8MHz-TX-HC6/U	10MHz-RX-HC6/U	11MHz-RX-HC6/U	12MHz-TX-HC25/U	14MHz-RX-HC25/U	18MHz-TX-HC25/U	36MHz-TX-HC6 & 25/U	44MHz-RX-HC6/U	44MHz-RX-HC25/U	48MHz-TX-HC6 & 25/U	52MHz-RX-HC25/U	72MHz-TX-HC25/U
144.4 (433.2)	b	e	b	e	e	b	e	e	e	e	e	e	e	e
144.480	e	e	e	e	e	e	e	e	e	e	e	e	e	e
144.800	c	e	e	e	e	c	c	c	e	c	c	e	e	e
144.850	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.000/R0T	a	b	a	c	c	a	b	b	c	a	a	c	b	e
145.025/R1T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.050/R2T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.075/R3T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.100/R4T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.125/R5T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.150/R6T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.175/R7T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.200/R8T	a	b	a	e	e	a	b	b	e	a	a	e	b	e
145.300/S12	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.350/S14	e	e	c	e	e	c	c	c	e	c	c	e	e	e
145.400/S16	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.425/S17	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.450/S18	a	e	e	e	e	a	b	b	e	a	a	e	e	e
145.475/S19	a	e	e	e	e	a	b	b	e	a	a	e	b	e
145.500/S20	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.525/S21	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.550/S22	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.575/S23	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.600/R0R	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.625/R1R	e	e	e	e	e	e	b	e	e	a	a	e	b	e
145.650/R2R	e	e	e	c	e	e	b	e	e	a	a	e	b	e
145.675/R3R	e	e	e	c	c	e	b	e	e	a	a	e	b	e
145.700/R4R	e	e	e	c	c	e	b	e	e	a	a	e	b	e
145.725/R5R	e	e	e	c	c	e	b	e	e	a	a	e	b	e
145.750/R6R	e	e	e	c	c	e	b	e	e	a	a	e	b	e
145.775/R7R	e	e	e	c	c	e	b	e	e	a	a	e	b	e
145.800/R8R	a	b	a	c	c	a	b	a	e	a	a	e	c	e
145.950/S38	a	e	e	a	e	e	e	e	e	a	e	e	e	e

TWO METRE CRYSTAL RANGE

PRICES: (a) **£1.95**, (b) **£2.32**, (c) **£2.80**, (d) and (e) **£3.94**. **AVAILABILITY:** (a), (b), (c) and (d) stock items normally available by return (we have over 5000 items in stock). (e) 4/6 weeks normally but it is quite possible we could supply from stock. **N.B.** Frequencies as listed above but in alternative holders and/or non stock loadings are available as per code (e).

ORDERING: When ordering please quote (1) Channel, (2) Crystal frequency, (3) Holder, (4) Circuit conditions (load in pf). If you cannot give these, please give make and model of equipment and channel or output frequency required and we will advise if we have details.

JAPANESE AND AMERICAN EQUIPMENTS

We can supply crystals for **YAESU** FT2F, FT2FB, FT2 Auto, FT224, most of the **ICOM** range and the **TRIO-KENWOOD** range. We can also supply from stock crystals for the **HEATHKIT** KW202 and HW17A.

CRYSTALS FOR THE BRITISH 70CM CHANNELS

Due to the much higher multiplication involved (3 times that on 2m) all our stock 70cm crystals are to much closer tolerances than our standard amateur range.

We are stocking the following channels: RB0 (434·60/433·00), RB2 (434·65/433·05), RB4 (434·70/433·10), RB6 (434·75/433·15), SU8 (433·20), RB10 (434·85/433·25), RB14 (434·95/433·35), SU18 (433·45) and SU20 (433·50) – TX and RX for use with: PYE UHF Westminster (W15U), UHF Cambridge (U10B), Pocketfone (PF1) and STORNO CQL/CQM 662 all at **£2.32**. For the U450L Base Station we have the TX crystals for all the above channels **£2.32**. The RX crystals for the U450L Base Station, together with the TX and RX crystals for the remaining SU channels (SU12·433·30·RTTY, SU16·433·40 and SU22·433·55) for all the above equipments are available at **£3.94** to amateur spec or **£4.64** to same spec as stock items. Delivery approx. 4/6 weeks.

4m CRYSTALS FOR 70·26MHz – HC6/U

TX8·7825MHz and RX6·7466MHz or 29·7800MHz **£2.32**

10·245MHz "ALTERNATIVE" I.F. CRYSTALS-£2.32 For use in Pye and other equipment with 10·7MHz and 455kHz I.F.s to get rid of the "birdy" just above 145·0MHz. In HC6/U, HC18/U and HC25/U.

CRYSTAL SOCKETS – HC6/U, HC13/U and HC25/U (Low loss) 16p each. **10p** P. & P. per order (P. & P. free if ordered with crystals).

