August 1982

RADio COMmunication

FIELD DAY WEATHER!

June 1982 was for many places the wettest June this century—and even the wettest month of the century in some places!

Typically, the early summer weather at the beginning of the month broke in time for HF NFD, and this photograph by A. Reilly, G4BVW, gives a vivid impression of the prevailing thunderstorm conditions experienced in many parts of the country. It shows the Thornton Cleveleys ARS club station, in the tent at bottom right, and the club's home-made 50ft tower. The lightning flash was no more than 200 yards away and took the roof off a house; after which the station went off the air for 20min. The two-hour storm was part of a very exciting field day for the club.

Journal of the Radio Society of Great Britain

Lee Electronics Ltd

LONDON'S LEADING SUPPLIER OF—STANDARD ★ ICOM ★ YAESU ★ FDK ★ MICROWAVE MODULES ★ J-BEAM ★ LUNAR ★ HI-MOUND ★ TELECOMM ANTENNAS ★ COMMUNIQUE PRODUCTS ★ OSCAR METERS ★ AND MANY MORE TOO NUMEROUS TO MENTION ★

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TOP QUALITY MOBILE ANTENNAS

TA-301 2m ¼ wave with snap-in mount and cutting chart **£3.99**

TA-309 2m ⅝ wave 3dB gain with snap-in mount and cutting chart **£9.95**

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MK704	Squeeze paddle	**£10.00**
MK705	Squeeze paddle on marble base	**£22.43**

ALL PRICES INC. VAT. P&P 50p

ADONIS MICS

AM802	Desk mic	**£59.95**
AM502	Desk mic	**£29.95**
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202HD	Headset	**£28.17**
202FX	Swan neck	**£30.48**

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ICOM

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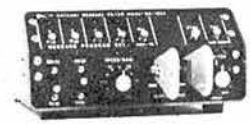
SWR200B swr/power meter covering 3-200MHz 50/75 Ohm power range 3-30MHz, 20/200/2kW. VHF 2/20/200W **£39.95** inc. VAT. P&P 50p.

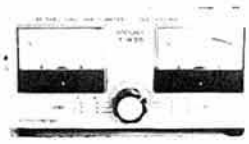
EK-150

A semi- or fully-automatic squeeze keyer producing dots and dashes in the precise ratio required for perfect code. The speed is adjustable from 0-60wpm. Power inputs 110/240V AC or 9-14V DC. **£74.75** inc. VAT. P&P £1.00.



MK-1024

As EK-150 but with four memories each capable of storing 256 bits making a total of 1,024 bits. This can be recalled separately or in sequence for one lone message **£109.25** inc. VAT. P&P £1.00.



T-435: VHF/UHF swr and power meter with 2/20/120 watt through line power measurement **£34.95** inc. VAT. P&P 75p.

UH74 SWR and power meter switchable HF, 2m and 432MHz with remote head at **£15.39** inc. VAT. P&P 75p.

SWR25: This ever-popular twin SWR and Power meter covers 3·5-150MHz at **£12.00** inc. VAT. P&P 50p.

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2m with BNC plug	**£4.50**
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★ NEW SA-450 ★

High quality coax switch housed in a diecast box with S0239s

Frequency	3·5-500MHz
Loss	0·02dB
Weight	450gms
Max power	2·5kW
Impedance	50ohm

CT-1 Coax toggle, 3 S0239s **£6.85** inc. VAT. P&P 25p.

CT-2 Coax toggle, 2 SO239s, 1 PL259 **£6.85** inc. VAT. P&P 25p.

TS-120 Coax slide switch, 3 SO239s **£6.75** inc. VAT. P&P 25p.

POWER SUPPLIES

PX402

PM103, 4·5/6/7·5/9/12V dc 500mA fully stabilised **£13.50** inc. VAT. P&P £1.00
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PH5000 13·8V dc 5A continuous 7A max. Fully stabilised **£46.00** inc. VAT. P&P £2.00.

MICROWAVE MODULES

		Price £ Inc. VAT	Post Rate
CONVERTERS			
MMC144/28	(2m converter)	27.80	A
MMC144/28LO	(2m converter)	29.90	A
MMC432/28-S	(70cm converter)	29.90	A
MMC432/144-S	(70cm converter)	34.90	A
MMC1296/28	(23cm converter, 10m output)	32.20	A
MMK1296/144	(23cm converter, 2m output)	59.80	B
FREQUENCY COUNTER:			
MMD050/500	(500MHz digital frequency meter)	69.00	A
MMD600P	(600MHz prescaler)	23.00	A
MMDP1	(frequency counter probe)	11.50	A
RECEIVE PREAMPLIFIERS:			
MMA28	(10m preamplifier)	14.95	A
MMA144V	(2m RF switched preamplifier)	34.90	A
MMA1296	(23cm preamplifier)	29.90	A
FILTERS:			
MMF144	(2m filter)	6.90	A
MMF432	(70cm filter)	6.90	A
ATTENUATOR:			
MMR15/10	(15dB attenuator, BNC terminations)	5.75	A
TRANSVERTERS:			
MMT28/144	(10m linear transverter)	99.00	B
MMT144/28	(2m linear transverter)	99.00	B
MMT432/28-S	(70cm linear transverter)	149.00	B
MMT432/144-R	(70cm linear transverter)	184.00	B
MMT70/28	(4m linear transverter)	115.00	B
MMT70/144	(4m linear transverter)	115.00	B
MMT1296/144	(23cm linear transverter)	184.00	C
LINEAR AMPLIFIERS:			
MML144/25	(2m 25 watt linear amplifier)	59.00	B
MML144/100	(2m 100 watt linear amplifier)	129.00	D
MML144/40	(2m 40 watt linear aimplfier)	77.00	B
MML432/20	(70cm 20 watt linear amplifier)	77.00	B
MML432/50	(70cm 50 watt linear amplifier)	119.00	D
MML432/100	(70cm 100 watt linear amplifier	228.65	D
RECEIVE CONVERTERS:			
MM2000	(RTTY to TV converter)	169.00	B
MMC28/144	(10m converter)	27.90	A
MMC50/28	(6m converter)	27.90	A
MMC50/28LO	(6m converter)	29.90	A
MMC70/28	(4m converter)	27.90	A
MMC70/28LO	(4m converter)	29.90	A

THE ABOVE PRICES ARE INCLUSIVE OF VAT BUT NOT POSTAGE. PLEASE ADD POSTAGE TO THE ABOVE PRICES AT THE FOLLOWING RATES:
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Access

BARCLAYCARD VISA

AUGUST 1982

VOLUME 58 No 8

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.

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

NEW HF TRIO *pacesetter in amateur radio*

TS 930S

TS-930S FEATURES:

- **160-10 Metres, with 150 kHz-30 MHz general coverage receiver.**
  Covers all Amateur frequencies from 160-10 metres, including new WARC, 30, 17, and 12 metre bands, on SSB, CW, FSK, and AM. Features 150 kHz-30 MHz general coverage receiver. Separate Amateur band access keys allow speedy band selection. UP/DOWN bandswitch changes in 1-MHz steps. A new, innovative, quadruple conversion, digital PLL synthesized circuit provides superior frequency accuracy and stability, plus greatly enhanced selectivity.
- **All solid state, 28 volt operated final amplifier.**
  The final amplifier operates on 28 VDC for lowest IM distortion. Power input rated at 250 W on SSB, CW, and FSK, and at 80 W on AM. Final amplifier protection circuit with cooling fan. SWR/Power metre built-in.
- **Automatic antenna tuner, built-in.**
  Available with AT-930 antenna tuner built-in, or as an option. Covers Amateur bands 80-10 metres, including the new WARC bands. Tuning range automatically pre-selected with band selection to minimize tuning time. "AUTO-THRU" switch on front panel.
- **CW full break-in.**
  CW full break-in circuit uses CMOS logic IC plus reed relay for maximum flexibility, coupled with smooth, quiet operation. Switchable to semi-break-in.
- **Dual digital VFOs.**
  10-Hz step dual digital VFOs include band information. Each VFO tunes continuously from band to band. A large, heavy, flywheel type knob is used for improved tuning ease. T.F. Set switch allows fast transmit frequency setting for split-frequency operations. A = B switch for equalizing one VFO frequency to the other. VFO "Lock" switch provided. RIT control for ±9.9 kHz receive frequency shift.
- **Eight memory channels.**
  Stores both frequency and band information. VFO-MEMO switch allows use of each memory as an independent VFO (the original memory frequency can be recalled at will), or as a fixed frequency.
- **Dual mode noise blanker ("pulse" or "woodpecker").**
  NB-1, with threshold control, for pulse-type noise. NB-2 for longer duration "woodpecker' type noise.
- **SSB IF slope tuning.**
  Allows independent adjustment of the low and/or high frequency slopes of the IF passband, for best interference rejection.
- **CW VBT and pitch controls.**
  CW VBT (Variable Bandwidth Tuning) control tunes out interfering signals. CW pitch controls shifts IF passband and simultaneously changes the pitch of the beat frequency. A "Narrow/Wide" filter selector switch is provided.
- **IF notch filter.**
  100-kHz IF notch circuit gives deep, sharp, notch, better than −40 dB.
- **Audio filter built-in.**
  Tunable, peak-type audio filter for CW.
- **AC power supply built-in.**
  120, 220, or 240 VAC, switch selected (operates on AC only).
- **Fluorescent tube digital display.**
  Fluorescent tube digital display has analog type sub-scale with 20-kHz steps. Separate 2 digit display indicates RIT frequency shift.
- **RF speech processor.**
  RF clipper type processor provides higher average "talk-power", plus improved intelligibility. Separate "IN" and "OUT" front panel level controls.

Other features:

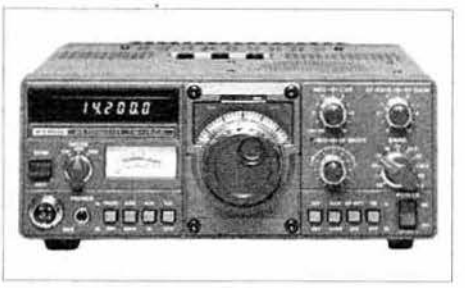
- SSB monitor circuit, 3 step RF attenuator, VOX, and 100-kHz marker.

MC 60 SP930 TS 930S

TS 930S AMATEUR BAND TRANSCEIVER WITH 100KHz to 30MHz GENERAL COVERAGE RECEIVER

TS 830S
£694.30 inc VAT carr £5.00

TS 530S
£543.98 inc VAT carr £5.00



TS 130S
£529.09 inc VAT carr £5.00

LOWE ELECTRONICS Ltd
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VHF UHF

Now, with the production of the TS780, the dual bander has come of age, giving the two band multimode facilities of the original concept, plus a wealth of additional operating facilities. Trio have again produced a rig which others cannot even copy.

- Full coverage of 2 metre and 70cm band. 144·00 to 146·00 430 to 440.
- All modes. Upper sideband. Lower sideband CW and FM. Also a position with which you will not be familiar FM CH. This gives the VFO a mechanical click stop feel and increments of 12·5 or 5kHz. Ideal for 2 metre and 70cm simplex working.
- Free running VFO with 2 speeds of frequency coverage, slow in 20Hz steps, fast in 200Hz steps. Add to the VFO a friction brake and ease of fine tuning is the result.
- Band scan in either 0·5, 1, 3, 5, or 10MHz widths.
- Memory scan. The rig can be instructed to scan either the 2 metre or the 70cm frequencies in the memories or to scan the total content.
- IF shift to move the receiver pass band without changing the receive frequency and give greater operability under crowded band conditions.
- Full repeater shift facility for either 2 metres or 70cm repeaters plus tone access and reverse repeater switches.
- Up down microphone supplied as standard.
- 13·8V DC or 240V AC 50/60Hz operation

TS 780

TS 780 £748.00 inc. VAT carriage £5.00

The TR9130 is the new all mode VHF mobile or base station rig from Trio giving 25 watts output on 2 metres FM, USB, LSB and CW and now having a green LED display to make for easier mobile operation.

- 25 watts output on FM, SSB and CW.
- FM/USB/LSB/CW all mode operation.
- For added convenience in all modes of operation, the mode switch, in combination with the digital step (DS) switch, determines the size of the tuning step, and the number of digits displayed.
- Six memories. On FM, memories 1 through 5 for simplex or +600kHz offset, with the OFFSET switch. Memory 6 for non-standard offset. All six memories may be operated simplex, any mode.
- Memory scan. Scans memories in which data is stored. Stops on busy channels.
- Internal battery memory back-up. With Ni-Cad installed (not Trio supplied), memories will be retained approximately 24 hours, adequate for the typical move from base to mobile. A terminal is provided on the rear panel for connecting an external back-up supply.
- Automatic band scan. Scans within whole 1MHz segments (ie 144·0-144·999MHz), for improved scanning efficiency.
- Dual digital VFOs. Incorporates two built in digital VFOs, selected through use of the A/B switch and individually tuned.
- Squelch circuit on all modes (FM/SSB/CW).
- Repeater reverse switch. For checking signals on the repeater input, on FM.
- CW semi break-in circuit with sidetone. Built-in, for convenience in CW operations.
- Digital display with green LEDs.
- Transmit offset switch for repeater shift.
- High performance noise blanker.
- RIT (Receiver Incremental Tuning) circuit. Useful during SSB/CW operations.
- HI/LOW power switch. Selects 25 or 5 watts RF output on FM or CW.
- Accessory terminal. A four-pin accessory terminal is provided for use with a linear amplifier or other accessory.
- Includes quick release mobile mounting bracket and up/down microphone.

TR9130

TR9130 ALL MODE TRANSCEIVER £395 carr: £5.00

TR9000 IS STILL AVAILABLE AT £359.00

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TRIO

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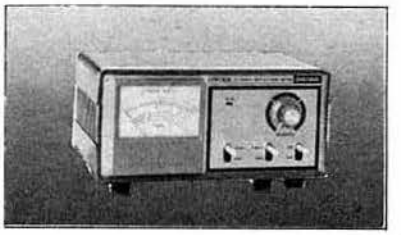
we recommend the DAIWA range.

		Price inc. VAT	Carr.
VHF AMATEUR RECEIVERS			
SR9	2m FM tunable/xtal receiver 144-146MHz	46.00	1.50
POWER & SWR METERS			
CN520	1·8-60MHz mini cross needle power/SWR meter	32.50	1.50
CN540	50-150MHz mini cross needle power/SWR meter	35.00	1.50
CN620A	1·8-150MHz cross pointer power and SWR meter. Up to 1kW	52.81	1.50
CN630	140-450MHz cross pointer power and SWR meter. Up to 200W	75.00	1.50
CN650	1·2-2·5GHz cross pointer power and SWR meter. Up to 20W	95.00	1.50
CNW518	3-30MHz 8 band hi power tuner and cross needle power meter	175.00	2.00
CNA1001A	Fully automatic all band ATU. Includes cross pointer power meter	156.00	5.00
CNA2002	As for CNA1001A but 2kW rating for tuner and power meter	228.00	5.00
SW110A	SWR/power meter 1·8-150MHz. 0-20 and 0-200W. Not cross pointer	29.90	1.25

ROTATORS

DR7500X	For HF 3 element beams. Preset controller. 6 core cable	98.04	5.00
DR7500R	As for DR7500X but using the DAIWA round controller	107.98	5.00
DR7600X	Heavy duty. Will take up to 2 element 40m beam. Preset control	141.00	5.00



DR7600R	As for DR7600X but using the DAIWA round controller	152.00	5.00
KS065	Deluxe bearing for fixing stays to rotating mast	18.50	2.00

MOBILE WHIP ANTENNAS

DA500	Dual band whip. 2·7dB gain on 2m and 5·5dB gain on 70cm. 200W	16.50	1.00

ANTENNA ACCESSORIES

CS201/TW2	Two way 50 ohm coax switch. 0-500MHz	11.98	1.00

POWER SUPPLIES

PS300	Daiwa heavy duty PSU 30A max 22A continuous.	117.99	5.00

INFRA RED MICROPHONE

RM940	New mobile mic with no connections between mic and rig	45.00	1.50
S9	Spare sensor for RM940 mic system	6.50	0.50
M9	Extra mic for RM940 system	13.00	1.50
F4	Set of four windshields for RM940 mic. Available singly at 75p	3.00	0.50

the HONOR family

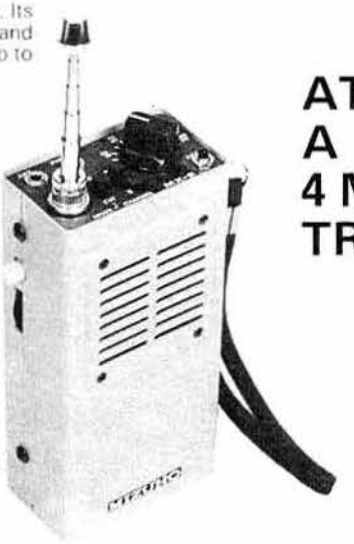
ANNOUNCE THE ARRIVAL OF THE GT1000 DIGITAL MULTIMETER

The GT1000 is the newest multimeter in the established range from Honor. Different because its digital LCD display gives instant unambiguous readings over its wide range (200mV full scale up to 1000 V full scale DC, 2 V-600 V AC). The meter is auto ranging and auto polarity selecting so you can pay attention to the measurement in hand without bothering with switch twiddling. Its even auto ranging on the ohms scales, and will measure from 200 ohms full scale up to 2M ohm. Amazing.

£39.50 inc VAT carriage £1.50

the MX 4

SSB and CW from 70.150 to 70.250 MHz with 200 mW power output. Internal telescopic aerial. CW key and Nicad charger. Operates from either an internal battery or an ext 9 volt DC supply. (Optional module for 12 volts) the rig is supplied in semi-kit form for around **£75.00.**



AT LAST! A 4 METRE TRANSCEIVER

LOWE ELECTRONICS | Access | BARCLAYCARD VISA | LOWE ELECTRONICS | Access | BARCLAYCARD VISA

EMPORIUM NEWS

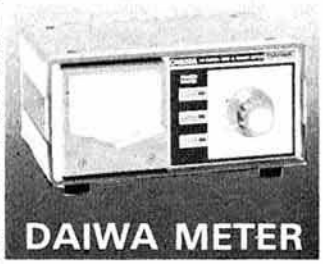
Good morning.

Another edition of Emporium News. **First, the new products.** For the many of you who build your own pieces of equipment there has always been a shortage of good tools, small hand tools I mean. Alan has been scouring the market and has come up with **the finest set of small hand tools** of all imaginable varieties. **I list them: round** nose, **side** cutting, **flat** nose, **long** nose, **bent** nose, **diagonal** cutting, **wire stripper** and, finally, **plastic** cutting. All of them are priced at £4.50 each and are unbelievable value for money. Each tool is supplied in its own bubble pack, postage and packing on each item being 50p. Of course if you're ordering **the full set** then please **ring Anne** to find out **the correct amount of postage** required.

To complement the above items we now have **a full range of screwdriver** kits which are available in the following types. Again these are all priced at £1.98, postage and packaging being 50p. Don't forget **our chassis punch kit** which will only cost you £8.63 and **includes a tapered reamer** – the pearl catch at 98p which is the only piece of kit available for retrieving the lost screw from the **dark depths of your rig.** Still available is the 22 piece tool kit at £7.95, carriage £1.00, and last, but certainly not least, how many of you could manage without **a helping hand:** a multi arm instrument vice system **with a magnifier** that costs only £4.95, postage and packing £1.00.

New this month are the range of **Revco** bases for the first class 2 metre and 70 cm whips. Now having a well designed quick release system that in today's car parks ensures security; the "hole in the bodywork" Revco base costs £5.50 and the mag. mount version £18.50. Those who own a Hokushin aerial with 259 base but want an upmarket mag. mount can now have the Revco base already fitted with a SO239 for the same £18.50. So please don't forget to specify which type of base you require. **The SR9 superb VHF** receiver, tunable and with fixed channel positions, is still available at £46.00, including VAT. A first class piece of equipment and just the rig to expand your listening horizons. **Now to join the SR9 is the SR1000E.** Also made by Daiwa the SR1000E covers the entire 2 metre band **plus** in 5KHz steps and costs £72.50, carriage on both items £1.50.

I must now record **how surprised I am** that you amateurs and short wave listeners out there have not turned **the large range of CB antennas to good use on the amateur bands.** The aerials are cheap and the ones we stock are well constructed. The visitor to the Matlock Emporium can listen to our range of receivers on either the long wire antenna or the **"John Wilson Special",** the vertical. Ask David to show you the difference between vertical and horizontal aerials. Of course, I am not saying that the vertical is the bee's knees for every situation but, as you all know, **a vertical** is likely to be better when **capturing the weak signal** at the beginning and end of a propagation path. And there is one great advantage of the vertical. Unless you live on the fifth floor of a multi storey block of flats there must be a place where you can put a vertical. "Another aerial in the garden", I can hear your wife saying, but think of the advantages of a vertical. You can tell her that there isn't a bird made that can sit comfortably on a vertical so that will certainly mean less bird droppings on the line of washing. Talking about such subjects, I am afraid **I have had to allow the wife access to the radio shack** before she pegs out the washing on the line which runs near the bottom of my tower. (A TL922 linear is way above a tumble dryer on my list of priorities.) She sets my VHF/UHF aerials array pointing north/south which ensures that the birds miss the clothes by at least 2 feet, sorry 600mm. I wonder how many more of you are beset by these mundane wash-day problems. Anyway, to get back to the verticals, ring John and ask him about modding the 27MHz aerials for other amateur bands and how much they cost – **you will be amazed.**



I never cease to be amazed at the **operability of the TR2500 2 metre hand held transceiver.** A chap in the showroom asked me to show him how the rig worked. I explained the various controls and then programmed the memories. What about this programmable scan? he asked – no problem at all. And soon the rig was scanning between two frequencies in the multiple of 5KHz that the enquirer had suggested. **Ultimate flexibility and such a good receiver.**

From Daiwa yet another aid to operating. **An all mode active filter: the AF606K.** In addition to the notch, SSB and CW filters, the AF606K is equipped with a PLL tone decoder; when the tone frequency of the CW signal and the free running frequency of the PLL tone decoder are the same a locked signal is generated. This locked signal keys an audio oscillator which then reproduces the received CW signal. However, there is a tremendous difference between the produced signal and the received one – no noise and, of course, no fading. We have this piece of equipment on display here at Matlock and also in London and **all who have seen it are suitably impressed.** The price of the AF606K is £56.60, carriage £5.00.

We have for a long time regretted not having a nice small power supply for the small receivers. Now we have one. Rated at 500mA and covering the following voltages 3, 4·5, 6, 7·5, 9 and 12 volts DC, the PM103 power supply will assist in many situations. The PM103 costs £12.00, postage and packing £1.00.

For the guy who can also **afford good quality stereo equipment** in addition to **amateur radio, a wife, child and budgerigar,** we have the **JH777 stereo headphones,** an unbelievable bargain at only **£4.95.** The workshop lads, all hi fi buffs, have tested them and seem extremely pleased so it would seem another Lowe Electronics' winner.

We still haven't caught the guy who walked off with our demo TR2500. Remember, this rig was a preproduction model and **has no serial number.** If you have seen this rig, or know someone who has, then please contact us. **When we have caught the guy and have chopped off his fingers** then a suitable reward will follow to the person or persons who have helped. Also, anyone who has **seen a TS120V,** serial number **941488,** is asked to contact us.

On a more cheerful note, we were very pleased to entertain **the Denby Dale Radio Club** here at Matlock a couple of Sundays ago. **A pleasant crowd and real gentlemen,** they brought their **wives** with them to enjoy **the pleasures of Matlock.** So why don't you, on one of those **dreary Saturdays** when all you have to do is **dig the garden, cook the dinner, look after the children,** or make a start on **decorating the front room,** surprise the wife and bring her over to enjoy the pleasures of Matlock, the beautiful scenery and the **great camaraderie** to be partaken here at the Emporium. Show them the drinks machine **and how hot soup should really be made** and, for the adventurous amongst you, point out Tracy's bright red toe nails.

Anyway, that's about it for now as I have just heard a rumour that Marlyn, our tealady, has just changed the month-old tea bag and I want to be first in line for a fresh cup so Gud DXes 73es FBYLS, XYLS, esFBOM, etc. DAVID.

ICOM

Spans the world.

IC-720A
Possibly the best choice in HF.
£883.inc.

The main problem that the amateur of today has to deal with is deciding just which rig out of the many excellent products available he is going to choose. Technology is advancing at such a rapid rate and getting so sophisticated that many cannot hope to keep up. Some go too far!

Perhaps one way of dealing with the problem is to look at just what each model offers in its basic form without having to lay out even more hard earned cash on "extras". The IC-720A scores very highly when looked at in this light. How many of its competitors have two VFOs as standard or a memory which can be recalled, even when on a different band to the one in use, and result in instant retuning AND BANDCHANGING of the transceiver? How many include a really excellent general coverage receiver covering all the way from 100kHz to 30MHz (with provision to transmit there also if you have the correct licence)? How many need no tuning or loading whatsoever and take great care of your PA, should you have a rotten antenna, by cutting the power back to the safe level? How many have an automatic RIT which cancels itself when the main tuning dial is moved? How many will run full power out for long periods without getting hot enough to boil an egg? How many have band data output to automatically change bands on a solid state linear AND an automatic antenna tuner unit when you are able to add these to your station?

Well you will have to do quite a bit of hunting through the pages of this magazine to find anything to approach the IC-720A. It may be just a little more expensive than some of the others – but when you remember just how good it is, and of course the excellent reputation for keeping their secondhand value you will see why your choice will have to be an IC-720A!

IC-PS15 Mains PSU £99

IC-2E £159.inc.
IC-4E £199.inc.
The World's most popular portables & now the marine version IC-M12

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

Fully synthesized – Covering 144 – 145.995 in 400 5KHz steps. (430-439.999 4E)
Power output – 1.5W with the 9v. rechargeable battery pack as supplied – but lower or higher output available with the optional 6v or 12v packs. Rapid slide-on changing facility.
BNC antenna output socket – 50 ohms for connecting to another antenna or use the Rubber Duck supplied (flexible ¼ λ whip – 4E)
Send/battery indicator – Lights during transmit but when battery power falls below 6V it does not light, indicating the need for a recharge.
Frequency selection – by thumbwheel switches, indicating the frequency. 5KHz switch – adds 5KHz to the indicated frequency.
Duplex simplex Switch – gives simplex or plus 600KHz or minus 600KHz transmit (1·6MHz and listen input on 4E)
Hi-Low switch – reduces power output from 1.5W to 150mW reducing battery drain.
External microphone jack – if you do not wish to use the built-in electret condenser mic an optional microphone speaker with PTT control can be used. Useful for pocket operation.
External speaker jack – for speaker or earphone. This little beauty is supplied ready to go complete with nicad battery pack, charger, rubber duck.

A full range of accessories in stock.		**£ p**			
ICM11	10W mobile booster for IC2E	49.00	BC25	Mains charger as supplied	4.25
BP6	11 volt battery pack	30.00	DC1	12-volt adapter pack	8.40
BP4	Empty battery case for 6 x AA cells	5.80	HM9	Speaker microphone	12.00
BP3	Standard battery pack	17.70	CP1	Mobile charging lead	3.20
BP7	6 volt pack	22.00	IC12 3	cases	each 3.60
BC30	Base charger for above	39.00	All prices include VAT		

The IC4E is going to revolutionise 70 CM!

Well worth thinking about!

IC-25E
The Tiny Tiger
£239.inc.

Amazingly small, yet very sensitive. Two VFO's, five memories, priority channel, full duplex and reverse. LED S-meter, 25KHz or 5KHz step tuning. Same multi-scanning functions as the 290 from mic or front panel. All in all the best 2M FM mobile ICOM have ever made.

IC-251 £499.inc.
IC-451 £630.inc.
Great Base Stations

ICOM produce a perfect trio in the VHF base station range, ranging from 6 Meters through 2 Meters to 70 cms. Unfortunately you are not able to benefit from the 6m product in this country, but you CAN own the IC-251E for your 2 Meter station and the 451E for 70 cms.

Both are really well designed and engineered multi-mode transceivers capable of being operated from either the mains or a 12 volt supply. Both contain such exciting features as scan facilities, automatic selection of the correct repeater shift for the band concerned, full normal and reverse repeater operation, tuning rate selection according to the mode in use. VOX on SSB continuous power adjustment capability on FM and 3 memory channels. Of course they are both fitted with a crystal controlled tone burst and have twin VFO's as have most of ICOM's fully synthesized transceivers. There is now a superb low noise mast head pre-amp available for the IC-451.

IC-290E £366./IC-490E £445.inc.
Multimode mobiles
290E-144-146 MHz/490E-430-440 MHz

IOW RF ouput on SSB, CW and FM. Standard and non-standard repeater shifts. 5 memories and priority channel.

Memory scan and band scan, controlled at front panel or microphone. Two VFO's LED S-meter 25KHz and 1KHz on FM – 1KHz and 100Hz tuning steps on SSB. Instant listen input for repeaters.

IC-24G
Low-priced mobile
£169.inc.

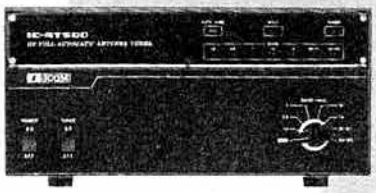
The famous IC-240 has been improved, given a face lift and renamed the IC-24G. Many thousands of 240's are in use, and its popularity is due in part to simplicity of operation, high receiver sensitivity and superb audio on TX and RX. The new IC-24G has these and other features. Full 80 channels (at 25kHz spacing) are available and readout is by channel number – selected by easy to operate press button thumbwheel switches. This readout can clearly be seen in the brightest of sunlight. Duplex and reverse duplex is provided along with a 12½ KHz upshift, should the new channel spacing be necessary. The old IC-240 proved to be the most reliable rig we have ever sold – the IC-24G because it is so similar, looks like following the same pattern. Remember for mobile use a rig MUST be easy to operate to be safe. Send for technical details.

ICOM & Thanet....open

IC-730 The best for mobile or economy base station £586.inc.

ICOM's answer to your HF mobile problems – the IC-730. This new 80m-10m, 8 band transceiver offers 100W output on SSB, AM and CW. Outstanding receiver performance is achieved by an up-conversion system using a high IF of 39MHz offering excellent image and IF interference rejection, high sensitivity and above all, wide dynamic range. Built in Pass Band Shift allows you to continuously adjust the centre frequency of the IF pass band virtually eliminating close channel interference. Dual VFO's with 10Hz and 1KHz steps allows effortless tuning and what's more a memory is provided for one channel per band. Further convenience circuits and provided such as Noise Blanker, Vox, CW Monitor, APC and SWR Detector to name a few. A built in Speech Processor boosts talk power on transmit and a switchable RF Pre-Amp is a boon on today's crowded bands. Full metering, WWV reception and connections for transverter and linear control almost completes the IC-730's impressive facilities.

IC-AT500 £299.inc. Automatic antenna tuner 100W version AT100 £249. inc.



The Automatic Antenna Tuners which put all the others to shame.

It was only when we started to use the new fully automatic antenna tuners from ICOM that we realised just how far ahead of their competitors they are! The very fast tune up time and simplicity of use make them a real worthwhile addition to any station even if the rest of your station isn't ICOM. If it is, then you have the added advantage of fully automatic band selection so that you can virtually hide it away in a cupboard if you want (though we think you will want to show it off).

Apart from its very rapid action and auto band selection facilities it will select the correct antenna for the band (up to four). The new bands are covered of course, but the AT100 does not cover topband, whereas the AT500 does.

Dual accessory sockets are supplied so that you can easily chain your IC-720A, (or IC-701 or IC-730) together with the IC-2KL and AT5 to produce what must be one of the most advanced automatic stations available.

Why not call us for more details or get your dealer to demonstrate one to you today?

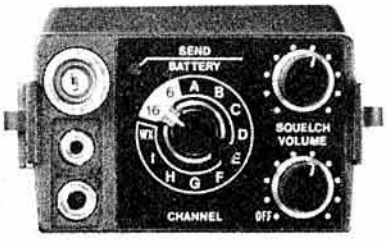
Super Linear IC-2KL £839.inc. Matching Power Supply IC-2KLPS £211.inc.

To compliment the excellent IC-720A HF Transceiver, ICOM have produced the IC-2KL linear amplifier. It is of a similar size and matches the IC-720A perfectly. It produces 500W output on SSB, CW, AM and RTTY needing 80-100W of drive. As with the IC-720A it will operate from 1.6MHz to 30MHz continuously at full output power, but you still need an antenna that matches. It will follow the IC-720A automatically changing bands WITH NO TUNING – the operating is done from the prime-mover.

This automatic facility can be overriden for use on rigs other than the IC-720A, but can be added to the IC-701 and the IC-730. The IC-2KL employs a heat pipe cooling system for the heatsink of the power transistors. This is a new technology used to transfer the heat, and has a high conductance, several hundred times that of copper, plus a very quick response.

The IC-2KL has a matching power supply the IC-2KLPS delivering 40vDC at 25A continuous for 10 minutes maximum.

A marine version of the IC-2E £199.+VAT.



12 Channels – Synthesised – No Crystals to buy!

ICOM are proud to introduce the IC-M12 which is the Marine version of the worlds most popular portable, the IC-2E. It uses all the same accessories, has the same exceptional receiver sensitivity and versatility of the 2E and it is HOME OFFICE APPROVED.

It is almost certain to prove the most popular Marine hand portable in the world. So if you are not in marine yourself why not tell your friends about it!

12 programmable channels which include the private ones. £199 + VAT.

Trade Enquiries Welcome

Thanet Electronics

ICOM

143 Reculver Road, Beltinge, Herne Bay, Kent. Telephone (02273) 63859.

up the airways!

Tono RTTY and CW computers
7000E-£550./9000E-£650.inc.

The TONO range of communication computers take a lot of beating when it comes to trying to read RTTY and CW in the noise. Others don't always quite make it!

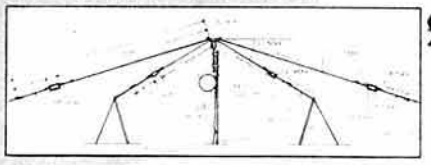
Check the many facilities offered before you buy – especially look at the 9000E which also throws in a Word Processor. Previous ads have told you quite a lot about these products – but why not call us for further information and a brochure?

