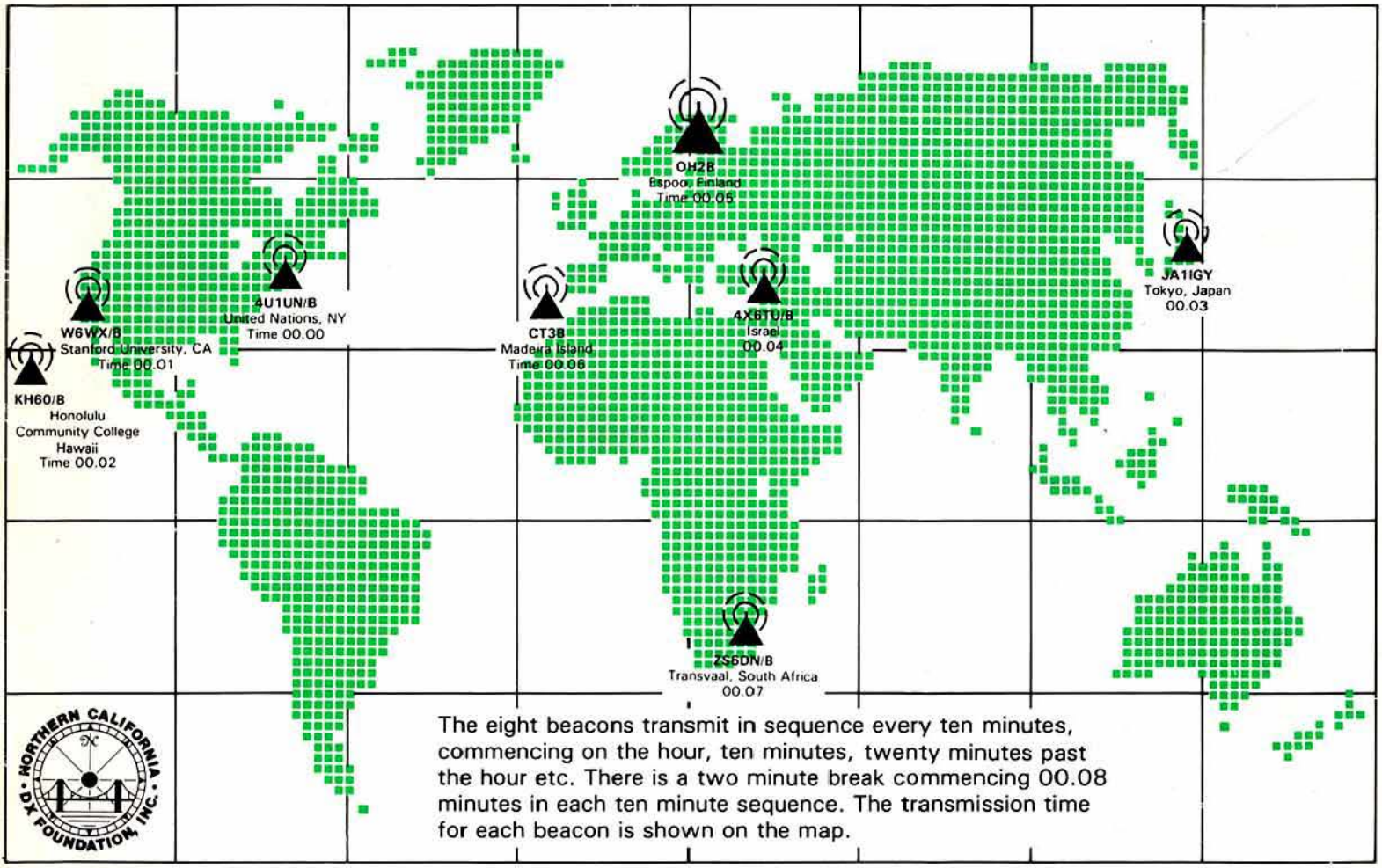
RADio COMmunication

September 1983

WORLD COMMUNICATIONS YEAR 1983

Worldwide 14.100MHz beacon network



The eight beacons transmit in sequence every ten minutes, commencing on the hour, ten minutes, twenty minutes past the hour etc. There is a two minute break commencing 00.08 minutes in each ten minute sequence. The transmission time for each beacon is shown on the map.

Journal of the Radio Society of Great Britain

ANNEE MONDIALE DES COMMUNICATIONS
WORLD COMMUNICATIONS YEAR
ANO MUNDIAL DE LAS COMUNICACIONES
1983

RSGB

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SEPTEMBER 1983

VOLUME 59 No 9

RADio COMmunication

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All articles received are reviewed for technical merit by the RSGB Technical & Publications Committee, or an acknowledged expert on the subject, before acceptance. Payment at high competitive rates will be made for all articles published.

The editor will be pleased to send intending authors a manuscript preparation guide and to give any other advice and assistance requested.

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We here at TRIO-KENWOOD have over the years developed a range of equipment designed by our professional engineers for you the active radio amateur. Our products range from the top notch TS930S HF amateur band transceiver to the smallest accessory. Each piece of equipment is specifically designed with the requirements of you, the radio amateur in mind. It has always been our policy at TRIO-KENWOOD to improve the specification and reliability of equipment by listening to the valuable comments of radio amateurs all over the world. The important relationship between yourself, the radio amateur and TRIO-KENWOOD is through our authorised distributor for the UK, LOWE ELECTRONICS LTD.

We give below a list of approved dealers in the UK. Any dealer not on this list has no connection with the UK distributor network and has no direct factory backing. Great care should be taken when purchasing your amateur radio equipment, to ensure that the dealer is factory approved. In any case, first contact our sole distributor for the UK: Lowe Electronics Ltd., who will be pleased to advise you of your nearest dealer.

Sole Distributor Lowe Electronics Ltd.
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Tel: 041-945 2626

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Tel: 0325 486121

Birmingham Ward Electronics
Soho House, 362-364 Soho Road, Birmingham B21 9QL
Tel: 021-554 0708

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Tel: 0444 400786

Yorkshire Leeds Amateur Radio
27 Cookridge Street, Leeds LS2 3AG
Tel: 0532 452657

Northern Ireland George Moore Electronics
7 Cyprus Avenue, Belfast BT5
Tel: Belfast 647570

The TW4000A is the latest step forward in Trio's programme of providing today's radio amateur with the very best in equipment. Following the success story of the Trio TS780 dual band base station transceiver, the TW4000A gives the mobile operator a superb FM transceiver for both 70 centimetres and the 2 metre band. Not only for mobile operation is the TW4000A perfect but also for shack use where the rig with its scanning and dual band facilities enable the enthusiastic amateur to keep in touch with the local scene.

* The TW4000A covers in one compact transceiver both the 2 metre band (144.000 to 146.000 MHz) and also the full 10 MHz of the 70 centimetre band (430.000 to 440.000 MHz). Measuring 60mm high, 161mm wide, 217mm deep and weighing only slightly more than 2.0 kg, the TW4000A is smaller than most current 2 metre transceivers.
* Added to the exceptional receive performance, now a Trio standard by which others are judged, is the TW4000A's 25 watt capability on both 2 metres and 70 centimetres.
* A green backlit liquid crystal display gives frequency, memory channel, repeater offset, VFO A or B, scan function, channel occupied and "ON AIR" information.
* Ten memory channels are provided which store frequency, band and repeater offset (on 2 metres minus 600 KHz shift, on 70 centimetres plus 1.6 MHz shift). Memory 1 is used for priority watch, memories 8 and 9 for instant recall and memory 0 for split channel use (cross band operation).
* Frequency scan is extremely versatile in that the rig can be programmed to scan either all memory channels or those holding either 2 metre or 70 centimetre frequencies. The rig can also be programmed to skip those channels which the operator does not wish to monitor. The scan direction can also be changed by using the UP/DOWN switch on the microphone. In order that an important contact is not missed, when in priority watch mode, the rig switches back from the frequency in use to memory channel 1 for one second out of ten. The two most used frequencies can be placed in memories 8 and 9 respectively, common channel scan checking each alternatively for approximately 5 seconds.
* The use of GaAs FET's in the RF amplifiers on both 2 metres and 70 centimetres, as well as the use of high performance MCF's in the 1st IF section, provides a high receive sensitivity and an excellent dynamic range.
* Two VFO's are provided tuning in either 5 or 25 KHz steps, the UP/DOWN shift switch on the microphone providing control.
* Full repeater facilities are included giving the correct frequency shift, 1750 Hz access tone, and of course the essential repeater shift.
* The use of advanced diecasting techniques in the fabrication of the combined chassis/heat sink, as well as in the RF shielding results in greatly improved mechanical strength, plus a higher immunity to RF interference.

Optional Accessories
PS430 matching power supply.
VS1 voice synthesizer unit.
SP40 compact mobile speaker.
MA4000 dual band antenna with duplexer.
SW100B mobile SWR and power meter.
SW200B base station SWR and power meter.
PG3 noise filter for mobile use.

TRIO

TRIO-KENWOOD CORPORATION
Shionogi Shibuya Building, 17-5, 2-chome Shibuya, Shibuya-ku, Tokyo 150, Japan

TRIO-KENWOOD COMMUNICATIONS, GmbH
D-6374 Steinbach-TS. Industriestrasse,8A West Germany

I have used the TS430S, John has used it, Alan has used it, in fact we have all put the new HF rig from Trio on the air and our unanimous opinion is that with this new rig Trio have pushed the concept of transceiver as we all knew it well into the next generation of equipment. Not only is the rig compact, only slightly larger than the TS130S but along with being a full amateur band transceiver the new TS430S also provides todays discerning operator with a general coverage receiver. Key features of the new rig are two digital VFO's, eight memory channels each of which can be used as a separate VFO, programmable band scan, IF shift, notch filter and the provision for internally fitting an optional FM mode.

Modes of Operation
The TS430S modes of operation are USB, LSB, CW, and AM. FM is available by the addition of the optional FM430 frequency modulation unit. Mode selection is easily accomplished by front panel switches with adjacent LED indicators.

General Coverage
In addition to the amateur bands from 160 to 10 metres (including the new frequency allocations) the TS430S features a 150kHz to 30MHz general coverage receiver. Front panel UP/DOWN switches allow easy selection of the desired amateur band. A MHz step switch provides 1MHz band steps across the entire range of the transceiver and each of the two digital VFO's is completely tunable from 150kHz to 30MHz.

Two VFOs
The two digital VFO's operate independently of each other tuning in 10Hz steps, a STEP switch is provided, use of which increases the tuning step to 100Hz. An A = B switch is provided to enable the operator to quickly put both VFO's on the same frequency, ideal for checking on the source of QRM without losing the original operating frequency. A lock switch guards against accidental frequency shift. RIT is provided which operates on both VFO's and memory channels alike.

Memory Operation
Each memory stores frequency, mode and band information, the eighth memory holds receive and transmit frequencies independently so giving simple split frequency operation. A front panel VFO-MEMO switch allows each of the memory channels to be used either as a VFO or as a fixed channel. An internal lithium battery gives complete memory and VFO back-up independent of the external supply to the transceiver. The TS430S also has Memory scan, the transceiver scanning only the channels in which a frequency has been stored. Not only does the memory hold frequency but the mode also, most useful if a mix of broadcast frequencies has the odd SSB net frequency within it. The hold time for each occupied channel is approximately 2 seconds, a hold switch is provided to interrupt the scanning process.

Band Scan
A programmable band scan is available, the limits of scan being set by memory channels 6 and 7. Again the hold switch will cancel the scan function.

IF Shift
IF shift enhances listening on today's busy bands.

Notch Filter
A tunable notch filter is included to give best interference rejection.
A front panel NAR/WIDE switch allows narrow-wide IF filter selection when the optional filters are installed. In the SSB mode, with the optional YK-88SN (1·8kHz) filter installed, either 2·4kHz wide, or 1·8kHz narrow may be selected. In the CW mode, with the optional YK88C (500Hz) or the YK88CN (270Hz) filter installed 2·4kHz wide or 500Hz or 270Hz narrow may be selected. In the AM mode, with the optional YK88A (6kHz) filter installed, 6kHz wide or 2·4kHz narrow may be selected. In the FM mode, with the optional FM430 unit installed, a single 15kHz bandwidth is provided.

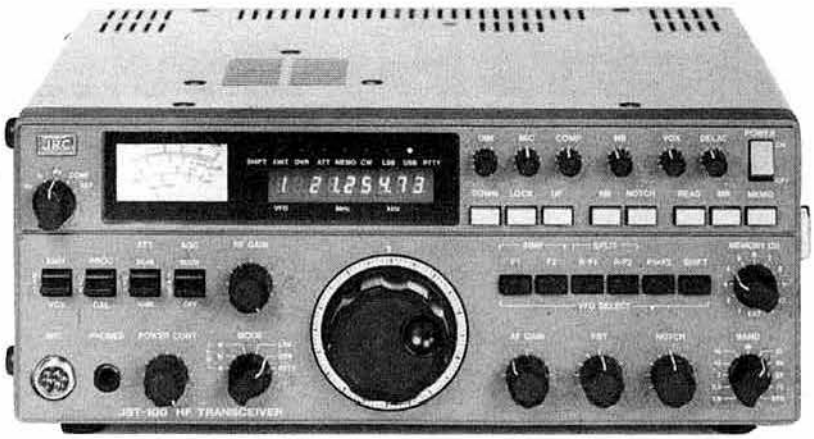
Filters
A front panel switch activates the speech processor circuit, with its audio compression circuit, and change in ALC time constant, resulting in a marked improvement in intelligibility, accompanied by a substantial increase in "talk power."

Speech Processor
The TS430S runs 200 watts input on SSB/CW on 160-15 metres; 180 watts on 12-10 metres. In the AM mode, it runs 80 watts on all bands and in the FM mode with the optional FM-430 unit fitted the rig runs 100 watts input, again on all bands. The TS430S operates from 12 volts DC, or from 240 volts AC by means of an optional AC power supply.

Other Important Features
All mode squelch circuit.
Includes a 20dB FR attenuator.
A transverter socket is included on the rear panel.

for the hf operator for whom only the best will do, the **JST100** amateur band transceiver.

JRC *Japan Radio Co., Ltd.*



The JST100 from the Japan Radio Company is a solid state transceiver built to the high standards as set by JRC for their complete range of products. The JST100 is first and foremost an "Amateur Bands" only rig. Having an extremely high class receiver, the JST100 enables the enthusiast HF operator to clearly hear weak signals under even the poorest of conditions.

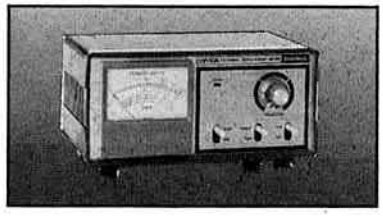
Having located the weak DX station or your sked contact out of the QRM then the high quality of JRC transmitted audio produces a first class contact.

Those familiar with the Japan Radio Company's previous items of equipment—the NRD505 and 515 general coverage receivers, the NSD515 matching amateur band transmitter, the NDH518 96 channel memory unit and the NCM515 remote controller—will know that the equipment is designed to provide the ultimate in operating satisfaction. The JST100 is built in the same tradition.

JST100 £998.00	inc VAT carr £6.00
NFG97 ATU £150.00	inc VAT carr £6.00
NVA88 SPEAKER £37.50	inc VAT carr £6.00

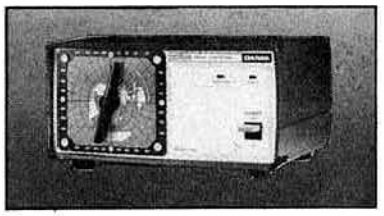
we recommend the DAIWA range.

		Price inc. VAT	Carr.
VHF AMATEUR RECEIVERS			
SR9	2m FM tunable /xtal receiver 144-146MHz	46.00	2.50
SR1000	2m synthesised VHF monitor receiver. Requires no crystals for full amateur band coverage 144-146MHz	72.50	2.50
POWER & SWR METERS			
CN520	1-8 60MHz mini cross needle power/SWR meter.	36.50	1.50
CN540	50-150MHz mini cross needle power/SWR meter.	39.50	1.50
CN550	144-250MHz mini cross needle power/SWR meter.	39.50	1.50
CN620A	1-8-150MHz cross pointer power and SWR meter. Up to 1kW	57.00	2.50
CN630	140-450MHz cross pointer power and SWR meter. Up to 200W	85.00	2.50
CN650	1-2-2·5GHz cross pointer power and SWR meter. Up to 20W	114.00	2.50
CNW419	1-8-30MHz 200W gen. cov tuning unit	130.00	6.00
CNW919	2M power meter and antenna tuning unit	92.00	2.25
CNA1001A	Fully automatic all band ATU. Includes cross pointer power meter	156.00	6.00
CNA2002	As for CNA1001A but 2kW rating for tuner and power meter	228.00	6.00
ANTENNA ACCESSORIES			
CS201/TW2	Two way 50 ohm coax switch. 0-500MHz	13.95	2.00
CS401	Four way 50ohm coaxial switch 0-500MHz	43.50	2.50
ROTATORS			
DR7500X	For HF 3 element beams. Preset controller. 6 core cable	113.72	6.00
DR7500R	As for DR7500X but using the DAIWA round controller	125.00	6.00
DR7600X	Heavy duty. Will take up to 2 element 40m beam. Preset control	163.49	6.00



DR7600R	As for DR7600X but using the DAIWA round controller	176.29	6.00
POWER SUPPLIES			
PS200D	Heavy duty power supply 9-15V amps. Fully metered	118.00	6.00
PS300	Daiwa heavy duty PSU 30A max 22A continuous	135.00	6.00
PSR1250	Daiwa 50A max	338.00	6.00

INFRA-RED MICROPHONE			
RM940	New mobile mic with no connections between mic and rig	45.00	2.00
S9	Spare sensor for RM940 mic system	6.50	0.50
M9	Extra mic for RM940 system	13.00	0.50
F4	Set of four windshields for RM940 mic. Available singly at 75p	3.00	0.50



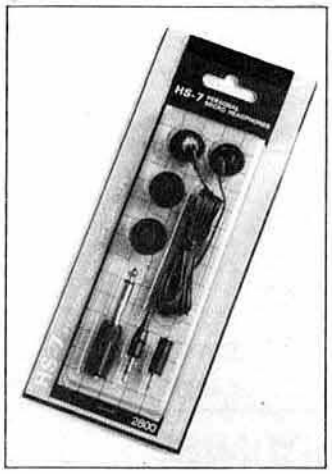
OBITER DICTA

Good Morning

New products and **old** products this month. To remind you, the **HF5** and **radial kit** are probably the widest used HF vertical in the UK. **Priced at only £55.75,** including VAT, for the aerial and £35, including VAT, for the radial kit, the HF5 system **puts easy five band operation**—80, 40, 20, 15 and 10—within everyone's reach. OK so you have a large garden and a tower, then the Jaybeam TB3 is for you. But for most of us **an HF5,** either clamped to a short pole in the garden or mounted perhaps on a gable end or chimney position with the matching radial kit, is all we can manage.

Of course those who live in **water-logged pastures** will probably do better than those dry fertile plains but what's to **stop the wife** from watering the ground at the base of the antenna! **The Darlington Shop** used an HF5 and radials as the HF listening aerial—customers seem pleased so all must be well.

I'm sorry we won't be attending the ARRA Show at Doncaster Race Course or the Rally to be held in Granby Halls, Leicester. Commitments to other Rallies, Club talks, our Open Day and the Scottish Convention keep us all very busy here at Matlock. Of course we will be at the National Exhibition Centre for the Second RSGB Show early in 1984—28th and 29th April to be precise. From what I have heard it will be a "classic". I am reliably informed that chairs are to be provided for QSO's.



Back to the GPV5—a simple aerial for the 2 metre FM band. A fine aerial provided you can mount it well in the clear. Many in use and many satisfied customers. **The GP23** is a later addition to the range of verticals giving additional gain. Due to its having an additional section the GPV23 is proving popular.

On 70 cm for the real enthusiast the GPV7 has to be a firm favourite for FM into the numerous 70 cm repeaters. I am pleased to see at last more stations on 70 cm—both FM and SSB—and I'll tell you another thing, **that a contact on 70 centimetres** will most probably give more **satisfaction** than one on 2 metres. Why do I say this? Well, to get on 70 cm needs a firm commitment from any guy, either to build a new rig or gather hard-earned cash together and splash out on a new 70 cm rig. **Most new amateurs** get onto 2 metres. Some fall by the wayside and go on to some new hobby that takes their fancy but the amateur who has made it to 70 centimetres and who perseveres to have a contact is rewarded—**a pleasant QSO with another enthusiastic amateur.**

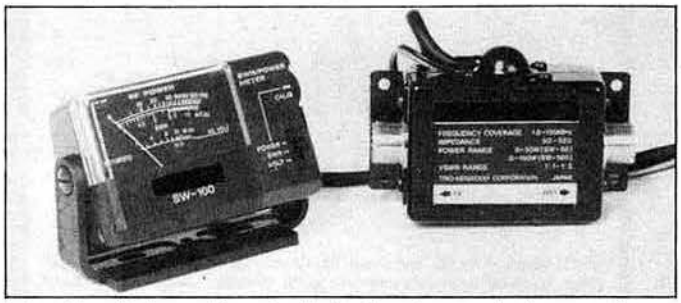
Trio equipment on 70 centimetres is **the handheld TR3500** FM rig at £250.70, including VAT. The SSB FM and CW base station with mobile inclinations, **the TR9500,** £395.00 including VAT and last, but certainly not least for the real enthusiast, the all-singing, all-dancing **TS780 70 cm/2 metres** all in one package—**no options, no extras,** all in at the price, including mic, for £843.87, including VAT. The only rig for the operator who wants a true base station.

I forgot to list the prices of the remaining vertical aerials I just mentioned. The **GPV5 £33.90,** the **GPV7 £29.00,** and the new 2 metre **GP23 £39.00.** We also have the GPV720 which operates on both 2 metres and 70 centimetres—**GPV720 £33.90.**

That reminds me again, an aerial for two bands, the GPV720, a multi-mode base station for 2 bands, the Trio TS780 and now available but in limited quantities, the **Trio TW4000A dual band FM mobile,** as I have said before in this column the rig of the year.

What more can I say? Mobile operating **on 2 metres** and **70 centimetres** using only **one compact** rig. Whatever next . . . . and it's not so long ago that I was using a **dash-mounted Pye Cambridge,** rougly three times the size and with only one crystal controlled channel.

I trust you all enjoyed **our third Open Day.** I hope I did too because as



I sit writing this I am still putting the final touches to what I am sure for our visitors will be an entertaining day. I hope I enjoy the staff party afterwards. **Beryl,** you know the **lady on our switchboard,** has been bowled over by your courteous comments about her bicycle riding. Indeed, from my desk in the inner sanctum I often hear customers discussing their double clangers with her! Now that better weather is with us **Beryl** is often to be seen in those pale blue shorts cycling to work. Look out for her and give **her a cheerful wave.**

New goodies from Trio. Over the past few days my desk and shack have been littered with new products from Trio. I will describe them to you: in addition to an already superb range of communication headsets, Trio have produced in line with current lightweight thinking, **the HS7 headset.** The main feature of the 'phone is the lack of headband and ear muffs—indeed, the individual speakers are inserted into the outer ear. Very comfortable—dangerously so as I found as I inadvertently got up from my operating position and found my TS780 following me across the shack. The HS7 comes with a 3.5 mm jack fitted and simple plug-in adaptors giving 2.5 and 6.3 mm jacks. **The Trio HS7 £11.27, including VAT.**

For the lucky person who owns both a TR2500 and TR3500 Trio have introduced the **RA5 dual band antenna**—£13.80, including VAT. Complete with BNC plug and being telescopic and RA5 gives a ½ wave on 2 metres and 5/8 on 70 centimetres. In all a useful antenna and top pocketable.

Trio have now introduced to their range of equipment **SWR/power meters,** both mobile and suitable for a base station. First of all for mobile use we have the **SW100A 1.8 to 150 MHz** and the **SW100B 140 to 450 MHz,** and as a base station meter the **SW200A (1.8 to 150 MHz head supplied).** The advantage over other meters is that a separate detector head is used, and in the case of mobile operation, a neater much smaller meter case. In the base station unit the alternative detector (optional) 140-450 MHz can be fitted and switched in line. So one can easily check performance of more than one rig or more than one antenna (3 detectors can be fitted). Both units have illuminated dials and the base station SW200 model measures both power and peak envelope power (switchable).

Prices of the units are **SW100 A and B £37.26,** including VAT and the **SW200A £80,50,** including VAT. **Good meters** and easy tailored to shack or car.

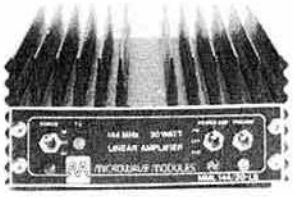
Anyway, that's about it for now as I've just heard a rumour that **a considerable amount of mail** has arrived addressed to "The Columnist, Obiter Dicta", so I suppose **I had better sharpen my quill.**

Gud DXes 73es FBYLS, XYLS, esFBOM, etc

David

Microwave Modules LARGEST Stockist In London!

MML 144/30LS



£69·95
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(P&P £2·50)

1 or 3 watts in for 30 watts out. Make your portable heard and hear other stations with this **superb** 12dB preamp. Noise factor **only** 1·5dB!

OTHER 2 MTR VERSIONS AVAILABLE:–

Model	Input	Output	Prices inc. VAT
MML144/50S	10W	50W	**£85·00** (P&P £2·50)
MML144/100S	10W	100W	**£139·95** (P&P £3·00)
MML144/100LS	1 or 3W	100W	**£159·95** (P&P £3·00)

ALSO 70cm VERSIONS. NOISE FACTOR 2dB

Model	Input	Output	Prices inc. VAT
MML432/30L	1 or 3W	30W	**£99·00** (P&P £3·00)
MML432/50	10W	50W	**£109·95** (P&P £3·00)
MML432/100	10W	100W	**£228·65** (P&P £4·00)

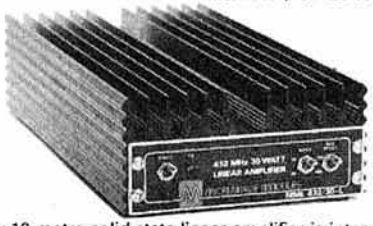
RTTY MML2001

£189·00
inc. VAT
(P&P £2·50)

BORED with your receiver?!
NOW you can Translate those bleeps into words on either your T.V. (**not** during DALLAS!) or Video Monitor. See weather – Telex – News Agency reports and, of course amateur Transmissions. Just look for **RY. RY. RY. RY!!** On the screen.

MML28/100S

£129·95 inc. VAT (P&P £3·00)



This all new 10 metre solid-state linear amplifier is intended for use with any existing 28MHz equipment having an output power of up to 10 watts. When used with such a drive source this unit will provide an output power of 100 watts on SSB and FM and 40 watts on AM.
The linear amplifier and the ultra low noise receive preamp can both be independently switched in and out of circuit due to the inclusion of sophisticated switching circuitry controlled by front panel mounted switches.
10 Watts in for 100 Watts out – 10 MTR Linear/Preamp switchable.

Lee Electronics Ltd

WELZ SP-15M & SP-350

SP15-M: 1·8-160MHz 5W-20W-200W Power/SWR Meter ..... **£32·00** inc. VAT
SP-350: 1·8-500MHz 200W Power/SWR Meter ..... **£59·95** inc. VAT

WELZ SP-300

SP-300: 1·8-500MHz 20W-200W-1KW Power/SWR Meter ..... **£75·00** inc. VAT

WELZ SP-10X & SP-380

SP-10X: 1·8-500MHz 200W Pocket Size ..... **£24·95** inc. VAT
SP-380: 1·8-500MHz 200W Dash Mount ..... **£49·95** inc. VAT

ADONIS MICROPHONES

AM803: Desk compressor mic with head and swan neck .**£59·00** inc. VAT
AM503: Desk compressor mic as 803 with one output **£42·25** inc. VAT
AM303: Desk Mic .....**£32·78** inc. VAT
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ICOM's Latest The IC-751 HF Transceiver

Think about the IC-740, One of the most popular amateur bands transceivers, make a few improvements such as adding 36 memory channels, doing away with mechanical bandswitching and then add full HF receive capabillity (0.1-30 MHz) which is even an improvement on the famous R70 and you get a pretty good idea of what the IC-751 is like. It is fully compatible with Icom Auto units such as the AT-500 and IC-2KL and a further option for computer control can be added. There is also a digital speech synthesizer option which will be ideal for blind operators. For power supplies you have the option of the IC-PS740 (which fits inside) or the PS-15/PS20 range for external use.

As you would expect there is a built in speech processor, a switchable choice of a J-FET pre-amp, straight through or a 20dB pin diode attenuator and two VFOs allowing split frequency operation.

Other standard features include:- 36 memory channels with scan facility and start/stop timers, a marker, 4 variable tuning rates, Pass Band Tuning, notch, variable noise blanker, monitor switch, DFM (direct feed mixer) in the front end, full break-in on CW and AMTOR compatibility. The first IF is 70.045 MHz. Any XIT and RIT adjustment is shown on the display. The transmitter features high reliability 2SC2904 transistors in a low IMD (-32dB@ 100W) full 100% duty cycle. Power is restricted to 40W on AM and adjustable from 10W on all modes. FM and the IC-FL44A crystal SSB filter are both fitted as standard.

As you can see from this brief description the IC-751 is certainly a transceiver worth considering – Why not call us for further details?

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IC-R70, HF Receiver

The R-70 covers all modes (when the FM option is included), and uses 2 CPU-driven VFO's for split frequency working, and has 3 IF frequencies: 70MHz, 9MHz and 455KHz, and a dynamic range of 100dB. It has a built-in mains supply.

Other R-70 features include: input switchability through a pre-amplifier, direct or via an attenuator, selectable tuning steps of 1KHz, 100Hz or 10Hz, adjustable IF bandwidth in 3 steps (455KHz). Noise limiter, switchable AGC, tunable notch filter, squelch on all modes, RIT, tone control. Tuning LED for FM (discriminator centre indicator). Recorder output, dimmer control.

The R-70 also has separate antenna sockets for LW-MW with automatic switching, and a large, front mounted loudspeaker with 5.8W output. The frequency stability for the 1st hour is ± 50Hz, sensitivity- SSB/CW/RTTY better than 0.32 μv for 12dB (S+N)÷N, Am-0.5μv, FM better than 0.32 for 12dB Sinad. DC is optional

IC-740, HF Transceiver

Features of the IC-740 transceiver include a very effective variable width and continuously adjustable noise blanker, continuously adjustable speed AGC, adjustable IF shift and variable passband tuning built in. In addition, an adjustable notch filter for maximum receiver performance, along with switchable receiver preamp, and a selection of SSB and CW filters. Squelch on SSB Receive and all mode capability, including optional FM mode. Split frequency operation with two built-in VFO's for the serious DX'er.

The IC-740 allows maximum transmit flexibility with front panel adjustment of VOX gain and VOX delay along with ICOM's unique synthesized three speed tuning system and rock solid stability with electronic frequency lock. Maximum versatility with 2 VFO's built in as standard, plus 9 memories of frequency selection, one per band, including the new WARC bands. With 10 independent receiver and 6 transmitter front panel adjustments.

Options include:

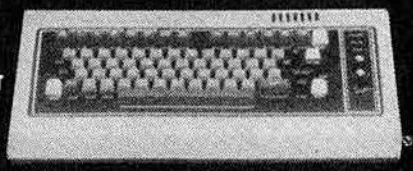
- FM Module
- Marker Module
- Electronic Keyer
- 2 - 9KHz IF Filters for CW
- 3 - 455MHz Filters for CW
- Internal AC Power Supply
- Automatic Antenna Tuner

RTTY, Morse & ASCII

Shortwave listeners and amateurs are able to take more interest in other modes of transmission than speech with the latest range of decoders and senders available. As well as amateur transmissions, there is an abundance of news and other interesting broadcasts which can be read using these space-age devices.

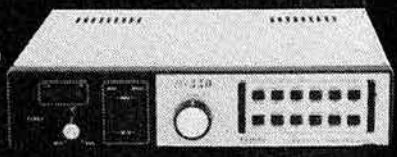
Some models in our range are the Tono 550, 9000E and the Telereader CWR-670, CWR-685E and CWR-610E. There is now available a professional version of the Tono 9000E, the PRO-1, which has a built-in scrambler. The Telereader CWR-670 is also available with a built-in VDU which can include a 40 column printer.

TONO 9000E Sender/Decoder



CWR-610E, Decoder

TONO 550, Decoder



As U.K. importers of the renowned TONO and TELEREADER products, we can offer you a wide range, from a simple morse and RTTY reader which can be plugged into your TV., to a complete send and receive system with memories and built-in displays, or outputs for high-definition VDU.

As well as stocking the complete ICOM range of equipment suitable for European use, we also sell Yaesu, Jaybeam, Datong, Welz, G-Whip, Western, TAL, Bearcat, Versatower and RSGB publications from our shop and showroom at the address below. Come in for a demonstration or just a chat, our qualified sales staff and technicians will be glad to assist you.

Securicor or post despatch free, same day if possible.

Agents Please telephone first, all evenings and weekends only (except Scotland).
North West – Gordon G3LEQ Knutsford (0565) 4040, Ansaphone.

Do you know what time it is!

When the globe of this digital clock is revolved, a red lamp indicating a major city in the world will blink, and the current time of that city will be displayed in place of the date. At a glance know the current times of 24 different time zones throughout the world.

This mini-globe clock stands 195mm. high and also has an alarm fitted. This useful device should stop you getting your Amateur friends, on the other side of the world, out of bed in the middle of the night.

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NEW! IC-271, VHF Multi-mode Base station

Icom have made improvements to the IC-251 and brought it up to date.

Power can be adjusted up to 25W on all modes SSB, CW and FM. Squelch works on all modes and a listen-input facility has been added for Repeater work. There is a switchable front end pre-amp. RIT shift is shown on the display. Why not call us for further details?

Options include:
Speech synthesizer announcing displayed frequency.
22 Channel memory extension - with scan facilities.
10 Hz tuning facility. SM5 desk mic
Internal chopper PSU (IC-740S)

IC-251E, Available on Special offer

Icom produce a perfect trio in the VHF base station range, from 6 meters through 2 meters to 70cms. The IC-251E is the 2 meter station while the IC-451E is used for 70cms. The 251E is now available with Mutek front-end fitted.

IC-290H, VHF Multimode Mobile

The recently introduced IC-290H has proved so popular that we have decided to concentrate on this (25W) model 2m multimode. With its bright green display, 5 memories, scan facilities on either memories or the whole band, tone-call button on the microphone and instant listen input for repeaters, this little box really is a beauty. The 70cm version, the IC-490E has similar features (although the output is only 10W in this case).

IC-25H/25E, VHF, FM Mobiles

The FM mobile choice has to be the Icom IC-25E. It is so small yet boasts a powerful 25 Watt voice and a sensitive receiver. The new 25H now avaiable has a green display and 45 Watts output. There are five easily programmable memories, and facilities for changing the repeater shift from the default value of 600kHz. You can tune the VFO while in a memory without losing or changing the memory. You can listen on the input instantly, and there are also priority channel facilities should you want to be sure of not missing that private message. The HM10 scanning mike is supplied as standard, but the HM11 with tone call on the mike can be used.

IC-2E, VHF/FM IC-4E UHF Portables

Nearly everybody has an IC2E – the most popular amateur transceiver in the world – there is also the 70 cm version which is every bit as good and takes the same accessories.

NEW! IC-120, 1296 MHz FM

Thinking of 1296? Then Icom IC-120 could be the answer.

Now you can have the sophistication of today's technology on this up and coming band-all built into a unit the same size as the IC-25E, very compact...

Features include:	Output Power = 1 W or more
Frequency coverage 1260 - 1300	Mode - FM
Adjustable Repeater Shift	2 VFO's
6 Memories - with scanning facility	Deviation + 5 KHz
Spurious Emissions - 40dB or better	RIT

8 W and 16W (Puma) Linear Amps available shortly.

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Software available for six computers
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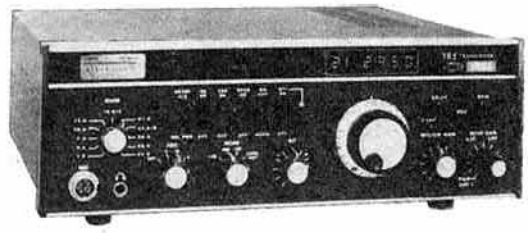
COLLINS KWM-380 Amateur Bands

Transceiver 1.8-30MHz
Receiver 1.8-30MHz
£2199.00

DRAKE TR7A

The Transceiver others try to copy
£1099.95

DRAKE TR5



DRAKE's low cost Transceiver
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BC-100FB **£345.00**
Hand held 16 channel programmable

NEW!
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40 Channels
AM/FM
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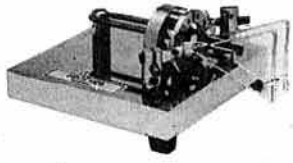
DRAKE R7A

General Coverage Receiver
£1069.50

BENCHER PADDLES

BY-1 Black Base	**£37.95**
BY-2 Chrome Base	**£48.30**
BY-3 Gold plated	**£92.00**
ZA-1A Balun	**£15.00**
ZA-2A Balun	**£17.25**
ZY-2 CW Audio Filter	**£57.50**



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YAESU – Latest...

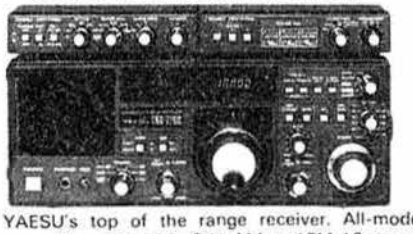
Latest news from YAESU - Expected in August is the new **FT-757GX** all-mode HF transceiver - 160 thru ten of course plus general coverage RX. FM and all options fitted including dual VFO's, eight memories, programmable memory scan, full break-in on CW, 100 watts PEP/DC output at 100% duty cycle and all this in a package measuring 238W x 93H x 238Dmm!

KEEP AHEAD WITH THE YAESU FT-102!

STOP PRESS

We are pleased to announce a new price breakthrough on this Superb Transceiver
—Phone or Write for details

FRG-7700 HIGH PERFORMANCE COMMUNICATIONS RECEIVER



YAESU's top of the range receiver. All-mode capability, USB, LSB, CW, AM *and* FM 12 memory channels with back-up. Digital quartz clock feature with timer. Pictured here with matching FRT-7700 Antenna tuner and FRV-7700 VHF converter.

FT-290R/790R 2m & 70cm PORTABLES

10 memories, 2 VFO's, LCD display, C size battery, easy car mounting tray, FT-290R 0.5 low/2.5 high watts out FT-790R 0.2 low/1.0 high watts out (incorporates speech compressor).

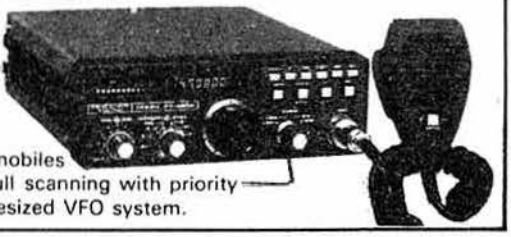
FT-230R/730R 2m & 70cm FM MOBILES

- Two independent VFO's
- 10 memories
- Priority function
- Memory and band scan
- 12.5/25KHz steps (25/100KHz FT-730R)
- Large LCD readout.

FT-780R/208R SYNTHESIZED UHF/VHF TRANSCEIVERS

- NC-7 - Standard charger
- NC-8 - Standard/quick charger/DC Power supply
- NC-9C - Compact charger (220-234V)
- PA-3 - Car adapter
- YM-24A - Speaker/microphone
- FL-2010 - 10 watt power amplifier for FT-208R
- FL-7010 - 10 watt power amplifier for FT-708R

FT-480R/780R 2m & 70cm MOBILES



The most advanced 2 metre and 70 cm mobiles available today — USB, LSB, FM, CW full scanning with priority channel, 4 memory channel, dual synthesized VFO system.

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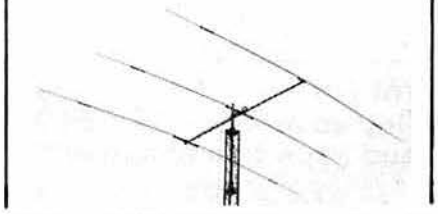

AX210N	10 ele. yagi for 2m crossed	74.95	(n/c)
HB10F2T	2 ele. 10m mono band beam	51.50	(n/c)
HB10F3T	3 ele. 10m mono band beam	74.95	(n/c)
HB15F2T	2 ele. 15m mono band beam	60.66	(n/c)
HB15F3T	3 ele. 15m mono band beam	93.46	(n/c)
HB15M2SP	VP mini size 15m 2 ele.	69.50	(n/c)
HB15M3SP	VP mini size 15m 3 ele.	102.30	(n/c)
HB34D	4 ele. tri band beam 10/15/20m	222.90	(n/c)
HB33SP	3 ele. tri band beam 10/15/20m	192.50	(n/c)
HB35C	Tri band array 10/15/20m	283.95	(n/c)
HB35T	5 ele. 10/15/20m	278.50	(n/c)
MV3BH	Vertical for 10/15/20m	37.99	(n/c)
MV4BH	Vertical for 10/15/20/40m	48.90	(n/c)
MV5BH	Vertical for 10/15/20/40/80m	63.95	(n/c)
MLA4	Loop antenna 10/15/40/80	105.60	(n/c)
SQ22	Phased 2 ele. swiss quad 2m	58.95	(n/c)
SQY06	6 ele. quagi 2m	45.75	(n/c)
SQY08	8 ele. quagi 2m	52.75	(n/c)
HB210S	10 ele. dual driven yagi 2m	47.99	(n/c)
TE214	14 ele. long yagi 2m	74.40	(n/c)
SSL720	9 x 2 ele. (18) slot fed 70cm	77.20	(n/c)
HB23SP	2 ele. tri band beam 10/15/20m	135.60	(n/c)
SSL218	9 x 2 ele. (18) slot fed 2m	144.79	(n/c)
TPH2	Phasing harness 2m	17.25	(n/c)
QYU10	10 ele. quagi 70cm	67.90	(n/c)
SQ007	70cm 2 ele. phased swiss quad	66.99	(n/c)
SQ10	Swiss quad 10m	97.50	(n/c)
SQ15	Swiss quad 15m	106.90	(n/c)
YAESU ANTENNAS			
Base			
RSL145GP	½ wave base ant. 2m	21.20	(1.50)
RSL435GP	½ wave co-linear 70cm	31.60	(1.50)
HF Mobile			
RSL3.5	3.5MHz resonator & whip	12.21	(0.50)
RSL7.0	7.0MHz resonator & whip	11.80	(0.50)
RSL14.0	14.0MHz resonator & whip	11.45	(0.50)
RSL21.0	21.0MHz resonator & whip	11.20	(0.50)
RSL28.0	28.0MHz resonator & whip	11.00	(0.50)
RSL2A	Mast to suit above	5.00	(0.50)
RSM2	Gutter mount/Feeder/PL259 suit above	10.94	(0.75)
VHF Mobile			
RSL145	2m ½ wave fibreglass whip	12.10	(0.50)
RSL145S	2m ½ wave steel whip foldover	9.25	(0.50)
RSL150SS	2m ¼ wave PL259 shock spring	3.90	(0.50)
RSM2	Gutter mount/Feeder/PL259 (RSL145)	10.94	(0.75)
RSM4M	Heavy duty mag/Feeder/PL259	13.25	(1.00)
UHF Mobile			
RSL453S	½ wave antenna	15.50	(0.50)
ANTIFERENCE ANTENNAS			
VHF Mobile			
TAP3009	½ wave 3db snap-in hinged whip	13.00	(3.00)
TAP3677	½ wave 3db snap-in shock coil	14.56	(3.00)
TAP3002	¼ wave unity gain snap-in hinged whip	9.96	(3.00)
UHF Mobile			
TAP3462	½ over ½ wave 3db	16.86	(3.00)
TAP3697	½ over ½ wave 5db	20.00	(3.00)
K220	Mag mount/Feeder to suit above	11.96	(2.00)

Simply phone or write and leave the rest to us

Antennas Various/Accessories			
HQ1	Mini beam 10/15/20m 2 ele. 1kW	139.00	(4.00)
C4	Vertical 10/15/20m	48.50	(3.00)
G4MH	Mini beam 10/15/20	88.00	(4.00)
KTLM-4	Gutter mount/Cable assy. SO239	6.90	(0.50)
DATONG PRODUCTS			
PC1	50KHz to 30MHz receive converter	137.42	(0.50)
VLF	Very low freq. converter	29.90	(0.50)
FL1	Frequency agile audio filter	79.35	(0.50)
FL2	Multimode audio filter	89.70	(0.50)
ASP/A	Auto RF speech clipper (YAESU)	82.80	(0.50)
ASP/B	Auto RF speech clipper (TRIO)	89.70	(0.50)
D75	Manual RF speech clipper	56.35	(0.50)
RFC/M	RF speech clipper module	29.90	(0.50)
D70	Morse tutor	56.35	(0.50)
AD270	Active dipole RX ant. (indoor)	47.15	(0.50)
AD370	Active dipole RX ant. (outdoor)	64.40	(0.50)
MK	Morse keyboard	137.42	(0.50)
DC144/28	2m converter	39.67	(0.50)
RFA	Broadband preamplifier	33.92	(0.50)
MPU	Mains power unit	6.90	(0.50)
MICROWAVE MODULES			
Transverters			
MMT28/144	10m transverter	109.95	(2.50)
MMT70/144	4m transverter	119.95	(2.50)
MMT432/144R	70cm transverter	184.00	(2.50)
MMT1296/144	23cm transverter	184.00	(3.00)
MMT70/28	4m transverter	119.95	(2.50)
MMT144/28	2m transverter	109.95	(2.50)
MMT432/28S	70cm transverter	159.95	(2.50)
Linear Amplifiers			
MML28/100S	10m 100W linear amp.	129.95	(3.00)
MML70/50S	4m 50W linear amp.	85.00	(2.50)
MML70/100S	4m 100W linear amp.	139.95	(3.00)
MML144/30LS	2m 30W linear amp. 1-3W in	69.95	(2.50)
MML144/50S	2m 50W linear amp.	85.00	(2.50)
MML144/100LS	2m 100W linear 1-3W in	159.95	(3.00)
MML144/100S	2m 100W linear 10W in	139.95	(3.00)
MML432/50	70cm 50W linear amp.	109.95	(3.00)
MML432/100	70cm 100W linear amp.	228.65	(4.00)
MML1296/10	23cm 10W linear amp.	199.00	(2.50)
MML432/30	70cm 30W linear amp. 1-3W in	99.00	(3.00)
Converters			
MM1000KB	ASC11 morse converter with keyboard	99.95	(3.00)
MM4001	RTTY to TV converter	189.00	(2.50)
MM4001KB	RTTY transceiver	269.00	(2.50)
MM4000KB	RTTY transceiver with keyboard	299.00	(4.00)
MMC28/144	10m to 2m converter	29.90	(1.00)
MMC50/28	6m to 10m converter	29.90	(1.00)
MMC70/28	4m to 10m converter	29.90	(1.00)
MMC70/28LO	4m to 10m with LO	32.90	(1.00)
MMC432/28S	70cm to 10m converter	37.90	(1.00)
MMC432/144S	70cm to 2m converter	37.90	(1.00)
MMC435/600	UHF ATV converter	27.90	(1.00)
MMC1296/28	23cm to 10m converter	34.90	(1.00)
MMC1296/144	1296MHz low noise converter	69.95	(1.00)
MMK1691/137.5	1691MHz meteosat converter	129.95	(2.50)
Morse Talkers			
MMS1	Morse tutor 2-20WPM Side tone	115.00	(2.50)
MMS2	Morse tutor (advanced) 6-32WPM + speak back	169.00	(2.50)
Amateur TV			
MTV435	70cm 20W (PSP) transmitter	149.00	(2.50)
MMC435/600	Converter ATV UHF output	27.90	(1.00)
Preamplifiers			
MMA144V	2m preamp RF switched	34.90	(1.00)
MMA28	10m preamp	16.95	(1.00)
MMA1296	23cm preamp	34.90	(1.00)
Frequency Counters			
MMD650/500	500MHz digital meter	75.00	(1.00)
MMD600P	600MHz pre scaler	29.90	(1.00)
MMDP-1	Probe	14.90	(0.50)
Filters			
MMF144	2m band pass 40W max.	11.90	(1.00)
MMF452	70cm band pass 40W max.	11.90	(1.00)
Various			
MMS384	384MHz signal source	29.90	(1.00)
MMR15/10	15db 10W attenuator	11.90	(1.00)
HI-MOUND MORSE KEYS			
HK702	Up down keyer marble base	24.50	(0.50)
HK704	Up down keyer	16.68	(0.50)
HK705	Up down keyer	12.50	(0.50)
HK706	Up down keyer	13.75	(0.50)
HK708	Up down keyer	11.96	(0.50)
HK808	Up down keyer marble base	39.57	(0.50)
MK704	Twin paddle keyer	10.95	(0.50)
MK705	Twin paddle keyer marble base	22.00	(0.50)
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IK	Iambic keyer	19.95	(0.50)

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HC150	HF ATU SWR/Power meter 200W PEP	62.50	(n/c)
HC2000	HF 2kW ATU SWR/Power meter 6 POS ant. switch. 6 to 1 vernier high Q coils 2kW peak 1kW continuous	276.55	(n/c)
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AW05	Pocket RF wattmeter 5W up to 500MHz BNC	19.75	(1.00)
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DRAE4	4 amp PSU	30.75	(2.00)
DRAE6	6 amp PSU	48.00	(2.50)
DRAE12	12 amp PSU	74.00	(3.00)
DRAE24	24 amp PSU	105.00	(4.00)
DRAE WM	135-450MHz wavemeter	27.50	(1.00)
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N8	"N" Male connector RG8	2.40	(0.25)
N308	"N" T adaptor (three female)	2.40	(0.25)
N307	"N" L adaptor (1 male 1 female)	2.40	(0.25)
N306	"N" Double female adaptor	1.90	(0.25)
N310	"N" Double male adaptor	2.50	(0.25)
NB304	"N" Female to BNC male adaptor	2.10	(0.25)
N402	"N" Plug to SO239	2.05	(0.25)
N403	"N" Socket to PL259	2.00	(0.25)
N404	"N" Socket to SO239	1.80	(0.25)
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HL160V	VHF linear preamp output meter 1-10W in 160W+ out	242.40	(n/c)
HL45U	UHF linear preamp 2-15W in 10-45W out	119.75	(n/c)
YAESU			
YH55	Headphones Low Z	10.00	(0.50)
YH77	Lightweight headphones Low Z	10.00	(0.50)

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YS2000		69.79	(n/c)
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FC902	All Band A.T.U.	135.00	(1.50)
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2 YEAR GUARANTEE

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FV012: —VFO, 10Hz steps and readout, scanning, QSY
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- ★ Plug in modular, computer style constructor.
- ★ Fully adjustable RF Speech processor.
- ★ Ergonomically designed with necessary LEDS.
- ★ Incredible range of matching accessories.
- ★ Universal power supply 110-234V AC and 12V DC.**

FREE FTV901R transvertor frame with every FT902. List £195.00

FT902DM £885 inc. VAT @ 15% & SECURICOR

*Option **D & DE Models

FT77

FREE CREDIT COVER

- ★ 80-10 metres including WARC allocations.
- ★ Multimode LSB-USB-CW (W) CW (N)* *and* FM.
- ★ 100W PEP output (IOW "S" version).
- ★ No tune design—inbuilt SWR meter.
- ★ Only 3¼ × 9¼" —Less than a foot deep!
- ★ Dual selectable pulse width noise blanker.

FT77	Transceiver 100W output	
FT77S	Transceiver 10W output	
MARK 7	Crystal Marker board	£9.60
FMU77	FM Unit	£25.30
XF8,9HC(N)	600Hz or 300Hz (N)	£26.05
FV707DM	Digital Memory VFO	£200.00
FC700	Antenna Tuner	£99.65
FP700	Mains P.S.U.	£110.00
FTV707	Transverter, frame only	£79.00

Modules: 432 £195.00 144 £109.65 70 £84.70

URGENT

Then use HOTLINE numbers

URGENT ORDERS	0703	867330
SERVICE ENQUIRIES	0703	861829
NORMAL CALLS	0703	867333

SMC SERVICE
Free Securicor delivery on major equipment.
Access and Barclaycard over the phone.
Biggest branch agent and dealer network.
Securicor 'B' Service contract at £4.49.
Biggest stockist of amateur equipment.

FREE FINANCE
On many regular priced items SMC offers.
Free Finance (on invoice balances over £120)
20% down and the balance over 6 months or
50% down and the balance over a year.
You pay no more than the cash price!

GUARANTEE
Importer warranty on Yaesu Musen products.
Ably staffed and equipped Service Department.
Daily contact with the Yaesu Musen factory.
Tens of thousands of spares and test equipment.
Twenty-five years of professional experience.

nmunications Ltd.

AUTHORISED YAESU

MAIN DISTRIBUTOR—FACTORY BACKED

FT707 £515 inc. VAT @ 15% & SECURICOR

FREE FTV707 transverter frame with every FT707 List £79.00

- ★ 80-10 metres (including 10, 18 and 24MHz bands).
- ★ USB-LSB-CWN-AM (Tx and Rx operation).
- ★ 100W PEP. 50% power output at 3:1 VSWR.
- ★ Full "broad band" no tune output stage.
- ★ Excellent Rx dynamic range, power transistor buffers.
- ★ Rx Schottky diode ring mixer module.
- ★ Local oscillator with ultra-low noise floor.
- ★ Variable IF bandwidth—16 crystal poles.
- ★ Bandwidths 6kHz*, 2.4kHz-300Hz, (600-350) Hz*.
- ★ AGC; slow-fast switchable VOX built-in.
- ★ Semi-break in with side tone for excellent CW.
- ★ Digital (100Hz) plus analogue frequency display.
- ★ LED Level meter reads: S, PO and ALC.
- ★ Indicators for: calibrator, fix, int/ext VFO.
- ★ Receiver offset tuning (RIT clarifier) control.
- ★ Advanced noise blanket with local loop AGC.

*Option

SMC FM MODIFIED VERSION AVAILABLE; £40 EXTRA

FT726R MULTIMODE £699 inc. VAT @ 15% & SECURICOR

- ★ 3 Bands 2 metres, 70cms* (10MHz) & 6M* plug-ins.
- ★ Full Duplex*! Cross band Tx & Rx simultaneously.
- ★ SSB-CW-FM! all optimumly catered for.
- ★ Variable bandwidth *and* IF shift! SSB & CW.
- ★ Processor! Front panel mic gain *and* drive.
- ★ Two main VFO's! A & B with 20Hz steps.
- ★ Separate channelised VFO! (for FM operation).
- ★ Scanning! Over the band *and* the 10 memories.
- ★ Repeater splits! Programmable *and* preset.
- ★ Instant reversal *and* + & − splits *and* A/B.
- ★ Twin meters; PO/DISC, S/ALC. Duplex switchable.
- ★ Switchable; AGC, CW bandwidth, dial lock.
- ★ Noise blanker, impulse interference tuned

		*Option
FT726R(2)	Transceiver c/w 144MHz	£699.00
430T726	430-440MHz module	£230.00
50T726	Six meter module	£170.00
SAT726	Full duplex unit	£90.00

AVAILABLE SOON HF MODULE FOR 21, 24, 28MHz

KDK2030 £199 inc. VAT @ 15% & SECURICOR

EXCEPTIONAL VALUE

- ★ 2M. 12VDC compact $2\frac{1}{8}" \times 6\frac{3}{8}" \times 7\frac{3}{16}"$.
- ★ 25W (+adjustable low power), $12\frac{1}{2}$kHz steps.
- ★ 10 "year long" memories for "crystal control".
- ★ Display reads to 100's of Hz *or* channel number.
- ★ Sensitivity $<0.2\mu V$ for 12dB SINAD (0.14μV typical).
- ★ Single knob frequency selection. 20 steps rev.
- ★ Rapid QSY button, end to end in a single turn.
- ★ Digital RIT 1kHz steps, adjusted from, main tuning.
- ★ 2, 5 slot memories, simplex, cross or 600kHz split.
- ★ Memories entered by pushing main tuning knob.
- ★ +600kHz split. Instant repeater input monitor.
- ★ Band scan between front panel selectable, limits.
- ★ Scan stop requires squelch open *and* centre zero.
- ★ Scanning and up/down tuning on the microphones.
- ★ Reprogrammable; steps, tone, splits, and coverage.
- ★ C/W mic. "Easy out" mobile mount and handbook.

RECEIVER WITH 12 MEMORIES: FRG7700M £399 inc. VAT @ 15% & SECURICOR

- ★ 30MHz down to 150kHz (and below).
- ★ 12 Channel memory option with fine tune.
- ★ SSB (LSB/USB), CW, AM, FM.
- ★ 2·7kHz, 6kHz, 12kHz, 15kHz @ −6dB.
- ★ 3 Selectivities on AM. Squelch on FM.
- ★ Up conversion, 48 MHz first IF.
- ★ 1kHz digital, plus analogue, display.
- ★ Inbuilt quartz clock/timer.
- ★ No preselector, auto selected LPF's.
- ★ Advanced noise blanker fitted.
- ★ Antenna 500Ω to 1·5MHz, 50Ω to 30MHz.
- ★ 20dB pad plus continuous attenuator.
- ★ Switchable A.G.C. Variable tone.

'7700 THE ONE WITH FM!'

NON-MEMORY VERSION £355

- ★ 110 and 240Vac, 12Vdc option.
- ★ Signal meter calibrated in "S" and SIMPO.
- ★ Acc; Tuners, Converters, LPF, Memory.
- ★ FRT7700; 150kHz-30MHz, Switch, etc.
- ★ FRV7700A; 118-130, 130-140, 140-150MHz
- ★ FRV7700B; 118-130, 140-150, 50-59MHz.
- ★ FRV7700C; 140-150, 150-160, 160-170MHz.
- ★ FRV7700D; 118-130, 140-150, 70-80MHz.
- ★ FRV7700E; 118-130, 140-150, 150-160MHz.
- ★ FRV7700F; 118-130, 150-160, 170-180MHz.
- ★ FF5; 500kHz (for improved VLF reception).
- ★ MEMGR7700; 12 Channels (internal fitting).
- ★ FRA7700; Active Antenna.

COMMUNICATION RECEIVER: NRD515

- ★ 30MHz to 100kHz or lower, 100Hz steps.
- ★ PLL digital VFO, stable (50Hz/hr AWU).
- ★ Backlash free, 500Hz analogue calib.
- ★ Fast tune up/down switch, dial lockout.
- ★ SSB (USB/LSB), CW, AM, RTTY.
- ★ 6 and 2.4kHz, 600* and 300* Hz @−6dB.
- ★ Passband tuning ±2kHz on SSB and CW.
- ★ Variable BFO on CW for preferred tone.
- ★ Modular plug in design with mother board.
- ★ Reliable—low power schottky & CMOS.
- ★ Designed for maximum ease of operation.
- ★ Noise blanker 0-10-20dB attenuator.
- ★ Small (140 × 340 × 300mm) light 7½Kg.

PROFESSIONAL MONITOR

- ★ Up conversion, 70.455MHz and 455kHz
- ★ No R.F. amplifier, balance U310 mixer
- ★ Crystal filter before first IF amplifier
- ★ Transceiver provisions; sidetone, trip etc.
- ★ Frequency data input/out port.

NHD518	96 (4 × 24) channel memory unit.
NCM515	Remote frequency keypad controller, LCD readout. 4 channel memory Up/down step tuning.
CQE515	Junction unit (NCM515 to NHD518).
NVA515	External 3W speaker.
CFL260	600Hz mechanical filter.
CFL230	300HZ crystal filter.

AUTHORISED YAESU

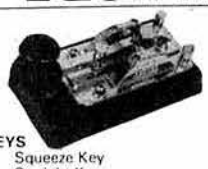
REMEMBER

Only authorised Yaesu dealers have direct contact with the factory in Japan, and only if you buy your radio from an authorised dealer can you be assured of spares and service back up. So **BEWARE** of grey importers who offer sets a few pounds cheaper, they may not be around if your set goes wrong!

BARCLAYCARD VISA

SOUTHAMPTON	GRIMSBY	STOKE	LEEDS	CHESTERFIELD	BUCKLEY	JERSEY	EDINBURGH
SMC Ltd.	SMC (Humberside)	SMC (Stoke)	SMC (Leeds),	SMC (Jack Tweedy) LTD.	SMC (T.M.P.),	SMC (Jersey)	SMC Scotcomm
36-38 Rumbridge Street,	247A Freeman Street,	76 High Street,	257 Otley Road,	102 High Street,	Unit 27 Perfold Workshops	1, Belmont Gardens	23 Morton Street
Totton, Southampton	Grimsby, Lincolnshire	Talke Pits, Stoke	Leeds 16, Yorkshire	New Whittington, Chesterfield	Perfold Lane, Buckley	St Helier, Jersey	EH15 2HN
Southampton (0703) 867333	**Grimsby (0472) 59388**	Kidsgrove (07816) 72644	Leeds (0532) 782326	Chesterfield (0246) 453340	**Buckley (0244) 549563**	**Jersey (0534) 77067**	031-657 2430
9-5.30 Mon-Sat	9.30-5.30 Mon-Sat	9-5.30 Tue-Sat	9-5.30 Mon-Sat	9-5.30 Tue-Sat	9.30-5.00 (Lunch 1-1.45) Tue-Sat	10-7 Mon-Sat	10-5 Tue-Fri (9-4 Sat)

MORSE EQUIPMENT



MORSE KEYS

BKU1	Squeeze Key	£30.30	£1.20
HK703	Straight Key	£25.70	£1.20
HK704	Straight Key	£17.65	£1.20
HK706	Straight Key	£14.60	£1.00
HK707	Straight Key	£13.75	£1.00
HK710	Straight Key	£36.40	£1.75
HK808	Straight Key	£45.60	£1.75
HK711	Key Mounting	£29.50	£1.50
BK100	Mechanical Bug	£22.25	£1.75
MK701	Single Lever Paddle	£25.25	£1.60
MK702	Single Lever Paddle	£26.45	£1.60
MK703	Squeeze Key	£25.95	£1.75
MK705	Squeeze Key	£22.60	£1.75
MK706	Squeeze Key	£19.50	£1.75
IKP60	Iambic	£9.95	FOC
SR1	Straight Key	£12.65	FOC

MORSE EQUIPMENT

KP100	Squeeze CMOS 230/13·8V	£69.00	£2.00
KP200	Memory 4096 Multi Ch Mem Back Up 230/13·8V	£155.25	£2.50
D70	Morse Tutor (Datong)	£56.35	FOC
MMS1	Morse Tutor (M/M)	£115.00	FOC
MMS2	Morse Tutor Advanced	£155.00	FOC

MICROWAVE MODULES – RTTY EQUIPMENT

MM2001	RTTY to Demod./Convertor	£189.00	FOC
MM4001	RTTY Transceiver		FOC
MM4001KB	RTTY Transceiver c/w keybd	£299.00	FOC
MM1000	ASCII to Morse Converter	£69.95	FOC
MM1000KB	ASCII CW conv c/w keybd	£89.00	FOC

PRICES INCLUDE VAT at 15%
Carriage as shown

JAYBEAM

4 METRES				
4Y/4M	Yagi 4 element	7dBd	£29.90	£2.20
PMH2/4M	Phasing harness 2 way		£16.10	£1.50
2 METRES				
H0/2M	Halo head only	0dBd	£5.98	£1.20
HM/2M	Halo with 24" mast	0dBd	£6.55	£1.50
C5/2M	Colinear omni vert	4·8dBd	£54.62	£2.50
LW5/2M	Yagi 5 element	7·8dBd	£14.37	£2.50
LW8/2M	Yagi 8 element	9·5dBd	£17.82	£2.50
LW10/2M	Yagi 10 element	10·5dBd	£24.15	£2.50
LW16/2M	Yagi 16 element	13·4dBd	£35.07	£3.20
14Y/2M	Yagi 14 element	12·8dBd	£36.23	£3.20
PBM10/2M	10 ele Parabeam	11·7dBd	£44.85	£3.20
PBM14/2M	14 ele Parabeam	13·7dBd	£55.77	£3.20
Q4/2M	Quad 4 element	9·4dBd	£29.32	£2.50
Q6/2M	Quad 6 element	10·9dBd	£39.10	£2.50
Q8/2M	Quad 8 element	11·9dBd	£44.85	£2.50
D5/2M	Yagi 5 over 5 slot	10dBd	£25.30	£2.50
D8/2M	Yagi 8 over 8 slot	11·1dBd	£34.50	£2.50
5XY/2M	Yagi 5 ele crossed	7·8dBd	£28.17	£2.50
8XY/2M	Yagi 8 ele crossed	9·5dBd	£35.65	£2.50
10XY/2M	Yagi 10 ele crossed	10·8dBd	£46.00	£2.50
PMH2/C	Harness cir polarisation		£9.77	£1.50
PMH2/2M	Harness 2 way 144MHz		£12.65	£1.50
PMH4/2M	Harness 4 way 144MHz		£28.75	£1.50
SEVENTY CM				
C8/70	Colinear Omni Vertical	6·1dBd	£62.10	£2.50
D8/70	Yagi 8 over 8 slot	12·3dBd	£25.87	£2.50
PBM18/70	18 ele Parabeam	13·5dBd	£32.20	£2.50
PBM24/70	24 ele Parabeam	15·1dBd	£42.55	£2.50
LW24/70	Yagi 24 element	14·8dBd	£27.02	£2.50
MBM28/70	28 ele Multibeam	11·5dBd	£21.27	£2.50
MBM48/70	48 ele Multibeam	14·0dBd	£35.65	£2.50
MBM88/70	88 ele Multibeam	16·3dBd	£48.87	£2.50
8XY/70	Yagi 8 ele crossed	10dBd	£42.55	£2.50
12XY/70	Yagi 12 ele crossed	12dBd	£52.90	£2.50
PMH2/70	Harness 2 way		£10.35	£1.50
PMH4/70	Harness 4 way		£22.42	£1.80
1296 MHz				
CR2/23CM	Corner reflector	13·5dBd	£40.25	£2.50
PMH2/23CM	Harness 2 way		£31.05	£1.50

NB: PRICES INCLUDE VAT AT 15%
Carriage extra, mainland rate shown

ANTENNA ACCESSORIES

2M ASCOT ANTENNAS MOBILE
(The keenest prices) p/p
Complete with bases and cable

340COM	¼ × Standard	£6.10	£1.50
310COM	¼ × Swival	£8.10	£1.50
344COM	¼ × Sprung	£10.38	£1.50
440COM	⅝ × Standard	£7.71	£1.50
330COM	⅝ × Swival	£10.00	£1.50
341COM	⅝ × Sprung	£12.31	£1.50
092	Magnetic Mount	£10.75	£1.50
350	½ × Standard	£14.26	£1.50
351	½ × Sprung	£15.01	£1.50
091	Magnetic Mt ½ ×	£10.75	£1.50

MASTS & TOWERS

TT24	79' Tower c/w rigging	£626.00	DIST
TT30	101' Tower c/w rigging	£730.00	DIST
SMC16	16' Portable c/w rigging	£21.28	£2.20
SMC24	24' Portable c/w rigging	£25.88	£2.20
SPK16	16' Light duty portable	£17.25	£2.20
10P30	30' Telesc. Versatower	£388.00	DIST
13P40	40' Telesc. Versatower	£436.00	DIST
13P60	60' Telesc. Versatower	£534.00	DIST
16P40	40' Telesc. Versatower	£650.00	DIST
16P60	60' Telesc. Versatower	£739.00	DIST

COAXIAL CABLE (per metre)

UR43	50 ohm 5mm	£0.27	£2.00
UR76	50 ohm 5mm Stranded core	£0.29	£2.00
UR67	50 ohm 10·2mm low loss	£0.67	£2.40
LDF2	50 ohm ⅜" Foam Heliax	£2.85	£2.50
LDF4	50 ohm ½" Foam Heliax	£3.58	£2.50
307EP	75 ohm Economy	£2.21	£2.00
UR70	75 ohm 6mm	£0.30	£2.00
UR39	75 ohm 7.8mm	£0.44	£2.40
UR57	75 ohm 10.2mm low loss	£0.69	£2.50
302	75 ohm Galv. twin	£0.17	£1.50
306	300 ohm Galv twin	£0.23	£1.50

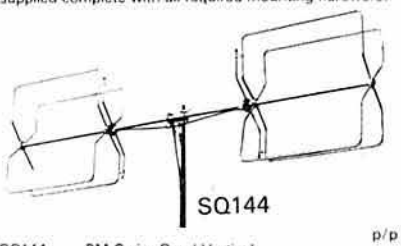
ANDREWS HELIAX CONNECTORS

L42W	'N' Plug male LDF2/50	£12.07	£0.65
L42N	'N' Jack female LDF2/50	£12.07	£0.65
L42P	UHF Plug (PL259) LDF2/50	£12.07	£0.65
L44W	'N' Plug male LDF4/50	£12.42	£0.65
L44N	'N' Jack female LDF4/50	£12.42	£0.65
L44P	UHF Plug (PL259) LDF4/50	£11.09	£0.65

SMC-HS

HF, VHF, UHF, BASE STATION ANTENNAS

SMC-HS range of base station antennas covers from 80M through to 70cm. All have S0239M connectors and are supplied complete with all required mounting hardware.