CONVERTER/TRANSVERTER CRYSTALS – HC18/U

All at **£3.00**, 38·6666MHz (144/28), 42MHz (70/28), 58MHz (144/28), 70MHz (144/4), 71MHz (144/2), 95MHz (342/52), 96MHz (1,296/432/144), 101MHz (432/28), 101·50MHz (434/28), 105·6666MHz (1,296/28) and 116MHz (144/28).

TEST EQUIPMENT FREQUENCY STANDARD CRYSTALS

100kHz in HC13/U and 200kHz and 455kHz in HC6/U, **£2.95**.
1MHz and 5MHz in HC6/U and 10MHz and 10·7MHz in HC6/U and HC25/U, **£2.80**

ANZAC MD-108 DOUBLE BALANCED MIXER

5·500MHz supplied with full details for only **£5.95**.

CRYSTALS FOR PROFESSIONAL USE

We can supply crystals to most commercial and MIL specifications, with an express service for that urgent order. Also for commercial use, eg TV or computer crystals, etc, we can supply at very competitive prices. Please send S.A.E. for details or telephone between 4.30·7pm and ask for Mr Norcliffe.

EXPRESS SERVICE

Many types of made-to-order crystals are available on our "EXPRESS SERVICE" – with delivery of three days on our class "A" service. Telephone or Telex for details.

TERMS: CASH WITH ORDER – MAIL ORDER ONLY – S.A.E. WITH ALL ENQUIRIES – PRICES INCLUDE P. & P. (BRITISH ISLES) EXCEPT WHERE STATED – OVERSEAS CHARGED AT COST.

CRYSTALS MANUFACTURED TO YOUR SPECIFIC REQUIREMENTS

Prices shown are for one off to our amateur specs; closer tolerances are available. Please send us details of your requirements.

A Low frequency fundamentals in HC13/U or HC6/U

Adj. tol. ±50ppm, Temp. tol. ±100ppm 0 to +70°C

6·0 to 19·999kHz	**£28.12**	80 to 99·999kHz	**£7.30**
20 to 29·999kHz	**£17.75**	100 to 149·99kHz	**£6.68**
30 to 59·999kHz	**£15.51**	150 to 499·99kHz	**£6.20**
60 to 79·999kHz	**£12.41**	500 to 799·99kHz	**£7.30**

B High frequency fundamentals/overtones in HC6/U, HC18/U or HC25/U

Adj. tol. ±20ppm, Temp. tol. ±30ppm – 10 to +60°C

†800 to 999·9kHz (fund)	**£9.50**	*25 to 30MHz (fund)	**£7.56**
*†1·0 to 1·499MHz (fund)	**£9.45**	*15 to 20·99MHz (3 O/T)	**£4.72**
*†1·5 to 2·599MHz (fund)	**£4.21**	*21 to 62·99MHz (3 O/T)	**£3.94**
*†2·6 to 20·99MHz (fund)	**£3.94**	*60 to 105MHz (5 O/T)	**£4.53**
*φ3·4 to 3·999MHz (fund)	**£5.43**	*105 to 125MHz (5 O/T)	**£7.09**
*φ4·0 to 5·999MHz (fund)	**£4.21**	125 to 180MHz (O/T)	**£6.48**
* 6·0 to 20·99MHz (fund)	**£3.94**	180 to 250MHz (O/T)	**£10.64**
* 21 to 24·99MHz (fund)	**£6.14**		

***Delivery** Normally 4/6 weeks (express available) – all other frequencies 6/8 weeks.
Holders – Low frequencies HC13/U or HC6/U dependent on frequency.
Mid and High frequencies are available in HC6/U, HC18/U or HC25/U unless marked † only available in HC6/U or φ only available in HC18/U and HC25/U.
HC17/U (replacement for FT243) and **HC33/U** (wire end HC6/U) available as per HC6/U above at **25p** extra on HC6/U price.
Unless otherwise specified, fundamentals will be supplied to 30pf circuit conditions and overtones to series resonance.

2 ALEXANDER DRIVE, HESWALL, WIRRAL, MERSEYSIDE, L61 6XT
Tel: 051-342 4443. Cables: CRYSTAL, BIRKENHEAD. Telex: 627371

DATONG ELECTRONICS LIMITED

PRODUCTS FOR THE SERIOUS COMMUNICATOR

WORK MORE DX

Datong RF clippers make your speech sound louder and clearer. The worse the conditions the greater the benefit. This is exactly what you need for working DX. After all, if they can't hear you, you can't work them!

All three models use the same innovative r.f. clipping techniques which have made the name Datong synonymous with r.f. clipping.

MODEL ASP

is fully automatic with calibrated push-button selection of degree of r.f. clipping in steps of 6 dbs from 0 to 30 dbs. It adjusts itself to suit your voice and microphone.