NEW! £699.inc.
with built-in VDU

The **Telereader** range of communications computers are becoming very popular right through the range. All have composite video and UHF output for use with a TV set. Add a new dimension to your short wave listening.

CWR 685E	Send/receive with VDU and Keyboard	**£699**
CWR-670	Delux rx only version with CW and six selectable baud rates – 3 shifts	**£259**
CWR-600	**"Morse Master"** Rx only (but it does RTTY also-3 baud rates). Key socket and built in oscillator for morse practice.	**£189**

A new Trap Dipole!



£49.50.inc.

The MT-240X Multi-band trap dipole antenna (80m – 10m) is a superbly constructed antenna with its own Balun incorporated in the centre insulator with an SO239 connector. Separate elements of multi-stranded heavy duty copper wire are used for 80-40-15 and 20-10 Metres.

Really one up on its competitors. £49.50 inc. VAT

CUE DEE antennas
Hot stuff from Sweden!

The BEST in recent tests and really well made too. Send for a catalogue of these Dx antennas. Here's part of the range:-

10 element	2m	long yagi	**10144A**	11.4	dBd	**£44.90**
* 15 element	2m	long yagi	**15144A**	14	dBd	**£57.00**
17 element	70cm	long yagi	**17432AN**	14.5	dBd	**£43.00**

* **SM2GGF** uses 8 of these for moonbounce!!

Prices of other Tono quality products
These prices may be subject to change, depending upon the state of the £.
All inclusive of vat.
Green display monitor CRT1200G £136.00
Dot Matrix Printer HC900 £590.00
Dot Matrix Printer HC800 £499.00
Printer socket SK7 £8.50p
Linear amplifiers:
UC70 430 MHz 55W + RX pre-amp £149.00
2M-50W (2M) £65.00
2M-100W (2M) + RX pre-amp £115.00
MR-250W (2M) + RX pre-amp £259.00
MR-28LB
(26-30 MHz) + RX pre-amp £65.00
Mast-Head Pre-amp:-
RX144 £65.00 – RX430 £70.00
(both include control and psu box)

You will get a good deal from Thanet – Call us.
Why buy from Thanet?
1. Full 2 years warranty on all equipment
2. Excellent back up and after sales service using fully equipped work shop.
3. ICOM trained technical staff
4. No charge for speedy delivery service
5. Avoid disappointment – buy from the experts with years of experience.

Instant credit available in most cases.
1. Phone us during office hours
2. Out of hours leave a message on our ansaphone stating clearly your name, address, day time telephone number and Access/Barclaycard number.
3. Write enclosing full details of your requirements together with payment, quoting call sign if possible.

Please note: Access/Barclaycard owners – goods must be sent to address registered with credit card company.

No carriage charges.

Your nearest ICOM Supplier is....

ICOM DEALERS

London	Amateur Radio Exchange	01-992 5765	**Yorkshire**	Leeds Amateur Radio	(0532) 452657
	H Laxton Ltd	01-558 0854		Greens Telecom	(0226) 5031
	Lee Electronics Ltd	01-723 5521		Northern Telecoms	(0422) 40792
	CQ Centre	01-543 5150	**Midlands**	Amateur Electronics (UK)	021-327 1497
Essex	Waters and Stanton Electronics	(0702) 206835	**N. Ireland**	George Moore Electronics	(0232) 647570
	Arrow Electronics	(0277) 226470		Tyrone Amateur Electronics	(0662) 3680
Sussex	Bredhurst Electronics	(0444) 400786	**Eire**	Armstrong Electronics	Dublin 309839
Herts	Photo Acoustics	(0908) 610625	**C.I.**	Radio & Electronic Services	(0481) 28837
Avon	Booth Holdings Ltd	(02217) 2402	**North East**	Alvtronics	(0632) 683418

Thanet Agents (phone first all evening weekends only except Scotland)
Scotland – Jack GM6 GEC 031-657 2430 (daytime) 031-665 2429 (evenings)
Midlands – Tony G8AVH 021 329 2305
Wales – Tony GW3 FKO (0874) 2772 or (0874) 3992
North West – Gordon G3LEQ Knutsford (0565) 4040 Ansaphone available

We welcome Access

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COMING SOON
IC 740 The set to beat them all

AMATEUR ELECTRONICS UK

Your number one source for YAESU MUSEN

G3FIK

YAESU

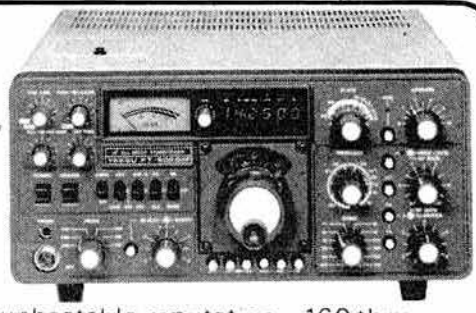
FT-ONE SUPER HF TRANSCEIVER

The ultimate in HF transceivers–
–the new FT-ONE provides continuous RX coverage of 150KHz–30MHz plus all nine amateur bands (160 thru 10m). All mode operation LSB, USB, CW, FSK, AM, *FM • 10 VFO system • **FULL** break-in on CW • audio peak filter • notch filter • variable bandwidth and IF shift • keyboard scanning and entry • RX dynamic range over 95 dB! and **NO** band switch!!! *OPTIONAL

FT-101ZD Mk III

YAESU's FT-101ZD **WITH FM** is the most popular HF rig on the market thanks to its very comprehensive specification and competitive price. Incorporates notch filter, audio peak filter, variable IF bandwidth plus many other features.

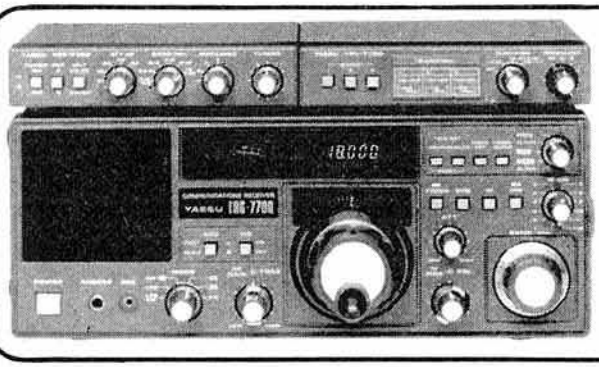
FT-902DM Competition grade HF transceiver



The YAESU world famous pace-setter with the acknowledged unbeatable reputation. 160 thru 10 metres including the new WARC bands. All-mode capability, SSB, CW, AM, FSK **and FM** transmit and receive. Teamed with the FTV-901R transverter coverage extends to 144 & 430MHz.

FT-707 All solid-state HF mobile transceiver

The definitive HF mobile rig, digital, variable IF bandwidth, 100 watts PEP SSB, AM, CW (pictured here with 12 channel memory VFO) Latest bands



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.

KEEP AHEAD WITH THE NEW FT-102!

Once again YAESU lead the field with the exciting new FT-102 HF transceiver– no other manufacturer offers so many innovative features.

Better Dynamic Range
The extra high-level receiver front end uses 24 VDC for both RF amplifier and mixer circuits, allowing an extremely wide dynamic range for solid copy of the weak signals even in the weekend crowds. For ultra clear quality on strong signals or noisy bands the high voltage JFET RF amplifier can be simply bypassed via a front panel switch, boosting dynamic range beyond 100dB. A PLL system using six narrow band VCOs provides exceptionally clean local signals on all bands for both transmit and receive.

Total IF Flexibility
An extremely versatile IF Shift/Width system, using friction-linked concentric controls and a totally unique circuit design, gives the operator an infinite choice of bandwidths between 2.7kHz and 500Hz, which can then be tuned across the signal to the portion that provides the best copy sans QRM, even in a crowded band. A wide variety of crystal filters for fixed IF bandwidths are also available as options for both parallel and cascaded configurations. But that's not all; the 455kHz third IF also allows an extremely effective IF notch tunable across the selected passband to remove interfering carriers, while an independent audio peak filter can also be activated for single-signal CW reception.

New Noise Blanker
The new noise blanker design in the FT-102 enables front panel control of the blanking pulse width, substantially increasing the number of types of noise interference that can be blanked, and vastly improving the utility of the noise blanker for all types of operation.

Commercial Quality Transmitter
The FT-102 represents significant strides in the advancement of amateur transmitter signal quality, introducing to amateur radio design concepts that have previously been restricted to top-of-the-line commercial transmitters; far above and beyond government standards in both freedom from distortion and purity of emissions.

Transmitter Audio Tailoring
The microphone amplifier circuit incorporates a tunable audio network which can be adjusted by the operator to tailor the transmitter response to his individual voice characteristics before the signal is applied to the superb internal RF speech processor.

IF Transmit Monitor
An extra product detector allows audio monitoring of the transmitter IF signal, which, along with the dual meters on the front panel, enables precise setting of the speech processor and transmit audio so that the operator knows exactly what signal is being put on the air in all modes. A new "peak hold" system is incorporated into the ALC metering circuit to further take the guesswork out of transmitter adjustment.

New Purity Standard
Three 6146B final tubes in a specifically configured circuit provide a freedom from IMD products and an overall purity of emission unattainable in two-tube and transistor designs, while a new DC fan motor gives whisper-quiet cooling as a standard feature. For the amateur who wants a truly professional quality signal, the answer is the Yaesu FT-102.

New VFO Design
Using a new IC module developed especially for Yaesu, the VFO in the FT-102 exhibits exceptional stability under all operating conditions.

ANCILLARY EQUIPMENT

SP-102 EXTERNAL SPEAKER/AUDIO FILTER
The SP-102 features a large high-fidelity speaker with selectable low- and high-cut audio filters allowing twelve possible response curves. Headphones may also be connected to the SP-102 to take advantage of the filtering feature, which allows audio tailoring for each bandwidth and mode of operation to obtain optimum readability under a variety of conditions.

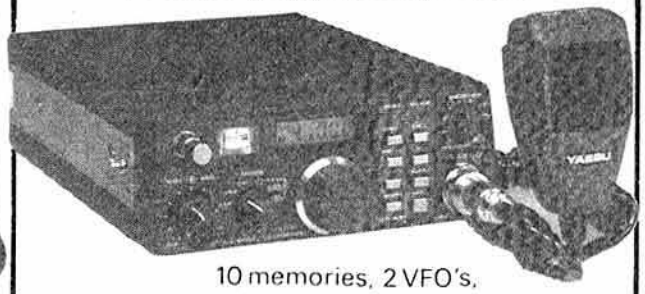
FC-102 1.2 KW ANTENNA COUPLER

FV-102DM SYNTHESIZED, SCANNING EXTERNAL VFO

NEW! FT-230R 25watt 2m FM mobile

- Two independent VFO's
- 10 memories ● Priority function
- Memory and band scan
- 12.5/25 KHz steps
- Large LCD readout.

FT-290R All-mode 2m portable



10 memories, 2 VFO's,
LCD display, C size battery,
easy car mounting tray, 2·5 watts out.

AGENTS
North West – Thanet Electronics Ltd. Gordon, G3LEQ, Knutsford (0565) 4040
Wales & West – Ross Clare, GW3NWS, Gwent (0633) 880 146
East Anglia – Amateur Electronics UK, East Anglia, Dr. T. Thirst (TIM) G4CTT, Norwich 0603 66189
North East – North East Amateur Radio, Darlington 0325 55969
Shropshire – Syd Poole G3IMP, Newport, Salop 0952 814275

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For full details of these new and exciting models, send today for the latest YAESU PRICE LIST & LEAFLETS. All you need do to obtain the latest information about these exciting developments from the World's No.1 manufacturer of amateur radio equipment is to send 36p in stamps and as an added bonus you will get our credit voucher value £3·60 – a 10 to 1 winner!

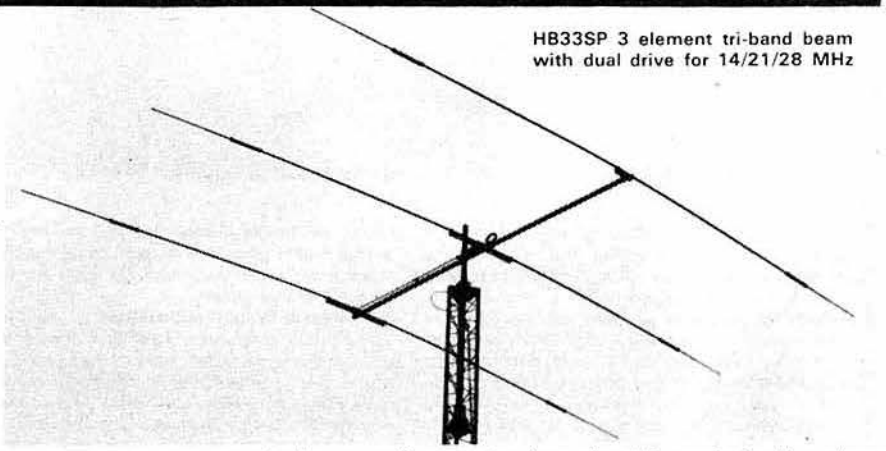
As factory appointed distributors we offer you-widest choice, largest stocks, quickest deal and fast sure service right through-

TET ANTENNA SYSTEMS

THE ANTENNA WITH THE DIFFERENCE

TET HF antennas are unique in that they employ dual driven elements with the following distinct advantages—

- **Improved gain over conventional arrays.**
- **Broader bandwidth with lower SWR.**
- **Enhanced front to back ratio.**
- **Better matching into solid state transceivers without an A.T.U.**
- **High power handling capacity.**



HB33SP 3 element tri-band beam with dual drive for 14/21/28 MHz

TET manufacture an exciting range of multi-element HF beams including superb monobanders plus HF verticals. Also there is a full range of VHF/UHF antennas most of which have multi-element drive or distinctive technical features.

Model	Description	incl. VAT	Carriage
HB10F2T	2 Ele. Mono Band Beams for 10 Meter Band	50.75	2.75
HB10F3T	3 Ele. Mono Band Beams for 10 Meter Band	73.79	2.75
HB15F2T	2 Ele. Mono Band Beams for 15 Meter Band	57.21	2.75
HB15F3T	3 Ele. Mono Band Beams for 15 Meter Band	88.49	2.75
HB34D	4 Ele. Tri Band Beams for 10/15/20 Meter Band	202.69	5.87
HB23SP	2 Ele. Tri Band Beams for 10/15/20 Meter Band	128.80	2.75
HB33SP	3 Ele. Tri Band Beams for 10/15/20 Meter Bands	189.23	4.60
MV3BH	Vertical Antenna for 10/15/20 Meter Band	40.25	1.75
MV4BH	Vertical Antenna for 10/15/20/40 Meter Band	49.50	1.75
MV5BH	Vertical Antenna for 10/15/20/40/80 Meter Band	71.25	1.75
MLA4	Loop Antenna for 10/15/40/80 Meter Band	105.60	2.10

YOUR LOCAL TET STOCKISTS

Amateur Radio Exchange,
373 Uxbridge Road,
Acton, London W3

Amcomm Services,
194A Northolt Road,
South Harrow, Middlesex

Bredhurst Electronics,
High Street, Handcross,
Haywards Heath,
West Sussex RH17 6BW

Stephens James Ltd.,
47 Warrington Road,
Leigh, Lancs. WN7 3EA

Uppington Tele Radio,
12-14 Pennywell Road,
Bristol BS5 0JT

- Full range of VHF/UHF Beams now in stock — an S.A.E. for full details please

TET SOLE AGENTS

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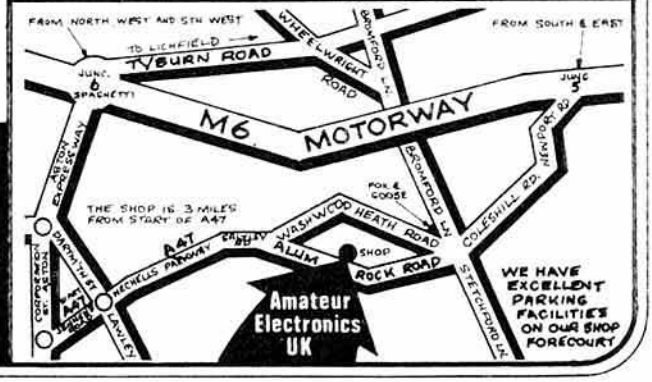

Amateur Electronics UK
504-516 Alum Rock Road · Birmingham 8
Telephone: 021-327 1497 or 021-327 6313
Telex: 334312 PERLEC G
Opening hours: 9.30 to 5.30 Tues. to Sat. continuous – CLOSED all day Monday.

WATERS & STANTON ELECTRONICS

18/20 MAIN ROAD, HOCKLEY, ESSEX. Tel: (0702) 206835

Dear Customer,
This month I've put together a selection of items that I think you'll agree offers some of the best values in amateur radio today. The prices are unbeatable and the performance and quality is excellent. All come with a full 12 months warranty backed up by our own service department. We really do try and be as competitive as we can on prices but we will never allow our margins to fall below the level at which we can offer an honest after sales service throughout the expected life of a rig. That way, not only do we get more customers we also keep more customers.

Peter Waters

2M and 70cms — FDK — — — — THE SENSIBLE APPROACH

70cms EXPANDER £199 2m M750E £289 PS750 AC PSU £66

AMAZING AZDEN PCS 300

£179

3 watts
144-146MHz
8 memories
12½ kHz steps
S-meter
Scanning
ni-cads
AC charger

NEW! Squeeze Key £59

* 220v AC 13·8v DC
* Built-in Speaker
* Speed & Volume controls
* Tone & Weight controls
* Full 12 months warranty

FDK THE NUMBER ONE FM RIG

M700EX
25 WATTS £199

Every so often a classic is born that outlasts and outperforms the competition. In FM radio the M700EX is just such a rig. It's the simplicity of design combined with rugged and total reliability plus a power output in excess of 25 watts that make it a rig of technical excellence. Then consider that it costs under £200, has scanning, and you'll start to see how it so quickly became Britain's number one selling FM rig. Send for colour leaflet today and learn more about the M700EX classic design.

WELZ—IS THERE REALLY ANY OTHER CHOICE?

SP-45M SWR/PWR METER £45
The SP-45M has been designed for the VHF/UHF enthusiast who requires the means of accurately measuring true rf power and swr. The completely flat response means instant measurement from 140-470MHz. Full scale ranges of 3, 20 and 100 watts cater for most requirements.

SP-15M Limited quantity in stock £29.95

CH-20N COAX SWITCH—Rated to 1·3GHz!
Here's a switch that is a must for UHF. Fitted "N" sockets it has an insertion loss of less than 0·1dB up to 1,300MHz and cross talk better than 50dB. There is certainly nothing else on the market that can touch this performance at this price! £27.95

CH-20A As above with S0239 £15.95

Max power 1kW
Freq range 1·8MHz-160MHz

THE SUPERB SP200
EVERY SHACK SHOULD HAVE ONE!

£59 inc VAT

The SP200 is a highly reliable and accurate RF power and in-line SWR meter. Its specially designed sensing head has a flat response from 1·8MHz to 160MHz requiring no calibration. Simply connect it in the aerial line and whether you are on 160 metres or 2 metres, it will read true RF power. Also incorporated is a 2-way aerial switch and a 3-range power selector covering 20 watts, 200 watts and 1kW.

WATERS & STANTON ELECTRONICS

18-20, MAIN ROAD, HOCKLEY, ESSEX TEL: (0702) 206835 204584

		Price Inc. VAT	Carr. & Ins.
FDK RANGE			
M.700EX	2m FM 25 watt.	199.00	n/c
M.750E	2m FM/SSB/CW 10w.	289.00	n/c
Expander	70cm transverter	199.00	n/c
PS750	230v AC power supply	66.00	n/c
Palm II	2m FM 6 channel	109.00	n/c
Palm IV	70cm FM 6 channel	125.00	n/c
TB1	1750Hz tone burst	10.00	0.50
TM56B	2m FM 230v/12v DC scanner	89.00	n/c
TM56B	Marine version	89.00	n/c
FDK	12v DC leads	2.75	0.65
CC2	Case for Palm II/IV	6.75	0.75
BC2	230v AC charger	4.50	0.75
BB2	"AA" size battery case	5.00	0.75
BT2	Ni-cad battery pack	12.00	0.75
Xtals	for Palm II and Palm IV	3.00	0.25
Xtals	for TM56B	3.00	0.25
T1200	2m synthesised handheld	159.00	n/c
SNAP-1	Joining plates. M750/Expander	7.95	1.00
AZDEN RANGE			
PCS3000	25w 2m FM trans.	219.00	n/c
PCS300	2m synthesised handheld	184.00	n/c
ECK	5m cable kit	25.00	n/c
AS006	Mobile extension speaker	8.95	1.00
DX-354	Deluxe base station mic.	29.00	1.50
WELZ PROFESSIONAL POWER/ SWR METERS & ACCESSORIES			
SP200	1-8-160MHz 20w-200w-1kw	59.95	n/c
SP300	1-8-500MHz 20w-200w-1kw	79.95	n/c
SP400	130-500MHz 5w-20w-150w	59.95	n/c
SP15M	1-8-160MHz 5w-20w-200w	29.95	n/c
AC38	3-5-30MHz Coax ATU	59.00	n/c
CT15A	50w dummy load	6.95	0.75
CT15N	15/50w dum load. N Plug	11.95	0.75
CT150	150/400w dummy load	31.00	n/c
CT300	300/kw dummy load	43.00	n/c
CH20A	2 way coax switch	15.95	n/c
CH20N	2 way coax switch "N"	27.95	n/c
CT-03N	3w dummy load 1-3GHz	24.95	n/c
ADONIS MICROPHONES			
MM202S	Safety mic. Lapel type	20.95	1.00
MM202HD	Safety mic. head band	29.00	1.00
MM202HM	Headphone & Mic.	39.00	1.00
NEW AM303	Base station mic.	27.00	1.00
NEW AM503	Base station mic.	35.00	1.00
AM802	Base station mic.	49.00	1.00
TRIO			
NEW TS930S	Solid state transceiver	1,098.00	n/c
TS830S	160-10m transceiver	694.00	n/c
VFO230	Digital VFO	215.00	5.00
AT230	All band ATU	119.00	5.00
SP230	External speaker unit	34.95	1.75
DS2	Optional dc pack	43.95	1.75
DFC230	Digital remote controller	179.00	1.75
YK88C	500Hz CW filter	29.60	0.75
YK88CN	270Hz CW filter	32.60	0.75
SM220	Station monitor scope	198.00	5.00
BS8	Panoramic display module	44.85	1.50
TS530S	160-10m transceiver	534.00	n/c
VFO240	External VFO	92.50	5.00
TS130S	8 band 200w pep mobile	525.00	n/c
TS130V	8 band 20w pep mobile	445.00	n/c
TL120	200w pep linear for TS120V	144.00	2.00
MB100	Mobile mount for TS130	17.00	1.50
VFO120	External VFO	85.00	2.00
SP120	Base station speaker	23.00	2.00
SP40	New mobile speaker unit	12.40	1.00
AT130	100w antenna tuner	79.12	1.50
PS20	AC power supply 4 amps	49.45	3.00
PS30	AC power supply 20 amps	88.50	5.00
MA5	Trio 5 band mobile aerial	88.75	3.25
MC50	Deluxe desk mic.	25.75	1.50
MC35S	Fist microphone 50k	13.80	0.75
MC30S	Fist microphone 500ohm	13.80	0.75
MC40S	Up/down microphone	13.80	0.75
LF30A	HF low pass filter	17.90	1.00
RD300	1kw dummy load	52.20	2.00
NEW TS780	2m/70cm transceiver	748.00	n/c
TR9000	2m multimode transceiver	359.00	n/c
TR9130	2m multimode 25w	395.00	n/c
BO9	Base plinth for TR9000	34.95	1.50
TR7730	Compact 25w 2m FM tcvr	247.00	2.00
TR7800	2m FM 25w transceiver	257.00	2.00
TR2300	2m FM portable tcvr	166.75	2.00
VB2300	10w amplifier for TR2300	58.00	1.50
MB2	Mobile mount	17.70	1.00
RA1	Rubber flexible antenna	6.90	0.75
PS1200	AC power supply unit & charger	29.50	1.50
NEW TR2500	Compact 2m FM h'held	207.00	2.50
ST2	Base stand charger	46.00	1.75
SC4	Soft case	12.00	0.75
MS1	Mobile stand/trickle chgr	28.00	1.25
SMC25	Speaker microphone	14.50	0.75
PB25	Spare battery pack	22.30	0.75
LH2	Deluxe leather case	21.30	0.75
TR8400	70cm FM mobile tcvr	299.00	2.00
PS10	Base station power supply	64.00	2.50
TR9500	70cm multimode tcvr	449.00	n/c
PL1	Charger lead for TR2300	1.30	0.75
R1000	Synthesised 200kHz-30MHz receiver	297.00	n/c
SP100	External speaker unit	26.90	2.00
HC10	Digital station clock	58.75	1.50
HS5	Deluxe headphones	21.85	1.25
HS4	Economy headphones	10.35	1.25
NEW R600	Synthesised 150kHz-30MHz receiver	235.00	n/c
DM81	Dip resonance meter	60.00	1.50
DL705	Digital multimeter	80.00	1.50
MC76	Case for DL705	4.95	1.00

SERVICE

"YES IT DOES GO WRONG SOMETIMES"

Even the best equipment goes wrong and you want to be in a position whereby you are assured that any faults can be rectified quickly and efficiently. At Hockley we have a well equipped, full-time service department to give you just that re-assurance. It's only when things go wrong that you begin to tell the "men from the boys" in the retailing world. Our policy is quite simple. We will service any equipment that we sell both in and out of warranty and do our utmost to get the work completed as fast as is humanly possible. Minor faults we will try and do whilst you wait but do please telephone before making a journey to us so that we can make sure it can be fitted into our day's schedule.

YAESU			
NEW FT1	Deluxe solid state tcvr	1,295.00	n/c
KEYT901	Curtis keyer	23.00	0.75
DCT1	DC lead	6.50	0.75
RAMT1	Memory board	10.00	0.75
FMUT1	F.M. Unit	t.b.a.	0.75
XF8.9KCN	300Hz CW filter	15.35	0.75
XF8.9KC	600Hz CW filter	15.35	0.75
XF8.9KA	6kHz AM filter	15.35	0.75
XF10.7KC	CW filter	13.80	0.75
FT902DM	9 band AM/FM transceiver	885.00	n/c
FT902DE	9 band transceiver	790.00	n/c
FC902	9 band atu SWR/PWR etc	135.00	5.00
FTV901R(2)	Transverter fitted 2m mod	285.00	5.00
FTV901R	T'verter main frame only	195.00	5.00
430TV	70cms module for tvtr	185.00	2.00
144TV	2m module for transverter	100.00	2.00
70TV	4m module for transverter	80.00	2.00
YO91P	Monitor scope with pan. adaptor	330.00	5.00
FV901DM	Remote vfo for 901	260.00	5.00
SP901	External speaker	31.00	2.00
FL2100Z	160-10m 1200w linear	425.00	n/c
FT101ZFM	160-10m 9 band transc.	590.00	n/c
FT101ZDFM	As above with digital readout	665.00	n/c
DCT101Z	12v DC adaptor	42.50	1.50
FV101Z	Remote VFO for FT101Z/ZD	112.00	5.00
FV101DM	External Digital VFO	249.00	5.00
FANT101	Fan for 101 series	13.80	1.00
FT707	80-10m 8 band tcvr	569.00	n/c
FP707	230v AC for FT707	125.00	5.00
MR7	Metal rack for FT707	15.70	2.00
MMB2	Mobile mounting bracket	16.00	1.50
FV707DM	Digital VFO	203.00	5.00
FL110	100w linear amplifier	155.00	5.00
FRG7	General Coverage rcvr	199.00	n/c
FRG7700	Gen. co. receiver	329.00	n/c
MEMGR7700	Memory module	90.00	1.00
DCRG7700	DC modification kit	1.15	0.50
FRT7700	Antenna tuner	37.00	1.50
FF5	Low pass filter	9.95	0.75
VHF Converters for FRG7700:			
	FRV7700 'A' 118-130; 130-140; 140-150MHz	69.75	1.50
	FRV7700 'B' 118-130; 140-150; 50-59MHz	75.50	1.50
	FRV7700 'C' 140-150; 150-160; 160-170MHz	65.95	1.50
	FRV7700 'D' 118-130; 140-150; 70-80MHz	72.45	1.50
	FRV7700 'E' 118-130; 140-150; 150-160MHz	71.30	1.50
	FRV7700 'F' 118-130; 150-160; 170-180MHz	71.30	1.50
FT208R	2½watt 2m h'held tcvr	209.00	1.50
FT708R	1 watt 70cms h'held tcvr	219.00	1.50
FNB2	Nicad battery pack	17.25	0.75
NC9C	Slow charger unit	8.00	0.75
PA3	12v charger unit	13.40	0.75
MMB10	Mobile bracket	6.50	0.75
FT290R	2m all-mode portable	249.00	n/c
FT790R	70cms all-mode portable	t.b.a.	1.00
NC11C	Charger for FT290R	8.00	1.00
CSC-1	Carrying case	3.45	0.75
MMB-11	Mobile mounting bracket	22.25	1.50
FL2010	10 watt linear	64.00	2.00
NC/WSE	2amp hour ni-cad pack	20.00	1.75
FT480R	2m 10 watt SSB/CW/FM transceiver	379.00	n/c
FP80A	230v AC power supply	63.25	2.00
FL2050	50 watt linear	126.50	2.00
FT780R	70cms all-mode tcvr	449.00	2.00
YAESU ACCESSORIES			
YM21	Hand mic. 600ohm 4 pin	13.80	0.75
YM24A	Hand mic. 2K ohm 6 pin	16.85	0.75
YM34	Desk mic. 500/50K ohm 8 pin	21.45	1.50
YM35	Hand mic. 8 pin scanning. 600ohm	13.80	0.75
YM36	Hand mic. 8 pin n/c. 600ohm	13.05	0.75
YM37	Hand mic. 600ohm 8 pin	6.90	0.75
YM38	Desk mic. 600/50K ohm 8 pin	24.90	1.50
YM39	600ohm 7 pin hand speaker/mic.	14.95	0.75
YE7A	Hand mic. 600ohm 4 pin	6.90	0.75
YD148A	Desk mic. 600/50k ohm 4 pin	21.10	1.50
YD844A	Desk mic. 600/50k ohm	25.30	1.50
FP4	230v/4 amp 12v psu	42.95	2.00
FP12	230v/12 amp 12v psu	86.25	5.00
YH55	8ohm communication headphones	10.00	1.00
YH77	Lightweight headphones	10.00	1.00
QTR24D	24 hour World clock	28.00	1.50
FF501DX	Low pass filter 2kw	23.00	1.50
YP150Z	Dummy load/wattmeter	92.00	1.50
ICOM			
IC730	HF Mobile tcvr 100W	586.00	n/c
FL30	SSB Pass band tune filter	24.70	0.75
FL44	Hi Q 455kHz xtal filter	t.b.a.	0.75
FL45	CW Narrow xtal filter	34.20	0.75
EX202	LDA unit for above	t.b.a.	0.75
EX203	CW Audio filter	11.60	0.75
EX205	Transverter controller	10.50	1.00
IC720A	HF transceiver + Gen. Cov. Rcvr.	883.00	n/c
PS20	PSU for above with speaker	130.00	5.00
PS15	PSU no speaker	99.00	5.00
FL32	CW narrow filter	29.30	0.75
FL34	AM filter	23.40	0.75
BC10A/E	Mains memory backup	5.30	0.75
IC2KL	Matching HF linear 500W	839.00	n/c
IC2KLPS	PSU for above	211.00	5.00
ICAT500	1-8-30MHz auto tuner	299.00	5.00
ICAT100	3-5-30MHz auto tuner	249.00	5.00
IC45IE	70cm FM + SSB base stn	630.00	n/c
IC25IE	2m FM + SSB base stn	499.00	n/c
IC290E	2m Multimode mobile 10W	366.00	n/c
IC490E	70cm multimode mobile	445.00	n/c
IC25E	2m FM mobile 25W	259.00	n/c
IC2E	2m FM handy talky	159.00	n/c
IC4E	70cm hand portable	199.00	n/c
ICML1	10 watt mobile booster	49.00	1.00
BP5	11 volt battery pack	30.50	0.75
BP4	Battery box for 6 × AA	5.80	0.75
BP3	Standard battery pack	17.70	0.75
BP2	6 volt pack	22.00	0.75
BC30	Base charger for above	39.00	0.75
BC25	Mains charger as supplied	4.25	0.75
DC1	12 volt adaptor pack	8.40	0.75
HM9	Speaker/Microphone	12.00	0.75
CP1	Mobile charging lead	3.25	0.75
LC1/2/3	Cases each	3.50	0.75
IC202S	2m SSB portable tcvr.	169.00	n/c
IC402	70cm SSB portable tcvr.	245.00	n/c
ICSP2/3	External speaker	29.00	1.50
IC3PE	3 amp psu + speaker	64.90	1.50
ICSM2	Desk mic. 4 pin plug	29.00	1.50
ICSM5	Desk mic. 8 pin plug	29.00	1.50
ICHM3	Hand mic.	12.00	0.75
ICHM5	N/C mic. as above	20.00	0.75
ICHM7	Hand mic.	12.00	0.75
ICHM10	Scan mic.	20.00	0.75
LOWE RECEIVERS			
SRX-30	General Coverage HF receiver	158.00	n/c
SRX-30D	SRX30 with dig readout	195.00	n/c