SQ144

		p/p	
SQ144	2M Swiss Quad Vertical Mounting	£57.60	£2.50
	2M ¼ c/w ground plane		
GP2M	3·4dB ↓	£18.00	£2.50
GP144W	2M 2 × ⅜ colinear 6·5dB ↓	£27.60	£2.50
GP23	2M 3 × ⅜ colinear 7·8dB ↓	£39.85	£2.50
GP432	70cm 3 × ⅜ colinear 6·8dB ↓	£29.90	£2.50
70N2V	2M/70cm colinear 2·8dB ↓/5·7dB ↓	£29.90	£2.50
HS770	2M/70cm Duplexer 50W 30dB isolation	£15.35	£1.50
VHFL	65-520MHz Discone Rx only	£15.70	£2.50
GDX1	80-480MHz Discone 3dB ↓	£40.25	£2.50
GDX2	50-480MHz Discone 3dB ↓	£49.45	£2.50
GDXA	100-480MHz Discone 3dB ↓	£33.75	£2.50
LT606	50-500MHz Log Periodic 7·8dB	£115.00	£2.50
HF5V	Trapped Vertical 10-80M 5 bands	£54.80	£2.50
HF5R	Loaded Radial Kit	£34.90	£2.50
3Y1015D20	3 ele 10, 15M Dipole 20M	£144.90	£5.00

NB: PRICES INCLUDE VAT AT 15%
Carriage extra, mainland rate shown

ROTATORS

The finest range: be it Kenpro, C.D.E., Channel Master, SMC, has over 19 models to choose from. Ask the experts for the right model to suit your requirements – it should save you money. Write, phone or call.

RLD3	Bell	5 Core	Light Duty	£40.25
505	Bell	5 Core	Light Duty	£40.25
AR30	Offset	5 Core	Light Duty	£56.35
KP250	Bell	6 Core	Lighter Duty	£54.91
9502B	Offset	3 Core	Lighter Duty	£56.92
AR22	Bell	4 Core	Medium Duty	£67.85
9508	Offset	3 Core	Medium Duty	£80.21
AR40	Bell	5 Core	Medium Duty	£90.85
BT1	Bell	5 Core	4 Preset medium	£91.43
KR400	Bell	6 Core	Matches KR500	£97.75
KR500	Thro	6 Core	Elevation	£112.12
AR50	Bell	5 Core	5 Position Medium	£113.85
KR400RC	Bell	6 Core	Medium Duty	£114.94
CD45	Bell	8 Core	Heavy Duty	£136.85
KR600RC	Bell	8 Core	Heavy Duty	£163.30
HAM IV	Bell	8 Core	Heavier Duty	£258.75
KR2000RC	Bell	8 Core	Heavier Duty	£314.52
T2X	Bell	8 Core	Very Heavy Duty	£327.75
H300	Bell	8 Core	Digital Readout	£493.35

Control Cable

RC4W	4 Way	28p/mtr	Carriage £1.80
RC5W	5 Way	33p/mtr	Carriage £1.80
RC6W	6 Way	51p/mtr	Carriage £1.80
RC8W	8 Way	55p/mtr	Carriage £1.80
9523	Support Bearing 9502	£15.81	Carriage £2.50
KC038	Lower Mast Clamp KR400 600	£12.07	Carriage £2.50

Prices including VAT and carriage, but carriage on accessories is extra unless sent with rotators

BARGAIN CORNER

CPU2500RK	FM25W Keyboard Mic Scanner 25kHz	£189.00
FT227RBst	FM10W Scanner 25kHz	£189.00
FT227RKS	FM10W Scanner 25kHz	£179.00
FTV107	Transvertor Frame only (grey)	£49.00
FV107	Remote VFO (grey)	£59.00
DMS107	Digital memory unit for FT107	£69.00
FT207R	FM2.5W Handheld keyboard, Scanner set	£149.00
FTV650B	Matching 6m transvertor FT101 'B 'E	£99.00
YK901	Keyboard	£89.00
AMO101Z	AM unit MK3 101Z	£10.00
DIGT225OSC225	Digital modification kit for FT225	£55.00
Mobil mount	FT 101 series to E, FR, FL101	£12.00
Mobil mount for	FTs 107, 901, 221, 225, 301, FRG7, 7000	£10.00
MMC70/4	Convertor 70MHz to 4MHz	£19.00
MC70/18	Convertor 70MHz to 18MHz	£19.00
MMC1296/28	Convertor 1296MHz to 28MHz	£25.00
MMC1296/144	Convertor 1296MHz to 144MHz	£25.00
MMC156/28	Convertor Marine band to 28MHz	£27.00
Bearcat 220	Scanning Receiver	£169.00

NB. PRICES INCLUDE VAT AT 15%
and carriage by post or Securicor

STOCK-CARRYING AGENTS WITH DEMONSTRATION FACILITIES

Stourbridge Andrew (038 43) 72632

Bangor John GI3KDR (0247) 55162
Tandragee Mervyn GI3WWY (0762) 840656

Neath John GW4FOI (0639) 52374 Day, (0639) 2942 Eve

HF ANTENNAS

SMC have the greatest range of HF antennas eg. Multi Beams/Quads, over 20 models. Shown below is the sensational new Explorer 14 – contact us for full details.

EX14

MULTIBAND BEAMS		Inc VAT	P&P
EX14	Explorer 10-20m	P.O.A.	
TH3JN	3 Ele 10-20m	£202.40	£3.50
TH2MK3	2 Ele 10-20m	£169.05	£3.50
TH3MK3	3 Ele 10-20m	£274.85	£5.30
TH5DXX	5 Ele 10-20m	£419.75	£6.70
TH7DXX	7 Ele 10-20m	£511.75	£8.75
TB3	3 Ele 10-20 Jaybeam	£181.70	£5.40
HQ1	Mini Quad 10-20	£139.00	£4.00
G4MH	Mini Beam 1-20	£82.50	£4.00
TA33JNR	3 Ele 10-20 Moseley	£161.00	£3.40
Mustang 2	2 Ele 10-20 Moseley	£177.10	£3.50
Mustang 3	3 Ele 10-20 Moseley	£220.80	£3.70
GQ2E	2 Ele 10-20 Quad	£189.75	£5.40
GQ3E	3 Ele 10-20 Quad	£313.95	£9.20
GQ4E	4 Ele 10-20 Quad	£446.20	£10.00
Hyquad	2 Ele 10-20	£171.35	£6.70
LP1007	Log Periodic 13-20 MHz	£1474.30	DIST
3Y1015D20	3 Ele 10-20m	£134.95	£5.00
DB10/15A	3 Ele 10-15m	£198.95	£4.80

TB3

MONO BAND BEAMS			
103BA	3 Ele Yagi 10m	£67.85	£3.50
105BA	5 Ele Yagi 10m	£155.25	£3.75
153BA	3 Ele Yagi 15m	£90.85	£3.50
155BA	5 Ele Yagi 15m	£236.90	£5.90
203BA	3 Ele Yagi 20m	£178.25	£4.90
204BA	4 Ele Yagi 20m	£286.35	£7.30
205BA	5 Ele Yagi 20m	£396.75	£9.40
402BA	2 Ele Yagi 40m	£247.25	£6.50
18TD	Dipole Tape 10-80m		

HF5V

HF5R

VERTICALS			
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14AVQ	Vertical 10-40m	£64.40	£2.75
18AVT/WB	Vertical 10-80m	£113.85	£2.75
18V	Vertical 10-80m taped	£36.22	£2.75
C4	Vertical 10-20m	£59.00	£2.50
SMCHF5	Vertical 10-80m	£54.80	£2.50
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TRAP DIPOLE			
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Extra coils	For above to 160m	£5.70	£1.00
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FS-500H

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FS50VP	50-150 MHz	20/200W	Pep	89.70
FS500H	1.8-60 MHz	20/200/2000V	Pep	69.75
FS500V	50-150 MHz	20/200W	Pep	69.75
FS300H	1.8-60 MHz	20/200/1000		46.40
FS300V	50-150 MHz	20/200		46.40
FS200	1.8-150 MHz	20/200	Pep	50.60
FS601M	1.8-30 MHz	20/200W	Pep	51.35
FS601MH	1.8-30 MHz	200/2000W	Pep	51.35
FS602M	50-150 MHz	20/200W	Pep	51.35
FS603M	430-440 MHz	5/20W	Pep	51.35
FS210	1.8-150 MHz	20/200W	Auto SWR	55.20
FS301M	2-30 MHz	20/200W		35.65
FS301MH	2-30 MHz	200/2000W		35.65
FS302M	50-150 MHz	20/200W		35.65
FS711H	2-30 MHz	20/200W	Head	36.80
FS711V	50-150 MHz	20/200W	Head	36.80
FS711U	430-440 MHz	5/20W	Head	36.80
HB1	FS711H Coupler			23.75
VB1	FS711V Coupler			23.75
UB1	FS711U Coupler			23.75
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FS5S	1.8-150 MHz	20/200/1000W	HF	37.95
FS7	145 & (432 MHz)	5/20/200	144	41.00
SWR3E	3.5-150 MHz	20/200/1000W	HF	25.00
SWR3S	3.5-150 MHz	F/S Meter ant.		26.45
SWR50B	3.5-150 MHz	Twin Meter		26.45
FS20D	3-150 MHz	5/20W		37.95
FS-800	1.8-150 MHz	6/30/150W		115.00
JD				
JD110	1.5-150 MHz	10/100W		13.80
MIRAGE				
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T3-170L

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SMC 78F

GCD

SMC258

GCD

	SMC-HS MOBILE ANTENNAS	£	P&P
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SMC6P2T/BNC	Telescopic 2M BNC fitting 0dB¼	5.00	0.60
SMC2H/PL	Helical 2M PL259 fitting	3.45	0.60
SMC2H/BNC	Helical 2M BNC fitting	5.00	0.60
SMCHS430	70cm ½ wave BNC fitting 2.5dB¼	6.90	0.60
SMC2QW	2M ¼ wave 0dB¼ 1.6'	2.30	1.50
SMC2NE	2M ⅝ wave fold 3.0dB¼ 4.3'	6.90	1.80
SMC2VF	2M ⅝ wave fold 3.0dB¼ 3.5'	11.50	1.80
SMC78F	2M ⅞ wave fold 4.5dB¼ 5.7'	13.80	2.00
SMC78B	2M ⅞ wave ball 4.5dB¼ 5.6'	13.80	2.00
SMC78SF	2M ⅞ wave short 4.7'	13.80	2.00
SMC88F	2M 8/8 wave 5.2dB¼ 6.5'	18.80	2.00
SMC118M	Colinear 2M 11/8 wave fold 7dB¼ 9.7'	29.90	2.50
SMC25B	70cm 2 × ⅝ fold 5.5dB¼ 3.1'	12.65	1.80
SMC358	70cm 3 × ⅝ 6.3dB¼ 4.7'	16.85	1.80
SMC70N2M	Dual band 2M 2.7dB¼ 70cm 5.1dB¼	16.85	1.80
SMCHS770	144/432 Duplexer 50W	15.35	1.50
SMC20SE	20M 1.72M 'fold over' 100W PEP	17.65	2.00
SMC15SE	15M 1.72M 'fold over' 130W PEP	14.55	2.00
SMC10SE	10M 1.72M 'fold over' 200W PEP	13.80	2.00
SMC17SE	17M 1.915M 'fold over' 200W PEP	15.70	2.00
SMC12SE	12M 1.915M 'fold over' 200W PEP	14.20	2.00
SMCGCCA	Gutter clip 4 mtrs cable	9.95	1.80
SMCSOCA	Cable assembly 4M	5.00	1.20
SMCSOCAL	Cable assembly 6M	5.35	1.20
SMCTMCAS	Trunk mount c/w 6M cable	8.45	1.80
SMCSOMM	Magnetic base c/w 4M cable	9.95	1.80
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HS770

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Input Modes	SSB, FM, AM, CW				
Input Requirements	10 Watts with standard attenuator-MMR 15/10 (3 Watts with alternative attenuator—MMR7/3				
Output Power	10 Watts	10 Watts	10 Watts	10 Watts	2 Watts
Conversion Principle	SINGLE	DOUBLE	DOUBLE	DOUBLE	SINGLE
Receive Gain	15 dB				
Receive N.F.	2.0 dB max.	2.0 dB max.	3.0 dB max.	3.0 dB max.	1.2 dB max.
Input & Output Impedance	50 ohm				
RF Connectors	SO239	SO239	SO239/BNC/N	SO239/BNC/N	SO239/BNC/N
Power Requirements	13.8V at 2.1A	13.8V at 2.1A	13.8 V at 2.1A	13.8V at 2.1A	13.8V at 0.5A

MMT 432/144-R

MMT 1296/144

TRANSVERTERS FOR 10 METRE TRANSCEIVERS

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Input Modes	SSB, FM, AM, CW		
Input Requirements	5-500 mW (Continuously Variable)		
Output Power	10 Watts	10 Watts	10 Watts
Conversion Principle	SINGLE	SINGLE	SINGLE
Receive Gain	30 dB		
Receive N.F.	2.0 dB max.	2.5 dB max.	3.0 dB max.
Input/Output Impedance	50 ohm		
RF Connectors	SO239	SO239	SO239/BNC/N
Power Requirements	13.8V at 2.1A	13.8V at 2.1A	13.8V at 2.1A

MMT 144/28

MMT 432/28-S

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RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY REPRESENTING ALL UK RADIO AMATEURS

Founded 1913 Incorporated 1926 Limited by guarantee A member society of the International Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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.

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UK corporate member: £14.50 **Associate member under 18: £5.80** **Family member: £5.80** **Overseas member: £14.50**
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Affiliated societies: £14.50 (including *Radio Communication*) **£8.70** (excluding *Radio Communication*)
(Subscriptions include VAT where applicable)

RSGB QSL BUREAU

QSL cards for distribution should be sent to: **Mr E. G. Allen, G3DRN, QSL Bureau manager, 30 Bodnant Gardens, London SW20 0UD**

A list of QSL Bureau sub-managers was published in the January 1983 issue of *Radio Communication*, and amendments are published under "Amateur Radio News".

RSGB NEWS SERVICES

Headline News
Telephone 0707 (77 from London) 59312 for a recording of the latest amateur radio news.

GB2RS Broadcasts
Sunday news broadcasts from stations throughout the UK using the callsign GB2RS on frequencies in the 3·5, 7 and 144MHz bands.

Details of frequencies, locations and times were last published in the June 1983 issue.

Amendments are published under "Amateur Radio News". A full schedule can be obtained free on request by sending a large sae to the Membership Services Dept, RSGB HQ.

EDITORIAL

The Cost of Amateur Radio—Part 2

Last month's editorial referred to the cost of amateur radio in terms of both the increased fee for the amateur radio licence and also the cost of amateur equipment. No sooner was the ink dry than more information appeared on both topics.

We understand from the Department of Trade & Industry that all record-keeping of the Radio Regulatory Department will be taken over by the Post Office at its offices in Chesterfield in the autumn of this year. This will include all new applications, renewals and changes of licence and address, as well as reciprocal licensing. At first, these will be dealt with manually, as at present. However, by the spring of 1984 it is expected that the records will be fully computerized, with applications being processed within 5 to 10 days.

This news is welcomed for the several reasons given last month, especially in advancing the possibility of a more satisfactory licence document. From the Society's own extensive experience with computer records, we hope that the RRD will insist on having direct access to the system; and that the lessons of the Swansea computer have been absorbed.

Last month we used the off-the-top-of-the-head figure of £1,000 as an example of what some amateurs might spend on their equipment. Since then there has been enough time to find out what they actually *do* spend. As will be remembered, members were asked in a survey taken a little while ago to place a value on both their commercial equipment, and also on their home-constructed equipment in terms of equivalent commercial equipment. The results obtained from a sample show that, as would be expected, some people place a zero value on their commercial equipment and a high value on their home-constructed equipment, and vice-versa. The majority, however, obviously had spent a fair proportion on both.

More specifically, Class A licensees valued their home-constructed equipment from zero to £8,000, with the average being £278, while their commercial equipment was valued as up to £10,000, with the average being £1,055. The corresponding figures for Class B licensees averaged £230 and £790. The swls in the sample valued their home-constructed equipment up to £1,000, with the average as £146, and their commercial equipment up to £6,000 with the average as £714. We obviously have some very enthusiastic listeners.

The question still remains: with this sort of expenditure by the average amateur on equipment, is the £12 fee for our licence or £14.50 for the RSGB membership fee, or similar subscription rates for other amateur radio magazines, really a very high proportion of an individual's total expenditure on amateur radio? Clearly there could be a lot more that could be said in this area. Perhaps we should consider having a financial column in *Radio Communication!*

D.A.E.

Amateur Radio News

Licensing news

The Radio Regulatory Department plans to phase out all existing G5-plus-three-letter reciprocal callsigns by 1 January 1984—they will be replaced at the next renewal date with a normal UK Class A or B callsign. There are, in fact, no less than three types of reciprocal licences, both Class A and Class B. The first is a "mobile" licence, which is valid for two months and which is not associated with a fixed station address; the second is a "temporary" licence, which is valid for any period up to one year and which requires a fixed station address, and the third is a "permanent" licence. This is renewable on an annual basis and also requires a fixed station address.

All non-resident Class A applicants (ie those who qualify for either the first or the second type of licence) will be issued with a G4 prefix which will be followed by the licensee's home callsign. For example, if DJ5JN visits the UK he will be issued with either a "mobile" or a "temporary" licence and he will sign G4/DJ5JN. When the G4 prefixes are replaced by G0 later this year or early next year, that prefix would be used instead. The same applies to a non-resident who holds the equivalent of a Class B licence in his home country: he would use the prefix G6 (or, later on, G1) followed by his usual callsign.

Applicants who are resident in the UK on a permanent basis would be issued with a licence of the third type (a "permanent" licence), which is a standard UK Class A or B, as applicable. Hence G5BOR, for example, will become a G4-(or G0)-plus-three-callsign by 1 January, and G5MDF would become a G6 or G1 callsign in the same way.

As far as QSL arrangements are concerned, there is no change to the existing arrangement. The sub-manager for the G5 series is G4CMM, and she will remain in charge of the new-style callsigns—so a holder of one of the types of UK reciprocal licence mentioned above who wishes to use the RSGB bureau to receive his QSL cards should lodge envelopes with G4CMM in the usual way.

On a related topic, the effective cut-off date for any reciprocal agreement between the UK and Rhodesia/Zimbabwe has now been deemed to be 13 January 1983. However, the Department of Trade & Industry is continuing to negotiate in order to attempt to resume the reciprocal agreement. In the meantime, Zimbabwean holders of amateur licences may obtain a UK licence until 11 January 1984, a one-year grace period having been allowed by the Radio Regulatory Department.

The Belgian saga

As is well known by now, radio amateurs in Belgium are threatened with the loss of some of their uhf and shf bands: the story has been related on GB2RS and in the Headline News in recent weeks, and has been watched with alarm by amateurs in the UK. The background to the affair is that on 24 June officials of UBA, the Belgian national society, were called to a meeting at the Belgian PTT: at this meeting, it was announced that changes to the Belgian licence schedule would be introduced with effect from 15 July. First, power limits on the 144 and 430MHz band would be reduced to 30W output (not erp). Second, the bottom 4MHz of the 430MHz band (indeed, possibly the bottom 5MHz) would be lost to the amateur service, leaving a rump of 434MHz or 435MHz to 440MHz. As we go to press, the precise details of what exactly would be withdrawn are not yet clear—whatever the outcome, however, all normal working into other countries from Belgium would cease on this band and normal television transmissions would also become impossible.

Third, the 1·3, 2·3 and 5·6GHz bands would be withdrawn in their entirety, apparently as a means of ". . .protecting other services". Also, the power limit on all bands above and including 10GHz would be reduced to 100mW: here again, this refers to the output from the transmitter, not the erp.

The other measure to be introduced, apparently as a result of pressure from cb groups in Belgium, is a "novice licence". With minimal technical qualifications, apparently a very simple questionnaire of a semi-technical nature, this licence would allow the use of 15W of fm anywhere within the 144–146MHz band. It is understood that, following vociferous protests from both UBA and other national societies, this proposal is now to be amended to allow use only of 145–145·8MHz.

To say that these proposals came as a surprise to Belgian amateurs and the UBA would be a considerable understatement. No consultation took place, and the timescale of the proposals meant that co-ordinated reaction was extremely difficult, bearing in mind that the proposals were not announced until 24 June and were planned to take effect from 15 July. UBA's reaction was to make the entire matter a political issue, and a campaign to lobby leading politicians and to make the Belgian media aware of what was taking place began very quickly. Their main line of argument was that the amateur service in Belgium had shared primary status in these bands and that Belgium was a signatory to the provisions of the 1979 World Administrative Radio Conference. As we closed for press, it would appear that UBA has been delaying the implementation of these changes, by perhaps a few weeks: however, the final outcome does not seem a matter for optimism. It is to be hoped that the Belgian PTT bows to pressure from the government —which appears to be sympathetic to the Belgian amateur's cause—and revokes the proposals.

The inevitable question is "could it happen here?". To say the least, the Society is surprised and concerned by this new manifestation of a rising trend on the part of national licensing administrations to ignore the provisions of the Radio Regulations whenever they see fit. The member countries of the International Telecommunications Union go to immense lengths to produce these regulations, but it is a fact, however, that individual administrations have the right to make whatever local arrangements they wish. This cuts both ways: there is no provision for a 70MHz amateur band in the UK in the regulations and neither do they mention experimental research permits in the 50MHz band.

However, the negative side of this is that, as in the Belgian case, administrations can and do make changes which affect large numbers of amateurs, without consultation and with what seems to be a poor quality of technical decision making. It would seem, furthermore, that some administrations are increasingly reluctant to involve the radio amateur—whose technical competence is well established—in the decision-making process itself, and this is seen very much by the Society as retrograde progress. Amateurs in all countries have a significant investment in equipment for use in all frequency bands allocated to the amateur and amateur satellite services, and it would not seem unreasonable for administrations to consult with the amateur service before making sweeping changes.

Having said that, the Society is not aware of any facts which would suggest that the experience of Belgian amateurs is likely to be immediately repeated either in other European countries or indeed in the UK. It does seem that what has taken place in Belgium is an internal affair as opposed to the thin end of a European wedge, but nevertheless the Society remains extremely concerned by its implications.

Shuttle mobile

The six-day flight of STS9, otherwise known as the Space Shuttle *Columbia*, is now expected to begin on 28 October. It will be carrying Dr Owen Garriott, W5LFL, who will be the first amateur in space to operate in the amateur bands—he will take with him his special 144MHz fm "handi-talkie", which will undoubtedly have the greatest range ever of such a device. As mentioned last month, W5LFL will only be able to operate for one hour per day during the mission—as yet we do not have precise details of operational times but we hope to be able to broadcast these over GB2RS in the course of this month.

Provisional information suggests that W5LFL will transmit continuously for one minute beginning on the even minutes and will be receiving for one minute beginning on the odd minutes: so if you wish to work him, be sure to check the accuracy of your shack timepiece. What will happen is that

during Dr Garriott's "receive" periods, stations on Earth should send their callsigns only—repeating them several times during the minute. During the next minute, ie W5LFL's "transmit" period, he will simply acknowledge all the callsigns heard and this will constitute a two-way contact. The maximum communications time, assuming that the shuttle passes directly overhead, will be approximately 8min. Good operating will be vital in order that as many people as possible can make contact.

For those who wish to track the shuttle, the STS9 intended orbital parameters are: period 90min, altitude 155 nautical miles (250km), inclination 57°, and the increment between each orbit along the Equator is 22°. We hope to bring details of the launch and reference orbits to you by means of GB2RS if there is time, or the Headline News Service on Potters Bar (0707) 59312.

NCDXF beacon established at Helsinki University. L to r: Axel Tigerstedt, OH5NW; Kauko Rahko, OH2PZ; Arto Horjula, OH6GH; and Martii Laine, OH2BH

Next year's President

The Society is pleased to announce that the 1984 President will be Mr R. G. Barrett, GW8HEZ.

"Bob" Barrett has been interested in amateur radio from an early age and was licensed in 1972. He was deputy regional representative in Region 10 from 1974 to 1975 and regional representative for the same region from 1975 to 1979. He then took the office of zonal manager for Wales from 1980 to 1983 and is currently executive vice-president, chairman of the Membership & Representation Committee, vice-Chairman of the Finance & Staff Committee, and a member of the Licensing Advisory Committee and the Forward Planning Group.

When not involved in amateur radio, he is head of production in a video facilities company: he was with the BBC for some 18 years in the television and film areas, travelling abroad a good deal. GW8HEZ is also an active participant in local Raynet activities and is a founder member of his local repeater group, looking after GB3BC. His other chief hobby is sailing small dinghies.

It gives the Society particular pleasure to have a Class B licensee as next year's President for the first time, and at just over 40 years of age Bob Barrett is one of the youngest people to assume the Society's highest office.

New Finnish beacon

As a part of national events associated with World Communications Year 1983, a worldwide beacon network using eight beacons transmitting in sequence every 10min and using variable power levels (first mentioned on GB2RS some months ago) has been established on 14,100kHz and is working well. The North European link in this chain, which has been established by the North California DX Foundation, is OH2B: this beacon is located at the Helsinki University of Technology and was officially inaugurated in March 1983. The beacon is based on a Trio TS130S and keyer/control unit supplied by the foundation. (See also map on front cover of this issue.)

JOTA '83

The Scout Jamboree on the Air this year takes place over the weekend of 15/16 October. Members wishing to put on a special event station with a GB callsign should apply to Miss Janet Attfield at RSGB HQ.

Many applications are expected this year and it will be much appreciated if applications could be sent in early. The closing date for completed forms is Tuesday 13 September, and it is regretted that applications arriving after this date will not be considered.

Reciprocal licensing in Spain

The subject of reciprocal licensing agreements with Spain has cropped up several times within these pages, and it was stated recently that the only facility which existed was for UK licensees to obtain a visitor's licence for a short-term stay. This was not a reciprocal licence, insofar as a Spanish visitor to Britain could not obtain a licence of any kind. The Society's enquiries of the Spanish licensing administration brought no reply, and neither did enquiries by the Radio Regulatory Department. However, we are glad to be able to report that a normal reciprocal agreement covering Class A and B licensees is now in force. Details will be added to the computer data base as soon as they have been received from RRD, and they can be obtained free of charge by members, in the same way as other reciprocal licensing information, from the Membership Services Department on receipt of a letter or by telephone.

Radio afloat

Many amateurs like to take to the water during summer months and enjoy a certain amount of operating, particularly on 144MHz. It is perfectly permissible to operate mobile (not maritime mobile) from a boat in non-tidal waters in the UK: however, for operation in rivers and at sea, ie in tidal waters, a separate maritime mobile licence is required. This licence is issued by the RRD for operation from a specific vessel and is not transferable to any other vessel without written permission.

The maritime mobile licence, although using the same callsign as the home station, is a separate licence for which a further fee must be paid, and it specifically requires the use of suffixes. These are /MM for maritime mobile, ie when the vessel is under way, and /MA when the vessel is at anchor or tied to a mooring or jetty. It should be stressed that operation /MM is *not* simply an extension of a normal licence in the same way that operation /A or /P is, for example.

The Society has been asked about the legal position concerning operation /MM within the territorial areas of another country. Broadly speaking, the answer is that such operation is quite legal, in accordance with paragraph 2(f) of the licence: this states that "if the station is used within the territorial limits of any country other than the UK, such use shall be in accordance with any regulations which may have been made by the administration of such other country". In effect, this means that the licensee should acquaint himself with the regulations of the country he wishes to visit and, if he may only operate under a licence issued by that country's administration, he will be required to obtain one. It may be that, as in the UK, such a licence is not issued, in which case the licensee must establish which frequencies are locally assigned for /MM use.

Call Book changes

The 1984 edition of the *RSGB Amateur Radio Call Book* will break with tradition somewhat: in previous years the *Call Book* has been published each autumn at the same time as the ARRA Leicester exhibition, but the next edition will appear early in 1984. This is to allow the callsigns which are issued as a result of the May RAE to be included, and hence to make the effective life of the *Call Book* somewhat longer. The exact publication date has not yet been fixed, but it is likely to be late January or early February.

Headquarters is often asked about the viability of producing a supplement to the *Call Book* at some time within the year.

Various approaches to improving the

currency of this publication are presently being considered, and it may be that the 1985 edition will be produced in a different way.

In the Commons

Sir Patrick Wall MP asked the Secretary of State for Trade & Industry, Mr Alexander Fletcher, how many cb licences had been issued. Mr Fletcher replied that about 453,000 licences had been issued since the legalisation of cb in November 1981 and about 286,000 were valid at the end of May 1983. Sir Patrick Wall also asked what progress was being made towards a common cb frequency allocation in Europe: Mr Fletcher replied that CEPT were due to consider a draft revised recommendation for 27MHz cb radio in Europe at a meeting in September 1983. If accepted, it would be for individual countries to decide whether to implement it. He added that the UK's objective was to adopt the CEPT recommendations in due course, and discussions with radio users were taking place to determine how the recommendation might be applied.

On 8 July 1983, Mr Barron, MP for Rother Valley, asked the Secretary of State for Trade & Industry when he expected to introduce a novice amateur radio licence. Mr Alexander Fletcher said that there were no plans at present to introduce such a licence.

Mr Barron also asked the Secretary of State for Trade & Industry on 19 July why he has decided not to introduce a novice amateur radio licence at present. Mr Alexander Fletcher replied that radio amateurs were required to achieve a minimum standard of proficiency, and there was a risk that introducing a lower standard for novices would cause interference to other services. Moreover, it would involve additional administrative burdens which could not be undertaken before the amateur licensing process had been fully computerized.

In principle the RSGB supports the concept of novice licences, and has looked at how they work in the few countries which have them. Novice licences are supposedly a means of introducing people to the hobby: they appear to have worked well in those countries where they are the first rung on the ladder of an incentive licensing system, but in other countries they are seen as a factor in lowering standards. The proposed novice licence in Belgium, reported earlier, is a classic example of the latter. It is apparently unwanted by the genuine radio amateur: it has been engendered by cb operators seeking access to amateur frequencies without the appropriate qualifications.

The question of a novice licence in the UK has been raised on many occasions in the past decade or so, but it has never been implemented due to what would appear to be little or no demand. During the last few years there has been little evidence to support the notion of a UK novice licence: the introduction of cb may have changed this situation, but the Society would not wish to fall into the trap of being responsible for the introduction of any form of amateur licence which would lower standards without providing the incentive to progress.

In practical terms, the Radio Regulatory Department has stated that it would be unable to consider any additional form of licensing in the UK until all amateur licensing records are fully computerized. When this happens, the Society will reconsider both the apparent advantages and the disadvantages of some form of novice licence in the UK, and will make appropriate representations to the RRD.

Mentioning the House of Commons reminds us that with the transfer of the Radio Regulatory Department to the Department of Trade & Industry, the new Minister of State responsible is Mr Cecil Parkinson. It just so happens that his constituency covers Potters Bar—could be useful. . .!

GB3RS update

Various things have been happening at the Society's headquarters station GB3RS, which is frequently to be heard on the receiving end of a large pile-up on about 7,055kHz at lunchtimes. An Amtor facility is now available, based on an ICS terminal and a BBC model B computer, and the licensed staff are just beginning to get to grips with this exciting mode. The antennas presently available are a trap dipole for the hf bands, an eight-element Yagi for 144MHz and a 19-element Yagi for 430MHz—however, equipment for the latter band has not yet been completed. A distributed amplifier for the hf bands is under construction, and also a W1SL variant for 144MHz. Visitors to headquarters may have noticed what looked suspiciously like a couple of Band 1 broadcast transmitters in the reception area—which is precisely what they are! The Society has been fortunate enough to acquire two Marconi BD376A units, which until recently were in use at BBC transmitter sites: these will be restored as part of the headquarters station and used in amateur bands. Originally these units produced 100W of sound and vision from a pair of 4CX250B valves.

Readers will remember our recent appeal for oil-filled paper capacitors for use with high-voltage supplies. The ARRL informed us recently that they had some problems with some of theirs—a string of electrolytic filter capacitors exploded and caught fire at W1AW on the night of 14 June, putting their 3·5, 7 and 14MHz signals off the air. In fact, it seems to be a bad time of year for reactive components: one of the 50MHz permit holders, Brian Bower, G3COJ, was about to call a Canadian station on that band when his power supply smoothing capacitor exploded. He did not manage to complete the contact. Equally, a high-voltage transformer which was being tested for use with one of the amplifiers mentioned above decided to develop an open-circuit primary winding for no apparent reason.

Some capacitors have now been found for GB3RS, thanks to Hivolt Capacitors of Londonderry, Northern Ireland, and it is hoped that the problems which beset the ARRL and G3COJ will not arise at Potters Bar. GB3RS does, in fact, change its callsign for a couple of hours around lunchtime on Fridays: this commenced in early August. It becomes GB3WCY, in connection with World Communications Year.

Amateur radio can damage your health

There would appear to be a potentially serious health hazard present in many amateur shacks. Some high-voltage transformers, large dummy loads and "oil"-filled capacitors contain derivatives of a group of substances known as polychlorinated biphenyls: fluids of this type were used in manufacture as recently as the late 'seventies. However, it has been shown that these substances have been linked to various types of cancer—notably cancer of the liver—and their use is now prohibited by law in the USA. They are usually colourless liquids and are harmless so long as the container remains securely sealed. However, any spillage is likely to be hazardous, and fumes from a warm dummy load could also be injurious to health according to a recent American report. Under no circumstances should these fluids be disposed of by tipping them down the drain, and if members have reason to believe that any components are leaking or liable to leakage, they are advised to contact their local area health authority. Alternatively, the

local fire station might be able to help, since the fire service holds details of potentially hazardous materials and their disposal.

IARU Region 2 conference

Twenty-three countries in Region 2 were represented at the triennial Region 2 conference in Cali, Colombia. Five working groups tackled a wide range of subjects: one straw in the wind is that the "Maidenhead" vhf locator system was introduced in Region 2. Band plans for 50-54MHz and 1,215-1,300MHz were approved. Other resolutions of the conference were to condemn the attack on the West German dxpedition to Spratly, to make efforts to promote reciprocal licensing, and to support World Communications Year 1983. Congratulations were extended to W5LFL, ARRL and AMSAT for obtaining NASA's permission to allow the first amateur radio operation in space.

Can you help?

Geoff Roberts, G3ENY, QTHR, has a problem with an "intruder alarm" at a house about 100 yards away. The outward sign is a red box over the porch marked in large black letters "A1". "T5" would have been more appropriate, because it radiates a signal of this tone every 32·8kHz throughout the range 50-145MHz.

He has written to the makers, A1 Security Services Ltd of Harrow, about it but has had no reply. Have any readers knowledge or experience of this device? If so, G3ENY would be pleased to hear from them.

Relaunch of 2MT

The relaunch of the historic callsign 2MT, referred to here in the July and August issues, took place on 2 July when the Marconi Radio Society went on the air with the special callsign G2MT. Over 50 club members, company and vip guests gathered at the Marconi Space & Defence System's Stanmore headquarters to witness the start of a weekend during which the callsign was used to contact more than 150 radio amateurs around the world.

Covenants

The Society is sometimes asked whether restrictive convenants, such as those which prohibit the erection of antennas, have any legal force. The question of enforceability of covenants is a wide one, but in general terms there is a distinction between freehold and leasehold property. In the case of leaseholds, the position is that it is up to the individual to negotiate with the landlord or any other contracting parties, but in general terms there is no provision for removing what might appear to be onerous restrictions. English law takes the view that if you do not like what you are offered, you should not take it!

In the case of freehold property, restrictive covenants are binding on purchasers provided that certain formalities have been observed. There is a provision to apply to the Lands Tribunal to discharge restrictive covenants but this is only allowed under certain circumstances—for example, that the covenant has become obsolete owing to changes in the neighbourhood or that persons entitled to the benefits of the covenant will not be injured by the proposed discharge or modification.

Cordless telephones

Some months ago members were asked to pass any information on cordless telephones operating illegally in amateur bands to G. Kimbell, G3TCT. A report on the situation has now been produced, and some of the main conclusions are summarized here.

Cordless telephones consist of a base unit connected to the subscriber's telephone, and a remote unit which may be hand-portable or used mobile. Full duplex transmit and receive and numeric keypad control are commonly used. In almost all cases the transmissions are crystal controlled and utilize fm.

The most common frequencies in use appear to be in the bands 1·6-2MHz and 49·6-49·9MHz for the base units and 49·7-49·9MHz and 70-70·5MHz for the remote units. By comparison, the recently legalized units operate on 1·632-1·792MHz and 47·45-47·554MHz.

It will be seen that the illegal units operate in two amateur bands, and powers of anything between 100mW for simple handheld units and 50-100W for some car mobile units have been reported. Certainly in London and the South-East, the problem is reaching quite serious proportions. It is estimated that about one home in 1,000 has an illegal cordless telephone, which would suggest about 10,000 units in the area as a whole.

It would seem that official action against the problem has been subject to the same difficulties as in other areas of illicit usage. However, a direct approach to the local British Telecom Radio Interference Service gives good results provided that as much information as possible can be given: the address and, most importantly, the telephone number that the illegal unit is connected to is required if possible.

The Society trusts that the Telecommunications Bill, which will shortly be considered by Parliament once again, will enable the problem of illicit cordless telephones to be addressed from a more positive standpoint.

One of the guests, Eric Godsmark, G5CO, secretary of IARU Region 1, right, presenting a pennant to George Benbow, G3HB, chairman of the Marconi Radio Society, at the relaunch of 2MT. ***A Marconi photo***

"A modern hf transceiver"

Mr G. N. Fare, G3OGQ, author of this article published in *Rad Com* April-July 1983, advises the following amendments:

TR101 source.....0·10V
TR102 source.....0·45V
TR103 base.....2·5V
TR103 emitter.....2·0V
Change value of C804 and C806 to 150pF
Change value of C805 to 330pF
Add:
T701 primary.....2t 24swg plastic insulated
T703 secondary.3t 24swg plastic insulated
The centres of the pads for T703 (Fig 13) should be 22·5mm.

Ray Cracknell returns

Ray Cracknell, Z22JV, whose exploits in connection with transequatorial propagation are well known, is shortly to leave Zimbabwe and return to the UK. The beacon which has operated under his callsign on 29·266MHz was closed down on 30 June. Ray has operated a 10m beacon for many years, and has been the mainstay of tep research for the last 25 years: his friends will be glad to hear him operating under his old callsign of G2AHU on his return. The Society was pleased to be able to play a small part in re-establishing his UK licence.

Amateur at professional conference

Mike Dennison, G3XDV, the chairman of the Society's Repeater Working Group, is delivering a paper at a professional conference in September. The conference, on radio spectrum conservation techniques, takes place at the University of Birmingham in early September, and the Society's paper concerns the UK 433MHz amateur radio repeater network. Further details from the Institution of Electrical Engineers or RSGB HQ (MSD).

1984 Council election

Attention is drawn to the notice calling for nominations to the 1984 Council published in *Rad Com* August 1983, p690.

Newsreaders required

The main newsreader for the Scarborough area, John Dean, G4OSD, will not be able to continue the service after 28 August due to changed circumstances: the Society would like to thank him for his valuable services. The reserve reader for the area, G4EEV, would also like someone to take over from him, although he is able to help during the transition period. So new readers are needed for the Scarborough area—offers, please, to John Nelson at HQ. Prospective readers need a reasonably good station which is able to give approximately the same coverage on 145·525MHz as those of the existing readers.

RAE

The next Radio Amateur's Examinations take place on Monday 5 December, Monday 19 March and Monday 14 May. The Society will be arranging two examination centres, one in Derby and one in Central London, and the closing date for completed applications for the December examination is 15 October: early application is recommended. Application forms can be obtained from the local examinations secretary in the Membership Services Department, RSGB HQ.

Special Event Stations

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

2-3 September, GB2ROG
To celebrate the 500th anniversary of the granting of The Royal Charter to The City of Gloucester, Gloucester ARS will be operating a special event station. The Charter of Incorporation was granted by Richard III of Gloucester, hence the callsign. In addition the society is organizing an award for contacts with any "GARS" stations.

3-5 September, GB2CYW
A group of local amateurs will operate this station from Chirk Castle (Castell Y Waun), Clwyd, as part of the 1983 Festival of Castles in Wales. Operation will be mainly on ssb on all hf bands, particularly 3·5, 7 and 14MHz, with some cw operation. It is hoped to operate continuously from 0000 on 3 September to 2359 on 5 September. Details from Alan Donnelly, GW4PWJ, Minffordd, Tregelriog, Llangollen, Clwyd LL20 7LA.

5-6 September, GB2RAE
The station will be run at Airedale & Wharfedale College of Further Education, Calverley Lane, Horsforth, Leeds LS18 4RQ, in aid of World Communications Year. Operation will be on all bands, conditions permitting, and ex-RAE and morse students of the college are invited to take part. Details from G4OAT, QTHR, tel Leeds 585695, or G8TEJ.

9-11 September, GB2LBC
The station will operate at the World Association of Christian Radio Amateurs & Listeners Annual Conference Weekend, to be held at the London Bible College, Northwood, Middx. Operation will be on hf and vhf. The WACRAL call, G3NJB, may also be used. Details from Mr L. D. Colley, G3AGX, QTHR.

10 September, GB4RAF and GB8RFC
The Oxfordshire members of the RAFARS will run the station at RAF Abingdon for the "Battle of Britain At Home Day". Operation will be on 7 and 3·5MHz for GB4RAF, and 144MHz for GB8RFC. S22 will be a talk-in frequency. The station will operate from 0930-1830. Details of the event can be obtained from G3FVC, 29 St Marks Crescent, Maidenhead, Berks SL6 5DD.

24-25 September, GB4SWY
The station will operate at the Fourth Biennial Reunion of the Swinnerton Society at Swynnerton in Staffs. Operation will be on hf and vhf, conducted by G2YS and G4MXE.

25 September, GB2TMT
The Derby & DARS will operate the station at the open day and bus rally held by the Trent Motor Traction Co Ltd at Derby. Special QSL cards will be available. Operation will be on vhf and hf from 1000 to 1630. Details from K. Griffin, 97 Woodlands Road, Allestree, Derby DE3 2HH.

30 September-1 October, GB2BT
The Reading Telephone Area RC will operate the station to celebrate the second anniversary of the formation of British Telecom and their club. Operation will be from 1200-1200, mainly on the hf bands ssb and rtty, and 70MHz. Special QSL cards will be available. Details from sec G8VQV, QTHR.

1-28 October, GB2CY
This station will be operated by G3PLB of Basildon, Essex, to commemorate World Communications Year 1983. Bands worked will be 1·8-144MHz and 432MHz. All contacts will receive a special QSL card via G3PLB or the bureau.

2 October, GB2UB
Members of Birmingham University ARS will operate this station on vhf-only as part of the annual University Freshers' Fayre. Special QSL cards will be available. Details from Martin Allcock, G6KJJ, c/o 1A Sandridgebury Lane, St Albans, Herts AL3 6DD.

14-22 October, GB2CDY
Farnborough & DRS will be running the station to commemorate the 75th anniversary of the first sustained powered flight in Britain by Col. Cody on 16 October 1908. Operation will be on most bands including vhf with ssb and cw. All contacts requesting a QSL card will be sent one via the bureau, but direct QSL cards should be sent to G4JFN, QTHR, enclosing an sae to take a card of 4 by 6in. Details from G4JFN, QTHR.

15-16 October, GB2HBS
This station will operate during the Jamboree-on-the-air on behalf of Hebden Bridge Scouts. Operation will be on hf and vhf. For further details contact V. A. Kerrigan, G4SAF, (ex-G8TIE).

Other Events

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

9-11 September - WACRAL Annual Conference Weekend, London Bible College, Northwood, Middx. All welcome, provided G3AGX, QTHR, is given advanced notice.

25 September - Welsh Amateur Radio Convention, Oakdale Community College, Blackwood. Details from R. B. Davies, GW3KYA, QTHR.

6-8 October - ARRA 12th Amateur Radio & Electronics Exhibition, Exhibition Centre, Doncaster Racecourse.

8 October - Midlands VHF Convention, British Telecom Training School, Stone, Staffs.

15-16 October - EI-GI Convention, Ballymascanlon.

10 December - RSGB AGM, IEE, Savoy Place, London.

28-29 April 1984 - RSGB National Amateur Radio Exhibition, National Exhibition Centre, Birmingham.

Mobile Rallies Calendar

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

11 September—Telford Mobile Rally, Telford New Town Centre Malls, Telford, Shropshire (exit 12 off M6 on to A5, or A442, from N or S) Open 11am (10.45am for disabled). Talk-in via GB4TRG on S22, and SU8/20 fm. All the usual attractions. Catering and licensed premises on site. Parking and entrance free. Details from G8DIR, tel Shrewsbury 64273, G8UGL, tel Telford 584173, or G3UKV, tel Telford 55416. All QTHR.

11 September—Vange Mobile Rally. St Nicholas School, Nicholas Lane, Basildon. Open 10am. Talk-in on 144MHz (S22). Details from Mrs D. Thompson, 10 Feering Row, Basildon SS14 1TE.

18 September—Peterborough R&ES Mobile Rally. Wirrina Sports Stadium, Bishops Road, Peterborough. Situated on the river embankment with good car parking, good food, and bar meals, with bar in the adjacent Gildenburgh rooms. Open 10.30am-5pm. Details from D. T. Wilson, 4 Conway Avenue, Peterborough, tel Peterborough 76238.

24 September—Ballymena & DARS 10th Annual Rally, Bailee High School. Open 12 noon. Talk-in station S22. Numerous trade stands, bring & buy stall, refreshments, ample car parking. Further details from GI4HCN, QTHR.

25 September—Harlow Mobile Rally. Harlow Sportcentre, Hammarskjold Road, Harlow. Doors open 10.30am. Bring & buy stall, refreshments and licensed bar, good parking, special interest stands. Talk-in on vhf/uhf. For further details contact G8FRG, QTHR.

2 October—Great Lumley ARES Rally, Community Centre, Great Lumley, nr Chester-le-Street, Co Durham. Open 11am. Talk-in on S22. Usual attractions including bring & buy. Further information from Ian Blackman, G4OCQ, QTHR, or tel 0385 45425.

11 December—Leeds & DARS Third Annual Christmas Rally, The Civic Centre, Pudsey, nr Leeds. Open 10.30am. Admission free. All the usual facilities. Enquiries from traders to A.A. Alexander, G6CJI, QTHR.

1 April 1984—White Rose ARS Rally, The University of Leeds. Details from A. N Bramley, G4NDU, QTHR.

RAE Courses 1983-4

Basildon. Basildon College of Further Education, Nethermayne, Basildon, Essex. For details contact the course tutor, Sam McCarlisle, G4LJL, at the college.

Birmingham. Selly Park Education Centre, Pershore Road, Birmingham, B29 7PL. Classes Thursdays. Details from Ron Blacker, G4GBE, QTHR.

Colwyn Bay. Llandrillo-yn-Rhos Technical College. Enrolment 6-8 September, 10-12.30pm, 2-4.30pm, 6-8.30pm. Reductions for students and oaps. Further details from the college.

Crawley. Sara Robinson School, Ifield, Crawley, West Sussex. Enrolment 12 and 14 September, 7-9pm. Classes Mondays or Thursdays, 7-9pm, commencing 19 or 22 September. Further details from Steve Webb, G4GHO, tel Crawley 25742.

Derby. Derby College of Further Education, Wilmarton, Derby DE2 8UG. Enrolment 12-13 September. Classes Wednesdays commencing 28 September. Details from Mr F. Whitehead, G4MLL, at the college, tel 0332 73012.

Dudley. Dudley College of Technology, The Broadway, Dudley, W Midlands DY1 4AS. Enrolment 6 September. Classes Tuesdays 6.30-8.30pm commencing 6 September. Tel Dudley 53585 for more details.

Durham. For details please contact G3ZJY, QTHR, tel 0385 66773. Morse classes also held.

Heckmondwyke. Heckmondwyke Grammar School. Enrolment 6-7 September. Classes Mondays, 7-9pm, commencing 12 September. Fee £18.90. Details from Frank Stork, G3TEE.

London. Acton Technical College, Mill Hill Road, Acton, London W3 8UX. Classes Wednesdays, 6.30-8.30pm, commencing 21 September. Course fee £55. Course organizers J. R. Holmes, BSc, and O. A. Pereira, BSc, CEng, FIERE, MBCS, MBIM. Further details from the departmental office at the college, tel Mrs J. M. Carsons, 01-993 2344, ext 2565.

London. Brixton College, Ferndown Road, SW4 7SB. Enrolment 5-9 September, 6.30-9pm. Classes weekly, 6.30-9pm. Students may attend meeting of Ferndown RS, 5-6.30pm Wednesdays. Course tutor R. McEwan Reid, G4GTO. Details from the college, tel 01-737 2323.

Manchester. Pendlebury High School, Cromwell Road, Swinton. Enrolment early September. Classes Mondays, 7.30pm, commencing 26 September. Details from instructor, P. Whatmough, G4HYE, tel 061-794 3706, or from Swinton Adult Education Centre, tel 061-794 5798.

Melton Mowbray. College of Further Education, Ashfordby Road, Melton Mowbray. Enrolment 6-7 September. Details from the college, tel 0664 67431, or from course tutor G3WKM, tel Melton Mowbray 68810.

Newcastle-upon-Tyne. Gosforth High School, Gosforth, nr Newcastle-upon-Tyne. Classes Tuesdays, 7-9pm. (Morse classes Thursdays). Details from the Principal, Gosforth Adult Association, Gosforth High School, Knightsbridge, Gosforth, or from D. R. Loveday, G3FPE, tel Newcastle-upon-Tyne 668439.

Newquay. Tretherras School, Newquay. Enrolment 21 September. 6.30-8.30pm, or by post to the Adult Education Principal, MCCPE, Palace Road, St Austell, Cornwall. Classes Mondays, 7-9pm, commencing 26 September. Morse will be available if required. Details from course tutor Bob Lawrence, G4LDA, tel Wadebridge 3649.

Nottingham. Sandiacre Adult Education Centre, Friesland School, Nursery Avenue, Sandiacre, nr Nottingham NG1 5HG. Enrolment 13 September, 7.15pm. Classes Tuesdays, 7.15pm, commencing 20 September. Course tutor G3VGW. Details from the Principal, H. G. Crowther, at the centre.

Orpington. Ramsden School for Boys, Gillmans Road, Orpington. Enrolment 13 September, at the school, 7-9pm, or at the first lesson if places are available. Classes Thursdays, 7.30-9.30pm, commencing 22 September. Enrolment for the May 1984 exam only should be made before Christmas 1983. Details from Alan Betts, G8TKV, QTHR, tel Orpington 31123.

Morley. Morley Technical Institute, Fountain Street, Morley. Courses Mondays, 7-9pm. Details from Mrs Stewart, at the college, tel 538252.

Portsmouth. Further Education Centre, Drayton Road, North End, Portsmouth. Tuesdays and Thursdays 6.30-8.30pm, starting mid-September. Details from the centre at Cosham Park House, Cosham Park Avenue, Portsmouth PO6 3BG, or from G6NZ.

St Austell. St Austell Adult Education Centre. Enrolment accepted by post from 1 September or in person at the Mid-Cornwall College, on 21 September, 6.30-8.30pm. Classes Tuesdays, 7-9pm, commencing 27 September. Details from course tutor G4DNO, QTHR, tel St Columb (0637) 880479.

Stamford. Great Casterton Community Centre, Ryhall Road, Great Casterton, nr Stamford. Enrolment 5 September from 7.30pm, or by post to the principal. Classes Thursdays, 7pm, commencing 22 September. Details c/o the college.

Turnford. East Herts College. Classes probably Mondays, 7-9pm. Fee between £40 and £60. External entrants may be accepted for the December 1983 and May 1984 RAE, but approval should be sought well in advance. Final details from Jim, G3OJI, tel Ware 4316 or contact Mr J. France, at the college, tel Hoddesdon 66451.

Walsall. Barr Beacon Adult Education Centre, Old Hall Lane, Walsall, and Broadway North Centre. Enrolment 22 and 19 September respectively. Fees £7.50 per term max. Free to unemployed etc. External candidates may be allowed to sit exams, and some more advanced students may be able to sit the December exam. Details from Civil Centre, Walsall, or tel Frank Fear, Aldridge 52706.

Wakefield. Wakefield College of Technology & Arts, Margaret Street, Wakefield. Course Thursdays, 7-9pm. Details from C. Hinkley, Electrical Engineering Dept of the college, tel Wakefield 370501.

Witney. West Oxfordshire Technical College, Holloway Road, Witney OX8 7EE. Enrolment 5 September 6.30-8.30pm. Classes Mondays 7-9pm. Cost £10, excluding examination fee of £16. Further details from Mr Calvey, tel 0933 3464/5/6/7, at the college, or course tutor D. Watkins, G6FJQ, tel 0993 2229, ext 457, daytime.

Morse classes

Bromsgrove. Rigby Lane School, Bromsgrove, Worcs. CW for beginners to test speed for morse test. Details from Roy Williams, G4IUX, QTHR. Tel 021-475 8403.

Cheshunt. It is hoped that a beginners cw class will be available on Thursdays, commencing September. Final details to be arranged, subject to demand. Details from Jim, G3OJI, QTHR, tel Ware 4316. Early application would be appreciated.

Grantham. St Hughs CE Comprehensive School, The Avenue, Dysart Road, Grantham NG31 7PX. Classes Mondays, 6.30-8pm, commencing 12 September. Enrol at first class. Full details from the school, or from the College for Further Education, Stonebridge Road, Grantham, tel 0476 3141.

Heckmondwyke. Heckmondwyke Grammar School. Enrolment 6-7 September. Classes Thursdays, 7-9pm, commencing 15 September. Fee £18.90. Details from Frank Stork, G3TEE.

London. Acton Technical College, Mill Hill Road, Acton, London W3 8UX. Classes Tuesdays, 6.30-8.30pm, commencing 20 September. Fee £55. Details from the departmental office at the college, tel Mrs J. M. Carsons, 01-993 2344, ext 2465.

London. Beckenham Adult Education Centre, 244 Croydon Road, Beckenham, Kent BR3 4DA. There will be two classes: a) Beginners, Tuesdays, 7.15-9.15pm, commencing 20 September, at the above address, tel 01-650 4208. Tutor Mr Henschel. b) Intermediate, for students who can already read approx 8wpm, Tuesdays, 7.30-9.30pm, commencing 20 September, at 28 Beckenham Road, Beckenham, Kent, tel 01-650 4208 and 01-650 1383. Tutors steve Palmer and Peter Grant.

Manchester. Pendlebury High School, Cromwell Road, Swinton. Details of classes from G4HYE, tel 061-794 3706, or from Swinton Adult Education Centre, tel 061-794 5798.

COUNCIL PROCEEDINGS

A brief report of a special Council meeting, during which chairmen of committees were invited to report and discuss the work of their committees, held on 11 June.

PRESENT

Council members: Mr D. E. Baptiste, CBE (President, in the chair), Dr E. J. Allaway, Messrs R. G. Barrett (also as chairman of Membership & Representation Committee), J. Bazley, G. A. Griffiths, L. N. G. Hawkyard, Mrs J. Heathershaw, Messrs H. M. Holmden, G. R. Jessop, I. J. Kyle, T. I. Lundegard, W. J. McClintock, H. S. Pinchin, D. M. Pratt (also as chairman of Licensing Advisory Committee), and K. E. V. Willis.

Committee chairmen: Messrs M. Appleby (VHF), M. Dennison (Repeater Working Group), Dr D. S. Evans (Technical & Publications), Messrs R. G. Flavell (Propagation Studies), N. O. Miller (Exhibition & Rally), P. G. Murchie (Microwave), B. O'Brien (Finance & Staff), G. C. Oxley (Education), and D. Thom (HF).

Headquarters staff: Mr D. A. Evans (general manager/secretary) and Ms H. M. Allin (minutes secretary).

Apologies for absence were received from Messrs Cornish, Fisher, Hall and Hutchinson.

. . . . . .

Committees
The President welcomed the committee chairmen and explained that the purpose of the meeting was to provide an opportunity to clarify each committee report prior to discussing individual recommendations and changes to terms of reference arising therefrom at the Council meeting to be held in August.

The committee chairmen were then invited to the Council table and took part in turn in the discussion of the work of their respective committees. After this part of the agenda was completed, the committee chairmen left the meeting.

1984 President
Mr R. G. Barrett, GW8HEZ, executive vice-President, was proposed by Dr Allaway and seconded by Mr Bazley.

Mr J. Anthony, G3KQF, was proposed by Mr Hawkyard and seconded by Mr Lundegard.

A ballot took place, following which the President announced that Mr Barrett had been elected President for 1984. Council expressed its congratulations to Mr Barrett.

Area representatives
The following nominations were accepted: Mr G. S. Bates, G6RIL, Maltby, Yorks; and Mr F. Pickersgill, G3XXN, Worksop. It was noted that these appointments would be for one year only, as the current term of office expired in June 1984.

Chairman, Raynet Committee
(Mr Griffiths withdrew from the meeting during this agenda item)
The appointment of Mr Griffiths as chairman of the Raynet Committee was approved.

Council noted that Mr Goddard has resigned from chairmanship and membership of the Raynet Committee at its last meeting. The President gave an explanation of the circumstances leading up to Mr Goddard's resignation.

Mrs Heathershaw said that the Raynet Committee wished Mr Goddard to remain as a member of the committee and had written to him inviting him to do so.

The President would write to Mr Goddard, expressing Council's appreciation for his past work.

Chairman, HF Contests Committee
The appointment of Mr R. L. Glaisher as chairman of the HF Contests Committee was approved. The President would write to him, and also to Mr Andrews as past-chairman.

Editorial Board
Mr Willis asked if Mr Hawker had resigned from the Editorial Board. Mr Evans confirmed that this was so, as Mr Hawker felt his membership of the board might lead to conflict of interest with his other publishing commitments. He had, however, been extremely helpful and positive, and it was hoped that he would keep in touch with the board as he had agreed to continue to check *Radio Communication* page proofs.

Licence fees
The secretary spoke of the increased licence fees recently imposed by the Home Office. The reasons for the increase had been requested and would be discussed at the next Home Office meeting.

The main reason for the 50 per cent increase was to help fund the computerization of Home Office records. The Society was aware that the decision could not be changed but it would nevertheless register its concern at the lack of prior consultation and advice.

OBITUARIES

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

Mr E. Chilton, G2DJM
Ernie Chilton died on 1 June, aged 74. He joined the Derby & DARS after the second world war and continued his membership even after retiring to Suffolk. He was a regular reporter for the GB2RS 3·5MHz news broadcasts. He was also a member of RSARS.

Mr G. A. Dodd, MBE, FIEE, G8GX
George Dodd, who died recently, was a very active pre-war call. After a second period of activity until 1952 he concentrated wholly on his professional career, but returned with enthusiasm to amateur radio upon retirement.

Mr J. J. Jones, RS33097
Mr Jones died on 27 May, aged 85. Although he had been blind for many years, in the early days of radio, when he was sighted, he had been a keen constructor.

Mr J. Pryce, G4MLU
John Pryce died on 27 June, aged 49. Licensed in 1980, he had been a member of Edgware & DRS for three years, was a lively committee member, and a keen cw operator, with a great sense of humour.

Mr C. W. Stedman, G3XWS
Bill died on 12 May. He had been very active on all bands and often on the Royal Signals Net. During the 'sixties and 'seventies he held the post of secretary in the Dunstable Downs and Shefford radio clubs.

Mr W. Whitehouse, G3SKB
Wilf Whitehouse died on 27 June. He had joined the RSGB in 1943 as an swl, and during the war helped to found the RSGB Group in St Albans. The group was succeeded by the Verulam ARC, of which Wilf was chairman in 1964. He enjoyed "nattering" on 144MHz and was adept at making random wire radiate—the only hf antenna he could use at his QTH!

Also:
Mr A. S. Anderson, G3VFM;
Mr W. M. Coulsell, RS38662;
Mr D. S. Eller, RS47955, on 2 April;
Mr J. Fraser, GM3KLW, on 19 June;
Mr J. C. Hendrick, RS34964, in April;
Mr D. L. Highgate, RS51979;
Mr M. P. Johnson, G4CYG;
Mr N. E. Jones, RS51909, on 27 April;
Mr J. D. McAleer, GI4JCB, on 3 March; and
Mr J. L. Thompson, G8TNC, on 7 January.

Members' Mailbag

I SAY . . .

Sir—Do you realize that your "readers' letters" section (now renamed "Members' Mailbag") has become boring in the extreme, containing as it does so many childish letters in which the writers are airing their opinions on the status of G6 licensees, the requirement, or otherwise, of the morse test etc. It goes on and on, and these writers must represent only a very small proportion of the radio amateurs who read *Radio Communication*.

May I suggest that you file these letters where they belong, because they do nothing for the spirit of amateur radio except to generate ill-feeling, when your role should be to promote friendship.

Please let us have some interesting correspondence on equipment, experiences, advice etc, and let's forget all this back-biting and dissatisfaction with licence conditions for a change.

John Denton, G6CMC

Well, we can only publish what we receive: the idea of "Members' Mailbag" is to provide a forum for the subjects which interest members. Topics such as the desirability of a morse test and the difficulty or otherwise of the RAE are of interest to many amateurs—if numerous discussions on the air and letters to the editor and to RSGB headquarters are anything to go by. We believe that one of the major roles of amateur radio is to promote "friendship" and "international goodwill" (to quote the ITU), even given the limitations of human nature, and we will consider any letters for publication as long as they are interesting and relevant to the hobby as a whole.

AMATEUR RADIO AND CB

Sir—It was with utter disgust that I read Mr Alan Blears' letter (*Rad Com* July 1983). How dare *The Sun* associate amateur radio enthusiasts with cb users! Who does Mr Blears really think he is? Because he has passed the RSGB examination it does not make him one of God's chosen people. I should like to point out that many cb users are also amateur radio licence holders, and hundreds of cb users have passed the RSGB examination and are in fact members of the RSGB—so he is condemning his own members.

Listening on the 144MHz band, one hears the same misusage as on the cb frequencies. I think one should put one's own house in order before condemning others, because a few are bad does not condemn the whole. I know many very good cb users—and remember they have authority to operate the same as the amateur radio user.

I think the time has come when the attitude of "we" and "them" should come to an end, and the RSGB get together with the cb users. I am sure some goodness could come out of it which would benefit both parties.

As to the point about planning permission for antennas would be affected if they are cb users is utter nonsense—every case is taken on its merit.

Councillor Norman Gardner, RS50836

There are some misconceptions in this letter. First, the examination required to become a radio amateur is set by the City and Guilds of London Institute, not the RSGB. Second, the Society does not seek to condemn cb, and indeed never has except insofar as it believes that the choice of 27MHz for a short-range personal communications facility represents poor technical decision-making because the choice of frequency is manifestly inappropriate.