MODEL D75

is manually adjusted and has LED monitoring to aid in setting.

MODEL RFC/M

is a fully tested printed circuit module for building into your own case.

All three units feature very long life battery operation and connect in series with your microphone

No internal modifications are required to your rig.

IMPROVE RECEPTION

Our two no-compromise audio filters give a remarkable ability to filter out the intelligence from the noise.

MODEL FL2

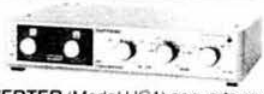
the new "top-of-the-line" filter, offers extremely sharp pass-band edges for truly exceptional filtering performance on all modes, but especially for SSB. **Its 10 poles of fully variable low and high pass filtering give sharper filter edges even than normal crystal filters.** A separate manually tuned notch filter is also fitted.

MODEL FL1

on the other hand, was recently described in "73 Magazine" (October 1979) as "truly the Rolls Royce of the current filter market". It is the only filter in the world which can notch out an interfering whistle from SSB signals **automatically.** Additionally, for CW, bandwidths down to 20 Hz are practicable thanks to the use of "limited AFC" – another Datong exclusive.

Both filters connect in series with the loudspeaker and will improve virtually any receiver. An external DC supply is required.

RECEIVE MORE BANDS



The Datong **UP-CONVERTER** (Model UC1) converts any good quality ten-metre or two-metre receiver or transceiver into a really high performance general coverage receiver.

It gives full coverage in thirty 1MHz segments from 60 kHz to 30 MHz.

At low cost, UC1 adds a new dimension to your expensive amateur bands only equipment and for sheer performance beats most of the common general coverage receivers.

INDOOR ANTENNA

MODEL AD170

Active Antenna is designed for under-roof mounting and gives sensitive reception right through from below 60 kHz to Band 1 TV around 50 MHz. It needs no tuning and includes a switchable 12 db broadband amplifier.

Although only three metres long, Model AD170 has the same directional properties as a full size dipole, even at 60 kHz.

LEARN MORSE THE EASY WAY

The Datong Morse Tutor (Model D70) is your passport to a full licence. Compact, with internal battery and speaker plus personal earphone it provides unlimited random morse to practice on. With D70 you can practice morse anywhere, anytime and at your own pace. With the Morse Tutor, practice becomes a pleasure because you get results quickly.

Prices: All prices include delivery in UK. Basic prices are shown with VAT inclusive prices in brackets.

ASP £69.00 (£79.35)	D75 £49.00 (£56.35)	RFC/M £23.00 (£26.45)
FL2 £78.00 (£89.70)	FL1 £59.00 (£67.85)	UC1 £119.00 (£136.85)
D70 £43.00 (£49.45)	AD170 £33.00 (£37.95)	AD170 + Mains Power Unit £37.00 (£42.55)
MPU (Mains Power Unit) £6.00 (£6.90)		

Full data sheets on any product available free on request. New literature includes: short form catalogue, new ASP data sheet, FL2 data sheet.

DATONG ELECTRONICS LIMITED

Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England. Telephone (0532) 552461

SOMMERKAMP

1980 PRICES

NEW!

FT720R 70cm mobile or 2m 25W option. £355.00

ALL PRICES INCLUDE VAT

FT 7B 80-10m 100WAM/CW/SSB 12V Tr.	£429.00
YC 7B Digital Readout for FT 7B	£69.00
YR 901 RTTY + CW Converter	£454.00
YVM 1 Video Monitor for YR 901	£144.00
FT 277ZD (FT 101ZD +) 200W SSB Tr. w.cw-filt. + blower. AM 12/220V	£669.00
FT 101Z 200W 80/10 without digital	£550.00
SP 901 Speaker for FT 277ZD/FT 901DM	£27.50
FTV 901 Transv. 2m/70cm + oscar f. 277ZD/901DM	£459.00
FT307CBM 300W SSB 80-10m Transceiver with all access. built-in	£960.00
FC 307 Antenna Coupler for FT 307CBM	£106.00
FV 307 VFO for FT 307CBM	£92.00
FTV 307 2m Transverter for FT 307CBM	£209.00
YD 148 Stand Microphone for all FT models	£21.25
YM 21 Noise Cancel fist. mic.	£13.80
FL 2277Z 1·2kW Power Amplifier 220V	£399.00
FT 901DM 200W SSB/AMFM Transc. 12/220V 80-10m w. Keyer memory AM + CW filter	£914.00
FV 901 VFO for FT 901DM	£247.00
YO 901P Monitorscope f.FT 901 w. bandscope	£314.00
FC 901 Antenna Tuner for FT 901DM	£131.00
FRG 7 Receiver 0·5-30MHz 220V/12V	£205.00
FRG 7000 Dig. Receiver 0·25-29·9MHz	£339.00
FT 225RD 2m 15W SSB FM Tr.w.dig. 12/220V without memory	£558.00
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