MICROWAVE MODULES RANGE

MML28/100-3	10m 100w linear/preamp	129.95	2.00
MML70/40	4m 40 watt linear/preamp	77.00	1.25
MML70/100-S	4m 100 w linear/preamp	129.95	2.00
MML144/30L-S	1-3 w I/P 30 w O/P	65.00	1.75
MML144/40	2m 40 w linear/preamp	77.00	1.25
MML144/100-S	2m 100 w linear/preamp	129.95	2.00
MML144/100LS	2m 100 w (1 or 3w i/p)	145.00	2.00
MML432/20	70cm 20 w linear/preamp	77.00	1.25
MML432/50	70cm 50 w linear/preamp	99.00	2.00
MML432/100	70cm 100 watt linear	228.65	2.00
MML1296/10	23cm 10 watt linear	199.00	1.25
MMC435/51	70cm ATV converter	34.90	0.75
MMC435/600	70cm ATV converter	27.90	0.75
MTV435	70cm ATV 20 watt tx	149.00	1.25
MM1000	ASC11 to morse converter	59.00	1.25
MM1000KB	Morse converter with keyboard	89.00	2.00
MM2000	RTTY to TV converter	169.00	1.25
MM4000	RTTY transceiver	269.00	1.25
MM4000KB	with keyboard	299.00	2.00
MMS1	The MORSETALKER	115.00	1.25
MMS2	Advanced morse trainer	155.00	1.25
MMT28/144	10m transverter	99.00	1.25
MMT70/28	4m transverter	115.00	1.25
MMT70/144	4m transverter	115.00	1.25
MMT144/28	2m transverter	99.00	1.25
MMT432/28-S	70cm transverter	149.00	1.25
MMT432/144-R	70cm transverter	184.00	1.25
MMT1296/144	23cm transverter	184.00	2.00
MMC28/144	10m to 2m converter	27.90	0.75
MMC50/28	6m to 10m converter	27.90	0.75
MMC70/28	4m to 10m converter	27.90	0.75
MMC70/28LO	4m to 10m converter	29.90	0.75
MMC144/28	2m to 10m converter	27.90	0.75
MMC144/28LO	2m to 10m converter	29.90	0.75
MMC432/28-S	70cm to 10m converter	34.90	0.75
MMC432/144-S	70cm to 2m converter	34.90	0.75
MMC1296/28	23cm to 10m converter	32.20	0.75
MMK1296/144	23cm to 2m converter	59.80	0.75
MMK1691/137.5	1691MHz Meteosat converter	115.00	1.25
MMA28	10m low noise preamp	14.95	0.75
MMA144V	2m RF switched preamp	34.90	0.75
MMA1296	23cm low noise preamp	29.90	0.75
MMDO50/500	500MHz digital meter	69.00	0.75
MMD600P	600MHz prescaler	23.00	0.75
MMDP1	Counter amplifier/probe	11.50	0.75
MMF144	2m bandpass filter	9.90	0.75
MMF432	70cm bandpass filter	9.90	0.75
MMV1296	70cm to 23cm varactor	34.50	0.75
MMR15/10	15dB, 10 watt attenuator	9.90	0.75

DATONG

PC1	General Cov. Converter	120.75	n/c
VLF	VLF converter 28-29MHz coverage	25.30	n/c
FL1	Agile audio filter	67.85	n/c
FL2	Multi-Mode audio filter	89.70	n/c
ASP/B	Automatic r.f. clipper (Trio)	79.35	n/c
ASP/A	Automatic r.f. clipper (Yaesu)	79.35	n/c
D75	Manual r.f. speech clipper	56.35	n/c
D/0	Morse Tutor	49.45	n/c
MK	Keyboard morse sender	129.00	n/c
RFA	Broad band pre-amplifier	29.30	n/c
AD270	Active dipole (indoor mounting)	37.95	n/c
AD370	Active dipole (outdoor mounting)	51.75	n/c
MPU	Mains power unit	6.90	n/c
DC144/28	2 metre converter	35.65	n/c
Codecail 'A'	4000 link programmable codes	27.60	n/c
Codecall 'B'	4000 switch programmable codes	29.30	n/c

JAYBEAM ANTENNAS

10, 15 & 20 metre antennas

TB3	HF 3 el tribander 1kw	181.70	5.00
VR3	HF Vertical triband 1kw	46.00	4.00
4 metre antennas			
4Y/4M	4 element beam	22.42	4.00
PMH2/4M	2 way phasing harness	13.22	1.50
2 metre antennas			
DC1/WB	Wide band discone (100-470MHz)	41.40	3.00
LR1/2M	Colinear 4·3db	25.87	3.00
LR2/2M	Colinear 2·8db	21.85	3.00
C5/2M	5db glass fibre colinear	47.72	4.00
5Y/2M	5 element yagi	12.07	3.00
8Y/2M	8 element yagi	15.52	3.50
10Y/2M	10 element yagi	33.35	4.00
PBM10/2M	10 element parabeam	39.67	4.00
PBM14/2M	14 element parabeam	48.30	4.00
5XY/2M	Crossed 5 element yagi	24.72	3.50
8XY/2M	Crossed 8 element yagi	31.00	4.00
10XY/2M	Crossed 10 element yagi	40.82	4.00
X6/2M/X12/70cm	dual band crossed yagi	41.40	4.00
PMH/2C	Harness for circular pol.	8.00	1.50
Q4/2M	4 element quad yagi	25.87	3.00
Q6/2M	6 element quad yagi	33.90	4.00
Q8/2M	8 element quad yagi	39.10	4.00
D5/2M	Double 5 slot-fed yagi	21.85	3.00
D8/2M	Double 8 slot-fed yagi	29.32	4.00
SVMK/2M	Kit for vertical pol.	8.00	3.00
UGP/2M	Ground plane	10.90	2.00
HO/2M	Mobile 'halo' head only	5.15	2.00
HM/2M	Mobile 'halo' with 24" mast	5.75	2.00
PMH2/2M	2 way phasing harness	10.90	1.50
PMH4/2M	4 way phasing harness	25.30	1.50
70cm Antennas			
C8/70cm	8db glass fibre colinear	54.00	4.00
D8/70cm	Double 8 slot-fed yagi	22.40	3.00
PBM18/70cm	18 element parabeam yagi	27.60	3.00
PBM24/70cm	24 element parabeam yagi	36.80	4.00
MBM28/70cm	28 el multibeam yagi	18.40	3.00
MBM48/70cm	48 el multibeam yagi	31.00	3.00
MBM88/70cm	88 el multibeam yagi	42.55	4.00
8XY/70cm	Crossed 8 element yagi	36.80	3.00
12XY/70cm	Crossed 12 element yagi	46.00	4.00
PMH2/70cm	2 way phasing harness	9.20	1.50
PMH4/70cm	4 way phasing harness	19.55	1.50
23cm Antennas			
CR23cm	Corner reflector array	39.00	3.00
D15/1296	Double 15 slot-fed yagi	36.80	3.00
PMH2/23cm	2 way phasing harness	27.60	1.50
JAYBEAM Sundries			
DL	Double lashing chimney kit	10.78	3.00
W6	6" wall bracket (1½" mast)	3.00	2.00
W21	21" wall bracket (2" masts)	10.80	3.50
W24HD	24" wall bracket (2" masts)	15.45	4.00
SPM	16' × 1" portable masts	16.35	3.00
PME	4' extension	2.75	3.00
A4	4'6" × 1½" straight	4.30	3.00
A5	5' × 1" straight	2.80	3.00
A9	9' × 1½" straight	8.65	3.00

MAIL ORDER

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Once you've made the decision to buy you'll want to get your equipment as quickly as possible. That's why we set up a completely separate mail order department to give you exactly that kind of service. Martin Pyke is our mail order manager and his number one job is to get all goods shipped out the same day as the order is received. We can take orders right up to around 5.00 p.m. for same day despatch (with the exception of the larger items where 2.30 p.m. is the limit). Either send us your order by post using our clip out order form contained in this advert or telephone us your credit card details.

A10	10' × 2" straight	13.55	3.50
A12	12' × 2" straight	16.20	4.00
A14	14' × 2" straight	18.85	4.00
CP1	Cross-over plate 2" × 2"	3.60	1.75
JBL59/15	15" jointing sleeve	6.05	2.00
JBL29	Universal clamp	1.75	1.00
JBL30	Universal clamp	1.70	1.00
JBL53	Universal clamp	1.25	1.00
JBL58	Guy wire clamp	1.60	1.00
JBL63	Universal clamp	2.15	1.00
JBL64	Die-cast clamp	1.32	1.00
JBL65	Die-cast clamp	1.35	1.00
MBP	Mast base plate 2"	3.90	1.50

SPECIAL VHF ANTENNAS

Scan-X	65-520MHz discone rx only	16.00	3.00
LAB	Airband ground plane	11.50	2.50
LMD	Marine dipole aerial	4.80	2.00
GDX-2	Discone aerial 50-480mHz tx & rx	39.50	3.00

G-WHIP MOBILE ANTENNA RANGE

Tribander helical for 10/15/20 metres	25.80	3.00
Base mount single hole fixing + 3m cable	6.30	1.25
LF40m coil for above aerial	6.55	1.25
LF80m coil for above aerial	6.55	1.25
LF160m coil for above aerial	6.55	1.25
LF telescopic resonator whip	4.25	1.25

AERIAL ROTATORS (complete with control boxes)

CDE AR40 (5 core cable) up to 2 el. tribander	65.00	3.50
Channelmaster 9502B (3 core) up to 8 el. VHF	54.00	3.50
9523 Channelmaster alignment bearing	14.50	1.25
Jaybeam KR400 (6 core) up to 3 el. HF beams	99.00	3.50
250 Hirschmann (3 core) suits VHF aerials up to 8 el.	43.00	2.50
SL100 Alignment bearing for 250	13.50	1.50

HF ANTENNAS (Various manufacturers)

Mini-Products HQ-1 20/15/10m 2 el. 1kw "Mini-Beam	115.00	4.00
Mini-Products C4 20/15/10m vertical dipole 1kw	55.00	3.00
Mosley TD3JR20/15/10m wire dipole 600w	40.00	2.00
Mosley "Mini-Beam" 20/15/10m 2 el. beam 600 watts	99.00	4.00
Mosley TA33JR 3 band 3 el. beam 600 w	133.00	4.00
Hy-Gain 12AVQ 20/15/10m vertical 2kw	43.00	3.00
Hy-Gain 14AVQ 40-10m vertical 2kw	64.00	3.00
Hy-Gain 18AVT/WB 80-10m vertical 2kw	91.00	3.50
HF5 80-10m vertical 200 watts	48.50	3.50
Radial kit for HF5	30.50	3.00
Jaybeam TB3 HF 3 el tribander beam 2kw	181.70	5.00
Jaybeam VR3 HF vertical 2kw	46.00	4.00
Western DX-5V 5 band 2kw vertical	89.00	3.00
5-band commercial grade 1kw 80-10m dipole	39.00	2.00

VHF/UHF MONITOR RECEIVERS

SX200N	Scanning receiver	260.00	5.00
BEARCAT 220	Scanning receiver	229.00	5.00
TM56B	FM Scanner 12v DC/230v AC	89.00	2.00
Sound Air 008	8 channel FM monitor	39.00	2.00
Sound Air M161	16 channel FM monitor	39.00	2.00
SR9(A)	2m Amateur receiver 12v DC	46.00	2.00
SR9(M)	Marine band rcvr 12v DC	46.00	2.00

ANTIFERENCE (ANTENNA SPECIALISTS) MOBILE ANTENNAS

ASP201	2m ¼ wave aerial	3.95	3.00
ASP3462	70cm colinear 3db gain	8.95	3.00
K220A	Magnetic mount for above	8.95	2.00
ASP3009	2m 3db gain 5/8th wave	9.95	3.00
ASP3677	Deluxe 2m 3db gain 5/8th wave	15.95	3.00
ASP3667	Deluxe 70cms 5db gain	16.95	3.00
K220	Magnetic mount	8.95	2.00
ASPM161	'No-hole' boot mount	3.75	1.00
ASPM124	27/28MHz ¼ wave whip	18.95	3.00

HOKUSHIN RANGE (MOBILE ANTENNAS)

2E	2m 5/8 wave 3·4db gain	8.50	3.00
2NE	2m 7/8 wave 4·5db gain	14.50	3.00
10SE	28MHz whip	12.65	3.00
15SE	21MHz whip	12.65	3.00
20SE	14MHz whip	13.80	3.00
RG4M	Base for all above aerials	4.50	1.50
GSS	Gutter/boot mount	4.50	1.50
MB5	Magnetic mount with 5m coax (not 2NE)	7.95	2.00
CBA311	2m ¼ wave gutter clip aerial	5.00	3.00

SWL AERIALS & ATU's

SW69	SWL 50ft dipole 3-30MHz	24.95	1.50
004	3-30MHz 60ft dipole with 50ft coax	29.92	2.00
Mosley RD5	All band dipole	40.00	2.00
Global AT1000	SWL antenna tuning unit 0-2MHz-30MHz	31.95	2.00

AIR BAND PORTABLE MONITORS

R517	Air band portable receiver	49.50	1.50
AIR1	Soft case for R517	3.00	1.00
Crystals for R517		3.00	0.25
ATC720	Synth Air Roc 118 136MHz	TBA	

MISCELLANEOUS ITEMS

PS134	13·8v 4 amp power supply	24.95	2.00
PS125	5 amp AC power supply	29.95	2.50
PP1310	PSU 240v/13·8v DC output at 10amp protected	49.50	3.00
Global PS15	6 amp psu with meter	32.95	2.00
EK121	Katsumi Electronic keyer	29.00	1.50
EKM12	Matching side tone monitor	10.95	1.25
COK2	Morse code oscillator	6.95	0.75
HK708	Telegraph CW key (manual)	11.50	1.00
YW3	Twin SWR/Power/Field strength meter	11.95	0.75
MF210	Self powered 2m FM monitor	9.95	0.75
FX1	Deluxe station wavemeter	33.00	1.50
DM81	Solid state dip meter	60.00	1.50
Altai	Dip oscillator	47.00	1.50

MAIL ORDER SLIP to: Waters & Stanton Electronics, Main Road, Hockley, Essex.

Name..... Goods required.....

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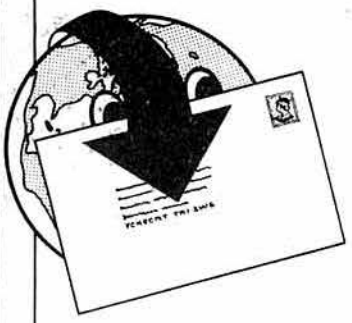

YAESU TRANSCEIVERS

FT-ONE	1,295.00
FT-902	885.00
FT-102 AM/FM	To be announced
FT-101ZD FM	665.00
FT-101ZD AM	650.00
FT-101Z FM	590.00
FT-101Z AM	575.00
FT-107	725.00
FT-707	569.00
FL-2100 Linear Amp	425.00
FT-480 VHF	379.00
FT-290 VHF	249.00
FT-230 VHF	239.00
FT-790 UHF	To be announced

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FRG-7700	329.00
FRG-7700M	409.00
FRT-7700 ATU	37.00
FRV-7700A Converter	68.00
FRV-7700B Converter	75.00
FRV-7700C Converter	65.00
FRV-7700D Converter	72.00

ICOM

IC-720A, IC-730, IC-451, IC-251, IC-290, IC-25E, PS-15, IC-2E, IC-4E — Prices on application

TRIO

TS-930, TS-530, TS-830, PS-30 — Prices on application

All other TRIO models available

MICROWAVE MODULES

MMT144/28	2M Transverter for HF Rig	99.00
MMT432/28S	70cm Transverter for HF Rig	149.00
MMT432/144R	70cm Transverter for 2M Rig	184.00
MMT70/28	4M Transverter for HF Rig	115.00
MMT70/144	4M Transverter for 2M Rig	115.00
MMT1296/144	23cm Transverter for 2M Rig	184.00
MML144/25	2M 25W Linear Amp (3W I/P)	59.00
MML144/40	2M 40W Linear Amp (10W I/P)	77.00
MML144/100S	2M 100W Linear Amp (10W I/P)	129.00
MML432/20	70cm 20W Linear Amp (3W I/P)	77.00
MML432/50	70cm/50W Linear Amp	119.00
MML432/100	70cm 10/100W Linear Amp	228.60
MM2000	RTTY to TV Converter	169.00
MM4000	RTTY Transceiver	269.00
MMC50/28	6M Converter to HF Rig	27.90
MMC70/28	4M Converter to HF Rig	27.90
MMC144/28	2M Converter to HF Rig	27.90
MMC432/28S	70cm Converter to HF Rig	34.90
MMC432/144S	70cm Converter to 2M Rig	34.90
MMC435/600	70cm ATV Converter	27.90
MMK1296/144	23cm Converter to 2M Rig	59.80
MMD050/500	500MHz Dig. Frequency Meter	69.00
MMD600P	600MHz Prescaler	23.00
MMDP1	Frequency Counter Probe	11.50
MMA28	10M Preamp	14.95
MMA144V	2M RF Switched Preamp	34.90
MMF144	2M Band Pass Filter	9.90
MMF432	70cm Band Pass Filter	9.90
MMS1	The Morse Talker	115.00

MORSE EQUIPMENT

MK704	Squeeze Paddle	10.50
HK707	Up/Down Key	10.50
HK704	Deluxe Up/Down Key	14.50

MORSE EQUIPMENT

BY1	Keyer Paddle (black)	32.00
BY2	Keyer Paddle (chrome)	39.95
BY3	Keyer Paddle (gold-plated)	92.00

ROTATORS

KR250	Kenpro Lightweight 1-1½" mast	44.95
9502B	Colorotor (Med VHF)	49.95
KR400RC	Kenpro-inc lower clamps	99.95
KR600RC	Kenpro-inc lower clamps	139.95

DESK MICROPHONES

SHURE 444D Dual Impedance	33.00
SHURE 526T Mk II Power Microphone	46.00
ADONIS AM502 Compression Mic 1 O/P	39.00
ADONIS AM601 Compression Mic + Meter 1 O/P	49.00
ADONIS AM802 Compression Mic + Meter 3 O/P	59.00

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ADONIS AM 202S Clip-on	20.95
ADONIS AM 202F Swan Neck + Up/Down Buttons	30.00
ADONIS AM 202H Head Band + Up/Down Buttons	30.95

DRAE PRODUCTS — fully protected power supplies

4 Amp	27.95	12 Amp	69.00
6 Amp	44.95	24 Amp	99.00
VHF Wavemeter 130-450MHz			24.95

Morse Tutor — new product

TEST EQUIPMENT

AT145	Packer VHF Wavemeter	19.95
Welz SP15M	1.8-150MHz—200W	29.00
DM81 Trio Dip Meter		63.25

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AMATEUR RADIO EXCHANGE

ONCE UPON A TIME, THERE WAS THE H R O...

Customers often ask, after they have decided on a new rig, whether it's the most up-to-date equipment on the market, or whether there is something even more exciting lurking round the corner...and our honest answer to that question has to be that, however sophisticated the rig you buy, there is **always** something newer on some manufacturer's launching pad. The trouble is, if you insist on waiting for the ultimate rig, you'll miss out on a lot of superb equipment in the meantime.

The recent progress in communications receivers is a case in point. About seven years ago YAESU introduced an absolute gem of a receiver, the FRG-7, which sold by the thousand world-wide, and is still in demand today as sheer good value for money when funds are limited.

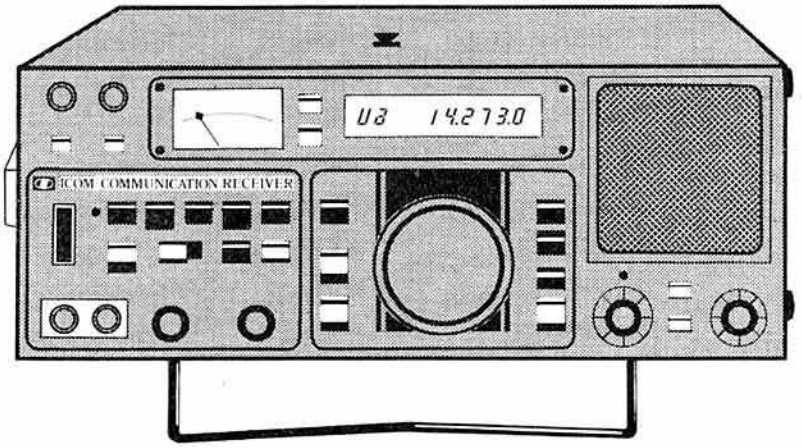
Then, however, TRIO/KENWOOD burst upon the market with their even more remarkable R-1000...and we gather that lots of tranquillisers had to be rushed to Matlock when a certain firm of "sole importers" realised to what extent we at Amateur Radio Exchange had jumped the official gun on the launch of that one!

YAESU's answer was not long delayed, and came in the form of the FRG-7700 which outclassed even the R-1000 and has been, until today, the market-leading receiver...

...until today, and the entry of a new name into the receiver field, namely ICOM, who are about to announce a really outstanding new model which we had the opportunity to see and try on our recent trip to Japan. Having done so, we are convinced that everyone who wants the best in today's receiver technology will now be asking for ICOM. Here are just a few of its key features.

- **Tunable from 100kc to 30MHz**
- **AM/SSB/FM right across the range**
- **Pass band tuning • Scan facility**
- **Notch filter • Two VFO's**

Whether you want to buy outright or part-exchange your existing receiver—FRG-7700, R-1000, FRG-7 or even an old HRO—phone or call in without delay and be one of the first to enjoy a remarkable new experience in radio reception.



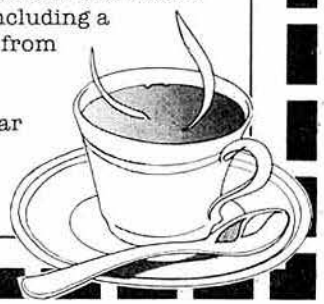
OTHER RANGES AND PRODUCTS

Standard • Welz • Datong • Sota • Packer • Wood & Douglas Kits

Antennas and accessories by Cushcraft, G-Whip, Jaybeam etc.
Scanning receivers by Bearcat, also the SX200N and AR-22.
Tono VHF amps. Tasco CW readers.
Wraase SSTV kits etc etc.

The further fruits of our trip to the Land of the Rising Sun are a whole new generation of scanning receivers, all synthesised (of course!), for UHF, VHF and Low Band, with digital readout, scanning in 5/10/12.5/25kc steps, and in hand-held and mobile format. Also airband receivers, including a professional-type model tunable from 118 to 136MHz on AM.

All of these should start to arrive in August, so come and hear all about it...and have a cup of Brenda's coffee while you're listening!



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Bredhurst electronics

TRIO R-600 £235.00

TRIO		£	Carr.
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TS830S	160-10m Transceiver 9 Bands	694.00	(—)
VFO230	Digital V.F.O. with Memories	215.00	(2.00)
AT230	All Band ATU/Power Meter	119.00	(2.00)
SP230	External Speaker Unit	34.96	(1.50)
DFC230	Dig. Frequency Remote Controller	179.00	(1.50)
YK88C	500Hz CW Filter	29.60	(0.50)
YK88CN	270Hz CW Filter	32.66	(0.50)
TS530S	160-10m Transceiver	534.00	(—)
TS130S	8 Band 200W Pep Transceiver	525.00	(—)
TS130V	8 Band 20W Pep Transceiver	445.00	(—)
VFO120	External V.F.O.	85.00	(1.50)
TL120	200W Pep Linear for TS120V	144.00	(1.50)
MB100	Mobile Mount for TS130/120	17.00	(1.50)
SP120	Base Station External Speaker	23.00	(1.50)
AT130	100W Antenna Tuner	79.00	(1.50)
PS20	AC Power Supply - TS130V	49.45	(2.50)
PS30	AC Power Supply - TS130S	88.50	(5.00)
MA5	5 Band Mobile Aerial System	86.00	(5.00)
MC50	Dual Impedance Desk Microphone	25.76	(1.50)
MC35S	Fist Microphone 50K ohm IMP	13.80	(0.75)
MC30S	Fist Microphone 500 ohm IMP	13.80	(0.75)
LF30A	HF Low Pass Filter 1kW	17.90	(1.00)
TR9130	2M Multimode	395.00	(—)
TS9500	70cm Multimode	449.00	(—)
TR9000	2M Synthesised Multimode	359.00	(—)
RC9	Base Plinth for TR9000	34.90	(1.50)
TR7800	2M Synthesised FM Mobile 25W	249.00	(—)
TR7730	2M Synth FM Compact Mobile 25W	247.00	(—)
TR2300	2M Synthesised FM Portable	166.00	(—)
VB2300	10W Amplifier for TR2300	58.00	(1.50)
MB2	Mobile Mount for TR2300	17.71	(1.50)
RA1	Flexible Rubber Antenna for TR2300	6.90	(0.50)
TR2500	2M FM Synthesised Handheld	207.00	(—)
ST2	Base Stand	46.00	(1.50)
SC4	Soft Case	12.19	(0.50)
SMC25	Speaker Mic	14.49	(1.00)
PB25	Spare battery pack	22.30	(1.00)
MS1	Mobile Stand	28.20	(1.00)
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PS10	Base Station Power Supply for 8400	64.00	(2.00)
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SP100	External Speaker Unit	26.90	(1.50)
HC10	Digital Station World Time Clock	58.80	(1.50)
HS5	Deluxe Headphones	21.85	(1.00)
HS4	Economy Headphones	10.35	(1.00)
SP40	Mobile External Speaker	12.40	(1.50)
ICOM			
IC740	HF Mobile Transceiver 8 Band	599.00	(—)
IC720A	HF Transceiver & Gen. Cov. Receiver	883.00	(—)
PS15	Power Supply for 720A	99.00	(3.00)
IC251E	2M Multimode Base Station	499.00	(—)
IC25E	2M Synth Compact 25W Mobile	219.00	(—)
IC290E	2M Multimode Mobile	366.00	(—)
IC2E	2M FM Synthesised Handheld	159.00	(—)
IC L1/2/3	Soft Cases	3.50	(0.50)
IC HM9	Speaker/Microphone	12.00	(0.75)
IC BC30	230V AC Base Charger and Hod	39.00	(1.50)
IC BC25	230V AC Trickle Charger	4.25	(0.75)
IC CP1	Car Charging Lead	3.20	(0.50)
IC BP2	6V Nicad Pack for IC2E	22.00	(1.00)
IC BP3	9V Nicad Pack for IC2E	17.70	(1.00)
IC BP4	Empty Case for 6 × AA Nicads	5.80	(0.75)
IC BP5	11.5V Nicad Pack for IC2E	30.50	(1.00)
IC DC1	12V Adaptor Pack for IC2E	8.40	(0.75)
IC ML1	10W Booster	49.00	(1.00)
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Trio Low Pass Filter LF30A 1kW		17.90	(1.00)
Yaesu Low Pass Filter FF501 DX 1kW		23.00	(1.00)
HP4A High Pass Filter TV Down Lead		5.95	(—)
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T Piece Polyprop Dipole Centre		1.00	(0.30)
Ceramic Strain Insulators		0.40	(0.10)
Small Egg Insulators		0.40	(0.10)
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75 ohm Twin Feeder - Light Duty - Per Meter		0.16	(0.04)
300 ohm Twin Feeder - Per meter		0.14	(0.04)
URM67 Low Loss 50 ohm Coax - Per Meter		0.60	(0.20)
UR76 50 ohm Coax - Per Meter		0.25	(0.05)

Pleasesend total postage indicated. Any excess will be refunded

RECEIVER			
R517	Airband Handheld	49.50	(1.00)
AR22	Amateur Band synthesised handheld	89.00	(1.00)
AR22M	Maine Band synthesised handheld	95.00	(1.00)
SX200N	Scanning VHF-UHF receiver	259.00	(—)
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'C' Nicads 2-2 Amp-Hr (FT290R etc)		2.50	(—)
'AA' Nicads 500 mAmp-Hr		1.00	(—)
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DL30	PL259 connector 30W max	5.00	(0.50)
DL60	PL259 connector 60W max	8.80	(0.75)
DL60N	N type connector 60W max	16.50	(0.75)
WELZ CT300 1 kW max		42.95	(1.50)

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BNC Plug to SO239	1.75
BNC Socket to PL259	1.75
BNC Socket to SO239	1.75
BNC Socket to N plug	3.50
BNC Plug to N socket	3.50
SO239 to N plug	3.00
PL259 to N socket	3.00

Minimum postage 30p—any no. of connectors

DATONG D70 MORSE TUTOR £49.45 inc VAT & carriage

DATONG PRODUCTS			
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VLF	Very Low Frequency Converter	25.30	(—)
FL1	Frequency Agile Converter	67.85	(—)
FL2	Multi mode Audio Filter	89.70	(—)
ASP	Auto R.F. Speech Clipper (Trio or Yaesu Plug)	79.35	(—)
D75	Manually controlled R.F. Speech Clipper	56.35	(—)
RFC/M	R.F. Speech Clipper module	26.45	(—)
D70	Morse Tutor	49.45	(—)
AD270	Indoor Active Filter (inc PSU)	42.55	(—)
AD370	Outdoor Active Filter (inc PSU)	56.35	(—)
MK	Keyboard morse sender	129.00	(—)
Codecall	Selective calling device (Link prog)	27.60	(—)
"	" " " (Switch prog)	29.32	(—)
RFA	Wideband preamplifier	29.32	(—)
MPU	Mains power unit	6.90	(—)
MORSE EQUIPMENT			
MK704	Squeeze Paddle	10.50	(0.50)
HK707	Up/Down Key	10.50	(0.50)
	Practise Oscillator	8.75	(0.50)
EK121	Elbug	33.00	(0.50)
EKM1A	Matching Side Tone Monitor	10.95	(0.50)
EK150	Electronic Keyer	74.00	(—)
ROTATORS			
KR250	Kenpro Lightweight 1-1½" mast	44.95	(2.00)
Hirschman	RO250 VHF Rotor	49.95	(2.00)
9502B	Colorotor (Med. VHF)	49.95	(2.00)
KR400RC	Kenpro - inc lower clamps	99.95	(2.50)
KR600RC	Kenpro - inc lower clamps	139.95	(3.00)
DESK MICROPHONES			
SHURE 444D Dual Impedance		33.00	(1.50)
SHURE 526T Mk II Power Microphone		46.00	(1.50)
ADONIS AM502 Compression Mic 1 O/P		39.00	(—)
ADONIS AM601 Compression Mic + Meter 1 O/P		49.00	(—)
ADONIS AM802 Compression Mic + Meter 3 O/P		59.00	(—)
MOBILE SAFETY MICROPHONES			
ADONIS AM 2025 Clip on		22.00	(—)
ADONIS AM 202F Swan Neck + Up/Down Buttons		30.00	(—)
ADONIS AM 202H Head Band + Up/Down Buttons		30.95	(—)

DRAE PRODUCTS - fully protected power supplies

4 Amp 27.95 (1.50) 12 Amp 69.00 (2.00)
6 Amp 44.95 (2.00) 24 Amp 99.00 (3.00)

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TEST EQUIPMENT		
Drae VHF Wavemeter 130-450MHz	24.95	(—)
FXI Wavemeter 250MHz MAX	33.00	(0.75)
DM81 Trio Dip Meter	59.75	(0.75)
MMD50/500 Dig. Frequency meter (500MHz)	69.00	(0.75)
Co-AXIAL SWITCH		
2 Way Diecast (U.H.F.)	10.00	(0.50)
2 Way Toggle (V.H.F.)	5.00	(0.50)
HELICAL ANTENNAS		
2M BNC or PL259 (state which required)	4.50	(0.50)
2M Thread for TR2300 or FT290R (state which)	4.50	(0.50)
70cm BNC or thread	4.50	(0.30)
70MHz Helicals BNC or PL259	5.00	(0.75)

YAESU			
FT1	Superb new HF Transceiver	1295.00	(—)
FT902DM	160-10m 9 Band Transceiver	885.00	(—)
FC902	All Band A.T.U.	135.00	(1.50)
SP901	External Speaker	31.00	(1.50)
FT102	New H.F. Transceiver	About £700	
FT101Z	160-10m 9 Band Transceiver (FM)	590.00	(—)
FT101ZD	160-10m 9 Band Transceiver (FM) Digital R.O.	665.00	(—)
DCT101Z	DC/DC Power Pack	42.55	(1.50)
FAN101Z	Cooling Fan for 101Z/ZD	13.80	(0.75)
FT707	8 Band Transceiver 200W Pep	569.00	(—)
FT707S	8 Band Transceiver 20W pep	485.00	(—)
FP707	Matching Power Supply	125.00	(5.00)
FTV707R (2)	Transverter 2M	198.00	(—)
FV/707DM	Digital V.F.O.	203.00	(—)
FC707	Matching A.T.U./Power Meter	85.00	(1.00)
MR7	Metal Rack for FT707	15.70	(1.00)
MMB2	Mobile Mounting Bracket for FT707	16.10	(1.00)
FRG7	General Coverage Receiver	199.00	(—)
FRG7700	200KHz-30MHz Gen. Coverage Receiver	329.00	(—)
FRG7700M	As above but with Memories	409.00	(—)
FRT7700	Antenna Tuning Unit	37.00	(1.00)
FT208R	2M FM Synthesised Handheld	209.00	(—)
FT708R	70cm FM Synthesised Handheld	219.00	(—)
NC7	Base Trickle Charger	26.88	(1.30)
NC8	Base Fast/Trickle Charger	44.10	(1.50)
NC9C	Compact Trickle Charger	8.00	(0.75)
FBA2	Battery Sleeve for use with NC7/8	3.05	(0.50)
FNB2	Spare Battery Pack	17.25	(0.75)
PA3	12V DC Adaptor	13.40	(0.75)
FT480R	2M Synthesised Multimode	379.00	(—)
FT780R	70cm Synthesised Multimode (1.6MHz Shift)	459.00	(—)
FP80	Matching 230V AC Power Supply	63.00	(1.50)
FT290R	2M Portable Multimode	249.00	(—)
MMB11	Mobile Mounting Bracket	22.25	(1.00)
CSC1	Soft Carrying Case	3.45	(0.75)
NC11C	240V AC Trickle Charger	8.05	(0.75)
FL2010	Matching 10W Linear	64.00	(1.20)
Nicads	2.2 AMP HR Nicads Each	2.50	(—)
FF501DX	H.F. Low Pass Filter 1kW	23.00	(1.00)
FSP1	Mobile External Speaker 8 ohm 6W	9.95	(0.75)
YH55	Headphones 8 ohm	10.00	(0.75)
YH77	Lightweight Headphones 8 ohm	10.00	(0.75)
QTR24D	World Clock (Quartz)	28.00	(0.75)
YM24A	Speaker/Mic 207/208/708	16.85	(0.75)
YD148	Stand Mic Dual IMP 4 Pin Plug	21.00	(1.50)
YM34	As 148 but 8 Pin Plug	21.45	(1.50)
YM38	As 34 but up/down Scan Buttons	24.90	(1.50)
FDK VHF/UHF EQUIPMENT			
Multi 700EX	2M FM Synthessed 25W Mobile	199.00	(—)
Multi 750E	2M Multimode Mobile	289.00	(—)
Expander	70cm Transverter for M750E	199.00	(—)
STANDARD VHF/UHF			
C78	70cm FM Portable	219.00	(—)
CPB78	10W Matching Linear	67.50	(1.50)
C58	2M Multimode Portable	239.00	(—)
CPB58	25W Matching Linear	79.50	(1.50)
CM8	Mobile Bracket	19.95	(1.00)
CL8	Soft Carrying Case	6.95	(0.75)
C12/230	Charger	7.59	(0.75)

WELZ SWR/POWER METERS

SWR - POWER METERS			
Model 110	H.F./2M Calibrated Power Reading	11.50	(0.50)
SWR25	H.F./2M Twin Meter	11.50	(0.50)
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WELZ SP45M	2M/70cm 100W	45.00	(0.75)
WELZ SP200	H.F./2M	59.00	(1.00)
WELZ SP300	H.F./2M/70	79.00	(1.00)
WELZ SP400	2M/70	59.00	(1.00)
DAIWA SW110A	H.F./2M	35.00	(—)
DAIWA CN620A	H.F./2M Cross Pointers	52.80	(—)
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communications microphones

444D	controlled magnetic fixed station microphone	**£33** *inc VAT (C&P£1.50)*
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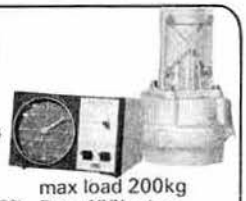

360° position indicator
1½" to 2½" masts

KR400RC	max load 200kg
£99.95 *(C&P£2.50)*	Rot. 400kg/cm
	Brake 1500kg/cm
KR600RC	max load 200kg
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electronic keyer

An iambic mode keyer with fully adjustable speed 6·50wpm. Full dot and dash memory. 240 v.a.c. or 12 v.d.c. supply. Relay switching or solid-state switching.
Built in side tone, adjustable volume and pitch.