It is however, indisputable that some sections of the cb fraternity have received poor publicity in the media, and the Society is anxious to see that amateur radio is not affected in some way by this fact. Amateur radio has respect and credibility worldwide, and it has obtained these as a result of what it is, not because it has broken the law and forced governments to make provision for it. The media are already quite sufficiently confused about the differences between cb and amateur radio, often to the detriment of the latter. The Society, in the interests of its members and of the hobby as a whole, will continue to point out to the media that amateur radio and cb radio are emphatically not the same thing. The two activities exist for quite different reasons.

Finally, the RSGB has quite enough to keep it occupied in looking after the interests of radio amateurs—although maintaining dialogue over matters of mutual interest, there is no intention to "get together" with cb users. They have their own national organizations, with their own interests and priorities.

Sir—I was rather interested in G4PDX's letter and I quite agree that the media needs educating regarding amateur radio: what we are and what it's all about. I do not agree with his remark about a cb and amateurs "great divide". It's remarks like this that cause the rift between the amateurs and cbers; both are hobbies in communication. I don't know where G4PDX comes from, but here in Cornwall both cbers and radio amateurs get on well together. In fact many licensed amateurs here, including myself, use the 27MHz band.

There are also a lot of cbers who take an interest in amateur radio and have joined the Cornish Radio Amateur Club. Some are also studying for the RAE. In Cornwall amateurs are welcomed on the cb channels and have helped a lot in procedure and on technical questions. There are of course still some idiots on cb channels, but let's face it, we have them as well—you have only to listen to some repeaters—so it's not all on one side by a long way.

G4PDX talks of what the amateurs have done, which is all quite true, but you also have to give some credit to cbers. I hear one who calls up an old lady every day to make sure she is ok. There are long-distance lorry drivers being directed to their destinations. During the water strike they were a great help to many old and disabled people, and there are hosts of other good deeds. Let's be fair, this type of help is very limited on amateur radio.

Why am I, as an amateur, also a cber? I am 76, war disabled, housebound, and a widower on my own. Yes, I can go on any band and have a rubber-stamp QSO. I can also go on the "Cornish Net" each day, but at a fixed time. On the amateur bands there is not always someone who wants a heart-to-heart chat, but cb is that different. If I feel lonely or depressed I can always rely on having a chat with someone sensible, and it's a great help.

I've been interested in radio for 62 years and licensed since 1937. I welcome cb radio. Let's move with the times and not act like an ostrich with its head in the sand. CB is not going away. It's a radio communication hobby as well as ours, so let's help one another and cut out the "great divide".

Ted Bowden, G2AYQ

The Society fully accepts that cb is "not going to go away", and also accepts that cb has its uses—we have never denied that it does. All we have said is that (a) cb is not the same as amateur radio and (b) it should not, for good technical reasons, be on 27MHz!

THE MORSE TEST

Sir—I would like to put forward my view concerning the "morse test", and hopefully settle some of the controversy that it has caused.

Is it not conceivable that people who learn morse will tend to use it either as their primary mode of communication or, if all else fails, use it to make that all-important dx?

It is also advisable to discourage every Tom, Dick and Harry who has a basic knowledge of radio from using voice on the hf bands, because the allocated space is quite narrow and the disciplines involved in learning morse are such that only the most dedicated "hams" can even be bothered to learn it.

It is possible (with a little effort, using Q-codes and the like) to QSO with most countries throughout the world, because an on/off tone is the same throughout the universe; and a phrase book by your side means that rare callsigns may be worked without complete understanding of their languages

G. D. Daisley, RNR, BRS52137, Communications instructor Southend Sea Cadets

Sir—Could I add my (rather biased G8---) views to the debate on the morse test. There appear to be three prongs to the argument for retaining a morse test:

(i) We had to do it and therefore so should everyone else; usually coupled with the argument that if you aren't prepared to put in the effort to pass the morse test then you aren't really interested in amateur radio. I could equally well argue that anyone interested in keeping fit could run a marathon, and therefore they should do it. Most people have better ways to use their time.

(ii) Other users may need to use morse to ask you to QSY. I believe that this is something of a rarity, and in any case only requires the ability to *receive* morse code.

(iii) It is an international rule. This does not stop the RSGB from formulating its own policy on the subject and lobbying at both national and international levels for changes in the regulations.

I would therefore suggest that as a first step the RSGB should lobby for the morse test to be changed to a reception-only test, which hopefully can be phased out as computerized morse-decoding becomes more common. My own belief is that the morse code test is as relevant to modern operating as a man with a red flag is to driving.

Dr Roger Cook, G8ZJJ

The great morse test debate appears to show no sign of ever ending: here are two more diametrically-opposed views. Morse is, indeed, the nearest thing to a universal language. It is also true to say that many learn it who have no intention whatsoever of going on the hf bands, but who wish to use techniques such as e-m-e and ms on the vhf bands. Whatever one may feel about the political arguments, it is a matter of fact that morse will still get through when almost everything else fails. Since the RSGB is in favour of anything which extends the effectiveness of amateur communication, it follows that we remain in favour of morse. As it stands, the UK amateur may elect to take the morse test if he wishes, or not to take it if he does not: some stations use morse and others do not: and those who go in for state-of-the-art techniques at vhf and uhf would certainly not agree that morse is not relevant to modern operating!

A JOY TO BELONG

Sir—I have been an swl for only 18 months, despite the fact that I was in military signals from 1934 to 1947. On becoming an swl, I decided at once to do two things: join the RSGB; and become a member of the Wirral ARS.

On becoming a member of the latter, I was cautious, believing that perhaps licensed radio amateurs would have looked down their noses at me. Not a bit, they have turned out to be a fine lot of lads and lassies, and nothing is too much trouble for them with their unstinted help. One has a sense of belonging and being a genuine part of the society. My advice to any new swl is to join these movements and be put in touch with all that is going on.

In conclusion, please be good enough to tell your readers about utc, as compared to gmt.

Ted Humphries

Thank you for your kind words: it is excellent to hear that the amateur is still a gentleman. With reference to gmt and utc, for all practical purposes they are the same thing.

THE ANTENNA LAB

A state-of-the-art digital wattmeter, automatic vswr indicator and peak power monitor

by A. L. Bailey, G3WPO*

PART 2

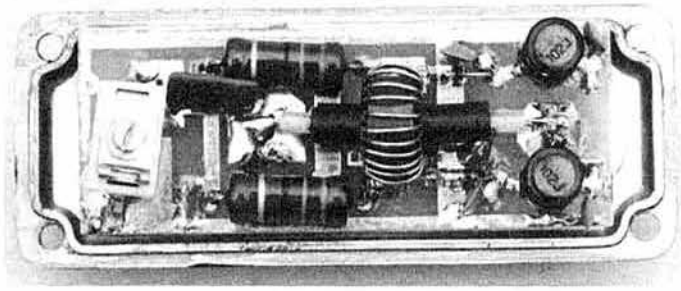
RF sense head (Figs 7, 8 and 9)

(a) Commence by placing the pcb inside the rear face of the die-cast box lid, track side upwards, and mark through the positions of the three holes, before drilling the lid. Then mark and drill the lower section of the die-cast box.

(b) All components mount on the track side of the pcb. The leads should be inserted through the holes and cut off flush underneath. Initially, mount all the components except for the ferrite core and coaxial primary. C7 should be left standing clear of the pcb, with all other components having the shortest possible leads, especially C7.

(c) Insert a 12mm 6BA bolt through from the outside of the lid, and tighten up with a lockwasher and two 6BA half nuts on the inside of the lid. Lightly file the spigots of the two SO239 sockets (this helps soldering) and fix the two sockets in place on the lid. Slide over the pcb and fix in place with another lockwasher and a 6BA nut. Make sure the pcb is level, then solder the two spigots to the pcb around their entire circumference using a hot iron.

(d) Carefully wind 15 turns of wire around the ferrite core—this is best done by threading the wire through the hole to halfway, then winding in two sections. (Make sure the winding is in the same sense all the way round!) Be careful not to strip the insulation while doing this. Then cut the excess leads to leave 6mm or so, remove the insulation and tin.



The RF sense-head

(e) Prepare the coaxial primary as in Fig 13. The dimensions are not critical except for the overall length. Slide the coaxial cable through the wound core, and solder into place on the pcb, with the braid pigtail soldered to the pcb adjacent to the fixing bolt.

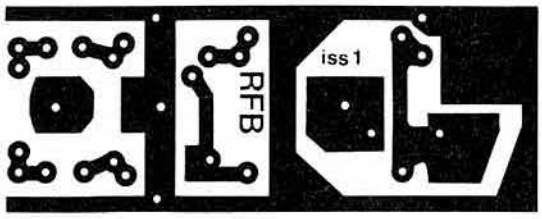


Fig 7. RF sense head pcb

(f) Solder two short lengths of insulated wire between the output connections on the pcb and the feedthrough capacitors on the box proper. Screw the lid and pcb assembly into the box.

The sense head can now be aligned by connecting a voltmeter between the reflected voltage output and the box as ground. Connect a 50Ω dummy load to the output socket, and the transmitter on 7 or 14MHz to the input socket.

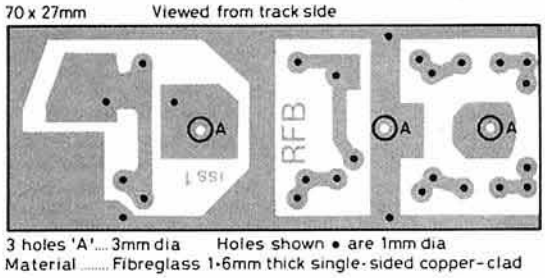


Fig 8. RF sense head pcb drilling

Apply rf power and, via the access hole in the back of the box, adjust C7 for minimum voltage, increasing the power output as the null is reached. It should be possible to reach a reading of less than two per cent of the forward voltage reading.

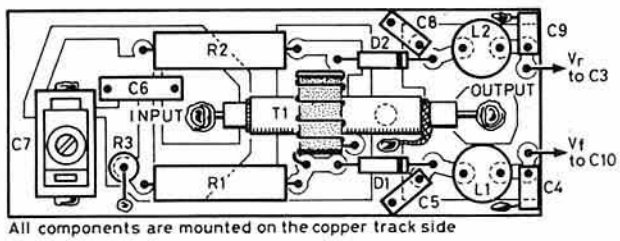


Fig 9. RF sense head pcb layout

*20 Farnham Avenue, Hassocks, West Sussex BN6 8NS.

Display pcb (Figs 10, 11 and 12)

(a) Insert (from the track side) and solder the pcb connection pins, and the two ic sockets (these go on the non-track side only).

(b) Insert and solder the remaining components on the non-track side (Fig 12a).

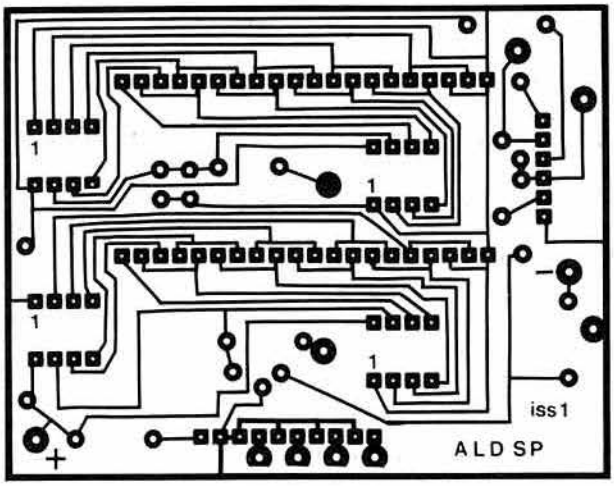


Fig 10. Display pcb

(c) Observing orientation, solder in IC4 and IC9 **on the track side** of the pcb—this side was chosen to avoid a number of links which would have otherwise resulted.

(d) Following Fig 12(b), solder in one l.e.d. at each end of the four rows of displays, making sure that they are all at the correct height and parallel with the pcb surface. Without soldering, the other l.e.ds can now be inserted, lined up, and then soldered into place. Note that all insert the same way round except for the six lower l.e.ds, of which five are the opposite way round.

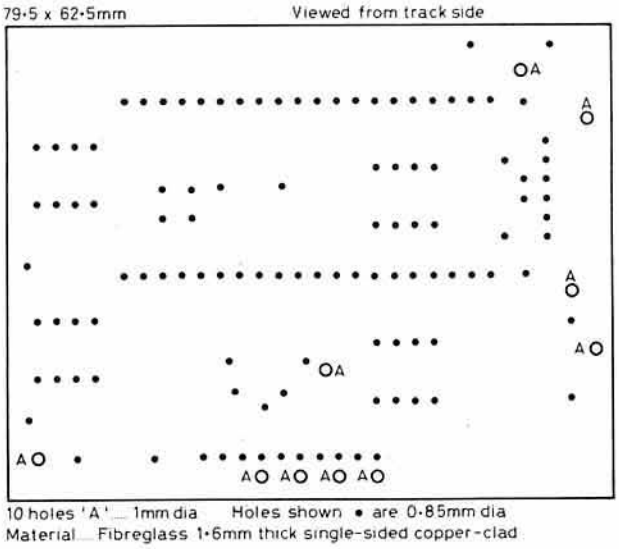


Fig 11. Display pcb drilling

(e) Insert IC5 and 10. Double check orientations etc.

At this stage it is worthwhile checking that the display pcb is functioning satisfactorily by temporarily connecting it up to the main pcb, as in Fig 15, together with RV9. Using the same variable voltage arrangement as was used for the alignment, connect V reflected to earth, and the potentiometer wiper to V forward.

Varying the voltage should result in the vswr display staying off at all times, but the peak detector display should illuminate, depending on the settings of the variable voltage and RV9.

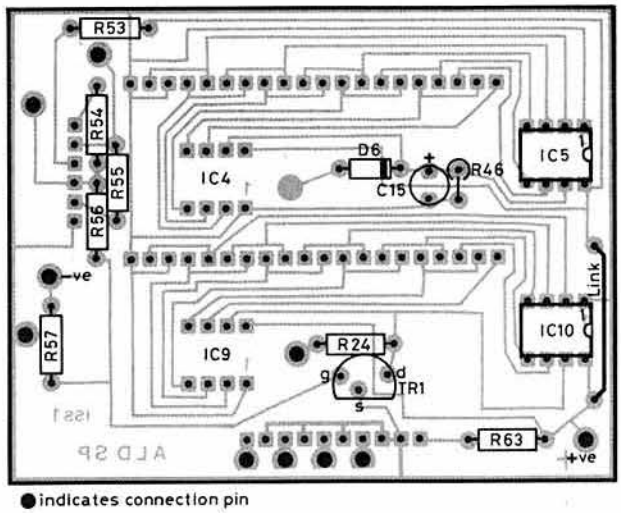


Fig 12(a). Display pcb layout—non-track side

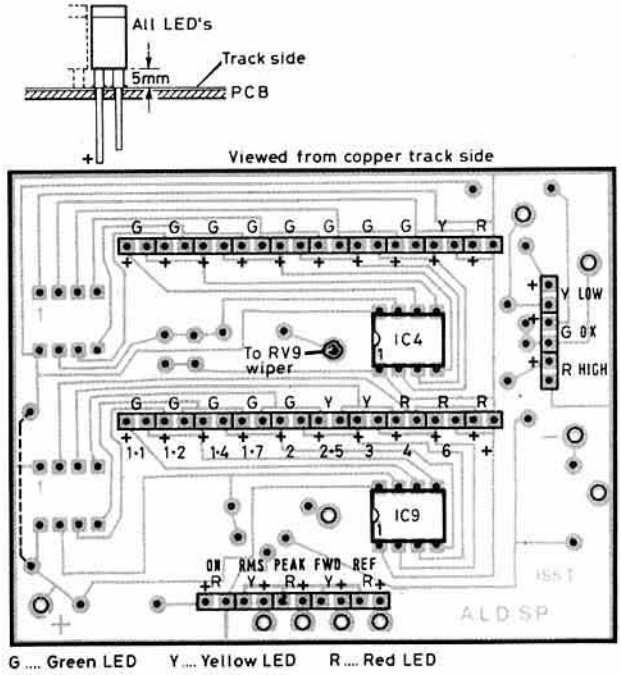


Fig 12(b). Display pcb layout—track side

Now connect V forward and V reflected together—all l.e.ds of the vswr display should come on once the applied voltage is above 1V. To calibrate this display, connect two equal value resistors, one from V forward to V reflected, and the other from V reflected to 0V to simulate a 3:1 vswr. With the variable resistor at around 5V, adjust RV1 carefully so that the 3:1 l.e.d. only just illuminates fully.

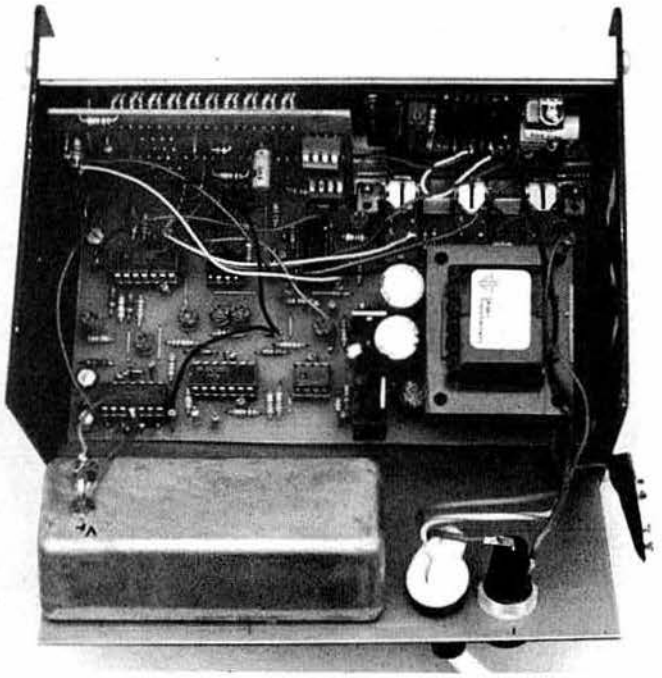
All other status l.e.ds should illuminate as previously described.

If the digital display is wired and connected, it should be reading in the region of 300–500 with 10V applied to V forward, with the relay controlling power to the display. Final calibration is left until cased.

Housing the Antennalab

The prototypes were designed to fit the Centurion DX2 case shown in the photographs. Other cases can be used, possibly building the unit into other equipment if desired. The drilling instructions given in Fig 14 assume the use of this case.

The only awkward parts of the construction are the slots for the l.e.d. displays. The author used a Goscut nibbling tool and a thin needle file to



Interior view of the Antennalab

cut the slots; alternatively a long series of small holes which can be filed out is another method.

The photographs and drawings should be self-explanatory. Note that the initial assembly is easier if the sides are left off the case while wiring up. A fair amount of heat is generated by the circuit, so ventilation holes in the upper and lower panels of the case are essential.

Mounting of the display pcb simply consists of carefully pushing all the l.e.ds through the slots in the front panel, with about 1mm of each protruding from the front. A small drop of cyanoacrylate adhesive at each end of the top and bottom rows of l.e.ds will secure it in place. RV9 is mounted directly on the front panel, behind the display board, with flying leads to the three connections, the wiper going to the undrilled pad on the track side of the pcb.

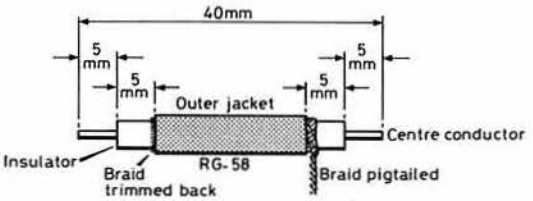


Fig 13. Coaxial primary dimensions

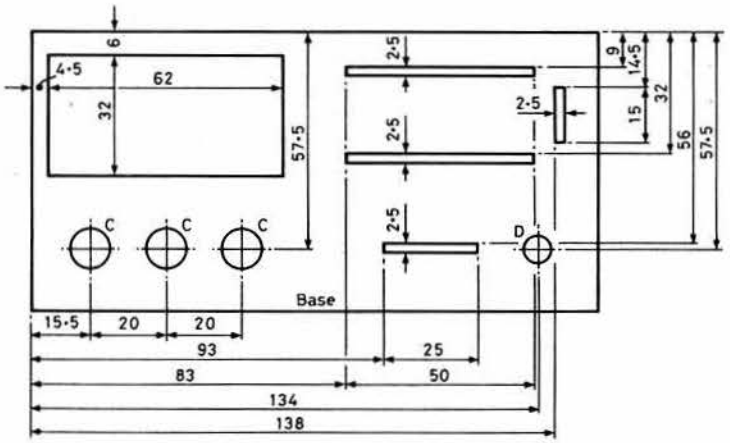
The digital display is mounted in a bezel assembly, using four self-tapping screws which secure the display to the back of the bezel. The bezel itself should be secured to the panel by cyanoacrylate or other suitable adhesive. The battery is held against the left-hand side panel by double-sided tape, or a small bracket could be fabricated if preferred. Make sure that the negative lead of the battery goes to the display connection, **not** to 0V, and that as short leads as possible are used for the Vss and Vdd connections to the pcb.

The rf sense head assembly is mounted inside the cabinet, held to the back panel via the SO239 sockets and their mounting nuts.

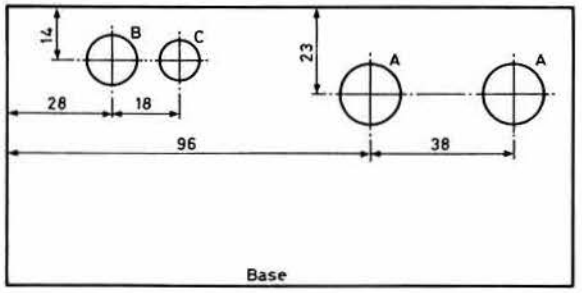
Once the assembly is finished, final calibration of the power scale can be carried out by connecting the Antennalab in series with another calibrated power meter, into a dummy load. RV8 should be adjusted for a correct reading at the highest possible power available. This should be carried out in the rms position with the transmitter in cw mode, or driven by a single tone.

If problems are experienced with any of the sections, Table 1 gives a voltage check for a correctly-aligned circuit, with both inputs at 0V.

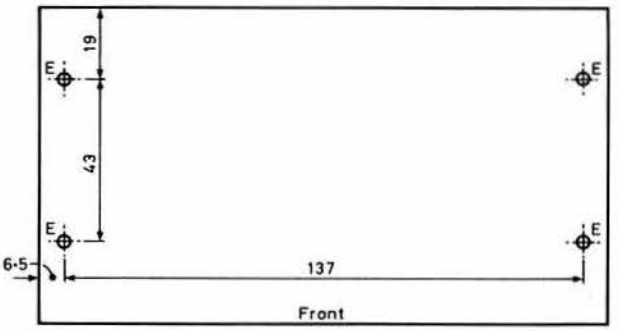
The only areas which may require adjustment to personal taste are the delay time before the display switches off (decrease R59 to shorten the



(a) Front panel (viewed from front)



(b) Rear panel (viewed from inside-non-coated side)

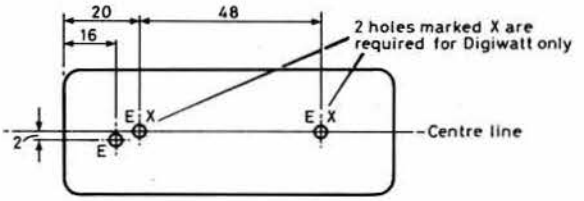


(c) Base panel drilling (viewed from non-coated side)

Case.... Centurion DX2

Dimensions are in millimetres

Holes 'A'..... 16mm dia
'B'..... 13mm dia
'C'..... 10mm dia
'D'..... 7mm dia
'E'..... 3mm dia



(d) RF sense head die-cast box drilling

Fig 14. Drilling diagrams. Front and rear panels. Lower panel. Die-cast box

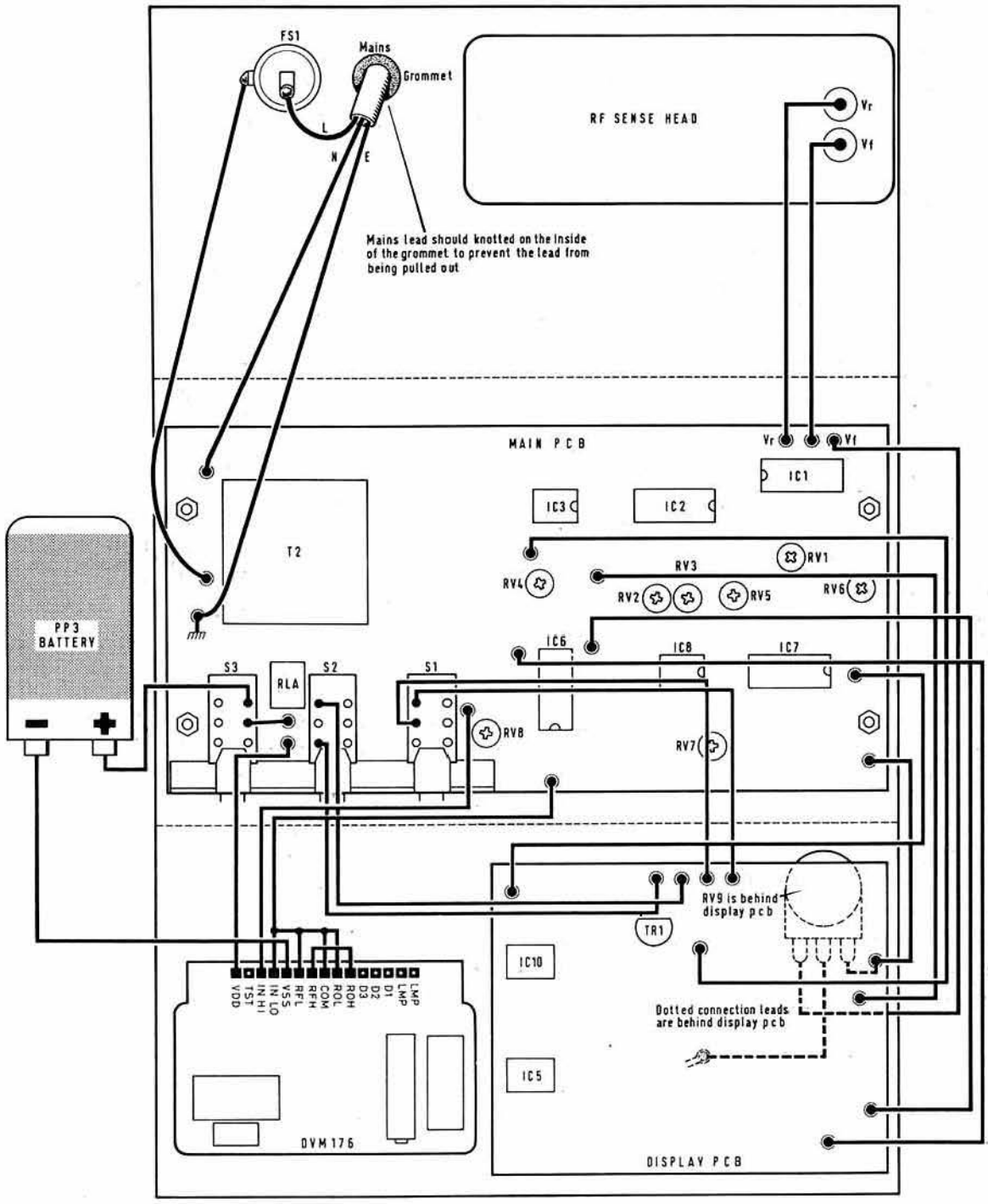


Fig 15. Wiring diagram

time), and the time constant of the peak detecting circuit. The latter gives fairly steady readings with normal speech input to the transmitter, but note that increasing the time constant will also increase the time taken for the display to decay down again. R29 can be altered if required. Switching from rms to peak will cause a temporary high reading of the display as C14 initially charges.

Two-tone tests

A note of caution should be introduced here. If an ssb transmitter driven by a single tone is being used, then switching to p.e.p. mode should give the same power reading, and a two-tone input would give four times the power reading when in p.e.p. mode. This corresponds to the two times voltage deflection which is obtained on an oscilloscope when a single tone input is replaced by a two-tone input (providing the two tones are of equal amplitude).

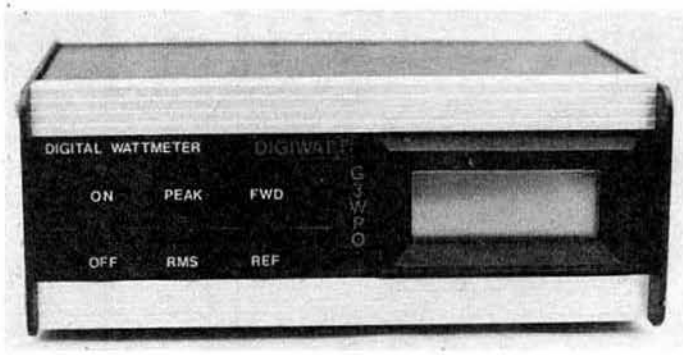
However, the author has spent some time investigating why his transmitter gave varying readings, depending on the tone input level, of up to 10 times the rms reading on p.e.p! After obtaining similar results with another transmitter, and analysing the signals with an oscilloscope, it was discovered that the carrier oscillator was the cause of the problem.

Despite apparently good carrier suppression in both rigs, the leakage was sufficient to effectively introduce a third tone into the system. Thus the single-tone input was effectively already two-tone, it even being possible to show a classic two-tone pattern on the scope with the single-tone input and carrier oscillator leakage only! Hence the differing rms and p.e.p. readings, as with three tones of equal amplitude, each tone has a power of one-ninth of the p.e.p. output. So if strange readings are experienced, this is more than likely the answer, and one that the text books do not appear to mention.

Other causes of incorrect, usually high, p.e.p. readings are the presence of harmonics, and parasitic oscillations.

THE DIGIWATT

For those requiring only the digital wattmeter facility, a simpler version of the Antennalab has been evolved called the Digiwatt. This requires less components and is built in a smaller case.



The Digiwatt

The circuit

There are no circuit changes associated directly with the digital power measuring circuit (Fig 2)—the description of the method of operation, and of the alignment remain the same. For the sake of convenience, and to enable the same pcb to be utilized, all component numbering is as for the Antennalab. For this reason the circuit diagram is not reproduced again.

As this instrument is to be as simple as possible, all unnecessary circuitry was removed from the pcb to leave only that required for the power measurement and display, together with a "power-on" status l.e.d.

The items not required are IC2, IC3, IC4, IC5, IC9, IC10 and TR1, together with associated components. In addition, those components associated with IC6c and d can be omitted, although the IC itself is still required.

The only component which has a new function is R31, which is now the dropping resistor for the status l.e.d. In addition, a different transformer is used for the power supply, as the loading is much lighter. An additional component listing is given here, showing exactly the new requirements.

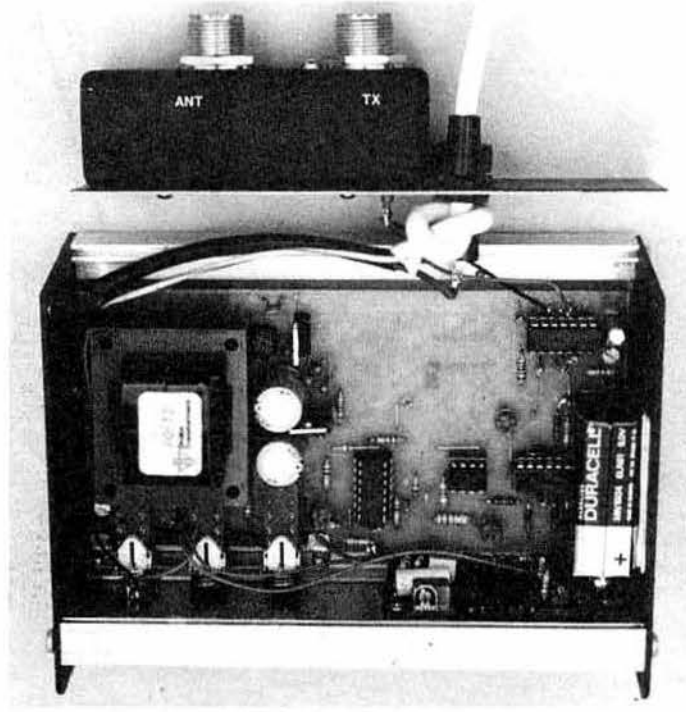
PCB construction and alignment

As already mentioned, the same pcb is used as for the Antennalab-see Figs 4 and 5. Fig 16 gives the layout for those components now required, and the same order of assembly should be followed as originally. The alignment is exactly the same as for the Antennalab power section. Connection data is as for the power section of the Antennalab.

Metalwork

A smaller version of the original Centurion case is used, type DX1, which is only half the height. Fig 18 gives the required drilling information.

As the heat generated is much lower, no ventilation holes are required. The single l.e.d. is held in place with adhesive, or a chrome surround type with screw thread could be used instead.



Interior view of the Digiwatt

Unlike the Antennalab, the rf sense head, which is identical, is mounted on the outside of the case, as there is insufficient room inside. Two additional mounting holes are shown on the original drawing for this purpose. Priming and painting the die-cast box will enhance its appearance. Also, the two feedthrough capacitors are screwed to the die-cast box base only, and enter the main case through clearance holes, as the majority of feedthroughs have short threads.

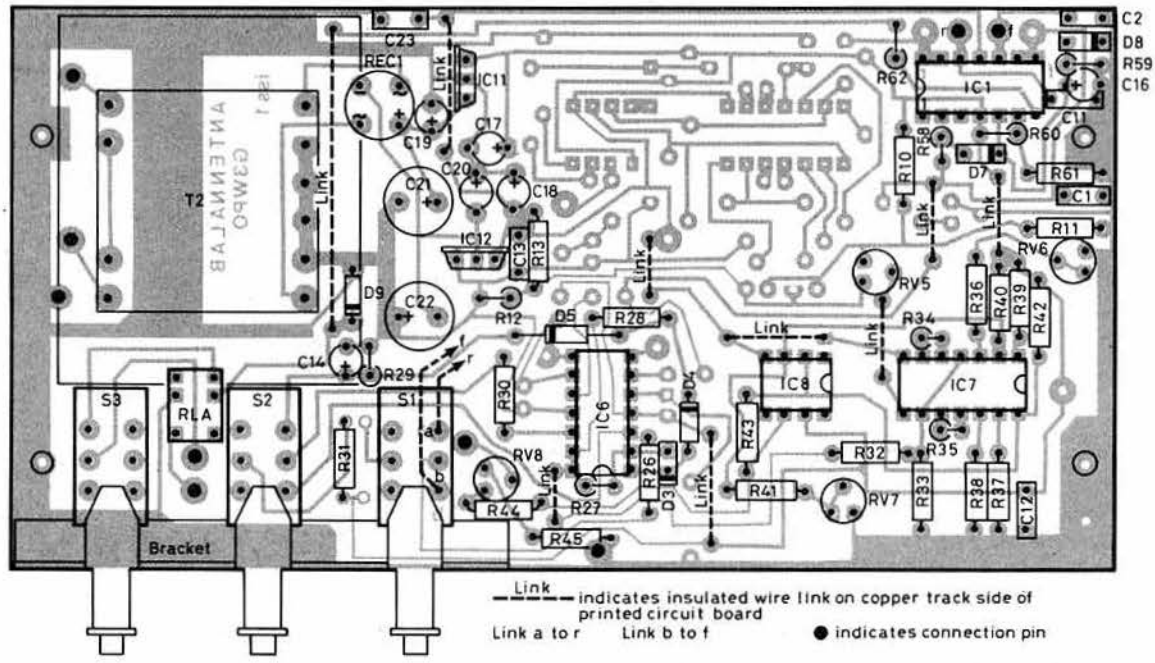


Fig 16. Digiwatt pcb component layout

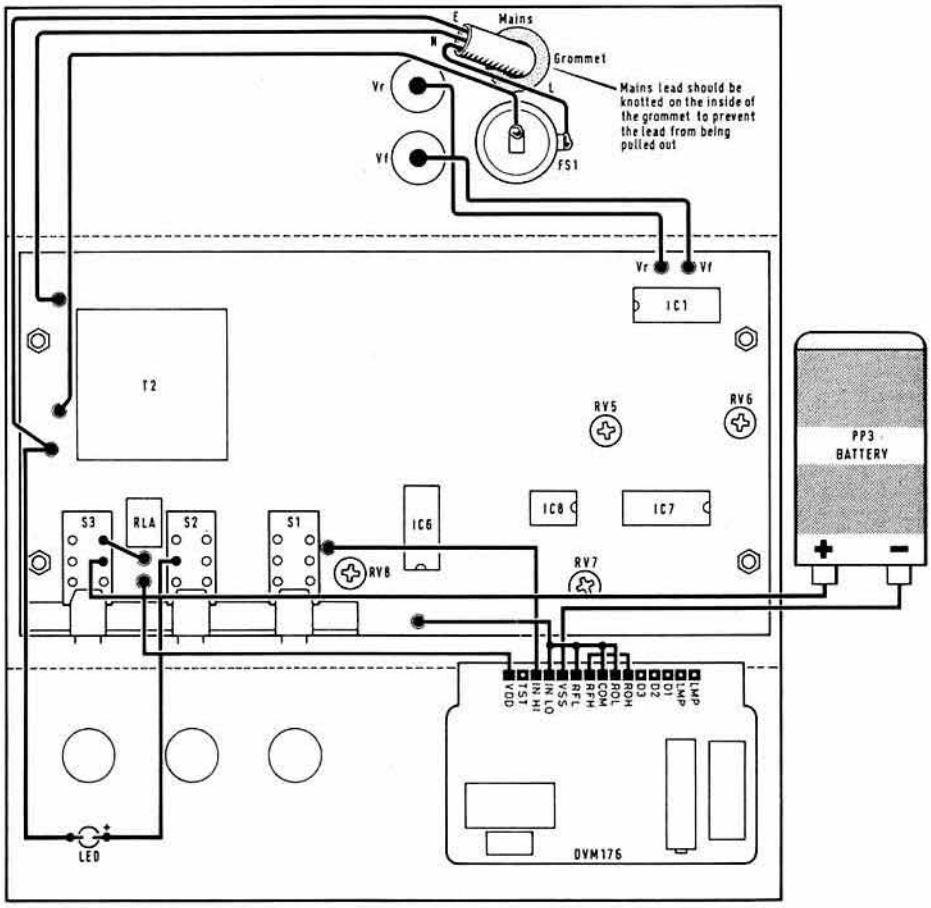


Fig 17. Digiwatt wiring diagram

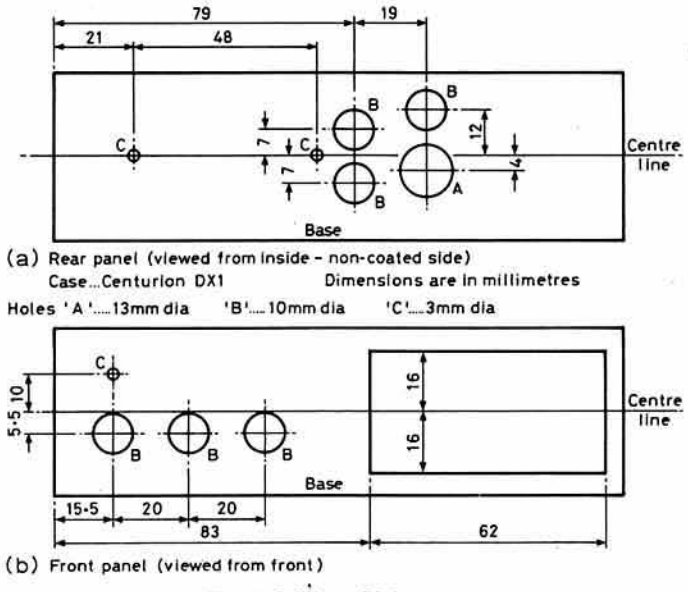


Fig 18. Drilling—Digiwatt case

Digiwatt components list (see Fig 1)

C1, 2, 4, 5, 8, 9, 11, 12, 13, 23	0·01μF ceramic disc
C3, 10	1,000pF screw-in feedthrough
C6	2·2pF silver mica
C7	140pF mica compression trimmer
C14	2·2μF tantalum 10V min
C16	22μF miniature electro 6V
C17, 18, 19, 20	0·68μF tantalum 35V min
C21, 22	470μF 25V pcb electro 14mm dia max
RV5	ALPS 22kΩ cermet preset
RV6, 7	ALPS 4·7kΩ cermet preset
RV8	ALPS 1kΩ cermet preset
IC1, 6	LM324
IC7	MC1495/ 1595
IC8	MC1741
IC11	7815
IC12	7915
REC1	WO-005 potted rectifier 50V 1A or equivalent (0·2in lead spacing)
D1, 2	OA91 matched pair (see text)
D3-5, 7-9	1N4148
L1, 2	TOKO 8BA 1mH rf choke
T1	15t 0·56mm enam copper wire wound on Fair-Rite Products ferrite toroid type 5961001101
T2	Drake PO612 0-12, 0-12V 6VA
RLA	Miniature type OUC
Display	Type DVM176 200mV FSD
L.E.D.	3mm round red
Battery	PP3 and connector
S1, 2, 3	SUE two-pole c/o push/push on 20mm spacing bracket
RF head enclosure	Die-cast box size 89 by 30 by 35mm
Case	Centurion Type DX1
F1	20mm 200mA fast in panel holder

R1, 2	27Ω 1W*
R3	2·2kΩ*
R10, 13, 60	15kΩ†
R11, 12	2·2kΩ†
R26, 30 58	10kΩ*
R27, 41, 43	20kΩ†
R28	1MΩ*
R29	4·7MΩ*
R31	1kΩ*
R32, 33, 34, 35, 38	10kΩ†
R36, 37	12kΩ*
R39	3·9kΩ†
R40, 42	3·3kΩ†
R44	1MΩ†
R45	3·6kΩ†
R59	2·2MΩ*
R61	150Ω*
R62	47Ω*

* Carbon film 0·25W 5%
† Metox 2% or better
All carbon film resistors other than R1 and 2 may be replaced by Metox types.

Miscellaneous

Three 14-pin dil sockets
One 8-pin dil socket
Bezel for DVM (type BEZ-10)
40mm RG58 coaxial cable
Two SO239 single hole sockets
Eleven 0·1in pcb connection pins
50cm 0·56mm dia enam copper wire
Four 0·5in threaded 6BA metal spacers
Eight 0·25in 6BA bolts and lockwashers
Three 0·5in 6BA bolts
Six 6BA half nuts
Three 6BA lockwashers
Four stick-on rubber feet
Length of three-core mains cable 5A
0·25in aperture cable grommet
Three knobs for push switches

A set of two pcbs is available from the author for £5.25 incl p&p.

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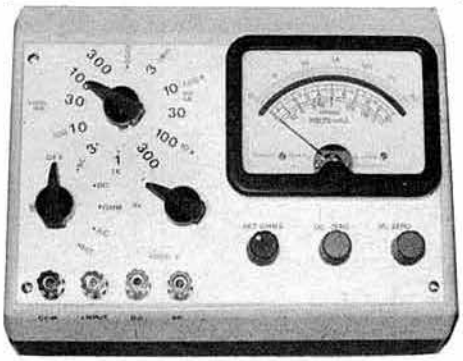
[2] "Frequency independent directional wattmeters", P. G. Martin. *Rad Com* June 1969.
[3] "Broadband power-tracking vswr bridge", H. Perras, K1ZDI. *Ham Radio* August 1979.
[4] "Automatic vswr and power meter", V. G. Leenerts, W0INK. *Ham Radio* May 1980.
[5] "Broadband reflectometer and power meter", R. Harrison, VK2ZTB. *Ham Radio* May 1979.
[6] Fair-Rite Products Corp data sheets.
[7] Motorola MC1495L specification and data application sheets. □

A WIDE-RANGE



ANALOGUE MULTIMETER

by H. L. Gibson, G2BUP*

THE CONVENTIONAL MULTIMETER using shunts and series resistors applied to a pointer type (analogue) microammeter has been largely displaced by the digital multimeter which is now frequently no more expensive than a commercially-made analogue multimeter. The digital meter is generally more accurate, more sensitive and, on voltage ranges, has a higher input impedance. However, digital meters using l.e.d. displays are expensive to power from batteries, or require a mains supply, while those using lcd displays tend to have a slow response time and are difficult to use when the value to be measured is not constant.

The analogue instrument described here competes with the digital meter for sensitivity and impedance by the use of transistor amplifiers to give full-scale deflection from 10mV to 1,000V or from 3μA to 300mA on both ac and dc, as well as resistance ranges, while drawing less than 2mA from a 9V battery. The input impedance on voltage ranges is a constant 10MΩ on ac, and 10MΩ/V on dc ranges, with a maximum of 10MΩ. The accuracy depends on the scaling accuracy of the meter and the tolerance of the range resistors, but an overall figure of ± 3 per cent can be achieved, which is more than adequate for most measurements; on ac, the calibration holds up to at least 50kHz after adjusting the compensating capacitors.

Circuit arrangement

The battery voltage is stabilized to about one per cent, and supplies separate dc and ac amplifiers used in conjunction with precision resistive dividers.

The stabilizer, shown in Fig 1, holds the supply at about 6·5V from a 9V battery, with the zener diode operating at very low current to reduce battery drain. The stable voltage is indicated on position 6 of the function switch S1 to give warning of the need to replace the battery, which should, however, last about a year in normal use.

The dc amplifier, shown in Fig 2, consists of two complementary long-tailed pairs with the voltage gain controlled by the differential feedback of R212–213 over R207–208. Transistors should be matched to about 10 per cent to ensure that the zero adjust controls have sufficient range. The meter movement is protected against damage by the inherent current limiting of the output stage, while the amplifier input is protected against most overloads by R205 and 206 and the shunt diodes. With an instrument containing non-linear elements there is a risk that ac superimposed on the dc being measured will result in serious errors; this can be minimized by giving the input circuit a long time constant. With C202 at 2·2μF, a signal at 50Hz or greater, equal in amplitude to the dc signal being measured, should not cause trouble.

Two zero controls are provided, both being mounted on the front panel. RV202 is set with the input shorted, for which a position is provided on S401 of the complete instrument, while RV201 sets the zero with the input open-circuit. This ensures that there is no potential across the measuring terminals and no risk of measurement error due to bias current flowing through the range resistors or the external circuit. RV203 is used to calibrate the instrument in order to take up meter and resistance tolerances, and should be of good quality for long-term stability; it could be mounted internally but, in the prototype, was mounted on the rear of the case. In the complete instrument the input signal to the amplifier is selected by the range resistors switched by S402a for voltage, S402b for current while S402c provides resistance measurement using an internal 1·5V battery as current source.

The ac amplifier shown in Fig 3 consists of TR303–305 driving a capacitor half-bridge rectifier, with a third diode in the collector of TR305 to offset the rectifier voltage pedestal. This type of rectifier measures the average level of the signal and requires an ac current of 110μA for full-scale deflection

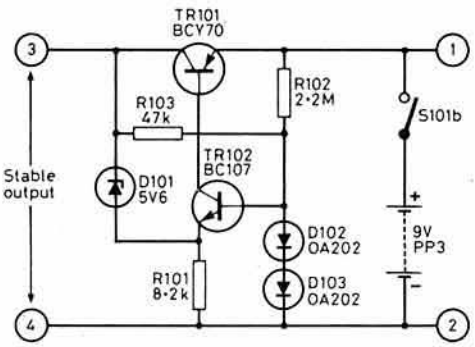


Fig 1. Stabilizer circuit diagram

*8 Springfield, Norton-St-Philip, Bath BA3 6NR.

ABOUT THE AUTHOR

G2BUP first joined the RSGB in the early 'thirties as BRS1224. He became 2BUP as an AA call in 1936-7, and was chiefly interested in 5m at that time. Although always in close touch with the Society, he did not take up a full call until the late 'sixties. Before retirement he was an applications engineer in the valve industry, and he lectured on two occasions at early vhf conventions on low-noise valves. He was responsible for the 432MHz beacon GB3GEC.

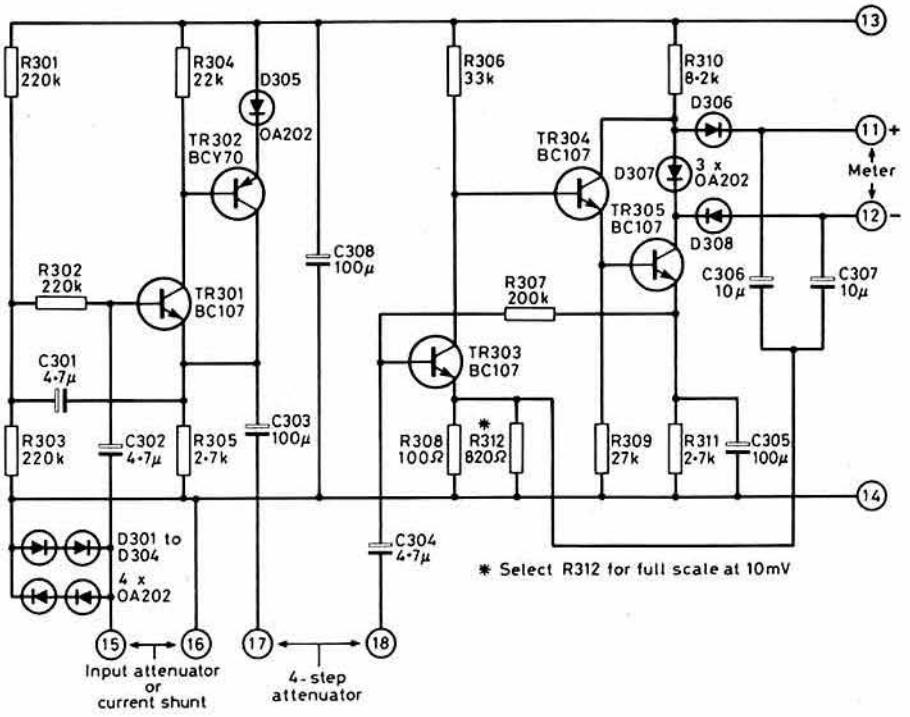


Fig 3. AC amplifier circuit diagram

of the 50µA meter. Feedback over R308 raises both input and output impedances, and defines the amplifier sensitivity at 10mV rms input for full-scale deflection. The amplifier is fed from a four-step low-impedance attenuator connected across points 17 and 18 and switched in the complete multimeter by S402f, providing ratios of 10-30-100-300. This is driven by the output of transistors TR301 and TR302 acting as a unity gain impedance converter between the high and low impedance attenuators.

The input attenuators are switched in three steps (×1, ×100, ×1,000) to give the full range 10mV to 300V and 10µA to 300mA. These are connected between points 15 and 16 in the complete instrument by S403a selecting either the voltage attenuator switched by S402d or the current shunt switched by S402e. The meter movement is protected from damaging overload by current limiting in the amplifier output stage; there is a transient deflection of the meter on switch-on but no damage results. The amplifier input is protected by four shunt diodes and the 4·7kΩ resistor in the millivolt attenuator range. Blocking capacitors are used to ensure that any dc component will not cause the protection diodes to conduct.

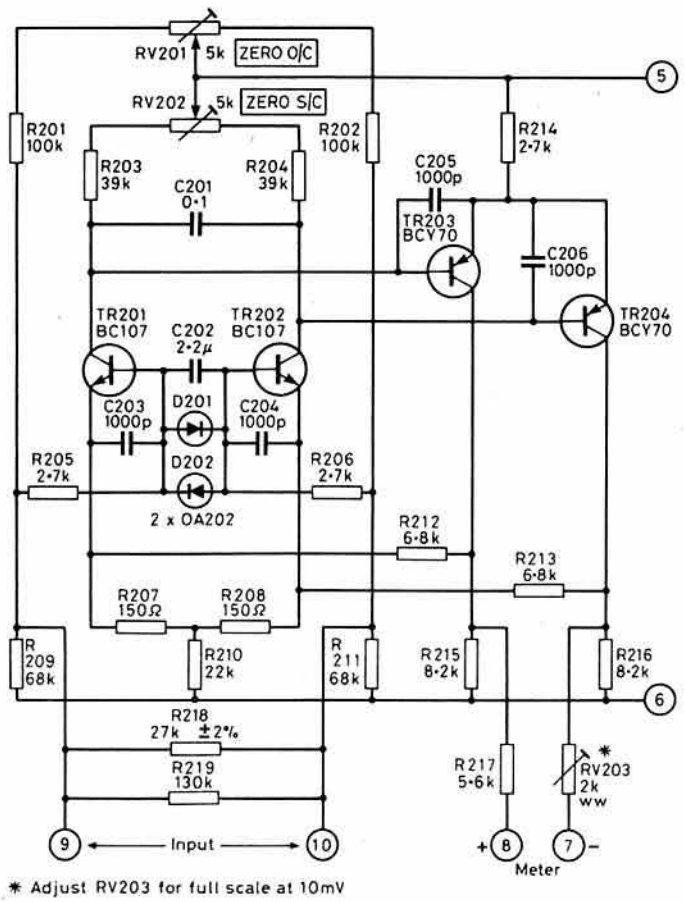


Fig 2. DC amplifier circuit diagram

Switching arrangements for the complete instrument

The circuit of Fig 4 shows all the switching connections and the values of the resistance chains. Taking the circuit from the input terminal; S401a connects the input for dc, ac or ohms measurement; S401b connects the internal battery in all except the OFF position; S401c and S401d connect the output of the voltage stabilizer to the appropriate amplifier; S401e and S401f connect the meter to the appropriate amplifier, or in position 6 to the stabilizer for checking the supply voltage; while S401g shorts the amplifier input for zero setting and connects the ohms zero adjust resistor RV404.

All the resistors shown in Fig 4, unless otherwise marked, should be of the highest precision available. A tolerance of ±1 per cent is desirable but is difficult to obtain, but two per cent metal film (MR25) or metal oxide (TR5) types are generally considerably better than their stated tolerance. These are satisfactory, especially if they can be checked on a bridge or digital meter of sufficient accuracy. The 7MΩ, 700kΩ, 70kΩ, sequence connected to S402a are made up of 68kΩ and 2kΩ in series and so on for each decade. The series resistors feeding the separate 1,000V dc terminal are shown as five 2MΩ resistors in series; this value is not generally available to a closer tolerance than five per cent, but if space is available for 10 resistors, 1MΩ values of type TR5 may be used. All of the dc shunt values connected to S402b are available in type MR25 except for 2·4Ω. This may either be wound with resistance wire or made up of several MR25 types in parallel; 5·1, 5·1 and 39Ω is a suitable combination.

The resistors associated with S402c, the ohms range selector, should be slightly lower than the rounded values shown, to allow for the 24mV drop in the current shunt, but it was felt scarcely worth correcting for this in view of the scaling accuracy of the meter ohms scale.

AC voltage ranging is selected by S402d, with the resistive dividers shunted by capacitive dividers which predominate at frequencies above about 5kHz. The fixed capacitors should be silvered mica types, while the trimmers may be Mullard beehive types. The separate 1kV ac terminal

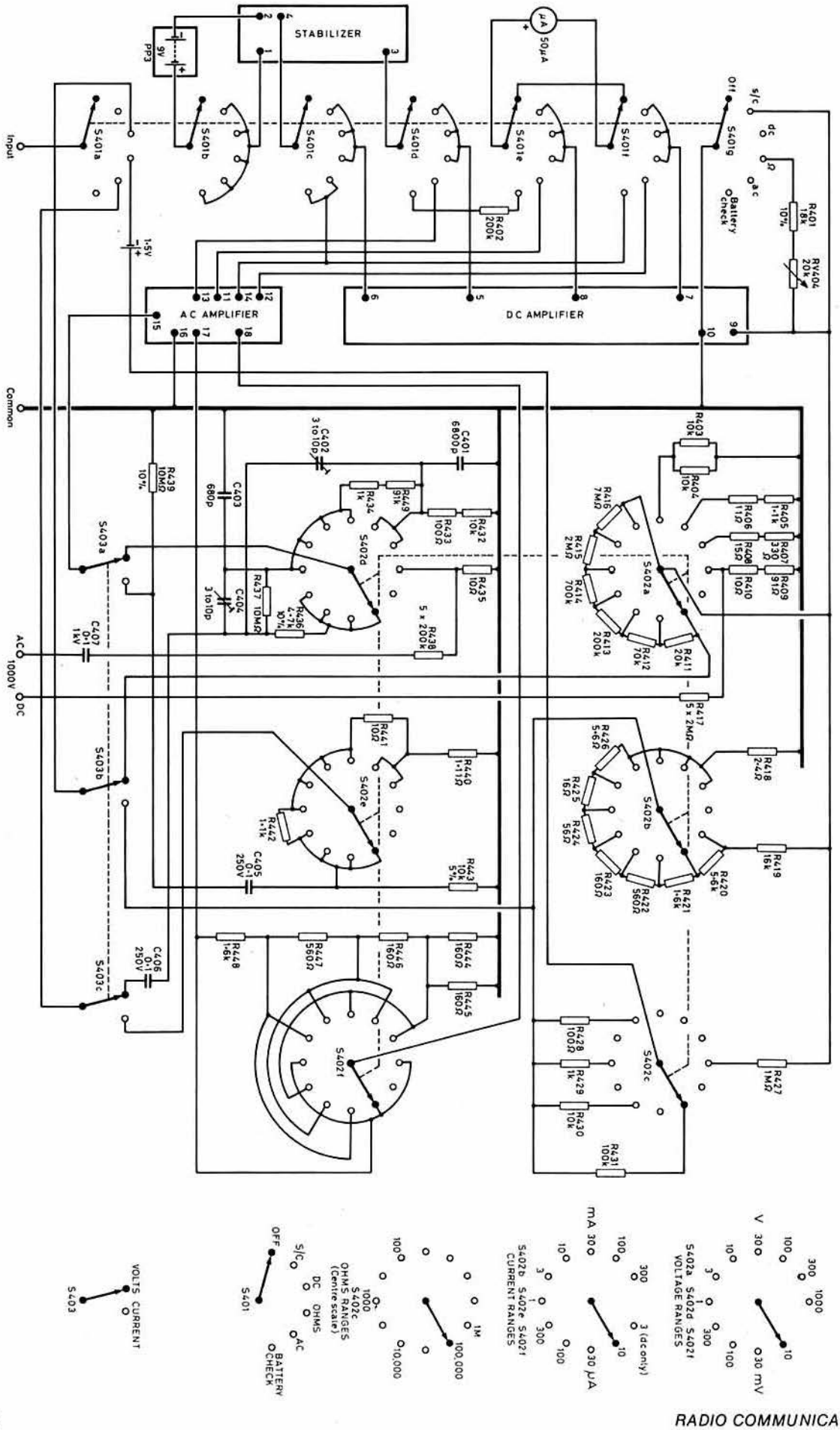


Fig 4. Switching arrangements and switch functions

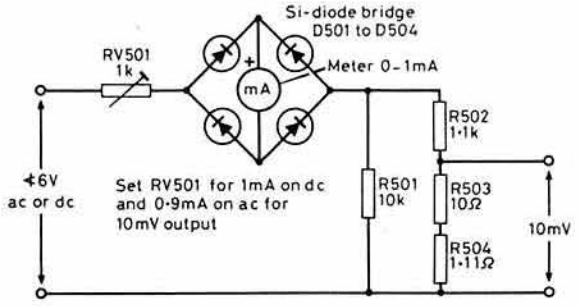


Fig 5. Source of 10mV for calibration

operates at 1mA full-scale to avoid having to frequency compensate this range. AC current ranging is selected by S402e; the 1·11Ω resistor may be made up of five 5·6Ω resistors in parallel or of resistance wire. The resistors associated with S402f, which switches the four-step attenuator, are available at ±2 per cent.

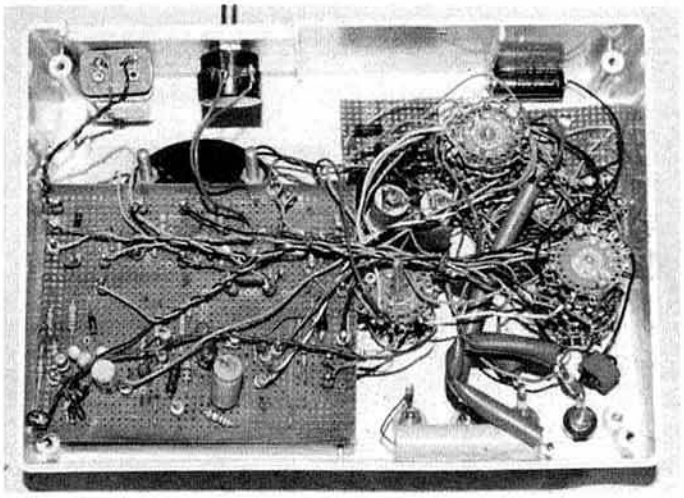
Construction

The construction adopted may be seen in the photographs, but it is not critical. The housing is a Verobox type 21032 which is a plastic box with an 8 by 5in sloping metal panel which comfortably takes a meter in a 4 by 3in bezel. It was intended to line the box with aluminium foil as a screen against rf pick-up, but so little trouble was experienced at the author's station that the screening was omitted. Nevertheless, the amplifiers must be susceptible to rf, and screening should be considered. RF filtering was provided by taking the leads from the terminals inside the box through twin-hole ferrite beads (Siemens type B62152 size C in U17 material).

Intending constructors frequently expect a layout for a special pcb to be provided for a project of this kind. In the author's view, this is not an appropriate form of construction for a one-off, low-frequency project; the time and effort required are not justified. The readily-available 0·1in matrix Veroboard is entirely suitable. In the prototype, the two amplifiers and the stabilizer were built on a single board 4·5 by 3·5in, while the ac and dc attenuators were made separately on Veroboard 3 by 1·5in mounted either side of the range switch. Layouts approximating to those used are given for these boards, but considerable variation is possible. The author is quite sure that a second attempt would come out differently, and constructors might well prefer to devise a layout for themselves taking account of the size of components to be used.

The important point when using Veroboard is to ensure that the copper strips are broken where intended; failure to do so can lead to puzzling and potentially damaging faults. A helpful method is to counter-bore lightly on the component side of the board at each point where the track on the underside has been broken. This enables the component layout to be checked against the circuit diagram without repeatedly turning over the board. Working in this way provides a check against errors either in the printed article or introduced by the constructor.

When first built, thermal drift was noticeable in the dc amplifier, but was adequately reduced by thermally coupling TR201 and TR202 with a blob of



Interior view of the multimeter

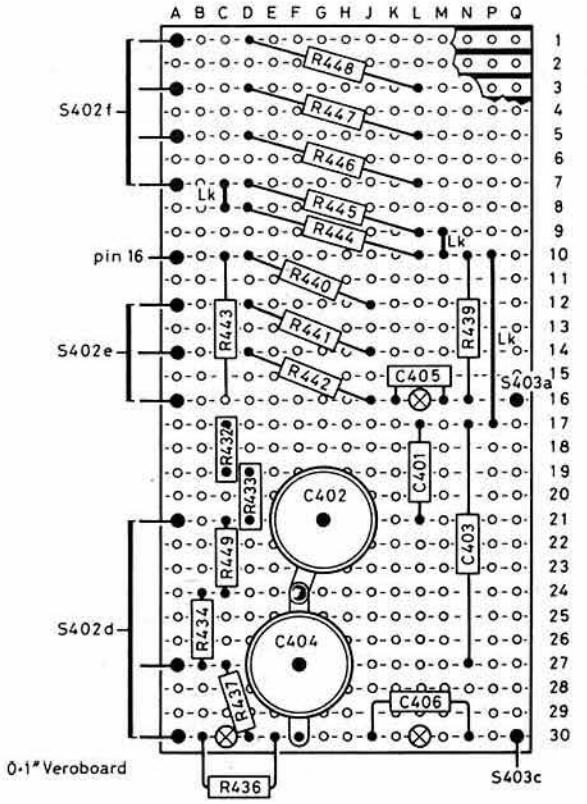


Fig 6. AC range resistors layout on Veroboard

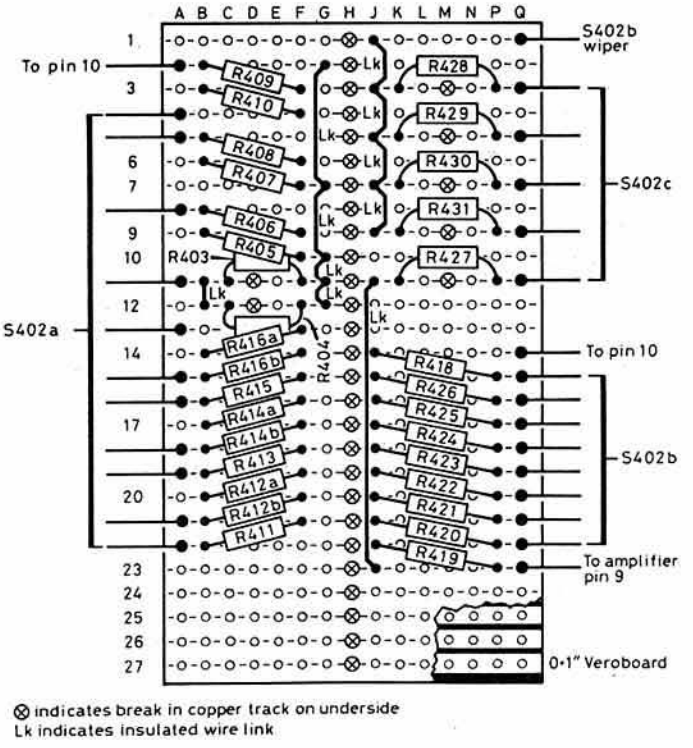


Fig 7. DC range resistors layout on Veroboard

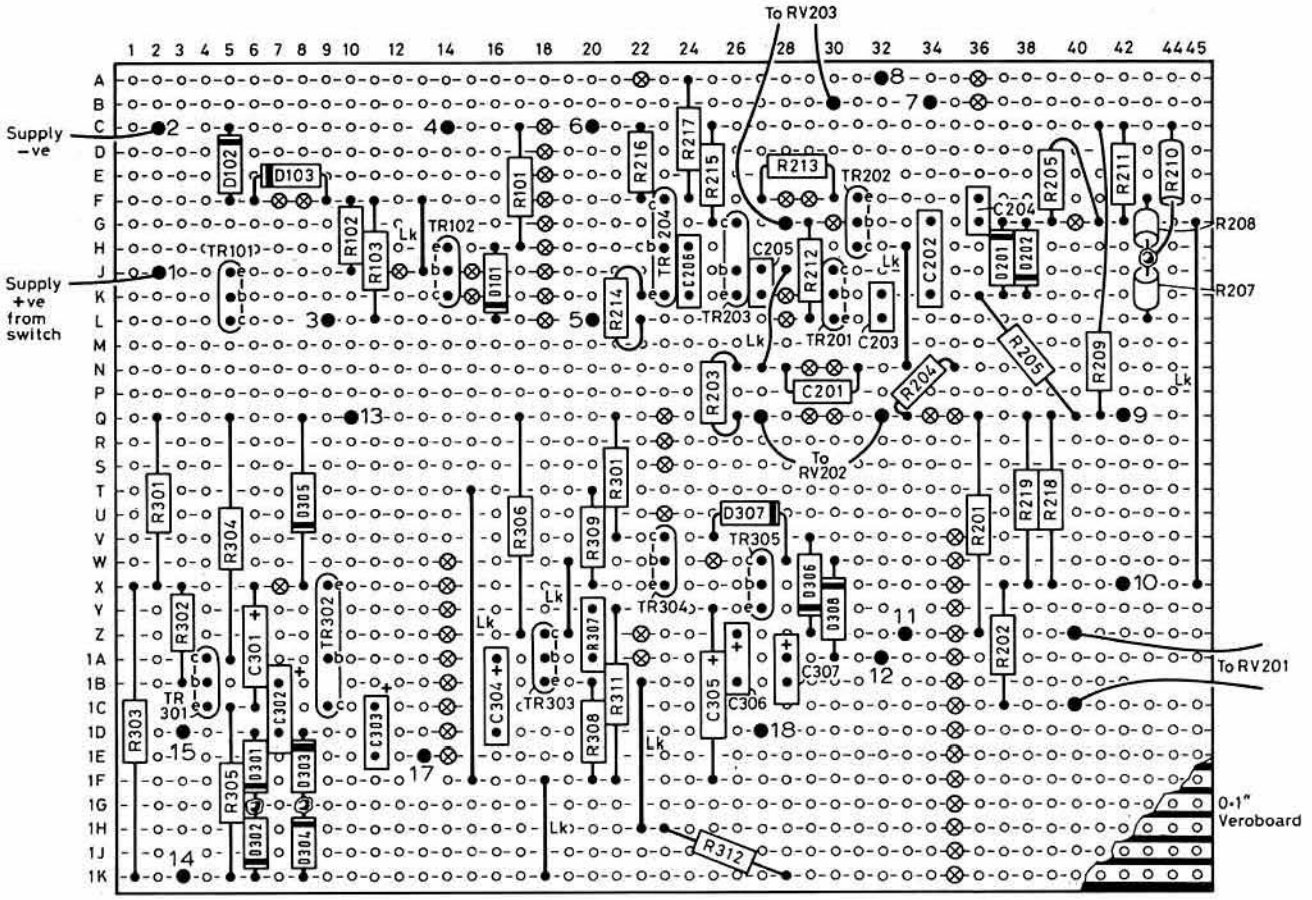


Fig 8. Amplifier and stabilizer layout

Araldite. These two transistors should, therefore, be located close to each other.

The switches are all of the RS Maka switch type. S401 uses four two-pole six-way bbm wafers with one set of contacts unused. S402 has six wafers, each one-pole 12-way bbm, except for the current shunt switches S402b and S402e which are 11-way mbb. S403 only requires a three-pole two-way switch but a three-pole four-way wafer was used.

Calibration

A 50μA meter movement scaled 0–1 and 0–3, and an ohms scale based on 100 at centre scale, are required to display all the ranges. One or more of these scales will normally have to be added by hand or, of course, alternate ranges could be omitted. If an ohms scale based on 200 at centre scale (ie the AVO Model 9 movement) is already available, all the resistors associated with S402c and the ohms battery voltage should be doubled. On the other hand, if a digital meter reading ohms is available, it might well be decided to omit the ohms ranges from this instrument, since the accuracy cannot compare.

A calibration voltage of 10mV ac and dc is required in order to set the sensitivity of the two amplifiers. If no standard is available, the arrangement shown in Fig 5 may be used; it requires an accurate 0–1mA meter and a duplicate set of the resistors used for the ac current shunt. With about 3V dc applied, the variable resistor is set to give 1mA meter deflection; similarly, with ac voltage applied, a current of 0·9mA is set up. These two conditions will provide 10mV dc and ac respectively at the output. With 10mV dc applied to the most sensitive dc range, RV203 is adjusted for full-scale deflection. With 10mV ac applied to the same ac range, the 820Ω resistor shunting R308 in the ac amplifier should be modified to give full scale deflection.

To correct for the effect of stray capacitances on the ac ranges, the two trimmers must be adjusted for correct reading at a frequency between 5 and 50kHz. The trimmer shunting the 10MΩ resistor corrects the 1 to 30V ranges, while the other trimmer corrects the 100 and 300V ranges. Typically, the beehive trimmers have the two halves just unmeshed.

Meter substitution

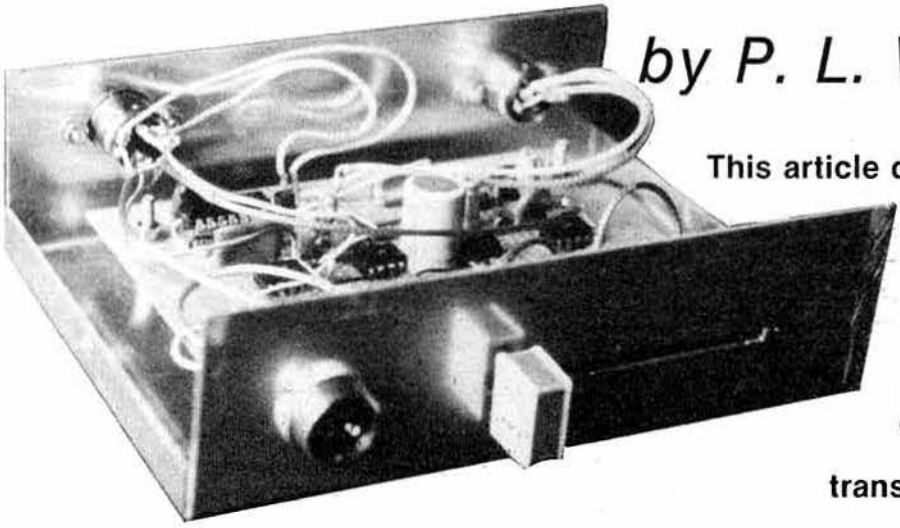
In the event that a suitable 50μA meter is not available, a 100μA meter may be used with the following modifications and a slight increase of battery consumption.

DC amplifier, Fig 2. Change R214 to 1·5kΩ, R215 and R216 to 4·7kΩ, and R217 to about 3·3kΩ (adjust so that RV203 is set reasonably near mid-travel).

AC amplifier, Fig 3. Change R310 to 4·3kΩ, R311 to 1·4kΩ, R308 to 47Ω, and R312 to 1kΩ adjusted during calibration. The 200kΩ resistor between S401d and S401e should be reduced to 100kΩ. The meter resistance has not been allowed for in these values as the battery check position need not be accurate.

All the components used in this multimeter, except the meter itself which came from the junk box, were obtained from Electrovalue. □

A CASSETTE RECORDER ADAPTER



*by P. L. Woods, G8HHZ**

This article describes an adapter built by the author to enable him to record both sides of a QSO onto a standard cassette recorder. Such recordings may later be mixed with the signal from the microphone and retransmitted providing certain licence conditions are met.

A facility exists for logging transmissions on a selected channel.

Introduction

There are many occasions when it would be useful to be able to tape-record a contact. For example, to have a record of a QSO with a special event station, or perhaps just to keep a note of a Christmas net for the later enjoyment of absent friends. Also, a recording of all transmissions on a channel could prove invaluable in the debriefing after a Raynet exercise. One popular method of operating sstv without a camera is to play previously-recorded pictures into the microphone socket of the transmitter and record the reply in case a copy of the contact is needed at a later date. Indeed, the amateur radio licence permits messages received to be recorded and retransmitted if they do not contain any callsigns and are intended for reception only by the originating station. This provides an honest way of answering the frequent request for "an audio quality report please, om".

Facilities to fulfil the above demands could be provided by connecting the microphone and loudspeaker sockets of the transceiver to the radio out and in sockets on the tape recorder. Life is rarely as simple as this, however, as the various signal levels and impedances must be matched for good reproduction. Also, to avoid the inconvenience of unplugging the microphone when it is desired to replay a recording, some form of mixer is required. Then, to record both sides of a QSO the signal from the microphone must be mixed with the receiver audio before being fed to the recorder. Finally, the drive to the squelch gate in the receiver, when combined with the push-to-talk (ptt) switch, should be made to operate the tape recorder only when there is a signal on the desired channel. This can be used to provide a channel logging feature.

This is the specification of the unit to be described, and Fig 1 is a block diagram of the design.

Circuit description

The author's prototype was designed for use with the Icom IC22A 144MHz vhf transceiver and Grundig C415 cassette recorder. Adaptation to other types of kit is considered later. Fig 2 is the circuit diagram of the project. The bulk of the circuit is concerned with converting the signal levels from those delivered by one thing to those desired by another. In addition to connections to the transceiver, the cassette recorder and the microphone, there is an extra audio output available from the unit for those who wish to employ a headset. This is at 15mV at 1kΩ impedance.

The microphone is fed into IC5, which acts as a buffer amplifier feeding the adder, IC3, and the mixer, RV2 and RV3. IC2 and IC3, like all the operational amplifiers in this circuit, are of the common 741 type. To record a QSO the receiver audio is buffered by IC2, and attenuated slightly in the process to bring it to the same level as the microphone signal. These are then added by IC3. RV4 is intended as a balance control so that both transmitted and received audio seem to be of equal strength on the recording.

The output of IC3 is fed into the AUDIO IN socket of the cassette recorder, and is set to provide 35mV of signal. This is adequate for the Grundig C415, which has an automatic record level facility, but may be insufficient for a recorder without this feature. The modern standard is for 400mV at 47kΩ impedance, which could be supplied by decreasing R8 to 5·6kΩ. Alternatively, the MICROPHONE IN socket could be used as it has greater sensitivity.

To transmit a recording, the "radio out" signal from the recorder is fed into the potential divider formed by R2, RV1 and R5. This is because the signal was found to be sufficiently large to need attenuation rather than amplification. The actual mixing is controlled by a pair of ganged potentiometers, RV2 and RV3, which select whether the microphone or recorder is to provide the transmitter modulation. The mixer output goes into IC1. The output from this is fed into the microphone socket of the transceiver. RV1 is intended as another balance control, and should be set up so that the played-back recording sounds as loud as speech from the microphone to a listener to the transmission.

A capacitor is included in the feedback network of each op-amp to limit its hf response. This is always a wise precaution, especially if there is likely to be any rf floating around to cause interference. Further protection against rfi is provided by series rfcs in each lead, the op-amp side of which is decoupled to earth with a 1nF disc ceramic capacitor.

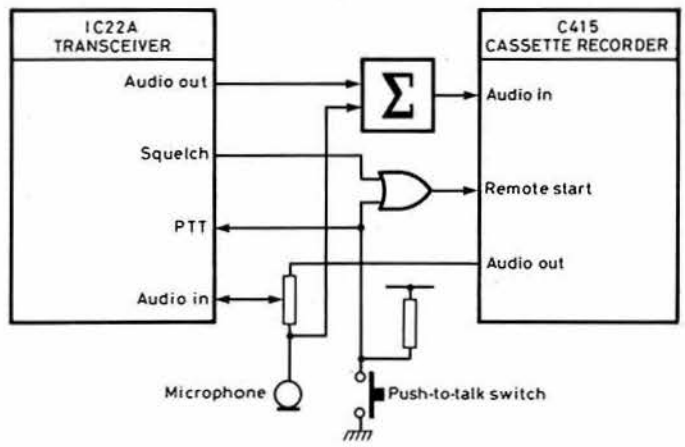


Fig 1. Block diagram of the adapter

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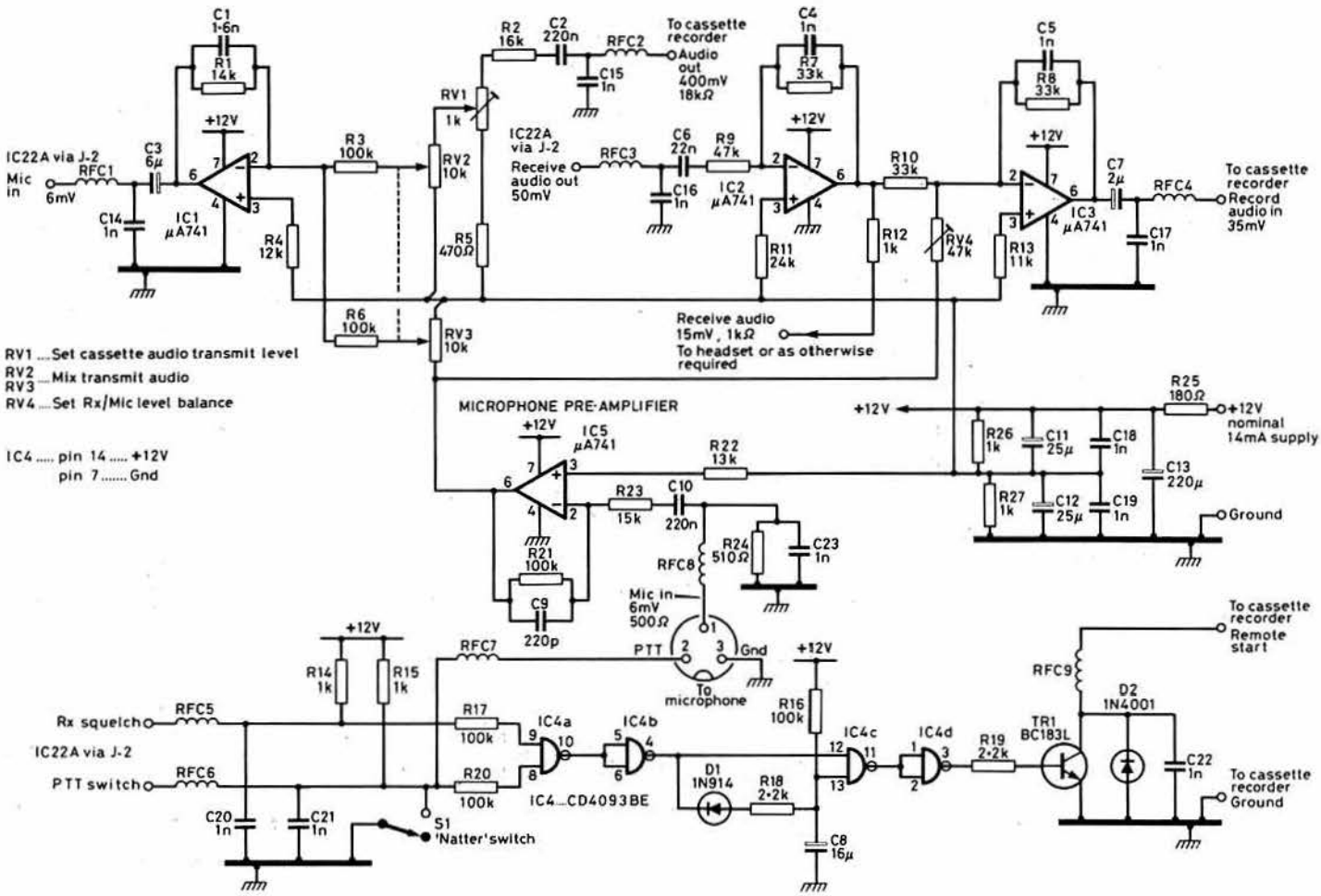


Fig 2. IC22A-C415 interconnection circuit diagram

The control circuitry is based on a CD4093BE, which is a cmos quad Schmidt trigger circuit. The sense of both the squelch and the ptt switch is that they are at logic "1", or +12V, when they are inactive. That is, if the ptt switch is pushed to transmit, or the receiver detects a signal on the monitored channel, then the appropriate line becomes active and changes state to logic "0", or 0V. IC4a and b are used to perform this function. Their inputs are protected from damage by static discharges by a series and shunt resistor network in each lead—R14, R15, R17 and R20.

The output from IC4b, the tape "run" signal, could be used to drive the cassette recorder remote start line directly, but this would result in the recorder starting and stopping at the end of every over. This is avoided by putting a delay on the time that this signal turns off. R16 and C8 provide the delayed "run" signal, D1 ensuring that the time delay resets quickly when the "run" signal returns. IC4c and d combine the two lines to yield a composite "run" signal which does not drop out at the end of an over, but keeps the recorder running for a second or so ready for the start of the next transmission.

This composite "run" signal is finally buffered by TR1 to drive the cassette recorder's remote start line. This will switch up to 20mA at 20V, which is adequate for the C415 as this recorder features a transistorized speed governor for the capstan motor. If more drive is required, a bigger transistor or reed relay will be needed. D2 provides protection against incorrect connection.

Connection to recorder and transceiver

The necessary connections to the cassette recorder should present no difficulty as all the necessary lines are available directly on a seven-pin DIN socket. The precise pin connections may be found in the circuit diagram supplied with the recorder; those of the C415 are shown in Fig 3.

The connections to the IC22A are more of a problem as they must first be installed, rather than just used. They are all made via the accessories socket, J2, fitted at the rear of the IC22A chassis, which has many spare pins.

Four signals are needed in addition to the ground line, which is already connected. The ptt and transmit audio signals are best connected direct to the microphone socket, J1, on the front of the chassis. Pin 1 is "microphone in", and pin 2 the ptt line. The receive audio is tapped off the "hot" side of the audio gain potentiometer, R1, on the front panel. Finally, the squelch signal is derived from the controlled side of the squelch indicator light. This lamp, PL2, is connected between the +12V line and a driver transistor, Q26, and it is the driver transistor side of the lamp which should be used.

Both audio signals should be conveyed along miniature coaxial cable to avoid picking up rf from the various oscillator chains in the unit.

The author also took the 12V supply needed by the adapter from the IC22A via the socket J2.

Power supply

The power requirements are modest at only 14mA at 12V nominal. This should easily be accommodated by the psus in either the transceiver or cassette recorder. Unless an extremely bad supply is used, there should be no need to regulate it.

If mobile operation is intended, the car battery should prove adequate. The 741 op-amps have an absolute maximum rating of 35V, and so are

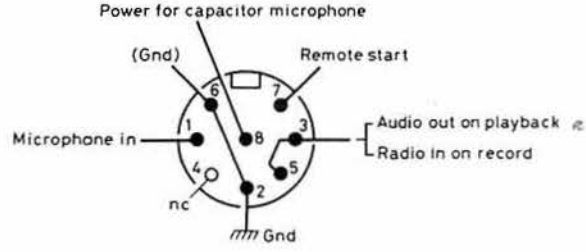
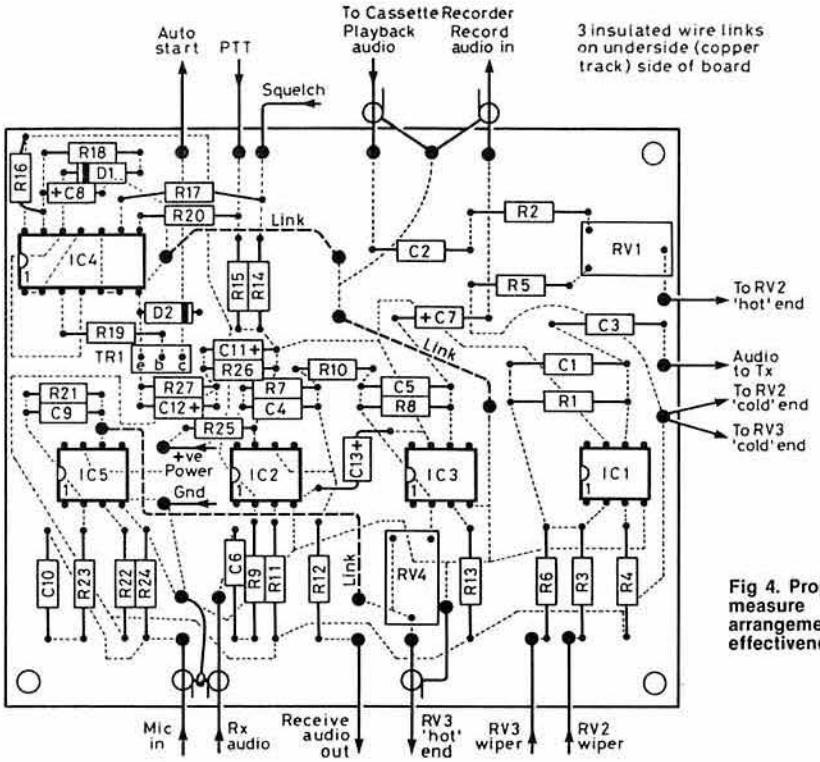


Fig 3. Connections to DIN socket on Grundig C415



Components list

R1	14kΩ	C1	1·6nF
R2	16kΩ	C2, 10	220nF
R3, 6, 16, 17	100kΩ	C3	6μF
20, 21		C4, 5	1nF
R4	12kΩ	C6	22nF
R5	470Ω	C7	2μF
R7, 8, 10	33kΩ	C8	16μF
R9	47kΩ	C9	220pF
R11	24kΩ	C11, 12	25μF
R12, 14, 15,	1kΩ	C13	220μF
26, 27		C14-23	1nF disc ceramic
R13	11kΩ		
R18,19	2·2kΩ	RFC1-9	Small rf chokes
R22	13kΩ		
R23	15kΩ	IC1, 2, 3, 5	μA741
R24	510Ω	IC4	CD4093BE
R25	180Ω		
		TR1	BC183L
RV1	1kΩ preset		
RV2, 3	10Ω ganged slider	D1	1N914
RV4	47kΩ preset	D2	1N4001

Fig 4. Proposed pcb layout for the cassette recorder adapter. The boards measure 3 by 3·5in plus whatever border is needed for mounting arrangements. C14-23 and the rfcs are not shown on the pcb, as for maximum effectiveness they should be mounted directly on the connectors bolted to the box containing the unit

unlikely to be affected by most electrical spikes. The absolute maximum rating of the CD4093BE is lower at 20V, but if troubles are experienced here, presumably they are already foretold by the car radio continually breaking down.

Decoupling capacitors should be used between the power supply pins of each ic. The author used 1μF tantalum bead and 10nF disc ceramic capacitors effectively.

The only point to note is that R26 and R27 are used to give a line at half the supply potential to which the signals to and from the 741 op-amps are referenced. So that power supply voltages are given as 0–6–12V rather than the more usual – 6 – 0 – + 6V. This is because this equipment is designed to be operated from one battery, rather than two.

Construction

As may be seen in the photograph of the interior view, the prototype was constructed on Veroboard, using point-to-point wiring as necessary. A suggested pcb layout is shown in Fig 4 for those who prefer that means of construction.

At the top of the photograph can be seen a slider potentiometer used as RV2 and RV3. To the right of that is a three-pin microphone socket of the type used on the IC22A, and similarly connected. Thus the Icom microphone may be employed directly with this adapter. A pair of seven-pin DIN sockets at the bottom of the photograph convey the signals to and from the transceiver and the cassette recorder. All af signals are carried on miniature screened coaxial cable to avoid hum pickup at the low signal levels used.

A metal box is used to enclose the unit, as should all projects where freedom from rf interference is desired. All incoming and outgoing leads are decoupled with small series rf chokes and shunt 1nF ceramic disc capacitors. These are mounted on the connectors, rather than on the pcb, to prevent the connecting leads acting as antennas and radiating the stray rf to be picked up by the ics. Time spent installing these from the start will be well repaid in later reliability.

Operation

Use of the unit is very simple. To record a QSO, the cassette recorder is loaded with a cassette, and turned on as usual. The QSO is carried out using normal operating practice, the logic driving the recorder's remote start line ensures that the tape only runs while the QSO is in progress.

To transmit a recorded cassette, the tape must be positioned at the appropriate point; then, with the tape running, the microphone can be faded-out and the tape faded-in using the mixer control, RV2 and RV3. Operation of this control will also mute the playback as needed to remove any unwanted callsigns. The ptt switch still controls the transmitter, and must be depressed, even if a recording is being transmitted.

By this method, reports on audio quality may easily be given. For this, it is perhaps best to have a third station listening to both the original and retransmitted signal in order to confirm to the station requesting the report that his audio really does only sound as good as that.

Connections to other equipment

This article describes a principle, and there is no reason why the project should not be used with other equipment. This adapter could be modified to use any transceiver, or separate transmitter and receiver, at hf, vhf or uhf. The cassette recorder could be replaced with a reel-to-reel recorder if logging over an extended period were desired.

Because op-amps are used to buffer most signals, it is an easy matter to

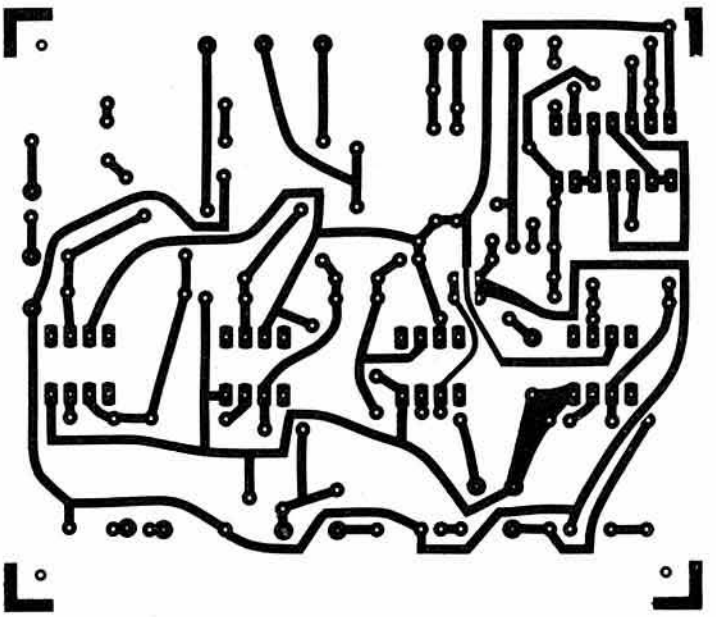
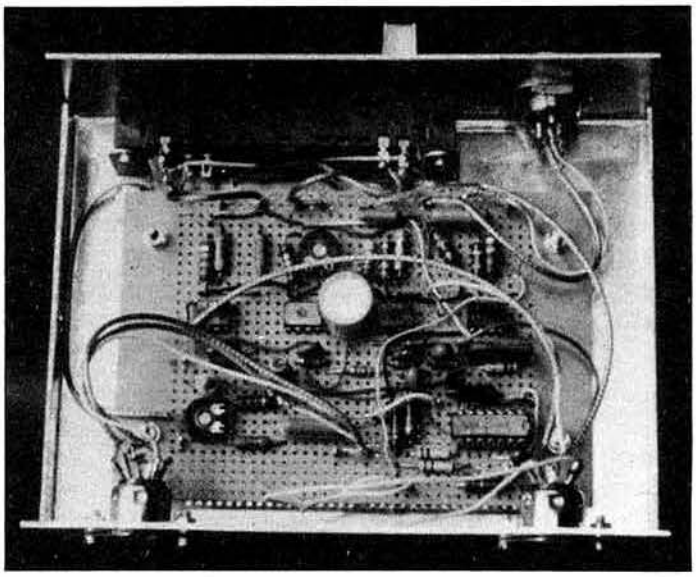


Fig 5. PCB etched copper side



Interior view of the adapter

adapt the unit to different signal levels simply by altering the values of the feedback resistors. The precise audio levels are generally unimportant, as most cassette recorders and "rice boxes" contain agc circuits to set the record level or prevent over-modulation.

If no squelch signal is available, as may be the case if the unit is used with an hf receiver, the standby/transmit switch on the transmitter could be used instead, although with the loss of the channel logging facility. If another cassette recorder is used, it is possible that a remote start line may be unavailable. In that case, use will have to be made of the normal record/playback button.

Improvements

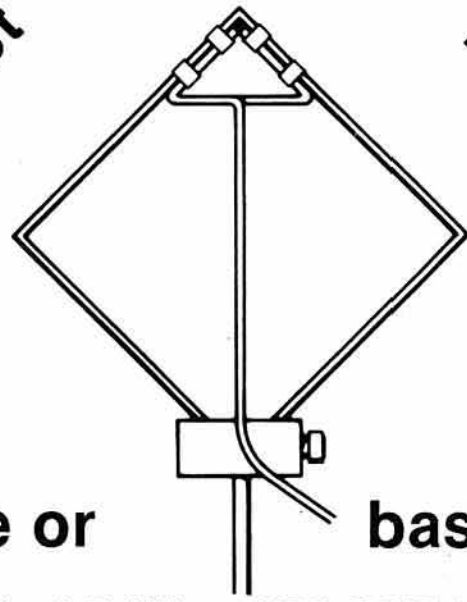
After using the unit for some time, the author has found only one problem; the microphone is always live, even when the transceiver is on receive. This leads to general room noise being recorded on to the cassette, which can sometimes detract from the quality of the recording. The solution is to incorporate some form of audio gate at the output of IC5 which is controlled by the ptt switch. The author has not yet been able to try this modification.

Conclusion

A need was identified for an adapter to connect a common 144MHz mobile rig, used by the author as a base station, to a tape recorder so that QSOs could be logged for record or demonstration purposes. The described unit fulfils the project requirements, and permits the recordings made to be replayed for retransmission. A built-in fader section allows recordings to be commented on as they play, or faded-out to remove unwanted callsigns from the retransmission.

The unit has been in use at the author's station for several months, and has proved itself useful on many occasions. □

A compact hf antenna for portable or base operation



by J. R. Killeen, MBE, G3KPV*

THE NEED for a compact efficient hf antenna has been the dream of radio amateurs for many years, especially those with limited space available, as well as for portable operation without the need to carry large masts and riggings which create problems in transportation.

The loop antenna has been around for many years now, although its use has been confined (until recent years) to receive-only operation, mainly for df purposes. In recent years, improvements to increase efficiency of the loop by the use of low-loss conductors, and improved matching circuitry have made it quite suitable for transmitting purposes. In fact, efficiencies similar to that of a dipole antenna may now be achieved, particularly at the higher frequencies. For maximum efficiency of the $\lambda/2$ loop described (this can never exceed that of a resonant dipole), the radiating loop should be approximately $\lambda/4$ circumference at the highest frequency, and constructed of large diameter copper or even silver-plated copper tube in one piece so as to form a circle. This figure allows for stray capacitance and minimum available C on most normal air-spaced capacitors. For portable use, the sides of the square radiating loop (copper or aluminium) may be bolted together for easy dismantling. The square shape produces a slightly lower efficiency compared with a circular loop which provides the greatest area from a given circumference.

Electrically, the $\lambda/2$ loop described is a capacitance-loaded $\lambda/2$ dipole, the capacitance being placed across the ends of the dipole radiating element, and may be made variable in order to cover a large frequency range. With normally-available air-spaced transmitting capacitors, maximum/

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minimum ratios of approximately 30 can be achieved, which in turn can produce a tunable frequency range of 4·5:1 after allowing for stray capacitance across the ends of the radiating element and the wiring. Better still, with those fortunate enough to have at hand a vacuum capacitor, a tunable range of 10:1 is a possibility due to the very high ratio of minimum/maximum capacitance.

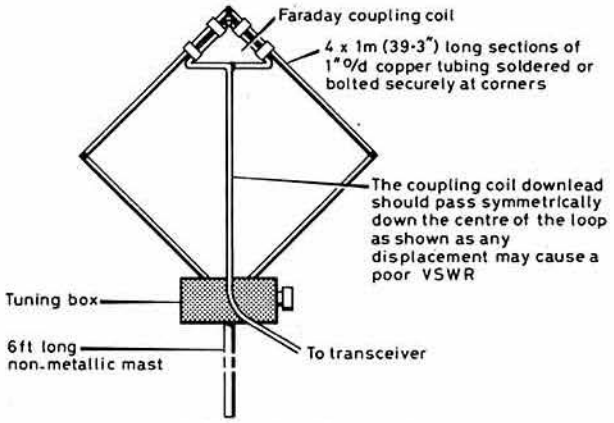


Fig 1. Complete antenna system

A loop antenna constructed along these lines has other advantages not previously mentioned:

1. High operating Q—typically 200 or more (thus adding to the front-end selectivity of the receiving system).
2. Dipole performance over a wide frequency range.
3. Figure-of-eight polar diagram at low angles of radiation, thus enabling unwanted dx from other directions to be reduced or the reduction of locally-generated noise and tv line time-base interference, by rotation of the loop.

Construction of an antenna covering the 3·5–14MHz bands

Overall efficiency is largely dependent on the material and the enclosed area of the radiating loop, and although 1in aluminium tubing has been used by the author, it would be advisable for this to be formed in one piece as a loop or even square configuration. For portable use, the four 1m sections should be flattened at each end and securely bolted together in order to provide a low resistance path for the high currents flowing within the radiating loop. *Note:* Currents of approximately 40A have been measured at some frequencies with an input power of 100W. Alternatively, 1in copper tubing could be used in four 1m sections with the ends flattened and the sections soldered together to form a square. Fig 1 shows the construction of the complete antenna system.

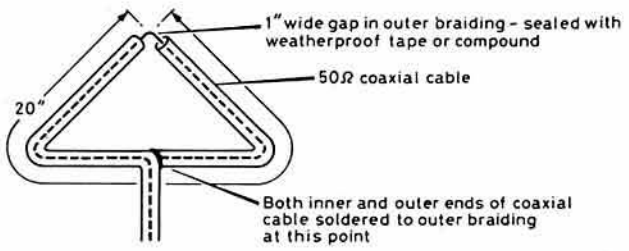


Fig 2. Faraday coupling coil

The Faraday coupling coil (Fig 2) may be taped to the top corner of the radiating loop alongside the radiating element, or may be secured by Terry clips. The circumference of the coupling coil shown is 20in and provides a good compromise vswr over the bands covered by a 4m-circumference loop. However, if a different size of loop is decided upon, or if lower vswr is required at the lower frequencies (at the expense of the higher frequencies), then the circumference of the coupling coil may have to be changed to suit the requirements.

Fig 3 shows the wiring of the tuning box, which may be constructed of any reasonable insulating material, or even wood suitably weatherproofed. The backplate of the tuning box supports the radiating loop, and should therefore be constructed from the best insulating material available, such as ptfe, perspex, etc in order to preserve the high Q (and thus the efficiency) of the antenna.

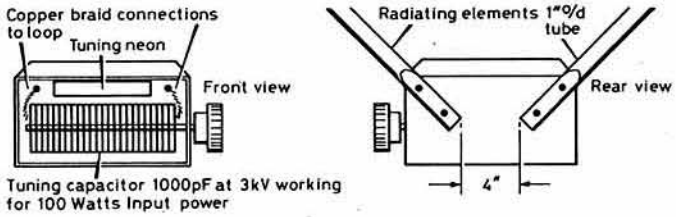


Fig 3. Tuning box layout

A 4W neon tube suspended above the tuning capacitor will serve as a tuning indicator (tuning for maximum brilliance) or, alternatively, a vswr meter connected in the coaxial feedline may be used for resonating.

Results

The author's model is constructed of 1in copper tube, in a square configuration with 1m on each side, and tuned by an air-spaced capacitor of 1,000pF maximum. The tuning range is approximately 3·4–15·2MHz, and therefore covers the 3·5, 7, 10 and 14MHz amateur bands. Approximate gain figures reference to a dipole at the *same height* indicate that the loop is equivalent to a full size λ/2 dipole at 14MHz, −3dB at 7MHz and −9dB at 3·7MHz. It should be stressed at this point that gain measurements were taken at high angles of radiation with the loop and the reference λ/2 dipole mounted at the same height. The practical efficiency of a horizontal dipole (particularly at the lower frequencies) increases with height because of ground losses, whereas the gain of the loop is little affected. Therefore, if the gain of the loop is compared with that of a dipole mounted at 60ft above ground at 3·7MHz, the loop will show a loss significantly greater than the 9dB quoted earlier.

Using skywave propagation, results have shown the polar diagram to be omnidirectional up to 1,000 miles, with some directivity beyond this distance depending upon the radiation angle. On 3·5MHz, signals have generally been 59 over UK and Europe, and the occasional QSO Statesside using 100W output ssb with reports of 55/57. Similar results were obtained on 7 and 14MHz where results similar to that of a resonant dipole can be expected.

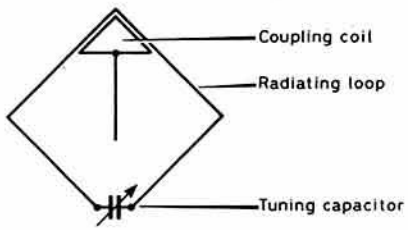


Fig 4. Wiring diagram

Compared with a dipole, reception on all bands shows an improvement in signal-to-noise ratio after nulling out any local noise levels such as tv line time-base interference etc. The vswr relative to 50Ω showed a worst case figure of 2·5:1 at 3·5MHz, gradually improving to less than 2:1 at 3·8MHz and better than 1·5:1 on 7 and 14MHz.

Although the version described covers the 3·5–14MHz bands, a fixed capacitance of 1,500pF 5kV working voltage, and preferably of silvered mica construction, may be switched in parallel to the main tuning capacitor in order to cover the 1·8MHz band. Better still, for greater efficiency, a separate loop could be constructed for 1·8 and 3·5MHz with sides of about 2m, using 2in diameter copper tubing and tuned with a 1,000pF variable capacitor.

The antenna described has a high Q, and therefore a small bandwidth (typically 20kHz at 3·7MHz), so that even small changes in operational frequency must be accompanied by antenna retuning if low vswr and efficiency are to be maintained. □

Technical Topics *by Pat Hawker, G3VA*

THOSE OF US who still feel that amateur radio deserves better than just being written off as another leisure hobby concerned only with QSLs, countries lists, dxpeditions or cross-town chatter can point with some pride to the history of radio astronomy. We have just passed the 50th anniversary of the discovery that signals were coming from outer space—a discovery that then became little more than a footnote in the literature until a talented and keen American radio amateur got busy in his back garden, driven by the curiosity that has led to so much progress in radio science.

THIS MONTH

50 years of radio astronomy

The first person to clearly identify radio emissions as coming from extra-terrestrial sources was Karl Jansky of the Bell Telephone Laboratories. He announced his discovery on 4 May, 1933. American newspapers are usually more on the lookout for scientific stories than our own; Jansky's discovery made next day's front page of the *New York Times*. But BTL could see little practical value in his work, and his research project, nominally concerned with "atmospherics", was allowed to lapse. The hapless Jansky was put on other work to his bitter disappointment.

Indeed nothing more happened for a number of years. Then Grote Reber, W9GFZ, a radio receiver engineer working in the Chicago area, but also, in his spare time, a skilled and enthusiastic radio amateur and frequent contributor to the amateur journals, came on the scene. He built in his back garden what is acknowledged as the world's first steerable radio telescope, and set about studying and plotting the arrival of noise. His equipment was by no means modest, and later, when he became one of the first full-time radio astronomers, his antenna was re-erected at the observatory. He kept up his studies for a number of years before turning "pro".

Then again, in the 'thirties, Denis Heightman, G6DH, noted in this journal the bursts of noise heard from time to time on 28MHz—the "hiss phenomenon" that later proved so important.

The scene shifts to wartime. J. S. Hey (who has been called "the father of British radio astronomy"), of the Army Operational Research Group at TRE, was endeavouring to keep one step ahead of possible enemy jamming of vhf radar. There was indeed a scare on 27–28 February, 1942 when severe jamming appeared to be taking place. Hey, however, had a feeling that the noise could be the type of "hiss" noted by G6DH. The Royal Greenwich Observatory confirmed the existence during this period of a large and exceptionally active sunspot. Hey's report linking these two events and blaming Old Sol rather than Old 'itler was at first received with scepticism, but later accepted by his colleagues. In 1943–4 he proposed modifying army radars to predict V2 rockets in flight, and has revealed that at one stage AA Command intended to fire a dense barrage with the aim of exploding incoming V2 missiles—although they were not ready to do this until shortly after the attacks had ceased.

The anti-V2 work with sensitive sky-pointing radars showed up, for the first time, the effects of meteor trails, and also pin-pointed the first discrete galactic source in Cygnus A. It was this work that led to the setting up of three new teams specifically devoted to radio astronomy: (Sir) Martin Ryle, G3CY, at Cambridge; (Sir) Bernard Lovell at Manchester (Jodrell Bank); and J. L. Pawsey (of Pawsey-stub fame) in Australia (CSIRO). Hey continued working at Defford, near Malvern. One of the first public lectures ever given on radio astronomy was Ryle's "Signals from the Sun" one of the 1947 series of RSGB lectures at the IEE. Those of us who heard him will never forget his intense enthusiasm for this new field of scientific research. So, amateur radio activities by Reber and Heightman; professional and military research serendipity by Jansky and Hey; a scientist who was also a radio amateur, Ryle; university and government scientists Lovell and Pawsey: all combined to launch a new scientific discipline that has become one of the most productive of all and led the way into space by providing "a second window" on the universe. A reminder that our hobby can at times be more than just a leisure pastime!

More on groundplanes

One of the more surprising aspects of reporting the antenna scene is the degree of uncertainty—and controversy—that can still surround simple antenna systems that have been with us for 40, 50 or even 60 years. For example, the "zepp" technique of end-feeding a resonant element from a nominally "balanced" open-wire feeder, without any attempt to use a stub balun (*Amateur Radio Techniques, HF Antennas for All Locations* etc) is still regarded as an "acceptable" technique, although G6CJ drew attention to "the proportion of failures" that this involves as long ago as 1955.

More recently there has been the dispute over the basic feedpoint impedance and radiation resistance of an elevated groundplane antenna with horizontal wire radials: 36 or 19Ω? Fred Brown, W6HPH, noting G6XN's comments (*TT* May 1983), waxes indignantly, claiming "the 36Ω impedance of a groundplane has been well established, both theoretically and experimentally, for well over a quarter of a century", quoting such eminent sources as Kraus, *Proc IRE*, Jordan etc.

How come then that Les Moxon, with powerful support from Dave Gordon-Smith, G3UUR/W3, still has no doubt whatsoever that, whatever others may say, the correct figure is around 18–19Ω, that the dipole has no gain over the groundplane antenna in free space; and that this can readily be proved theoretically?

The confusion, G3UUR suggests, arose from the original use of vertical monopoles mainly by mf broadcasters; in other words as a $\lambda/4$ vertical with the earth theoretically providing an infinite, perfectly conducting "groundplane". In these circumstances the radiation resistance *is* 36Ω. But, as G3UUR puts it:

"The subsequent use of the elevated $\lambda/4$ groundplane at higher frequencies reflected practical rather than theoretical work, and the difference between the effect of the (wire radial) groundplane and an infinite, perfectly conducting ground. I agree with G6XN that radials by no means form a 'screen'. Provided that the radials are symmetrically placed about the base of the radiating element, the radiation pattern is essentially $\cos\theta$, though *not* a point-source. Only a hypothetical isotropic radiator can be considered, as G6XN suggests, 'merely a matching device'. The inherent radiation resistance of the groundplane element is determined by the current distribution on it. This is not altered by the existence of the radials. They provide only a return path for the E-field and current. A better description, I feel, would be to say that the radials act as a coupling device, since they are not transforming the feed impedance to some other value.

"Some years ago, while still at school, I derived a simple formula that has given good results. This relates the radiation resistance of an elevated groundplane, a ground-mounted $\lambda/4$ vertical monopole, or a dipole, to the radiation resistance of their shortened forms by using a correction factor: Table 1. In practice, as is well known, the radiation resistance of an elevated

Table 1

1. Radiation resistance of short dipoles ($l = \frac{\lambda}{2}$ or less)

$$R_{RAD} = 72 \left[\frac{1 - \cos\left(\pi \frac{l}{\lambda}\right)}{\sin\left(\pi \frac{l}{\lambda}\right)} \right]^2 \text{ ohms}$$

where l = length of dipole as proportion of wavelength, λ.

2. Radiation resistance of ground-mounted monopole ($l = \frac{\lambda}{4}$ or less)

$$R_{RAD} = 36 \left[\frac{1 - \cos\left(2\pi \frac{l}{\lambda}\right)}{\sin\left(2\pi \frac{l}{\lambda}\right)} \right]^2 \text{ ohms}$$

where l = length of vertical radiator proportion of wavelength, λ.

3. Radiation resistance of elevated groundplane with horizontal radials ($l = \frac{\lambda}{4}$ or less)

$$R_{RAD} = 18 \left[\frac{1 - \cos\left(2\pi \frac{l}{\lambda}\right)}{\sin\left(2\pi \frac{l}{\lambda}\right)} \right]^2 \text{ ohms}$$

where l = length of vertical radiator
l = length of radials as well in terms of λ.

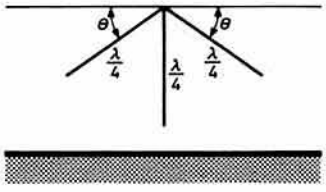
4. Radiation resistance of elevated groundplane with 55° drooping radials ($l = \frac{\lambda}{4}$ or less)

$$R_{RAD} = 50 \left[\frac{1 - \cos\left(2\pi \frac{l}{\lambda}\right)}{\sin\left(2\pi \frac{l}{\lambda}\right)} \right]^2 \text{ ohms}$$

where l = length of vertical radiator
l = length of radials in terms of λ.

Note: It is interesting to note that the rate of change of radiation resistance *vs* horizontal droop angle is maximum at about 53° when the radiation resistance is 49Ω.

5. Radiation resistance of inverted groundplane with radials sloping downwards.



For $\theta = 45°$ $R_{RAD} = 4{\cdot}5\Omega$!
$\theta = 30°$ $R_{RAD} = 10{\cdot}1\Omega$

With 45° droop, the ohmic losses in an 18-20swg antenna could cause up to 2dB loss at hf

gpa can be increased by dropping the radials downwards. For resonant antennas Table I shows the radiation resistance of a dipole to be about 72Ω, a ground-mounted monopole about 36Ω; an elevated groundplane about 18Ω; and an elevated groundplane with 55° drooping radials about 50Ω."

IGP, T and M antennas

TT (May 1983 pp424-5) attempted to trace briefly the history of "the inverted groundplane family", in so far as it was known to me. I suggested then that the first published discussion of the igp was my *TT* July 1970, though I recognized that the technique was not new but a re-invented wheel.

This led to an interesting letter from an old friend, George Proctor, GM8SQ, who recalled that "as far back as 1937 I experimented with a "T" antenna (Fig 1(a)) which then appeared to be called the "G5GQ" antenna. In June 1939 I concocted what I called the "M" antenna (Fig 1(c)) which although only about 15ft above ground was reasonably effective . . ." He later used the arrangment of Fig 1(d) which has appeared in American publications as a "novice" antenna. This information set me thinking: if the igp of Fig 1 (a) had been known to GM8SQ as a "G5GQ" antenna, it must surely have come from a published article—and I felt it would be valuable to track this down since 1937 was *before* the usual-way-up

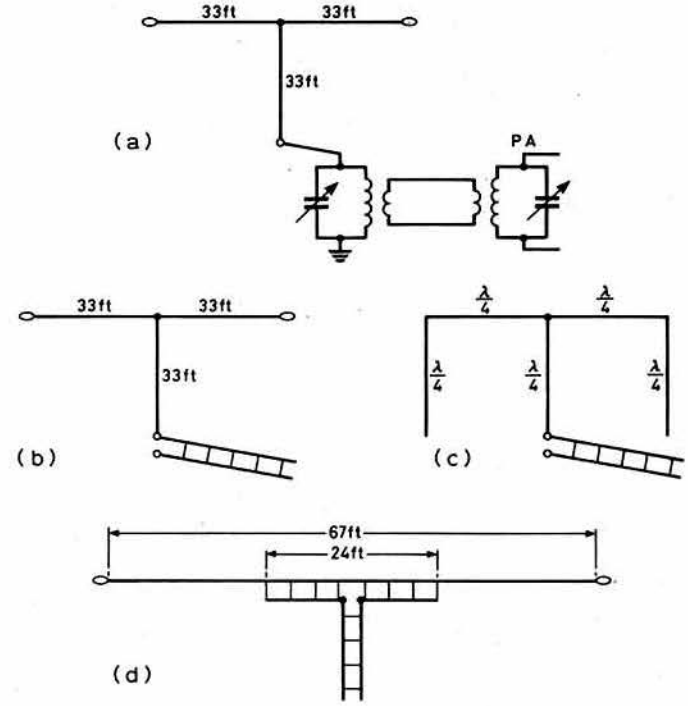


Fig 1. Ideas from GM8SQ's notes. (a) The "G5GQ" used pre-war; (b) alternative arrangement for "zepp feeding" the "G5GQ"; (c) GM8SQ's "M" antenna; (d) a useful multiband antenna GM8SQ used and later noted being recommended in American publications as a "novice" antenna

groundplane, developed by Dr George Brown of RCA, had become established!

The clue was G5GQ. This was the call of the late Basil Wardman—the original editor of *Short Wave Magazine*, though he soon handed the journal over to the late Austin Forsyth, G6FO.

A visit to the Science Museum Library brought confirmation of this hunch. The very first issue of *SWM* (March 1937, pp22-3) included an article "A new 'dx' aerial—for multiband operation" which described an antenna (Fig 2) used by G5GQ on 7, 14 and 28MHz, and which, sure enough—at least on 7MHz—was a genuine inverted groundplane! The description of its operation however, was somewhat incorrect in suggesting that "the horizontal section, radiates horizontally, the combined radiation of the aerial being at a far lower angle to the ground than that of a vertical aerial alone." G5GQ clearly did not appreciate that radiation in the horizontal span, as in the radials of a groundplane, is largely self-cancelling.

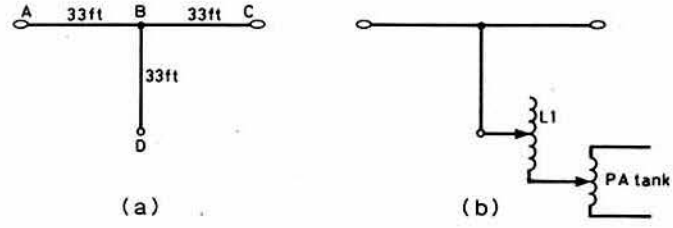


Fig 2. The "G5GQ" antenna as described in the very first issue of *Short Wave Magazine* in 1937. Intended for multiband use it is undoubtedly on 7MHz an inverted groundplane antenna, in the days before anyone was using the groundplane the usual way up!

Nevertheless G5GQ made a strong case for this antenna, including (*1*) multiband operation; (*2*) equal radiation in all directions; and (*3*) ease of operation. G5GQ pointed out that "the half-wave (on 14MHz) vertical (or semi-vertical) section is connected to the centre of a 66ft horizontal section. It looks like a single-wire-fed type (ie Windom) but the 33ft vertical section is not a feeder; it is intended to radiate". On 14MHz his dx results 45 years ago would still be entirely acceptable, including low-power tests achieving R8 on 14MHz from W2 with 3W input, and R7 on 7MHz with 6W, plus (on higher power) Japan, Philippines, South Africa, Brazil etc.

Apart from its historic interest, the G5GQ "T" antenna has value in underlining that this configuration provides useful *multiband* operation —both harmonic and sub-harmonic bands, as with the classic mf broadcast "T" antenna.

T with sloping radials

The advantage of a single main support combined with the concentration of maximum radiation from the highest section of the element has made the inverted-V dipole or multiband dipole one of the most popular approaches to simple wire antennas. In the May 1983 *TT*, G6XN noted that the top non-radiating section of a T or inverted groundplane can slope downwards, though this does tend to reduce the effective bandwidth. The vertical radiating section can also slope.

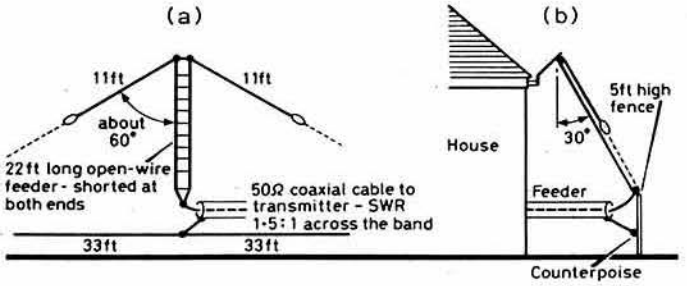


Fig 3. G3ZZD's T antenna with sloping T element. (b) Implementation using bamboo supported antenna with sloping "vertical" element

Steve Ireland, G3ZZD, mentions that in January this year he enjoyed considerable success using a variant of the λ/4 T antenna. In his case he used the vertical section of the open-wire feeder of a G5RV antenna to form the vertical radiating element: Fig 3 (a). He writes: "The vertical section of my antenna was supported by a 5ft bamboo cane wedged in the downpipe of the house guttering. The base of the 'semi-vertical' (about 30° true vertical) was secured to the garden fencing. The two λ/4 radials were run out horizontally along the garden fencing as a counterpoise. Despite the proximity of the house and guttering, results were excellent . . ."

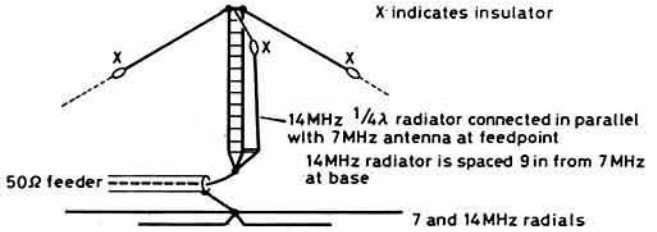


Fig 4. How G3ZZD turns his antenna into a two-band antenna

The antenna can be very easily made into a two-band system (7/10MHz or 7/14MHz) by the addition of a parallel λ/4 vertical section and attachment of another pair of λ/4 radials: Fig 4. The additional vertical should be spaced about 6–12in from the 7MHz vertical section. This produces excellent results on both 7 and 14MHz.

Antenna round-up

Follow-up notes on various hf antenna ideas that have appeared previously in *TT* underline the value of simple wire-loop systems.

Laurie Margolis, G3UML, mentions that the simple loop system described in *TT* (May 1982, Fig 3) has now accounted for 280 countries, all ssb except BY1PK. He has replaced the original wire, but otherwise found no reason to change it!

Tom Higginson, GW3AHN, notes that despite all that has been said against (and for) various forms of X arrays, he and other enthusiasts continue to find his Butterfly array (*TT* September 1978) performs very effectively. He draws attention to an article by Brice Anderson, W9PNE, "Horizontal X Beams for 15 and 20 metres" *QST* March 1983. GW3AHN remains convinced by his own experience and that of others that the "Butterfly" array is capable of good forward gain with much reduced sidelobes, compared with the full-sized X beams. A 220MHz model version by VE3BUP appears to confirm W9PNE's figures of about 6dBd forward gain, half-power beamwidth 60°, front/back ratio 15–18dB and negligible side lobes. Diligent readers will be aware of G6XN's disapproval of X-type arrays. GW3AHN feels that the experience and satisfaction of users deserves to be recorded, whatever the books may say.

Dr Guy Fletcher, VK2BBF (ex-G3LNX, FK0TAG), notes a reprint in *Amateur Radio* June 1983, p11, of an article he wrote for a local newsletter *QUA* "Another useful multiband antenna—the Delta loop". He mentions that this was based on notes by HB9ADQ (*TT* September 1980, pp904–5) and has proved a very effective "limited space" antenna on bands as low as 3·5MHz: Fig 5.

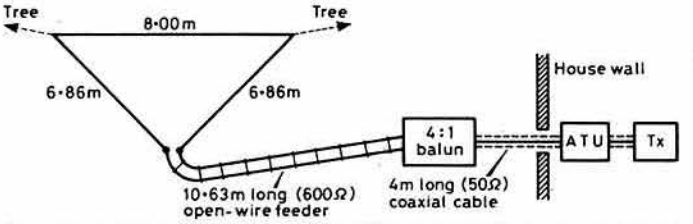


Fig 5. VK2BBF's version of the HB9ADQ triangular multiband loop antenna

Doubts on the value of the "absorber elements" proposed by G8SEQ (*TT* November 1982, pp959–60) last year continue to grow. G3UUR writes: "The idea intrigued me but, like G6XN, I find it hard to believe that it works! The "absorber element" can at most absorb only half the power that it gathers; the other half is always re-radiated in all directions . . . the only way a null can be produced without it being filled in by diffraction is through the destructive interference of two fields. The current in the "absorber element" is not sufficient to provide the second field, as pointed out by G6XN. I would be very wary of this technique, it sounds suspiciously like a hoax! It may improve the sidelobe situation, but my response to that is 'use a better design to begin with and you won't suffer from poor sidelobes!' As far as front/back ratio is concerned I would suggest using trigonal reflectors since they improve the f/b marginally as well as giving another 0·5dB forward gain." Perhaps G8SEQ would like to comment?

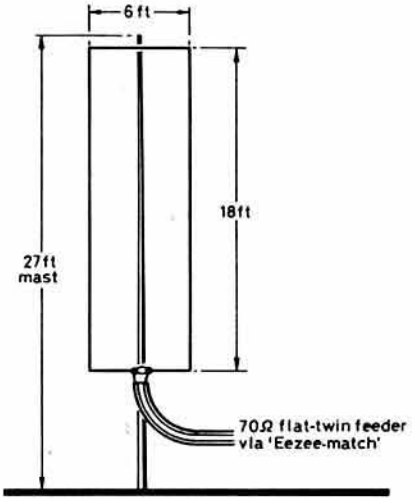


Fig 6. Vertically-elongated (3:1) loop antenna used by GM6RI and GM3VNW on 21MHz

Jim Macphee, GM3VNW, in collaboration with Walter Robertson, GM6RI, has been trying out a vertically-elongated (3:1) loop antenna on 21MHz, using ideas from the article "The gain of a quad" by F. Rasvall, SM5AGM, in *Rad Com* August 1980. SM5AGM provided theoretical computer calculations of a large number of loop shapes, including a horizontally-elongated element that should give a small (0·21dBd) gain relative to a dipole (2·3dBi). This was implemented (Fig 6) by GM6RI using a 27ft mast, with 48ft of wire trimmed to resonance using a grid dip oscillator. The vertical sides were 18ft, horizontal sides 6ft, with the lower horizontal section fed from 70Ω flat-twin feeder connected to a TS530S via an "Eezee Match" unit. An identical arrangement was set up at GM3VNW using a KW2000B. Over two years, results in both cases have proved encouraging, out-performing horizontal dipoles. The system takes up little space and is easy to erect. GM3VNW points out that he has never found any other stations using this configuration, and he would be interested to hear from anyone who gives it a try. Presumably it radiates with mixed polarization.

Powerful mosfets

In the April 1983 *TT* reference was made to a high-power (1·6 to 1·8kW p.e.p. output) solidstate linear design by Helge Granberg, K7ES/OH2ZE, of Motorola, and described in *QST* (December 1982/January 1983). This used a series of eight pa modules each comprising two of the recently-introduced Motorola MRF150 power mosfets in push-pull.

James Keeler, G4EZN, has drawn attention to another Motorola design capable of providing 600W of rf output from a single amplifier using four of the MRF150 devices which eliminates the need for even one combiner

unit ("Four mosfets deliver 600W of rf power" by H. O. Granberg in *Microwaves & RF*, January 1983, pp89, 90, 93, 120). Combiners permit the output of a number of solidstate amplifier modules to be combined together to raise the power level, but they do involve considerable power loss and add to the cost. The higher input impedance of mosfet devices enable four to be paralleled at relatively higher power levels, and the limit to the number of devices that can be paralleled is dictated by physical, rather than electrical, considerations. It should, however, be recognized that input impedance of a high-power mosfet is far lower than that of a small-signal device (primarily because of the input capacitance); nevertheless it will be five to ten times that of a comparable bipolar transistor in a common emitter circuit. The output impedance of both bipolar and fet power devices is determined by the dc supply voltage and power level.

The Motorola design is intended for 2–30MHz wideband operation with 1 to 1·5dB less gain at about 30MHz. Power gain over the entire band is of the order of 20dB. This latest design is intended for professional rather than amateur applications, but is another example of the trend towards power mosfets at hf. They are also being used at mf, and, for example, a Canadian firm is now making all-solidstate mf a.m. transmitters rated at 10kW. Nevertheless, as Peter Hart's review of linears showed (June 1983 *Rad Com*) the cost for amateurs is still roughly double that of an equivalent valve amplifier, and linearity a little lower; however, they do have the attraction of broadband, instant bandchanging for those who seek this facility. Circuit and other details of the unit are given in *Microwaves & RF* but are probably also available from the USA as a Motorola Application Note (Motorola Semiconductor Products, 5005 East McDowell Rd, Phoenix AZ 85008).

Suppression of regulator rfi

Don Sutherland, ZL2AJL, notes that problems often occur in mobile radio due to electrical noise from generator/alternator voltage regulators. The usual handbooks insist that you should *never* put a bypass capacitor on the field (F) lead, though unfortunately, as ZL2AJL points out, they do not say what you *should* do to stop the hash originating at the regulator contacts (or transistor switch) being conducted along the "F" lead, other than sometimes suggesting over-optimistically that a 0·001μF capacitor in series with a 5Ω resistor may do the trick. In reality, a much larger value of capacitance (0·5 to 1μF) is needed for effective suppression.

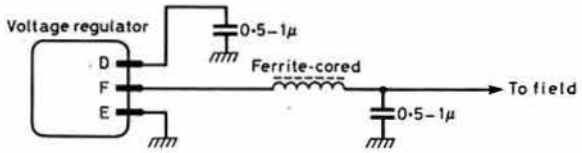


Fig 7. Hash suppressor for generator or alternator vehicle voltage regulators providing capacitance between the field lead and chassis

In 1964 ZL2AJL discovered a solution to this problem that has since been used successfully in many hundreds of installations in New Zealand, the main field of application being for commercial "mhf" mobile radiotelephones ("mhf" being about 1·6 to 6MHz, a range of frequencies not used in Europe for professional mobile radio). His solution is to impose between the "F" terminal and the bypass capacitor a choke coil of about 300μH: see Fig 7. The suppression components should, of course, be fitted as close as possible to the regulator box in order to minimize radiation by inductive loops. Sometimes it is possible to build the suppression circuits inside the regulator, with nothing visible on the outside.

ZL2AJL adds that he has also found that some alternators cannot be suppressed satisfactorily with externally-fitted capacitors. The remedy in this case is to dismantle the machine and install 0·1μF capacitors (Philips/Mullard "lollipop" flat foil, 250V types) across each rectifier diode. These capacitors must be *well cemented down* or they will tend to break off and fall out. This technique has also been extensively and successfully used.

Neither of the above techniques should have any adverse effect on the vehicle's electrical equipment.

Audio filters and the old FL8

Most of the published designs for af filters these days are of the "active" variety, making use of the gyrator effect of an amplifier providing "inductance" by virtue of the phase reversal of a capacitive reactance. Some of the active filters can be very effective and can be made tunable etc. However, there is still a lot to be said for the traditional form of passive resonant af filters, despite the problem of achieving a useful *Q* for an af tuned circuit.

For example, I have to admit that I still use one of the old "surplus"

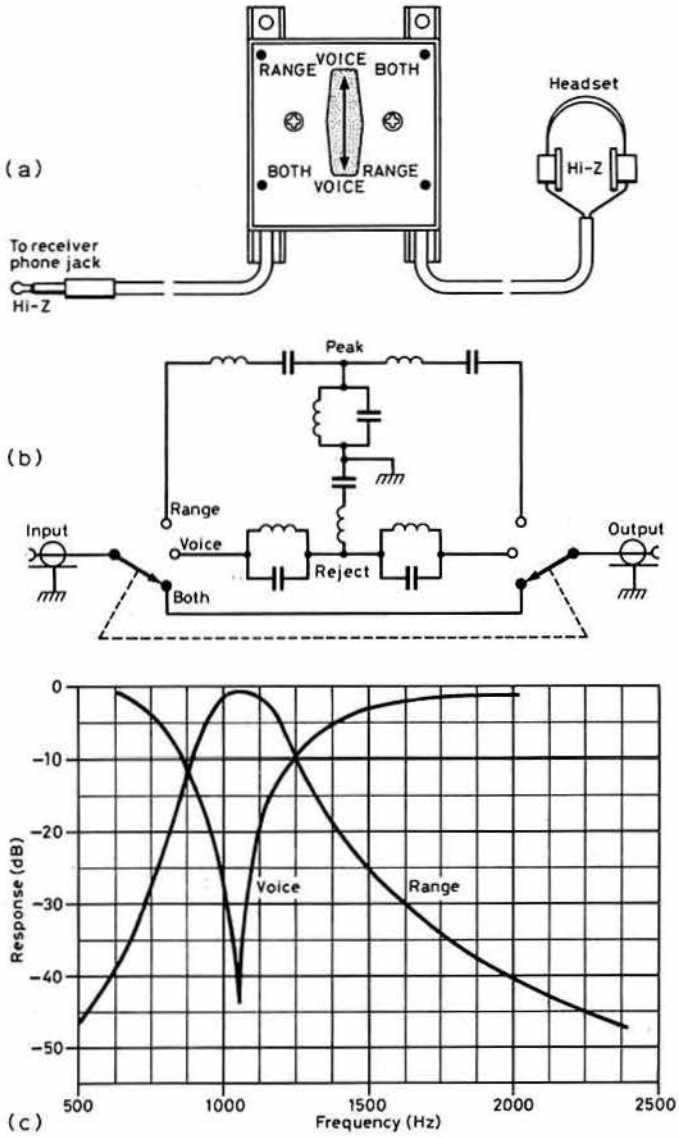


Fig 8. Details of the passive FL8 audio filter—a favourite item of "surplus" since the 'forties, and still useful

FL8A filters originally used in aeronautical Radio Range receivers in the 'forties. These filters can be switched in three positions: as an allpass filter by simply bypassing the tuned circuits; as a 1,020Hz narrowband filter; and as a filter having a 1,020Hz rejection notch: Fig 8. Provided that the FL8 is used at a reasonably-high impedance, it will still add a useful cw facility to any transceiver or receiver equipped only with an ssb filter. By rewiring the units to omit the notch facility or by cascading more than one filter, it is claimed that extremely sharp filtering can be achieved, although (in my opinion) the characteristics of the unmodified unit are reasonable enough and do not cause undue "ringing".