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freq. range 700kHz to 250MHz in seven bands

comes complete with coils battery and operating manual

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SX 200N

Covers 26- 88MHz
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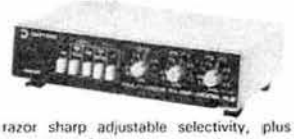
DATONG MULTIMODE AUDIO FILTER FL2



adds razor sharp adjustable selectivity, plus notch filtering to any receiver and has operating characteristics tailored to suit reception of SSB, CW, QTTY, SSTV and AM signals.

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MICROWAVE MODULES LINEAR

Output power amplifiers combined with low noise preamplifiers. Ideal for use with 2M portables input power 1W or 3W.

MML 144/100LS 100W O/P **£145**
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2 METRE OR MARINE RECEIVERS

SR9 —Amateur—tunes 144-146MHz.
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facility for 11 optional crystals. 12 v.d.c. supply comes complete with internal speaker and mounting hardware.

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Fully protected British made 13·8V power supplies

4 Amp **£27.95** (1.50) 12 Amp **£69** (2.00)
6 Amp **£44.95** (2.00) 24 Amp **£99** (3.00)

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mini-beam

10-15-20M
1200 watts
6ft turning circle

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118-144MHz
VFO Tuning
Optional 3 Xtals
Internal Batteries

£49.50 *(C&P£1)*

YAESU FT290R 2 METRE PORTABLE MULTIMODE

£249 *inc. carriage*

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On *regular* priced items from: Yaesu, Ascot SMCHS, CDE, HyGain, Channel Master, Hansen, SMC, MFJ, KLM, Mirage and Hi-Mound, on invoices over £100 SMC offers Free Finance! How is it done? Simple, pay 20%, split the balance equally over 6 months or pay 50% down and split the balance over a year.

You pay no more than the cash price!!

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Yaesu's *own* warranty does not extend outside Japan. Repairs are the responsibility of the UK retailer. SMC's two year guarantee is backed, as UK distributors, by daily contact with the factory and many tens of thousands of pounds of spares and test equipment. Avoid hawkers offering sets without serial numbers, spares, service or advice back-up.

NEW SHOWROOM

Our superb new showrooms located within our new administrative headquarters in Rumbridge Street (abuts the Osborne Road Stores/Service/Manufacturing complex) is now open *six* days a week *9 till 5.30.*

Six "Yaesu line up length" demonstration benches provide *you* with full "on the air" and "side by side" evaluation facilities. Check on a FT102, FT ONE or FT23OR TODAY.

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In our catalogue you will find the widest selection anywhere: 200 stock lines of Yaesu, 600 different antennas, masts, rotators, coaxes, plus 300 items of communications equipment.

If that is not enough to tempt you into our showrooms how about: A FT107 (below), the prices overleaf, a Bearcat 220 for *£195,* a MMT432/28 for *£119* or a Hokoshin gutter mount $\frac{5}{8}\lambda$ for *£10!*

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Buy a FT107 and you can choose your accessories from the 'Line up' prices.

If sight of the full line up: (FT + FP + DMS + FV FTV + 144TV + SP —List *£1,267.30*) is too much to stand, its yours for *£999!!!*

	FT107M	FP107	FP107E	DMS	FV107	FTV107	SP107P	SP107
LIST	£725	£101.95	£113.10	£92.75	£98.50	£119.20	£57.50	£29.90
SALE	£625	£90	£100	£90	£80	£110	£55	£29
LINE-UP		£80	£90	£80	£60	£100	£50	£25

WIDE COVERAGE ALL MODE RX; FRG7700 £329 inc. VAT @ 15% & SECURICOR

'7700 THE ONE WITH FM!

- ★ 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, 48MHz first IF.
- ★ 1kHz digital, plus analogue, display.
- ★ Inbuilt quartz clock/timer.
- ★ No preselector, auto selected LPF's.
- ★ Advanced noise blanker fitted.
- ★ Antenna 500Ω to 30MHz, 50Ω to 30MHz.
- ★ 20dB pad plus continuous attenuator.
- ★ Switchable A.G.C. Variable tone.
- ★ 110 and 240Vac and 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.
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FT ONE £1,295 inc. VAT @ 15% & SECURICOR

*Option

FREE FINANCE

★ Rx: 150KHz-30MHz. Continuous general coverage.
★ Tx: 160-10m (9 bands) or 1.5-30MHz commercial.
★ All Modes: AM, CW, FM*, FSK, LSB, USB.
★ 10 VFO's!!! Any Tx-Rx split within coverage.
★ Two frequency selection ways, *NO* bandswitch.
★ Main dial, velvet smooth, 10Hz resolution.
★ Inbuilt keyboard with up/down scanning.
★ Dedicated digital display for RIT offset.
★ Receiver dynamic range up to 100dB!!!
★ SSB: Variable bandwidth *AND* IF shift.
★ 300* or 600Hz*, 2,400 → 300Hz, 6kHz*, 12kHz*.
★ Audio peak and notch filter. FM squelch.
★ Advanced variable threshold noise blanker.
★ 100W RF, key down capability, solid state.
★ Mains and 12VDC. Switch mode PSU built in.
★ RF processor. Auto mic gain control. VOX.
★ Last but not least *FULL* break in on CW.

FT902DM £885 inc. VAT @ 15% & SECURICOR

★ 160-10 metres including new allocations.
★ Variable IF bandwidth 2.4kHz down to 300Hz.
★ Audio Peak and independent notch controls.
★ AM, FSK, USB, LSB, CW, FM, (Tx and Rx).
★ Semi-break in, inbuilt Curtis IC Keyer.
★ Digital plus analogue frequency displays.
★ VOX built-in and adjustable.
★ Instant write in memory channel.
★ Tune up button (10 sec, of full power).
★ Switchable AGC and RF attenuator.
★ Optional 350 or 600Hz CW, 6kHz, AM filters.
★ Clarifier (RIT) switchable on TX, RX or both.
★ 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.

2-YEAR WARRANTY

*Option

FT102 £725 inc. VAT @ 15% & SECURICOR

"INSTANT" H.P.

★ 1.8-3.5-7-10-14-18-21-24.5-28MHz
★ All modes: LSB, USB, CW, AM†, FM†, (†Option board)
★ Front end: extra high level, 24V DC operation
★ RF stage bypassable, boosts dynamic range over 100 dB!
★ Variable bandwidth 2.7KHz 500Hz *and* IF Shift
★ Fixed bandwidth filters, parallel or cascade
★ If notch (455KHz) *and* independent audio peak
★ Noise blanker adjustable for pulse *width*
★ External Rx and separate Rx antenna provisions
★ *Three* 6146B in special configuration—40dB IMD!
★ Extra product detector for checking Tx IF signal
★ Dual meter, peak hold ALC system
★ Mic amp with tunable audio metwork
★ SP102:—Speaker, Hi and Lo AF filters, 12 responses!
★ FV012:—VFO, 10Hz steps and readout, scanning, QSY
★ FC102:—ATU, 1.2KW, 20/200/1200 W FSD PEP, wire
★ FAS-1-4R:—4 way waterproof antenna selector

FT101ZD £635 inc. VAT @ 15% & SECURICOR

★ 160-10 metres including new allocations.
★ Variable IF bandwidth 2.4kHz down to 300Hz.
★ Selectable CW fixed bandwidth CW-W and CW-N*.
★ Semi-break in with sidetone for excellent CW.
★ Digital plus analogue frequency displays.
★ 180W PIP and—31dB 3rd order intermod.
★ RF speech processor fitted—adjustable level.
★ VOX built-in and is adjustable from the front panel.
★ Wide dynamic range for big signal handling.
★ High usable sensitivity, for those weak ones.
★ Superb noise blanker—adjustable threshold.
★ Attenuator; 0-10-20dB, AGC; slow-fast-off.
★ Clarifier (RIT) switchable on TX, RX or both.
★ Low level transvertor drive output facility.
★ Universal power supply 100-234V AC and 12V DC*
★ Incredible range of matching accessories.
★ 6 models: Digital/Analogue—AM/FM options.

FREE SECURICOR

*Option

FT707 £569 inc. VAT @ 15% & SECURICOR

*Option

PLASTIC BY 'PHONE

★ 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 blanker with local loop AGC.

OVER 33% OFF

Reductions shown are taken from previously advertised prices and are not necessarily those at which the equipment has been offered continuously for the last 28 days. Certain items are shop soiled/ex demo – please enquire.

2m SYNTHESISED £175 inc.

FT227RB 10W remote tuning transceiver.
FT227RXS 227 fitted special scanner **£195**.

OVER 40% OFF

Reductions shown are taken from previously advertised prices and are not necessarily those at which the equipment has been offered continuously for the last 28 days. Certain items are shop soiled/ex demo – please enquire.

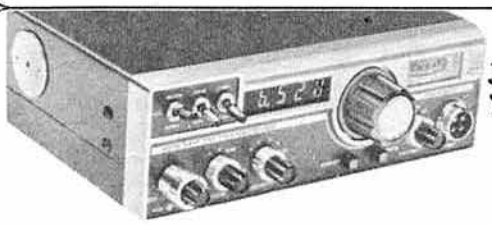
2m SYNTHESISED £205 inc.

CPU2500RKS. 10W keyboard mic up/down tuning etc., 25W RK model **£210**, 25kHz stepper version **£220**.

SUPER PRICE

COMMUNICATIONS RX £995 inc

NRD515, 100 KHz–30 MHz, Digital, Electronic tune, 100 Hz VFO, SSB/AM/CW/RTTY



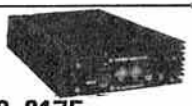
£20 OFF

2m, 25W, FM, £179 inc. VAT @ 15% + SECURICOR

2025 MARK II Full coverage 2M Transceiver, 12½kHz (set 12½-200kHz), rapid tune, 10 "easy write" memory channels, memory or band-scan between programmable limits, auto scan stop dependent on squelch *and* centre zero.

KP202 c/w KCP2 £100 INC!

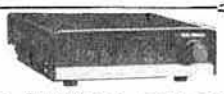
6 chnl, 2 W, 144 MHz Handheld c/w charger Telescopic ant S20, S21 etc
Extra crystals – stock items only – **£1.00** each!!!



SAVE £24!

PA15/160 £175

2 m linear. 10 W ➡ 160 W. over temp. RF and hard wire switch etc.



YC221 ~~£83.38~~ ➡ £35.00

Digital readout for FT221 (R)

£50 OFF

2m, 250W(+) PEP. £459

NAG 144XL LINEAR. 4CX350F tube, 10W nom. drive, switchable pre-amp. RF and hard switching. Thermal delay.

FT207R: SALE £159 inc. VAT at 15% and postage

LOW PRICE

- ★ 144-146MHz (144-148 possible)
- ★ 12.5kHz synthesizer steps
- ★ Keyboard entry of frequencies
- ★ Keyboard lockout safety features
- ★ Digital display to hundreds of Hz
- ★ Display auto shutdown timer
- ★ Four Channels of memory
- ★ Memory back up, disable switch
- ★ Up/down manual tuning
- ★ Bandscan for busy or clear channels
- ★ Memory scanning features
- ★ ± 600kHz split built in
- ★ Any split + or – programmable
- ★ BNC antenna connector
- ★ "On Air" and "Channel Busy" LEDs
- ★ Built in condenser microphone
- ★ 200mW AF to internal/external speaker
- ★ 2.5/0.2W of RF output
- ★ Rx; 35mA squelch, 150mA full vol.
- ★ Tx; 250mA low, 800mA high
- ★ 0.3μV for 20dB quieting
- ★ External speaker/mic available
- ★ 1.7 (2.2)" D × 2.5 (2.7)" W × 6.7 (7.2)" H
- ★ C/W Easy change NiCad pack, case, helical

FT230R £239 inc. VAT 15% & Securicor

- ★ 144-146 MHz (144-148 possible)
- ★ 25 watts RF output (Low 2.5W)
- ★ 150 (W) × 50 (H) × 176 (D) mm. 1·3Kg
- ★ Selectable 12½ or 25 KHz steps
- ★ Up/down, memory/band scanning
- ★ Ten Memories with priority function
- ★ Easy write in memory channels
- ★ Large illuminated "any angle" LCD display
- ★ Display to 100's of Hz and special functions
- ★ Two independent VFO's
- ★ Operation between memory and 'other' VFO
- ★ Memory backup "5 year" lithium cell
- ★ ± 600 KHz and simplex
- ★ Manual and automatic tone burst
- ★ Large "full sound" speaker
- ★ Concentric volume/squelch controls

YAESU

hy-gain

The TH3jnr is a 3 element triband (10-15-20m) beam whose compact design (longest element 24·2ft, boom 12ft turning radius 14·3ft) makes it ideal where space is the limiting factor. Separate and matched air dielectric Hy-Q traps are used for each band giving a 52ohm fed with a 1·5:1 VSWR at resonance, 8dB Av gain, 25dB F.B. ratio and a power handling of 600W P.E.P. By using a 1¼in boom the antenna presents only 3·4sq ft of surface area (equals 87lb of load at 80mph). The mast to boom clamp accepts 1-1⅝in masting and like all the hardware, is Iridite treated to mil specs.

12AVQ	Vertical 10-20m inc.	**£43.13**	£1.73
14AVQ/WB	Vertical 10-40m inc.	**£58.08**	£1.73
18AVT/WB	Vertical 10-80m inc.	**£90.85**	£1.73
14RMQ	Roof mounting Kit	**£30.48**	£1.73
18V	Vertical 10-80m inc.	**£31.97**	£1.73
103BA	3 Ele Yagi 10m	**£60.38**	£1.73
105BA	3 Ele Yagi 10m	**£112.70**	£3.16
153BA	3 Ele Yagi 15m	**£74.75**	£2.36
155BA	5 Ele Yagi 15m	**£135.13**	£4.77
203BA	3 Ele Yagi 20m	**£159.85**	£3.97
204BA	4 Ele Yagi 20m	**£217.35**	£5.87
205BA	5 Ele Yagi 20m	**£281.75**	£7.59
402BA	2 Ele Yagi 40m	**£201.25**	£5.23
DB10-15A	3 Ele Yagi 10-15m	**£146.05**	£3.91
TH3JNR	3 Ele Yagi 10-15-20m	**£159.28**	£2.47
TH2MK3	2 Ele Yagi 10-15-20m	**£136.85**	£2.59
TH3MK3	3 Ele Yagi 10-15-20m	**£205.85**	£4.66
TH5DXX	"Thunderbird" 5 Ele	**£228.85**	£5.41
TH6DXX	"Thunderbird" 6 Ele	**£281.75**	£6.97
TH7DXX	"Thunderbird" 7 el.	**£419.75**	£8.75
HYQUAD	2 Ele Quad 10-15-20m	**£240.35**	£4.89
18TD	Dipole Tape 10-80m	**£80.39**	£2.30
BN86	Balun 1:1·3 30MHz	**£15.53**	£1.15
LA1	Lightning Arrestor	**TOS**	£0.75

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

SMC

COAXIAL 50 OHM CABLE (all prices per metre)		
URM95	Solid centre 2.2mm	**£0.23**
UR43	Solid centre 5.0mm	**£0.23**
UR76	Stranded core 5.0mm	**£0.25**
RG58U	Stranded core 5.0mm	**£0.25**
RG213	Low loss 10.2mm	**£0.55**
UR67	Low loss 10.2mm	**£0.60**
LDF450	Heliax ½" Foam	**£3.45**
COAXIAL 75 OHM CABLE (all prices per metre)		
307EP	Economy Typic 4.3mm	**£0.18**
UR70	Stranded light	**£0.28**
UR39	Medium duty 7.8mm	**£0.41**
UR57	Low loss 10.2mm	**£0.66**
BALANCED TWIN CABLE (all prices per metre)		
302	75 Ohms light duty	**£0.16**
306	300 Ohms Ribbon	**£0.17**
UHF COAXIAL PLUGS		
PL259	Standard type 11.2mm	**£0.55**
PL259P	Push on type 11.2mm	**£0.79**
UG175	Reducer 5.0mm	**£0.14**
UG176	Reducer 5.6mm	**£0.14**
PL259R	Reduced type 5.0mm	**£0.67**
PL259A	De-luxe type 11.2mm	**£1.50**
PL259B	De-luxe type 5.0mm	**£1.13**
PL259SL	'Solderless' 11.2mm	**£0.63**
PL259SS	'Solderless' 5.0mm	**£0.63**
PLZ259E	Angle type 5.0mm	**£0.95**
PL259M	Metric type standard	**£0.75**
PL259PM	Panel mount 4 hole	**£1.07**
UHF COAXIAL SOCKETS		
SO239F	Standard 4 hole fix	**£0.48**
SO239T	2 hole fixing type	**£0.48**
SO239NI	Nut fix inside type	**£0.59**
SO239NO	Nut fix outside type	**£0.59**
SO239E	Free angle type 5.0mm	**£1.01**
UHF COAXIAL COUPLERS		
PL258	Back to back female	**£0.91**
PL274	Back to back chassis	**£1.07**
PL258M	Back to back male	**£1.38**
M359	Elbow male-female	**£1.07**
M358	'T' 2 female, 1 male	**£1.38**
M358AF	'T' 3 female	**£1.70**
M458	'X' 3 female, 1 male	**£2.13**

N.B. PRICES INCLUDE VAT AT 15%
Carriage: Cable £1.50 to 7 kg, plugs £0.50 any quantity

J-BEAM

FOUR METRES				
4Y/4M	Yagi, 4 element	7·0dB	**£22.43**	£1.73
PMH2/4M	Harness, 2 way		**£13.23**	£1.44
TWO METRES				
HO 2M	Halo, head only	3·0dB	**£5.17**	£0.63
HM 2M	Halo, 24in mast	3·0dB	**£5.75**	£0.75
UGP 2M	Ground Plane	0·0dB	**£10.92**	£1.73
C5 2M	Colinear omnivert	4·8dB	**£47.72**	£1.73
5Y 2M	Yagi 5 element	7·8dB	**£12.07**	£0.58
8Y 2M	Yagi 8 element	9·5dB	**£15.52**	£1.73
10Y/2M	Long Yagi, 10 element	11·4dB	**£33.35**	£1.73
14Y/2M	Long Yagi, 14 element	13·0dB	**£36.00**	£1.73
D5/2M	Yagi, 5 over 5 slot	10·6dB	**£21.85**	£1.73
D8 2M	Yagi, 8 over 8 slot	12·3dB	**£29.32**	£1.73
PBM10 2M	10 element parabeam	12·4dB	**£39.67**	£1.73
PBM14 2M	14 element parabeam	13·7dB	**£48.00**	£1.73
Q4 2M	Quad, 4 element	10·0dB	**£25.87**	£1.73
Q6 2M	Quad, 6 element	12·0dB	**£33.92**	£1.73
5XY/2M	Yagi, 5 element cross	7·8dB	**£24.72**	£1.73
8XY/2M	Yagi, 8 element cross	9·5dB	**£31.05**	£1.73
10XY/2M	Yagi, 10 element cross	11·3dB	**£40.82**	£1.73
PMH2 C	Harness, Cir. Polar		**£8.05**	£0.52
PMH2 2M	Harness, 2 way		**£10.92**	£0.86
PMH2 2ML	Harness, 2 way long		**£11.92**	£1.15
PMH4 2M	Harness, 4 way		**£25.00**	£1.73
SEVENTY CMS				
C8/70	Colinear vert.	7·8dB	**£54.05**	£1.73
D8/70	Yagi, 8 over 8 slot	12·3dB	**£22.43**	£1.73
PBM18/70	Parabeam 18 element	14·9dB	**£27.60**	£1.73
PBM24/70	Parabeam 24 element	15·1dB	**£36.80**	£1.73
MBM28/70	Multibeam, 28 element	12·5dB	**£18.40**	£1.73
MBM48/70	Multibeam, 48 element	15·7dB	**£31.05**	£1.73
MBM88/70	Multibeam, 88 element	18·5dB	**£42.55**	£1.73
8XY/70	Yagi, 8 element cross	10·0dB	**£36.80**	£1.73
12XY/70	Yagi, 12 element cross	13·0dB	**£46.00**	£1.73
PMH2/70	Harness 2 way		**£9.20**	£0.75
PMH4/70	Harness 4 way		**£19.55**	£1.44
TWENTY THREE CMS				
D15/23	15 over 15 slot	15·0dB	**£36.80**	£1.73
CR/23	Corner reflector	14·8dB	**£35.08**	£1.73
PMH2/23	Harness 2 way		**£27.60**	£1.73

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

Kenpro

KR600RC
£132.25

360° round type meter Max. load 200kg. Rot, 600kg/cm, brake 4,000kg/m. 1½in-2½in masts Lower casting optional.

KR400RC
£90.85

360° round type meter Max. load 200kg. Rot, 400kg/cm, brake 1,500kg/cm 1½in-2½in masts Lower casting optional.

KR500
£86.25

Elevation Rotator (180°) Up to 50kg of Load. 1¼in-2½in mast. 1¼in-1⅝in boom

KR250
£44.85

Twist and switch controller. Rotator 200kg/cm. Brake 600kg. 1in-1½in masts.

NB: PRICES INCLUDE VAT AT 15%
Carriage free (post or road) mainland only

Channel Master

9508
£74.75

Auto control, secondary pointer gives position during travel. Stainless steel hardware. Heaviest duty "offset type". To 5sq

Takes 1-2" masts and 1-2" stub.

9502
£54.63

Automatic control box. Dial direction secondary pointer gives position during travel.

Takes 1-2" mast and 1-1⅝" stub.

Upper mast support bearing.

2" mast and 1¾" stub.

Post and packing **£1.20**
9523 **£14.38**

Rotary bearing 3-way guying.

Takes 1²⁹/₃₂" mast.

Post and packing. **85p**
9525 **£14.38**

NB: PRICES INCLUDE VAT AT 15%
Carriage free (or as shown) mainland only

CDE

AR40
£65.55

Accurate, silent self calibrating control box. Dial up desired beam heading, push knob; motor rotates to that position and then switches off.

CD45
£113.85

Large illuminated meter gives read out of antenna heading at all times. Armature brake. Low voltage meter. Handles antennas to 8½sq ft.

HAM IV
£189.75

Large illuminated meter gives read out of antenna heading at, all times. wedge solenoid brake mechanism. Handles antennas to 15sq ft.

T2X
£270.25

Large illuminated meter gives read out of antenna heading at all times. Wedge solenoid brake mechanism. Handles antennas to 30sq ft.

NB: PRICES INCLUDE VAT AT 15%
Carriage free (post or road) mainland only

SOUTH MIDLANDS COMMUNICATIONS LIMITED

BRANCHES: CHESTERFIELD · HUMBERSIDE · STOKE · LEEDS · BUCKLEY

VERSATOWER

TELESCOPIC & TILTOVER RADIO TOWERS 25-120 FT

Below is a photograph of the versatowers chosen for the important approach lights for Manchester Airport. Be sure of quality and reliability by using the original Versatowers achieved through twelve years of continuous development which has produced a range of over 50 models, all of which, being made in England, conform to the current B.S.S., requiring minimum designed wind speeds of 85mph and up to 117mph.

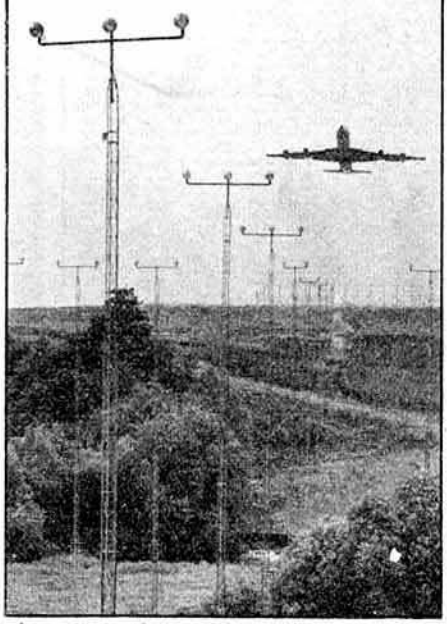
Before purchasing a Tower, we strongly recommend consulting one of our engineers for advice regarding the most suitable combination for an installation. *It would be incorrect to nominate a specific headload as this is dependent upon load distribution, geographical location and siting.*

SEND NOW FOR SPECIFICATIONS/PRICES

They cost less than you would expect:
Post mounting 30ft inc. VAT **£388.35**
Post mounting 60ft inc. VAT **£533.83**

'30ft': 10ft SECTION "MINITOWER"

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



HANSEN

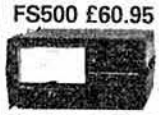
IN LINE POWER/SWR BRIDGES P.E.P., R.M.S. 1·8–440MHz

The Hansen range covers 30 quality models with top-of-the-line the FS710. This is a flat frequency response, peak envelope power and average in-line wattmeter with many novel features. Notable being the 'power independent' SWR scale—no forward power calibration knob, just direct reading SWR.

FS710; PEP AUTO-SWR RMS LEVEL
FS710 £78.20

FS710H: 1·8-60MHz. 15, 150, 1·5kW
FS710V: 50-150MHz. 15, 150W
V.S.W.R: 4:1 and to 20:1
Accuracy: ±7% of FSD
Impedance: 50 52 Ohms
Connectors: SO239
Power: 240 Volts AC 50Hz
Weight: 3·lbs (1·5Kgs)
Size overall: 8 × 4 × 5½"
Size Meter: 2 × 3½"
Time Const: PEP follow 4 second

FS500 £60.95



PEAK READING LEVEL RESPONSE
FS500H 1·8-60MHz 20, 200 & 2kW
FS500V 50-150MHz 20 & 200W
Power ±7% FSD. SWR 1:1-5:1
Size: 8 × 4 × 5½"

FS600 £44.85

PEAK READING LEVEL RESPONSE
FS601M 1·8-30MHz 20 & 200W
FS601MH 1·8-30MHz 200 & 2kW
FS602M 50-150MHz 20 & 200W
FS603M 430-440MHz 5 & 20W
Power ±10% FSD. SWR 1:1-3:1
Size: 6½ × 2½ × 4½"

FS300 £40.25

LEVEL RESPONSE, LARGE METER
FS300H 1·8MHz 20, 200 1kW,
FS300V 50-150MHz 20, 200W FSD
Power ±10% SWR 1:1-3:1 ±10%
Size: 8 × 4 × 5½"

FS7 £35.65

VHF/UHF WATTMETER & BRIDGE
FS7 145MHz & 432MHz 5, 20, 200W
Power average ± 10%. SWR 1:1-3:1
Power Max: 144MHz, 200W
432MHz 20W
Size: 6½ × 2½ × 4½". 'N' type sockets

FS711 £32.20

REMOTE INDICATOR TYPE
FS711H 1·8-30MHz 20 & 200W
FS711V 50-150MHz 20 & 200W
FS711U 430-440MHz 5 & 20W
Power ± 10% SWR 1:1-3:1 ± 3%
Indicator 5 × 2¾ × 1½"
coupler 3½ × 2½ × 1½"

FS5E £32.20

INDEPENDENT TWIN METER
FS5E 3·5-150MHz 20, 200 & 1kW
Power average ± 10%. SWR 1:1-5:1
Power Max: 1kW 3·5 30MHz
50W 50 150MHz
Size: 7 × 3 × 3½". 'On the Air' LED

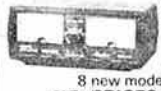
FS300M £31.05

LEVEL RESPONSE, POWER & SWR
FS301M 1·8 30MHz 20, 200W
FS301MH 1·8 30MHz 200, 2kW
FS302M 50 150MHz 20, 200W
Power ±10%. SWR 1:1 3:1 ±3%
Size: 6½ × 2½ × 4½"

SWR3S £23.00

WIDE RANGE POWER & SWR
SWR3S 3·5 150MHz 20 & 200W
Power average ± 10%. SWR 1:1-3:1
Power Max: 200W 3·5 30MHz
50W 50 150MHz
Size: 6 × 2½ × 2½". Antenna/switch

SWR50B £23



TWIN METER, RELATIVE POWER
SWR50B 3·5 150MHz Scaled 1kW
Power average ± 20% SWR 1:1-3:1
Power Max: HF 1kW 1:1, 300W 3:1,
VHF 50W
Size: 6 × 2½ × 2½". 'On the Air' LED

8 new models in stock. Sae for details
NB: PRICES INCLUDE VAT AT 15%
Carriage free (surface post) worldwide

SMC-HS

HF, VHF, UHF ANTENNAS MOBILE VERTICALS

SMC-HS Mobile Elements, tabulated below, feature an inbuilt PL259M connector, which mates with the SO239M on any of the four standard mounts. This arrangement is ideal for easy removal —band changes, comparative test, car wash, and anti-vandal, system checks from the feed point, portable operation and for ease of garaging etc. All models have fold over bases (either lift and lay or locking collar) except the 78B which has an inbuilt ball in case the mount must be fitted askew.

Model	Band	Gain	Type	Power	Length	Price
20SE	20m		(½λ)	100W	1·72m	£15.35
17SE	17m		(½λ)	200W	1·92m	£14.20
15SE	15m		(½λ)	130W	1·72m	£13.80
12SE	12m		(½λ)	200W	1·92m	£13.40
10SE	10m		(½λ)	100W	1·72m	£12.65
4E	4m	0dB	¼λ	150W	1·03m	£7.65
2H/PL	2m		(½λ)	50W	0·17m	£3.45
2QW	2m	0dB	¼λ	200W	0·49m	£2.30
2VF	2m	3dB	¼λ	50W	1.06m	£10.35
2NE	2m	3dB	¾λ	150W	1·30m	£6.90
78SF	2m		(⅝λ)	100W	1·42m	£12.25
78F	2m	4·5dB	⅝λ	100W	1·75m	£12.25
78B	2m	4·5dB	⅝λ	150W	1·72m	£12.65
88F	2m	5·2m	⅝λ	100W	2.03m	£16.50
70N2M	2/70	2·7dB 5·1dB	(½λ) 2 × ⅝λ	100w	0·89m	£14.20
258	70cm	5·5dB	2 × ⅝λ	100W	0.91m	£11.50
358	70cm	6·3dB	3 × ⅝λ	100W	1·36m	£14.95

Model	Description	Price
SOWM	**Wing Mount.** SO239M upper SO239 under adjustable angle	£3.45
TMCAS	**Boot Mount** c/w 6 mtrs RG58 and PL259 plug	£7.30
GCCA	**Gutter Mount** deluxe cast type c/w 4 mtrs cable assemble and PL259	£8.80
SOMM	**Magnetic Mount** c/w 4 mtrs RG58 and PL259 *For use with smaller antennas only*	£8.45

An alternative mounting for any of the two metre antennas listed above is the BSD stainless steel bumper strap at **£7.75** plus the HS88BK extension tube at **£16.50** which raises by 80 cms and acts as a counterpoise to the radiator.

Also fitting the bumper mount is the 10 foot, 3 section (quick disconnect and fold over jointed) mobile colinear element which provides about 7dB of gain for **£28.35.**

Stop press:—⅝λ ultra low radiation angle, typ. 30° below ⅝λ. Substantial improvement on DX (in clear).

For operation on 2 metres and 70 cms the dual band 70N2M is an elegant solution particularly when combined with the HS770 diplexer which provides 50W power handling, 30dB isolation between transceivers with an insertion loss of only 0·5dB for **£13.40.**

Mainland delivery: accs. £0.80, antennas £1.80

NB: PRICES INCLUDE VAT AT 15%

S. M. HOUSE, OSBORNE ROAD, TOTTON, SOUTHAMPTON, SO4 4DN, ENGLAND
Tel: Totton (0703) 867333, Telex: 477351 SMCOMM G, Telegram: "Aerial" Southampton
See preceding pages for complete addresses and phone numbers

MAIL ORDER

BY TWO WAY FREEPOST

Send 50p for our bumper bundle literature

All items advertised in stock at time of going to press.