VCRFI—the video problem

TT (February 1983, p134) presented Shaun Scannell, G3ZSU's down-to-earth views on the serious problems being presented to amateur radio operators by the rapid growth in the use of domestic video cassette recorders attached to tv receivers. Interference is not confined to the periods when the vcr is actually being used but may arise also from the wideband amplifiers in the vcr that remain in use when the set is taking off-air tv. It is worth noting that the penetration of these machines is already very high in the UK. BREMA statistics show that deliveries exceeded 2·2 million in 1982 and over one million in 1981, so it can be estimated that around one in five or so homes now have these devices.

Among the many hf operators who have had the vcr problem brought home to them is E. S. Saunders, G4LMT, whose neighbour unexpectedly complained of tvi in November 1982, although G4LMT had had no previous problems in almost two years of operation. He soon discovered

that the most severe problems were arising during playback of tapes (suggesting direct breakthrough into the high-gain tape-head amplifier), though there were also some problems when using 28MHz when making video recordings, and also severe tvi when the tv set was tuned by using the tuning buttons on the vcr machine.

He was soon involved in exhaustive tests to overcome the various problems; trying a wide range of filters, including antenna filters and mains filters; antennas of different polarization; different power levels etc. There is no doubt that clearing vcrfi can prove an intractable problem, and at the time of writing, although G4LMT had solved many of the problems, it was still not possible to overcome rfi when using a horizontally-polarized transmitting antenna or 3·5MHz except by wrapping the vcr machine in metal foil; interference begins to show up on a horizontal antenna with transmitter power inputs as low as 3W, although with a vertical antenna he can use up to 15W at 3,500kHz increasing to 100W at 3,730kHz.

G4LMT has compiled careful notes on his various countermeasures, though like all tvi case histories one suspects that what will clean up some problems may prove only partially successful in other circumstances. It is of course also important to find out whether the vcrfi is brought about by direct break into the head amplifier (most likely cause when operating on 3·5MHz) or into a wideband vhf/uhf amplifier (this can be a problem on virtually any band from about 10MHz upwards), or, quite likely a combination of the two. He lists the following remedies to try, including mains filters which have proved essential for 7MHz operation:

(a) Initially carry out tests with any cord-type remote-control units unplugged (note this type of remote-control unit is now relatively rare).
(b) Keep the vcr-to-tv connecting cable uncoiled.
(c) Try the effect of greater physical separation of vcr and tv set.
(d) Fit a mains filter(s) (one may serve both units if need be).
(e) Fit effective braid-breaker filters in the tv antenna lead and in the vcr-to-tv lead. G4LMT prefers home-made filters using double-sided pcb, as described in *Amateur Radio Techniques* etc, rather than the commercially-made units which he has not found effective.
(f) Adjust the vcr output channel frequency by trial and error if interference is still present on any band other than 3·5 or 7MHz. This can prove a long job, since clearing tvi on one band can result in problems on another band. G4LMT notes that even 3W 144MHz fm transmission can affect vcr playback, and also off-air tv reception where the vcr tuner is used instead of changing tv channels on the tv set.
(g) If problems have been cleared, plug-in the corded remote control unit (if any) and make further tests. A useful filter takes the form of winding 20 turns of the cord on to a piece of 0·37in diameter ferrite rod, though not all vcr users will accept the appearance of such a filter.

In investigating tvi and vcrfi problems, G4LMT finds a good use for handheld cb equipment to link the operating shack with an observer at the vcr/tv location.

As noted earlier, there is inevitably a good deal of trial and error in tackling these problems which, as G3ZSU pointed out, seems likely to persist as long as vcr units are designed for both vhf and uhf tv sets (ie have wideband rf circuits) and with less than fully-screened tape-head amplifiers. Clearly some machines are likely to be found more vulnerable than others, but virtually all current designs are more vulnerable than where only a uhf tv set is involved.

Cassette keyer

Although there is a good deal of automatic telegraphy these days deriving from systems using electronic memories, a fair imitation can be provided by a small cassette tape recorder using prerecorded tapes. In the "Try This" feature of *Amateur Radio* (Australia) April 1983, p34, Don Smith, VK2BDU, provides a straightforward arrangement which takes the audio output from a low-cost cassette recorder, steps up the impedance, rectifies the af signal and uses the dc output to operate to a reed relay: Fig 9. The relay is then used to key a transmitter. With the addition of a zener diode a similar arrangement can be used to provide input to an rtty-demodulation computer-program when fed with the af output of a transceiver in a home-computer system.

When recording the morse symbols, a high record level ("in the red") should be used. Problems can arise on the higher frequency bands due to direct rectification of rf fields in the high-gain amplifiers of some cassette players.

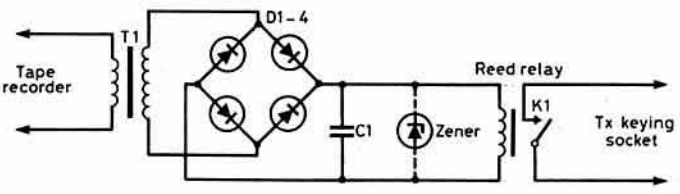


Fig 9. Tape cassette recorder keyer. T1 speaker transformer (7kΩ secondary, primary to match recorder output). D1-4 EM401 or similar. C1 1μF polyester capacitor at least 50V working. K1 reed relay normally open. Zener BZXC51 or similar

First pseudo-stereo chip

Some years ago there was renewed interest in the use of pseudo-stereo audio signal processing to enhance the reception of weak cw signals through interference, initiated by the earlier work of "Dud" Charman, G6CJ. This involved some fairly elaborate circuit arrangements to split the af signal and provide a time delay. It seems possible that this interesting idea—in which the spectrum is spread almost panoramically between the ears of the operator—could receive a boost from the introduction of a new Philips/Mullard integrated circuit, type TDA3810.

This chip, claimed as the first of its kind, is intended to provide pseudo-stereo and spatial-stereo effects on monophonic broadcasts, for example on mf sound radio, tv sound etc, and for low-cost two-speaker portable radio sets, without the need for the normal decoder circuits used for vhf/fm/stereo reception.

In the TDA3810 an incoming mono signal is split and routed into two channels: one channel goes straight to the output, the other imposes about 500μs delay on all frequencies above 300Hz with a channel separation of about 55dB. It is claimed to produce a subjective stereo effect that resembles stereo sound. Whether this is truly effective or not is a matter of opinion—but the chip would seem to provide almost exactly what is needed for the G6CJ form of signal processing for cw signals!

Enclosures again

TT has noted recently (May 1983, p427) the techniques being used to provide rfi shielding to what are basically plastics enclosures. A long article in *Electronic Design* ("Focus on enclosures: adapting to today's electronics") 26 May 1983, pp211-216, 218, 220) shows the wide variety of enclosures now made for the American market. It is stressed that while some manufacturers see a move away from metal in favour of lightweight, more versatile plastics, others envisage the opposite scenario. Die-cast aluminium; plastics-coated aluminium and extruded aluminium figure prominently, while traditional 19in rack and panel construction is still seen as having a role to play for larger units; wood or Formica-type melamine plastics with "wood-grain appearance" is also noted.

Interestingly, Ten-Tec's custom-designed two-tone enclosure for amateur radio equipment has developed into a healthy business of its own, with Ten-Tec now supplying equipment manufacturers with a range of table-top enclosures of which some accept 19in rack panels. These have a vinyl-clad, removable top cover providing access to circuit boards, main chassis having a smooth or textured baked-enamel coating, Cycolac plastics end pieces, and an internal strut.

Miniaturization has created a demand also for palm-sized compact enclosures. Bud Industries has a line of small metal enclosures, including a "Minibox" that comprises two U-shaped sections connected with snap locks or sheet-metal screws; a very different line is their "Contempo" enclosure with "wood-grain" and baked-enamel finishes.

Cool-running equipment

With any enclosure, a key consideration is how to ensure that the components stay cool; blowers, louvred panels, vented top covers are the prime techniques used to transfer heat from equipment through conduction, convection and radiation.

In professional high-power transmitters, five cooling processes are utilized; unassisted radiation cooling from the components; forced air cooling; water cooling; evaporative cooling (eg valves with specially designed anodes immersed in a boiler containing distilled water); and conduction cooling using heatsinks, heatpipes etc. Heatpipe cooling uses thin pipes of very high thermal conductance to transfer heat away from power transistors to a finned heat-exchanger. This is a relatively new technique for amateur radio equipment, though developed for professional applications in the 'sixties.

G3SJX noted the use of heatpipes in his review of the Icom IC2KL high-power solid-state linear (*Rad Com* June 1983, pp509-510). Water and evaporative cooling are usually reserved for very-high-power transmitters; in amateur practice "liquid cooling" is more for the operator than the rig.

Beryllia ceramic is often used as an electrical insulator and also because it is a good thermal conductor. Great care should be taken in the handling of or disposing of this highly toxic material.

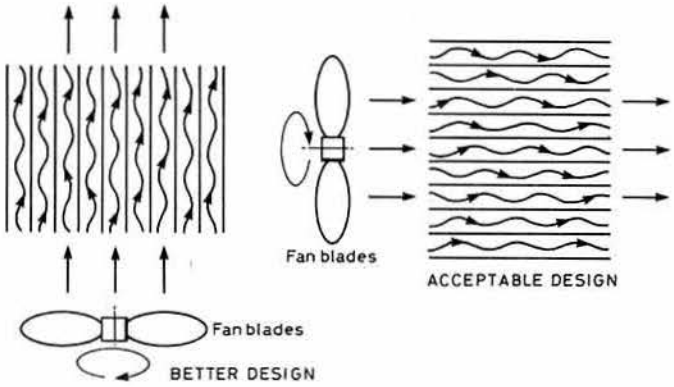


Fig 10. For air cooling of a number of printed circuit boards it is preferable to mount them in vertical racks when possible so that natural convection air currents can contribute to heat dissipation

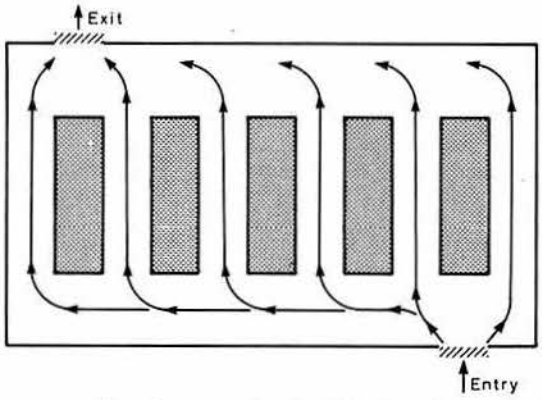


Fig 11. With air-cooling, the entry point should be placed low at the front of the equipment cabinet and exit points high at the rear in order to minimize operator exposure to fan noise

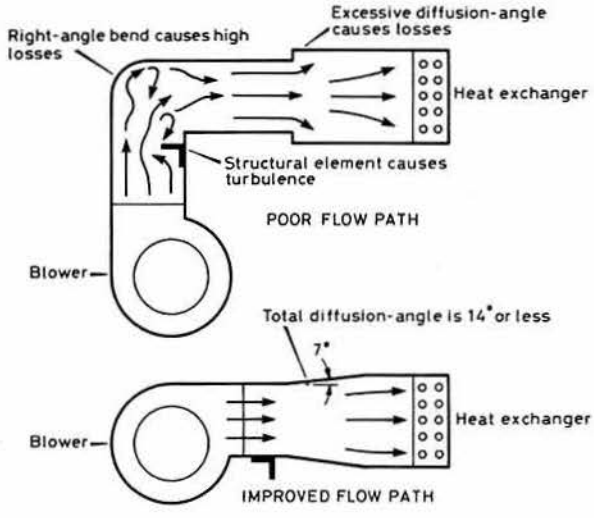


Fig 12. A good clean air flow path without bends and discontinuities minimizes aerodynamic noise

Forced air blowers and extraction fans include units fitted with rfi shielding. For some professional equipment, reliability is improved by circulating dust-free air in a closed-loop around the equipment and then transferring heat to an external air system. In amateur radio equipment a frequent requirement is to provide adequate cooling of valve(s), envelope(s) and seal(s), and a typical forced-air system consists of an air blower, a conduit (duct) to guide the air to the required location, a heat radiator on the component and an air exhaust exit.

The design of equipment to run cool without becoming noisy is not simple. Forced-air blowers and extractor fans are widely used for cooling linears and transceivers, and often generate a good deal of noise. Air movers vary from reasonably quiet to distinctly noisy, but it is not always recognized that the amount of noise depends also on aerodynamic factors ("Design equipment to run silent, run cool" by C. C. Chardon, *Electronic Design* 21 June 1980, pp119-125). The more freely air moves in the equipment the less chance there is of aerodynamic energy dissipating itself in the form of sound.

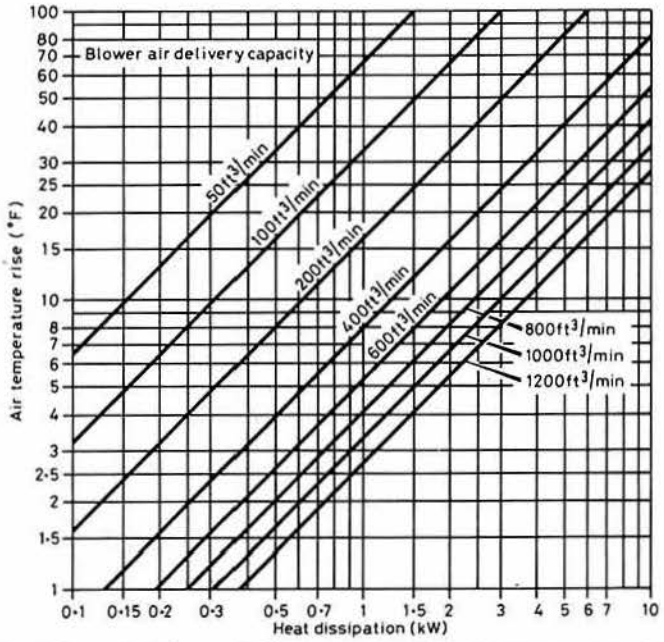


Fig 13. Suggested blower air delivery capacity relative to air temperature rise and heat dissipation as recommended by an American manufacturer

Fig 12 shows that bends and discontinuities in the air flow result in turbulence and the loss of aerodynamic energy that may show up as noise. Where there are a series of printed circuit boards etc, advantage should be taken of natural convection; similarly an air-entry point low down at the front of equipment with an air-exit point high at the rear reduces operator exposure to fan noise. Louvres and grilles should preferably restrict air flow to the minimum possible extent, but taking into account the need for good rfi shielding. Plastic foam sheet, typically 0·5in thick, can be used to absorb noise in air ducts etc, but care needs to be taken since this material will also form a heat insulator and may require an increase in air flow to compensate for reduced cooling. Fans or blowers may excite vibration in shafts, ducts etc, enhancing the vibration at critical speeds. Propeller fans are cheaper but less efficient than tube-axial fans, typically designed to run at about 3,000 or 3,500rpm.

Tips and topics

Denis Taylor, G3FGC, noted the March 1983 *TT* (page 234) reference to the Exide Torquestarter fully-sealed lead-acid car batteries, and their convenience for indoor use, although they are not yet available on the UK market. He comments that sealed, "maintenance-free" batteries are available from some suppliers, providing in evidence a leaflet describing the AC Delco "Freedom" range of batteries that were being promoted at the 1981 Boat Show, intended for marine applications.

The firm claims that they are physically smaller and lighter in weight than conventional lead-acid batteries of equivalent capacity. To quote the leaflet:

"These batteries use antimony-free plates and carry a lifetime supply of electrolyte in a heat-sealed case. Water never has to be added, so there are no filler/vent caps, no acid spillage or filming, and the batteries stay clean and dry. Battery cases are polypropylene, ribbed and reinforced, and highly resistant to damage. "Freedom" batteries need no periodic checking, cleaning or servicing. They are sealed, and so cannot be contaminated. The new plate and grid materials reduce self-discharging, and shelf life is substantially extended (up to 15 months at 80°F). A flame arrestor is built-in, as is a test-indicator."

I have also noticed that one of the Japanese firms which have established factories in South Wales, also includes sealed lead-acid batteries among its "high-technology" products, though I have no further details.

Chip-mikes?

In these days of "chips with everything", someone was bound to attempt to put an acoustic transducer on a chip as a miniature microphone or hearing aid etc. It is relatively easy to have a microphone amplifier on the same chip.

G. R. Smith, G8AOJ, draws attention to a report in *Electronics* (19 May, 1983, pp48-9) that Honeywell Inc, by putting a thin-film piezolectric sensor on an n-channel mos chip, is claiming to have developed "a mike on a chip" —although this is not expected in production for a couple of years or so. The sensor is a layer of zinc oxide deposited on a 26μm thick silicon diaphragm isotropically etched into the chip: the diaphragm is 3mm diameter. Amplifier and other circuitry can be integrated into the complete 0·25in square chip. The device is sensitive to audio frequencies as low as 0·1Hz. More attractive from an amateur communications viewpoint is that compared with conventional piezoceramic devices it is smaller, consumes less power, and is possibly cheaper. Other manufacturers, with a touch of sour grapes, comment "It is feasible. Whether or not it's practical remains to be seen".

Colpitts oscillator with Darlington pair

By connecting two bipolar transistors in what has long been known as a "Darlington pair", a high-gain amplifier with high-input impedance is obtained. This provides a useful configuration for a fundamental Colpitts-type crystal oscillator. The arrangement shown in Fig 14 comes from the new book by Dr Ulrich Rohde, DJ2LR/W2, *Digital pll frequency synthesizers*. Because of the high input impedance it is possible for the capacitive divider components C1 and C2 to have large values. This ensures that the reaction of the transistor stage on the oscillator frequency is very small. The effective load capacitance of the crystal is represented by the series connection of C1 and C2. In order to obtain a suitable standard value of about 30pF (typical range 10-15pF) an additional (preset) capacitance of this order should be placed in series with the crystal to align frequency to the nominal parallel-resonance value".

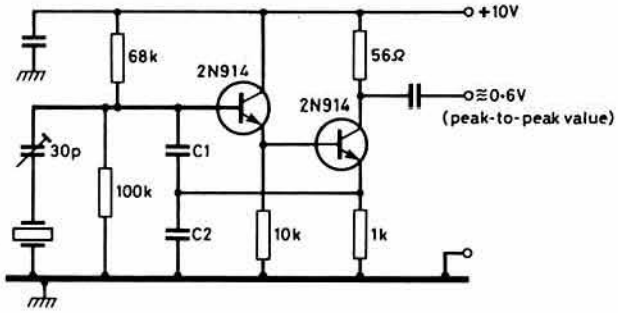


Fig 14. Colpitts oscillator with Darlington-type arrangement suitable for fundamental mode crystals. From Kristall-Verarbeitung Neckarbischofsheim Gmbh as reproduced in Ulrich Rohde's book on frequency synthesizers

3-6MHz:	C1, 560pF;	C2, 470pF.
6-15MHz:	C1, 560pF	C2, 220pF.
15-30MHz:	C1, 220pF;	C2 100pF.

Dr Rohde notes that a disadvantage of all aperidic (untuned) crystal oscillator circuits is a tendency to oscillate at a third or higher overtone frequency, or at non-harmonic spurious resonances. In difficult cases he advises that C2 should be replaced by a resonant circuit which is then detuned so that it is capacitive at the nominal frequency, as in the tritet oscillator.

Dave Gordon-Smith, G3UUR/W3, noted the crystal calibrator circuits in the June 1975 issue and has sent along details of a unit that he has been using for a number of years based on two cmos devices: Fig 15. This provides a 1MHz output that is either unmodulated or modulated, or alternatively a 100kHz unmodulated output. He points out that the stability of an AT-cut 1MHz crystal can be expected to be an order of magnitude better than HiStab 100kHz crystals over the range 0°C to 60°C.

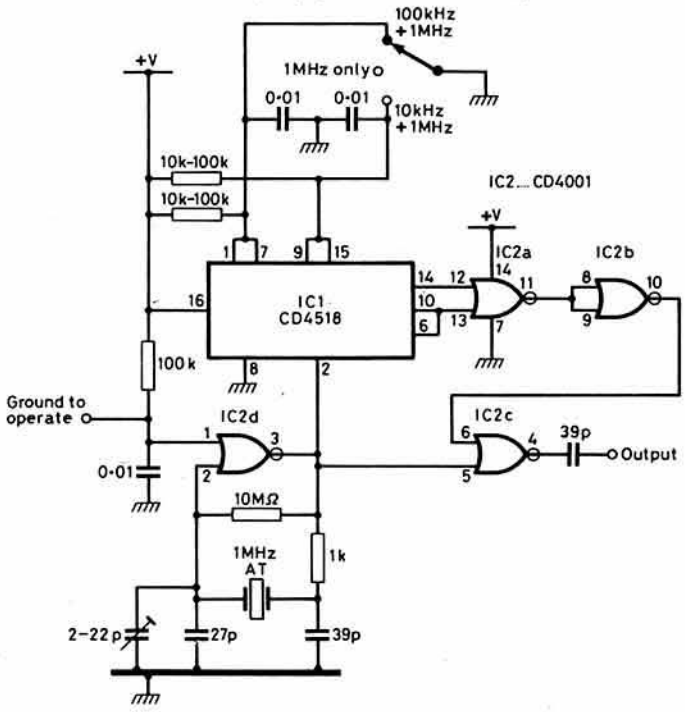


Fig 15. G3UUR's crystal calibrator using 1MHz crystal and capable of greater stability than with say 100kHz crystals

AFI and the suitcase transmitter

Maurice Sandys, G3BGJ, has noted the various items in *TT* and elsewhere on the growing use of suitcase sets, unobtrusive antennas etc: for example *TT* June, July 1983. He notes, however, that little or nothing has been said about what he feels can, and must always have been, a major problem for anyone trying to operate a cw transmitter without attracting attention to themselves in hotel rooms, flats etc. This is the problem of plain ordinary noise, particularly that arising from the penetrating sound and vibration of a morse key, especially the older and larger forms of "pump-handle" or straight keys.

In any chunky metal key that has a fixed contact that takes the full impact of the key movement, there is inevitably a good deal of kinetic energy involved. This produces sound, vibration and heat—perhaps why some telegraphists were known as "red-hot" operators? If the key is clamped or fastened directly to a table or chair the sound is conveyed to the floor and often thence to the room below. I can recall at least one case of a tenant complaining bitterly that she was suffering interference—additional key-click filtering produced no improvement, and the amateur concerned discovered in the end that what he thought was "bci" was in fact objection to the sound of his key!

Maurice Sandys, lamenting the acoustics of some modern buildings, sometimes imagines his neighbours exclaiming: "There's that queer noise again. Whatever can it be?". He recognizes that sooner or later they will hit on the true explanation. For he, like many amateurs these days, finds it wiser not to broadcast his amateur radio activities around the building, and is beginning to feel something of the anxieties that beset the clandestine operators. He wonders whether this problem was tackled and solved on their behalf during wartime.

The answer is yes and no. Many of the suitcase sets used fairly conventional RAF-type small straight keys, and these must have been quite noisy. Even the miniature metal key on the otherwise excellent Polish AP series undoubtedly had distinctive clicks, although not comparable with the disturbance that emanates from large pump-handle keys. The Whaddon Mark 7 ("Paraset") had a built-in miniature key that was very quiet though not always convenient to use; this equipment, however, suffered from the problem of radiating a signal from the regenerative oscillator during "receive".

Those who made most effort to reduce keying noise were almost certainly the Germans, who developed various forms of "silent" and quiet keys not only for clandestine purposes but for normal Service use. Many of their keys had springy contacts that "gave" slightly so that there was no sudden metal-to-metal "thump".

Even large brass keys can be reasonably quiet. For example, the classic British "double-current" telegraph key, made by various firms to a basic Post Office specification from the 1890s to the 1920s, has springy contacts and a leather shock absorber. Such a key can be made quieter by mounting it on a metal platform with rubber or other noise-absorbing mat.

Rubber mountings can also reduce the rather different noise produced by bug keys, side swipers etc. Noise interference can also be a problem with other modes. The mechanical teleprinter is horribly noisy. Talking into a microphone, plus loudspeaker reception of incoming signals, can prove embarrassingly audible well beyond the shack. Large power transformers with laminated cores can generate 50Hz buzz through floors and walls. Air cooling fans can be noisy. Acoustic insulation of rooms is not easy, particularly for the amateur with a fixed location. The wartime clandestine operators were usually expected to keep moving to different locations. □

EPHEMERIS Satellite news and views

*by R. O. Phillips, G4IQQ**

THE LAUNCH of the Phase 3B satellite on 16 June appears to have generated a tremendous amount of interest within the amateur community. The daily information nets on 3·5MHz now have a large following waiting for the latest information, and many contacts can be heard afterwards discussing notes and comparing orbital predictions. It is still too early to say what real impact this latest generation of satellites will have on the hobby. One thing that is certain is that amateur satellite operation no longer represents a fringe area of interest but is now well into the mainstream of activity. Like most other facets of amateur radio, amateur satellites have much to offer both to those whose interest is chasing dx as well as those with an interest in computing, orbital mechanics and communications. It's nice to know there are still many new unexplored avenues of amateur radio.

AMSAT Oscar 10

Last month I reported the successful launch and events of the first few days of Oscar 10. The reason for the spin axis of the satellite being in line with the sun rather than at 90° to it, after separation from the launch vehicle, is still not known. However, as expected, within a few days the spacecraft axis began to shift from the sun line due to the effects of natural forces. This resulted in greater illumination of the solar panels and hence adequate power to energize the magnetorquers to complete the orbital manoeuvres. The spin rate on the satellite was gradually increased to its desired value of around 36rpm prior to activation of the onboard kick motor. It was originally thought that this would take place during orbit 50; however, due to what has been described as a "breakdown in communications", nothing actually occurred at that time. The actual reason is likely to be debated further, but what really matters is that on Monday 11 July at 22·32utc the motor was successfully fired.

It was initially planned that the first motor firing should last for 107s. However, in the event it continued for about 190s. The result was that the perigee was raised to 3,900km, and the orbital inclination increased to 26·2°. A second burn was planned for 26 July but unfortunately this failed, and the spacecraft will now stay in the above-mentioned inclination and orbit.

During the first few weeks of life of a satellite, a great amount of testing needs to be done before it can be made available to users. Initial indications are that both the mode B (435–145MHz) and mode L (1,269–435MHz) transponders are functioning well. The cw bulletin board on the general beacon (145·810MHz) provides status reports every half hour followed by psk transmissions and ranging tests.

The uplink to the mode L transponder at 1,269MHz is not only new to satellite users but is well away from the terrestrial communication sub-band at 1,296–1,298MHz; so anyone wishing to use this transponder will need to modify, build or buy equipment to operate in this band. Designs for 1,296MHz may be modified by changing the frequency of the final mixer oscillator from 1,152 to 1,124MHz (assuming a 144–146MHz i.f. is used). If you are unsure about modifying a piece of commercial equipment, it would be wise to seek advice from the manufacturer or supplier before embarking on any major surgery. As far as commercially-available equipment for 1,268MHz is concerned, enquiries have so far revealed two sources of supply. First, Microwave Modules have just announced details of their transmit converter which requires drive of either 0·5 or 10W at 144–146MHz to produce 2W output at 1,268–1,270MHz. Linear mode of operation will support all classes of emission. The second source is from the Swedish company Parabolic (or the UK agent MuTek Ltd). Again drive is required in the frequency range 144–146MHz (100mW), and output powers of either 1 or 3W are available. The company can also supply receive converters for 1,268–1,270MHz with a 28MHz i.f. While on this point it is worth recalling that it is a requirement of the amateur licence that you are able to listen on your transmit frequency.

Satellite status reports

With all the interest in Oscar 10, it is all too easy to forget that there are several other satellites, in various states of health, available for various purposes.

RS

There is little to say about the performance of the Russian satellites except that activity continues at a high level, and no problems have occurred and none is anticipated in the foreseeable future.

Oscar 8

The news on the satellite is essentially the same as last month. There is no indication of recovery of the battery and all spacecraft operations depend on direct solar illumination. The request not to use the satellite remains in force though telemetry reports would be welcome.

UOSAT

The spacecraft remains in its flat (end over end) spin configuration though it is proposed to use the magnetorquers to re-orient the spin axis which should reduce the rather high temperature gradient. A large number of experiments have been carried out by the University of Surrey, particularly concerning data transmission to the satellite. The normal operational schedule is as follows:

Mondon—Friday: various data formats (145 and 435MHz);

Friday—Monday: 1,200 baud telemetry and bulletin, digitalker, 2·4GHz and hf beacons.

Other news

Several months ago I referred to proposals for amateur satellites carrying payloads intended for data transmission using packet radio techniques. The system concept is capable of supporting highly reliable communications by means of built-in error detection/correction coding combined with an automatic repeat request (ARQ) arrangement such that any corrupted blocks of data are retransmitted until correctly received. While the technique is not limited to satellite communications it is quite suitable where a large number of users are accessing a narrow channel in a more-or-less random manner. One essential requirement of such a system is the use of a common signalling protocol to ensure compatability between all users. The level of interest in the subject is an unknown quantity in this country, so I would be glad to hear from anyone who has developed ideas in this area or might wish to become involved.

On several occasions I have referred to the practice of a limited, but persistent, number of fm operators using the satellite sub-band at 145·8 to 146·0MHz. In the past this has been a particular problem with the UOSAT telemetry/data beacon on 145·825MHz; however, with Oscar 10 now operating at 145·810MHz a number of complaints have been made concerning interference from over-modulated signals on 145·80MHz. It is worth, perhaps, pointing out that while this frequency is at the top end of the fm sub-band, it is not a recognized channel in the band plan, and observance of this would be very welcome.

Earlier this year I referred to the excellent book *Satellite tracking software for the radio amateur* by John Branegan, GM4IHJ, published by AMSAT-UK. All the programs contained in the book are now available to owners of ZX81 and BBC microcomputers on prerecorded cassette tapes. In addition, a real time azimuth/elevation control and orbital prediction program is available for the BBC micro, either on tape or disc medium. Further details of the above and other software may be obtained from Ron Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. □

*170 Shirehall Road, Hawley, Dartford, Kent DA2 7SN.

Microwaves

*by Charles Suckling, G3WDG**

News from France

F8WN was sorry that he could not be active during the June 10GHz Cumulative Contest weekend, but when he arrived at his normal site (AJ51b) the track was blocked by a locked gate and a notice prohibiting entry! As he was not feeling too well, he decided to go home rather than drive to his alternative QTH (ZJ56b).

Albert mentioned that he has now completed his new 10GHz ssb equipment. On transmit, he is using a G3JVL mixer (tapered version). The receiver consists of a GaAs fet preamplifier in front of a balanced mixer, with a separate local oscillator. Transmit/receive "switching" is accomplished with a circulator. He is looking forward to making many cross-Channel contacts with this equipment!

Operating news

With the excellent weather conditions in June and early July came some very good openings on the microwave bands, with several records being broken. G4BYV reported that he had worked DC9XG, DF9LN and DK1ZD on 3·4GHz. These contacts brought his squares-worked total to six on this band (AM, CK, DL, FO, EN and EO). His best contact so far is DF9LN (623km). John noted that SM6HYG has a temporary permit to operate on 3·4GHz until October. He has heard G4BYV on this band already, but a two-way contact was not possible due to a transmitter problem at SM6HYG. John has also heard his first signal on 5·7GHz, from DC9XG in EN! G4BYV was also active on 2·3GHz, and worked two new squares (EM and ER) to bring his total on this band to 25.

G3LTF finally installed his 2·3GHz equipment on his tower, just in time for the July lift. He worked the following stations in the space of a few days: PA0WWM (CM), PA2DOL (CL), PA0FRE (CL), G4FRE (AL), PE1HQO (DN), PE1DPX (DM), G4LRT (ZM), G3WDG (ZM) and two stations in DL. He also had a one-way contact with G3AUS (Devon). All these contacts were made with low power—150mW!

G3WDG put up a temporary antenna for the lift, and worked G3LQR, as well as G3LTF, on 2·3GHz. The PA0QHN beacon was also heard, but unfortunately there were no Dutch stations on the band at that time!

As mentioned above, SM6HYG has a permit to operate on 3·4GHz, and this resulted in what is probably a new record for this band, when he worked G3LQR on 11 July, over a 924km path. The same night, they also worked on 5·7GHz, which must also have been a new record. However, a few minutes later the record was broken again, when SM6HYG worked G3ZEZ over a distance of 978km!

G8PSF was active on 1·3GHz during the June lift, with 600mW and a 15/15 Yagi. Despite the low power, he made a number of very interesting QSOs. On 18 June, he began the evening by hearing GB3BPO at needle-bending strength, as well as PA0QHN and DB0VC. His first QSO was with PA3BGL (S9 report received), followed by DC9XO (S7 received) and then a very exciting QSO at 2222gmt with OZ7UX (FO) at 825km (S5 received). His final QSO of the evening was with PA0BWL.

Adrian notes that one can achieve excellent results on 1·3GHz with low power when conditions are good—what chance would you have to work this sort of dx on 144MHz with 600mW?

Awards corner

Two remarkable claims were made in July. Ten cards from Keith Hancock, G4KIY, (Whittlesey) confirming 60 squares worked on 1·3GHz all related to exceptional dx and put him at the top of the squares table. Nine of them alone would have qualified for the "over 600km worked" award; in fact, their average distance was 900km. The cards gave fascinating information about systems used by operators in other countries. DL3NQ was using 150W and two 2C39Bs, while OE2CAL had 350W into a 2m dish. In Denmark OZ9SL used 50mW from a BRF96 pa into a 100-el loop Yagi, while OZ7IS had 500W into a "four by 23".

The claim from Steve Berry, G4LRT, a few miles west of G4KIY, for the 2·3GHz band, put him in the 15-squares-worked category for the band. Good tropo conditions on 18 June yielded six new squares and a good QSL return. His cards also denote a steady increase in power levels: 35W used by PE1DPX, and 25W by DC9XO. All contacts were on ssb.

Another three "over-600km-on-23cm" awards were issued in June to: G8RYK (now G4ROB) (Nottingham) No 53; G8KAX (Essex) No 54, and G8IEM (Hampshire) No 55: Requirements for these "QRB awards" are:
For 1·3GHz: the first contact to be made beyond 600km.
For 2·3GHz: the first contact to be made beyond 500km.
For 3·4GHz: the first contact to be made beyond 400km.
For 5·6GHz: the first contact to be made beyond 300km.
For 10GHz and 24GHz: the first contact beyond 150km.

In each instance the claim must be supported by an appropriate QSL card, and should be forwarded to G5UM, QTHR.

A varactor multiplier for 5·7GHz

Dave Robinson, G4FRE, has sent details of a 1,152—5,760MHz varactor multiplier which he has developed from a number of previous designs (DF5QZ, DD0QT and DC0DA). With 2·5W drive, up to 270mW output power has been obtained, which is considerably more than has been achieved using "high order" multipliers from 384MHz. It can be used in its own right as a cw/fm transmitter, or as a drive source for an ssb mixer.

Details of the G4FRE multiplier are given in Figs 1-5. Dave has supplied the following constructional notes. First, cut the waveguide to length and square off the ends. Make a mark 7mm from one end, and scribe a line

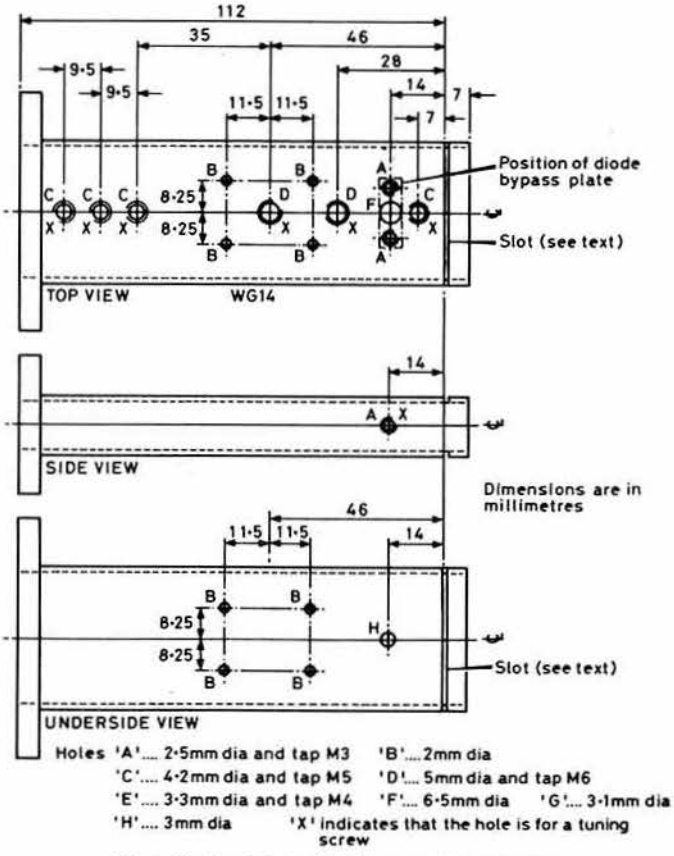


Fig 1. Mechanical details of waveguide assembly

*46 Windsor Close, Towcester, Northants.

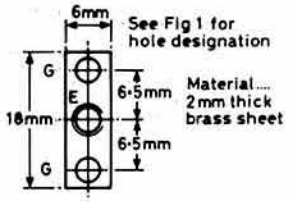


Fig 2. Diode bypass plate details

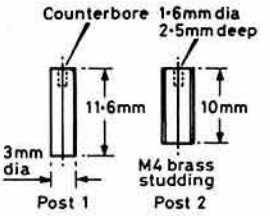


Fig 3. Diode post details

through this mark across the top face of the waveguide, and then continue the line around the other three faces (see Fig 1). Cut a slot in the top and bottom faces using a junior hacksaw. This is best done by starting to cut at one side, and then continuing the cut across to the other side, rather than trying to cut the slot all at once. Next, mark out the positions for all the holes (except for the holes "A" and hole "F"), relative to the left-hand edge of the slot. The diode bypass plate should then be fabricated, as shown in Fig 2. Initially, the holes in the plate should be drilled 2·5mm. Using the plate as a template, drill the holes designated "A" and "F" in the waveguide 2·5mm. Open out the holes to the sizes/threads shown. All the other holes can then be drilled, and tapped as appropriate.

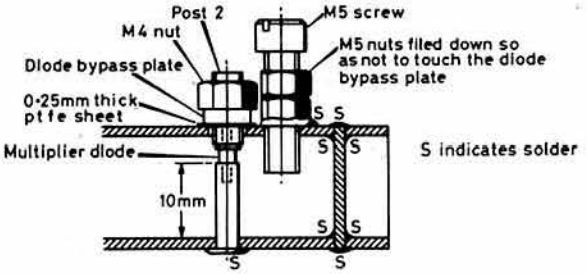


Fig 4. Diode mount details

The end plate, which fits into the slots previously cut, can then be made (34·8 by 18 by 0·6mm brass or copper). Four lengths of 2mm copper wire (preferably silver plated) are then fitted through the waveguide via the 2mm holes. Cut off, leaving about 1mm of wire protruding on either side. The diode posts are made next (see Fig 3). If a lathe is not available, take great care to drill the 1·6mm holes centrally to avoid diode breakage later.

Deburr the inside faces, and fit the end plate into position. Using stainless steel or rusty screws, jig nuts into position at holes "C" and "D" in the top face, and hole "A" in the sidewall. The waveguide assembly can then be soldered (including the end plate, 2mm wires and bottom diode post), using a hotplate or a gas torch (eg a Ronson). Before the assembly cools, solder the 1mm plate (which is made from a 25 by 50mm piece of brass, folded into an L-shape) to the sidewall, as shown in Fig 5.

The final stage of assembly is to build the input matching network, details of which are given in Fig 5. First, place the diode bypass plate and the ptfe insulation in position. Use nylon screws to fix these to the waveguide, and include a solder tag under the screw nearest to the plate on the sidewall. After building the rest of the matching network, fit the diode into its mount (see Fig 4), and fit the tuning screws (each with a lock-nut).

The alignment details are as follows. Apply drive through a 3dB attenuator, and adjust C2, C3 and C4 for maximum dc voltage on TP1. The multiplier tuning screws can then be adjusted for maximum output. G4FRE recommends using a 3dB attenuator (eg a length of cable) on the input, as this improves the stability of the multiplier. With no attenuator, there was a tendency for the multiplier to oscillate into poorly-matched loads. The performance of the prototype (with a 3dB attenuator at the input) was as follows. With 3W drive (at input to attenuator) an rf output of 110mW was obtained with a BXY28E diode. With 5W drive, the BXY28E gave 150mW, while 200mW was obtained from a VSC64J, and 275mW from a BXY39E.

Jersey active on 1·3GHz

Andy Renouf, GJ8SBT, is now active on 1·3GHz from Jersey, and is looking for contacts during his holidays. At the moment he has 25W output to a 45-el loop-Yagi, fed with a length of H100 cable (1dB loss). He is planning to improve his equipment to 75W shortly, with two long-Yagis and LDF450 cable (0·5dB loss). He would be happy to arrange skeds by telephone (0534-42258).

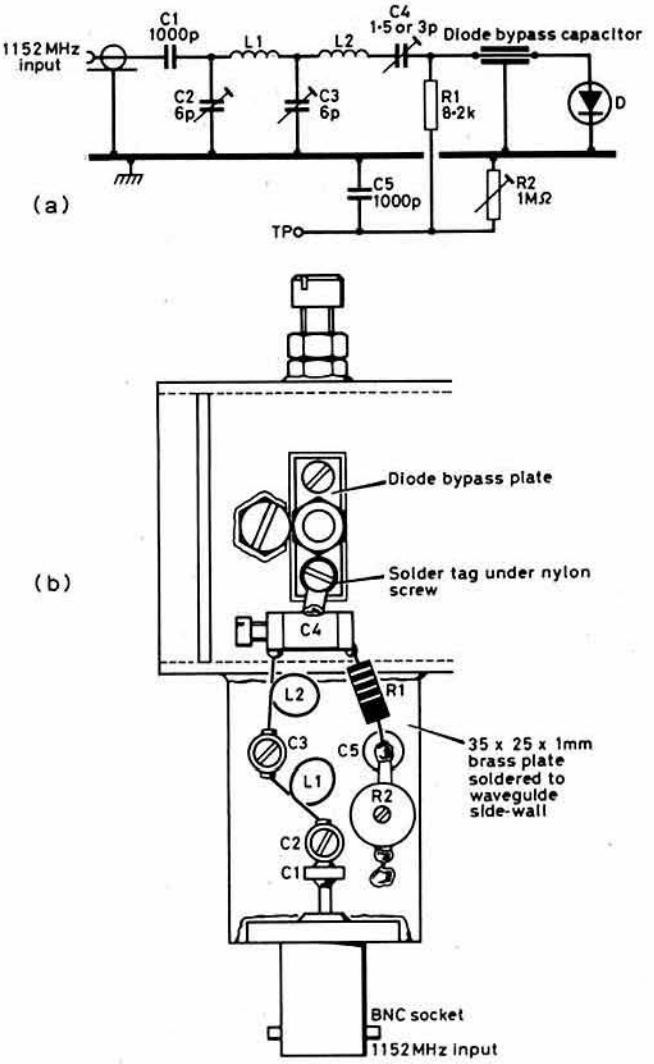


Fig 5. Input matching network. (a) Circuit diagram. (b) Layout: C1, C5, 1,000pF leadless disc; C2, C3, 6pF tubular trimmer; C4, 1·5 or 3pF ptfe tubular trimmer; L1, 1t 1·6mm wire 6mm dia; L2, 1t, 1mm wire 6mm dia; R1, 8·2kΩ 0·125 (1/8) W; R2, 1MΩ preset pot; D, BXY28E, BXY39E or VSC64J varactor diode

An rf milliwatt meter for use up to 1·5GHz

Richard Marshall, G4ERP, has sent in details of a very simple rf milliwattmeter, which he has found to be very useful when aligning local oscillators and transmitters. It is capable of measuring low power levels with reasonable accuracy, unlike the more typical power meters, which are useful only for measuring higher power levels.

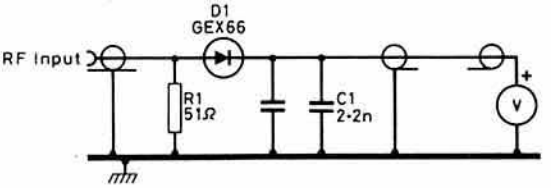


Fig 6. Circuit diagram of the G4ERP milliwattmeter

The circuit of the power meter, shown in Fig 6, was based on a design by G4CNV (see "A high quality source for microwave applications", *Rad Com*, October 1981). G4ERP found that the original design was very useful at 432MHz and below, but he ran into problems when trying to use it to align a 1,296MHz transmit converter. The unit was very prone to hand effects, presumably due to inefficient decoupling at this frequency. As a result of this, he decided to develop a new version with improved high

(Continued on p809)

SWL News

*by Bob Treacher, BRS32525**

HF challenge

Following the success of the lower frequency challenge in January, it is time to tempt everyone with another, but this time not so specific a challenge. The CQ WW Contests turn each of the six main dx bands into something approaching sheer bedlam during the ssb and cw legs in October and November respectively. Therefore, there seems to be no better time to set a challenge, when it is clear that the bands will be extremely active and capable of providing everyone with plenty of dx signals to log. The ssb challenge will therefore be held from 0000 29 October to 2359 30 October, and the cw challenge from 0000 26 November to 2359 27 November.

The idea is to log as many DXCC countries as possible, and the rules of the challenge are as follows:

i) Entries may be either single-band or multi-band.

ii) Each different country heard on each band will count for points:
a) countries in the swl's own continent will count one point on 28, 21 and 14MHz, two points on 7 and 3·5MHz, and three points on 1·8MHz;
b) Countries outside the swl's own continent will count three points on 28, 21 and 14MHz, five points on 7 and 3·5MHz, and 10 points on 1·8MHz.

iii) The final score should be computed as follows:
a) *single-band entries:* The total points should be added together and multiplied by the number of DXCC countries heard (eg 120 points × 65 countries = 7,800);
b) *multi-band entries:* The total points gained on each band should be added together and multiplied by the total number of DXCC countries heard on each band.

iv) Entries, showing the full callsign, time, and signal strength of the stations heard, should be sent to me at the address at the foot of this column, to arrive no later than 19 November for ssb and 17 December for cw.

v) Several prizes will be on offer. So, good luck, and let us hope conditions are good.

VHF dx report

Having given the hf band listener something to whet his appetite, it is now time to report the good vhf conditions which prevailed at the end of June and early in July.

Martin Parry, BRS52543, wrote from YN square to update his efforts on 144MHz. He managed to catch some sporadic-E on 17 and 21 June. In the first, he heard OK1DIG and OK1OA, both in HK square, at 1638, and during the second he heard SP9AF in JJ square at 1709 for a new country. On the tropo front he caught EI2BBB in VM on 17 June. The following day brought numerous French stations from the Calais, Dieppe, Amiens area, plus DLs in EN square and a dozen PA0s in CM and CN squares. The 24th brought OZs and DLs in the Baltic area. Martin remarked that during both the Es openings heard so far, Band 2 fm was wide open, and broadcast stations from Poland were audible on 70MHz.

Dave Whitaker, BRS25429 (ZN square), commented on the 18/19 June "lift" mentioned briefly last month. "Very lively" was his summing up of conditions, with hoards of OZs and SM6s copied. Perhaps the best station logged, however, was PA3AGX/MM in BN square. Other squares copied were EO, EP, EQ, ER, FO, FP, FQ, FR, GP, GQ, GR, DN and EN. Quite a large area, but only a couple of new squares for 1983.

In London, the band has been in good shape to the Continent. LA1BM in CT square was audible on 20 June, while late on the 21st five GMs in YR square were good copy. At my QTH the 24th provided SM6MNS, plus assorted OZs including OZ1HNE(FR) and OZ1EYE(FQ). On the following day, conditions opened up to the Baltic area again. VHF NFD did not produce much in the way of dx here until after midnight on the Saturday. Yes, I know there was a sporadic-E opening to the east on the Saturday, but I heard none of it due mainly to the high power used by many stations located on the North Downs in Kent. One well-equipped portable station in AM square worked several UC2s, a UB5, plus an LZ, YU and HA for good measure. The 9H1 Es opening before the contest was also missed here —due to gardening! On tropo, F6CJG/P and F1FEN/P in BF and CF squares respectively were the best catches. At last some Es was bagged on 7 July. The event started here at 1823 with EB5AZT(ZZ). CT1AYC(VY), I0SNY/EA9 (Ceuta-XV04e), CT1ALF(VZ) and CT1AUW(WA) followed. A further brief opening occurred at 2009 when I0SNY/EA9 and EA7BVD(XX) were heard.

BRS62088, my xyl, has been listening mainly between 1400 and 1700 and hoping for some good dx, but it seems that the days she stayed out of the shack were the days when there was some Es! However, on tropo, she caught DK5LB(EO), OZ1GOK(EP), DF8BL(EN), GJ6WKV/P(YJ), GB1BOY(ZM), GM6VDQ/P(YR), SM6MNS(GR), ON1BLS(BL), F1KNU/P(ZI), F6EZV(BI) and CT1ALF during the 7 July Es.

Dave Shapiro, ARS53844 (YN square), listened during NFD and noted PI4VLI, PI4ZVL/A, DF0OK and F0FF/P as his best dx.

1983 HF COUNTRIES TABLE

(Starting score 150)

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS8841	136	190	207	132	123	32	820	ssb, cw
BRS25429	132	165	154	115	122	39	727	ssb
BRS48909	120	176	186	113	99	29	723	ssb
BRS52543	106	175	174	119	121	25	721	ssb
BRS44703	102	113	134	90	110	34	579	ssb
BRS50134	88	128	137	95	97	26	571	ssb
RS49327	91	131	155	66	47	12	502	ssb
BRS44395	78	122	131	85	57	29	502	cw
BRS46084/7Q7	103	161	147	62	20	0	493	ssb
ARS53844	76	136	129	69	64	12	486	ssb
BRS1066	69	95	109	99	67	36	475	cw
RS49875	74	125	146	53	28	5	431	ssb
BRS25901	73	84	101	52	67	10	387	ssb
BRS18529	15	48	67	65	94	17	306	ssb
BRS42979	45	56	78	45	58	22	304	ssb, rtty, sstv
EI-835	22	53	100	25	23	3	226	ssb
ORS45992/7Q7	25	77	112	8	0	0	222	ssb
BRS62088	11	24	45	45	48	8	181	ssb

ALL TIME COUNTRIES LIST

(Entry score 750)

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS25429	277	308	332	245	226	70	1458	ssb
BRS32525	268	303	318	246	249	60	1444	ssb
BRS25901	256	291	325	201	227	31	1331	ssb
BRS8841	252	283	311	206	188	40	1280	ssb, cw
BRS48909	210	240	252	160	122	43	1027	ssb
BRS1066	189	203	261	163	104	61	981	ssb, cw
BRS44703	191	211	216	152	145	48	963	ssb
BRS18529	130	190	238	144	110	44	872	ssb
BRS50134	149	182	216	110	119	32	808	ssb
ORS46084/7Q7	188	228	234	104	43	1	798	ssb
ORS45992/7Q7	196	234	238	75	32	0	775	ssb
BRS44395	139	194	216	107	62	45	763	cw

1983 UHF/VHF SQUARES/COUNTRIES TABLE

Station	QTH loc	70MHz Sq	70MHz Countries	144MHz Sq	144MHz Countries	432MHz Sq	432MHz Countries	Total	Via*
BRS25429	ZN	—	—	96	22	—	—	118	a, b
BRS52543	YN	13	6	59	15	9	2	104	a, b, c
BRS32525	AL	—	—	66	19	8	2	95	a, b
ARS53844	YN	—	—	28	10	11	4	53	a
BRS62088	AL	—	—	33	12	—	—	45	a, b

*a = tropo, b = Es, c = Ar

Newcomers

It is nice to welcome more new recruits this time. Peter Reynolds, BRS84647, was hoping to find a few quiet hours in order to put an RX80 together. He has had many tips on what antennas to use and as there are so many types it can be a difficult decision. The best advice is to continue experimenting until something is found which suits your own circumstances. Peter wondered about the virtues of an active antenna and several commercial verticals.

It is not possible to review equipment in this column, so the best alternative is to write to the various suppliers and ask for an information sheet on the particular product which interests you, and then compare the

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

performance data before actually committing your pen to your cheque book. Most commercial companies are usually extremely keen to provide literature, so this approach should not provide too many problems.

Adam Allcock, BRS84501, is interested in the countries table. The July column covered this question in detail, so the answer for Adam, or anyone else, is either refer to that, or, if you joined too late to receive the July issue, to purchase a copy from RSGB Publications (Sales). Adam had just erected a G4MH mini-beam when he wrote, and hoped that would help pull through VKs, ZLs and P29s, which Adam considers to be the ultimate for a new swl. I wouldn't argue too much with that!

Ken James, RS52308, has three receivers capable of providing coverage from 1·8MHz to 432MHz—an Eddystone EA12, an FT408R and a System 500A (for 144–148MHz). He took the RAE in May and was hoping for a first-time pass.

Ray Hills, BRS52794, has taken up amateur radio again after a break of several years due to outside commitments. Ray is lucky enough to have a 360ft garden at his QTH near Cambridge, and is working hard to install a fine array of antennas capable of catching all the dx on the higher frequency bands. An Eddystone 830/6 receiver is in use, and now that he has solved an rfi problem he is raring to go; he is grateful to G3WWB who encouraged him back to the hobby.

Dave Cooksey, RS50876, confesses to being dedicated and to having plenty of time to listen. He has recently acquired a scanner receiver capable of tuning 68–88, 144–174, 450–470 and 470–512MHz, and he wonders what delights these frequency ranges might hold. With a discone antenna at a height of about 20–30ft in a conurbation area, many interesting users can be copied. However, the 70 and 144MHz bands are the amateur bands covered. Bands 3 and 4 tv sound can also be found in the 450–512MHz range.

David Traynor, BRS50190, wrote for the first time and concentrated on the subject of slps. Hopefully, the news of the 28MHz slps will have delighted him, because he feels that slps are a good way of learning more about your rig, propagation and, above all, operating practice—which will prove invaluable when a licence is obtained. Indeed, the main idea behind slps is to study the propagation characteristics of a band, particularly 28MHz, during the decline of the sunspot cycle. With the cycle due to peak next in another seven years or so, there is plenty of scope for slps and other similar ideas for some considerable time to come. David has a 1983 *DX Callbook* and is willing to provide dx information. He can be reached at 2 Pembridge Court, Ellesmere Port, South Wirral L65 9EG; tel 051-356 0883 between 1700 and 1800 daily.

Here and there

Tina Keil, EI-835, had taken the RAE and was anxiously waiting for the "good news" when she wrote. CW practice continues, along with chasing the dx on the hf bands, and she recently received the EU-DX Diplom and is hoping to claim other awards. Tina has moved her FRG7700M to her caravan, and at weekends she travels to a high spot near her home and with an MA-5 vertical enjoys many hours of listening. Her countries score is now on computer, which makes it impossible for her to double-count a country, thus giving her an accurate entry each time.

Dave Shapiro, RS53844, was at the end of sixth-form examinations when he wrote, and he was hoping that with his studying over he could divert some of his attention to amateur radio. He heard some sporadic-E signals on 28MHz from Europe, which increased his band score. He also referred to tv time-base QRN, but thanks to a talk on interference at his local club, he solved the problem by buying a couple of ferrite rings and placing them behind the offending tv and its antenna.

Robert Small, BRS8841, has been his usual busy self and had several new ones to report. OH0AM on 1·8MHz, ZD7BW on 3·5MHz, and S79RD on 7MHz were all new. On the higher frequency bands 28MHz had provided C30LA as the pick of many sporadic-E stations heard, while on 21MHz those of interest were: J20WCY, 7P8CS, 3X4EX, OA7BGC/OA7 near Lake Titicaca, K1UDH/HH2, N7EDK/5N7, ZK2JS and FG0DDV/FS. With so much dx heard, it is not surprising that Robert offered a long list of choice QSL cards received. Just a few were: BY8AA (21MHz cw), C21RK, 9M6YY, KL7IHP/VS6, VK0AB (Casey station, Antarctica), VS5RB, T30CJ, TT8AD and FM0HVL. Some interesting comments were received with a QSL card Robert received from A4XJP. That station considers G swl reports to be the worst he receives. The majority are thought to be poor at cw reception and fail to give sufficient information: eg stations audible at the same time, local weather, equipment used etc.

These comments are at variance with those in this column last month, which goes to show that you cannot please all of the people all the time. Personally, I can see little point in including wx details on a QSL card that is sent via the bureau and arrives at its destination some nine months later. The space could be more beneficially used to give more informative details such as other stations audible, equipment used, and listing more than one station which the station you are reporting on has worked. One point with which I thoroughly agree, however, is that reception reports to dx stations on the lower frequency bands are more worthwhile and certainly produce the desired QSL card.

Reminders

Several things to jog a few minds about now. October is normally a good month for dx, and hopefully there will be many entries to the hf challenge which coincides with CQ WW ssb. Earlier in the month the UHF Open occurs on 1/2 October and the Society's 21/28MHz ssb Contest event takes place on 9 October. For cw types the Society's 21MHz CW Contest is on 16 October. These last two contests both count towards the HF SWL Championship (rules on p63 *Rad Com* January 1983).

Finale

A mixed bag with hopefully something to excite a few. News, views, comments and table scores for inclusion in the November issue should reach me no later than Tuesday 20 September, with short items of late news to be received by Tuesday, 27 September. □

MICROWAVES

(continued from p807)

frequency decoupling—two bypass capacitors were used: a conventional 2,200pF component, and a fabricated "low inductance" capacitor. Screened cable was used to connect the detector head to the voltmeter; in the prototype RG214 miniature coaxial cable was used, but any type of coaxial cable would do.

Mechanical details of the milliwattmeter are shown in Fig 7. The body of the unit consists of two 1·85in lengths of 0·75 by 0·375in aluminium bar held together by M3 screws, to give a piece with 0·75in cross section. A 7·8mm hole is drilled in the centre of one end to a depth of 1·575in. This hole is then continued through the remainder of the bar at 2·6mm diameter. When the braiding of the RG214 is bent back over the outer insulation, a hole of this diameter forms a good cable clamp. The 7·8mm hole provides sufficient clearance for the bnc socket to be mounted flush with the end face. The socket must be modified by removing the ptfe insulation at the pin end, and then shortening the pin to 2mm length. The resistor and the 2,200pF capacitor are grounded by solder tags which are mounted as closely as possible to the components. The brass rod which forms the inner of the coaxial capacitor is insulated from the body by a single layer of Sellotape. A small spigot is provided at either end of the "barrel" to assist soldering. Depending on what type of 2,200pF capacitor is used, it may be necessary to file away part of one end of the barrel to give adequate clearance.

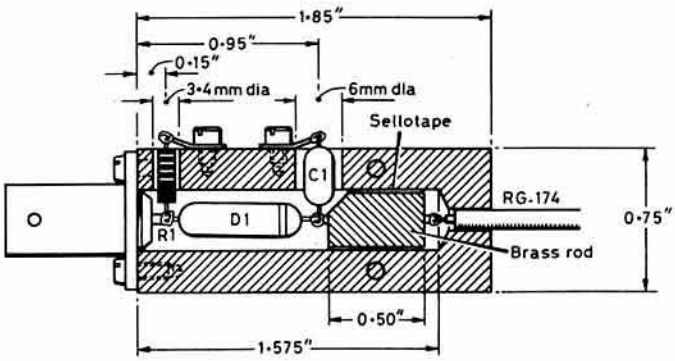


Fig 7. Construction of the milliwattmeter

The following equation is used to determine the power level being measured:

$$P(\text{watts}) = 0{\cdot}01(V + 0{\cdot}25)^2$$

where V is the measured voltage. For quick reference, a graph of this function can be drawn.

For measuring power levels in excess of 250mW, G4ERP uses a power sampler and dummy load in conjunction with the milliwattmeter. This can give quite accurate results when measuring higher power levels, if the coupling attenuation is known. □

4-2-70

*by Ken Willis, G8VR**

THE DRAMATIC IMPROVEMENT in the weather towards the end of June, which continued into July with temperatures soaring into the nineties, brought a welcome change to the vhf bands since tropo contacts over long paths became possible once again. The period was also marked by the activity encouraged by the 2m open contest, the vhf field day and the Continental vhf field day, so there was much to be worked. With the Es "season" also in progress, many stations added exotic new squares and countries to their score sheets. Old-timers will look with quiet astonishment at some of the contacts made and taken for granted these days, made possible by better equipment and much greater band occupancy. Some UK stations have already worked more than 50 countries on 144MHz alone, without the use of the eme mode. This is an achievement never contemplated in the early days of vhf. Who will be first to DXCC on the 2m band?

Repeater news

Following the brief mention last month of GB3VS (Bridgwater) on RB13, some more detailed information on the site and the equipment being used may be of general interest.

From 24 May 1983 the repeater became operational from a block of flats in the centre of Bridgwater, Somerset. A Pye base-station (T460/R461) is used, providing 12W rf output and about 20W erp from the G3VEH full-wave dipoles spaced about 8ft. Two cavity filters have been installed, one for reception and the other on the transmitter side. Before this, however, some 58dB of isolation was being achieved simply through the spacing of the antennas.

The logic is a 6802 microprocessor plus peripherals. A tone detector and audio board couple into the logic unit, a system which will eventually be introduced into other repeaters in the Mendip Group (ie GB3WR and GB3UB). Considering that the Bridgwater repeater is not on a primary site, coverage is quite good. The block of flats is more or less at sea level, while the top of the antennas is about 120ft above ground. Mobile coverage is as far north as Clevedon on the M5, and to the south, down to Wellington. Serving Wales, coverage extends to Cardiff and Newport, while Bruton, Wincanton, Chard and Ilminster are all within mobile range, giving an approximate 20-mile radius. Fixed stations as far as Swansea and Bridport can get in with no problems.

The technical manager of the Mendip Group is Chris Morcom, G3VEH, who until recently was chairman of the RSGB VHF Committee.

Brian Smith, G4ETN, who is the GB3VS repeater manager, says he believes that GB3VS "fills in 70cm coverage quite well in the southwest", and feels that operators in that region are fortunate to have so many uhf repeaters at their disposal. He also expressed some displeasure at the time taken for the paperwork and general administrative matters to be sorted out to enable GB3VS to get on the air, but since much has already been published on this topic it may be best to let the matter drop now that Bridgwater is at last open for business. The area served by GB3VS is one much favoured by holidaymakers, so when travelling in the area, give this repeater a call on RB13 and let *4-2-70* know how you enjoyed working through it.

Alan Willis, G4JSN, who is treasurer of the Hereford ARS, has commented on the GB3HC uhf repeater operated by that group. It was reported last month that a site change was finally approved, with the result that GB3HC was activated on 15 June. While the group awaited permission for the site change, the opportunity was taken to overhaul the equipment and to purchase new antennas. As a result, the repeater is now working very well, but up to the end of June (when this report came in) it had not been busy. Hereford, of course, is another centre for touring the Wye Valley as well as lying on the main north-south holiday traffic route, so it should prove popular for tourist traffic. The channel used is RB6. G4JSN wishes to express his appreciation to the RWG and in particular to Mike Dennison, G3XDV, for all their efforts, which culminated in GB3HC becoming operational once more.

*11 Old Downs, Hartley, Kent DA3 7AA.

The Midlands VHF Convention 1983

G3UBX, secretary of the Organizing Committee of the Midlands VHF Convention, wishes it to be known that the venue for this year's event will be the British Telecom Training School, Stone, Staffs, and the date is Saturday 15 October. Doors will open at 11am, and the convention will feature lectures by G3RKL on the experimental ssb repeater, G3RZP on solidstate power amplifiers, and G3USF on the first six months of UK 50MHz operation. The convention will offer extensive measurement facilities and demonstrations, bookstall and bring-and-buy stall, plus the usual attractions expected of a convention. The organizers make the point that this is not a rally. The location is much better than the one in Wolverhampton used previously, and there will be extensive free parking immediately adjacent to the convention area. Talk-in will be available on channel S22. Admission will be £1, payable at the door, plus £4 for evening buffet, the latter by advance booking only. Further details from G3BUX, 28 Coalway Road, Wolverhampton WV3 7LX. The date has been changed from the original 8 October to avoid conflict with the ARRA exhibition on Doncaster Racecourse to be held on that day.

An alternative vhf net for night-time use

The suggestion that an alternative vhf net be established on the 80m band, put forward by GM3WCS and mentioned in *4-2-70* July 1983, has brought some response. G3IMW (London) points out that the frequency of 3,645kHz suggested lies within the USSR dx segment for ssb working (actually 3,635 to 3,650kHz) and contacts are frequently made on the 80m band with Asiatic Russian stations using high power both ways. Another reader, Kris Partridge, G8AUU, states that the frequency is within the "window" used for USA dx contacts with Europe. Somewhat ironically, the recent issue of *Dubus* (1/83) contains a note from DF2ZC on a suggestion "from DL7YS" that 3,645kHz be used as an alternative vhf net channel! One of the advantages quoted, apart from working in the hours of darkness, is that the UAs could be heard on this frequency! Another interesting comment is that a night aurora could be reported over an 80m net, whereas on 20m communication between European stations would normally be impossible.

To sum up, there seems to be plenty of support for an alternative net on 80m: all we need is for someone to take the initiative in suggesting a frequency, after which publicity and a few dedicated souls getting going on the new net will no doubt see it grow and flourish. Since G8VR regards anything lower in frequency that 28MHz as approaching dc, he is not well-qualified to comment on what would be a suitable choice for the new net, so instead of objections, may we please have some concrete suggestions? G3IMV has offered "something in the range 3,600 to 3,635kHz," not very much removed from the original 3,645kHz suggestion.

For those who regard the vhf net as simply a means of setting up schedules for ms contacts, greater use of the net by stations simply interested in any form of vhf propagation is surely welcome. There have been many times when auroras and Es openings have been notified in advance by our European friends, and it would be nice to think that all stations licensed for the hf bands who still retain an interest in vhf would regard the net as a means of keeping in touch with fellow-addicts when vhf conditions were flat or when momentous things occurring made communication on other channels useful.

Tropo

There were many days during the last week in June and the first three weeks in July when tropo conditions existed. None of the openings were major events, but many stations were able to work into countries such as Sweden, Norway, Denmark, Germany, East Germany, Luxembourg, France, Eire and Northern Ireland—so, according to location, almost everyone had something good to work during this period. The early mornings were often good for dx too, particularly on cw when the background noise was at times very low. For example, breakfast-time on 26 June was good to Scandinavia and Eastern Germany, with SP1AAY (IO) coming through on 144MHz cw

to provide a most-welcome rare square. At a similar time on 14 July, OK2PGS/P (GK) and OK1FM (GJ) were good signals, both worked by G4IJJ (Suffolk). The previous evening G4KUX (ZO) had some contacts with OKs who were S9 with him, a welcome change from the flat bands of a month ago. Several days produced propagation over a wide range of beam headings, and on some hot days dx continued to come through almost all day despite the very high temperatures.

The 70cm band has at times been better than 2m, and as will no doubt be reported elsewhere, 23cm has sometimes been good when 2m was only mediocre in its offerings. Among the 144MHz highlights, far too many to print, was a contact between G3ZNZ and an OY (he doesn't say which one), while on 20 June LA5XAA (CS) and LA1BM (CT), worked by G6ETA and many others, provided some hard-to-work squares. LA9LS (DS) was another much in demand, working QRP from his car and attracting a massive pile-up on 20 June. Another reported worked by G6ETA was LA1YCA/P (DS). So many OZ and SM stations were worked that it is not possible to report them in detail. Altogether a very good period which enabled many newcomers to swell their scores.

IARU Region 1 dx records

Some corrections are necessary to the IARU Region 1 dx records published in *4-2-70* April 1983. G4ASR has written to remind us that on 7 June 1981 he worked 5B4CY (Cyprus) on 70MHz Es while operating portable as GW4ASR/P from YM55f. This contact followed one by Gordon Pheasant, G4BPY, but the distance record clearly goes to GW4ASR/P, and it stands now at 3,475km, an incredible QRB. This was all reported in *4-2-70* August 1981 under the authorship of John Morris, G4ANB.

So far no station has challenged the 70MHz auroral contact between GM3WOJ/P and G8VR (882km) or the ms contact between GM4CJG/P and G8VR (836km), so until they do so, these will stand in the table for those modes.

We need to compile a complete tabulation for the 50MHz band, so will those who operate this band please submit their claims for two-way auroral, tropo, ms and Es contacts so that the information can be passed to the records keeper, SM5AGM.

Using the calling channels

Reference was made last month to the growth of amateur radio and its effect on the QRM situation in the more populated parts of the UK. If more streamlined operating procedures are adopted, QRM can be reduced considerably. Recent listening on the 144·300MHz calling channel has prompted some comment which may be particularly relevant to newly-licensed operators, though many old-timers could benefit from taking a little time to consider what constitutes good operating practice.

Calling channels were established with the aim of putting two or more stations in contact, after which they should move off to another frequency to continue their QSO. Because stations are listening on the frequency, long calls are quite unnecessary; if the callsign and possibly some location information (to assist in directing a beam) are given, this is all that is required at this stage, yet frequently one hears calls of at least 1min duration containing much redundant information.

Typical unnecessary information transmitted is "Beaming to the east from London", and the like, sometimes repeated several times. Many stations who give this sort of information will usually respond to calls from anywhere, irrespective of their beam heading, though of course there will be times when calls only from a specific area are sought. If you are beaming east, the chances are that only stations in that direction will hear you well enough to reply anyway. There is also a tendency creeping in these days to dramatise calls by using a sort of quasi-military procedure with statements such as "*This station* Golf *Figure* Six. . . . ." often accompanied at the over by a pip-tone as if the operator were at the controls of a satellite command station instead of his modest transceiver. Saying "Figure" after the prefix letter can be downright confusing to a Continental operator who speaks little or no English, and there is surely no need to say "This station". . .who else might it be anyway?

Another of my favourites is "Calling CQ *on* two metres". We can assume that everyone who has passed the RAE knows which band he is listening on, so this is redundant information, and "on" 2m always gives me a mental picture of someone operating a handy-talkie while poised on stilts! Calling "CQ from Alpha Lima square" can be self-defeating because this is probably the most populated vhf square in the world and most Continentals will have worked it many times. The same goes for any other "unfashionable" squares, but of course if you live in a much-needed square, give it some publicity.

I especially dislike the lack of adventure displayed by those who say they will "stand by for any *possible* call". Don't they fancy some impossible ones like from YU or HG on an apparently dead band? Would not "standing by for any call" or simply "G6... listening" be sufficient?

Pip-tones are my especial hate, mainly when they are used by stations working across town and exchanging 59 signals both ways. Pips can be useful in ms ssb when communication conditions are marginal—and in dx QSOs with signals down in the noise when there may be some doubt as to when the station goes over to receive—but in my view they have no place at all in normal communication, and they simply clutter up the airspace without achieving any purpose except in projecting the "satellite command station" image. The first men on the moon started it all. Pity they didn't leave a small 144MHz repeater up there instead of giving us this legacy!

Sporadic-E calls for special operating procedures. First of all, the event may be very short-lived. Secondly, there will inevitably be a pile-up. In pile-ups, all that the far station needs to establish contact is *your* callsign. He knows his, and if he hears you he will reply, and at that stage you can give the entire works of both calls, report and QRA locator—but in a pile up, please do not say "9Hotel One Bravo Tango You Have Golf Figure Six . . . In Alpha Lima Square Calling You,' just say 'Golf Six . . ." two or three times and listen. If the pile-up is continuing, wait for an opportune moment to call again. Many good operators have worked rare dx simply by giving their call and finding out *who* they are calling after establishing contact. This is not at all unethical if done swiftly and with minimum operating time, and certainly better than "QRZ You Have Golf Figure Six. . .etc". About 25s should be enough for an Es contact if both operators know their business, and the fact that you are using only 5W to a halo can wait to be written on the QSL card, not given over the air with 500 other operators waiting their turn. If a dx station comes up on the calling channel during an Es opening, don't expect him or anyone else to QSY. It is a cross we must bear, and one most of us will bear willingly since the event is not likely to be long-lived and with an SV4 on the line nobody wants to risk losing him by saying "Go up ten".

A useful operating guide is to assess your own procedures critically. If you speak on the air in any way differently than you do normally, then you are probably being over-dramatic or stilted, or too formal. When in doubt, use the "kiss" method—keep it short and simple—though occasionally, when the going is tough, you might enunciate your call letters a little more precisely than you normally would.

Please do not tune up on a calling channel. There are many "Whistler's brothers" on the air, but so far I have never heard a lady whistler. Find a clear spot near the channel to tune up and move to the calling frequency when all is ready to go. If we all did all these things there would be a much improved situation on the bands. If you hear someone doing something which is obviously bad operating procedure, tell him so in the nicest possible way and give your own call when you do so.

Most of us are only too anxious to be good operators, and we can all learn from others. Was it not Burns who said:

O wad some Pow'r the gift tae gie us
To see oursels as ithers see us!
It wad frae mony a blunder free us. . . .

and maybe help work a new square too!

Sporadic-E

Reports have continued to come in relating to the big Es opening to Yugoslavia on 22 June reported last month. It is clear that a very large number of UK stations were able to take advantage of this event and work some very rare squares. YO and LZ were also worked in this opening. Operators appear to be very much better briefed than hitherto in working Es. Many stations monitor the vhf broadcast bands from around 65MHz upwards, and watch for the appearance of fm broadcast above 90MHz as an indication of the muf rising towards 144MHz. VHF tv sets are also very popular these days as monitors, especially the small continuously-tunable portables which go down to about 47MHz, and several amateurs have reported steady "locked-on" pictures from USSR, Spain, Poland etc during the Es openings. Conversely there have been some openings when conditions on the 70MHz band have been quite poor; it seems to depend on whether the country favoured by 144MHz Es broadcasts fm in the 65-80MHz range which, however, the USSR bloc uses fairly extensively.

As previously mentioned, Es is a very local affair, so to report it becomes difficult; if a station in the south lists his dx worked, this is no guarantee that stations even a few miles away have heard anything at all. However, one feature of this year's Es season is that the vastly increased 2m band occupancy has meant that very few openings go without somebody, somewhere, catching them, even if the duration of the event is just a few minutes, as so many of them can be. This is illustrated very well by some of the reports below; the moral is, and always has been, keep listening

whenever you can. You can be sure that Murphy will provide the choicest dx the very moment you decide it is time to cut the grass!

Jim, G8LFB (Whetstone), misses very little, and has found Es on 70MHz most days. On 22 June he worked eight YUs in JE, JC, KE and KD, and heard a couple of YOs which he could not raise. He comments on the way people are becoming somewhat blasé about Es openings, and quotes hearing "Oh no! Not 9H1 again!" G6HKS (Cambs) enjoyed his first-ever Es participation on 15 June, following it up on the Yugoslavian event by working three stations for two new squares (JC, JE). G6ETA (Whitstable) was another who worked into JC and JE, plus another new one in KD square. Mick Cuckoo (Herne Bay) also worked a string of YUs, but was probably more excited to have a contact with LZ2AR (KE) which is quite a rare one for ssb.

Since that opening, many very brief events have been reported which can be summarized as follows:

2 July In a very late opening at 2215gmt, G4MVR and G4NRV both worked YO3AID/P in MF square. No other stations were heard calling him, so the event may have been very localized since both the UK stations are in Kent, some 10 miles apart. This was on ssb.

7 July An evening opening to Portugal extended up to ZO square. G8ECI worked CS1CGI (WX). CT1ALF (VZ) worked a few UK stations but was operating in leisurely fashion, taking several minutes per contact, which restricted the number of stations he could work. G3JXN and G6LX were among those who were lucky. G4DHF worked three new squares in contacts with CT1WW, CT1AYC (VY), CT4PI (VZ) and a CS1 in WX. Dave commented that after the CT activity seemed to have died down. He worked EA7AKH (XW), and at about the same time G3POI worked his 405th square in a contact with a French station portable in EA5 (ZY). G6EQM (Devon) worked EA7AG (YW).

In this later phase, G4IJE (Essex) worked a new country through a contact with IS0SNY/EA9, this being an expedition to Ceuta going after a 10GHz record but having 2m equipment with them. Later that evening, Paul worked CT1WW crossband, 4m/10m.

8 July An opening to the Ukraine occurred around 1600gmt, patchy in the south and inaudible to G4DHF in Lincolnshire, though some GWs are believed to have made contacts. G4IJE worked UT5BN (PK) and UB5PAZ (ML). G3POI worked UB5EFS, a first-G contact for the Russian. G3IMV could hear the USSR stations in Milton Keynes but could not raise them. G4SWX worked UB5FDF. All the UB5 contacts were on cw.

15 July There was an opening to 9H1 and IT9, but the main interest on this occasion was an IW9 station portable in IH9 (GW) on the island of Pantelleria, worked by several G stations in a massive pile-up. None of this was audible to G4DHF. Later, Dutch stations were heard working into Greece.

16 July G8LFB heard EA8XS (Canaries) very briefly at 1615gmt on ssb just above the calling channel. Earlier the same day, Jim had a partial contact with 9H1B in an opening lasting only a few minutes.

17 July G4PCS copied YU1EW briefly at breakfast time and with much Es on the 65–75MHz band, many stations called "CQ-Es" but the situation failed to develop on 2m.

When calling during an Es opening, please keep it short. Just give your *own* call until contact is established. In a pile-up, the dx station has to extract your call-letters from a turmoil of noise, so any other information at the calling stage is pointless.

50MHz

Operation outside tv hours continues, and propagation on this band is now becoming much more understood by those licensed to use it. Meteor scatter and sporadic-E propagation have made possible some very good dx contacts, and the "Six Metre Group" has issued the following list of "firsts" on the band, both two-way and cross-band.

Two-way

G5KW-ZB2BL	6.5.83	GW3LDH-K1TOL	19.6.83
GW3MHW-ZB2BL	3.6.83	GI3RXC-VE1YX	19.6.83
GJ3YHU-ZB2BL	3.6.83	G5KW-TF1T	20.6.83
G3NOX-GU2HML	8.6.83	GU2HML/TF1T	20.6.83
GW4HXO-GU2HML	8.6.83	GW4HXO-TF1T	20.6.83
GJ3RAX-GU2HML	11.6.83	GI3ZSC-TF1T	25.6.83
GU2HML-VE1YX	19.6.83	GI3ZSC-GI3RXV	2.3.83
G5KW-VE1YX	19.6.83	GI3ZSC-ZB2BL	3.6.83
GJ3RAX-VE1YX	19.6.83	GI3ZSC-GW3LDH	14.4.83
GW3LDH-VE1YX	19.6.83	GW3MHW-GJ3YHU	15.5.83

Crossband

G3TCU-CT1WB	20.6.83	G2AOK-EI9Q	21.5.83
GW3LDH-CT1WB	20.6.83	G5KW-OZ9QV	18.6.83
GI3SZC-CT1WB	20.6.83	GU2HML-I5CTE	18.6.83
G4BAO/I5CTE	18.6.83	GI3ZSC-GU2HML	20.5.83
GW3LDH-I5CTE	18.6.83	GI3ZSC-EI9Q	26.5.83
G5KW-GU2HML	29.4.83	GI3ZSC-I5CTE	18.6.83
GW3MHW-GU2HML	29.4.83	GW3MHW-EI9Q	12.5.83
G4GLT-EI9Q	21.5.83		

This list is by no means complete, however, since G4IJE has had crossband contacts with CT1WW, YO2IS, YU3ES, EA3LL, DJ5MS, DK1PZ and OK1OA, all on ms cw.

On 1 July TF1T was again heard at very high signal strength in the UK for some hours after tv had finished for the night, and many contacts were made.

There has been an interesting exchange of correspondence between "Buzzy" GU2HML, VE1YX, and VE1BNN in connection with the transatlantic contacts on 50MHz in June, and when space permits some of the more relevant points will be published. These contacts introduce some intriguing problems in the matter of records. ZB2BL had claimed the Es record for this band with his contact with G5KW, but if the transatlantic contacts are to be ascribed to this mode, then they clearly represent a large increase in QRB over the ZB2BL–G5KW path.

G4GLT has been receiving very good tv pictures from Czechoslovakia, Austria, Sweden, Hungary, Italy, Yugoslavia, Poland and Norway on or about 49·75MHz. He has had crossband contacts with SM6PU, I5CTE, CT1WB and TF1T, and worked WA1OUB crossband but was not quite successful in making two-way contact with him, though GJ3YHU did so. Finally, Dave reported working TF1T two-way on 1 July, and on 5 July a direct contact with GU2HML to give him his 32nd permit holder worked two-way on the band. Anyone wanting more information on the 50MHz band should write to G4JCC, QTHR, for details of the "Six Metre Group" which publishes an excellent newsletter and keeps operators and others interested in this band in close contact with all major activities and developments.

In the early hours of 19 July, G4IJE worked C31XV/P in Andorra on 50MHz ssb two-way using ms mode. The Andorra group used a barefoot FT620B into a three-element antenna to make the first-ever C31/G QSO on this band, and the contact was completed in less than 20min.

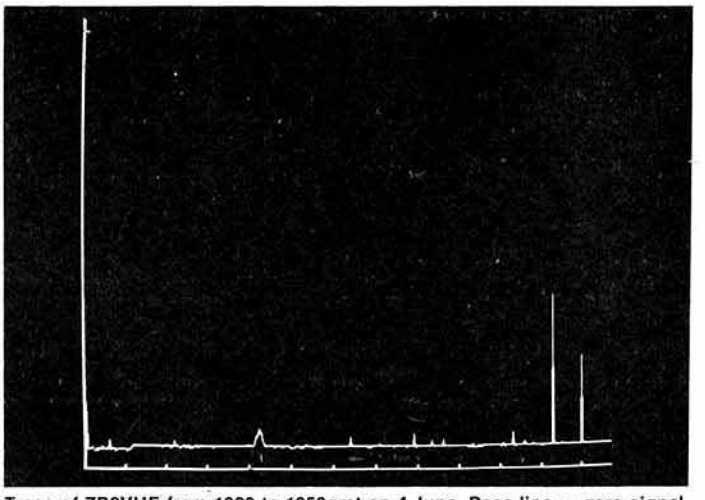
G4GLT reports that on 1 July during the Es opening on 50MHz, SM6PU (GR) worked WA1UQC, KA1A, WA1OUB, VE1BNN and VE1YX, all 50/28MHz crossband.

G4GLT made the first crossband QSO G/GD with GD3ZEX on 13 July at 2259gmt using 144MHz as talk-back frequency. GW3LDH then worked the Isle of Man station for another possible "first".

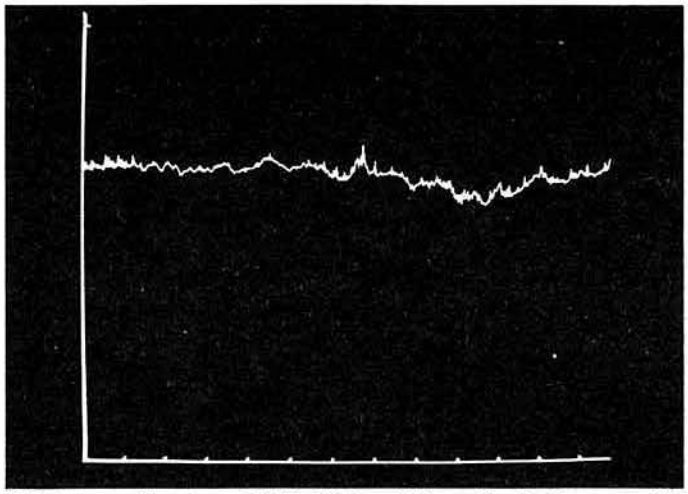
Another micro application

Jeremy Royle, G3NOX, is perhaps better known for his amateur television activities, but he also holds a 50MHz experimental permit and is a confirmed microcomputer user. He has sent details of an unusual application for his BBC Model B computer; he has used it to plot the signal strength of beacon ZB2VHF on 50·03MHz and the Rowridge (IOW) tv transmitter on 53·250MHz. By connecting the agc voltage from his Icom 551 to the analogue input of the computer, he can obtain "off-screen" plots over sampling periods ranging from 0·01s to several hours. The computer connection is taken to the A-D converter in the micro, which normally requires a peak voltage of 1·8V to give the full display range. To provide some "headroom" for exceptionally strong signals, Jeremy has arranged for a signal level of S9 as displayed on the Icom 551 to produce 1·6V at the analogue input.

The screen display of the received signal can be either linear or logarithmic, the latter being most useful for the observation of very weak signals. Each screen plot can, if required, be recorded on tape for long-term storage and playback, since recorded traces can be loaded back into the computer for future observation (off-screen photography) or print-out. The



Trace of ZB2VHF from 1920 to 1950gmt on 4 June. Base line = zero signal noise level



IOW tv transmitter from 1655 to 1700 on 4 June. S9 + 10dB average. No preamplifier

accompanying photographs show two very different situations, the Rowridge trace being of 5min duration with high signal strength, while the ZBVHF beacon is shown over a 30min period with signal down nearer to the noise. The short duration "bursts" (ms?) on ZB2VHF are very evident. This seems to be an excellent replacement for the bulky and expensive pen-recorders used by some observers, and the ability to store the information on cassettes is much preferable to the large rolls of pen-recorder paper which such machines churn out.

The BBC computer as used by G3NOX seems reasonably quiet from an rfi standpoint, but care must be taken to provide a common groundpoint for the receiver, computer, tape-recorder and rf amplifier. To remove any last traces, Jeremy suggests putting a wire mesh cage over the computer. G3NOX is using the system to plot 50MHz signals as part of the 50MHz "experiment". Details of the mods to the Icom 551 can be obtained by sending an sae to G3NOX, QTHR.

Miscellany

Georges, F8OP (CG36f) is seeking 144MHz contacts with squares AN, ZP, XN, XQ. He can work cw (including high-speed ms) or ssb, and requests proposals for schedules to "Le Cottage", 71290, Cuisery, France.

A group of 2m operators in Shetland, Orkney and Caithness have for some weeks operated a "dx net" at 9pm each Sunday on 144·280MHz. They would welcome calls, and will guarantee to be there when conditions are favourable. Some of the net members to be looked for are GM3XOQ (Shetland), GM8YMK (Orkney), GM6LXN (Caithness) and GM4LNN (Orkney) who provided this information.

Jack Hum, G5UM, the vhf awards manager, has been away "down under" for some time but is now back and dealing with a large backlog of claims. He wishes to pay tribute to G4FZL who handled all incoming mail while Jack was away. A list of awards will be published as soon as space permits. Meanwhile, winners of the coveted "Supreme" award during 1982-3 were (in order of claim) G3AZI, G8BWR, G4MAW, G4BPY, G8KAX, G6GN, G8VRJ, G3PBV and G4GIM, bringing the total number of these certificates issued to date to 46. Claim forms and details of all vhf awards may be obtained by sending a large sae to G5UM, QTHR.

Bob McHenry, G3NSM, the UK distributor of *Dubus* reports that all back numbers of the journal have now been sold but a few subscriptions are still open for 1983. A study of *Dubus* 1/83 shows that there is much dx being worked by UK amateurs on vhf bands which is not reported to *4-2-70*. With *Dubus* coming out several months after the events reported, the picture of some openings is changed by the information it contains. I have previously commented on the fact that Corsica (FC) was not easy to work, and in fact never heard here in my location. *Dubus* reports that on 5 June 1982 in a big Es opening, G4IGO (YL) worked seven stations in Corsica, plus 45 stations with Italian prefixes of one sort or another, including IT9, I8, I7 and IW5. On the same day, G8MFJ (ZL) also worked into Corsica with contacts with FC9RY (twice) plus a host of Italian stations and a 9H1. Even if space does not permit me to publish all dx reports submitted, the information contained in them enables a complete picture of an event to be built up, and all such reports eventually find their way to the Propagation Studies Committee.

My comment in the May issue on G6NSY has brought some further information on the New Scotland Yard ARS. The society is located in London SW and has authority to operate at powers up to 100W (250W p.e.p. on 144MHz ssb) on some of the hf bands, plus 144 and 432MHz. They were refused permission by the local authority (!) to erect their preferred antenna system, so they are forced to put up temporary antennas at present whenever the station is activated; on vhf are a 21-element Tonna on 432MHz and a 9-element Tonna on 2m. Nevertheless they have worked a very large number of stations and have a huge pile of QSL cards as a result. They have a very attractive card which is sent to all who QSL them. Best dx to date is to OK on 432MHz, while the contact reported in May with GD8ODB was using horizontally-polarized fm. They sometimes find operating manners far from perfect, as some stations continue to call them after contact has been established with a third party. The calls held are G4NSY (sometimes used on vhf/uhf cw), G6NSY GB4NSY and GB8NSY. Operation is at least one day a month, and Sunday is a favoured time due to the work-load of the operators. An early resolution of the antenna problem is expected.

Walter Gatt, 9H1DU, has sent more information to supplement what he told us about the use of handheld rigs in Malta (*4-2-70* April 1983). The situation has changed, and visitors to the island can now use handheld equipment subject to it being confined to indoor operation as a base station. In addition, the w/t office at Auberge de Castille, Valletta, should be informed as early as possible prior to the visit, and a copy of the home licence sent. The equipment must comply with local regulations (ie be limited to 144-146MHz), be declared at customs on arrival, and permission to operate obtained from the hotel/pension owner where the rig is to be operated. Hopefully the dx will be great after so much administrative hassle!

9H1DU says that the local vhf/uhf/shf group has no connection with any of the other local clubs. There are three clubs in Malta which combine to form a Federation of Amateur Radio Societies: the Malta Amateur Radio-League (MARL), the Amateur Radio & Electronics club, and the Gozo Amateur Radio Society. *(Note*: During a recent Es opening some 9H1 stations requested that QSLKs be sent to Box 144 Malta.)

OY5NS is working on his 432MHz eme antenna which had to be taken down during a very bad winter. He has eight 21-element Tonnas fed from a K2RIW linear.

OY9JD would like to try working aurora on 432MHz from WW square. Any LA or GM who is QRV on the band is invited to telephone him when conditions seem right. OY9JD is Jon Dam, Sandagota 1, Fr 3800, Faroe Islands, Tel 13365. I am indebted to *Dubus* for this information.

ZB2BL, official ZB2VHF beacon keeper for both the 4m and 6m transmitters, wishes to thank all operators including swls who have supplied him with reports over the past few years. He has sent details of 50MHz openings since 1978, and it is hoped to publish his information separately in *Radio Communication* shortly.

G4KUX (County Durham) is now very active from his new location some 1,200ft asl (see *4-2-70* November 1982). Since moving there he has worked a few auroras, and had some ms skeds, but he will not be satisfied until he has erected a 40ft tower to accommodate (probably 4 × 14-elements on 2m and 4 × 21-elements on 70cm, plus single Yagis for 4m and 23cm. Most of us must await our entry into the Great Radio Shack in the Sky before aspiring to such antennas!

G4JCC overheard one newcomer to the bands telling his friend "I always seem to get better reports of quality if I switch to lower sideband". With the other station on usb, that should sound like a tape recorder played backwards.

G4NRV was county-chasing and was late for a meal going after Tyne & Wear. When asked where he was, his daughter told her mother "Dad's working Tate & Lyle!"

Late news flash:

Just heard on 144MHz. . ."CQ Pornadic E". A new mode perhaps?

Deadlines

Please send all copy intended for the November issue to arrive not later than 21 September, late copy by 29 September. □

The Month on The Air

*by John Allaway, G3FKM**

LISTS AND NETS—A CODE OF PRACTICE

THE TWIN PHENOMENA of lists and nets have arisen spontaneously in response to a vastly-increased worldwide ham population and an ever-increasing interest in dx awards. In many cases they provide the only means of working a particular dx station, particularly on the hf bands. It should be noted that frequently lists are taken at the instigation of a dx station.

There is a feeling in some quarters, however, that QSOs made by this means are somehow less valid or fair than those made under more normal circumstances. It is true that sometimes there are abuses, but it is also true that lists and nets are here to stay. Attempts to discriminate against them in terms of awards would prove fruitless, as "policing" would be unenforcible and administration impossible.

It is therefore highly desirable that general recognition be given to a set of operating standards which would ensure the validity and acceptability of QSOs made by these means.

The following suggestions would go some way to minimizing current criticisms. It should be noted that these are **not** advisory notes on procedures, but suggestions in relation to operating standards and ethics.

1. The list operator (LO), when taking the list, should endeavour to ensure a fair and even representation from all those countries calling to participate.

2. It is not desirable to take a list for use at some future date. In the case of poor propagation, however, a running list may be held over and continued when possible.

3. It is desirable to establish with the dx station beforehand how much time he has available, or how many stations can be worked in the time available.

4. A valid QSO requires some minimum two-way exchange of information. As stations are usually addressed by callsign, this information has already been imparted to the DX station, nevertheless the LO should seek to avoid passing the whole callsign if possible. A convention has been established that the exchange need only be a correctly received RS report by both parties. It is therefore the responsibility of the LO at all times to ensure that this is accomplished fairly, accurately and without assistance. While reports are in order, if necessary, verification of partly-received reports is not. Should a relay or a guess be suspected by the LO, the transmitting station should be instructed to make a second attempt with a changed report. The LO should not flinch from giving "negative QSO" when not satisfied with the exchange.

5. It is acceptable practice for the LO to nominate another station to monitor and assist with the procedure in difficult circumstances, due to interference or linking for example.

6. If conditions fail the LO should terminate the operation rather than allow a "free for all" under the guise of the list.

7. It is very important that the LO gives out information at regular intervals relating to new lists, QSL managers, length of current list etc. This will be of great assistance to waiting stations not on the list, and minimize breaking and interference.

(The above paper was presented to the 1983 meeting of the IARU Region 1 HF Working Group by the Society's HF Committee. The meeting recommended that it should be published in national society journals.)

*10 Knightlow Road, Birmingham B17 8QB.

Top band

News of two new allocations on the band—amateurs in the German Democratic Republic have been allowed on the section 1,810–1,950kHz since 1 July, and Austrian amateurs now have a small phone allocation which is the same as that in the FR of Germany (1,832–1,835kHz).

A very interesting letter has arrived from Rudy, HB9T, pointing out that the first QSO ever between the UK and USA was between G2KF and U1MO on a wavelength of about 100m at 0545 on 8 December 1923, and that according to the *T & R Bulletin* of March 1932, G6FO worked W1DDM on 19 February 1932 actually on 1·8MHz using a power of 9·7W! The first QSO between HB and G took place on 3 February 1924 between G5DN and station "XY" in Geneva on 217m. During the RSGB 2MHz tests in 1931, HB9N (who had a special licence) worked several Gs, one of which was G6OO, and HB9T himself began regular top band activity in 1935.

New claims for "firsts" are as follows:

CT1CO-G3OZF (27.1.63)	UK2GKW-G3YMC (20.7.79)
EA8CR-G3YMC (29.10.77)	UO5AA-G3CNM (25.11.62)
IS0LYN-G3YMC (21.11.76)	UR2RPB-G3YMC (12.7.79)
G3WKH/HB0-G3YMC (10.9.73)	VE1ZZ-G3CNM (13.3.60)
JX5DW-G3YMC(4.6.83)	VO1DX-G8GF (25.2.61)
UA9DA-G8GF (23.4.62)	YU1IJK-G3CNM (12.2.59)

UB5WF-G8GF (25.2.61)

Overseas news

Mention of his former callsign 5Z4LW in May *MOTA*, prompted "Bob" Hope, LA2UA, who is a member of RSGB, to write to say that he closed down from Kenya in July 1977 and opened up with his old LA call the following January. Logs and QSLs for both his 5Z4LW and VQ9LW operation are still available to those needing them, either via the bureaux or to the address in "QTH Corner".

From G3JHI a copy of an item from the *New Zealand News UK* concerning the award of the BOC Challenge communications award to Matthew Johnstone, ZL4JO, of Owaka, for helping to save the life of a contestant in the round-the-world solo yacht race. The yacht *Skoiern III* capsized and sank half-way between New Zealand and Cape Horn, and Matthew was the principal radio operator responsible for guiding the rescue team.

G4NWC recently visited Malta and had the pleasure of visiting the HQ of the Malta Amateur Radio League. The club now has a membership in excess of 100 and meets on Tuesdays and Thursdays between 1800 and 2000, and also on Sundays from 1000 to 1200—all local time. The meeting place is the Parochial Centre, Attard, a suburb of Valletta, and very near the No 40 bus route! Jim assures us that visitors receive a very warm welcome, and that the kindness and hospitality of MARL members deserves special mention.

Bill Mahoney, G3TZM, also visited Malta recently and held the reciprocal licence 9H3BX. He operated on hf using his uncle's (9H1GR's) FT101ZD, and made a number of contacts, mostly with the UK. QSL cards are being printed and will be despatched at an early date. Bill's QTH appeared in last month's "QTH Corner".

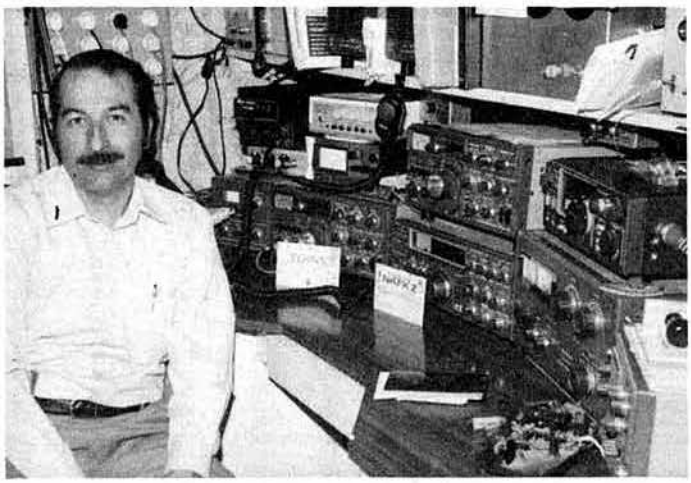
Expeditions

The *DX Bulletin* reports that Clipperton Is will be activated again at the end of the year and that operators have been chosen. More details later.

J28AZ is said by the same source to have a licence to operate from South Yemen in late August, and then from the Yemen Arab Republic for a further week. His callsign from DR Yemen may be 7O1AB, and he will be restricted to working during daytime.

VE1ASJ will be going with an eight-man group to St Paul Is for 10 days beginning 23 September. The expedition callsign will be VE1SPI and four stations will be on the air covering 1·8 to 432MHz, cw, ssb, rtty and Oscar.

The Alaska DX Association is planning a visit to the Pribilof Is late this month. These are located about 300 miles north of the Aleutian Is and the same distance from mainland Alaska. A previous application for DXCC



Entrants for G3GIQ's attempt at achieving a DXCC in visitors. L to r: TG9NX, who is also TG4NX, N4FKZ and N4FKZ/HR5, and a very keen dxer; HS1AMH; and SV1JG, best known for his activity from Mt Athos as SV1JG/A, and for his all-band efforts

status was rejected, but further attempts are being made to have them accepted under a different DXCC rule.

The Spratly Is expedition by DU1CK took place from Panata Cay near the island of Thitu, and it is hoped to repeat the activity before the end of 1983. On the next occasion the callsign will be 1S1WCY, and an invitation has been put out to foreign operators to go along also.

DX news

From 1 November Senegalese callsigns will indicate which of eight districts a station is in, and also from then until 31 December the prefix will change to 6V. Therefore normal prefixes will be 6V1-6V8, 6V9 will be reserved for clubs, and 6V0 for visitors. In 1984 the same divisions will be denoted by 6W1-6W0.

ZD7BW is appearing on 7MHz quite often between 7,044 and 7,048kHz, or sometimes on 7,084kHz, after 2130. At 2230 he QSYs to 3·5MHz ssb. Both ZD9CA and ZD9CS are now active on 21MHz ssb and have been worked in Europe during the 1500-1800 period.

Arild, 3X4EX, should now have a linear, and hopes to be active between 7,060 and 7,090kHz and between 3,650 and 3,700kHz. He is also planning to be on 1·8MHz, and will be on mostly at weekends between 1,831 and 1,841kHz.

ZL3AFH should have returned home from the North Cook Is where he has been on the air as ZK1WL. He is expecting to be posted to the weather station on Kermadec Is sometime this month, but he may not be very active on the air until January 1984.

Welcome . . .

. . . to the following who joined RSGB during June: A71BH, EI4FC, HB9CKR, HS1AMH, KD4RR, VP8WA, WA4QLZ, ZL2SB, ZS5ZA, ZS6LF, A. Higby and M. Tremlett (5Z), A. Steele (HC), and M. De Detten (PA).

28MHz

A lot of modified cb equipment is now available for use on the 28MHz amateur band, and this is providing a cheap way of getting active. There are differing opinions about the use of fm in this particular case, but it is certainly one way of using what would otherwise be an almost completely unoccupied slice of our spectrum. Readers who do decide to take part are asked to please try to avoid interference to downlink satellite signals—the IARU Region 1 segment in this case extending from 29·4 to 29·55MHz, and also to remember that there are a number of Russian satellites transmitting signals down to 29·331MHz.

In order to create interest and activity on the more usual modes, Bob Treacher, RS32525, has organized some "set listening periods" on the band. See *Rad Com* July 1983, p 620, for details.

The **28MHz countries table** (to 20 July) is as follows:

G3VOF-167	G3XBY-101	G3XTJ-66 (cw)	G3JFF-23
G3GIQ-151	G3SXW-85 (cw)	G4EHQ-52	G3SDZ-19
G3XQU-150	G4MUW-83	G4PKP-49	G3XBM-18
G3KHZ-147	G4GGY-82 (ssb)	G3KSH-27	G4FVK-17
G3JFH-135	G3TXF-77 (cw)	G3PSM-26 (cw)	
G3KDB-102 (cw)	G4OBK-74	G4PXT-25	

18 and 24MHz

It would seem that these two "new" bands are being neglected by most amateurs, possibly because of the low power and antenna restriction imposed by the Home Office, and perhaps because there is as yet relatively little activity from the comparatively few countries where operation is permitted. Added to these factors is the decision that no contests shall take place until the bands become amateur-exclusive (by 1989) and their non-involvement with the DXCC programme. However, VK6RO has written to say that both bands have been available in VK since 15 December 1982, and that normal power and modes may be used there with no antenna restrictions. Only parts of both bands are permitted: 18,068-18,071kHz, 18,079-18,101kHz, 18,109-18,121kHz, 18,134-18,141kHz, 18,151-18,156kHz, 18,164-18,168kHz, 24,890-24,896kHz and 24,905-24,990kHz. Graham claims three "firsts" on 24MHz—with G3KMA (1036 on 26.12.82), GW3AHN (1119 on 15.1.83), and GI4GPC (1116 on 18.3.83). On 18MHz he claims three more—with G6ZO (1300 on 27.12.82), GM3WOJ (1315 on the same day), and GW3AHN (1119 on 15.1.83).

To encourage activity on these bands *DX News Sheet* is organizing "activity periods" and hopes that as many as possible will try to join in at these times. They will be held on the first Sunday of each month from 1500 to 1800, and those taking part are asked to send in details of stations worked to DXNS, Box 146, Cambridge (with a copy to G3FKM please).

Contests

Scandinavian Activity Contest

1500 17 September to 1800 18 September (CW)
1500 24 September to 1800 25 September (Phone)

To encourage contact between Scandinavian and other amateurs. Scandinavia is defined by the following prefixes: LA/LB/LG/LJ (Norway), JW (Svalbard and Bear Is), JX (Jan Mayen), OF/OG/OH/OI (Finland), OH0 (Aaland Is), OJ0 (Market Reef), OX (Greenland), OY (Faroe Is), OZ (Denmark), and SJ/SK/SL/SM (Sweden). Bands 3·5 to 28MHz, with activity confined to the following segments: (cw) 3,505-3,575kHz, 7,005-7,040kHz, 14,010-14,075kHz, 21,010-21,120kHz and 28,010-28,125kHz; (phone) 3,600-3,650kHz, 3,700-3,790kHz, 7,050-7,100kHz, 14,150-14,300kHz, 21,200-21,350kHz and 28,400-28,700kHz. Single-operator single-transmitter, multi-operator single-transmitter and multi-operator multi-transmitter sections (all of which are all-band). In the multi-single class only one signal is allowed at any one time on any band, and the station must remain on a band for at least 10min after a first transmission following a band change. Exchanges consist of RS/T and serial number (from 001). Europeans score one point for each QSO with Scandinavia, and the multiplier is the number of call areas worked on each band added together. Note that LA1 = LB1 = LJ1 and SM3 = SK3 = SL3 etc. Portable stations without district number count as a tenth district (eg W4XXX/OZ would count as OZ0). Logs should give date, time, station worked, sent and received exchanges, band, if multiplier, and points. A summary sheet giving callsign, category, name and QTH, number of QSOs per band (less duplicates), QSO points per band, and final score, and the usual declaration should be enclosed. A multiplier sheet must be enclosed for each band on which 200 or more QSOs were made, and a

QTH CORNER

F0CH/FC	via HB9TL, J.Laib, Einfangstr 39, CH8580, Amriswil, Switzerland.
I1WXY/IA5	I1VRO, R. Viani, Via XXV Aprile 23, Imperia 18100, Italy.
VP2KBM	via W4UY, J. B. McGee, 11461 SW 186 St, Miami, Fla, 33157, USA.
VP2MM	via AB1U, R. J. Casey, 85 Hacienda Cir, Plantsville, Ct, 06479, USA.
VP8AQA	via GM4TNP, c/o Glenrothes ARC, 41 Veronica Cresc, Kirkcaldy, Fife, KY1 2LH.
YL3M	via UK3MAA.
ZD9CA } **ZD9CS** }	via KA1DE, H. B. Thompson, 15 Crestview St, Keene, NH, 03431, USA.
3B9FK	Patrick Chong Chap Sin, 10 Henri le Sidoner, Port Louis, Mauritius.
3D2CJ	R. Jones, "Beirut", Albert Drive, Deganwy, Gwynedd LL31 9RE.
3X4EX	T. Wood, Box 116, Dunn, NC, 28334, USA.
4X4WCY	via 4X4AT, A. Kirshner, 17 Haraquafet St, Holon 58204, Israel.
4X6WCY	via 4X6DW.
5V7WI	Box 1499, Lome, Togo.
ex-5Z4LW	O. Hope, Madlamarkveien 21, 4040 Madla, Norway.
7P8CL	via SM5GOJ, Radmansbacken 14556, Norsborg, Sweden.

duplicate sheet is also required under the same condition (it should be listed under countries and call areas). Post entries before 30 October to: SAC Contest Committee, PO Box 306, SF-00101 Helsinki 10, Finland.

SAC

In the **1982 contest (CW section) G3SXW** was overall fourth with 46,400 points, and G3TXF ninth with 34,960. Other UK scores were G2GM (7,700), GM4KGJ (6,930), G4DGG (5,588), GM3ZRT (4,180), G4MVA (3,572), G4EBO (2,816) and G6NK (1,900). In the phone section **G4FVK** led with 7,540 points, followed by G4CHP (4,016), GM4ELV (2,520), GM4JFS (1,798), G4DGG (1,606), G4ACY (374) and GM4BCI (48).

European DX Contest

0000 10 September to 2400 11 September (Phone)
Full details will be found in last month's column.

VK/ZL/Oceania Contest

1000 1 October to 1000 2 October (Phone)
1000 8 October to 1000 9 October (CW)
All amateur bands but no crossband QSOs. One contact per band—QSOs with VK and ZL count two points and with Oceania one. there are single- and multi-band sections. Listeners may take part, in which case the two sections of the contest are combined. The multiplier is the number of VK/ZL call areas worked on each band. In the multi-band section, final score is total QSO points multiplied by the sum of prefixes worked on each band. Exchanges consist of RS/T and serial number (starting from 001 on each band). Separate logs should be submitted for each band and should show date, time, station contacted, band, numbers sent and received, and each new multiplier should be underlined. A summary sheet giving callsign, name and QTH, details of equipment, and for each band points claimed and multipliers, should also be enclosed. Entries to reach WIA VK/ZL Contest Manager VK3BGW, 1 Noorabil Court, Greensborough, Vic 3088, Australia, no later than 31 January 1984.

ON Contest

0700-1100 2 October (Phone)
0700-1100 16 October (CW)
3·5MHz only. Only contacts with Belgian and DA (Belgian Forces) stations permitted. Exchange RS/T plus serial number (from 001). ON and DA stations will give their club code (eg MCL), and each QSO counts three points. Each club worked is a multiplier. Top station in each country receives an award, and listeners may take part by logging time, station heard and code given, station being worked. Post logs within three weeks of contest to Welters Leon, ON5WL, Borgstraat 80, B 2880 Beerzel, Belgium.

Congratulations to John Kay, G3AAE (rt), retiring chairman of the Society's HF Committee, seen here receiving his VK0JS QSL card from Henry, G3GIQ. John now has all current DXCC countries confirmed and occupies the coveted "top spot" in the DXCC Honour Roll

MOTA ALL-TIME COUNTRIES TABLE

Scores received up to 15 July—band leaders in bold type

Callsign	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3KMA	74	**215**	**286**	327	**329**	**314**	1,545
G3GIQ	48	173	216	326	327	306	1,396
G3MCS	30	185	233	316	317	302	1,383
G3UML	3	187	190	325	294	253	1,252
G3HTA	49	156	195	310	276	240	1,217
G4DYO	41	109	164	300	294	282	1,190
G3XTT	68	158	195	254	266	241	1,182
G4FAM	41	147	201	263	261	241	1,154
G2DMR	35	134	139	283	288	252	1,131
G3RUV	6	141	147	279	282	232	1,087
G3XJS	26	102	116	274	286	272	1,076
G3NOF	4	79	62	**339**	317	272	1,073
GW4BLE	11	145	155	252	255	238	1,056
G3TXF	39	150	161	244	245	204	1,043
G3IGW	**87**	129	228	217	192	170	1,023
G3RUR	1	120	141	271	238	217	988
VK9NS	14	131	191	249	210	168	963
G3XQU	1	89	122	260	250	229	951
G3YMC	65	82	132	201	214	172	866
G4FXT	1	87	115	174	258	223	858
G3JJG	28	72	92	189	237	189	807
GM3PPE	35	115	136	179	165	138	768
G4KPE	1	146	157	170	154	129	757
GM3YOR	37	64	107	167	168	171	714
G4LJF	1	65	75	182	149	164	636
G4GGY	2	100	76	182	142	100	602
Average	**30**	**126**	**155**	**250**	**247**	**220**	**1,028**

The next table will be in December issue—please send your scores to G3GIQ, QTHR, to arrive no later than 15 October.

Awards

Diploma JA 35.20

For contacts with stations on the 35° 20'N parallel in Japan (Chiba, Kanagawa, Shizuoka, Yamanashi, Nagano, Aichi, Gifu, Shiga, Kyoto, Hyogo, Okayama, Tottori, and Shimane prefectures). Class AA for all 13 prefectures worked, Class A for 10, and Class B for five. Send certified list plus 7 ircs to Tsuyoshi Ohashi, 62, Sakurai, Yoro-cho, Yoro-Gun, Gifu, 503-12, Japan.

Torshavn Award

Available to licensed amateurs and listeners for contacts/confirmed reception reports with OY stations between 0000 1 May 1983 and 2400 1 January 1984 on all bands 3·5 to 432MHz (but not 10, 18 or 24MHz). Scoring is 25 points on 3·5 and 7MHz per QSO for Europeans (40 for DX), 20 points in 14, 21 and 28MHz (30 for DX), and 40 points and 75 points respectively on 144 and 432MHz. QSOs with club station OY6FRA count double. Those with 75 points should send a list of the stations worked (certified by a national society awards manager or two licensed amateurs) together with 10 ircs or equivalent to: FRA Award Manager, Box 343, 3800 Torshavn, Faroe Is.

Around the bands

G8KG's summary arrived—in spite of the two days required by the Post Office to deliver a first-class letter from Ipswich to Birmingham! It reads as follows: "After the rather steep fall in solar activity during the first quarter of 1983, it was good to see a distinct recovery in May and June. During this period the 27-day average solar flux was generally between 130 and 140 sfu, with the lowest daily value being 115 on 7 May and the highest 174 on 7 June.

"In terms of amplitude Cycle 21 has now fallen to about the midpoint between maximum and minimum, and the fall has taken about 3½ years. The descent from the half-amplitude point to the minimum will probably be somewhat slower and could take as long as five years if, as seems possible, we are currently seeing a sequence of longer than average cycles."

The following very kindly provided logs from which callsigns were selected: G2HKU, G5JL, G3s DQL, GIQ, GVV, KDB, KHZ, KSH, YRM, G4s EHQ, FVK, GW4KGR, G4s NXG, RVV, G5CFJ, and RS33291.
Stations listed in italics were using cw.

1·8MHz. 0000 *LZ1KSN, SP1ADM, UR2QD.* **2100** LX1PD. **2200** *EA9KQ, OH0AM.* **2300** *DA1WA/HB0, YU3EF.*
3·5MHz. 0100 AB3A/4X. **0300** HI8GB, N4WW. **2200** ZS3GB, ZS4PB.
7MHz. 0100 AB3A/4X. **0200** *4K1D.* **0500** *PY, VK, ZL.* **0600** *K2KTT/PJ7, VK4LX, ZL1AZE, ZS6KT.* **0700** *FP0HSW.* **2100** Z21EV. **2200** CE8ABF, *PY7SA,* VS5DD, ZB2EO, *4K1QAV.* **2300** UK9AAN.
10MHz. 0200 *VP2KBI.* **0400** *ZL* (to 0700), *ZS5LT.* **0500** *VP2KBM, W1, 2, 3, 4, 6, 8, 9.* **0600** *VK* (to 0700), *WP4.* **0700** *C31XO, FG7BP, OY7ML, VK3MR.* **1800** *Y39XO.* **1900** *9K2BE.* **2200** *6W8JI.*
14MHz. 0300 *JX5DW.* **0500** KH6PK, KL7 (to 0900), W6, W7 (to 1000), ZL (to 0700). **0600** ZK1CH. **0700** *KH6IJ, TZ8DC,* VS5GA, 1A0KM. **0800** C21BD, G5YC/OY. **0900** FO8IW, ZK2IW. **1000** HL9UF, KG6RN. **1400** K8MFO/OH0. **1500** JA,

VE8RCS, VS6AY. **1800** JAs. **1900** JD1BBR, T77C, 9M2FZ. **2000** *UK1PGO*, VS5DD, *ZL1AH*. **2100** A71AD, *JW0A*, JY1, VP8MT, *ZB2EO*. **2200** VK9NS, 1Z9A. **2300** CE0ZAD, *FG0DDV/FS, KU0N/VE7, VK3MR*, 3X4EX.

18MHz. 0500 *DL2GG/YV5*. **0600-0900** *DL, OE, OH*. **1800** *9K2BE*. **1900** *6W8JI*.

21MHz. 0500 *KH6RS*. **0600** *FB8ZQ, FO8JL, KL7PF*, VE6-VE7, *W6-W7*, 5W1DZ. **0700** JX6BAA, *NL7G, VK6OH*, ZK1CG. **0800** JA, KH6LW/KH7, TZ6FIC, VK9NS, *VU2AJ*, ZK2JS. **0900** TU4AT. **1000** ZK2IK, 5W1EJ. **1100** J27RDD, *OD5LX*, P29NSF. **1300** *HZ1AB*, TL8ER, *3B9FK*. **1400** G4JMB/CT3, *FG7BP, FR0HPR, K4DY/SV5*, V3TV, 4S7RR. **1500** FP0HSW, *J28DX*, JA, *9V1TL*. **1600** HL2AHQ, *3D6AK*. **1700** *KH6CF, ZD7WT*, 1A0KM, 1Z9B, 9V1VP. **1800** W6, YC2NA, *4K1GDW*, 5R8AL, 6U1WCY. **1900** YI1BGD, 9X5KE. **2000** *A4XGY*, KH6WU, OD5SM, *YB2ARH*, 5H3SG. **2100** *HV3SJ, TR8JLD*, 5B4JE. **2200** *FG0DDV/FS, FY0HIJ, JA, JY5DT, UA0AG*, All W, 1A0KM. **2300** All W.

24MHz. 2000 *6W8JI*.

28MHz. 0400 TO8OFO. **0600** *VK5*. **0800** VK6NQE, *VK8*. **0900** *HZ1HZ, J28CL, OY7ML*. **1200** A22WF, *7P8CL*. **1300** *3B8FK*. **1400** Z21GJ, *6W8JI*. **1500** TR8DX, VP8AQA, 5N3RTF, 6W8JI. **1600** *DJ7ST/OH0*, PY, N7EDK/5N7. **1700** *EL2AE*, G5OY/OY, TU2IJ, ZP. **1800** LU, PY, TR8DR, *TZ8DC*. **1900** *JX5DW*, PY. **2200** *W9NXD/HR2*.

Acknowledgements to the following for information extracted: the *Long Island DX Bulletin* (W2IYX), *DX News Sheet* G3XTT/G3ZAY), the *Ex-G Radio Club Bulletin* (GI3OEN/W6), *Long Skip* (VE3EUP), *Lynx DX Group Bulletin* (EA2JG/EA3CBQ), *DX'press* (PA0GAM), *CQ Magazine* (W1WY), *DXNL* (DL3RK), and the *DX Bulletin* (K1IM).

Please send items for **November** issue **to reach G3FKM** no later than **29 September.**

HF propagation predictions for September 1983

Using the table

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band.

The probability of signals being heard is given on a 0 (indicated by a dot) to 9 scale; the higher the number the greater the probability, with 1 meaning 10 to 19 per cent of days, and so on. Additionally 50MHz F-layer and 1·8MHz openings are indicated by a dagger (†) sign in the 28 and 3·5MHz columns respectively. The higher probability figures are printed in **BLACK**, lower probability in RED type and lowest probability in GREEN.

	28MHz				21MHz				14MHz				10MHz				7MHz				3·5MHz			
GMT	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122
	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802
EUROPE																								
Moscow	...	...	...	...	...	134	444	3..	..1	777	778	972	645	544	446	898	875	322	123	689	·42	...	...	3··
Malta	...	...	...	...	...	145	444	51.	21.	777	778	984	866	755	456	899	997	422	223	689	··5	...	...	3··
Gibraltar	...	...	...	...	...	.23	222	31.	...	287	777	982	65	765	556	898	998	643	223	689	···	3..	...	3··
Iceland	...	...	...	...	...	..1	111	1..	...	.36	667	861	321	466	556	787	886	643	233	578	···	3..	...	245
ASIA																								
Osaka	...	...	...	...	...	124	2..	...	...	354	332	12.	...	.31	.13	562	...	...	..1	351	...	...	...	.2.
Hong Kong	...	..1	1..	...	...	245	542	1..	...	144	346	751	1..	.11	.13	685	...	...	..1	474	...	...	...	.4.
Bangkok	...	.11	11.	...	...	346	562	1..	1..	123	346	762	3..	..1	.13	687	1..	...	..1	476	...	...	...	.43
Singapore	...	.12	111	...	...	356	566	3..	1..	123	346	871	3..	..1	.13	686	1..	...	..1	476	...	...	...	.43
New Delhi	...	.12	12.	...	...	456	564	1..	1.2	213	346	763	62.	...	.13	688	51.	...	..1	478	2..	...	...	.45
Teheran	...	122	222	...	...	555	667	51.	314	322	346	885	853	...	.13	689	841	...	..1	478	52.	...	...	.45
Colombo	...	122	221	...	...	456	666	1..	111	112	346	765	62.	...	.13	689	5..	...	..1	478	2..	...	...	.45
Bahrain	...	133	232	...	...	555	667	51.	524	311	336	887	963	...	.13	689	851	...	..1	478	·2.	...	...	.45
Cyprus	...	133	333	2..	...	677	778	73.	635	655	567	997	986	422	335	799	984	1..	.12	588	·5.	...	...	25·
Aden	...	133	344	1..	...	555	678	511	734	211	236	888	973	...	.13	689	851	...	..1	378	·2.	...	...	.45
OCEANIA																								
Suva (S)	...	...	...	...	...	..2	22.	1..	...	444	333	73.	..1	531	113	62.	...	2..	..1	3..	...	...	...	...
Suva (L)	...	...	...	.1.	...	21.	...	.61	112	752	21.	552	..2	531	..1	62.	...	3..	...	3..	...	...	...	...
Wellington (S)	...	...	...	...	...	.11	11.	...	...	554	332	43.	..1	531	.13	63.	...	2..	..1	31.	...	...	...	...
Wellington (L)	...	...	...	...	...	1..	...	.21	232	631	...	263	.12	531	...	531	...	3..	...	31.	...	...	...	...
Sydney (S)	...	...	...	...	...	354	331	...	..1	554	345	431	...	221	.13	662	...	...	..1	43.	...	...	...	...
Sydney (L)	...	...	...	...	...	.1.	...	.11	211	252	1..	.75	...	331	..1	252	...	.1.	...	23.	...	...	...	...
Perth	...	122	1..	...	...	476	532	...	2.1	253	345	631	3..	.21	.13	685	1..	...	..1	474	...	...	...	.4.
Honolulu	...	...	...	...	...	...	...	2..	...	133	1.4	52.	..2	531	.13	2..	..2	31.	...	...	...	...	...	...
AFRICA																								
Seychelles	...	133	331	1..	...	555	676	631	634	111	336	898	962	...	.13	689	84.	...	..1	378	·..	...	...	.45
Mauritius	...	133	444	2..	...	556	778	841	633	211	336	898	962	...	.13	689	84.	...	..1	378	·..	...	...	.45
Nairobi	...	134	455	3..	...	555	678	851	734	311	136	898	985	...	.13	689	872	...	..1	378	·4.	...	...	.45
Harare	...	144	456	41.	1..	566	678	962	854	411	136	899	996	1..	..3	689	883	...	...	378	··.	...	...	.45
Capetown	...	.44	456	.	...	476	678	862	742	632	236	898	996	3..	..3	689	885	1..	...	378	··2	...	...	.45
Lagos	...	.44	566	62.	1..	375	568	972	872	731	115	899	997	5..	..2	689	786	2..	...	368	4·3	...	...	.45
Ascension Is	...	.43	235	51.	...	.86	557	871	771	362	112	698	996	53.	...	489	886	3..	...	168	5·4	...	...	.35
Dakar	...	.34	445	62.	...	.76	566	881	674	662	112	698	998	63.	...	389	887	3..	...	158	5·4	...	...	.25
Las Palmas	...	.23	222	41.	...	.78	777	871	563	676	666	898	998	753	333	689	898	521	..1	378	··5	2..	...	.4·
S AMERICA																								
South Shetland	...	...	344	41.	...	..4	678	862	653	343	335	567	898	531	..2	346	687	3..	...	.13	354	...	...	...
Falkland Is	...	..2	444	63.	...	..6	777	872	653	554	333	468	998	631	...	137	787	3..	...	.14	5·4	...	...	...
Rio de Janeiro	...	..4	333	42.	...	..7	655	771	674	444	211	378	998	531	...	.48	887	3..	...	.26	·54	...	...	.4
Buenos Aires	...	..3	333	53.	...	..7	666	772	674	434	321	267	998	631	...	.36	887	3..	...	..4	··4	...	...	...
Lima	...	...	211	32.	...	...	654	562	553	243	321	126	898	531	...	..4	687	31.	...	..1	3·4	...	...	...
Bogota	...	...	211	22.	...	..2	644	552	552	124	311	126	897	531	...	..4	787	31.	...	..1	4·4	...	...	...
N AMERICA																								
Barbados	...	..2	211	32.	...	..6	644	562	653	244	311	157	998	531	...	.26	887	31.	...	..4	··4	...	...	...
Jamaica	...	...	111	21.	...	..1	544	451	541	.13	321	126	897	421	...	..4	687	31.	...	..1	3·4	...	...	...
Bermuda	...	...	111	11.	...	..3	544	551	541	.14	321	257	887	421	...	.25	787	31.	...	..3	4·4	...	...	...
New York	...	...	...	...	...	...	443	441	431	. 3	332	246	785	311	...	.14	687	31.	...	..2	3·4	...	...	...
Mexico	...	...	...	1..	...	...	143	431	321	.1.	331	113	575	321	...	..1	277	31.	...	...	.44	...	...	...
Montreal	...	...	...	...	...	...	343	441	42.	..3	332	356	785	311	...	.24	587	31.	...	..2	2·4	...	...	...
Denver	...	...	...	...	...	...	.12	22.	31.	...	233	223	464	31.	.11	..1	256	31.	...	...	.24	...	...	...
Los Angeles	...	...	...	...	...	...	..2	21.	21.	...	.34	212	254	31.	.12	...	.46	31.	...	...	..4	...	...	...
Vancouver	...	...	...	...	...	...	...	11.	1..	...	.24	322	244	321	.13	1.1	136	31.	...	...	..3	...	...	...
Fairbanks	...	...	...	...	...	...	...	...	...	222	223	432	223	531	.13	322	.13	31.	...	...	...	...	...	...

Sunspot update information had not been received from SIDC at the time of going to press.

Contest News

46th Commonwealth Contest 1983 results

Despite some of the worst hf conditions for many years, the contest committee was pleased to receive an entry on par with 1981, if somewhat down on last year, when record scores were achieved. Lower entries from the UK and VE were balanced by the increased entry from ZL and the maintenance of the splendid VK contingent.

Apart from call areas appearing among the entries, activity was also recorded from VE1, 2, 4, 6, ZL4, J6, T30, T32, VK9Y, VP2K, VU, ZK2, 3D6, 7Q7 and 8P6, though some of these have made only one or two contacts. 9H1 did not appear in logs for the first time we can remember.

A major solar disturbance sent the geomagnetic index from an average of nine or 10 to a massive 49, causing depressed mufs, especially in the northern hemisphere. No transatlantic contacts were made on 21 or 28MHz and there were only two minor openings from G to VK on 21MHz. However, these bands provided fair if not outstanding conditions between VK/ZL and VE, a significant feature of the results. The only compensation was 7MHz, where above-average traffic was recorded between G and VK/ZL on both paths.

The unusual conditions created a platform for the first win by a station in Eastern Australia (VK6HD won in 1971) since 1949. Russ Coleston, VK4XA, of Brisbane, broke the recent Canadian domination at the top with 322 contacts and 153 bonuses, a clear victory. He receives the Senior Rose Bowl, perhaps deservedly going "Down Under" this time after all the work put in to upgrade the VK entry by John, VK3ZC, and Eric, BCRS195.

The Junior Rose Bowl goes to Peter Lake, ZL1AIZ, and is an outstanding achievement in that he does not have a beam antenna! He will be remembered as 5W1BZ in recent years. ZL2RY took third place, while 6Y5HN in his first CC was a welcome entrant making a most creditable score.

Top UK entrant, Al Slater, G3FXB, now has 11 straight wins of the Col Thomas Rose Bowl, but as it is now 31 years since the last outright UK win, one can imagine G3FXB will be around shooting for the top spot for a while yet. Maybe he could use a little support—32 UK entries with over 300 active is dismal! If the VKs can produce around a 90 per cent entry, we can surely do as well. The committee is looking for a vastly increased home entry next year. If nothing else, at least send a check log so that we can identify the errors in those long lists of Gs worked.

The Receiving Rose Bowl has been regained by Eric Trebilcock, BRCS195, at the expense of last year's winner, "Brad" Bradbury, BRS1066. On 21 and 28MHz scores were "Treb" 250-"Brad" 0, which rather tells all. Both are to be congratulated on the accuracy of their logs.

Attention has been drawn to the new callsign arrangements in ZL, which appear to be similar to the USA, in that no change is mandatory when someone moves to another call area. The committee will consider the implications of this when framing next year's rules. On the subject of prefixes, some strange ones seem to have joined, or rejoined, the Commonwealth. Claimed for points were EI, ZS, 9K2 and, most bizarre of all, BY!

Many entrants are not checking their bonus claims or point additions. As a result some 30 per cent of logs had to be rescored prior to regular checking. Two scores show just a one point difference from the claims—this does not mean your logs received little attention! On the contrary, both were upgraded in points only to fall back in checking, a tiresome addition to the workload.

Only one entrant asked for a slight change to the rules, so apparently everyone else is happy, and indeed the committee do not contemplate any changes in the foreseeable future to this challenging event.

AWARD WINNERS

Senior Rose Bowl	S. R. Coleston, VK4XA
Junior Rose Bowl	P. B. Lake, ZL1AIZ
Col. Thomas Rose Bowl	A. J. Slater, G3FXB
Receiving Rose Bowl	E. W. Trebilcock, BCRS 195

SINGLE-BAND LEADERS

7MHz overseas	ZL1AZE	14MHz home	GW3MPB
14MHz overseas	VK6FS	21MHz overseas	VE7BS

How the leaders made their scores

	QSOs/bonuses					
	3·5	7	14	21	28	Equipment
VK4XA	30/20	74/29	139/46	49/34	30/24	TS520S; LF dipoles; HF 3-el Tri Yagi.
ZL1AIZ	42/24	62/32	61/42	33/27	26/22	FT902DM; 3·5MHz inv vee dipole; 18AVT/WB.
6Y5HN	9/8	45/25	166/52	47/32	16/9	TS120S; LF dipoles; HF 4-el Tri Yagi.
G3FXB	19/19	55/39	111/54	5/5	—	T4XC/R4C; 3·5 slopers; seven two 3-el fixed wire Yagis plus sloper; HF quad/Yagi.
VE5RA	1/1	40/23	45/30	47/31	46/30	IC720A; no ant details.

Comments from entrants

Conditions . . . Worst since '74—*G2QT*; since '45—*G3KSH*; ever—*G3JKY, G5ND* and others; one to forget—*RS44395*; words fail me—*GM3OXC*; absolutely stinking—G3HZL of G4HMS; took 3h for two QSOs—*Z23JO*; only heard one G—*VE5BAF*; no Eu heard—*VE7BS*; basically atrocious—*VE3JKZ*; Sunday almost blank here in no-mans land—*9V1TL*; who stole the ionosphere?—*Z26JC/G3TBK*; *but* . . . good, especially SP to UK—*ZL1AZE* (He was on 7MHz only!); generally good this end—*VK7ZO*.

Placings . . . Hard going this year—*VK4XA*; I'm hoping for the middle placing—*VK3YD*; Shall I be last again?—*VK7ZO*; bottom score?—*G3TXF*.

Miscellany . . . Sorry part-time entry—at 75 this lad needs sleep—*VK2ZC*; Eu callers go on my PEST list (23 of 'em)—*VK6FS*; beam jammed SE, and no one there—*VO1AW*; my score is pretty lousy—*ZL2BR* (*he missed off 1,000 points on his final addition*). Checked all bands and no contest station outside the designated contest segments—*RS52868*.

Nearly all entrants expressed enjoyment of the event, despite the adverse propagation, including Don, VK2BDU. Let him have the last word . . . "And didn't I have fun too! The antenna blew down the week before. Couldn't get it up because of the heat of the tin roof until Friday night, which I spent scrambling round the roof with a torch like a b....y 'possum'! Finished it Saturday morning, then all I got was a couple of poms—pardon—G stations! Thanks for running the contest—all good fun." Thank you, Don, the spirit lives on.