SWR POWER METERS

SWR 25	3.5-150MHz twin meter	12.96
OSKERBLOC 200B	3-200MHz 20/200/2000W	41.00
TET P220	3-30MHz 2000 Watts	56.75
Yaesu YS 200	1.8-150MHz 200 Watts	46.50
Yaesu YS 2000	1.8-60MHz 2000W PEP/RMS	61.80
Reece UH 74	50-542MHz 10 Watts	17.25
Reece T4359	144/435 MHz 100 Watts	32.50
Hansen 601MH	1.8-30MHz PEP/RMS 2000W	44.85
Hansen FS7	144/432 - 200 Watts	35.65

TET ANTENNAS

HB 33SP	3 El Tribander 10/15/20 mtrs	189.23
MV5BH	Vertical 10/15/20/40/80 mtrs	71.25
MV3BH	Vertical 10/15/20 mtrs	40.25
MV4 BH	Vertical 10/15/20/40 mtrs	49.50
SQ22	Stacked 2 el Swiss Quad 144/-146 MHz 16dB GAIN 20db F/B	55.67
SQY08	6 Element Quagi 2 mtrs	44.68
SSL 720	Stacked 2 x 9 element Yagi 2 mtrs	74.65
MLA4	Loop Antenna 80/40/15/10 mtrs 4 Elements of 1-8 mtrs	105.60

VAT inclusive. Carriage £4 per item.

MONITOR RECEIVERS

DAIWA VHF - Scan and VFO Control	49.00
AR 22 SYNTHESISED 2 metre Receiver	79.00

DATONG

PCI G/C converter HF on 2 metre	120.75
VLF very low frequency converter	25.30
FL1 frequency agile audio filter	67.85
FL2 multimode audio filter	89.70
ASP/B auto RF speech processor (Trio)	79.35
ASP/A auto RF speech processor (Yaesu)	79.35
D75 manually controlled RF Sp/Processor	56.35
RCF/M RF speech clipper module	26.45
D70 Morse tutor	49.45
AD270 indoor active antenna	37.95
AD370 outdoor active antenna	51.75
MPU1 PSU for above	6.90

ROTATORS

Skyking SU 4000	88.50
ART 3000 hd	88.50
KR 400RC	92.50
KR 400 1 wr bkt	10.35
Hirschmann 250	45.00
AR 40	65.00
2" KS 065 bearing	16.50
1½" S100 bearing	16.50

MORSE KEYS

HK 707	Straight up/down keyer	10.99
BK 100	Semi-automatic mechanical bug	22.12
MK 702	Up/down keyer on marble base	24.50
MK 702	Manipulator	24.50
Mk 705	Squeeze paddle on marble base	21.72
EKM 1A	Morse code practice oscillator	10.50
MK 1024	Automatic memory keyer	135.13
EK 150	Semi/automatic keyer	74.00

DESK MICROPHONES

SHURE 444D Dual Impedance	33.00
SHURE 526T Mk II Power Microphone	46.00
ADONIS AM502 Compression Mic + O/P	39.00
ADONIS AM601 Compression Mic + Meter 1 O/P	49.00
ADONIS AM802 Compression Mic + Meter 3 O/P	59.00

DAIWA

CNA	1001 Auto ATU 200W RMS	139.00
CNA	2002 Auto ATU 1kW RMS	192.00
CN	620A RF Power Meter 1.8 to 150MHz 1kW	54.00
CN	630 RF Power Meter 140-450 MHz 200W	69.00
SR11	Scanning Receiver	49.00

ANTENNAS

Wide range in stock including JAYBEAM - HYGAIN-GOTHAM TELECON-HOKUSHIN ¼ ETC. ETC.

Bantex ¼ mobile whip complete antenna	9.99
Bantex ¼ W mobile whip complete antenna	3.99

MOBILE SAFETY MICROPHONES

ADONIS AM 202S Clip-on	20.95
ADONIS AM 202F Swan Neck + Up/Down Buttons	30.00
ADONIS AM 202H Head Band + Up/Down Buttons	30.95

HY-GAIN ANTENNAS

12AVQ	Vertical 10-20m inc	43.13	1.73
14AVQ/WB	Vertical 10-40m inc	58.08	1.73
18AVT/WB	Vertical 10-80m inc	90.85	1.73
14RMQ	Roof mounting Kit	30.48	1.73
18V	Vertical 10-80m inc	31.97	1.73
18HT	"HY Tower" 10-80m	320.85	12.54
103BA	3 Ele Yagi 10m	60.38	1.73
105BA	3 Ele Yagi 10m	112.70	3.16
153BA	3 Ele Yagi 15m	74.75	2.36
155BA	5 Ele Yagi 15m	135.13	4.77
203BA	3 Ele Yagi 20m	159.85	3.97
204BA	4 Ele Yagi 20m	217.35	5.67
205BA	5 Ele Yagi 20m	281.75	7.59
402BA	2 Ele Yagi 40m	201.25	5.23
DB10/15A	3 Ele Yagi 10-15m	146.05	3.91
TH3JNR	3 Ele Yagi 10-15-20m	159.28	2.47
TH2MK3	2 Ele Yagi 10-15-20m	136.85	2.59
TH3MK3	3 Ele Yagi 10-15-20m	205.85	4.66
TH5DXX	"Thunderbird" 5 Ele	228.85	5.41
TH6DXX	"Thunderbird" 6 Ele	281.75	6.97
HYQUAD	2 Ele Quad 10-15-20m	240.35	4.89
18TD	Dipole Tape 10-80m	80.39	2.30
BN86	Balun 1:1 3.30MHz	15.53	1.15
LA1	Lightning Arrestor	TOS	.75

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FT902D	9 band transceiver	790.00
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70TV	4m module for transverter	80.00
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YO901	Standard monitor scope	256.00
FV901DM	Remote vfo for 901	260.00
SP901	External speaker	31.00
FL2100Z	9 band 1200W linear	425.00
FT107	9 band solid state 100W	725.00
FT107DMS	As above but with memory	799.00
DMST107	Memory unit	92.75
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FP107	230V AC power module	101.95
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Correspondence to RRs and honorary officers should be addressed directly to them (QTHR), not to RSGB HQ.

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RADIO SOCIETY OF GREAT BRITAIN

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

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

The national society representing all UK radio amateurs

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

GENERAL MANAGER AND SECRETARY
D. A. Evans, G3OUF

EDITOR
A. W. Hutchinson

RSGB HEADLINE NEWS
Tel 01-837 4118

By telephoning the above number, members can receive up-to-date amateur radio news of immediate interest from a three-minute recording. This is updated on Tuesdays and Fridays, or more frequently as necessary.

RSGB SUNDAY NEWS BROADCASTS

These broadcasts are made every Sunday morning, giving almost complete coverage of the British Isles. Stations broadcasting them (particulars below) use the callsign GB2RS.

The purpose of these news broadcasts is to provide an outlet for amateur radio news items which cannot wait for the next issue of *Rad Com*. Items for inclusion should reach RSGB HQ by letter (marked "GB2RS news") or telephone before 10am on Wednesdays, although no guarantee of inclusion can be given. Once broadcast, items are not usually repeated.

INTENDED RECEPTION AREA	NORMAL READER	RESERVE READER	LOCAL START TIME
Frequency: 3·640MHz. Mode: ssb			
NE Scotland	GM3HGA	GM3VEY	1130
Frequency: 3·650MHz. Mode: ssb			
SE England	G2MI	G4ARZ	0900
Midlands	G2CVV	G8QZ	0930
SW England/Wales	G8ML	G3JFH	1000
Northern Ireland	GI3GAL	GI3SXG	1030
NE England	G5VO	G3MCF	1100
E Scotland	GM4CUZ	GM4FLP	1430
Midlands	G8QZ	G2CVV/G3SZJ	1800
Frequency: 3·660MHz. Mode: ssb			
Central Scotland	GM3TCW	GM3ULP	1130
Frequency: 7·0475MHz. Mode: a.m.			
UK (from Northern Ireland)	GI3GGY	GI2DHB	0900
UK (from N Midlands)	G3LEQ	G2CVV	1100
Frequency: 144·250MHz. Mode: ssb (horizontal polarization)			
N from Carlisle	G4LAA	(Vacancy)	0930
SW from the Midlands	G3BA	G3KQF	0930
NE from S Devon	G3CHN	G3PBV	1000
NW from Manchester	G3SMT	G4IAL	1000
NNW from Cleveland	G4JJB	G8FTZ	1000
W from Carlisle	G4LAA	(Vacancy)	1030
SE from Lincoln	G3NRO	G8OFQ	1030
SW from London	G3FZL/G3VAG	G3IIR	1030
S from Aberdeen	GM8GHV/GM8MBP		1030
W from Bristol	G4CJZ	G3ZWY	1100
W from Bangor, Co Down	GI3TLT	GI3SXG	1130
Frequency: 145·525MHz (S21). Mode: fm (vertical polarization)			
Cornwall	G2ABC	G3NPB/G3VGO	0930
Hampshire, north	G8CKN	G3PZN	0930
Suffolk	G3ZNU	G4FSG/G4FZZ	0930
Leeds	G3SPX	G8XGN	0930
Co Down	GI3WEM	GI4DOR	0930
Edinburgh	GM4EHO	GM4JFS	0930
E Cornwall/S Devon	G3ZYY	G4GWJ/G4KYY	1000
Londonderry	GI2DHB	GI4AHD	1000
London	G3FZL/G3VAG	G3IIR	1000
Birmingham	G3BA	G4LCM	1000
Lincolnshire	G3NRO	G8OFQ	1000
Tyneside	G4FUT	G3WNR	1000
Glasgow	GM4HCO	GM4CXM/GM3VTB	1000
Elgin	GM4ILS	(Vacancy)	1000
Southampton	G8LVC	G8ADM	1030
E Sussex coast	G8SC	G3ZFE	1030
Bristol	G4CJZ	G3ZWY/G8NNU	1030
Manchester	G3LEQ	G3JWK	1030
Dumfries	GM8TKA	GM3MSG	1100
Brighton and coast	G3ZYE/G8GEZ	G4JGJ/MA	1100
Huntingdon, Cambs	G8BBK	(Vacancy)	1100
Jersey	GJ8KNV	GJ4ICD/GJ4JWA	1100H
Gwynedd	GW8TTM	(Vacancy)	1100
Clwyd/Merseyside	GW4IEQ	G8NNS	1100
Exeter	G3PBV	(Vacancy)	1130
Leicester	G4JYS	G4MFU	1130
Scarborough	G8XTL	G4EEV	1130

H = horizontal polarization

QTC
Amateur radio news

HOME OFFICE LIAISON

RSGB Licensing Advisory Committee

Earlier this year the RSGB made a number of substantial changes in respect of the system of liaison with the Home Office. These changes were recorded in "Council proceedings", *Rad Com* April, but it would be useful to describe the new scheme again in order to emphasize its importance for future Home Office/RSGB liaison work.

A new advisory committee of Council, known as the Licensing Advisory Committee, was formed at the Council meeting in January 1982. Council defined this new committee's function as being able to negotiate with the Home Office and other Government departments on all matters relating to licensing of amateur radio. It would also be responsible for maintaining liaison with other national societies on licensing matters, either directly or via IARU as appropriate, and for the Amateur Radio Observation Service.

A departure from the previous system would be that the LAC would largely be comprised of officers already holding specific appointments within the Society, namely, the hf, vhf and microwave managers, the Amateur Radio Observation Service organizer, the executive vice-President and the general manager. In addition, the post of telecommunications liaison officer was abolished by Council, with the duty of day-to-day liaison with the Home Office becoming the responsibility of the Society's secretary/general manager. Council, in conjunction with LAC, would continue to formulate policy for all licensing discussions.

One of the first matters to be thrown unexpectedly at this new committee was the new licence schedule of 12 February 1982. The outcome of the Society's negotiations with the Home Office, and the way in which the new committee arrangements operated, were illustrated by means of a special insert in the March issue of *Rad Com*, and a special pull-out supplement in the April issue which gave full details of further revisions to the schedule.

Although the licence schedule problems took up a large amount of time during earlier meetings of the committee, time was also spent on addressing many other key issues within the context of UK licensing. A number of meetings—and much other communication—took place with the Home Office during the first few months of 1982, culminating in a review meeting with the Home Office in April. Since then, the idea of producing an informative report in *Rad Com* on Home Office liaison has been put forward and adopted; the intention of this is to keep members advised of progress with current issues.

Home Office meeting, April 1982

Emergency use of amateur radio

The emergency use of amateur radio is seen by the Society as a vital issue in the development of the hobby. The Society believes that radio amateurs should have freedom to act as appropriate in an emergency situation, where risk to life is apparent. Present licensing conditions, however, do not permit the transmission of any third-party message. At the same time it is apparent that the increase of interest in Raynet operations means that further opportunities for Raynet training and practice are now necessary. Raynet groups may operate in conjunction with the users specified in the UK licence, but opportunities to practice procedures and improve user service/Raynet liaison under practical conditions are restricted to ". . . county shows and other similar events" only—here again, the Society believes that there is a need for greater freedom in this area, especially during events such as marathons, charity walks, orienteering and so on.

The Home Office agreed to consider this matter further and requested additional information from the Society, which has since been sent.

Agreement was also reached for Raynet to participate in arrangements for the Pope's visit to the UK, if specifically requested by local user services; all Raynet controllers were duly informed.

Greetings messages

The Society continued to press the Home Office to permit again the handling of short greetings messages to and from non-licensed persons. The Home Office had given this some thought, although a final decision had not yet been made. The Home Office expressed the view that some relaxation could soon be considered.

The Society hoped that a decision would be made in time for the Jamboree on the Air next October. The Home Office were to look into the international implications of these greetings messages, which would require co-operation from other governments: they would advise the Society accordingly.

70MHz

The Home Office confirmed that this band was not internationally allocated to the amateur service. The band was allocated on a special basis to UK amateurs until further notice. As such, the Home Office would continue to explore the possibility of Class B licensees using this band, in the context of how the potential increase in occupancy might affect the use of this part of the spectrum by the primary users in the UK.

The Society agreed that it was necessary to proceed cautiously while the implications of any major increase in occupancy were being studied.

Use of morse by Class B licensees

As amateur radio is a service of self-training, the Society wished to explore the concept of permitting Class B licensees to use morse code, primarily for practice purposes.

The Home Office would consider this prior to any further discussions.

50MHz

The Society has continued discussions regarding the use of 50MHz for experimental purposes. The possibility of time-sharing with broadcasters was still under review.

18 and 24MHz bands

The international implications regarding the use of these bands were discussed. The formal position was that primary status of the amateur service would not be achieved until all assignments to the fixed and mobile services had been transferred. This procedure had to be completed not later than 1 July 1989. Until this process is completed, the amateur service has no rights to the use of these frequencies.

However, amateurs in several other CEPT countries have been given permission to use 18 and 24MHz on a secondary basis. Amateurs in the UK were aware of this and were concerned to know why the same facilities could not be granted to them.

The Home Office would continue to examine the UK position in respect of other services currently registered on these frequencies.

Home Office computerization of amateur licences

For a number of years the Society has sought a convenient pocket-sized licence document, and this could become a reality when Home Office records are computerized. There are a number of advantages to be gained, both for the Home Office administration and the amateur. For the licensee this could help to overcome the problems associated with proving licence validity; for example, for reciprocal licensing purposes.

The period of validity of the amateur licence was currently being considered by the Home Office as part of a review of the licence structure.

The RSGB alternative licence schedule

As noted earlier (*Rad Com* April 1982) while the Society considered that the 16 April 1982 licence had provided a short-term practical schedule, it was nevertheless considered that the production of a new schedule was essential.

The Society hoped that this could be achieved by the end of 1982, and the Home Office commented that it expected to progress this by the formation of a Home Office/RSGB working group.

Novice licence

For many years the Society had been putting forward the concept of a novice licence to the Home Office.

The view of the Home Office remained that, although the Society had made constructive proposals which would help to remove some of the outstanding difficulties, even if the Home Office could be convinced that there were no objections in principle to the scheme the increased administrative burden that its introduction would entail would rule it out for the time being at least.

Experimental licences

The Society considered that existing arrangements for the issuing of experimental vhf licences should continue, provided these were issued only for *bona fide* research work. However, some tightening up of the procedures seemed to be in order.

The Home Office commented that they intended to levy an annually renewable fee on further experimental licences.

Other types of licences for experimental research were being considered by the Society.

Nominations for election to the 1983 Council of the RSGB

The Society's Articles of Association require that members who are entitled to vote be notified of those Council members who retire at the end of each year. The Council members who retire on 31 December 1982 are as follows:

ORDINARY MEMBERS
Dr D. S. Evans, G3RPE, who is not eligible for re-election under Article 26.
Mr G. R. Jessop, G6JP, who is eligible and willing to accept nomination for re-election.
Mr G. Knight, GM8FFX, who was co-opted during 1982 and who is eligible and willing to accept nomination for election.
Mr B. O'Brien, G2AMV, who is not eligible for re-election under Article 26.
Mr D. M. Pratt, G3KEP, who is eligible and willing to accept nomination for re-election.

ZONE E
Mr R. G. Barrett, GW8HEZ, who is eligible and willing to accept nomination for re-election.

NOMINATION PROCEDURE
The vacancies on the 1983 Council may be filled either by the re-election of retiring members of the Council who are eligible or by the election of any qualified Society member. In both cases a proper nomination must reach the secretary at RSGB HQ not later than 10 October 1982. A member who has been a corporate member of RSGB for not less than three years immediately prior to nomination is qualified to serve on Council. Members standing for election as zonal members must be resident in the appropriate zone, as must those who make zonal nominations.

At the Society's 1974 annual general meeting, changes were made to the Society's Articles of Association. One change concerned the period of office which Council members could serve. More specifically, having been elected to Council for a three-year period, a Council member could only be re-elected once and would then be required to stand down from Council for one year prior to any further nomination.

The changes to Article 26 were not retrospective, and thus could only have taken effect from 1 January 1980. Two members of Council are affected by Article 26 this year, as indicated above.

Any 10 or more fully-paid-up corporate members may nominate any qualified member for election to Council by delivering, in one closed envelope, to the secretary of RSGB, their respective nomination in writing. (As a safeguard it is recommended that each candidate be nominated by more than 10 members.)

The nominated member must also enclose:
(i) Written consent to accept office if elected.
(ii) A statement indicating if he/she will have passed their 70th birthday either prior to 1 January 1983 or within the three-year period commencing 1 January 1983. This information is necessary under the Companies Act.
(iii) A statement saying if his/her nomination for Council is for ordinary or zonal membership.
(iv) A statement declaring any commercial interests in the field of amateur radio. The candidate may use a maximum of 150 words as a statement of address to be circulated with the ballot forms. This statement of address should contain biographical details of the candidate as well as any other information he/she would like to convey. Bona-fide statements will receive the minimum of editing consistent with good style and factual accuracy; however, statements in excess of the maximum will be cut to 150 words.
(v) A suitable black and white photograph (head and shoulders), if he/she wishes.

Complete nominations should be addressed to: D. A. Evans, Secretary, RSGB, at the Society's headquarters address and must arrive not later than 10 October 1982. All nominations received will be acknowledged by return of post.

A LETTER TO VP8 MEMBERS

The following is the text of a letter sent to all RSGB members in the Falkland Islands on 21 June 1982:

Dear Member,

I am writing to all RSGB members in the Falkland Islands. You know that the thoughts of all of us within the UK have been with you in recent months. You know also that the role played by the amateur radio service has not gone unnoticed.

A number of RSGB members in the UK have suggested that it might be appropriate for the Society to co-ordinate any specialized help which you, as a radio amateur, might need at this time. There are many members who would undoubtedly wish to offer assistance of various kinds, specifically with regard to radio equipment to help you to return to full activity.

Before rushing to your aid, I feel that the Society should find out if any help is needed and if it is, what form it should take.

I look forward to hearing from you.

73.

Yours sincerely,

Dr John Allaway, G3FKM
President

Holiday closure

The Chelmsford editorial office will be closed from 7 to 15 August inclusive.

New Scotland Yard ARS

The recently-formed New Scotland Yard Amateur Radio Society, G4NSY, has obtained permission to operate a station from within the London Metropolitan Police headquarters and will be active from time to time on the 7, 14, 21, 28, 144 and 432MHz bands using all permitted modes. Operation on other amateur bands is not possible at present. Broadcasts have also been made using the special event callsigns GB4NSY and GB8NSY, and until the issue of an appropriate Class B callsign the headquarters may also be heard on the air as G8TOK/A or G8YQQ/A.

The society has appointed a QSL manager and will operate a policy of answering every card received. However, amateurs sending cards are asked to be patient, as a large number of QSLs are received after every transmission and it does take time to answer them all. QSL cards may be sent via the QSL Bureau or direct to the "New Scotland Yard Amateur Radio Society, Room 99, New Scotland Yard, Broadway, London SW1H 0BG". Direct cards must include an sae (or minimum of two ircs from abroad) or they will be returned via the bureau.

To avoid disappointment the society would like to make it clear that members of the public are not admitted to police buildings, and visits to the station cannot therefore be allowed.

BATC convention

The British Amateur Television Club is holding its bi-annual convention at the Post House, Leicester, on 5 September 1982. The convention will be run on similar lines to a mobile rally, and will include trade stands together with a full lecture programme and demonstrations of amateur television.

The doors will open at 11am, and admission is free.

Expedition to Flat Holm Island

Barry College of Further Education Radio Society is planning an expedition to Flat Holm Island from 27 to 31 August, when GB2FI will be operational to celebrate Marconi's pioneering tests from the island.

Operation will be on all hf bands—Flat Holm is the only Welsh land at AT26(WAB)—70MHz (a.m. or ssb) and 144MHz (ssb and fm). It is also hoped to run monochrome fastscan atv and/or ssb on 432MHz, and to operate 10GHz wideband fm equipment. Anyone interested in contacts on 70MHz, atv on 432MHz or fm on 10GHz is asked to contact Mr S. Lloyd Hughes, 1 Min y Mor, Barry, CF6 8QG.

Can you help?

Accommodation in the Birmingham area within easy reach of Aston University is urgently required by a licensed second-year pharmacy student, October to June term time only. He would appreciate being with a licensed (or sympathetic) household. Anyone able to help is asked to contact Mr P. D. Johnson, G3UQX, 1 Ferndale Drive, Ratby, Leicester LE6 0HL.

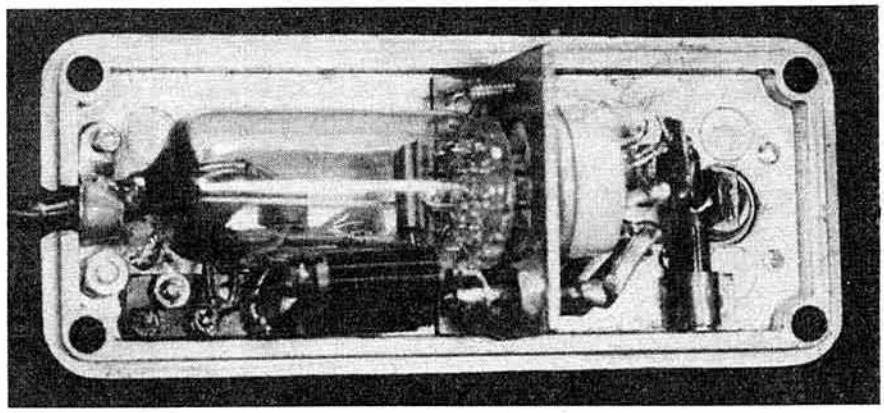
"CQ-GM"

A Zone G conference will be held at the Scottish Amateur Radio Convention from 1100 to 1230 on 11 September 1982

(See *Rad Com* July for convention details)

Please notify topics for discussion, prior to the conference, to Frank Hall, 45 Priory Cottages, Lunanhead, Forfar.

A reliable noise generator



by G. R. JESSOP, CEng, MIERE, G6JP*

A RELIABLE MEANS of measuring the noise performance of a receiver (with or without preamplifier) is essential for the serious amateur radio experimenter. Although useful comparative noise generators may be made using a semiconductor diode, they are usually unpredictable and do not allow day-to-day measurements of repeatable accuracy. An alternative noise generator can be made using a hot resistor or small lamp, but this type is difficult to calibrate with equipment available to the average experimenter. Fortunately another type, the thermionic diode noise generator, does not suffer from these problems.

In the thermionic diode noise generator a special diode with a pure tungsten filament (cathode) is operated under conditions of saturation, the diode anode current being adjusted by the filament temperature. Suitable diodes for this purpose are the CV2171-A2087 or 5722 American; these types are interchangeable provided pin 7 is not connected (the centre tap of the filament is not brought out in the British version). For measuring a receiver noise factor, the diode is used together with a source resistance to match the receiver input. This resistance is generally either 50 or 75Ω to suit the antenna system used, and it is only necessary to adjust the current through the diode to double the noise output of the receiver (for this the agc should be switched off). Under these conditions the noise output of the generator is equal to that of the receiver.

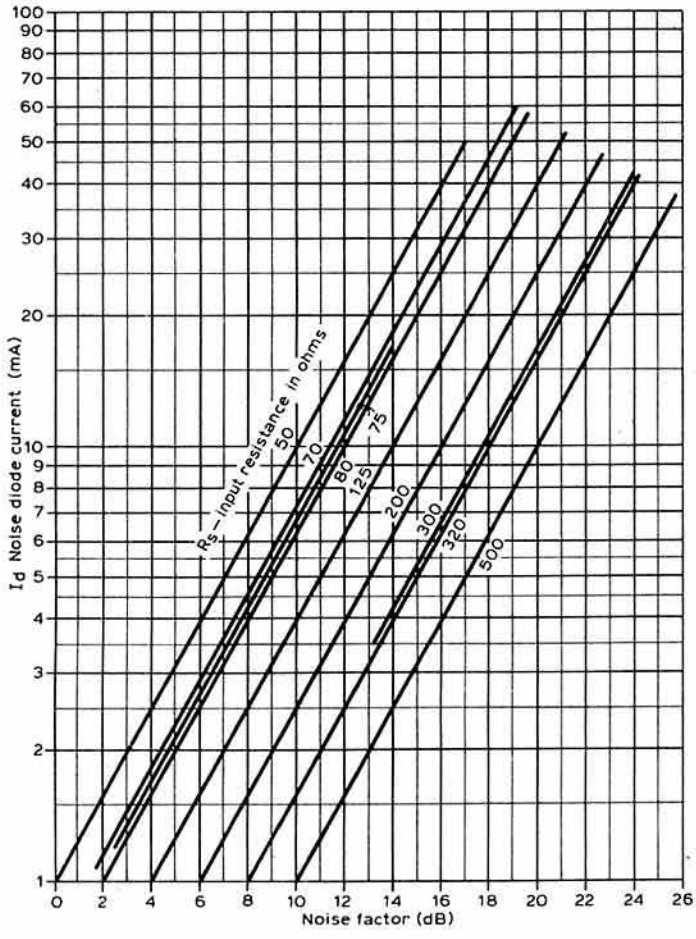


Fig 1. Noise diode current-noise factor curves for various diode noise generator source resistors

Noise factor

Noise factor may be calculated from $F = \frac{e}{2kT} I_d R_s$

where e is electron charge = $1{\cdot}59 \times 10^{-19}$ coulomb
k is Boltzman's constant = $1{\cdot}372 \times 10^{-23}$ joules per °K
T is temperature of source resistance (°K)
I_d is noise diode anode current (amps) to double receiver noise output power
R_s is source (load) resistance (ohms)

At normal temperature (290°K) the above formula becomes

(a) as a ratio $F = 20\, I_d R_s$
(b) in decibels $F = 10_{\log} (20\, I_d R_s)$

In Fig 1 the relationship between anode current and noise factor is given for various values of source (load) resistance.

A unit such as the one to be described (Fig 2) will give reliable results up to around 200MHz, and repeatable results on 432MHz—although at this frequency the results are likely to be 0·3–0·5dB higher due to transit time effects. With a noise generator of this type it is essential to have (*a*) a smooth control of the filament voltage, and (*b*) an accurate meter to read the diode anode current. Because the noise factor levels of particular interest are generally below 5dB, or diode anode currents below 3·5mA, it is desirable to be able to read the current to 0·1mA. This means that a fairly large-scale instrument is necessary.

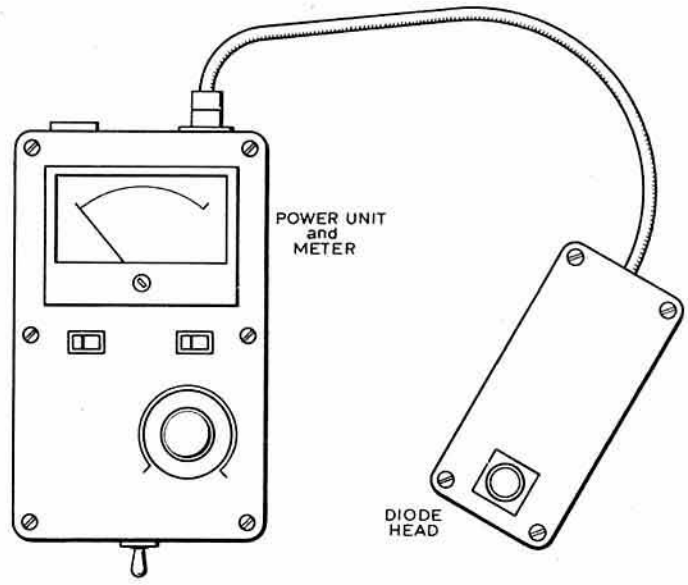


Fig 2. Sketch of the complete unit

*32 North View, Eastcote, Pinner, Middx

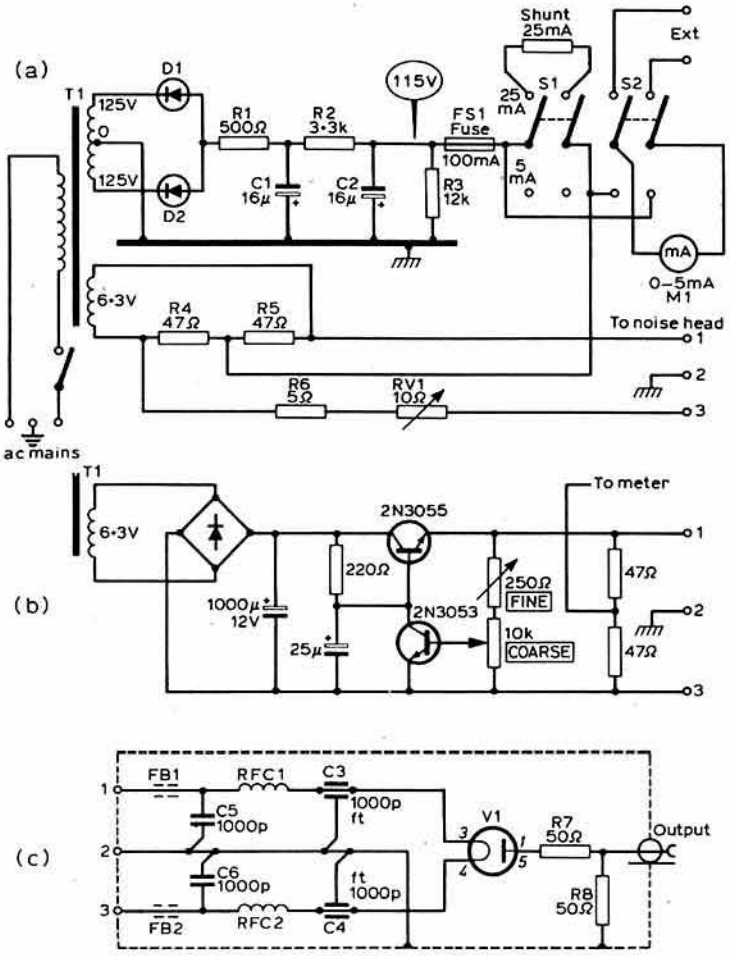


Fig 3. Circuit diagrams: (a) power unit; (b) alternative filament supply; and (c) noise head

Construction

The whole unit comprises a power supply with diode filament control, meter, and diode head (Fig 3)—good construction of the latter is important, as with any vhf unit.

Diode head unit

The diode head is built in a small die-cast box with all the components attached to the lid for ease of wiring; the location of the various items is

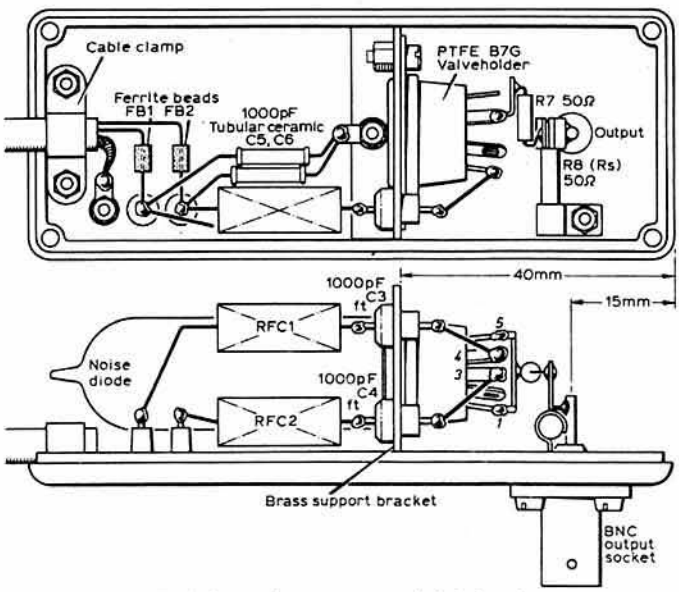


Fig 4. General arrangement of diode head

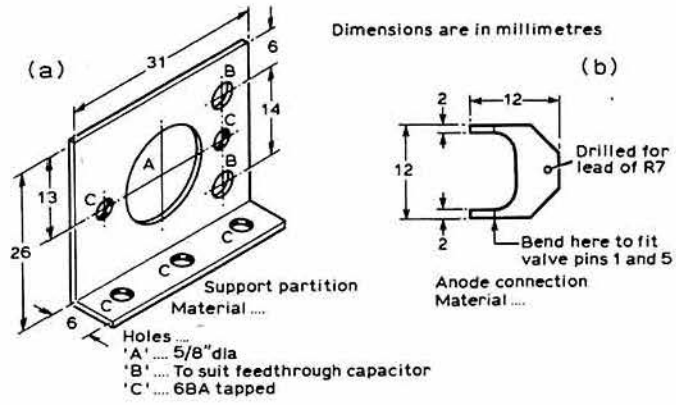


Fig 5. (a) Support partition; (b) anode connection bent to fit pins 1 and 5

shown in Fig 4. Care is necessary in fitting all the components within the space, particularly those mounted on the "bulb" side of the partition, such as the rf chokes, the tubular ceramic bypass capacitors and the ferrite beads.