G3XTJ

TRANSMITTING SECTION

Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points
1	VK4XA	4,475	35	VK7CH	1,862	69	**G4BUO**	1,069	90	VK3CT	493
2	ZL1AIZ	3,924	36	VK3ZC	1,855	70	**G3EFS**	1,050	91	**G3VW**	487
3	ZL2RY	3,909	37	VE5BAF	1,830	71	ZL1MT	1,003	92	**G3JKY**	465
4	VK3BLN	3,862	38	VE3JKZ	1,815	72	**GW3MPB****	955	93	VK5RG	428
5	6Y5HN	3,828	39	VK6IT	1,802	73	**G3CCZ**	940	94	VK2BDU	423
6	VK2GW	3,395	40	VK3MJ	1,784	74	**G8FC**	939	95	**G3XTJ**	375
7	VK3XB	3,374	41	VK3YD	1,775	75	**G3KSH**	938	96	ZL2RN	368
8	ZL2BR	3,310		VK4UR	1,775	76	VK5BO	924	97	Z23JO	358
9	**G3FXB**	3,221	43	VK5BN	1,687	77	Z26JC	921	98	**G3OLU****	338
10	VE5RA	3,130	44	VK6RU	1,670	78	**GM3OXC**	895	99	**G5ND****	314
11	VK3MR	3,087	45	**G3SXW**	1,657	79	ZL1BLJ	859	100	VK5HO	313
12	VE3KZ	3,007	46	**G2QT**	1,599	80	**G3GC**	852	101	**G8QZ**	285
13	**G3MXJ**	3,001	47	VK5DL	1,592	81	VK5KL	849	102	**G2AJB**	250
14	VK1CC	2,943	48	**G5RI**	1,591	82	VO1AW	767	103	VK2IC**	213
15	VK3AEW	2,739	49	VK2BAT	1,557	83	VK3KS	710	104	VK7GB*	150
16	ZL1HV	2,644	50	VK3VF	1,555	84	**G2HLU**	655	105	**G3AWR**	100
17	VK2ZC	2,593	51	VK7LZ	1,529	85	VK2GT	617	106	**G3TXF**	34
18	VK8HA	2,567	52	VK3BDH	1,494	86	VK2DO	602			
19	VK2AQF	2,540	53	**G3XBY**	1,492	87	VE7BS***	572			
20	VE2WA/3	2,456	54	VK3XX	1,490	88	VK7ZO	513			
21	ZB2EO	2,448	55	VK2SU	1,471	89	**G3VDL**	502			
22	VK3CM	2,426	56	VK3YK	1,449						
23	VK5GZ	2,411	57	**G3NOM**	1,335						
24	**G4GIR**	2,368	58	VK3RJ	1,309						
25	VK3KF	2,345	59	VK3BKU	1,303						
26	**G3PEK**	2,282	60	VK7RY	1,295						
	9V1TL	2,282	61	VK6FS**	1,294						
28	9J2BO	2,209	62	**G5MY**	1,269						
29	**G4CNY**	2,143	63	VK4SF**	1,178						
30	VK6RZ	2,010	64	**G4HMS**	1,176						
31	VK2DID	1,939	65	VK3FC	1,148						
32	**G3PDL**	1,913	66	VK5FG	1,132						
33	VK2BQQ	1,911	67	ZL1AZE*	1,108						
34	VK3AUQ	1,884	68	VK3XU	1,070						

Checklogs received with thanks from G3GMM, G3HRY and VK3CG.
British stations listed in bold type.

*7MHz single-band **14MHz single-band ***21MHz single-band

RECEIVING SECTION

Posn	Station	Points	Posn	Station	Points
1	BCRS 195	1,974	3	BRS 44395	696
2	BRS 1066	1,594	4	BRS 52868	542

RSGB HF Contests Championship 1984

1. RSGB hf contest general rules do not apply.
2. No entries for the championship are required.
3. The championship will be decided on the basis of RSGB hf single-operator contests held between 1 October 1983 and 31 July 1984.
4. Points will be awarded to the leading 10 UK stations in the results published in *Radio Communication* as follows:

	Position									
	1	2	3	4	5	6	7	8	9	10
21/28MHz Telephony	80	70	60	50	40	30	20	15	10	5
21MHz CW	80	70	60	50	40	30	20	15	10	5
2nd 1·8MHz	40	35	30	25	20	15	10	5	0	0
1st 1·8MHz	40	35	30	25	20	15	10	5	0	0
7MHz CW	70	60	50	40	30	25	20	15	10	5
7MHz Phone	70	60	50	40	30	25	20	15	10	5
Commonwealth	100	90	80	70	60	50	40	30	20	10
R Round-up	60	50	40	35	30	25	20	15	10	5
Town & County	40	35	30	25	20	5	10	5	0	0

5. Points gained by stations using the same basic callsign (with or without suffixes) and entering two or more of the individual contests will be totalled and a table published in *Radio Communication*.
6. Club stations. To be eligible for inclusion, a club station must be operated by the same single-operator during each contest. In the event of a club station meriting an award, the award will be made to the operator concerned and not to the club.
7. Awards. The winner will receive the G2QT Trophy. A certificate will be awarded to the runner-up.

7MHz Contest 1984 rules

Licensed radio amateurs and listeners throughout the world are invited to take part in these RSGB 7MHz contests. In the light of the small UK entry to the Phone Section of the 1983 contest, the HF Contests Committee is considering discontinuing this section of the contest. The final decision will be made once the level of entries for the 1984 contest is known.

GENERAL RULES

1. Entrants must operate in accordance with the terms of their licences.
2. Unmarked duplicate contacts will be penalized at 10 times the number of points claimed, and logs containing in excess of five unmarked duplicate contacts will automatically be disqualified. Duplicate contacts should be included in logs, marked as such, and without any claim for points.

Transmitting section

1. Eligible entrants. British Isles: RSGB members only. Rest of the world: all licensed amateurs.
2. Periods. Phone: 1200gmt 4 February to 0900gmt 5 February 1984. CW: 1200gmt 25 February to 0900gmt 26 February 1984.
3. Sections. Single-operator only.
4. Bands. Phone 7·04–7·10MHz. CW 7·00–7·03MHz. Entrants in the cw section are requested not to operate above 7·03MHz.
5. Exchange. RS(T) plus serial number starting at 001. Serial numbers when sent must be recorded from non-competing stations.
6. Scoring (a) British Isles stations with: European stations, 5 points per QSO; non-European stations, 15 points per QSO; British Isles stations may not work each other.
(b) European stations with: British Isles stations, 5 points per QSO.
(c) Non-European stations with: British Isles stations, 15 points per QSO.
Note: for scoring purposes aeronautical mobile and maritime mobile stations will count only as minimum score and not for multiplier. Entries from GB stations, aeronautical mobile and maritime mobile stations will not be accepted.
7. Multiplier (a) British Isles stations: one for each different country worked (ARRL DXCC List applies). In addition VE, VK, W, and ZL, call areas will each count as a country for this purpose.
(b) One for each different British Isles prefix worked, ie; G2, G3, G4, G5, G6, G8, GD2, GD3, GD4, GD5, GD6, GD8, GI2, GI3, GI4, GI5, GI6, GI8, GJ2, GJ3, GJ4, GJ5, GJ6, GJ8, GM2, GM3, GM4, GM5, GM6, GM8, GU2, GU3, GU4, GU5, GU6, GU8, GW2, GW3, GW4, GW5, GW6, GW8 (a maximum of 42).
Note that the prefix GB will not count.
8. Final score. QSO points multiplied by the number of different multipliers contacted.
9. Logs. Log sheets should be headed: date; time (gmt); callsign of station worked; RS(T) and serial number received; RS(T) and serial number sent; if multiplier; and QSO points claimed. A summary sheet is required showing the countries or prefixes worked.
10. Declaration. Each log must be accompanied by the following declaration: "I declare that my station was operated in accordance with the rules of the contest and in accordance with the terms of my licence". The declaration must be signed and dated.
11. Address for entries. Entries must be sent to G3OZF, RSGB HF Contests Committee, 'Mayerin', Churchway, Stone, Aylesbury, Bucks. Misdirected entries may be disqualified.
12. Closing date for receipt of logs. Phone contest, 1 April 1984; CW contest, 22 April, 1984.
13. Awards. The Thomas (G6QB) Memorial Trophy will be awarded to the leading British Isles entrant in the cw contest. Certificates will be sent to the entrants placed first, second and third in the British Isles, European, and non-European sections of each contest.
14. Dispute. All entries become the property of the RSGB. In the event of any dispute the ruling of the Council of the RSGB shall be final.

Receiving section

1. Rules as transmitting section except as superseded below.
2. Eligible entrants. British Isles: RSGB members only, who do not hold a Class 'A' transmitting licence.
Rest of world: all listeners.
3. Scoring (a) British Isles listeners should log only overseas stations in contact with British Isles stations. European stations logged count 5 points, others 15 points.
(b) Overseas listeners should log only British Isles stations participating in the contest. European listeners may claim 5 points per QSO logged, others 15 points.
4. Multiplier. As transmitting section.
5. Logs. Log sheets must be headed date; time (gmt); callsign of station heard; callsign of station being worked; if multiplier; and points claimed. Note that the callsigns of the stations being worked may only repeat once in every three contacts logged unless it is a new multiplier.
6. Declaration. As transmitting section plus "I certify that I do not hold a Class 'A' transmitting licence".

Region Round-up Contest 1983 results

This year's Region Round-up Contest was marred by a radio blackout in mid-morning. Many thought their receivers had packed up and started a hasty fault-finding session, realising eventually that the ionosphere had let them down, not the newly acquired black box. The really keen ones soldiered on, while others took the opportunity to go out and mow the lawn. Despite this setback six stations made in excess of 100 contacts, and last year's winner, Roger Western, G3SXW, managed to maintain a reasonable scoring rate throughout to gain first place again. In a repeat of last year Chris Burbanks, G3SJJ, took second place, and was the only entrant to work all 20 regions on one band, 7MHz. A disappointing entry in the QRP section was led by G4ELZ operating portable from a farm in Newton Abbot. Both he and G4ARI made respectable scores under difficult conditions.

Only three entries were received for the listener section. Prospective competitors should take heart from the fact that Bob Treacher cannot read morse, which surely gives the others a chance! Last year's winner in this section, Brad Bradbury, BRS1066, also repeated his success, but this time with competition from John Goodrick, BRS44395, and Donald Piccirillo, BRS52868, perhaps remembered by BERU entrants of the 'fifties and early 'sixties as ZD2DCP/5N2DCP, recently returned to the hobby.

There seems to have been a small increase in the number of logs submitted on the correct hf contest log sheets, and with a couple of exceptions duplicates were not widespread. Several competitors submitted dupe sheets with their entries, which made adjudication easier, and two entrants included very interesting operating analyses and graphs. Although the total entry was up, interest in the QRP section was disappointing and it is hoped that more low power operators will consider participating in 1984.

Certificates will be awarded to G3SXW, G3SJJ, G4GIR, G4ELZ/P, G4ARI, BRS1066, BRS44395 and BRS52868. *G4BUO*

SECTION A

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	G3SXW	133	14,184	19	G3SYA	79	6,873
2	G3SJJ	126	14,060	20	GM3OXC	82	6,642
3	G4GIR	125	11,748	21	G3CCZ	72	6,624
4	G3PDL	115	11,526	22	G6ZY	76	6,612
5	G4CNY	104	11,124	23	G4GLC	80	6,356
6	GW3MPB	102	10,872	24	G4FAS	70	5,890
7	G3NKS	97	10,185	25	GI2FHN	67	5,730
8	G4IZZ	91	9,180		G4MPK	68	5,730
9	G4EOF	99	9,052	27	G4HZV	65	5,626
10	G4BOU	87	8,874	28	G3AWR	58	4,671
	G4IQM	87	8,874	29	G4OOS	65	4,266
12	G2VJ	81	8,640	30	G3ZJK	52	3,648
13	G2HLU	84	8,316	31	G6QQ	42	2,829
14	G5MY	87	8,288	32	GW3ZDW	49	2,750
15	G4IUZ	90	8,277	33	G3GMM	41	2,300
16	G2FNK	84	7,744	34	G4KRS	45	2,025
17	G3TXF	75	6,944	35	G4PFZ	29	1,376
18	G4EBK	77	6,930				

SECTION B—QRP

Posn	Callsign	QSOs	Points	TX	Pwr	Ant
1	G4ELZ/P	85	8,019	FT301D (modified)	10W	Dipoles in tree, catapult-assisted
2	G4ARI	74	6,235	Sugiyama F850	10W	In-V dipoles

RECEIVING SECTION

Posn	Station	Points	RX	Ant
1	BRS1066	9,504	FR10IS	102ft long wire
2	BRS44395	7,872	FRG7700M	70ft wire
3	BRS52868	4,800	RA17	random wire NS

Checklog gratefully acknowledged from G3XTJ.

432MHz CW Contest 1983 results

In view of the demand for more cw contests it was decided to see how much interest would be shown on 432MHz. Unfortunately conditions proved to be very poor for the contest and this may have reduced the entry. The overall number was 14, which is perhaps disappointing, although contestants seemed to enjoy themselves. However, the small entry justified the application of Rule 4a, all classes, no sections. The winner, G3NNG, a fixed station, clearly was not at a disadvantage in relation to the "mountain top" portables.

Another problem affecting eastern and southern coastal stations was Syledis. G4MDZ appeared to suffer the most and therefore did very well to come second. To reduce the effect of Syledis he has found it necessary to stack and bay four long Yagis to minimize beam-width. He also had to use meteor scatter techniques. Unfortunately inland operators do not appreciate the problem and QSY before all the information has been copied. This results in points loss when contest logs are correlated during adjudication.

Some confusion was caused by the decision to substitute a 432MHz cw contest on a weekend that had in previous years been a 144MHz low power contest. A number of phone calls to HQ and members of the VHF Contests Committee were required to clarify the situation. The committee will now evaluate the response to the 1983 432MHz CW Contest before fixing the calendar for 1984 and deciding where to place it in the year.

Certificates go to the winner, G3NNG, who is to be congratulated on a good score in spite of poor conditions, and to the runner up G4MDZ, the Syledis sufferer1 G2DHV is thanked for a check log.

G3FZL

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G3NNG	363	51	ZL23	DJ9DL	604
2	G4MDZ	272	35	AL76	G4KUX	444
3	G3JKB/A	219	38	ZL08	DJ9DL	528
4	G3JNZ	214	38	ZL39	DJ9DL	520
5	G4CWH/P	188	34	AM71	PA3BPC	351
6	G6GN	187	23	YL48	PA0FRE	500
7	G4FJW	182	28	AL43	G8KUE/P	351
8	G4MEM/P	156	29	ZL01	PA0EZ	483
9	G3UKV	145	23	YM28	G4MDZ	312
10	G3KUE/P	143	18	YN07	G3GNR	358
11	G3JXN	136	28	ZL39	PA0EZ	—
12	G3CCZ	88	16	AL04	DJ9DL	446
13	G4APL/P	65	17	ZL12	G4TLH/P	209
14	G5HD	1	1	XK09	G3GNR	10

Oxford DF Qualifying Event results

The first qualifying round of the season was run on Sunday, 24 April 1983, by the Oxford & DARS. Following the virus attack to the unfortunate "professional" and several other well-known personalities not competing, only 21 teams took part on a perfect day.

Transmitter A, G5LO/P, operated by Brian, G3NCM, was located 1·5 miles to the north of the start in some 10 acres of overgrown stone pits surrounded by a barbed wire fence which when supplemented by some additional wire formed the antenna. The unexpectedly large signal received at the start from the 0·5W transmitter tempted three competitors to find Brian before the second transmission, however those caught within the enclosure during transmissions took much longer!

Transmitter B, G3UJO/P, operated by Peter, the callsign holder, had in his usual damp but valiant manner put on his wet suit and submerged himself up to his neck in a stream below a dense bush by a very rural footpath some 17 miles from the start. Many contestants got more than their feet wet here!

As was to be expected following the lack of suitable cover, all but five of the competitors located both transmitters and all appeared to enjoy once more this masochistic pastime. The teas, provided by Mollart Enterprises at Stanton St John Village Hall for a very modest cost were much appreciated.

Posn	Name	Club	Time of arrival Station A	Station B
1	E. Mollart	Mid-Thames	1353	1456
2	W. North	Mid-Thames	1353	1502
3	I. Butson	Colchester	1430	1528
4	M. Easterbrook	Dartford Hth	1531	1449
	G. Whenham	Coventry	1422	1531
6	D. Holland	S. Manchester	1532	1448
	P. Tyler	Mid-Thames	1421	1532
8	C. Merry	Dartford Hth	1429	1533
9	C. Plummer	Mid-Thames	1537	1503
10	R. Vickers	Slade	1538	1458
11	P. Lisle	Mid-Thames	1539	1432
12	A. Williams	Braintree	1604	1456
13	W. Pechey	Mid-Thames	1614	1532
14	C. McKenzie	S. Manchester	1359	1616
15	T. Gage	Mid-Thames	1616	1512
16	B. Poole	Mid-Thames	1618	1531
17	B. Mepham	Mid-Thames	1354	—
18	D. Newman	Slade	—	1457
19	A. Judd	Oxford	—	1532
20	M. Sheridan	Stratford	1626	—
21	S. Holley	Salisbury	1626	—

The competitors qualifying for the National Final in September are E. Mollart, G6AGE, and W. North, G3TRY.

Chelmsford/Colchester DF Qualifying Event results

Twenty-two teams assembled at a roadside lay-by near Halstead for the start. The majority of competitors opted to go south to where the A station, G3KJP/P, was concealed on the disused railway track which circles Maldon. A 300m-long antenna was arranged to give a confusing radiation pattern; at one point the antenna passed under the Maldon to Woodham Walter Road, and for the most part it ran parallel to a high voltage pylon line.

For the B station, G4HKC/P had chosen a site on the northern bank of the River Colne at Alresford. This caused considerable frustration to those who chose to explore the southern bank. Alresford Creek posed a further watery hazard which guarded the eastern approach. Since the event coincided with low water, one team risked losing their footwear in the ooze.

Catering for 52 ravenous df hunters posed no problems for the landlady of The Prince of Wales public house, Great Totham, who provided a sumptuous tea.

Posn	Name	Club	Time of arrival Station A	Station B
1	M. Hawkins	Chelmsford	1549	1426
2	W. North	Mid-Thames	1459	1602
3	P. Tyler	Mid-Thames	1430	1603
4	D. Newman	Slade	1502	1606
5	P. Lisle	Mid-Thames	1500	1609
6	T. Gage	Mid-Thames	1459·5	1616
7	C. Plummer	Mid-Thames	1618	1517
	A. Judd	Oxford	1500·5	1618
9	B. Bristow	Mid-Thames	1618·5	1509
10	P. Clark	Chelmsford	1619	1504
11	A. Williams	Braintree	1621	1453
12	B. Poole	Mid-Thames	1626	1438
13	M. Easterbrook	Dartford Hth	1523	1628
14	D. Pechey	Mid-Thames	1504	—
15	G. Whenham	Coventry	1516	—
16	C. Merry	Dartford Hth	—	1517·5
17	P. Cranmer	Colchester	—	1520
18	R. Emeny	Colchester	1536	—
19	C. Wells	Mid-Thames	1544	—
20	P. Larbalestier	Colchester	1555	—
21	P. McNeil	Colchester	1617	—
22	F. Pearson	Colchester	—	—

P. Tyler and D. Newman qualify for the National Final.

Rugby DF Qualifying Event results

The 1983 Rugby qualifying event was held on 12 June on OS map 152. The start was at New Wavendon Heath car park, where 20 teams assembled. Competitors could hear station A clearly, but station B was heard by only one or two teams, and according to the rules, an approximate bearing was given.

Station A was about 11km north west of the start, near Bradwell in the city of Milton Keynes, and was best approached through a newly built-up residential area.

Station B was about 30km north west of the start, on some waste ground near Duston Mill and on the north side of the River Nene, as a competitor found to his cost, after swimming the river and running barefoot among the stinging nettles.

A party of 54 sat down to tea at Yardley Gobeon Village Hall, where the results were announced, and the prizes presented. Thanks are due to the transmitter crews, Graham Taylor at A, and Derrick Newman at B, also the starter Bill Mays, and Mrs Sue Lineham and her band of helpers for the teas.

Posn	Name	Club	Time of arrival Station A	Station B
1	B. Bristow	Mid-Thames	1539	1449
2	G. Whenham	Coventry	1539·5	1457
3	T. Gage	Mid-Thames	1544	1457·5
4	A. Williams	Braintree	1545·25	1458
5	C. Merry	Dartford Hth	1547·5	1453
6	C. Plummer	Mid-Thames	1548	1456
7	M. Hawkins	Chelmsford	1551	1450
8	M. Easterbrook	Dartford Hth	1557·5	1450·5
9	E. Mollart	Mid-Thames	1552	1457
10	W. North	Mid-Thames	1552·5	1509
11	D. Yorke	S. Manchester	1558	1455
12	W. Pechey	Mid-Thames	1615	1506
13	D. Holland	S. Manchester	1449	1619
14	R. Parsons	Burton-on-Trent	1501	1624
15	B. Poole	Mid-Thames	1506	1625
16	A. Sapsed	Mid-Thames	1545	1627
17	I. Butson	Colchester	1454	1627·75
18	R. Goodearl	Mid-Thames	1458	—
19	C. McKenzie	S. Manchester	—	1620

One competitor did not find either station.
B. Bristow and G. Whenham qualify for the National Final.

Coventry DF Qualifying Event results

Twenty-five df teams assembled near Woodbine Farm, five miles east of Leamington Spa, for the start of the Coventry qualifying event for the RSGB National Final. Thirty-six consecutive days of rain did not deter these intrepid followers of the sport, although none of them realized how much mud the organizers had managed to find for them to battle through.

Station A, G2ASF/P, was located near Hampton Lucy on the west bank of the River Avon, approximately 14 miles south west of the start. The transmitter was actually located at the top of the bank with some 400m of antenna wire winding its way through some woodland, eventually ending up in the river. A dummy "tee" close to the transmitter fooled a number of competitors into thinking the station was at the bottom of the bank and they spent a considerable part of the afternoon at the wrong end of the antenna. The station operator took great delight in noting the moans, groans and other old English adjectives typical of tired, frustrated df teams.

Station B, G4KZU/P, was located on a disused railway embankment near Wormleighton Reservoir, approximately nine miles south of the start. Here, the antenna was about 500m long with the end tied to a brick and thrown across a dismantled bridge on the Oxford canal. This little ploy worked very well and many competitors found themselves on the wrong side of the canal, with a long trek round via the nearest bridge. There was a swing bridge nearby but this was well and truly locked in the up position, forcing most competitors to go the long way round. However, there is always someone who will risk life and limb to qualify. On this occasion it was Bernard Poole who did his Tarzan act and swung himself across the canal, holding onto the end of the swing bridge by his fingertips.

A total of 56 sat down for tea afterwards where Alan Williams gave an account of how he had won and Mike Hawkins thanked the Coventry ARS on behalf of the RSGB for organizing the event.

Posn	Name	Club	Time of arrival Station A	Station B
1	A. Williams	Braintree	1435	1535
2	M. Hawkins	Chelmsford	1433	1536
3	D. Newman	Slade	1458	1546
4	B. Poole	Mid-Thames	1434	1547
5	P. Lisle	Mid-Thames	1605	1455
	R. Vickers	Slade	1605	1506
7	C. Plummer	Mid-Thames	1605·5	1505·5
8	D. Yorke	S. Manchester	1502	1607
9	W. North	Mid-Thames	1609	1523
10	C. Wells	Mid-Thames	1610	1524
11	R. Brocks	Chelmsford	1612	1505
12	M. Easterbrook	Dartford Hth	1612·5	1505·5
13	B. Bristow	Mid-Thames	1615	1523
14	C. Merry	Dartford Hth	1618	1524
15	I. Butson	Colchester	1618·5	1523
16	C. McKenzie	S. Manchester	1625	1536
17	D. Holland	S. Manchester	1626	1525
18	P. Tyler	Mid-Thames	1547	1626·5
19	T. Judd	Mid-Thames	1630	1538
	R. Goodearl	Mid-Thames	1630	1525
21	A. Sapsed	Gloucester	1548	—
22	T. Gage	Mid-Thames	—	1551
23	M. Sheridan	Stratford	1607	—
24	J. Drakeley	Slade	1617	—

One competitor failed to find either transmitter.
A. Williams and B. Poole qualify for the National Final.

Barking R&ES 144MHz Contest 1983 results

SECTION 1

Callsign	Power	County	Score	Callsign	Power	County	Score
G8WBO/P*	40	Wilts	10,094	G6FQN/P	10	Essex	1,513
G6ECM*	40	Kent	6,191	G6DTD	25	Cheshire	1,166
G4HRO/P*	20	Staffs	4,512	G8YQT/A	25	Kent	1,008
G4ARI	12	Leics	3,815	G4OTV	40	Kent	870
GW4OXG/P	17	Clwyd	3,300	G6OIX	?	Essex	810
G8KAX/P	25	Essex	2,856	G4RWT	10	Kent	756
G8TZT/P	30	N Yorks	2,850	G8XWA	35	Cumbria	702
G6OOZ	30	Kent	2,750	G6SZT	30	Essex	627
G8MLO/P	25	London	2,664	G4FKI	20	Beds	420
G6GGE	40	London	2,574	G6NBO	10	Manchester	403
G8KSP/P	25	Kent	2,398	G8UZI	25	Essex	344
G6CMG/P	35	Glous	2,392	G8UYD	5	Notts	300
GW4RER/P	25	Gwent	2,175	G4DDP/P	3	London	216
G6LJO	40	Cheshire	1,794	G6MGE	15	Essex	156
G6MZM/P	10	Essex	1,710	G6HEL	20	Dorset	84
G6MGL	30	London	1,692				

SECTION 2.

Callsign	Power	County	Score	Callsign	Power	County	Score
G4PSX*	300	Hants	11,715	G6TTU	?	Glous	1,701
G4RZO*	350	Kent	10,660	G4PDP	400	Beds	1,045
G6SRY	?	Oxon	8,016	G4MPN	80	Cambs	945
G6CHL/P	120	Derby	7,353	G6AXO	120	Essex	481
G6DOD	100	Beds	5,700	G6HYF	?	Lincs	462
G6CHK	?	Bucks	5,624	G6EZI	90	Wilts	432
G4CRA/P	100	Essex	3,799	G6CQB	60	Herts	363
G4NVA	400	Cheshire	3,330	G4SPV	100	Herts	168
G8JXV	100	Surrey	1,794				

SWL SECTION

Station	County	Score
Mrs J. Charles*	Essex	1,848
N. Henbry	E Sussex	481

Check Logs gratefully received from G4SBV and G6LSA.
* Certificate winners.

BARTG Spring VHF/UHF Contest results

As usual the weather and conditions left much to be desired. Just to show how the number of active stations rose this year, analysis shows a 73 per cent increase on 144MHz, 245 per cent on 432MHz, and 50 per cent on 1.296MHz, so there are more and more stations to work as the years go on. It seems that this contest has now firmly established itself as a leading UK and European activity time. Congratulations go to the winners and runners-up in each section. Thanks for check logs from G4SOG and ON7PC.

144MHz MULTI-OPERATOR

Posn	Callsign	Points total	Contacts allowed	Best dx	Km	QTH	Power (W)	Ant	ASL (ft)
1	GW3UUP/P	487	57	ON7CB	543	YM54d	90	2 × 16Y	2,000
2	G2BRS	355	45	ON7CB	477	YK19a	120	2 × 14Y	898
3	G3WOR/P	300	58	G3NTJ/A	357	ZK09d	100	2 × 16Y	780
4	G3WOH	229	33	G3WOR/P	327	YN47f	100	9Y	240
5	G8DDC/P	199	46	ON7CB	345	ZL18h	100	14Y	800
6	G3WQK/P	183	41	DC1ZN/P	619	AK12f	200	14 Para	600
7	G3KUE/P	161	27	G2BRS	352	YO78d	100	14 Para	1,500
8	G4PDY/P	91	23	GW3UUP/P	275	AK11h	10	16Y	600

144MHz SINGLE-OPERATOR

Posn	Callsign	Points total	Contacts allowed	Best dx	Km	QTH	Power (W)	Ant	ASL (ft)
1	G3NNG	358	54	GM8TT/P	511	ZL23f	100	16Y	400
2	ON7CB	316	31	GW3UUP/P	543	CL53e	100	2 × 16Y	100
3	G4NQC	267	53	DC1ZN/P	646	ZL50c	80	4 × 17Y	120
4	ON1GL	247	29	GW3UUP/P	543	CL63h	100	9XY	10
5	DC1ZN/P	244	32	G4NOC	646	EK75j	70	2 × 16Y	360
6	G4LHU	225	46	GW8ELR	384	AL43d	100	14Y	250
7	G8MWU	177	41	G3WOH	305	AL51c	60	16Y	510
8	G8RBY	132	28	F6ASP/P	277	ZM16e	150	2 × 16Y	249
9	G6SXC	93	27	G3WOH	336	AL64a	25	Quagi	210
10	DG2SAH	85	17	DF8BR	410	EI17j	75	8Q/9Y	920
11	G6PQN	81	28	GW3UUP/P	253	AL32a	30	9Y	240
12	G8LWY	60	18	GW3UUP/P	222	ZL49j	100	8Y	0
	G8CDW	24	10	F6ASP/P	148	ZL30d	20	6Y	100
13	G3TTC	24	8	F6ASP/P	145	ZL59a	40	5Y	100
15	G6CKP	20	12	G8MWU	273	ZN32d	100	10Y	850

Contests Calendar

3-4 September	SSB Field Day *(Rules in May issue)*
10-11 September	BARTG Autumn VHF RTTY *(Rules in September issue)*
10-11 September	Cray Valley RS 13th SWL *(Rules in August issue)*
10-11 September	European DX *(Rules in September)* MOTA)
11-12 September	International ATV *(Rules in May issue)*
17-18 September	Scandinavian Activity (CW) *(Rules in September* MOTA)
18 September	DF National Final South Manchester
24-5 September	Scandinavian Activity (Phone) *(Rules in September* MOTA)
October/ November	432MHz Cumulative *(Rules in July issue)*
1-2 October	432-24GHz & SWL (IARU) *(Rules in June and July issues)*
1-2 October	VK/ZL/Oceania (Phone) *(Rules in September* MOTA)
2 October	ON (Phone) *(Rules in September* MOTA)
8-9 October	VK/ZL Oceania (CW) *(Rules in September* MOTA)
9 October	21-28MHz Phone *(Rules in May issue)*
16 October	ON (CW) *(Rules in September* MOTA)
16 October	21MHz CW *(Rules in May issue)*
16 October	1,296MHz Cumulative *(Rules in July issue)*
5-6 November	144MHz CW *(Rules in August issue)*
6 November	LF CW *(Rules in April issue)*
12-13 November	Second 1·8MHz
4 December	144MHz Fixed
1984	
4-5, 25-6 February	7MHz *(Rules in September issue)*

144MHz LISTENER SECTION

Posn	Callsign	Points total	Contacts allowed	Best dx	Km	QTH	Power (W)	Ant	ASL (ft)
1	NL4483	158	20	GW3UUP/P	475	BL48e	—	5Y	—

432MHz MULTI-OPERATOR

Posn	Callsign	Points total	Contacts allowed	Best dx	Km	QTH	Power (W)	Ant	ASL (ft)
1	GW8UUP/P	128	18	G8GCP/P	257	YM54d	80	4 × 8/8 slot	2,000
2	G8GCP/P	51	15	G3NYK	168	ZK09d	60	19Y	760
3	G8DDC/P	44	12	GW8UUP/P	188	ZL18h	10	18 Para	800
4	G3WOH	42	8	G3NNG	211	YN47f	100	27 quad loop	240
5	G3KUE/P	23	3	G3NNG	270	YO78d	50	8/8Y	1,500

432MHz SINGLE-OPERATOR

Posn	Callsign	Points total	Contacts allowed	Best dx	Km	QTH	Power (W)	Ant	ASL (ft)
1	G3NNG	80	16	G3KUE/P	270	ZL23f	100	21Y	400
2	G4NQC	34	8	GW8UUP/P	238	ZL50c	50	4 × 21Y	120
3	G8IEM	29	9	GW8UUP/P	216	ZK05d	40	16Y	300
4	G8LWY	22	6	GW8UUP/P	222	ZL49j	10	48MBM	0
5	DC1ZN/P	4	4	DF9ZP	13	EK75j	50	2 × 19Y	360
6	G8CDW	3	3	G8BJG	25	ZL30d	15	6Y	100

1,296MHz MULTI-OPERATOR

Posn	Callsign	Points total	Contacts allowed	Best dx	Km	QTH	Power (W)	Ant	ASL (ft)
1	GW8ABI/P	231	2	G3WOH	129	YM54d	1	15/15 slot	2,000
2	G3WOH	129	1	GW8ABI/P	129	YN47f	100	4 × 15/ 15 slot	240

1,296MHz SINGLE-OPERATOR

Posn	Callsign	Points total	Contacts allowed	Best dx	Km	QTH	Power (W)	Ant	ASL (ft)
1	G3NNG	403	4	GW8ABI/P	134	ZL23f	20	2 × 28Y	400
2	G4NQC	109	1	G3NNG	109	ZL50e	1	23Y	120

BARTG Autumn VHF RTTY Contest 1983 rules

The rules for this contest are the same as those printed in *Radio Communication*, September 1982, p788, except for the following:

Duration. 1800gmt 10 September to 1100gmt 11 September.

All logs must be postmarked no later than Saturday 8 October, and be sent to BARTG VHF Contest, c/o Ted Double, G8CDW, 89 Linden Gardens, Enfield, Middx EN1 4DX, from whom copies of the rules may also be obtained.

Members of Loughton & DARS at their club field weekend. L to r: Dave, G4FKI; Barry, G8UBH; Peter, G4CMD; John, G8DZH; Ted, G8NPF; Dick, G6AMY; and in the foreground, Chris, G6BPA. *Photo:* M. Bone, G6FWT

Club News

The following is the latest information received by RRs from RSGB affiliated societies, clubs and groups in time for inclusion in this issue. Basic unchanged information on other affiliated organizations will be published in the January 1984 issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **November** issue should reach them by **17 September** and for the **December** issue by **15 October.**

Club programmes are given in order of date, subject, time and place of the meeting. All callsigns of club secretaries and other contacts are QTHR (correct in the current *RSGB Call Book)* unless otherwise stated.

All clubs welcome visitors and would be pleased to hear from potential new members.

REGION 1—RR W. R. Parkinson, G3FNM, 141 Norris Road, Sale, Cheshire M33 3JR. Tel 061 973 1472.

Accrington (NW Repeater Group)—15 September, 8pm. Globe Bowling Club, Willows Lane, Accrington. Sec Howard Aspinall, G3RXH.

Ainsdale (AARC)—13 and 27 September, 8pm. Ainsdale Scout HQ. Details from sec John Wollaston, G6JOE, Tel 0704 27219.

Blackburn (East Lancs ARC)—6 September (Surplus equipment sale), 7.30pm. Shadsworth Leisure Centre, Blackburn. Pro Graham Pountain, G4MWY, tel 0254 678933.

Bury (BRS)—13 September ("Japanese morse", by Norman Kendrick, G3CSG), 6 and 27 September (Informal). Details of venue etc from Brian Tyldesly, G4TBT, 4 Colne Road, Burnley, tel 0282 24254, or pro Malcolm Pritchard, G3VNQ, tel 0706 355922.

Leyland (LHRG)—12 September, 7.30pm. Astley Sports Club, Hallgate, Astley Village, Chorley. Sec Arthur Jolly, G4JCO.

Liverpool (L&DARS)—6 September ("Rescue", by Bill Lockyer), 13 September ("Forces portable equipment", by Ian Mant, G8AVJ), 20 September (SSB inquest), 27 September (Pre-agm), 4 October (AGM), 8.15pm. Wavertree Conservative Association, Church Road, Wavertree. Sec Gordon Purslow, G6MHG, tel 051-263 5837.

Liverpool (UoLARS)—Officers are now: chairman, Martin Farrimond, G6WNN; treasurer, Nick Ebsworth, G6KZC; sec, Haroon Lakhaney (swl). Membership enquiries should be addressed to University of Liverpool Rad Soc, c/o Guild Office, 2 Bedford Street North, Liverpool 7.

Ormskirk (O&DARC)—12, 26 September. Contact sec Mike Coverdale, G4LTI, tel 0695 78326, for venue and programme details.

Preston (PARS)—8 September (Fox hunt), 15 September ("RTTY", a talk by Derrick Greene, G8VQB), 25 September (The last foxhunt for 1983), 29 September (To be announced). Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston. Contact George Earnshaw, G3ZXC, tel 0772 718175.

Skelmersdale (S&DARC)—Thursdays, 8.30pm. Dunlop Sports & Social Club, Skelmersdale. The club now has a new sec, George Rogers, 113 Foxfold, Fosters Green, Skelmersdale.

Warrington (UK FM Group Western)—1 September, 6 October. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Gordon Adams, G3LEQ, tel 0565 4040.

Warrington (W&DARS)—6 September ("Elliptical filters", by D. Fritsch, G5CKZ), 13, 20, 27 September (To be announced), 7.30pm. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Bill Green, G8HLZ, tel 0925 814740.

Wirral (WARS)—7 September (Safety in the shack), 21 September (RTTY), 5 October (Sale of surplus equipment), 7.45pm. Minto House School, Birkenhead Road, Meols. Sec Cedric Cawthorne, G4KFY, tel 051-625 7311.

Wirral (W&DARC)—14 September ("Fire protection techniques", by Steve, G8TCC), 28 September ("QRN, causes and cures", by Alan, G4EFP), 8pm. Irby Cricket Club, Irby Mill Road, Irby. Sec Gerry Scott, G8TRY, tel 051-630 1393.

REGION 2—RR D. S. Smith, G4DAX, Red Roof, Goathland, Whitby, North Yorks YO22 5AN. Tel 094-786 333.

Barnsley (B&DARS)—Mondays, 7.30pm. The Warren, Warren Quarry Lane, off Park Road, Barnsley. Sec K. W. Roberts, tel Barnsley 297365.

Barnsley (UK FM Group Northern)—4 September, 7.30pm. The Royal Hotel, Church Street, Barnsley. Sec G4LUE.

Harrogate Repeater Group—Chairman, G4ATZ. Donations to G4KCR.

Maltby (MARS)—Fridays, 7pm. Methodist Church Hall, Blythe Road, Maltby. Sec G3ZHI. A fairly new club, moving ahead quite steadily, with cw classes, a computer corner, and a full programme of lectures.

Pontefract (P&DARS)—8 September ("Repeaters", by G4EZV), 8pm. The Carleton Community Centre, Pontefract. Pro G4TGU, tel Leeds 871484.

Wakefield (W&DARS)—6 September (On air/natter night), 8pm. Holmfield House, Denby Dale Road, Wakefield. Sec, G8BPE, tel Wakefield 378727.

REGION 3—RR L. W. Craven, G4EQI, Grass Moor, Radford Road, Alvechurch, Birmingham B48 7DT. Tel 021-445 1347.

Atherstone (AARC)—15 September (Construction evening), 7.30pm. Tudor Centre, Coleshill Road, Atherstone. Sec G6IQM, tel Fillongley (0676) 40946.

Birmingham (Midland ARS)—20 September ("Raynet talk and film show", by George, G3XFN), 7.30pm. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.

Birmingham (South Birmingham ARS)—7 September ("Antennas", by Dave Yates, G3PGQ), 7.45pm Hamstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G8RGQ, tel 021-459 8312.

Bromsgrove (B&DARC)—Fridays, 8pm. Avoncroft Art Centre, Bromsgrove. Sec Jim, G6EAM, tel Kingswinford (549) 8550.

Coventry (CTCARS)—5 September (Normal club meeting), 7pm. Winfray Annexe, Coventry Technical College. Chairman G3ZFR, tel Coventry (0203) 365117.

Halesowen (MEB RC)—13 September ("The hf transceiver", by Clem Phillips), 27 September (Usual meeting), 8pm. Club open to non-MEB staff. MEBHQ Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.

Kidderminster (K&DARC)—11 September (Wyre Forest mini marathon station), 13 September (AGM), 27 September ("RSGB services and activities", by Leo Craven, G4EQI, RR3), 8pm. Aggborough Community Centre, Kidderminster. Sec G8WOX, tel Kidderminster (0562) 61584.

Shrewsbury (Salop ARS)—29 September (Fourth and final "fox hunt"), Thursdays, 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec G3UQH, tel Shrewsbury (0743) 83375.

Solihull (SARS)—20 September ("Meteorology", by Alan Brown, Birmingham Met Office), 7.30pm. Manor House, High Street, Solihull. Sec Nigel, G4NRR, tel 021-707 3684.

Stourbridge (StARS)—3 and 4 September (HF SSB Field Day Contest), 5 September (Arrangements for Stourbridge Carnival and JOTA groups), 10 September (Stourbridge Carnival—Demonstration station), 19 September (Matching circuits and swrs", by Dave Yates, G3PGQ), 8pm. The Garibaldi, Cross Street, Stourbridge. Sec G8JTL, tel Lye (593) 4019.

Sutton Coldfield (SCARS)—12 September (Natter night), 26 September ("Test equipment", by John Symes, G3LNN, and Richard Burrows, G8ALO), 7.30pm. Central Library, Sainsbury Centre, Sutton Coldfield. Sec G8TUR, tel 021-353 2061.

Telford (T&DARS)—Wednesdays, 7.30pm. 7 September (Mobile rally final preparation), 21 September (ATV demonstration by G8YDG/T to G3ZME/T). Phoenix Centre, Webb Crescent, Dawley. 11 September (Telford Mobile Rally, Town Centre Malls). Sec G8UGL, tel Telford (0952) 584173.

Warwick (Mid-Warwickshire ARS)—6 September (Junk sale), 20 September (Fox hunt, 145·350MHz). 7.30pm. 61 Emscote Road, Warwick. Sec Carol, G4TIL, tel Southam (092681) 4765.

Worcester (W&DARC)—5 September ("Demonstration of Trio equipment", by Lowe Electronics), Oddfellows Club. 19 September (Informal), 26 September (AGM), 8pm. Old Pheasant, New Street, Worcester. Sec G4NRD, tel Evesham (0386) 41508.

Would all club secretaries who receive copies of the *Council Letter*, kindly pass them on to their club editors/programme secretaries so that news items can be reproduced in club newssheets, and thereby reach all of their club members. *Council Letters* are full of up-to-date information of wide and general interest but are rarely used by club editors. *RR3.*

REGION 4—RR M. Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. Tel Derby (0332) 556875.

Buxton (BARS)—13 September ("Direction finding", a talk by G4IRG and G8WWF), 8pm. Egerton Hotel, 36 St Johns Road, Buxton. Sec Derek Carson, G4IHO, tel Buxton 5006.

Derby (D&DARS)—7 September (Junk sale), 14 September (Film show), 21 September ("Ambulance service radio", by G8SSL), 28 September (Talk, tba), 5 October (Junk sale), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Grantham (GRC)—20 September (Project evening), 8pm. Shirley Croft Hotel, Harrowby Road, Grantham. Sec John Kirton, G8WWJ, tel Grantham 5743.

Grimsby (GARS)—8 September (Talk on traps), 22 September (TBA), 7.30pm. Cromwell Social Club, Cromwell Road, Grimsby. Sec Reg Scarlett, G4HZF.

Lincoln (LSWC)—14 September ("The million pound robbery", by Lincolnshire Fire Brigade), 16 September (Junk sale and social evening), 28 September ("Home brew—wine not gear" by G4OSB), 8pm. City Engineers Club, Waterside South, Lincoln. Sec, Pam Rose, G4STO, tel Gainsborough 788356.

Melton Mowbray (MMARS)—16 September (AGM), 7.30pm. St Johns HQ, Asfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK, tel Melton Mowbray 63369.

Newark (N&DARS)—1 September (Social evening), 7.30pm. Palace Theatre, Appleton Gate, Newark-on-Trent. Sec Roger Hiscock, G4MDV.

Nottingham (ARCON)—8 September (Forum and beginners' question evening), 15 September ("The AE to ZO of antennas", by G3SJJ), 22 September (Foxhunt), 29 September (Repeaters and witch-

Tony Davies, G3RLO (left), receiving honorary life membership of ARCON for his contributions to amateur radio. In providing slow morse practice transmissions he has helped over 300 amateurs obtain class A licences. The presentation was made by Mike Shaw, G4EKW (president, centre) and Dave Molyneux, G3YUT (chairman) at the West Park Pavilion, Bridgeford. ***Photo:*** **G4OJL**

craft, by G4PMM), 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham. Sec Phil Barber, G4OSL.

REGION 5—RR J. S. Allen, G3DOT, 77 Rosslyn Crescent, Luton LU3 2AT. Tel 0582 508515, or at work on 0582 21151 ext 200.

Leighton Linslade (LLRC)—3 September (144 MHz Trophy Contest), 5 September (AGM), 19 September (Return quiz against the Milton Keynes Club), 7-10pm. Vandyke Community College, Leighton Buzzard. Sec Peter Brazier, G6JFN, tel Heath & Reach 270.

Luton (KPC ARS)—7 September (JOTA discussion). KPC Club House, Tenby Drive, Luton. Only open to employees of Brown Boveri or Brown Boveri Kent. Sec G3DOT.

Peterborough (GPARC)—22 September (Video evening). Southfields Junior School. Sec Frank Brisley, G4NRJ.

Shefford (S&DRS)—Thursdays, 1 September (Welcome back after the summer break. Final preparations for the SSB NFD), 8 September (General discussion on SSB NFD and the two other field days, how can we improve our efforts for 1984?), 8pm. Church Hall. Sec Alan, G4PSO.

Wellingborough (Nene Valley RC)—7 September (Lecture on satellite working by G4HME), 14 September (Lecture on rtty by computer by G8GIK), 18 September (Visit to Peterborough Mobile Rally), 21 September ("QRP", by George Dobbs, G3RJV), 28 September (Lecture on Raynet by G4NUG), 8pm. Dolben Arms, Finedon. Sec Lionel Parker, G4PLJ, tel Wellingborough 79539.

Not a lot to report this month, I suppose it is because of the holidays and the fact that some clubs, those whose meeting place is either a school or a university, are still on vacation. Please will club secretaries who have not sent me a report for this month make use of the RSGB news service to advertise their club's activities.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049481) 4240.

Aylesbury (AVRG)—Please note new sec, G6EKQ, c/o Hunter's Moon, Buckingham Road, Hardwick, Bucks.

Aylesbury (AVRS)—4 October ("A 160/80m transceiver", by Robin Hewes, G3TDR), 8pm. Stone Village Hall, Stone, nr Aylesbury. Details from sec Cathy Clark, tel 0844 51461.

Banbury Vale (BARC)—The club has many interesting meetings for the future. Contact sec J. Burrell, G8OZH, for details.

Halton (RAF Halton AR&EC)—Third Thursday in each month, 8pm. RAES Lecture Room, Corporals Club, RAF Halton. Details from Sqn Ldr Tony Gilchrist, G8BVJ, Airframe Training Squadron. The club plan to hold RAE and morse classes.

Maidenhead (M&DARS)—20 September (To be arranged). Contact Roger Hemmings, G3VCT, for details.

Newbury (N&DARS)—13 September (Junk sale). Please ask Mike Fereday, G3VOW, tel Newbury 43048, for details.

Oxford (RAFARS)—21 September, 7.30pm. Civil Service Club, Marston Road, Oxford. Contact Eric Palmer, G3FVC, tel Maidenhead 20107.

REGION 7—RR to be appointed

Bexleyheath (North Kent RS)—6 September (Video tape, "World at their fingertips"), 20 September ("DX", by Ken Willis, G8VR), 8pm. The Pop-in Parlour, Graham Road, Bexleyheath. Details from J. R. Frampton, 84a St James Way, Sidcup, Kent DA14 5HF.

Biggin Hill (BHARC)—20 September (RTTY evening), 18 October (Amateur radio satellites), 15 November (BBC Radio News), 8pm. Biggin Hill Memorial Library. Details from Ian Mitchell, G4NSD, tel Biggin Hill 75785.

Cray Valley (CVRS)—1 September ("UOSAT"—experiences with UOSAT with slide/16mm illustrations, by Kevin Packard, G8MLO), 15 September (Natter night), 6 October (Junk sale), 20 October (Natter night), 3 November ("SWLing", by Bob Treacher, BRS32525), 17 November (Natter night), 8pm. Christchurch Centre, Eltham High Street, Eltham SE9. Details from Chris Henderson, G4FAM.

Kingston (K&DARS)—21 September ("Slow-scan television", by A. V. Tillin, G3MES), 8pm. Alfriston, 3 Berrylands Road, Surbiton. Details from Brian Smythe, G3ODH, tel Epsom 26005.

REGION 8—RR to be appointed

Burgess Hill (Mid-Sussex ARS)—3-4 September (144MHz contest on the Downs at Keymer Post), 10 November (Visit to Police HQ and operations room at Lewes (limited to 16 members only)), 7.30 for 8pm. Marle Place Adult Education Centre, Leylands Road, Burgess Hill, West Sussex. Details from sec Bob Hodge, G4MMI, c/o Corner House, Manor Gardens, Hurstpierpoint, tel Hurstpierpoint 833559.

Thanet (RCT)—13 September (Talk by member of RSGB Interference Committee), 27 September (Talk by SEEB official). Grosvenor Club, Margate. RAE course commences 7 September. Details from G4NEF, tel 0843 54154.

Tunbridge Wells (West Kent RS)—9 September ("Top band and 144MHz df", by Ray Scrivens, G3LNM), 23 September (Open evening, all welcome), 8pm. Adult Education Centre, Monson Road, Tunbridge Wells. 13, 27 September (Informal). Victoria Road Drill Hall. Details from Brian Guinnessy, G4MXL, tel 0892 32877.

REGION 9—RR W. J. Colclough, G3XC, Highview, Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726 860485.

Camborne (CRAC)—1 September ("Propagation", by David Blackford, G3NPB), 6 October ("1,296 and all that", by David Blackford, G3NPB, and John Pover). Computer section: 19 September ("Basic routines", by Bert Hammett, G3VWK), 17 October ("Peripheral control", by Des Old, G3CZZ), 7.30pm. Contact Simon Rodda, G4PEM, tel Penzance 3948, for further details and location of meetings.

Caradon Hill Repeater Group—New details from agm: chairman, G6CIY; sec, G4DGU; treasurer, G6OVL; committee, G4KXQ, G3TGR, G6EQM, G8MWW. Details from sec Chris Bartram, 23 Tuckers Park, Bradworthy, Holsworthy, Devon EX22 7TL, tel 0409 240543.

Exeter (EARS)—12 September (Talk on satellites by G3XTS), 7.30pm. Community Centre, St David Hill, Exeter. First and third Mondays (Informal). Scout HQ, Emmanuel Road. 144MHz net Tuesdays, 1930h, on S23. Details from pro Andy Lake, G8YOA, tel Exeter 39597.

Newquay (N&DRS)—Alternate Wednesdays, 7.30pm. The Drill Hall, Crantock Street, Newquay. Contact Pat King, G4GFY, for further details, tel 0872 71133.

Plymouth (PRC)—5 September (Practical talk on microwaves by Cyril James, G3VVB), 19 September (Junk sale), 7.30pm. Tamar School, Paradise Road, Millbridge, Plymouth PL1 5QW. Contact Dave Whitbread, G6EQM, tel 0752 20224.

REGION 10—RR to be appointed

Cardiff (CRSGBG)—12 September (Junk and surplus sale, Newport Group invited), 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Details from Cyril Laws, tel Cowbridge 3212.

REGION 11—RR B. H. Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288.

Colwyn Bay (Conwy Valley ARC) (GW6TM)—8 September (Talk by Mr B. O'Brien, G2AMV, RSGB past-President, on "RSGB and what it stands for"), 7.45pm. Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec Mr J. N. Wright, GW4KGI, 46 The Dale, Woodlands, Abergele, Clwyd LL28 7DS, tel 0745 823674.

Rhyl (R&DARC)—8 September (Activity night), 23 September (AGM), 7.30pm. 1st Rhyl Scouts HQ, Tynewydd Road, Rhyl. Sec Mr B. Jones, 6 Rhodfa Maes Hir, Rhyl, Clwyd, tel 0745 37284.

REGION 12—RR M. R. Hobson, GM8KPH, 4B Tummel Crescent, Pitlochry, Perthshire PH16 5DF. Tel 0796 2140.

15 October—Caledonian Hotel, Church Street, Inverness. 10am-12am—Open Repeater Working Group meeting. 2-5pm—Regional Meeting including RSGB Bookstall. Further information from RR12.

Aberdeen (AARS)—Fridays, 7.30pm. Club rooms, 35 Thistle Lane. Details from Don Travis, tel Pitcaple 251.

Dundee (Kingsway TCARG)—Resume meetings on 13 September. Details from Malcolm, GM3ZXE, tel 0382 85312.

Elgin (Moray Firth ARS)—Details from sec Rev Stan Bennie, GM4PTQ, tel Buckie 32312. New area representative—Ron Adam, GM4ILS, tel 0343 45842.

Shetland (Lerwick RC)—Wednesdays, 7pm. Lerwick Community Centre. Details from Arthur, GM4LBE, tel 0595 4270. Area representative post vacant—any takers? Contact RR12 for details.

John Penney, G3JEP, demonstrating his hf rig to two visitors to a recent Exmouth ARC Open Meeting. *Photo:* **G4TEX**

REGION 13—RR A. B. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH. Tel Kirkcaldy (0592) 200335.

Edinburgh (Lothians RS) (GM3HAM)—Second and fourth Thursday in each month, 7.30pm. New premises under consideration. Details from C. J. Wright, GM4HWO, not QTHR, tel 031-332 5502, or 031-447 1809.

Glenrothes (G&DARC)—Wednesdays and third Sunday in each month, 18 September (AGM), 7.30pm. Provosts Land Centre, Leslie, Fife. Details from GM8ZTV, tel Kirkcaldy 203582.

Scottish Borders Repeater Group—The group held their first mobile rally at Lilliardsedge Caravan Park near Jedburgh recently. The event was very successful and the group funds have increased considerably. A similar event will be held next year. The group own and maintain the two 144MHz repeaters, GB3BT at Berwick-upon-Tweed, and GB3SB, located near Duns. Membership costs £4 and details may be obtained from Bruce McCartney, GM4BDJ, "Cairndhu", Walter Street, Langholm, Dumfriesshire, tel 0541 80018.

REGION 16—RR T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.

Braintree (B&DARS)—5 September (Quiz evening), 19 September ("From erk to test pilot", by Sqdn Leader A. S. Murkowski), 7.45pm. Braintree Community Centre, Victoria Street. Details from Jeff Roberts, G6OIX, tel Braintree 44857.

Colchester (CRA)—22 September ("A journey down the Nile", by G4PAY, 7.30pm. Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 70189.

Loughton (L&DARS)—2 September (CW practice), 9-11 September (Rainbow and Dove Field Weekend, special call GB2LRS), 16 September (CW practice), 30 September ("Talking book service", by G4NLF), 8pm. Loughton Hall, Rectory Lane. Details from Clive Knowles, G6FWT.

Norwich (Norfolk ARC)—4 September (Foxhunt), 7.47pm. Crome Centre, Telegraph Lane East. Details from Peter Forster, G3VWQ, tel Norwich 37709.

Vange (VARS)—1 September (Junk sale), 8 September (Talk by G3XPV), 11 September (Mobile rally), 7.30pm. Main Hall, Barstable Tennants 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.

Andover (ARAC)—6 September (RSGB video tapes), 21 September (Natter night), 8pm. Wolversdene Club. Sec G4OZL.

Fareham (F&DARC)—28 September ("History of the RSGB", by G6NZ), Wednesdays, 7.30pm. Portchester Community Centre. Sec G4ITG, tel Fareham (0329) 234139.

Farnborough (F&DRS)—14 September (Pre-agm discussion), 28 September (Constructional contest), 7.30pm. Railway Enthusiasts Club, Access Road, Farnborough. Sec G4BJQ, tel Farnborough (0252) 534036.
Horndean (H&DARC)—8 September (Junk sale auction), 7.30pm. Merchiston Hall, Horndean. Sec G4RLE, tel Horndean (0705) 593429.
Swindon (S&DARC)—1 September (RAE course night), 22 September (Open night, new licensees and would-be amateur radio hams very welcome), Thursdays, 7.30pm. Park School, Marlowe Avenue, Swindon. Sec G4IYW, tel Swindon (0793) 27227.
Weymouth (SDRS)—6 September ("Packet radio", by G3VPF), 11 September (DF hunt), first Tuesday in each month, 7.30pm. Army Bridging Camp, Wyke Regis, Weymouth. Sec G3ZGP, tel Weymouth (0305) 812893.
Wimborne (FRARS)—4 September ("Earthing and electrical safety", by G6DUN), 11 September ("Amateur radio operating overseas", by G3VMO), 18 September ("Nick's rambles", by G8MCQ), 25 September ("Use of radio in remote control and telemetry", by John Reid), 7.30pm. Flight Refuelling Social Club, Merley, Wimborne. Sec G8VFY, tel Wimborne (0202) 882271.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ Tel 01-989 6741.

Cheshunt (C&DARC)—7 September (Natter night), 12 September (Visit to Brookmans Park MF TX Station), 21 September (Natter night), 28 September (RSGB HQ, John Nelson), 8.15pm. The Church Room, Church Lane, Wormley, nr Cheshunt, Herts. Details from Roger Frisby, G4OAA, tel 09924 64795.
Chiswick (ABCARC)—20 September (Members' selected items, a discussion). Committee Room, Chiswick Town Hall, High Road, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.
Edgware (E&DRS)—3, 4 September (SSB Field Day at Coptal Playing Fields), 8 September (Informal), 22 September ("Basic programming", by John Bluff, G3SJE). Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Details from sec H. Drury, G4HMO, tel 01-952 6462.
Havering (H&DARC)—7 September (Informal), 14 September (Surplus junk sale), 21 September (Informal), 28 September (To be announced on GB2RS), 8pm. Fairkytes Art Centre, Billet Lane, Hornchurch, Essex. Details from A. Negus, G8DQJ, tel Upminster 24059.
Southgate (SARC)—8 September ("QRP operation", by Tony Smith, G4FAI), 8pm. St Thomas's Church Hall, Prince George Avenue, London N14. Pro John Fitch, G8EWG.
Stevenage (S&DARS)—6 September ("Aluminium for antennas, ideas on how to use it", by G4MEO), 8 September (Beginners evening, at the Fairlands Community Centre), 20 September (To be announced), 8pm. TS Andromeda, Fairlands Valley Park, Shephall View, Stevenage, Herts. Morse classes at 7.15pm. Details from pro Trevor Tugwell, G8KMV, or sec G4BGP, tel Baldock 893736.

Lincoln Hamfest '83 *Photos by G8VGF*

The Lincoln Short Wave Club chairman has a well earned pint on the bring & buy stall

Birchy the Clown presents Mrs Gladys Pestell with the FT290 she won on the Lucky Programme Draw, watched by husband Jim, G3BPB, and Tony, G3WRY (right). Gladys is now working hard to sit the RAE

Lincoln Hamfest manager, John, G8VGF, and Bob, G3VRD, the Lincoln Short Wave Club chairman, show Bob Aigne, W5MJQ and xyl Maria from Laredo, Texas, a Lincoln brochure, as they hope to move to the Lincoln area, but they are having trouble finding a garden 200yd long and a foot wide!

Lincoln-born RSGB membership services officer David Gough, G6EFQ, doing good business on the Society's stand

Members' Ads

CONDITIONS OF ACCEPTANCE

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB only. They must be submitted on the Members' Ad form printed on the back of a *recent* address label carrier used to mail *Rad Com* to the advertiser: this will automatically provide proof of membership and should not be more than two months old. No acknowledgement of receipt will be sent, and advertisements not clearly worded or punctuated, or which do not comply with the conditions of acceptance, will be returned. No correspondence concerning this service will be entered into.

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 for citizens band equipment will not be accepted.

Warning. Members are advised that they should, as far as possible, ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The "purchase" of goods legally owned by a finance company could result in the "purchaser" losing both the goods and the cash paid.

The current rate is £1 for 40 words or less: advertisements containing more than 40 words will cost an additional £1 for every additional 40 or less words. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

Closing dates in 1983 for issues in brackets, are **22 September** (November); **20 October** (December); **17 November** (January); **15 December** (February).

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising officer.

FOR SALE

Keyer 1024, new FC707 atu, like new, EK150 keyer, vgc. *Wanted:* Collins tx/rx KWM2 or 380, must be good cond. Beam ant, 10-15-20/Samson ETM 8C keyer, must be good. Tel Derby 557705.

Yaesu FRG7700, mint cond, 12 channel memory, additional FF5 filter, dc facility, orig packing, manual, full demo possible, £320. SR9 fm monitors, 144-146, SR9 marine band 156-162MHz, two xtal, £35 each. Tel Marlow 2726, evenings.

Commercial passive multicoupler, 50-75Ω, 2-30MHz, standard 19 by 3in rack mounting, allows two separate groups of one receiver from four aerials or one aerial to four receivers, £40. G3NR, QTHR. Tel Woking 4844.

Dragon 32 printer, Centronics parallel and RS232 serial, wired for Dragon, will work other machines, large heavy (40lb), cheap, £100, exc carriage. Mutek SLNA144S 2m preamp, £25. G6HQK, QTHR. Tel Wolverhampton 69796.

FT250, £175, buyer collect. Liner 2, preamp, free 4CX250B, £70. Coaxial relays, 10·7MHz filters, Pye tulip mics, Airlite head/mic set, Toshiba 6KD6, RCA 7360, CCS1, £5 each. QQV03-10, £1. 6146, £3. Toshiba 6JS6C, £8. Pair Eimac 4CX250B, £15 each. (Valves new and boxed). Pye and Storno manuals, Jaybeam 6-over-6 skeleton slot, used indoors, £12. All plus postage. GW3EJR, QTHR. Tel 0239 612331.

Yaesu FTDX560, 160m, 10m, 300W output, new pa valves, mint cond, £260. MM transverters, 144/432, 432/28S, £95 each. Ampere 432 linear, 40W output, £60 ono. G8KWI, QTHR. Tel Camberley 27601.

RA17L Racal rx, professionally rebuilt and aligned, super set, any trial invited, £125. 144 Marconi sig gen, 85kHz, 25MHz, old but works well, £25. Buyer collects. G8BIH. Tel John, Alton (0420) 82739, evenings.

Icom IC251E 144MHz multimode, good cond, £400 ono. Yaesu FRG7 hf rx, mint cond, £150 ono. Can deliver either item up to a 50 mile radius of Slough. GM8OFV NOT QTHR. Tel Peter, Slough 71196, after 6pm.

IC215 fm portable, nicads, charger, 15W pa, GP144W colinear, £135. G4OBS, QTHR. Tel 0980 862922.

R1155B, orig appearance, magic-eye Jones plugs, df controls, gwo, £25. R1155A, op stage, re-capacitored late-type slow-motion drive, £28. *Wanted:* AR88 or AR88D, good cond, non-working for spares. Tel St Albans 39908.

Shure high impedance mic 414A, £15. G4OKL, QTHR. Tel 0982 813039.

Trio 2m hand portables, models TR2400 and TR2300; both immac cond, nicads, trickle chargers, £130 and £105 respectively. 5/8 whip for hand portables, £13. Tel Oxford (0865) 863333.

FT101ZD fm, fan, mic, FC902 atu, exc cond, £500. G4TAK. Tel Ashton-in-Makerfield (0942) 714651.

TRS80 Model 1 Lev 2, green monitor, cassette, quickprinter, leads, editor, assembler, tapes, incl "Jumbo" books, £250. Swop mint FT902DM, FC902, SP902, for similar TS820S arrangement, cash adjustment, Atari 400, SX200 for Atari 800. G4MVZ, 28 Lumley Avenue, Skegness, Lincs.

FT221R rx, rf, 3SK48 unit, PB1456, paperwork, £20 ono. *Wanted:* Tommy Kinsman and his band "Perfect for Dancing" Nos 1, 3 & 4 Oriole records, or cassetted. Thurlow, G3WW, QTHR. Tel March 740255.

Telequipment Serviscope model S32A, 10MHz bandwidth, small size, good wkg order, orig handbook, £85. Icom cw filter FL63 250Hz, perfect, in maker's box, fitting instructions, bargain, £20. G3WLX, QTHR. Tel Gt Milton (Nr Oxford) (084-46) 643.

KW2000A, used little, fine cond, Shure mic, psu, spkr, spare output valves, instruction book, circuits, £175. Tel 0624 851796, evenings.

FT200, FP200, ac psu/spkr, all 10m xtals, matching desk mic, UD844 handbook, good cond, Magnum converter, 2m, £200 lot. GM4NC, QTHR. Tel Edinburgh (031) 339 5126.

Oric, Electron, BBC programs: morse tutor, £4. Locator, gives distance bearing points, £4. BBC rtty, (needs tu), £4. 144MHz 15W linear, £20. GEC hi-band tx/rx, £20. TI99/4 locator, £5. 13V psu, £5. G8KMV, QTHR. Tel 0438 54689.

Icom 701 1·8-30MHz, dual vfos, pass band tuning, speech processor, 0-100W output, vox, rit, att, agc, mint cond, £400. Kenpro 400RC, new, boxed, incl lower clamps, £95. G6PBG. Tel 0293 510491.

FT221 2m multimode, mint cond, boxed, manual, new colinear, £275 the lot. Buyer collects. G4HMW. Tel Chesterfield (0246) 36496.

Linear nine-band 4xPL519, self-contained power supplies, metering, relay-switching, input network, used with FT1, £135. Trans sec 230V, 850mA, £5. Trans sec 300V, 550mA, 6·3V, 5A, £5. Trans, new, unused. G3OXU, QTHR. Tel Daventry 2265.

TR2200G 2m fm portable, 12 channels, fully xtalled, S10, S13, S18-23, cw, nicads, charger, carrying case, manual, boxed, £80 ono. G6NXM, QTHR. Tel Roger, Fareham 238305.

Ringo Ranger 2m colinear, £10. Jaybeam 6-el beam, 8·5dBd, £8. UR67 low loss coaxial, 12m, £4. G3YWS, QTHR. Tel Newark 702413.

FRG7 hf rx, exc cond, still in box, full instructions etc, £125. G4NCH, QTHR. Tel Mike, 061-740 7115.

Jaybeam 14-el 2m Parabeam, erected but not used, comp in box, all receipts and instructions, £35. RS53624. Tel Rotherham (S. Yorks) (0709) 816554.

Eddystone 730/4 rx, 0·48-30MHz, alternative modified first rf ECC85 module available with set, vgc, manual, prefer buyer inspects and collects, £90 ovno. Tel Box (Wilts) 742681.

Racal RA17 rx, 0·5-30MHz, in good cond, handbook, £200 ono. Buyer must collect since it weighs 30kg. G8OTB, QTHR. Tel Nick, 01-445 7516, evenings after 7.30pm.

FT101EX, incl cw filter, Shure hand mic, vgc, £310. DX100U, £35. Driver, pas for FT101E, brand new, £8. G3ZAG NOT QTHR. Tel Flitwick (0525) 715277.

FT707 tx/rx, FP707 psu, FC707 atu, as new, £500 or near. HF5 five-band vertical antenna, HF5P radial kit, covers 80-10m, exc cond, £40. G4FDR. Tel Stourport-on-Severn (029-93) 6970.

TS180S, mint, all bands 160-10m, four tunable memories so remote vfo unnecessary, cw filter, £475. Datong clipper, £20. Shure 444, £20. TH3JR, £50. Kenpro rotator, £50. Drake lpf, £10. Various large capacitors for atus. G3XJS, QTHR. Tel 0494 712344.

FT30S 20W p.e.p. hf tx/rx, Fox Tango 250C filter, cw extender board, FP301D 20A psu, FV301 external vfo, £350 ono. FT221R 2m multimode, Mutek front end, extender board, matching spkr, £365 ono. G4OWY. Tel Weymouth 786930.

Hi-mount squeeze manipulator Mk704, £8. Mustang conversion, £30. Trio TL911 linear, £250. *Handbook of WT* 1938 Vol 2, £3. FAA FL1 filter, £30. 10-2m converter, £5. G4CJY, QTHR. Tel 0494 30018.

CR100, £20. Homebrew topband tx, psu valve, £5. SC/MP Mk14, psu, £12. *Rad Com* 1971-81, £1 per year or £5 the lot. Transformers, 450-0-450, 250mA, 6·3V, 10A, £3. 1,100V, 150mA, 6·3V, 5A, £3. Buyer collects. G4AWB NOT QTHR. Tel 01-864 8656.

TS120V hf tx/rx, boxed, as new, mint cond, not used mobile, comp with MC35S, 13·8V psu, service manual, £320. *Wanted:* FRG7700 rx, must be good cond, not modified. Cash waiting. GW4AEC, QTHR. Tel Llanelli (05542) 53186.

Eddystone 770R, £90. SBE 80-15m ssb tx/rx, £75. FT2 auto, £80. Oric 48k, £140. Sharp PC1211, £40. Wilson 6ch handheld, £35. MM converters, 432-144, £15. Ditto 432-28, £15. Datong ULC1 up-converter, £75. G3VMR, QTHR. Tel Maidenhead (0628) 24929.

Westminster dash mount, 6ch a.m. hi-band, needs alignment, tx out, six xtals, 220MHz, accept £60. Two extra boards, rf/audio, gone swl. G8BWI, QTHR. Tel Cambs 314532.

10m mobile equipment: ssb/a.m., 28·365-28·805 QRP, but much used, £50. FM 29·310-29·7, 5W output, vgc, £40. 10m fm linear amp, 30W out for 5W in, £15. Delivery might be possible. G4SDZ. Tel Michael, Newark (0636) 702076.

SWL's dream station: mint unmodded R1000 rx, handbook, gen for adding fm, latest 1983 edition *World Radio and TV Handbook*, £200 complete if collected, otherwise carriage extra. Tel 0373 64694 (nr Bath).

B40 rx, £25. Data Dynamics RO390 teletype (ASCII), stand, £65. VDU, manual, £65. Sony V2000 b&w videocorder, tapes, £50. All vgc. Colour tv, wkg, £20. All ono or p/x Nascom bits, electric guitar etc. Tel Orpington 25650.

Yaesu FRG7700, less than one year old, Yaesu FRV7700 converter, Yaesu FRT7700 tuner, for quick sale, £250 ono. Tel 0222 490417, after 6pm.

TR7800 25W, 2m fm tx/rx, vgc, £140. G8ZLP, QTHR. Tel Crowborough (E Sussex) (08926) 62523.

Yaesu FL2100B linear, LAR Omni-Match, fb cond, £300. Yaesu FV707 vfo for FT707, £75. Yaesu FV101Z vfo for FT101ZD, £80. MM2001 rtty rx decoder, £110. CWR680 rtty/cw decoder, £130. All mint. Carriage extra. G4IOT, QTHR. Tel Folkestone 76063.

Versatower SP60, autobrake loughing winch, 115V electric hoist winch, transformer, spare set cables, new price, £800 plus, first £350 cash secures. Buyer collects. G3MTX, QTHR. Tel 0424 210177.

Manuals (instruction) for 75A4, 75A2, HX50 tx, 32V1, FT101ZD, SX62A, 62AU Q-max tx, B4/40, Belcom 432MHz ssb tx/rx, Hammarlund SP600 JX

rx service instructions, Webster 79/80 wire recorder, all £2.50 each post-paid, (monies to charity). EI2W, QTHR. Tel Dublin 804645.

G4MH minibeam, very sooty, CDE AR40 rotator for above, £60. Carriage extra. *Wanted:* cw filter for Icom 740. Bencher paddle required. G4LOP, QTHR. Tel Skegness 810192.

144MHz linear kit, pair new CCS1 tetrodes, HC1 mount, heatsink, blower, base, transformer, chassis, copper strip, many other components, £75. Comp linear based on QQVO750, relays, metering, power supplies, etc, needs tweaking, £22. G4BLT, QTHR. Tel Wakefield 255515.

Icom IC251E 2m multimode base station, mic, immac, £425 ono. Daiwa RM940 infra-red mobile mic, no connections, £30. Icom ICSM2 desk mic, £20. Drake 7077 desk mic, £25. G4MH triband hf minibeam, fitted coaxial, £50. G4IOF, QTHR. Tel 01-486 8286, daytime.

FT707, a.m./fm, FC707 atu, FP707 psu, carry bracket, vgc, £545 ovno. G4NNG, QTHR. Tel 02302 3137.

FT101E, late model, mint cond, ac and dc leads, manual, mic, two sets (new) output tubes, £350 ono. Prefer buyer inspects, collects. G3AJX, QTHR. Tel Winchester 61605.

Hallicrafters SX28 rx, wkg, good cond, £50. Early wavemeter, standard radio R502, ser No 204, 100kHz-87MHz, £40. G3XKH, QTHR. Tel 024267 3520.

Total QRT: mint 2m fm mobile, Sommerkamp TS280FM full synth, 80ch, 10/1W auto rep shift, bracket, mic, manual, box, £90 ono. 2m mag whip, 3ch portable, nicads, for 2m conversion, HB9CV, etc. G6DMQ. Tel Wolverhampton (0902) 332295.

MM freq counter, 500MHz, £50. Trio TS120V, psu, atu, cw 270Hz filter, £430. 2m rig, synth fm, Tama 1510S 10W 144-6, 5kHz steps, £95. Mazuho Sky Coupler, hf rx atu, £15. *Wanted:* iambic keyer. G4TBF. Tel Ted, Blackpool 700637.

Hygain TH3 beam, perfect cond, worked much dx, log entries for inspection, £75. G3PJK, QTHR. Tel 061-643 2631.

TS530S, as new, AT230, SP230, MC50 mic, all about 18 months old, well looked after, £625 the lot. Will sell separate. HQ1 minibeam, nine months old, £90. Buyer collects. Going QRT on hf. G4NMV, QTHR. Tel 0924 823313, evenings.

Western Alumast, 30ft, comp hinged base, accessories, see *Rad Com* p363, cost £294, bargain, £194. Set SL600 series ics for tx/rx, offers. Heathkit GD1U grid dip osc, all coils, £20. G3UCE (Morecambe, Lancs). Tel Heysham 51760.

FRDX400 rx, 10-160m, comp with all filters, 4m, 2m converters, vgc, instruction book, circuit, 2m 4-el quad in with price, bargain, £100. No offers. E. D. Farnsworth, 44 Leamoor Avenue, Somercotes, Derbys DE55 1RL.

Sinclair Spectrum tapes containing four morse code tutor programs, QRA locator with European map, £3.50. Jones, G4SWH, 8 Cowper Road, Worthing, Sussex BN11 4PD.

SRX30D digital rx, £135. Safgan 10MHz dB scope, £90. Both as new. Heath digital electronics course, two texts, ics, trainer module, £50. Humphreys, GW8SGA, 31 Upper River Bank, Bagillt, Clwyd, N. Wales. Tel Holywell (0352) 713708.

Trio JR310 amateur band ssb rx, operating manual, exc cond, collect or carriage by arrangement, £85. BRS25941, James Ebdon, 8 Cleevelands Avenue, Pittville, Cheltenham. Tel 0242 515112.

FT707, homebrew psu, FL2100Z linear (new), 42ft aluminium dural pole (in 12ft sections), CDE 9508 rotator, hd 3-el tribander, one month old, all equipment as new, £1,000 or split. GW3XCR NOT QTHR. Tel 0792 401058.

IC202S, vgc, Standard accessories, helical, £100 or exchange for 240 or hf/vhf/uhf. W.H.Y? GW4KJW, QTHR (Gwent).

Yaesu FRG7700, FRT7700 atu, both boxed, eight months old, perfect, £280. Sky Ace portable airband monitor, 118-145MHz, vfo, three xtals, case, mains adapter, £30. The lot, £300. Tel Mossley 3999 (Manchester).

IC202S 2m, ssb/cw, mobile, exc cond, manual, orig packing, £95. Magnum Two transverter for FT101 etc, instructions, used little, collect, £90. G3VIN, QTHR.

KW2000A Shure mic, ac and dc psus, spare valves, manual, Europa "B" transverter, £185. Trio 9130 2m multimode, new February, has had little use, £385. G6DXR NOT QTHR. Tel 021-354 4125.

FT101ZD Mk3, fm, fan, mint, £525 ono. MD1 scanning mic, £25. TS120V, mic 30S, FL110, 200W p.e.p. linear, £340 ono. G4FPU, QTHR. Tel Welwyn Garden City 20741.

Parts for linear amp, oil filled transformers, 2,400V 1·6kVA, 500V, 300VA, 2x813 with bases, roller coaster, capacitor bank etc, must clear. *Wanted:* 18AVT/WB. G4CTY, QTHR. Tel Harpenden (05827) 61383.

Dipole antenna traps with instructions, Shure 201 mic, Jap xtal mic, linear parts, 1kV working caps, 0·25 up to 8μF, tx valve QQV0/6/40, base, meters, rf ammeters. State wants, mains transformers. G3KH, 133 Station Road, Cropston, Leicester LE7 7HH.

ITC 9in b&w monitor, vgc, £55. MMD 500MHz prescaler, £20. A.M. tx 5W MM, faulty, £5. Toni-Tuna, vgc, £30. 20Ω spkr, 8 by 5in, £1.50p. Stereo amp RTVC, kit built, 10W 4Ω, £15. All plus postage. G8ESK, QTHR. Tel 0274 45611.

Packing up: comp 102 line FT102 fitted all extras, £680. FC102 atu, £145. FAS-1-4 remote antenna selector, £30. FV102 remote vfo, £170. SP102, £39. MD1 mic, £32. Reduction comp package, all mint. G4CHP. Tel Swainsthorpe 470365.

Icom IC290, 8-el Yagi and rotator, £290. Yaesu FRG7, exc cond, £100. Datong morse tutor D70, unused, £35. G6CEA, QTHR. Tel Sittingbourne 23486, after 7pm.

Micropolis 1016/2 400k 5·25in disc drive, as new, qwerty keyboard, 53 keys, 12-key numeric pad, 20 key function pad, £175 ono. ASCII coded output, £15. 4027 4kyl dynamic ram, 30p each. Tel Newcastle (0632) 710834, after 6pm.

TenTec Century 21 cw tx/rx, as new cond, variable input QRP to 60W, good dxer, will deliver 50 miles, £130. G3JIC, QTHR. Tel 0744 23916.

Kenwood TS520SE, as new, in orig packing, £350. G4GSE, QTHR. Tel Swanley 64486.

S100 bus boards, Z80 cpu board, video display board, 8k static ram board, rom board, £100 the lot. 2047 static ram, 50p each. Tel 0632 710834, after 6pm.

YM47 mic, ex-FT290R, £10. Datong mpu psu, 13V, 200mA, £8. Cambridge kit lf sig gen, £5. Frequency meter add-on unit to measure cap, G3WPO design, £10. SD306 preamp, £3. All plus postage. G8ESK, QTHR. Tel 0274 45611.

Morse tuition program tapes for VIC20, Spectrum, ZX81-1k, ZX81-16k (specify), full instructions, no hardware needed, variable speed and run length, checks and scores your copy, characters come in five stages for easy fast learning, £5. GW3RRI, QTHR. Tel 0286 881886.

Yaesu FRG7700 gen cov rx, unused, new March, features 1kHz, 29·9MHz a.m./ssb digital readout clock timer, atu included, no offers, £200. Tel Harpenden 66077.

Swop Yaesu FT101ZD for Yaesu FTDX401, also TH33JNR and any 2m rig. Willing to collect. G4SKQ NOT QTHR. Tel Gordon, 0742 466530.

Circumstances compel sale of my pride and joy TS930S, comp with inbuilt psu, automatic atu and matching mic, Matlock guarantee, great performer, pleasure to operate, £995 plus carriage. G2KF, QTHR. Tel 072 681 2337 (Cornwall).

JRC NRD505 rx, 600Hz cw filter and memory options fitted, matching spkr, £700. Drake R7A with five filters, MS7 spkr, £825. Racal RA317 solid-state 0-30MHz rx, £325. All in exc cond. Carriage extra. GW3JAZ, QTHR. Tel 097 883 2584.

FLDX400, vgc, 80-10, £105. FTDX401, new valves, incl pas, £210. Racal vfo, comp with scale, £17.50. VVM 300V, very sensitive, £12. R475 Redifon rx, 250kHz-24MHz, £30. All ono. Buyers collect. G3JTU, QTHR. Tel Daventry 2909, after 6pm.

Cushcraft AV5 vertical antenna, 10-80m, as new, £50. Hirshman rotator 250, good cond, £30. Tel Marlborough 0672 52571, after 5pm.

Icom 251E multimode, Mutek front end, factory fitted, comp, ready to operate, super dx rig, £475. Securicor delivery, £10. Tel Ashstead (Surrey) 72626.

Standard 5800 25W multimode, fm, ssb, cw, multi-step tuning rate, 10 memories, various scanning modes, speeds, repeater shift, listen on input, as new, £300. G4OCH, QTHR. Tel Keith, 0543 376366, weekends.

Trio 710 2m ssb tx/rx, incl mains psu, £95. Pye Cambridge FM10D, xtal S20, S22, R6, £45. Marconi tx/rx, output test set, TS1065A/I, £25 ono. Racal vhf calibrator, 852, £25 ono. Army 38 set, offers. G8RIX, QTHR. Tel 051-327 6342.

FT290R, nicads, charger, case, 8-el Yagi, rotator, £235. G6CBY, QTHR. Tel 04747 4068.

770E Trio dual band 2m, 70cm multimode, mint cond, manual, boxed, comp with new MC30S mic, £535. Matching SP70 spkr, boxed, £15. SP180 spkr, audio filters, £20. Deliver 50 miles. G8CCI, QTHR. Tel Oxford 880229, evenings or weekends.

Going QRT: HW8, documents, w/key phones (built 1981), hp pulse generator, transformers, ics, RSGB publications, RS logic probe, pocket multimeter, £100 only. No splits. Buyer collects. Glenn Grayland, G8ZEB, 39 Dollar Street, Cirencester, Glos GL7 2AS.

Standard C58 2m multimode portable, £210. Standard C78 70cm fm portable, £200. Both with scanning mics, case, nicads, mobile bracket. Matching 70cm 10W linear CPB78, £50. Azden MEX55 mobile swan-neck mic, preamp, unused, £19. G4IOF, QTHR. Tel 01-486 8286, daytime.

Computer printer, Dolphin BD80, dot matrix, ideal for PET or similar computer or for rtty etc, hardly used, in exc cond, absolute bargain, £120 ono. G4RWH NOT QTHR. Tel Bob, 021-747 8784, anytime.

Yaesu FT280R multimode, 144-150MHz, similar FT480R, perfect cond, £199. G6HRK. Tel 01-801 1446 (London).

Shure 444T desk mic, £25. Yaesu hand mic, £5. Trio 130S ac psu, £325. Welz ant tuner, £25. KW pepmeter, £25. From the shack of the late G3HIW. G4CJY, QTHR. Tel 0494 30018.

FL200B tx, £80. FR100B rx, £80 or £140 the pair. Prefer buyer inspect and collect. G4DXW, QTHR. Tel Peterborough (0733) 232211.

Sharp MZ80K, 48k ram, integral vdu, cassette recorder, exc cond, only 18 months old, incl Basic, Pascal, Fortran, Forth, a host of games software, £400 ono. Exchange for hf rig. David Dodds, GM6SXF. Tel Dunfermline (0383) 723056.

Yaesu FT208R, as new, charger, manual, boxed, save £50, £150. Yaesu FT708R, mint, PA3 charger, manual, only £165. Yaesu FL7010 70cm linear amp, £65. Yaesu spkr mic, YM24A, £10. G4CGT, QTHR. Tel 0254 75037.

Heathkit HA14 linear amplifier, power supply, 1kW input, first class cond, £130. Sharp 5in tv cassette recorder, radio, new cond, boxed, Hammond T202 tonewheel electronic organ with stool, absolute bargain, £500. G3XKF. Tel Aylesbury (Bucks) 748256.

Heathkit IG42 laboratory sig gen, mint, £18. Heathkit MSP1 laboratory high voltage variable psu, mint, £5. Evershed and Vignoles megger ultra accurate ohmeter, leather case, £5. G3UML, QTHR. Tel 01-202 7071.

FT101ZD FM Mk3, fitted narrow cw filter, 12 months old, boxed, as new, £530. FV101Z external vfo, mint, boxed, £80. SP901, matching spkr, £15. G4MCK, QTHR. Tel Stevenage (0438) 68564.

TS830, DFC230, mic, new, £630. SEM, Ezitune, £60. PM2000, £30. 4-el beam ant, rotator, 10m, £75. Shure 444 mic, £20. Tel Derby 557705.

FT7 10W hf tx/rx, one owner, no mods, £220. G4HQH, QTHR. Tel Chesterfield (0246) 38249.

Tono Theta 7000E rtty cw-communications-computer, £425. 12in green screen video monitor, £60. Daiwa allmode active audio filter, £45. G3POX, QTHR. Tel 0480 811549.

Standard C58 all mode 2m tx/rx, five memories, auto scan, portable/mobile, comp with 25W linear, mobile bracket, nicads, charger, carrying case, May base, whip, £295 ono. Tel Mansfield (0623) 795395.

Commodore 4032 computer, cassette unit, handbook, some software manuals, in mint cond, £400 ono. Buyer collects. G8ULJ, QTHR. Tel Coventry 473502.

TS520S, DG5 digital readout, remote vfo, mic on stand, external spkr, swr coaxial for antenna, £350 or close offer. Tel 0624 814301.

Complete unit: five berth caravan, awning, comp with Peugeot 604 saloon, powered steering, all electric windows, roof, antenna, leather upholstery, the first £1,700 secures. I will deliver. Tel Peter, Lavington (0380 81) 3462.

Rare vintage rx type FB7DX, plug-in coil units for 160, 80, 40, 20, 10m, made by National Company of New Malden, USA in the early 'thirties, only other working specimen in ARRL Museum, offers around £100. G3JDK. Tel Wickersley 541606.

TS530S, mic, ssb filter, manual, etc, vgc, £425. AT230 atu, 10-160m, £80. 18AVT/WB, 10-80m trapped vertical, £60. LF30A low pass filter, £10. Buy the lot for £550. G4MPN, QTHR. Tel Denham 833169, Mon-Fri, 8am-5pm, or Peterborough 231848.

Trio TS520, remote vfo, ext spkr, vgc, £350. Yaesu FRG7, mint, £140. Prefer buyer see and collect. G4BCY, QTHR. Tel Headley Down 712121.

FT707, FP707, rack, boxed, mint, £500. FT221R, preamp, 10 xtals, boxed, £250. Carriage at cost or collect. GI4PCQ, QTHR. Tel 0232 612533.

Trio 2300, comp with charger, nicads, carrying case, reverse repeater, vgc, £120. G4RPA. Tel Bognor Regis 862629.

Yaesu FT2F 2m fm tx/rx, S8, S20-23, R0, RR0, R4-7, 144·8, 144·6, 144·48, 10/1W, mobile mount, handbook, £65 ono. Liner 2, preamp, mobile mount, handbook, £70 ono. G4DFN. Tel Steve, Coventry 612431.

IC290 multimode, 2m, 10W, 3W, HM10 scanning mic, orig packing, manual, mobile mount, all as new, used mobile once only, 11 mths old, cost new, £365, offers £275. Tel 01-801 8663.

Yaesu FL2100Z linear amp (pre-WARC bands), less then 50 hours use, orig packing etc, £250. Datong Universal rf speech clipper, £15. Both mint cond. Buyer pays carriage or collects. G2LL, QTHR. Tel Cooden (04243) 4645.

Manuals: AR77E, AR88LF, RA17L, CT212, £6.50 each. BC1031A, CT488, CT530, URM25D, TS505/B, T1041B, £7.50 each. Teletype TT5/6, USM32, £10 each. BC221AF, TF867, Creed 85, £4.50 each. CRT 2BP1, 3EG1, 3KP1, new, boxed, £10 each. All items plus postage. HRO gc coils, sae list. G3GUU, QTHR. Tel 0995 40387.

TS700S, all mode vhf tx/rx, mint cond, £270. Datong FL2 filter, mint cond, £50. ST5 tx/rx, rtty terminal unit, £35. MK4000 70-175MHz car scanning monitor, £50. G3LLL fm tx/rx boards for FT101 series, £40. Jaybeam PBM18/70, £18. G4FLY, QTHR. Tel 0734 594495.

Bearcat 220 covering 32-50MHz, 118-130, 144-148, 148-174, 420·450-470, 470·0125·512·45, with circuit diagram, one owner, exc cond, £145. Tel Worcester 820822.

TR2300, orig box, nicads, charger, £110. Access, Barclaycard available. G3SLH, QTHR. Tel 0829 260775.

Trio TR9000 2m multimode tx/rx, £225. GW6BMR, QTHR. Tel 0685 74700.

Yaesu FL110 linear, 10W in, 100W out, 2-el quad for 15 and 10, QRO tank circuit for two HCX250S (144MHz), offers for above or swop hf ssb tx/rx, anything considered, even homebrew. GW4BCD, QTHR. Tel 065671 8963.

HW100 tx/rx, 600Hz cw filter, ac psu, £115. G4EZC, QTHR. Tel 04215 2988.

AR88LF, £50 ono. Heath swr bridge, £15. HRO coil packs, £5 each. Well-made power unit for HW100 tx/rx, £25. Hustler 5BTV hf antenna, £50. Teletype ASR33 with pedestal, vgc, £75. Heavy items buyer collects. Small items carriage extra. G3FXA. Tel 0242 35727.

Cubex Skymaster 2-el quad antenna, boom/mast coupler, £70. CDR antenna rotator TR4, £60. KW107 antenna matching, £76. Coaxial switch, £12. TenTec keyer KR20, £17. Various valves etc. G4GBM, 66 Hythe End Road, Wraysbury, Staines, Middx TW19 5AP. Tel Wraysbury 2371.

Ten fm, repeater shift, listen input, xtal i.f. filter, 29·6 marker pip, superb rig, £35. MMT 28/144, covers 10m, 2m rig, all modes, WAC mobile, as new, £65. G4PHL, QTHR as G8UEB. Tel Sheffield (0742) 882913, home, 20212, work.

HP185B sampling oscilloscope, to plug-ins, HP1100A delay line, £200. Racal vhf/uhf calibrator model 850, sniffer, £40. Marconi automatic distortion meter TF2337A, £170. Marconi fm/a.m. modulation meter TF2304, £245. HP400E ac voltmeter, £95. Phelps-Dodge uhf duplexer, £35. All working, vgc, manuals, offers considered or swap FT290R/FT790R. G6KVD. Tel 01-348 7652.

Catronics CT600, rtty, in case, psu for Video Genie or TRS80, £65. FDK Multi U11, 70cm, fm, 12W, six xtal, ch4 simplex, £95. G3EKP, QTHR. Tel Blackburn (0254) 661098.

Racal RA17L professional communications rx, 30 bands, 0·5-30MHz, vgc, £165. G8JDE, QTHR. Tel Sambrook (095-279) 375.

Packing up: TH5DX beam, £180. CDE45 rotator, £85. Heathkit SC200 linear, modified, £180. LAR noise bridge, £19. LAR linear omnimatch, £8. LP filter, £10. Power packs, coaxial, sundries for callers. You collect large items. G4CHP. Tel Swainsthorpe 470365.

Icom IC211E tx/rx, 1GEX2 accessory box, ICRM3 remote controller, ICHM5 noise cancelling mic, mobile mount, £450, or exchange for Myford ML7 or similar lathe. G8DWR, QTHR. Tel Reading (0734) 478883.

HD9508 heavy duty antenna rotator, in good wkg order, mounts either to mast or flat surface, comes comp with 30ft of cable, control box, instructions, £45. G4JXI, QTHR. Tel Leigh 605839, after 5.30pm.

Yaesu FT-ONE gen cov tx/rx, used once, fitted ram, fm, YM38 mic, sale due to bereavement, £1,050. Tel Southampton (0703) 863382.

FTDX560, recently overhauled, £175. Creed 444 TU5, £50 each. RX80 kit, £100. WPO af filter kit, £12. DSB80, wkg, £25. Heathkit HW12 (80m), £15. HP23 power supply, £20. VS/2/1 af filter, £2.50. G3RHI, QTHR. Tel Bratton 830606.

Sommerkamp TS788DX 10m, all mode, scanning tx, £280 ono. Bearcat 220FB scanning rx, 30-512MHz coverage, ac/dc operated, two antennas, £135 ono. Both in vgc, in original boxes. Tel 061-336 0994.

FT225RD, Mutek front-end, immac, used little, due to lack of interest, comes with handbook, mic, leads, plugs, consider part/ex for cheap or non-working FT7/TS120V or 2m/fm gear, £475. G4HWB, QTHR. Tel Mike, 061-653 7055.

Partridge mini multi end-fed antenna, 10 to 80m, 24in long, 30ft feeder, ideal flat dwellers etc, £16. G4SVY. Tel Tony, Sandown 405190.

IC202E Icom portable, vhf, cw/ssb, 144·0-144·8MHz fitted, vgc, nicads, £120 ono. G6CQR, QTHR. Tel 0933 222754.

Icom 730 eight-band tx/rx, cw narrow filter fitted, Icom PS20 power supply, built-in spkr, £480 ono. EK150 electronic keyer, £35 ono. J. West, G4LRG NOT QTHR. Tel Burgess Hill (04446) 42727.

Yaesu FT707, £395. FP707 psu, bought Feb '83, £85. Mobile mount, £15. G-whip incl 40m, £30. SEM Z-Match, 160m, £50. EK150 keyer, £50. HF5, MV5BH verticals, £40 each. New Shure 444 mic, £30. G3WVD, QTHR. Tel 01-423 5809.

Sugden audio test equipment Si451 audio millivoltmeter, Si452 distortion bridge, Si453 low distortion oscillator, good cond, matching set hence will not split, cost over £200, accept £85 ono. G8PXY, QTHR. Tel 025-72 79640 (Lancs).

Kenwood TS830S, instruction, service manuals, exc cond, £575. MC50 desk mic, £25. Yaesu FT200, FP200 mic, spare valves incl matched pair 6JS6, BM7360, manual, orig packing, £210. G3LLL clipper, unused, suitable FT200, FT101, £20. G-whip, £20. G4HHH, QTHR. Tel 0947 880 245.

Yaesu FRG7700, FRT7700 atu, and FRV7700C, 140-170MHz converter, all new, unwanted gift, £300. Buyer collects. RS51578. Tel 0947 604716.

Yaesu FT101ZD, fitted fm board, cw filter, comp with fan, mic, a.m. board, boxed as new, £560 ono. 2m portable 2300, nicads, magmount, psu, boxed as new. Tel Crewe (0270) 664916.

KW2000B hf tx/rx, exchange for handheld/portable 2m rig, with possible cash adjustment. GM4RUP NOT QTHR. Tel 041-423 3912.

Tower, mobile, telescopic 21ft extending to 72ft on trailer, winch operated, adapted from hoist, could be answer to planning permission problems or mobile rally, £300. Generator, 6·25kVA, 240V, diesel, single cylinder, £350. G6DMS, QTHR. Tel 0371 84 250 (Essex).

FT207R external mic, nicads, charger, manual, going 70cm, nine months old, £130. Cushcraft three-band vertical, 10-15-20 stainless steel radials, as new, £25. Selmer 50W bass, treble guitar amp with curly leads, 50W spkrs in cabinet, £50. G4GMT, QTHR. Tel 0484 643124.

Realistic DX160 rx, vgc, £40. Halbar 4-el 2m quad, £10. Akai 4000DS Mk2 open reel tape deck, hardly used, £100 incl tapes. Bell & Howell 601 16mm projector, good wkg order, offers considered. G6GTC, QTHR. Tel 01-302 0059.

Drake T4XC/R4C with MS4 spkr, rx fitted 1·5 and 0·5kHz filters, additional sw ranges, all connecting leads, manuals, vgc, £500. G3TKN. Tel Waterlooville 65101.

Vertical 10/15/20/40m tet MV4BH, £25. G4OKL, QTHR. Tel 0952 813039.

Scanner SX200, boxed, mint cond, discone antenna, £215. Tel Alan Edwards, 01-805 6132, evenings.

Yaesu FT902DM, fitted with cw and a.m. filters, exc cond, £650 ono. G4NAJ, QTHR. Tel Hadlow Down (Sussex) 243.

Collins 30L1, vgc, £400. Pair quad els, £200. Icom ICB1050, converted 10 fm tx downshift with 25W amp, £45. Murphy A188C baffle radio, £30. HRO coil 160m BS, £5. G3GGK, QTHR. Tel 0954-210374 (Cambs).

Video Genie 16k computer, mint cond, manuals, £130 ono. Parallel printer interface for above, £20 ono. Trio JR599 amateur bands rx 160-2m, matching spkr, good cond, £100 ono. G8PXY, QTHR. Tel 025-72 79640 (Lancs).

Icom IC720A, ps, cw filter, new, £800. Tono 9000E comp, new, £525. TS430S, unused, £625. GW4ACO, QTHR. Tel 0492 515240.

FRG7, mint cond, as new, no mods, used little, manual, perspex cover, orig packing, £130. Reason for selling, ill health, buyer please collect. E. H. Warren, 136 Carlton Road, Boston, Lincs. Tel 0205 67452.

KM4000 memory keyer board, £40. Small Curtis chip keyer, £20. Field strength meter, £3. Fraser. Tel 0908 653961, daytime, 029 672 340, evening.

Shack clearance: quick sale. Trio 7500, Yaesu FT208R, YM24A/charger RG8/RG58 cable, antenna rotator, heavy duty transformer, capacitors, diodes etc, for homebrew. Many items unused, send sae for list. Buyer collects. G6EEF NOT QTHR. Tel Wolverhampton 742133, evenings.

Cushcraft ATV5 vertical antenna, vgc, £45. G4EIE, QTHR. Tel Huddersfield 42241.

FT480R, six months old, mint cond, never used mobile, boxed as new, £295. G4SVG NOT QTHR. Tel Ashford (Middx) 59341.

FRG7, no mods, £120, or part exchange plus cash for FRG7700. Tel 01-954 1871.

Yaesu FRG7700M rx with FRT7700 atu, £275. Sony 7662 r-to-r tape recorder, 7·5/15 ips half track, 15in nab spools, four heads, full logic control, remote control, £275. AKG mics, 200Ω balanced, D200, £25; D12, £70. G6RHL NOT QTHR. Tel John, Hitchin (0462) 812739.

Yaesu FRG7 communications rx, 500kHz-29·9MHz, ssb, a.m., cw, still under warranty, instruction manual, £120 cash, no offers. Hudson 208 fm xtals for GB3NL, £15. *Wanted:* late hf tx/rx. G6MFC, QTHR north west London. Tel 01-205 1985.

FT101ZD Mk2, fan, Yaesu mic, mint cond, £425. Telereader CWR680, mint, £140. G4NYZ. Tel Redditch 45800.

Yaesu FRG7000, 14 months old, mint cond, £150. Buyer collects. Consider exchange 22/26in colour tv in good cond and £100 cash. 50 Midfield Court, Thorplands, Northampton.

TS820 hf tx/rx, 160-10m, 240V ac, 13·8V dc, vgc, comp with manual, orig packing, MC50 desk mic thrown in for good measure, £350. G4IAR, QTHR. Tel Loughborough (0509) 217655.

Johnson capacitors: 800pF 3·5kV variable, £10; 120pF plus 120pF, £7. Johnson variable inductance, turns counting dial, five-pole switch with suitable capacitors, tune 3—30MHz, £15. 2 × 4·150S, plenum chamber, blower £10. QRO hf chokes, £2. G2LL, QTHR. Tel Cooden (042343) 4645.

Two 813 valves, new, unused, not war surplus, two bases, 10V 10A transformer, £35. Three old valve mains rxs, £15. 18V 20A transformer, £8. Two five-gang 75pF capacitors, £3 each. All collect. G3OXV, QTHR. Tel Daventry 2265.

Trio JR599 amateur bands rx, 2m, 70cm converters, boxed, manual, £125. Standard C78 fm rig, preamp, pa, mobile mount, nicads, charger, carry case, colinear, boxed, manuals, cost £335, accept £200. G8NPC, QTHR. Tel Ken, Hastings (0424) 444952.

Yaesu FV101Z external vfo, as new, open to offers. *Wanted:* interested in FL2100Z linear amplifier. GW4TGF. Tel Swansea 403526.

Yaesu FT902DM hf rig, mint cond, used little, nine-band tx/rx, £700. Buyer collects. G6LFU, QTHR. Tel Tony, Dorking 885533.

Comp vhf station: IC260E multimode mobile tx/rx, psu, Yaesu FP12, 40W MML linear amp, atu, swr meter, rotator, 12-el ZL-Special, 4-el quad, £375 ono. G4TXK, ex-G8XLT, QTHR. Tel Leeds (0532) 864297.

IC740, new, unused, comp with fm board, two months old, pristine cond, boxed, cost £725, offers around £600 for a quick sale. Genuine offer not refused. Call at 102 Nightingale Road, Hackney, London E5, after 2pm. Tel 01-985 7700.

Morse tutor, Datong D70, as new cond, £35. Tel 0733 238277.

Datong FL3, as new, £115. Icom ICFA1 helical for IC202 etc, £5. YC355D counter, £105. All plus carriage. G8ESK, QTHR. Tel 0274 45611.

Oscilloscope, Tektronics 545A 30MHz dual beam, delay, perfect, manufacturer reconditioned, bargain, incl spare valves, manual, new probes, £170 ono. Collins TC12S hf rx, psu, £20. Pye AM10MC, mic, circuits, £15. Ever Ready Skyqueen portable valve radio, collector's item, £15. G6BJD, QTHR.

Scanner: Tandy Pro 2001, 50 programmable channels, coverage 68/88 (4m) 108/136, 138/174, 410/512 (70cm), 240V ac/12V dc, as specified for spectrum monitoring purposes, *Rad Com* May '83 p421 refers, comp with handbook etc, mint cond, £149 (half price). G3IES, QTHR. Tel Bristol 500742.

FT101Z, six bands, mic, fan, dc converter, immac, boxed, £370. Leader atu, 80-10m, power, swr bridge, £60. Lowe 2m colinear ant, £15. *Wanted:* Sailing dinghy and trailer, could exchange. G4HIY, QTHR. Tel Crowmarsh (049169) 788.

Rotator, Kenpro 400RC, new, never out of box, round type meter, top clamps, £91. G6PBG. Tel 0293 510491, evenings.

A32320 a.m./fm, 20 memory scanning, searching rx, 110-162, 296-368MHz, Pye 3210 cassette recorder, digital flight scan, 108-136MHz, hifi Garrard 86SB turntable, AU2200 amp, spkrs, all vgc, boxed, manuals, lots of junk to clear. G3XLL, QTHR. Tel Mellis 596.

Yaesu FT207R 2m synthesized portable, no modifications, 12·5kHz steps, digital display, autoscan, memories, deluxe NC2 psu/charger, nicad, YM24A spkr/mic, PA2 mobile psu/adapter, helical, manual, used little, exc cond, £110 the lot. G4MOD, QTHR. Tel Reading (0734) 744828.

Oscilloscope, Philips PM3230, 10MHz dual beam transistorized, accessories, manual, vgc, exchange for comm rx or Datong UC1. TE221 audio generator, mint, manual, exchange for cw, audio filter. G3YJU, QTHR. Tel 0296 87983.

TS830S, fitted ultra selective switchable ssb/cw Fox-Tango Corp xtal, filters and dsi unit, SB220 2kW, immac cond, Racal RA117E, immac cond, Racal MA197B atu, all equipment comp manuals, reason for sale, new Drake line. G4HSB, QTHR. Tel Peter, 0642 816608, evenings.

FT500 tx/rx, for quick sale, ideal for newly licensed, five band, 250W, good wkg cond, first enthusiast with £100 can have it. G3LBX, QTHR. Tel Pakenham 30518 (nr Bury St Edmunds) to arrange collection.

An exc KW202 amateur bands rx, mint cond, handbook, £135. 146 copies *Radio Constructor* 1950-1978. 204 copies *Practical Wireless* 1950-1980 (not 1978), offers. QQV03-20A, new, £5. Transformers, chokes, numerous components, hundreds valves, sae enquiries please. G3OEI, QTHR.

LM7, similar BC221 hb psu, £20. Modified R1475 less psu, £15. New SB/254M, £10. QQV06/40, £8. AVO 7, £20. Harris, G3OTK, QTHR. Tel Wells (0749) 73025, ext 35.

Yaesu FT225RD 2m multimode, seven fixed channel xtals, Mutek front end board fitted, comp with orig front end, incl mic, mint cond, £450. G3KDH, QTHR. Tel Tring 3505.

Trio TS120S, cw filter, PS30 power supply, Z-Match atu, can be used with transverter, orig packing, comp station, £400 ono, or separately, offers please. C. N. Bauers, G4JUV, Kent College, Canterbury, Kent CT2 9DT.

Minimitter top to seven, 160/80/40m a.m. cw tx, mic, £18. Sabtronics 8610A 600MHz freq counter, £60. W&D 70cm converter, 2m i.f., metal case, £10. 14m Westlake UR67 coaxial, £4.50. G3MEW, QTHR. Tel Portsmouth 820315.

Yaesu FT101E, mint cond, £300. Tel Tideswell (0298) 871979 between 9am-5pm, evenings, Buxton (Derbys) 6288.

Yaesu FT7 10W cw/ssb, all 10m mobile mount, mic, cables, vgc, £250. Copal 222 digital clock. *Wanted:* 70MHz 144MHz convertors, any i.f. considered, price and cond. G4IDF, QTHR. Tel Worcester (0905) 20135, after 6pm.

Barlow Wadley XCR30 portable sw rec, £80 ono. Ranger 40 channel, 10m tx/rx, £40 ono. Would accept part exchange of HW7, Spectrum software, flute, or electronic portable organ. Tel 0723 351456.

HF5 vertical, radial kit HF5R, fiveband, 10-80m, one year old, vgc, new cost now, £90, will accept £45. Collect or carriage extra. G4OBR. Tel 0653 4382, anytime.

HF5 vert compact ant with rad kit, £45. 28-21-14-7-3·5MHz. G4KTK, Canvey Island, Essex. Tel 684978.

SMC monitorscope (KW108), used little, vgc, £45. G4DJY, QTHR. Tel 0253 725119 (Lancs).

FT107M, fitted power supply, filters, memory, YM38 scanning mic, unused, manual, offers. FV107 vfo, FTV107R, transverter, fitted 2m unit, 70cm unit, both unused, manuals, would exchange NRD515 or offer for lot. Will separate. Tel Honiton (0404) 850501.

Cushcraft AV5 trapped vertical, comp with stainless wire ground plane, worked 65 countries, ideal new G4, cost £80, £30. Buyer collects. G4RKO NOT QTHR. Tel Chelmsford 469683.

FT480R, exc cond, accessories, £290. ASP mag mount, 5/8 whip, £7. 12V at 6A psu, £9. 40W, 2m pa, preamp, solidstate changeover, £18. Tel Melton Mowbray 69119.

FT707 40-80, 100W, FTV707 2m transverter, £425. G4SSV. Tel 01-542 9336.

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Codar AT5 tx, T28 rx, HQ1 beam, FR101D or DD rx. All in good unmodified cond. G3SPR, QTHR. Tel Chippenham 653740.

IC2E. Pye Bantam hi-band a.m., xtals not needed. G6VMU. Tel Brian, 01-349 1891.

Has anyone an original S-meter for an AR88? Your price paid. Ken Cass, G6SAM, 53 Maple Drive, Burnham-on-Sea, Somerset. Tel 0278 786475.

Oscilloscope. Transistor type, supplied in kit form with BNR&ES Practical Electronics Course. Must be well made, in good wkg order. Prefer to purchase from successful student of above course. please write stating condition and price. G4KEW, QTHR.

Good, solidly built interrupter, such as from old fashioned doorbell or Tesla coil, will consider whole doorbell, preferably hi-voltage Tesla coil. EI1DA, QTHR.

Loop antenna type 3 or similar for R1155. Impedance matching unit type 12, 13, or 15 for above. Strobe unit for 62A Gee indicator or scrap indicator. Ken Brooks, G3XSJ. Tel Bristol (0272) 685280.

HF5 five-band vertical antenna, with or without radials. Cantenna or similar dummy load. G4LLQ. Tel 0928-88123.

£10 reward for information leading to purchase pedal generator, 1945 vintage, tripod tubular frame with rectangular back-frame and canvas deckchair seat. Generator in square tubular housing with 5-pin connector. G3EUR, QTHR. Tel South Ockendon 852371, reverse charge accepted.

Attempting my own "real" radio collection. Good price paid for mint 19 sets, 38 sets, 1154, 1155, BC348, anything of this era accepted. W.H.Y? G3ZYC, QTHR.

Motorola HT220 handbook, willing to purchase, or copy and return. G6VBJ. Tel 01-283 1880, or 01-310 5123, home.

For disabled person with limited funds, 2 by 8in stand off brackets, three lengths aluminium tubing, 1·5, 1·75 or 2in diameter for 144MHz antenna, have sat RAE, waiting results, please write in first instance, price plus carriage. P. W. Hall, 10 Dulverton Square, Leeds LS11 0LL. Tel 0532 771090.

For the Wireless Museum: old radio books, magazines, catalogues, QSL cards, call books, morse keys, valves, spkrs, components, shelving. Details pse to hon curator, G3KPO, 34 Pellhurst Road, Ryde, IoW. Tel 0983 62513.

KW2000 or similar for radio club. Reasonable price paid. *For sale:* AR88 and Panda Explorer hf tx, both wkg but may require some attention. GM4LQS, QTHR. Tel 0776 2570, evenings.

KW107 Supermatch or KW E-Zee Match. G4PJY. Tel Oakham 2721.

Racal RA17 serial No 801, headphone, jack plug, query ST&C GPO type 316 or MIL-P-642A, PJ055B. Cox, 39 Wingfield Avenue, Wilmslow, Cheshire. Tel 531591.

Urgent: service manual sig gen TF801B/3/S, copy, whatever. These valves: 6AS6, EF95, DET22D, TD03-10D, 5651, OA3, A1834, L77, EC90, 5R4GY, 6C4, 6AK5, DP61. The above are urgent as I have been badly let down. Tel Peter, 047-385 694.

Circuit manual, Swan Astro 150 tx/rx or copy, reasonable price paid. G3HJG, QTHR. Tel 061-748 7585.

Manual for Heathkit Mohican rx, buy or borrow. G6MQP, 83 Comber House, Comber Grove, Camberwell, London SE5 0LL.

Handbook for B28/CR100. Adaptor AP63993. Any reasonable price plus cost of phone call. Prop pitch motor with integral gearbox, unmodified. Not a cowl gill motor please. G3AAG. Tel Liss (Hants) 2143.

HW8, in good cond, unmodified. G3KZU, QTHR. Tel Oxford (0865) 63000.

RTTY program for PET 2001 (32k new rom) with interface details. CW receive also wanted. Beg, borrow or buy! G4JLU, QTHR. Tel 01-954 6728.

QSL cards wanted for cash! Large or small lots of any period (new collector seeking breadth!). Please write or 'phone. Norman Field, G4LQF, 14 Regent Road, Harborne, Birmingham 17. Tel 021-426 3663.

Manual for B28 rx, Admiralty version of CR100 loan buy or photocopy. Also required for above rx, a good set of knobs. Main translucent tuning scale for AR88, 540kHz-32MHz. G4PNM NOT QTHR. Tel Tony, 0203 318301.

Components of Redifon GR479G, eg GRB45, ACU9. Need other Clansman components, vhf, hf, have GA481 linears, 1·5-30MHz, for trade. AW/PRC74s. W.H.Y? Tony Grogan, WA4MRR, 5 Rollingwood Drive, Taylors SC 29687, USA. Call area code 803-244-0324.

Circuit diagram or valve complement of Leak trough line 2 fm tuner. Circuit diagram of volume and tone control unit for radio and records containing ECC40 valve. All letters answered. F. N. Brocklesby, 34 Littlecote, Petworth, W Sussex GU28 0EF.

4CX250B tubes, must be new. ITT or Eimac. GJ4ICD, QTHR.

Bradley Electronics oscilloscope 200, service information required. Good price paid for service manual or photocopy thereof, made under licence from G. E. Bradley by Stanley Laboratories. GW8CNS, QTHR. Tel John Mathias, Bridgend (0656) 59587.

Drake R4C tx, late model, will collect. G2ACK, QTHR. Tel 0342 21221.

Closed circuit camera with monitor. EI9BT, QTHR.

Yaesu YO101 monitorscope, mint cond, or YO901 multiscope, mint cond. BRS84262. Tel George, Fraserburgh (Scotland) 4756.

Manual for FRDX400 rx. Also for same, xtals 34·8535, 35·4535, cw filter, fm filter. Mobile bracket Trio MB2. Twin gang 75pF ex-RF27. G3KBI, QTHR. Tel Guisborough 76312.

FTV250, tatty but operational unit considered, must have leads. G4LTH, QTHR. Tel Stanford-le-Hope 674301.

Datong D70 morse tutor, and suitable morse key. BRS84221. Tel 0940 28438.

Can any old-timer supply me with a Post Office morse key type 610 with large knob. GW4JKR. Tel 0248 715582.

If you are helping to dispose of a deceased amateur's station, G3BDQ will be pleased to buy the QSL cards and help the estate a little. Please write to me at "Whitefriars", Friar's Hill, Guestling, Hastings TN35 4EP.

Southend Sea Cadet Corps are in urgent need of your unused radio equipment: txs, rxs, atus, psus and antennas, to train young Sea Cadets in radio comms. Donations gratefully accepted. Tel 0702 48334, Tuesday and Thursday evenings.

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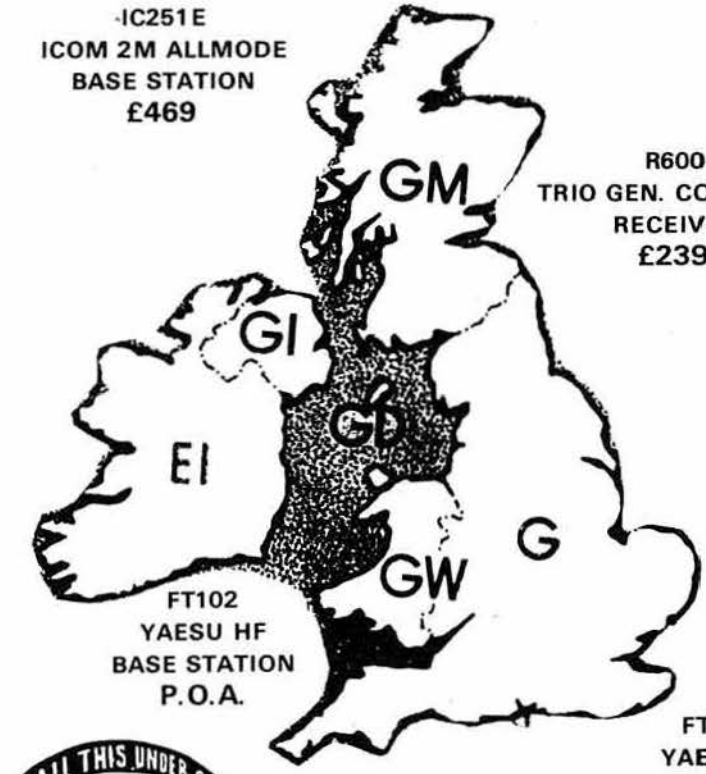

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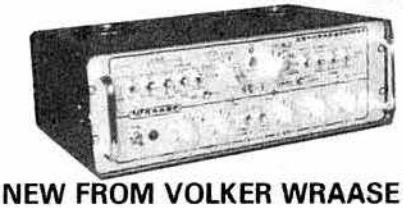

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MR 150W	144MHz 130-150W + preamp	169.00
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HK705	Up down keyer	12.50
HK706	Up down keyer	13.75
HK708	Up down keyer	11.96
HK808	Up down keyer marble base	39.57
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HB10F2T	2 ele. 10m mono band beam	51.50
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HB15F2T	2 ele. 15m mono band beam	60.66
HB15FT	3 ele. 15m mono band beam	93.46
HB15M25P	VP mini size 15m 2 ele	69.50
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HB34D	4 ele. tri band beam 10/15/20m	222.90
HB33SP	3 ele. tri band beam 10/15/20m	192.50
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SP15M	1.8-160MHz 5-20-200WW PWR/SWR Meter	35.00
SP45M	130MHz-470MHz POWER/SWR Meter	51.00
SP-10X	Compact version of SP15M	24.45
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CH20N	2 way coax switch 1kW 1.3GHz ('N' socket)	31.95
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HDRA 95u-2	11.5dB gain variant (input intercept + 16dBm)	32.90
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Synthesiser Modulator	MOD 1	8.10	4.75
Bandpass Filter	BPF 433	6.10	3.25
PIN RF Switch	PSI 433	9.10	7.75
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Pattern Generator	TVPG1	39.95	32.53
TV Modulator	TVM1	8.10	5.30
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3W Transceiver (boxed)	ATV-2	119.00	–
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50mW to 500mW	70FM1	14.65	8.85
500mW to 3W	70FM3	19.65	13.25
500mW to 10W	70FM10	30.70	22.10
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10W to 45W	70FM45	58.75	45.20
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RF Switched (30W Max)	70PA2/S	21.10	14.75
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FM Transmitter (1.5W)	144FM2T	36.40	22.25
FM Receiver	144FM2R	64.35	45.76
Synthesiser (2 pcb's)	144SY25B	78.25	59.95
Synth Multi/Amp (1.5W o/p)	SY2T	26.85	19.40
Bandpass Filter	BPF 144	6.10	3.25
PIN RF Switch	PSI 144	9.10	7.75
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Low Noise, RF Switched	144PA4/S	18.95	14.40
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Piptone	PT3	6.90	3.95
Kaytone	PTK3	8.20	5.95
Relayed Kaytone	PTK4R	9.95	7.75
Regulator	REG1	6.80	4.25
Solid State Supply Switch	SSR1	5.80	3.60
Microphone Pre-Amplifier	MPA2	5.95	3.45
Reflectometer	SWR1	6.35	5.35
CW Filter	CWF1	6.40	4.75
TVI Filter (Boxed)	HPF1	5.95	–
MICROWAVE PROJECTS			
Microwave Drive Source	MD05T	29.50	20.40
Bandpass Filter	BPF 384	5.10	3.25
4M EQUIPMENT			
FM Transmitter (1.5W)	4FM2T	34.75	21.20
FM Receiver	4FM2R	61.65	43.15
Pre-Amplifier	4PA4	10.95	7.95
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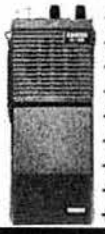

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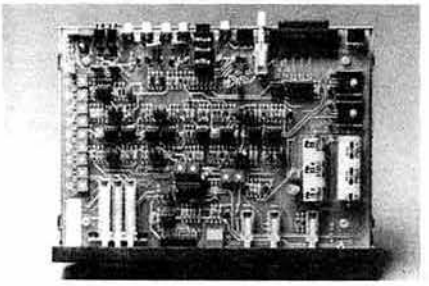

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BN 32S	N male to BNC female	2.05
BN 33S	N female to BNC male	1.95
BN 34S	N female to BNC female	1.63
	ALSO SEE UHF ADAPTORS	
BC 01	Solderless inline splicer for UR43	0.45
BC 02	Solderless inline splicer for UR90	0.52
BC 03	Solderless inline splicer for UR67	0.58

PREAMP TRANSISTORS

3SK88	145MHz, 26dB gain, 1·1dB NF	0.95
BF981	145MHz, 18dB gain, 0·7dB NF	1.20
BFR91	432MHz, 18dB gain, 1·9dB NF	1.35

R.F. POWER TRANSISTORS

MRF260	145MHz, 10dB gain, 5W output	6.56
MRF261	145MHz, 6dB gain, 10W output	8.74
MRF262	145MHz, 6·3dB gain, 15W o/p	14.40
MRF264	145MHz, 5·2dB gain, 30W o/p	15.26
MRF221	145MHz, 6·3dB gain, 15W o/p	17.60
MRF247	145MHz, 7dB gain, 75W o/p	40.74
MRF245	145MHz, 6·4dB gain, 80W output	44.25
MRF475	1·5·30MHz, 10dB gain, 12W PEP	4.95

All figures for gain and output power are minimum values, full data supplied with all orders. Send SAE for free data sheet on any of the above transistors.

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*on LPM models only

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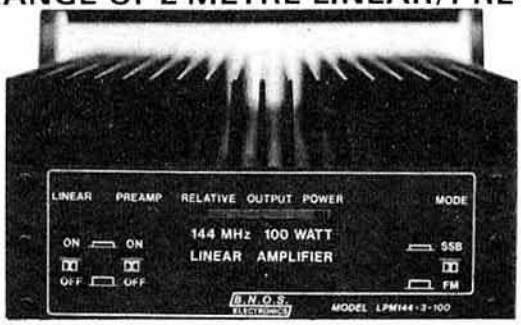

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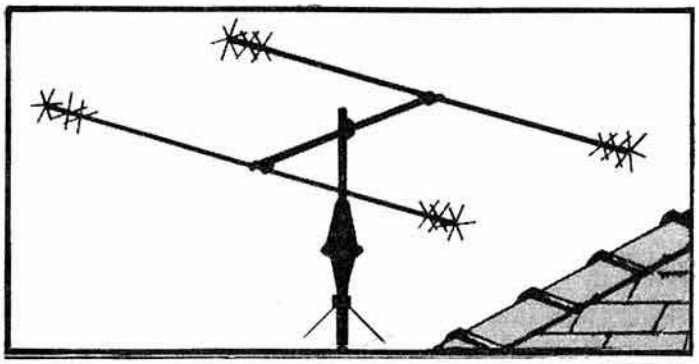

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Turning radius	7 feet	Input impedance	50 ohms
Operating frequencies	10m, 15m, 20m	Wind resistance	80 mph
Forward gain (ref D pole = 1:00)	3·6 dB	Weight	14 lbs
		Rotator requirements	AR40

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R4	4·0305	8·0611	12·0916	15·0000	18·1375	45·0000
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R6	4·0319	8·0638	12·0958	15·0055	18·1437	45·0166
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FP707	Matching Power Supply	110.00	(5.00)
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FT790R	70cm Portable multimode	349.00	(–)
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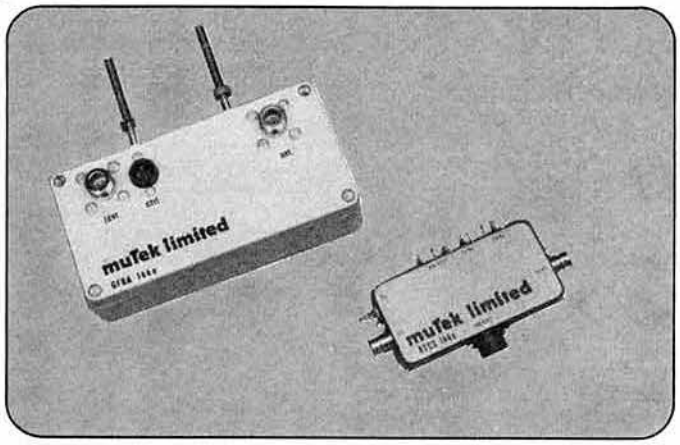

The vast majority of manufacturers of preamplifiers for the amateur radio market are quite content to use 'traditional' amateur designs without too much thought. Whilst it's true that almost anyone can make a low-noise amplifier of sorts it's a rather different matter to make high quality amplifiers at prices attractive to radio amateurs. There are also other important factors which many of our competitors either don't understand or try to ignore. To do the job properly requires considerable investment both in test equipment and engineering skills. It's a sobering thought that even a humble SLNA 144ub sees around £20k in test equipment before it leaves our factory!

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SLNA 145sb	Transceiver optimised preamplifier with antenna c/o switching using BF981. Intended for the FT290R, but has many other applications!	27.40
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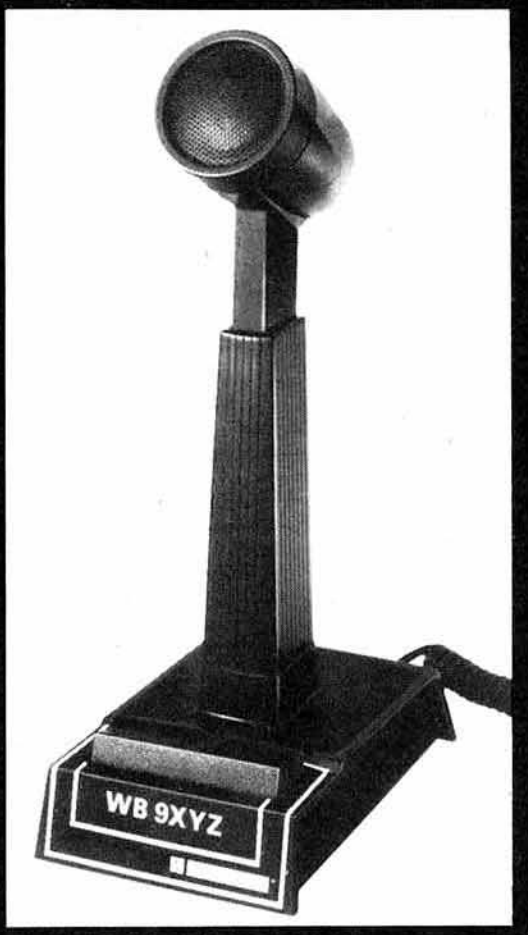

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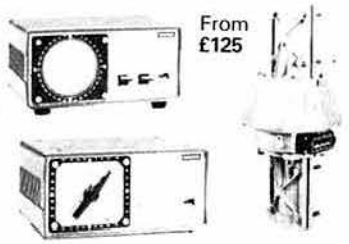

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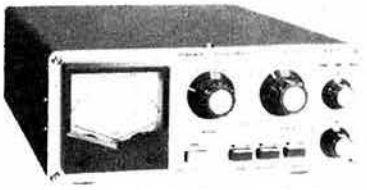

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QRM KILLERS

see us at A.R.R.A. Doncaster Oct. 6, 7, 8

MODEL SRB2

is the definitive and long awaited answer to the Russian Woodpecker. Others claim to solve the problem of the distinctive RAT A - TAT TAT of the Russian radar system. **DATONG are the first to succeed with a fully automatic blanker.**

With the introduction of model SRB2 the Woodpecker is dead. Completely automatic in operation, SRB2 locks onto the Woodpecker within a second or so of its appearance and blanks it out completely. SRB2 adjusts automatically and continuously to changing pulse widths and phase changes that defeat the manual blankers. SRB2 can even deal with more than one Woodpecker at a time. User selectable between 10 and 16hz repetition rates, SRB2 connects in series with loudspeaker and antenna leads, and is equally effective on SSB, AM and CW. A power supply of 10 to 16 volts @ 150 ma is required.

Price: **£75.00 + VAT** (£86.25 Total)

MODEL ANF

The value for money, stand alone automatic notch filter that doubles as a CW filter. Model ANF is small in size but neat in looks and big in performance. Simply connect model ANF in series with the loudspeaker lead of your receiver and from then on heterodynes, whistles and other steady tones that often make listening on the crowded amateur and short wave bands hard work will vanish automatically, as model ANF notches them out.

A bargraph LED display shows you the frequency of the offending interference. At the push of a button model ANF becomes a good CW filter eliminating all but the signal you want to hear. Manual or automtaic operation in notch and peak modes, plus automatic frequency control, makes model ANF extremely versatile and easy to use.

A power supply of 10 to 16 volts DC @ 100 ma is required. Model ANF is supplied with connecting leads, and is identical in size to model SRB 2

Price: **£59.00 + VAT** (£67.85 Total)

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Model ANF		£67.85	
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FT-980

The FT980's innovative design boasts the highest level of microprocessor (80-85) control ever offered as a standard feature in an all mode, all solid state, amateur H.F. transceiver.

Every frequency related function is digitally synthesised permitting local or external control via a personal computer of: Mode, all VFO and memory functions, IF shift and width, clarifier, band limits, FSK shift—and more!

Two independent VFO's—multiple tuning methods including; flywheel knob, two speed scanning in 10Hz (also 5/500 KHz) steps and keyboard entry.

12 totally independent mode/frequency memories (whose contents can be checked even while transmitting) are provided.

Primary digital readout offers resolution to 100 or 10Hz is mode sensitive, displays offsets and even VHF frequencies when used with the matching transvertor. A remarkable secondary display indicates frequency change by scrolling sideways, with a scrolling cursor providing resolution to 1 KHz.

Two receiver front ends are provided, one for general coverage—150KHz to 30 MHz, the other for amateur bands only. Seven high IDss JFETs produce extraordinarily wide dynamic range and the employment of ten V.C.O's secures a high carrier to noise ratio —even in the adjacent channel.

The triple conversion design of the FT980 receiver (Ω 47 MHz, Ω 9 MHz, 455 KHz) incorporates four cascaded stages for all modes and can operate as standard on SSB, CW, AM, FSK and FM transceiving.

The transmitter covers all H.F. amateur bands in 500 KHz segments. Convenience features include: simultaneous measurement of forward and reverse S.W.R., or compression (RF processor) or Ic or Vc or output power or ALC (includes "easy adjust" peak hold facility), AMGC (reduces ambient noise on voice transmissions), and a transmission quality monitor (all mode IF demodulator).

With a P.A. rated for 560W dissipation 100W PEP is produced from a 24V line with 3 order intermodulation at typically −40dB. Full thermal (with blower and VSWR) protection (though power delivery is still 75% of full into a 3:1 VSWR!) are of course standard.

For CW, full break-in and calibrating (spotting —zero beating with other station) and choice of sidetones are fitted, and an inbuilt Curtis Keyer is optional.

Other FT980 features include AGC speed, tone, FM, squelch and centre zero meter, additional 'write' button for protected memories, display dim, dial lock, QSK linear provisions—the list is almost endless—Ask your authorised Yaesu dealer for a full colour leaflet or better still call in to him and try one out today!

GENERAL

Frequency coverage
Rx; 50 KHz–30 MHz (continuous)
Tx; 10-160M (9 bands)

Frequency accuracy
Better than ± 3p.p.m (0-40°C)

Tuning steps
10Hz, 5 KHz & 500 KHz (band)
Direct/Computer keyboard entry

Modes of operation
J3E (LSB/USB), A1A (CW), A3E (AM), J1B (AFSK), G3E (FM); Rx & Tx

Power requirements
100/120-200/234 V 50/60 Hz
72VA Rx, 530VA Tx (100W out)

Dimensions (Ex/Inc projections)
370/380W x 157/165H x 350/465D mm
17Kg, Nett

Options

XF-455.8MCN	300Hz CW Filter
XF8.9HC	600Hz CW Filter
XF8.9GA	5 KHz AM Filter
MH-1-B8	Hand Scan Microphone
MD-1-B8	Desk Scan Microphone
D3000026	Curtis Keyer Unit
FIF-80	Computer Interface

RECEIVER

Sensitivity (2-30MHz)

J3E/A1A/J1B	:0.25μV	(2.4 KHz)
(10dB S + N/N)	0.16μV	(600 Hz)
	0.10μV	(300 Hz)
A3E	:1.40μV	(6 KHz)
(10dB S + N/N)	1.25μV	(5 KHz)
	1.00μV	(3 KHz)
G3E (12dB SINAD)	:0.60μV	(12 KHz)

Sensitivity (150 KHz-2 MHz)

J3E/A1A/J1B	:4.0μV	(2.4 KHz)
(10dB S + N/N)	2.6μV	(600 Hz)
	1.6μV	(300 Hz)
A3E	:22μV	(6 KHz)
(10dB S + N/N)	20μV	(5 KHz)
	16μV	(3KHz)

Dynamic range
95dB in 300 Hz (max sensitivity)

Audio peak filter
350 Hz-1400 Hz

IF notch filter
500 Hz-2700 Hz (demodulated)

Audio
4-16 Ohms, 3W in 4 ohms (10% THD)

Image/I.F. rejection
Better than 70dB

TRANSMITTER

Power output
J3E/A1A : 100W(PEP)
A3E : 25W
G3E/J1B : 50W

Intermodulation (3rd Order)
Better than −40dB (14 MHz 100W)

Carrier suppression
Better than −50dB (peak output)

Sideband suppression
Better than −50dB (1 KHz tone)

Spurious radiation
Better than −50dB (peak output)

Audio response
Better than 250 Hz-2750 Hz @ −6dB

FM deviation
±5 KHz (maximum)

AFSK shift
170, 425, 850 Hz

Microphone impedance
600 Ohms nominal

Output impedance
50 Ohms nominal, unbalance

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