First make the partition (Fig 5(a)) that forms the support for the valve socket and an earth connection for the feedthrough capacitors; it should be made of brass for ease of soldering and rigidity. Aluminium can be used if alternative capacitors are chosen, although most of the threaded type are mechanically too large for convenience when fitting the rf chokes. Discoidal type capacitors were used in the original.

The valve socket should be of ptfe insulation. The one used in the original was a below-chassis mounting type, but the normal alternative is equally suitable, although the position of the supporting partition will need to be reduced to allow for the increased height of the diode above the chassis. The filament connections to the feedthrough capacitors were made of 2mm wide

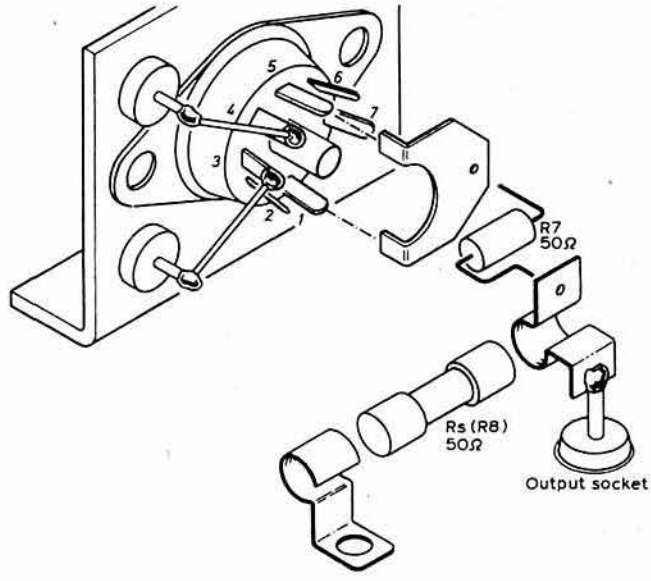


Fig 6. Exploded view of output circuit components

26swg copper strip. The anode connection to pins 1 and 5 is made by a small plate, as shown in Fig 5(b), which minimizes the inductance and is an important design feature. In Fig 6 the various components are shown in an exploded view. In the original design the terminating resistor was a 50Ω 1W precision type, but this may be replaced by either two 100Ω or three 150Ω composition resistors with some alteration of the connecting clips.

The filament decoupling rf chokes are wound on standard ferrite formers (cores) 5·3mm diameter, 16mm long, with wire end leads, the winding being close-wound 22t of 26swg wire. The second pair of bypass capacitors following the rf chokes are tubular ceramic type—disc type may be used, but these require some care in positioning to avoid fouling the diode's bulb. Also the actual position of the ferrite beads needs to be to the side of the glass bulb.

It is preferable to use twin-screened cable for the inter-connecting lead from the diode head to the power unit, the screen being connected to the diode head box and to the power unit case at the plug.

Power unit and indicator

These are of normal design except that the positive of the ht lead is earthed, and sleeved capacitors are needed. Almost any power transformer that will give 75–100V ht at up to 25mA, with either a half-wave or bi-phase rectifier and a 6·3V filament supply of up to 0·6A, is suitable. A standard transformer having a 125–0–125V at 25mA and 6·3V 1·2A —a so-called "midget mains transformer"— was used in the original, and fits comfortably in a standard die-cast box.

The anode current meter, the range switch and the filament control resistors are mounted on the lid; note that these are positioned over the ht supply smoothing capacitors. The connecting leads to the meter circuit and the filament control are made long enough for the lid to lay flat when removed from the box. Details of the component layout are shown in Fig 7.

In Fig 3(b) an alternative filament control arrangement is shown, which gives a very fine control of the filament voltage. However, it needs two variable resistors, but as they can be quite small, their installation in place of the one variable and one fixed resistor used in the original should not be a problem.

Note. "Industrial" type valves are no longer freely available, but the makers still have some stock, although they are expensive. It is recommended that the CV2171 type is sought from the surplus suppliers. □

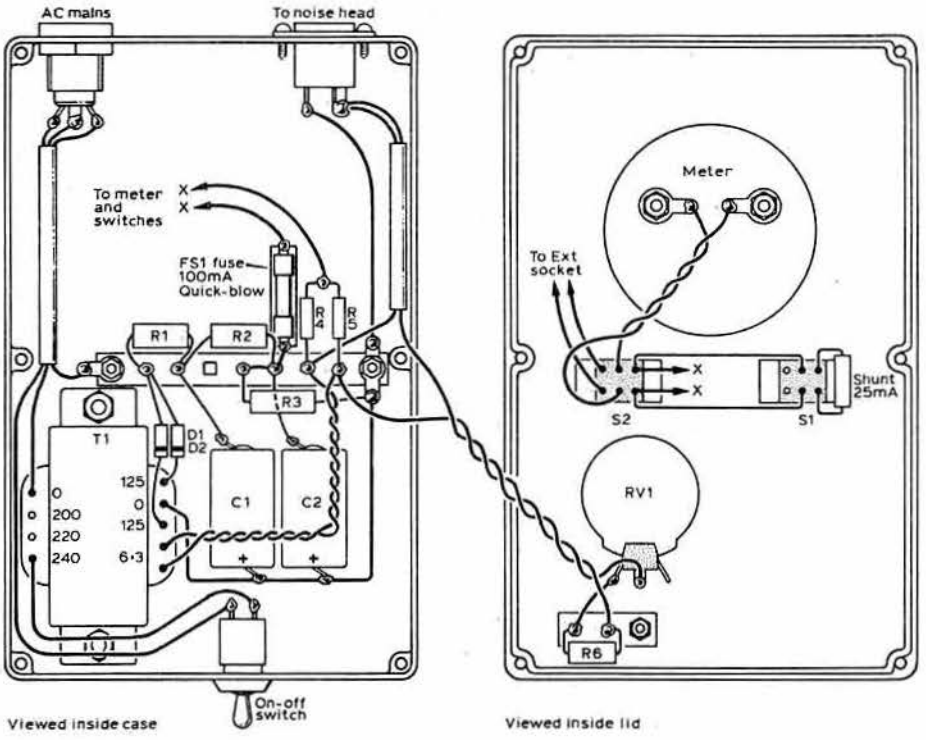
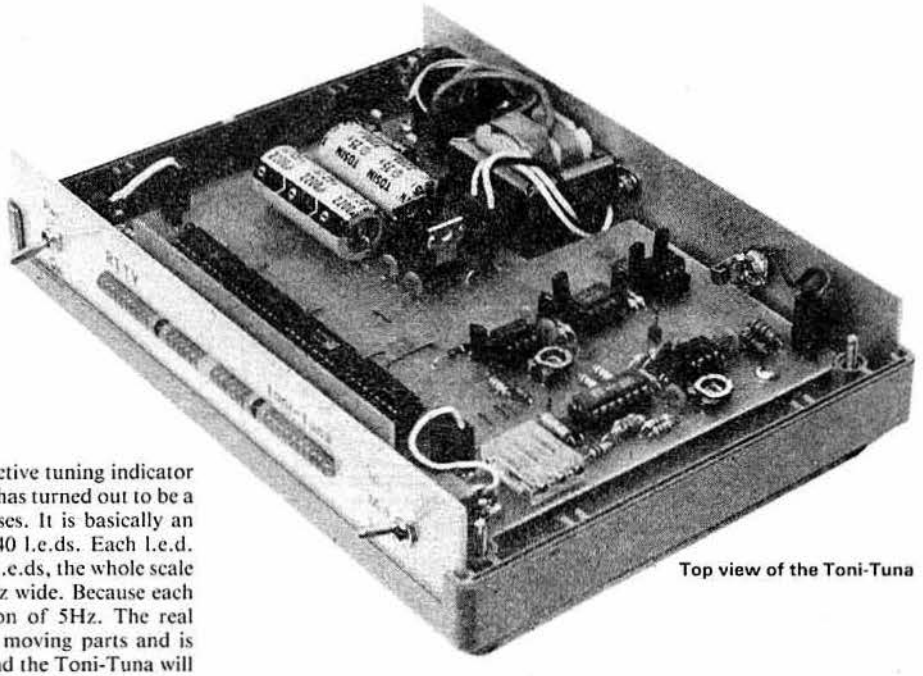


Fig 7. Power unit and meter, internal view

The Toni-Tuna

by A. J. OAKLEY, G4HYD*



Top view of the Toni-Tuna

Introduction

The Toni-Tuna was designed to be a simple and effective tuning indicator for rtty signals, but apart from this prime function it has turned out to be a very useful instrument for a variety of other purposes. It is basically an audio frequency meter, whose display is a row of 40 l.e.ds. Each l.e.d. represents a frequency 10Hz different to its adjacent l.e.ds, the whole scale thus covering a portion of the audio spectrum 400Hz wide. Because each l.e.d. overlaps, it is possible to read to a definition of 5Hz. The real difference, however, is that an l.e.d. meter has no moving parts and is inertia-less. Full advantage has been taken of this, and the Toni-Tuna will accurately indicate the frequency of a short burst of audio less than 20ms long (ie a single "space" signal in rtty). As a bonus, it will easily measure the frequency of a toneburst as used for repeater operation—the only instrument the author knows that is capable of this feat.

Circuit description

IC1 is a limiting amplifier whose function is to provide a constant amplitude signal to the next device. As it fully limits with only 50mV on the input, only a small amount of audio is needed, which may be taken from the headphone socket on the receiver, or from the speaker terminals. Because this stage

*100 Normandy Avenue, Beverley, N Humberside HU17 8PF.

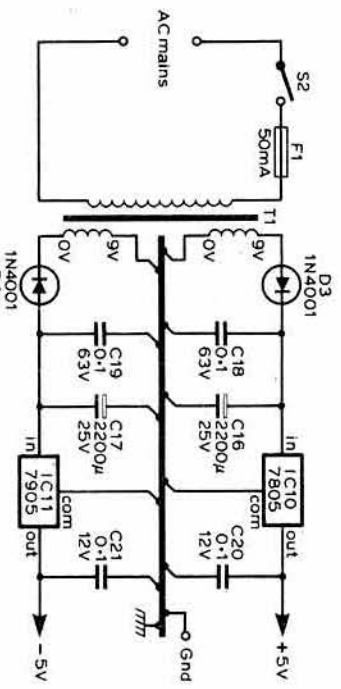


Fig 4. Power supply

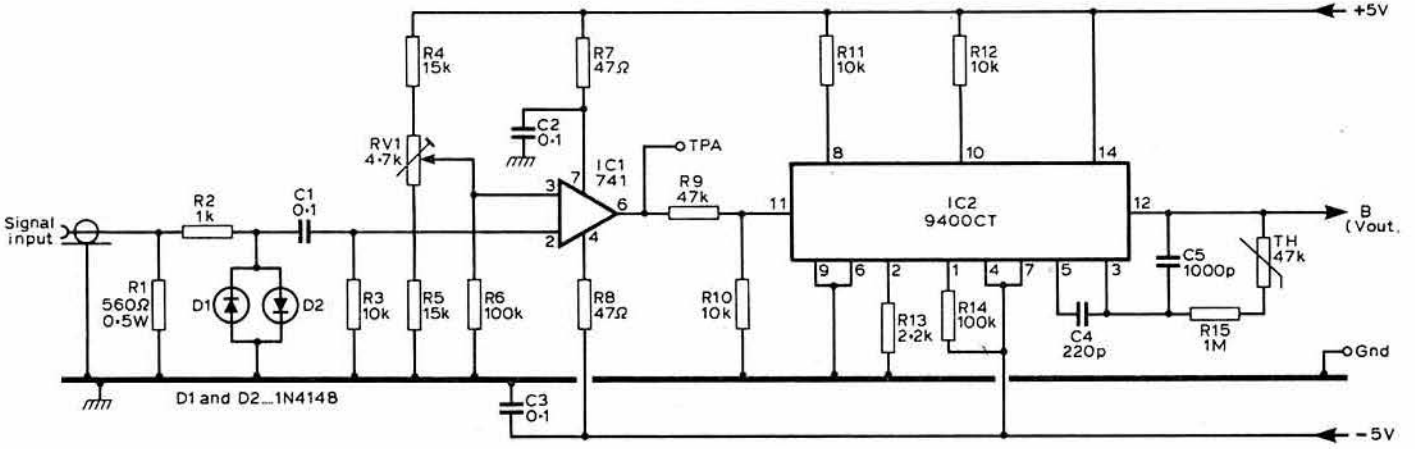
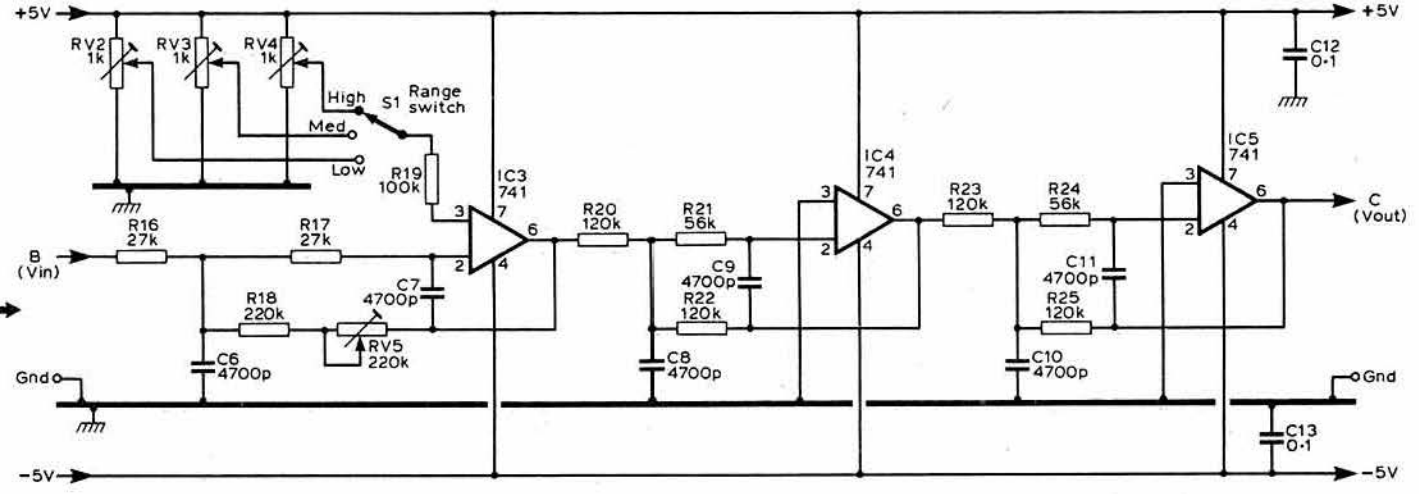


Fig 1. Input amplifier and F to V converter

Fig 2. DC amplifier and lowpass filter



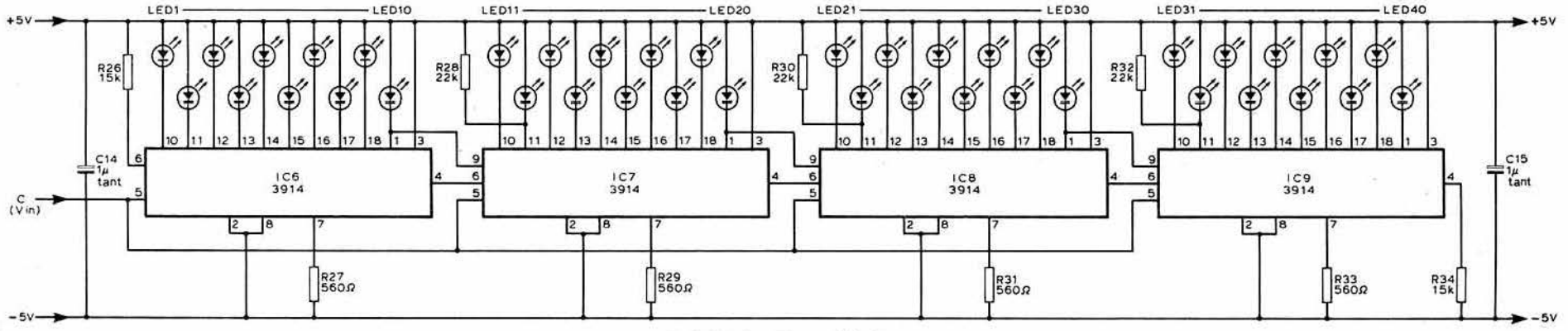


Fig 3. Display drive and display

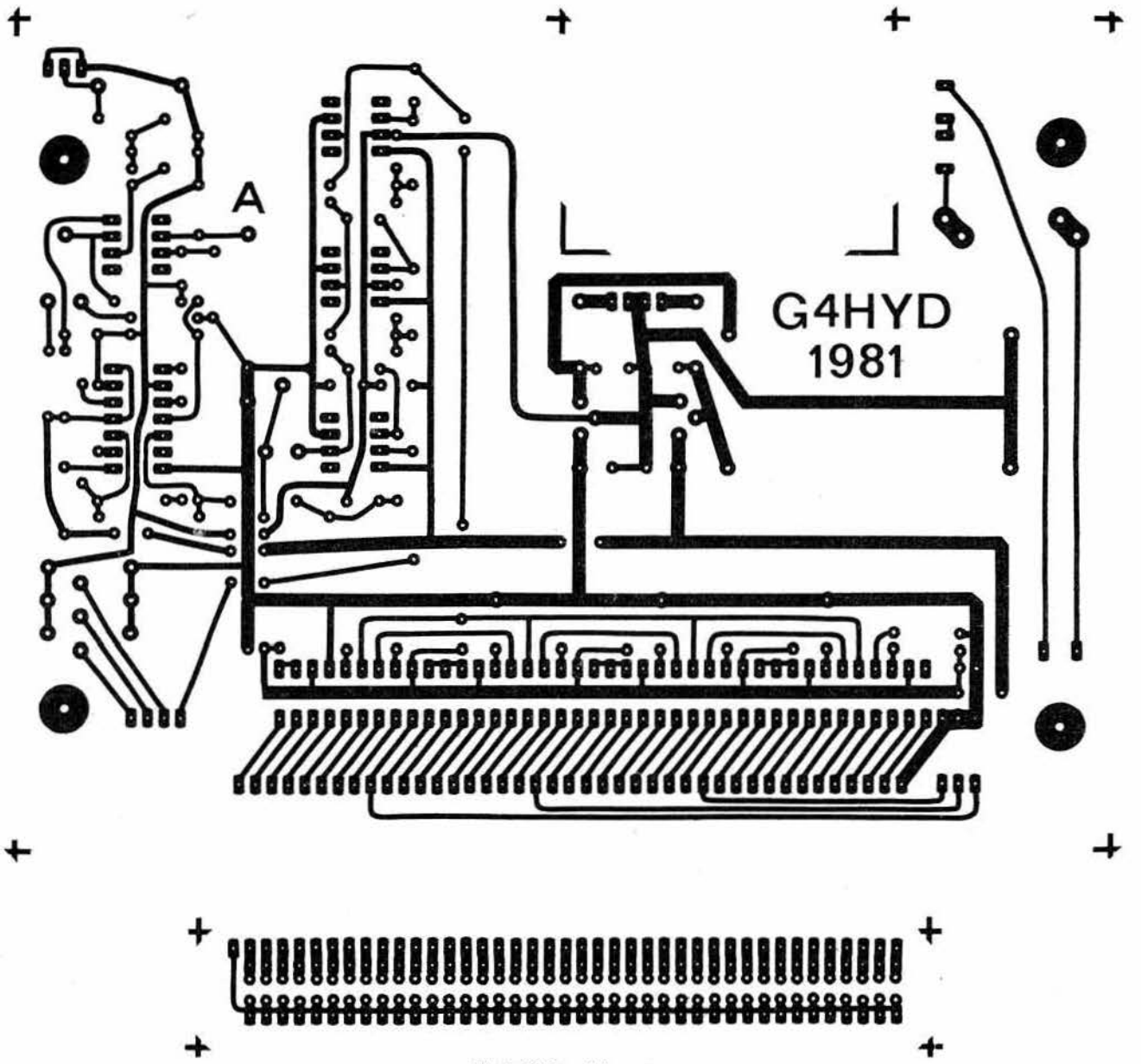


Fig 5. PCB track layout

Components list

R1	560Ω, 0·5W	C1, 2, 3, 12 13, 20, 21	0·1μF 12V ceramic
R2	1kΩ, 0·25W		
R3, 10, 11, 12	10kΩ	C4	220pF polystyrene
R4, 5, 26, 34	15kΩ	C5	1,000pF polystyrene
R6, 14, 19	100kΩ	C6, 7, 8, 9, 10, 11	4,700pF mylar
R7, 8	47Ω		
R9	47kΩ	C14, 15	1μF 15V tantalum
R13	2·2kΩ	C16, 17	2,200μF 25V electrolytic
R15	1MΩ	C18, 19	0·1μF 63V, polyester
R16, 17	27kΩ		
R18	220kΩ	D1, 2	IN4148
R20, 22, 23, 25	120kΩ	D3, 4	IN4001
		IC1, 3, 4, 5	741
R21, 24	56kΩ	IC2	9400CT
R27, 29, 31, 33	560Ω	IC6, 7, 8, 9	3914
		IC10	7805
R28, 30, 32	22kΩ	IC11	7905
RV1	4·7kΩ hor trimpot	S1	SP-3W
RV2, 3, 4	1kΩ multi-turn trimpot	S2	SP-1W
RV5	220kΩ hor trimpot	LED1-40	See text
TH	47kΩ thermistor	T1	9-0-9V @ 100mA
F1	50mA 20mm		
Case	Verobox 201, Part No 202-21034J		
PCB	An etched, tinned and drilled pcb is available from the author		

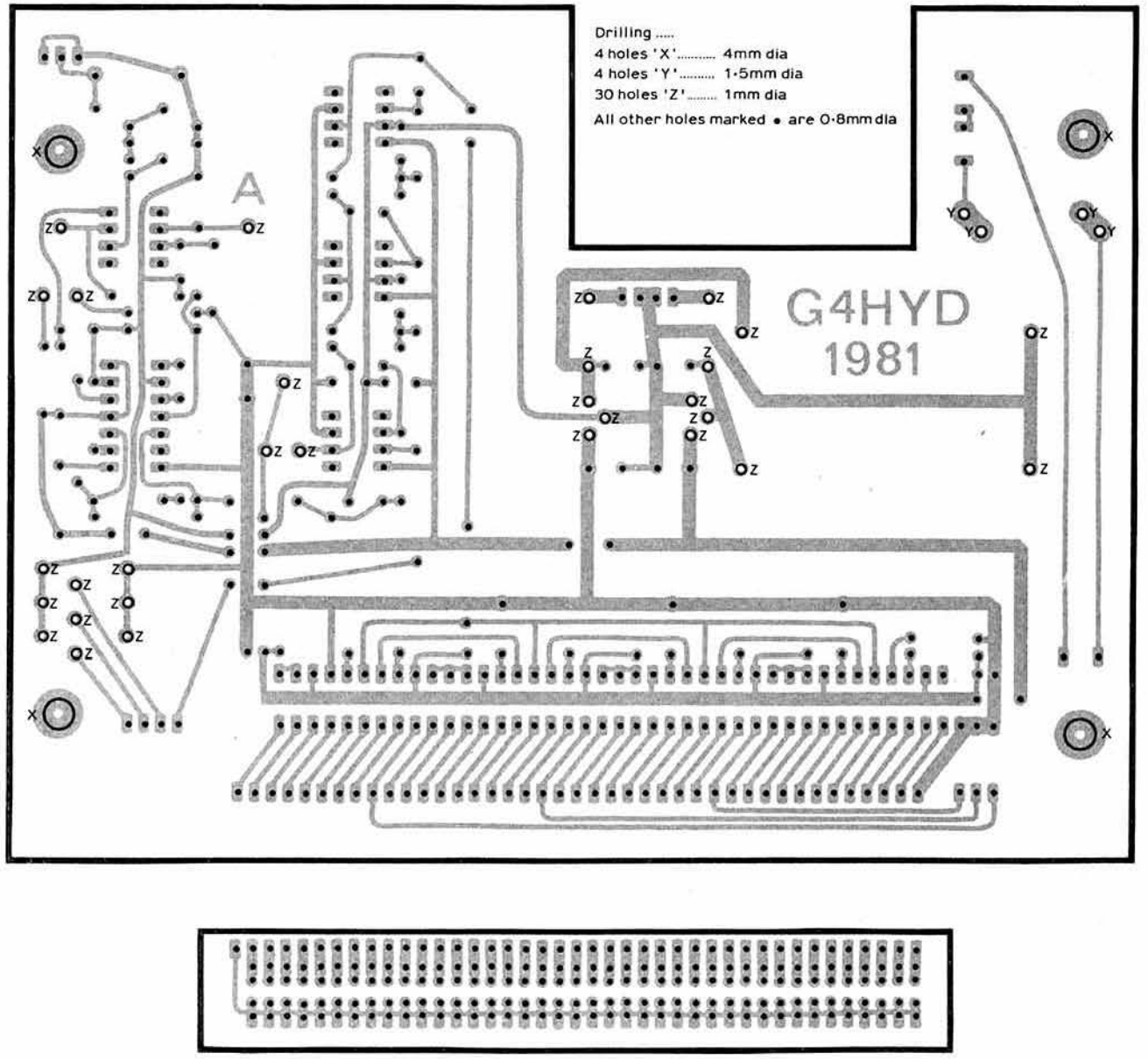


Fig 6. PCB drilling plan

operates at a very high gain, RV1 is provided to adjust for any dc offset that may occur.

IC2 is a frequency-to-voltage converter. With the values of components used, it will have a linear relationship between the average output voltage and the input frequency up to about 3,000Hz. However, because zero hertz input generates zero volts output, and because only a small portion of the audio spectrum is of interest, the actual output voltage used is considerably offset, and only varies by about 400mV. In addition it has a considerable ripple content at the input audio frequency.

IC3 is used to convert this offset output voltage from IC2 into a voltage varying over a range of ± 3V on either side of zero. RV5 sets the stage gain, and RV2, 3 or 4 set the bias to counteract the offset in the input voltage. Finally, the feedback components are chosen so that the device operates as a single-stage active low-pass filter. This is followed by two further stages of unity gain low-pass filters in ICs 4 and 5, which effectively remove the ripple content, yet allow the output voltage to follow rapid changes of signal frequency.

ICs 6, 7, 8 and 9 are l.e.d. bargraph drivers cascaded to drive 40 l.e.ds, in the "dot" mode. Component values are chosen so that − 3V input to the display ICs just lights the first l.e.d., and + 3V just lights the last l.e.d., and l.e.d. current is held at 20mA.

ICs 10 and 11, together with the transformer, diodes and associated capacitors, provide the dual rail supply voltages required by the unit.

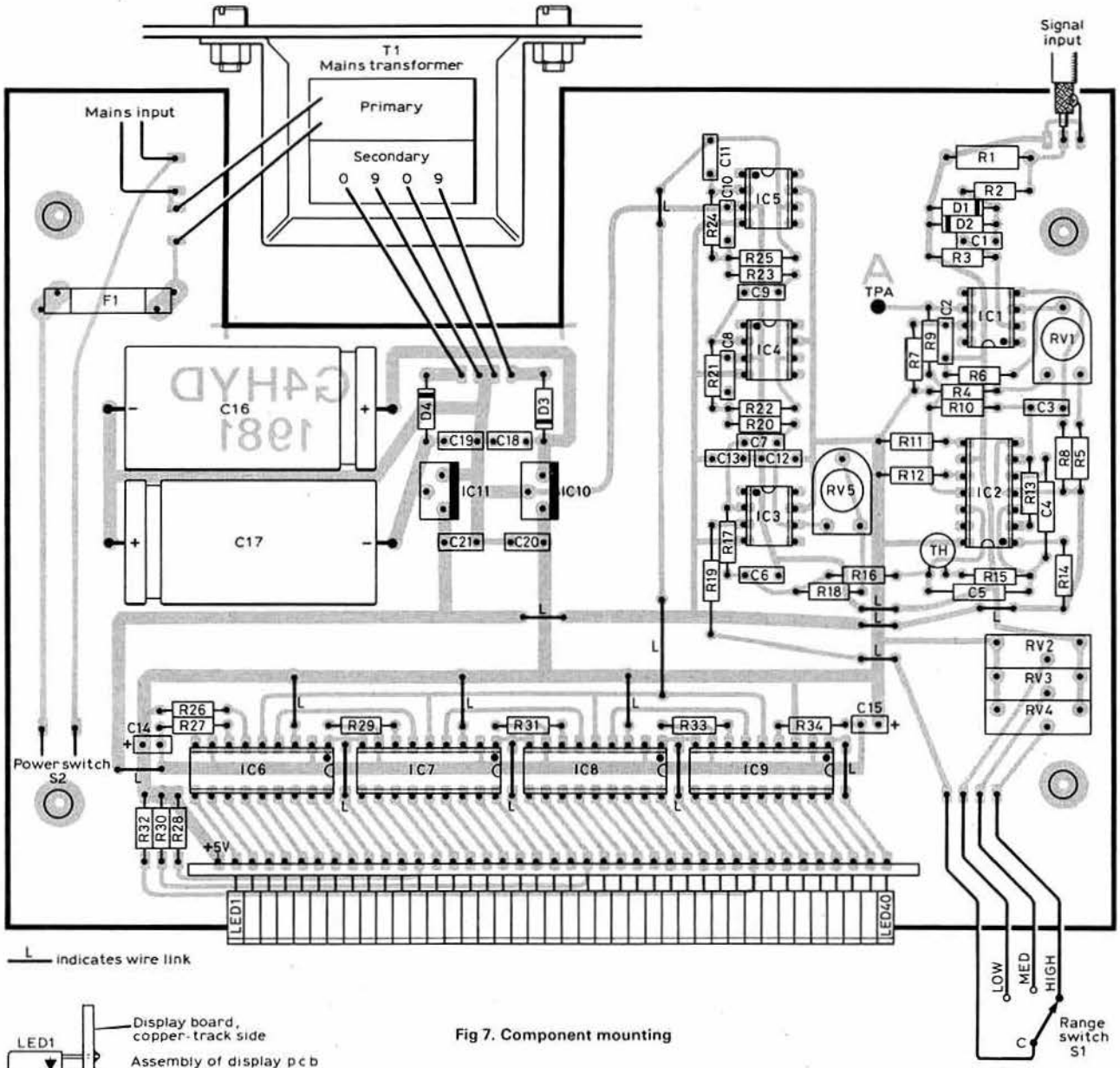
Construction

First decide upon the display it is intended to use. The display board will accept either discrete l.e.ds (the ones designed for 0·1 spacings) or four of the 10-bar dil arrays. If the latter are used, they may be mounted in ic sockets, but use the low-profile type to save space. If using discreet l.e.ds, an effective way of indicating "mark" and "space" is by using different colours. The author uses red l.e.ds for mark and space frequencies, yellow l.e.ds either side of the red ones, and green l.e.ds for the rest of the scale.

Before mounting any components, fit the display board to the main board. This is done by soldering 41 short (0·5in) lengths of 22swg tinned copper wire to the track side of the display pcb to make a 41-pin "edge plug", looking rather like a comb. Insert this into the 41 holes on the main board from the component side, and solder the other ends of the wires to the main board. Trim off the excess. Next mount the display l.e.ds, as previously decided.

The remainder of the construction is straightforward. Use 22swg wire for the jumpers, and use ic holders if desired, but none of the ics are delicate and they may be soldered directly into position. If only a single-range device is required, S2, RV4 and RV5 may be omitted. In this event, wire a jumper from the SW pin to the LO pin where the wires to the switch would have been.

The transformer, cassette type mains input plug and 3·5mm audio input jack socket are mounted onto the rear panel, and a slot is cut in the front panel to view the display.



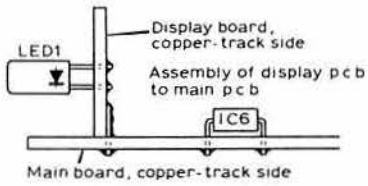


Fig 7. Component mounting

Setting up

Short the input terminals, and connect a voltmeter between TPA and ground. Adjust RV1 so that the voltmeter reads zero. This might not be possible as the meter may swing right across between + 5V and − 5V. In this case adjust RV1 as close to the cross-over point as possible. Remove the short.

Select the limits of the particular segment of the audio frequency required to be displayed. For the standard IARU rtty tones of 1,275/1,445Hz, the lower and upper limits will be 1,165 and 1,555Hz, and the setting up procedure for these frequencies will be described.

A stable audio oscillator and a frequency counter are required. Connect the frequency counter to read the audio oscillator frequency while the signal is applied to the input of the Toni-Tuna. At an input frequency of 1,165Hz, adjust RV3 so that the left-hand l.e.d. is lit. Swing the input frequency up to 1,555Hz and adjust RV5 so that the right-hand l.e.d. is lit. Repeat these two adjustments a few times until no further improvement can be made.

The other ranges, if fitted, are then set up by applying an input frequency corresponding to the lower edge of the scale, and adjusting RV3 or RV4 so that the left-hand l.e.d. is lit when the appropriate scale is selected by S1. Do not re-adjust RV5.

Uses

As an rtty tuning device, note the position of the two l.e.ds representing the "mark" and "space" tones. When tuning-in an rtty signal a "bar" of 17 l.e.ds should be seen moving across the display as the receiver is tuned across the signal. The two end ones will be brightly lit, and the intermediate ones will be a lot fainter. Adjust the receiver tuning to bring the ends of this bar coincident with the mark and space indications.

The length of the bar is proportional to the frequency shift, which can be measured off the air to an accuracy of 5Hz, and with afsk signals the actual frequencies can be measured with the same accuracy. Straddle tuning of fsk signals with incorrect shifts is easily accomplished, giving improved reception, and signal distortion is indicated by a "widening" of the ends of the bar so that 2, 3 or more l.e.ds are brightly lit.

A little practice on the air will quickly show how to use the Toni-Tuna to best advantage, and although it does not give quite as much information as a phase-shift monitor (see *Rad Com* April 1981, p324), as a pure tuning device it is unexcelled. Do not be surprised if the signal appears to drift during a QSO. It really may drift, due to both transmitter and receiver deficiencies, and the Toni-Tuna will show-up drifts as small as only 5Hz —far in excess of the stability of the best communication equipment in amateur use today.

As an accurate audio frequency meter, mark a scale alongside the l.e.ds. For measuring tonebursts the scale should be adjusted so that both the two centre l.e.ds light up when an input signal of 1,750Hz is applied, as this will give the greatest indication accuracy.

An atu for the RX80 receiver

by TONY BAILEY, G3WPO*

THE UNIT TO BE DESCRIBED was designed to complement the RX80 receiver which was described in *Radio Communication* January–April, June–August, September, October 1981. However, it will work with any similar receiver, and can also serve as a low-power atu for transmitting purposes up to about 5W. It is intended for unbalanced antennas, or those terminating in a coaxial feeder, such as most G5RV antennas. By changing the capacitors to air spaced, it would be possible to use the unit for higher power transmitters, and it will work well with mobile installations.

A toroid inductor is used for the coil, giving a wide range of inductance in a small space. A facility is provided for switching the unit out of circuit if required.

Circuit description

Many listeners, and a large number of licensed amateurs, use multiband antennas of the "long wire" type, where the antenna may be resonant at one frequency, but will exhibit a mismatch at most other frequencies to the receiver or transmitter. In order to transfer maximum signal to the receiver input circuits, which will almost certainly be designed for 50Ω impedance, an impedance transformer is required between the antenna and the receiver. This will transform the impedance of the antenna, which may range from a low value up to several thousand ohms, down to the required low impedance input at the receiver.

The atu circuit (Fig 1) is of a standard "T" configuration, similar to the transmatch atu originating in the USA, but without the additional series input capacitor (which is primarily intended for harmonic suppression). The input and output capacitors (C1, 2) are Jackson Bros Dilecon type of 500pF maximum capacity. These are ideal for this sort of application, as air-spaced capacitors of the required values tend to be expensive, although they would be required for a higher power transmitting version.

Twelve taps are provided on the inductor, with unused windings shorted out. The atu has proved capable of matching most antennas offered to it, in both receive and transmit applications. S1 is used to route the antenna direct to the receiver if required.

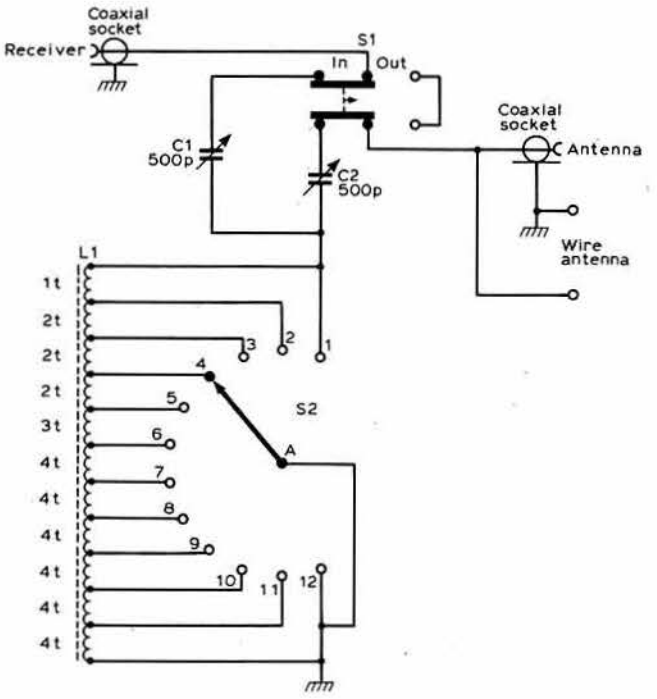


Fig 1. Circuit diagram

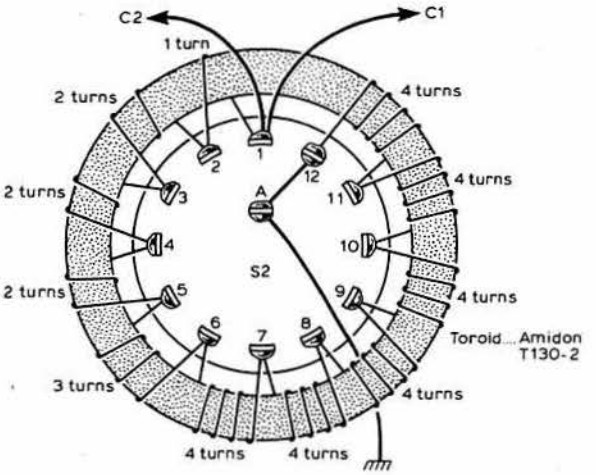


Fig 2. Toroid winding drawing

Construction

The prototype was built in a Centurion DX1 case, but this is not critical and any screened enclosure can be used. Step-by-step constructional details are not really required but two points need explanation.

The Jackson capacitors have the rotors connected to the spindle bush, hence they need to be insulated from any metal front panel. In the prototypes, oversize holes were drilled in the panel for the capacitors, the fronts insulated with the plastic backing discs which come with the scale discs, and the rear isolated from the panel with small pieces of glass-fibre pcb with central holes of the correct size for the spindles.

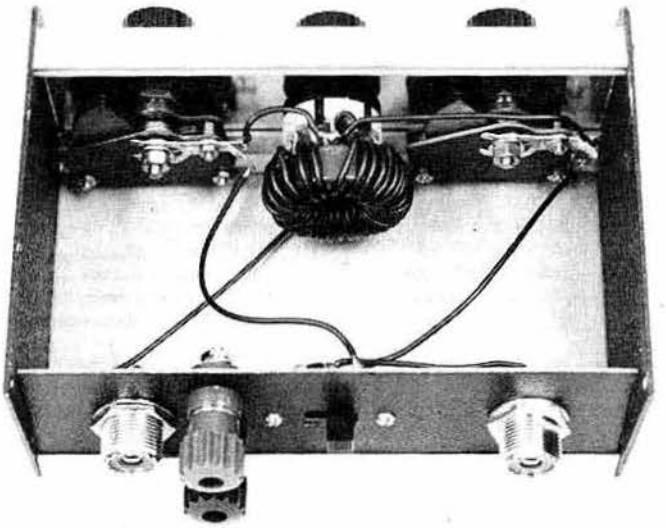
A front panel entirely made from plastic sheeting is an alternative. When fixing the capacitors into place, make sure that the spindles are clear of a metal front panel both before and after tightening the nuts up.

The inductor (Fig 2 and photo) is wound with individual groups of turns between the switch tags, rather than in a continuously tapped winding, to aid construction. Using reasonably stiff insulated wire, prepare one length 53mm long (one turn), three lengths 95mm long (two turns), one length of 135mm (three turns) and six lengths 175mm long (four turns). Strip 5mm of insulation from both ends of each wire and tin the stripped ends.

Before soldering in the turns, connect two lengths of wire to the pole of the switch, as these are difficult to solder in once the turns are in place. The turns can then be wound (all in the same winding sense) starting with positions 1 and 2 (marked on the back of the switch), soldering, then continuing with positions 2 and 3 etc. When finished, tidy up the spacing of the turns all round. There should be no connection between positions 12 and 1.

The remainder of the wiring is as Fig 1. The rear panel has a coaxial output socket, and paralleled screw type connectors to allow for both single-wire and coaxially fed antennas.

In use, the switch should be set to maximum inductance (position 12) and



Detail of toroid and switch

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

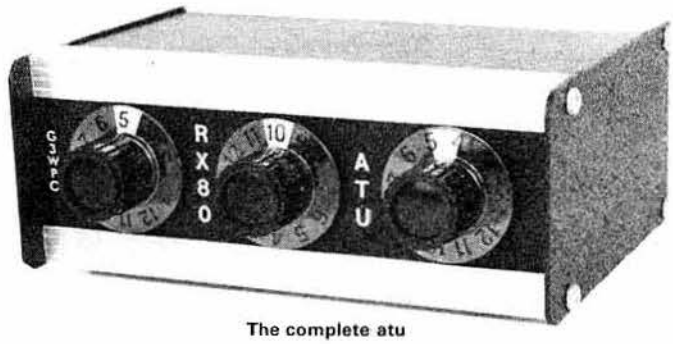
Components list

C1, 2	0·0005μF Jackson Dilecon
L1	(See text) wound on Amidon T130-2 core
S1	2p c/o slide switch
S2	1p 12-way Lorlyn switch (rotary)

Miscellany
Three knobs 0·725in dia (RS type 499-040)
Three dial skirts to suit knobs (RS type 499-832)
Two SO239 sockets
Two insulated screw terminals
Insulated wire
Centurion case type DX1

All of the above are obtainable from the author as a kit. The Jackson capacitors, switches and toroid are available individually from the same source.

the two capacitors at mid-range. The inductance can then be reduced until the position which gives maximum signal strength is reached, when the two capacitors can be adjusted for optimum signal. If this occurs at the extremes of one or both of the capacitors, then the inductance should be increased or decreased one step and the adjustments repeated.



The complete atu

The atu will earn its keep with non-resonant antennas, especially of the random long-wire type, when appreciable increases in signal strengths can be expected on those frequencies where a mismatch normally occurs. □

A simple way to double the channel coverage of the IC240

by W. G. JONES, GW4KJW*

Introduction

A considerable number of designs to modify the IC240 to give operation on more than the standard 22 channels have been published, even though this very useful little transceiver seems to have gone out of production. However, there are, and will continue to be, a great number of these sets giving valuable service for many years to come. Many of these previous modifications have included external switching arrangements or, as in the case of one of the most recent [1], the addition of extra circuitry inside the case of the transceiver.

The simple modification below requires no external switching, nor does it require any drilling of holes or other butchering of the transceiver case, and apart from changing one of the existing components the only other component added is a diode.

Design

Examination of the circuit diagram and the diode matrix tables in the IC240 manual will show that frequency selection and determination are dependent on a binary-coded input to the programmable divider. This binary coding is obtained on the standard transceiver from the diode matrix. Each position of the rotary, front-panel channel switch selects a maximum of seven diodes within this diode matrix, which results in an eight-bit output corresponding to the binary coded number 'N', which is in the range 64 to 144.

This being so, the existing channels programmed on to the diode matrix are all removed and, following the procedure in the manual, new channels in 50kHz steps are programmed in, ie S10, S12, S14, S16-S20, S22 etc. It now only becomes necessary to find a simple way of switching in an additional diode on the 25kHz line to provide a fill-in of the missing odd-numbered channels.

Construction

Not wishing to drill a hole anywhere on the set, or have an extra switch mounted externally, the problem now is how to make use of one of the existing switches and still retain the original functions. If one did not mind losing the low-power facility, it would be possible to hard-wire the power

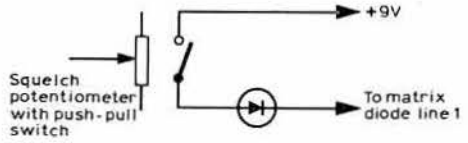


Fig 1. Squelch potentiometer with push pull switch

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Table 1. Suggested programmed channels

Channel	MHz	Channel	MHz	Channel	MHz
1	144·5	9	144·9	17	145·3
2	144·55	10	144·95	18	145·35
3	144·6	11	145·0	19	145·4
4	144·65	12	145·05	20	145·45
5	144·7	13	145·1	21	145·5
6	144·75	14	145·15	22	145·55
7	144·8	15	145·2		
8	144·85	16	145·25		

These channels when programmed on to the diode matrix, together with the modification, will give complete coverage in 25kHz steps between 144·5 and 145·8MHz.

output selection in the high-power position and use this switch to control the 25kHz diode. However, many people find the low-power function useful for driving transverters etc, or just for local cross-town natters.

Internal examination of the set will show that there is a reasonable amount of space behind the volume and squelch potentiometer, and one of these may be removed and a replacement which incorporates a push-pull on/off switch may be installed (the author changed the squelch). One pole of this on/off switch should be connected to the + 9V line, which may conveniently be done by taking a connection to where the existing rotary switch wiper tag is connected to + 9V. The other pole of the switch should be connected via a diode to the 25kHz line on the diode matrix (matrix line1), see Fig 1.

Now, if it has not already been done, re-program the diode matrix to cover the frequency range required in 50kHz spacings; Table 1 gives a suggested channel plan.

Conclusions

The modification is simple, three units having been modified in this way already, with no problems being encountered.

It soon becomes an easy matter to remember the channel arrangement, and channel selection even under mobile conditions is quite straightforward. Following on from the above, it would be a simple matter to extend the principle to both volume and squelch potentiometers, and by re-programming the diode matrix in 100kHz steps have 80 channels available (88 actually, but only 80 in the amateur band). Most users should find that the 44 channels which this modification gives them are enough, and with careful planning the whole of the fm part of the band and most of the usable channels in the all-modes part of 144MHz can be fitted in.

Reference

[1] "Converting the IC240 to 24 channels", R. C. Sterry, G4BLT. *Rad Com* October 1981, p922. □

A helical duobander

by W. HAZELDEN, G8FR*

VERY LITTLE appears to have been published in recent years on the helically-wound element for Yagi antennas, although it has some distinct advantages over more conventional types. It lends itself well to home-construction, and the materials can be obtained without too much difficulty. The saving in element length without any appreciable loss in efficiency is perhaps the biggest advantage. Bandwidth is adequate and allows effective operation over a reasonable frequency span. This antenna is capable of working satisfactorily at modest heights provided that it is "tuned" for the actual height. The only essential piece of equipment is a grid dip oscillator, which must be accurately calibrated.

This nested, two-band, two-element beam covers 14 and 21MHz, and the longest element is 19ft (5·79m). This is a little over half the size of a full 14MHz monobander, and three-quarters the size of the average tribander. In performance this helical appears to be little, if anything, down on the tribander. The front-to-back ratio is of course lower, and a little over two S-points can be expected.

Glass fibre would be ideal for the formers, but hardwood dowelling makes a fair substitute and, although heavier than glass fibre, the wood-based beam was light enough to be picked up with one hand. Some thought was given to element spacing, and finally a boom just over 9ft (2·74m) long, with the 14MHz elements 9ft (2·74m) between centres was used. On 14MHz a radiator and reflector were employed, but on 21MHz a radiator and director, with 4·5ft (1·37m) between centres to ensure adequate separation, was used (see Fig 1).

Plastic-covered wire is the most convenient material to use for the windings. A total of 128ft (39·47m), was found necessary for the lower frequency—61ft (18·59m) for the radiator and 67ft (20·88m) for the reflector. The wire was ordinary domestic single cable 2·5mm thick with a seven-strand core approximately equivalent to 16swg. This is both strong and flexible.

All four elements have 8ft (2·43m) length of 0·87in (22mm) hardwood dowelling as their main support. For the 14MHz antenna, two additional 7ft (2·13m) lengths of 0·62in (16mm) dowelling are fixed to the main support. There is an overlap on each side of 1·5ft (457mm), resulting in a total length of 19ft (5·79m). The 21MHz end pieces are of 0·5in (12mm) diameter dowelling 4·5ft (1·37m) long, with an overlap of 1ft (305mm), making a total element length of 15ft (4·57m). Where the wood overlaps, a slight flat on each surface makes a better fit and counters any tendency for the two to slip. Jubilee hose clips (35mm, size 1) provided an easy and quick way to fasten the elements together, and as long as the metal is properly protected they should last almost indefinitely; four are required for each element, making a total of 16.

"U" bolts and clamping blocks are used to attach the elements to the boom, but before doing so it is necessary to strengthen the wood where they are fitted. Pieces of aluminium tube 3·25in (82mm) long with an outside diameter of 1in (25mm) are slid along the wood to the centre of the element; holes are drilled through tube and element, and the clamping blocks ensure a 90° angle between them and the boom. The flat surfaces of the blocks, if homemade, must be very carefully matched to the profile of the boom and the elements. If these cannot by purchased, pieces of "U" channel fixed back to back would serve. Pieces of well-seasoned oak, thoroughly impregnated with creosote and well dried, would also be satisfactory. The block size is 1·5 by 1·5 by 0·9in (38 by 38 by 22mm).

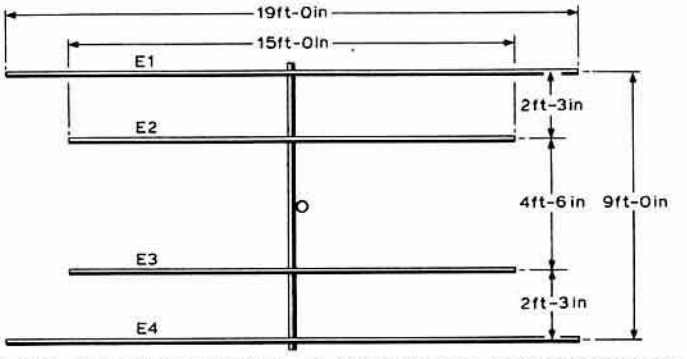

Fig 1. Constructional arrangement of the antenna

The boom was made from a 10ft (3·048m) length of 1·3in (33m) od aluminium tubing, and two pieces each 3·5in (89mm) long were cut from it to serve as strengtheners at the boom ends. About 0·5in (12mm) of metal was sawn away lengthwise from them and the reduced diameter allows them to be made a force fit into the ends. The U-bolt nuts can then be screwed up tightly without any collapse of the boom. When the formers have been completed a coat of marine (yacht) enamel should be applied and allowed to dry quite hard. After completion of testing and adjusting, at least two more coats should be applied.

At this point it must be made clear that the quoted lengths of wire are to be taken as a guide. Unlike aluminium tube, where quoted diameters and lengths will result in exact duplication, this is not the case with handwound wire elements. A certain amount of cut and try is called for, and a careful gdo check made after any alterations. Wire for the 21MHz band was 34·75ft (10·59m) for the radiator and 31·25ft (9·52m) for the director.

Windings were checked for resonance with the elements in clear space, horizontally positioned and 7ft (2·13m) from the ground. When the beam is erected the resonant frequency increases by approximately 200kHz. The 14MHz radiator was grid dipped to 13,900kHz, and at 40ft (12·19m) the resonant frequency was 14,100kHz. The reflector was trimmed to 13,000kHz at the 7ft (2·13m) level. The 21MHz figures are: radiator 20,900kHz, director 22,100kHz. Again as a guide, the number of turns on the 14MHz radiator was 252, and on the reflector 268. All windings were made in the same direction and turns equally spaced. The extra length of wire on the 14MHz reflector was "lost" on each side of centre by closing up the turns slightly.

Any convenient method can be used to couple the antenna to the line; UR43 was used, with a separate length of coaxial cable for each band. A single feed could be used, but this could cause complications of interaction and adjustment of wire lengths. The attachment of coaxial cable to the wires must of course be made quite waterproof. On either band the swr does not exceed 1·2:1 with this 50Ω cable, and for most of each band the swr curve is flat.

Windings were started at the centres, and enough spare wire to form a loop was left for pick up of rf from the gdo; the loosest possible coupling being used when doing so.

The windings were started and finished with adhesive tape, bound with twine, and varnished. Holes were drilled in each of the ends to secure the last turns on to the elements. The wire was wound from a small reel, keeping a fair tension throughout. A standard masthead clamp was used to fix the beam to the mast. It is useful to remember, that as in carpentry it is always easier to take off than to put on. □

Editorial note. The antenna presented in this article represents an approach towards small beams that has been established and accepted for several decades: those who have constructed and used such arrays appear generally to have been satisfied with the results, and it is felt that readers will be interested in the constructional details and procedures described by G8FR. Readers, however, may wish to be reminded that this approach towards compact arrays has not gone unchallenged: see, for example, the considered views of L. Moxon, G6XN, as set out in *Technical Topics* May 1980 in which he stressed his belief in the importance in two-element close-spaced Yagi arrays of achieving critical coupling between the two elements (if necessary by "neutralization") so as to obtain correct phase and amplitude balance, together with the advantages of reducing the effective element lengths by the use of "bent" ends (ie capacitative rather than inductive loading).

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TECHNICAL TOPICS

Pat Hawker, G3VA

THE BASICS of good radio reception change far more slowly than many people believe. Indeed one is tempted at times to feel that almost every fundamental invention can be traced back to one man—Howard ("The Major") Armstrong—who started as a schoolboy amateur radio enthusiast and who undoubtedly became one of the dominating figures of all time in innovative radio engineering—though not, because of the tortuous patent litigation, given full credit during his lifetime for his discoveries. The regenerative "straight" (direct-conversion) receiver; the practical superhet; the super-regenerative receiver; the practical use of frequency modulation for broadcasting and communications—what an incredible record to achieve in those productive years from 1912 until his untimely and tragic death in 1954. There is still no receiver in any amateur radio station that does not utilize at least some elements of Armstrong's work.

From the very beginnings of radio it has been recognized that it is relatively easy to receive signals; the really difficult part comes in *rejecting* unwanted interference. Today, more than ever, radio reception is limited by the strength of the interference rather than by the weakness of the signal. The interference may of course be generated within the receiver itself, due to intermodulation products, spurious responses or "birdies"; it may be electrical noise; or it may be another transmission on the same or adjacent frequencies. It has been said that the superhet is a very powerful type of receiver; it picks up all signals—most of them at least twice!

Phasing-out interference

For amateurs, a great step forward was taken in 1931 by Jim Lamb, W1AL, of ARRL, when he combined the "stenode" crystal filter of Dr Robinson —a British contribution—with Armstrong's superhet arrangement; providing a highly selective i.f. filter that also incorporated a phasing control. This placed a sharp notch anywhere within the passband of the crystal filter. A tunable notch was particularly useful in the days of a.m. phone because it could null out a heterodyning carrier, *provided* that its frequency was slightly offset from that of the wanted station.

Today, with improved crystal filters having good shape factors, passband tuning, notch filters, noise blankers, audio processing etc, the highest grade of receiver can cope reasonably well with interference that is off-set in frequency, though one should note that ssb, for all its advantages, is significantly more vulnerable to interference than broader-bandwidth transmissions.

So why do we still lose stations under QRM and QRN? Basically, it is most often because a much stronger signal or nasty noise comes up right on channel, 20, 30, 40 or even 50dB stronger than the signal we are trying to copy. There is usually nothing that even the most complex receiver can do about that. But are we sure? For example, it is possible by using coherent techniques or special waveforms or spread spectrum techniques to enable the receiver to identify and select only the wanted signal—but such techniques are seldom really suitable for amateur operation. More successfully we may identify the nature of electrical noise or Woodpecker type transmissions and endeavour to blank out the receiver at appropriate times, although this can be difficult to do effectively.

Yet there *is* at least one way in which we *can* separate wanted from unwanted signals—a technique so basic that it is incorporated (though often not very efficiently) in almost every low-cost medium-wave broadcast set: a directional antenna. This *can* "null out" an interfering station quite effectively simply by rotating the set. With ferrite-rods and loops, the nulls are sharper than the maxima because of the classic figure-of-eight pattern. In other words receiver "selectivity" can be improved significantly if we have the ability to null out unwanted signals on the basis of both frequency offset and directional offset, ie in the frequency and space domains.

Controlling directivity

On hf it is well recognized that a rotary antenna is often as valuable for its ability to reject unwanted signals as for its ability to provide gain in the forward direction.

A few years ago Ken Franklin, G3JFK (*Rad Com*, "New products" April 1980, *TT* May 1980) developed an ingenious and elegant system whereby the rejection nulls of a Yagi or quad array antenna could be adjusted remotely from the operating position, using servo mechanisms to control variable capacitors mounted on the antenna: it was marketed as the Antenna Vector Processor type AVP4. It has also been indicated in the past that by bringing separate transmission lines down from each element of a two-element Yagi or quad array it is possible to adjust the polar pattern of a beam array from the operating position (as well as being able to provide instant reversability).

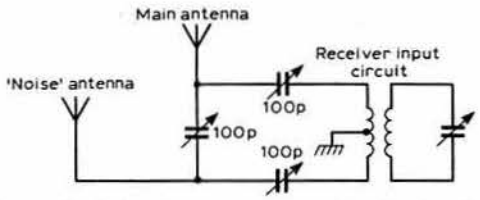

Fig 1. The Jones noise-balancing arrangement as described in early editions of *The Radio Handbook* was aimed at phasing out electrical interference by means of pick-up on an auxiliary antenna being used to provide a balancing (180° out-of-phase) signal to the receiver. It required careful setting up but could sometimes be very effective. Later a somewhat similar scheme was marketed in the UK to combat sporadic-E interference to Band 1 television

It is, in effect, both these approaches that are again attracting interest for applications that include "anti-ghosting" facilities on tv receivers and a new unit specifically intended for electronic steering of antenna nulls for hf interference reduction, presumably aimed at the professional communications market.

One should perhaps emphasize that the basic idea of electronically phasing out an unwanted signal is an old one. In the 'thirties there was the simple "Jones noise-balancing circuit" of Fig 1 which could be set up to reduce a specific unwanted source of interference by several S-points, while reducing the wanted signal by only about one S-point. Then, in about 1963, there was a professional and very effective system developed for broadcast relay stations by Christopher Henn-Collins, then GC5ZC, that could place a very deep rejection notch (over 50dB) on an unwanted signal. These systems required careful setting and were not, I think, ever intended as a form of operational control.

On the other hand an NHK Laboratories note of March 1977, "An 'anti-ghost' tv receiving antenna system with remote-controlled variable directivity" by Koicki Yamaguchi and Yukio Endo, showed how with the

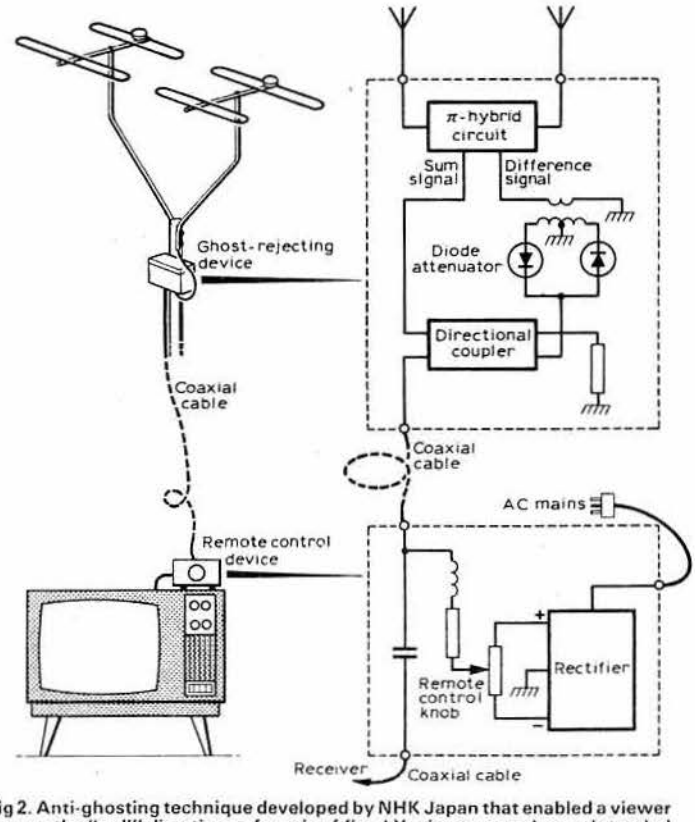

Fig 2. Anti-ghosting technique developed by NHK Japan that enabled a viewer to vary the "null" directions of a pair of fixed Yagi antennas. It was intended primarily for use in fairly strong signal areas where optimum antenna gain was not essential

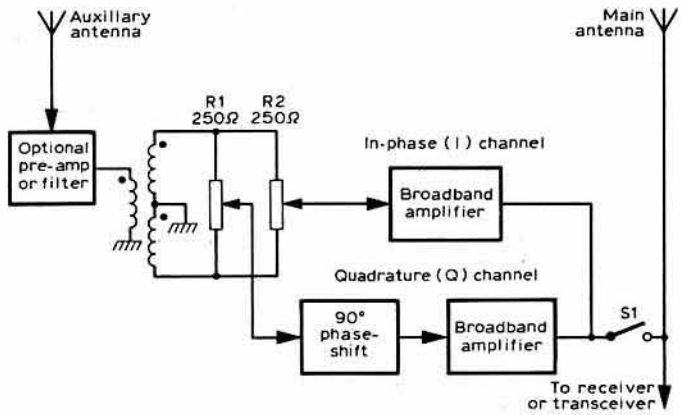

Fig 3. Functional diagram of the electronic null steering unit for use in conjunction with an hf receiver or transceiver (S1 is a relay contact to disconnect the system during transmission). The auxiliary antenna for this system preferably forms an element parallel to the main antenna. System described by J. K. Webb of The Mitre Corporation

aid of a small control unit the output from two small vhf receiving antennas could be combined under the control of the viewer to minimize a "ghost" (multipath) signal (even one arriving from around ±5° off the same direction): see Fig 2. Where only a single multipath signal was present the picture could usually be improved by a full point in the five-point impairment scale used in television. Tests were carried out in 23 locations in and around Tokyo, and the design was put forward not as a cure-all but as one likely to benefit large numbers of tv viewers in most areas where protection against ghosts is required. I am not sure if the system has ever been marketed; it was intended for vhf rather than uhf television areas.

The latest application of electronic null steering was presented at a recent conference on "HF communication systems and techniques" (*IEE Conference Publication No 206*) by J. K. Webb of The Mitre Corporation. He claims that a compact, relatively low-cost, null steerer located alongside (or incorporated into) a receiver or transceiver can generate deep nulls against a chosen single source of interference over the range 2–30MHz, by manual adjustment by the operator of two knobs: Fig 3. Operation, it is stated, is very similar to the use of a tunable notch filter except that the unit nulls a signal in both the space and frequency domains. In effect, by adjusting the phase and amplitude of signals from a main and an auxiliary antenna element, a variety of complex directional patterns is obtained. A breadboard model under simulated conditions showed a 56dB null possible at 30MHz. From on-the-air checks in the higher hf bands, J. K. Webb reported that stable deep nulls can be obtained on ground-wave signals from transmitters 10 to 20 miles away, with null depth limited only by channel noise.

Nulls obtained on skywave signals are less pronounced but are claimed to be usually better than 20dB on one-hop signals from transmitters a few hundred to a thousand miles away. It was found that broadband electrical noise, such as leakage from American 60Hz power lines, could be deeply nulled—and this would probably apply generally to electrical interference, provided this was being directly radiated to the receiver antenna and not entering the receiver in a less-directional manner (re-radiated from mains cabling etc).

The 90° phase shift is achieved using a series of fixed time delay lines (these can take the form of coiled lengths of coaxial cable at the higher frequencies) and it is possible to cover the range 2–30MHz with four delay times based on the geometric mean frequencies:

Freq range (MHz)	Geometric mean (MHz)	Delay time (nanoseconds)
2-3·9	2·8	89·3
3·9-7·74	5·52	45·3
7·74-15·2	10·8	23·1
15·2-30	21·4	11·5

The two broadband amplifiers use low-noise devices of wide dynamic range. The required gain depends on the relative gain of the main and auxiliary antennas to the levels of interfering signals.

The whole system could be incorporated within a receiver (Fig 4) with the advantage that the null steerer then operates at the fixed i.f., thus not requiring several frequency-dependent phase shifters or any amplifiers with gain at signal frequencies. It should be noted that the "front-end" for the auxiliary antenna should have the same dynamic range etc as the basic receiver.

It still remains to be seen whether such an approach, similar in principle to the G3JFK mechanically-controlled antenna vector processor, will find a

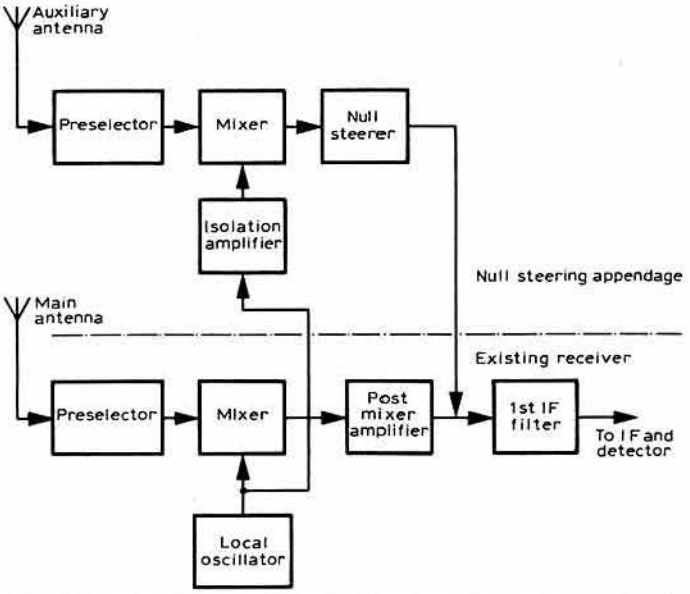

Fig 4. How a null steerer could be implemented at intermediate frequency and incorporated within a receiver having dual front-end circuits

real place in amateur operation. A problem with many nulling techniques is that they can prove difficult to adjust quickly enough to be of real value to an operator when a strong interfering signal suddenly pops up in the middle of a contact. But the idea of being able to reject interference on the basis of controllable antenna directivity, without requiring the use of rotary beams, surely merits careful consideration.

Buying secondhand?

With the cost of new hf transceivers rising steadily, up to and well beyond the £1,000 mark, and with a number of older equipments being discarded in favour of the latest nine-band, all-singing, all-dancing machines, the secondhand market has again become an important source of equipment for many of us, as it was in the days when the original users were so often the Services. Buying complex electronic gear that has been discarded by the initial purchaser is, as has been said of propagation forecasts, "a product carrying no guarantee" with only limited and often unenforceable "consumer protection". Like secondhand cars, such buys can be very good, or very bad.

Some advice on successful secondhand shopping is provided by Fred Hurteau, WD4SKH, in *73 Magazine* March 1982. A few of his hints are summarized below, together with some additional suggestions.

(1) Used gear *can* provide bargains and prove entirely worthwhile.

(2) Even badly-built home-made gear can provide useful components if the price is sufficiently low.

(3) In the USA, resale prices tend to drop quickly to around half the original retail price but then stay steady: so you can obtain several years' use and later get your money back (with UK inflation you may even get back more than you paid!).

(4) Make sure the equipment covers the bands and parts of the bands you want (older transceivers seldom covered all of 28MHz or any of 1·8MHz etc). If not, does it have spare crystal sockets, switch positions etc?

(5) Don't worry about superficial scratches or chipped paint if the rig itself is in good working condition. More important is the reputation of the manufacturer or of the model.

(6) Does it come with a circuit diagram (correctly indicating any modifications that may have been made), servicing manual etc? If not, do you know where to get such essential data?

(7) Has it the facilities you need (ptt, vox, semi or full break-in etc). If not, does it look as though modification will be easy. Remember, any modifications you make should be carefully recorded, or *you* will find resale values diminished when you want to pass it on.

(8) It is useful to have an idea of the "history" of the equipment and the reason why it is on the market (though "verbal" histories may not be verifiable and have to be regarded with some caution). Equipment used "mobile" may have had a battering! In any case, there may be minor aggravating problems that only show up later. (As mentioned below there can also be a major problem in that it may not be the property of the seller).

(9) In older (even well-made) equipments there may be mechanical problems that can be difficult to put right; particularly tuning mechanisms and bandchange switches. On the other hand, equipment sold cheaply in

unsatisfactory working condition can often prove a real bargain to someone with the necessary patience and experience to track down and eliminate an elusive fault.

To sum up, it is a matter of *caveat emptor* (let the buyer beware) but, at least in my experience, a reasonably careful purchaser seldom gets badly "stung" when making private purchases.

Watch out—thieves about!

However, when buying what appears to be an exceptionally good bargain from a complete stranger, there *is* always the risk that the seller is not the rightful owner. Recently I had a sad letter from an old-time amateur in his mid-'seventies enclosing a couple of equipment manuals for which, most regrettably, he had no further use. After many years of activity, his shack was broken into last September and all his modern hf and vhf equipment stolen. He writes: "It does seem that within amateur radio or communications radio generally there is an increasingly nasty element."

Of course it may often be that those who take such equipment have no use for, or knowledge of, what they are stealing; in that case they will either dump it or try to sell it for what they can get. Recently I heard about a dash-mounted control unit for a special police two-way radio (disguised as a normal broadcast car-radio) being stolen. One wonders what the thieves made of it or if they ever guessed who had been their victim!

It is worth remembering that the RSGB keeps a list of the serial numbers of equipment reported stolen. If you are suspicious that equipment offered to you "has fallen off the back of a lorry" or otherwise obtained illegally, why not try and get the serial number and check it out? It will be to everybody's advantage to stamp firmly on any trade in stolen amateur radio goods.

Valve replacements

Because valves have a finite useful life (though with care this can often be many thousands of hours) there comes a time when they need replacement. This is particularly true of many of the rf power valves used in ssb transmitters and transceivers of the 'sixties and 'seventies, when many of the valves were types intended for use as horizontal line output (sweep) amplifiers in domestic television receivers. In ssb transmitters these are used far beyond their nominal ccs ratings, taking advantage of the high voltages that can be withstood on their anodes and the high peak cathode emission. One way of shortening their life is to use them for heavily-processed speech without taking any steps to keep the valve envelope temperature reasonably low.

In a long letter to *QST* (March 1982, pp50-51), Robert G. Wheaton, W5XW/VP1XW/XE2XW, provides detailed guidance on the problems involved in the replacement of tv-type valves in transmitters. Some of the points he raises include:

(1) For parallel operation of tv power valves it is worth paying extra for "matched" sets.

(2) It is advisable to stick to the brand originally supplied with the equipment (so reducing problems of re-neutralization and/or circuit alignment). With a different brand, effective neutralization may prove difficult. Ask advice before fitting later versions of some valve types (eg 6JB6, 6JB6A etc); the later version may require some small circuit modifications.

(3) Follow the manufacturer's recommended neutralization procedure. In some equipment accurate neutralization on one band provides compromise neutralization on the other bands, so that it is important to adjust on the specified band.

(4) Regard bias-adjustment as routine after fitting new valve(s). W5XW recommends removing the driver valve from its socket while this is done, to prevent carrier leakthrough. Proper biasing should be carried out before neutralization.

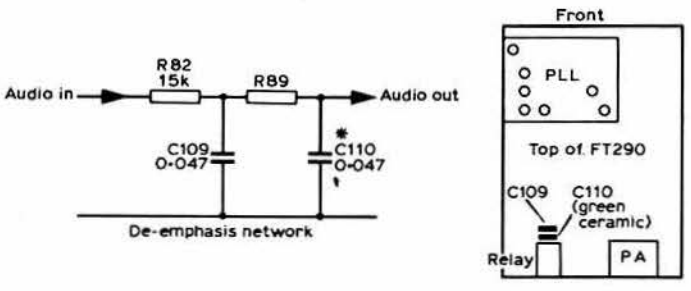

Fig 5. G3LLL's recommended modification for the FT290 to improve clarity and "brightness" of the audio output. C110 is removed by crunching it with a pair of long-nose pliers

(5) Biasing and neutralizing adjustments are especially important when it is necessary to use unmatched valves (if matched pairs are not available it is helpful to select valves from a batch to obtain nearest transconductance (inverse of mutual conductance) match. If you have to use random off-the-shelf valves it is advisable to isolate the bias potentials and to make one of these continuously variable.

W5XW stresses that tv-type valves are not designed for parallel operation, and manufacturing tolerances tend to be relaxed when compared with valves such as the 6146 which was specifically designed for transmitters. However, even with transmitting-type valves used in parallel it is a good idea to obtain two valves from the same production run (this is often coded on the valves or the cartons or both).

Although modern transceivers, transmitters and receivers tend to remain in alignment over extended periods compared with earlier equipment, unless subject to particularly difficult environments, we should not forget that rf circuits still tend gradually to drift out of trim, and performance is improved by occasional re-alignment.

Harry Leeming, G3LLL, of Holdings Photo Audio Centre, has pointed out that many of the older FT101 rigs are about due for some touching up of the alignment, and he has produced a useful note covering the FT101 Mk1, Mk2, B and E models. Copies are available from the firm. He also notes that many of the Japanese rigs tend to be excessively de-emphasized and that much "brighter" audio can be obtained by modifying the de-emphasis components. With the FT290, he suggests, the improvement is quite dramatic and can be obtained simply by removing C110: Fig 5. This is a ceramic capacitor, and the easiest way to "remove it" is to grab it with a pair of long-nosed pliers and squeeze until it disintegrates (make sure you've picked the right capacitor!). His firm is now modifying all units before despatching them. The modification reduces loudspeaker "rattle", and gives brighter, clearer and louder audio output (the original design may have been based on the different voice characteristics of Japanese speakers).

More valve lore

Even if the future is solidstate, the present is still concerned with thermionic valves for high-power linear amplifiers. As mentioned in the June *TT*, many of the once well-known techniques and dodges for extending valve life or performance are already in danger of being forgotten. This has been happening over many years. I recall visiting a well-known manufacturer of high-power communications and broadcast transmitters in the late 'sixties and being told that even then the company was finding it extremely difficult to recruit junior engineers who had sound theoretical and practical knowledge of high-power valves and high-voltage operation, since virtually all engineering training no longer included valves but was entirely based on solidstate. Since then, of course, the amateur UK licence examination has gone the same way. It has always seemed odd to me that someone passing the solidstate RAE can immediately be concerned with linear amplifiers with perhaps 2kV ht supplies when he has never handled equipment at more than 12V. Fortunately, of course, most newcomers do take the trouble to learn about valve and high-voltage practice from amateur radio handbooks etc.

There are many significant differences between valves and semiconductors. For example, the characteristics of valves have less initial "spread" but are subject to continuous change due to gradual loss of cathode/filament emission. As a valve grows older, its mutual conductance (and hence the stage gain) gradually decreases. To counter the loss of stage gain, the bias will tend to be reduced, and this will speed up the rate of deterioration. It may also increase the bulb temperature and bring about the liberation of traces of gas inside the envelope, again hastening deterioration. Generally, the harder the valve is run (that is to say the nearer to its maximum parameters) the faster the valve will age and deteriorate. This is not the case with solidstate. On the other hand, valves are far less susceptible than transistors to momentary overloads and transient overvoltages.

Since bulb temperature is often the limiting factor, a valve that is used in an intermittent mode can often handle a power significantly greater than where it has to operate continuously over long periods. This has resulted in the recognition for many years of the so-called icas ratings for intermittent commercial and amateur service, representing power ratings some 25 to 50 per cent higher than the ccs ratings for continuous commercial service. The higher the efficiency of the stage, the less power is dissipated in the valve itself, so that the very high-efficiency Class D (switching mode) amplifiers can safely deliver much higher rf power outputs than those suggested in the valve data tables. There have also been some systems based on using special coolants that keep valve envelope temperatures low, and these amplifiers can operate at powers well above those of normally-ventilated or even fan-cooled valves. With ssb linears it is most important to note that the increase in the duty cycle when using speech processing should be taken into account; for example, by fitting a fan.

There is a widely-held view that solidstate variable frequency oscillators are inherently more stable than valve oscillators, since valves normally generate more heat and take much longer to reach thermal stability. While this is often confirmed in practice, it should be remembered that solidstate junctions have capacitances that change with both heat and voltage, presenting to the tank circuit an input capacitance that may vary more than for a valve. One of the main reasons why valve oscillators are seldom as stable as they could be, is that while designers are usually careful to regulate the ht supplies for oscillators, they seldom take steps to regulate the heater/filament voltage/current. Current regulation devices were employed in a few valve receivers, but this was uncommon.

Today it is entirely feasible to think in terms of running the heater/filament of an oscillator valve from well-regulated, well-smoothed dc, using psu techniques that have become established for solidstate equipment. Then again, it is entirely possible to remove the tuned circuit of a valve oscillator several feet away from any of the sources of heat to provide a compact, temperature-stable control unit.

It is preferable to keep cathode-heater potentials to a minimum (avoid series-heater chains or, if this is impossible, put hum-sensitive stages near chassis potential). Since cathode/heater insulation breakdown is most likely to occur during warm-up, a delay in applying ht is useful—although with the more modern valves, heater-cathode breakdown is relatively uncommon and the main worry is to avoid introducing hum. If heater and anode voltages are applied simultaneously (as happens when silicon diode rectifiers are used) a power valve will operate for a short-period under cathode temperature-limited conditions which can be deleterious. Either manual or automatic delayed switching of ht may be advisable in transmitters (essential with mercury-vapour rectifiers if anybody still uses such antiquated devices).

Running valves over long periods with only heater voltages applied is not good practice: similarly, if it is necessary to open the cathode circuit of a valve stage (for keying or muting) a resistor not exceeding 0·25MΩ should be permanently connected between cathode and heater. A method of reducing hum is to operate the heater at a positive voltage with respect to cathode and grid (ie to prevent electrons emitted from the heater flowing to the grid). Heater-to-cathode insulation should not be connected across a tuned circuit because the insulation and capacitance vary with temperature.

Valve oscillators-such as the Franklin reduce the loading effect of valve inter-electrode capacitances to a minimum and, provided the tuned circuit itself is not subject to temperature variations, very high orders of short-term stability can be achieved.

These notes are not to suggest, Canute-fashion, a return to the era of valves. But even today there are often good reasons why amateurs should not forget about valves. As someone pointed out: if transistors had been invented first we should have hailed the development of valves as the answer to many problems. There are also a lot of good equipment and good designs that even now should not be thrown on the scrap heap.

The short vertical

Electrically short hf vertical transmitting antennas remain a tantalizing but important subject for further experimental work. In theory, even an almost infinitesimally short antenna, if matched and loaded correctly, should be capable of radiating a far field almost as strong as a conventional resonant λ/4 monopole over a narrow bandwidth. In practice, in a real situation, this is never achieved due to the rapid increase of losses in the impedance matching network and the earth losses etc. Nevertheless it is possible to achieve useful results with helically-wound elements such as the popular "rubber duck" type of vhf antennas etc.

On hf an interesting attempt to provide an efficient antenna only 2ft high (2·8 electrical degrees at 4MHz) almost as effective as a 60ft-high monopole was described some 20 years ago by J. M. Boyer, W6UYH, of Northrop Corporation (the hula hoop or ddrr antenna, see *ART).* The snag with the hula hoop was the need for high conductivity copper pipe in the large circular "top loading" section, and the need for an extremely good earth plane. More recently, the continuing requirement for antennas suitable for tactical defence applications with high-angle radiation has led to ferrite-loaded elements and to various forms of transmitting loop antennas.

Dr Martin Sweeting, G3YJO, of UoSAT fame, has noted the resurgence of interest in *Rad Com* in ground-based hf systems and the attempts to assess the various forms of earthing systems, including radials. He has sent along a paper presented a few years ago at an AGARD conference (NATO Advisory Group for Aerospace Research & Development, Conference Proceedings No 263, "Electrically short hf aerial systems" by M. N. Sweeting and Q. V. Davis); this paper was based on his doctorate thesis and explored the use of a standard 4m vertical whip antenna at frequencies in the range 1 to 20MHz in conjunction with a wide variety of earthing systems. No attempt was made to "load" the whip element, and the frequency range included its use as a resonant λ/4 whip.

At the lower frequencies, well below λ/4 resonance, radiation resistance of such an element decreases rapidly and reactance increases correspondingly. It was shown in the paper that an effective measure of the efficiency of such an antenna can be made by a study of the base impedance measurements.

G3YJO's detailed study covered a considerable number of earthing systems, including earth spikes, earth plates, radials along the ground, and elevated radials. These ranged from a simple 12in, 0·5in diameter earth spike to systems using aluminium discs of 3ft and 6ft diameter placed on the ground beneath the antenna, and on to radial systems with the antenna element at a height of 5ft above ground and radials up to 150ft long. The paper provides over 40 diagrams showing the results of this investigation. The following conclusions were reached:

"This practical study of electrically short hf antennas has provided fresh insight into their behaviour in a field environment, and has demonstrated that:

(1) Antenna base impedance measurements appear to provide a straightforward and rapid means of evaluating symmetrical antenna systems.

(2) Small ground systems can provide a significant improvement over a simple earth spike, and are competitive with larger radial systems when wideband operation is required.

(3) Larger ground systems may provide improved narrow-band performances; however, radial resonances at previously unexpected frequencies can give rise to substantial losses of efficiency.

(4) If narrow-band operation is desired then the radials should be designed to be nλ/4 resonant, taking into account the phase velocity reduction due to the proximity of the earth.

(5) Small elevated radial systems appeared to exhibit a 2 to 7dB groundwave advantage over the same system on the ground.

(6) Radial resonance frequencies can be predicted easily from a knowledge of the effective dielectric constant of the ground and the system geometry.

(7) A straightforward measurement of the nλ/2 resonant frequency of a shallow buried radial wire can be used to determine the effective dielectric constant of the ground at radio frequencies with minimal mathematics."

Three-band short vertical antenna

A coaxial-fed three-band top-loaded vertical antenna for 14, 21 and 28MHz (but which could probably be modified to cover also 18 and 24MHz) has been described by PA3AFZ and summarized in *Amateur Radio* (April 1982) by VK4QA. The idea is apparently based on a concept by Fred Brown, W6PHP/G5AWI, although the original article has escaped my notice.

The system is intended for use with λ/4 radials (at least one and preferably two or more for each band) as a top-loaded groundplane, although it could also be fed against earth if you have a really good earthing system. It is claimed by PA3AFZ that construction of a considerable number of such antennas has shown that the design is readily reproducible and capable of excellent performance on all the bands, provided that the original dimensions are retained and the adjustments correctly carried out.

The antenna (Fig 6) forms a λ/4 vertical on 28MHz (fine adjustment of resonance using the top section), and the system is brought into resonance on 21 and 14MHz by the two LC loading sections, one coil being adjusted for resonance on each band. The loading coils are wound on the horizontal rod, this crossmember being made from weatherproof pvc tubing having a diameter of 22mm and total length 305mm. The main vertical section consists of two short aluminium pipes sliding into each other to permit adjustment of length, with a hose clamp used to secure them. The coils are close-wound using 1mm diameter enamelled copper wire from 1·96m of wire for the 21MHz coil and 4·33m of wire for the 14MHz coil. The coils should be wound so that they can be moved as necessary to provide fine adjustment (coil details apply only if tubing is 22mm diameter), and it is claimed that the adjustments do not need to be carried out with the rod at its final height. The summary provided by VK4QA leaves a good deal of the detailed implementation of this antenna to the individual reader, but the following is a summary of the suggested adjustment procedure:

(1) Adjust length of radials for minimum swr on each band in turn.

(2) Adjust length of lower radiator section until resonance is obtained on 21MHz.

(3) Adjust 14MHz loading coil for resonance on 14MHz.

(4) Adjust top section of radiator for resonance on 28MHz.

Repeat the sequence of adjustments several times since there will be some interaction between the band resonances. Finally, if necessary, readjust radials which tend to be rather shorter than λ/4.

It is interesting to speculate whether this short antenna system could be extended to provide satisfactory results also on 18 and 24MHz, when these

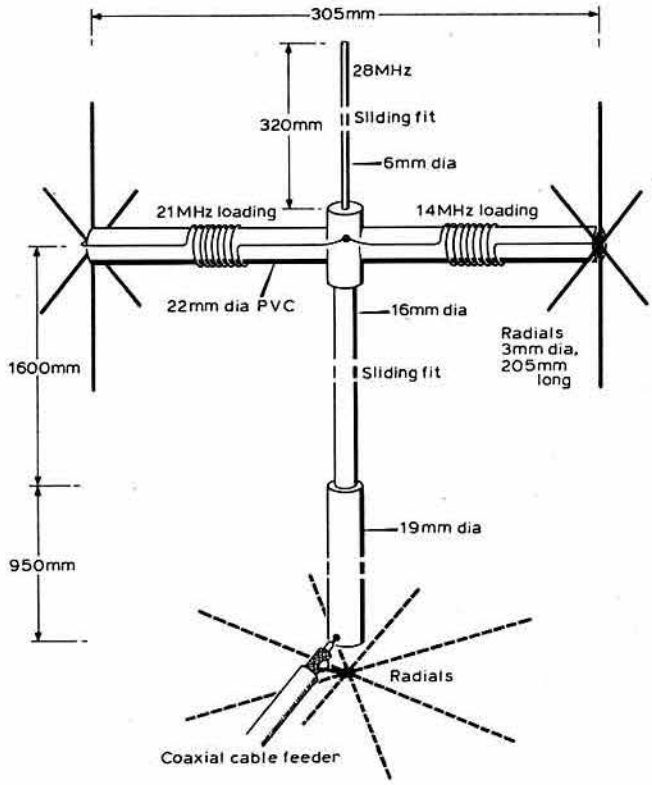

Fig 6. A three-band (14, 21 and 28MHz) short vertical antenna using top loading on 14 and 21MHz. The possibility of an additional crossmember carrying loading for 18 and 24MHz might be worth investigating

bands become available in the UK, simply by adding a second horizontal pvc rod at 90° to the existing crossmember, with two more capacitance hats and loading coils to resonate the system on these bands. If this were done it would require some re-adjustment on the existing bands, and there might be some unwanted resonances, but the idea would certainly seem to be feasible. Another possibility would be to add a degree of broadbanding to the antenna, for example by bringing wires down from the inner connection of the loading coils to the base of the vertical element (while retaining the existing connections to the top of the main pipe). This is based on pure speculation, but the result, once adjusted correctly, might well prove to be quite an effective five-band antenna with the radiating element less than 3m in total height. The *Amateur Radio* summary showed that the system, although of narrower bandwidth than a full-sized groundplane antenna, is not unduly so.

Time and your internal "clocks"

To the dx enthusiast, time spent sleeping means missing out on some of the most interesting "openings" on both vhf and hf. Yet many of us find it very difficult to so vary our routine as to take advantage of those late-night or very-early-morning sessions when the European competition eases off. Some 40 years ago, while doing my best to qualify for "boilermaker's ear", I spent some time working "night shifts" in the curiously on-and-off fashion that was developed at Hanslope Park aimed at making sure one could catch an early train out of the place and not have to return until late afternoon, a day or two later! I soon began to realize why those who regularly work through the night prefer to do so over an extended period of time and not to keep switching around.

Since then the occasional journey across several time zones has similarly confirmed the appreciable time it takes some of us to recover from "jet lag". It can take me anything up to a week or more to get my "internal time clocks" back into proper synchronization. It was therefore not without interest to discover that a recent study by Arthur T. Winfree of the Department of Biological Science at Purdue University, Indiana (*Nature*, Vol 297, 6 May 1982 "Human body clocks and the timing of sleep") emphasizes how little we really know about the alternation of sleep and wakefulness. Nobody even seems to know just why most people go to sleep and wake again at predictable times or exactly what mechanisms are involved. Nor for that matter why we need to sleep at all! It has been shown that someone removed from the usual "cues" of night and day, including temperature changes, tends to have a natural clock period of about 24·3h; under normal conditions the cues or triggers cause this to synchronize to a daily round of 24h. The author emphasizes that there are a few individuals whose internal clocks develop an inconvenient phase relationship with the natural 24h period and are virtually incapable of holding down any job requiring alertness in the mornings! With such individuals it is possible to overcome the phase problems by means of an 18h-delay therapy, bringing the clocks back into proper synchronization; but the whole problem is then likely to reoccur should they work (or work dx?) unduly late, or travel quickly westwards—unless they keep on going and cross the international date line!

It has also been noted that there are some individuals, usually elderly and living alone, who tend to drift into and out of synchronization, retiring to bed later each night and sleeping later each morning, until they become 180° out of phase with surrounding society. Even well-regulated human clocks tend to be moderately upset each time we go into and out of "summer time"; jet lag often lasts up to a week, and is more pronounced when travelling from west to east than for east to west journeys. There are a few people who feel *better* during periods when they are "suffering" from internal desynchronization. Jet lag and other disturbances to clock synchronization are generally overcome most quickly by emphasizing the differences between day and night, for example by direct exposure to sunlight, by always taking meals at the "correct" time etc.

How does all this affect amateur radio operation? As a complete layman in biological science it would seem to me that when it is just a matter of an occasional late-night session or over-night contest etc, then this is most unlikely to "desynchronize" anybody's internal clocks or to have much effect other than their feeling tired the next day. But the amateur who intends to develop a regular pattern of late-night or early-morning operation should probably do just that—make it a *regular* pattern and so ensure that his or her internal clocks become synchronized to this changed routine. But it also seems important to note that we are not all built the same; what may quite suit one individual could conceivably seriously disrupt the pattern of life for another. Like some television receivers, you may have unduly weak (or unduly firm) time-base synchronization!

Tips and topics

In a paper presented at a recent IEE conference on antennas and propagation, John S. Belrose, VE2CV, of the Canadian Department of Communications, shows that the use of *metal* (ie conductive) masts and towers to support simple wire hf antennas has a marked effect on the radiation patterns of the antennas. The radiation from the antenna proper induces currents in the supporting towers, resulting in the radiation of a vertically-polarized component having different directivity characteristics to the main element. His paper discusses the effects (measured on a 200MHz antenna range) on a $\lambda/2$ inverted-V dipole, a $\lambda/2$ horizontal dipole and a 1λ delta loop. However, it would seem from VE2CV's results that the effects on normal amateur operation would be fairly minimal, except perhaps in the case of the horizontal dipole where it may be highly desirable not to have any vertically-polarized component that might result in greater pick-up on the outer braid of local tv antennas etc.

Ernie Sumpton, G3DQL, passes on a tip for using 7MHz KW antenna "traps" on 10·1MHz. He writes: "I found it impossible to retune the traps accurately by removing turns, and the two tubes forming the capacitor were solidly fixed by epoxy resin. I roughly tuned the traps to about 10MHz, leaving a few inches of wire on one end. This wire was then wound on to a piece of ferrite (from a discarded mf broadcast receiver). The ferrite was about 0·5in diameter and cut about 1in long, and two turns spaced about 0·5in proved satisfactory. The free end was connected to the trap terminal to form a small variable inductor in series with the main coil. With the aid of a gdo it proved easy to retune the trap to the centre of the new band (about 10·125MHz) by adjusting the spacing of the two turns on the ferrite coil. After adjustment the core was cemented in place using epoxy resin. Despite the severe weather of the winter of 1981-2, the traps appear to have remained stable."

Brian Booth, G3SYC, was not surprised to read (*TT* May) of Z22JV's experiences in trying unsuccessfully to obtain details of a Japanese crystal filter from his British supplier. G3SYC had precisely the same experience with another Japanese brand of filter a few years ago; he ended up writing directly to the manufacturer in Japan—result, as much information as he wanted plus an offer of further help if needed. Later he wrote direct to Japan for a split-gear tuning drive—again successfully, a relatively low price, a quick response and the suggestion that he let the firm know of any other requirements! There can be little doubt that it is the pursuit of sound marketing policies and satisfied customers that has helped Japanese firms to be so successful in the amateur radio field. Though they may not be so pleased to learn that G3SYC has since disposed of all his factory-built gear and returned to home-brew QRP—and says he now *enjoys* the hobby once again! □

MICROWAVES

Charles Suckling, G3WDG*

1·3GHz television repeaters

Five proposals for television repeaters are due to go to the Home Office in the near future. These are:

GB3GV	5km W of Leicester, ZM25f
GB3TV	2km N of Luton, ZL08d
GB3UD	12km NNW of Stoke on Trent, ZN79b
GB3UT	3km E of Bath, YL49e
GB3VR	3km NW of Worthing, ZK18b

It is proposed that all these repeaters will use the same input and output frequencies (channel RMT1): 1,241–1,249MHz (repeater output) and 1,273–1,281MHz (repeater input). The sound and vision carrier frequencies will be:

Repeater output: vision, 1,242·25MHz; sound, 1,248·25MHz

Repeater input: vision, 1,274·25MHz; sound, 1,280·25MHz.

The repeaters will use horizontal polarization on both input and output. A full technical specifications for these repeaters has been agreed by the Microwave Committee and the RWG, and copies are available from Steve Davies, G4KNZ, 10 Wilberforce Way, Bracknell, Berks.

1·3GHz activity

Two more stations have indicated that they are now operational on 1·3GHz, and looking for contacts. They are G4KKF (Durham), and G6GN (Bristol).

Beacon/transponder news

PA0FRE has sent details of some beacons and transponders on the Continent. Of particular interest to UK 1·3GHz operators is a relatively new beacon, operated by, and using the callsign of, DC0DA. This beacon is located in DL48a, and runs 350W erp from an array of four 15/15 Yagis beaming on 280°.

He also mentions the existence of a transponder in Rotterdam. This has inputs on 1,296·350MHz ± 15kHz and 2,320·350MHz ± 15kHz, with the output on 432·500MHz ± 15kHz. The maximum output power is 4W, and there is a 1W beacon signal on 432·502MHz. The antenna system at present consists of a "double quad omni" for 1·3GHz and 432MHz, and two 30-element loop-Yagis on 2,320MHz (which can be pointed in any direction). The transponder is located 45m asl in CL03b.

Awards corner

At the moment of going to press only one distance award in respect of 10GHz had been issued in 1982; no doubt more will appear as the portable season develops. For a "First Contact on 3cm beyond 150km" award No 56 went to a very active overseas microwave operator, Rolf Niefind, DK2ZF/P. Rolf has also earned himself certificate No 34 following a 700km contact on 1·3GHz with G4BYV. Others in the 1·3GHz category which have been issued recently are No 33 to G4MAW; No 35 to that very active lady operator G8VRJ; No 36 to G8HPU, and No 37 to G4FRE/A.

On the Four Metres and Down Award front (requirement is three countries and 20 counties) G4KCT has won parchment No 30, and G8BWR No 31, the latter also bringing the Supreme Award to Paul Lawrence: he already held 144 and 432 Seniors, and winning the 1·3GHz Standard clinched the matter for him.

Several of the above callsigns figure also in recent Microwave Squares successes. Both G4MAW and G4KCT have secured the sticker for 1·3/15 squares as Nos 7 and 8 respectively, and G8FMK and G8HPU have won stickers Nos 13 and 14 in the 1·3/10 class.

The basic microwave squares category is five confirmed on 1·3GHz, where five parchments have so far been issued this year (two of them to yf operators): No 19 to G8SFI (Sue Firth), No 20 to G4BVY, No 21 to G8VRJ (Pam Rose), No 22 to G4FRE/A, and No 23 to G8PNN.

The last-mentioned station believes he may be the most northerly station to have secured the Microwave Award—as indeed the awards manager's ledger confirms. Gordon Emmerson, who lives in ZP square, has been on 1·3GHz only since February, with 1·3W into a home-built 28-element quad-loop antenna. In spite of a 100ft asl location he seems to do well with a sea take-off: on 28 March he worked eight PA stations on 1·3GHz—one of whom was only 25km short of the 600km target for that "First Contact on 1·3GHz beyond 600km"!

Claims for the 1·3GHz Four Metres and Down Award are sufficiently rare to make each one an event. The third to be received by the vhf/uhf awards manager came from Dave Robinson for operations from his home QTH as G4FRE before he moved to Suffolk (where he has been preoccupied with submitting claims for the famous G4BPO/P set-up). Parchment No 32 went to him at the end of May—and to G4BPO/P the 15th 1·3GHz Squares certificate.

A description of the G4FRE equipment reads like a progress report on the way techniques have developed down the years on 1·3GHz. Dave's earliest card in his 3 + 20 submission dated from 1978; before then he was active with a valve transmitter and a 1N23 mixer set-up to give him his first contact on 1·3GHz. In his own words:

"It was such a lash-up that I did not think it could work anyone except my nearest neighbour G8MWR. Then one night I heard the Emley Moor beacon on 23cm. I mentioned this to G3LRP, of Yorkshire, on 70cm, and it was he who persuaded me to try 23cm—and I was able to give him Warwickshire. Subsequently word got around that I was in Warks, and soon everyone wanted to work my amazing system! Those days are past: now there is an MM transverter to give 30W with suitable amplifiers, and when I am sitting in a field working VHF/NFD at 4am, I ask myself 'Did G3LRP start all this for me?'."

If award claims for 1·3GHz are few, those for 2·3GHz are even fewer. To Steve Berry, G4LRT, goes parchment No 4 for five squares worked on this band.

Waveguide suppliers

Another supplier willing to sell waveguide and flanges in small quantities (see June *Microwaves*) is Electroforms & Components Ltd, 90 High Street, Whetstone, Leicester (tel 0533-864832). They have in stock waveguide in the range WG4-WG22 and many types of flange, and they also manufacture the G4ALN type of dish feed for 10GHz, and the mounting hardware required to fit this type of feed to the *PW* dish.

Distance and bearing calculation using latitude and longitude

Most microwave operators are familiar with the use of national grid references to calculate beam headings and distances between sites (see *Microwaves* September 1980 and *Microwave Newsletter* 05/82). This method is perfectly accurate for medium distances (up to at least 250km) even when using a very high gain antenna, such as a 4ft dish on 10GHz. When greater accuracy is required, eg over longer paths in the UK or for very accurate path plotting, or when calculating distances and bearings to points outside the UK, other methods must be used.

The use of latitude and longitude gives the true great circle distances and bearings. The following method for calculating distances and bearings in this manner was described in *Microwave Newsletter* 05/82. The calculations can be done using a scientific pocket calculator, and the bearings obtained are relative to true north.

First the latitude and longitude of both stations are converted from the usual degrees and minutes to decimal degrees. The distant station's latitude and longitude will be referred to as DN and DW (Distant North, and Distant West) and the home station's latitude and longitude as HN and HW (Home North, Home West). Degrees north and west are defined as positive; south and east are negative.

The quantity DIFF is the difference in longitude between the two stations (DW–HW), and A is the angle in degrees subtended at the centre of the earth by the two stations. The bearings and distance are then calculated using the following formulas:

$$DIFF = DW - HW$$

$$A = \cos^{-1}\left(\cos(DIFF).\cos(DN).\cos(HN) + \sin(HN).\sin(DN)\right)$$

$$\text{Path length} = 111 \cdot 15(A) \text{ km}$$

$$X = \cos^{-1}\frac{(\sin(DN) - \cos(A).\sin(HN))}{\sin(A).\cos(HN)}$$

$$Y = \cos^{-1}\frac{(\sin(HN) - \cos(A).\sin(DN))}{\sin(A).\cos(DN)}$$

If DW is greater than HW then: bearing TO = 360–X
bearing FROM = Y
otherwise: bearing TO = X
bearing FROM = 360–Y

Generally it will be found that the bearings TO and FROM are not exactly 180° apart. Normally one is used to the fact that bearings and back-bearings are exactly 180° apart, but this is only an approximation!

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4 - 2 - 70

Ken Willis, G8VR*

IN TAKING OVER as co-ordinator of the *4-2-70* column, I would like, first of all, to pay tribute to my predecessor, John Morris, G4ANB. He has done a very fine job over the past two years, and his writing skill, technical knowledge and breadth of interest have combined to set a very high standard of vhf/uhf reporting. Although John has been unstinting in providing me with all the contacts and information necessary to take over his role, in theatrical terms he will be "a very difficult act to follow". I am sure everyone will join with me in wishing him well in the future.

Sporadic-E

At the time of writing there have been three significant sporadic-E openings to the UK, each of which differed in its coverage and duration. Hundreds of British stations made long-distance contacts, and many newly-licensed amateurs using low power and simple antenna systems have had their first opportunity to work into new countries and add new squares to their 144MHz totals.

The first occurred on 25 May at about 1500gmt. Mark Turner, operating G3UNU at the University of Nottingham, was heard calling CQ-DX on an apparently dead 144MHz band, but he had clearly heard something because he went on to work a whole string of Scandinavian stations in the rare squares IW, JX, KY, KZ and MZ, mostly on cw though some ssb contacts were made. Nothing was heard at the writer's QTH although it is understood that G4FUF, just slightly to the north in AL square, did manage to work into MZ square.

The opening appeared to favour an area running north from the Home Counties, right up into Scotland and as far west as Wales. Northern Ireland was also within the area of activity. GI8YDZ in Co Antrim was watching Band I tv from Norway at about 1200gmt. He checked the 28MHz band and found it full of short skip Europeans. At 1340 Band 2 fm opened up with many foreign-language broadcasts of unknown origin. At 1457 he put out a CQ call and was answered by OH0JN in KU square, a QRB of about 1,663km. In the next 10min GI8YDZ worked four other OHs in NU and LU squares. He then went on to channel S22 fm and started a pile-up, working a further 12 OHs, the best being OH5ST in PV square. His list of squares worked on 10W of fm in this opening is KU, KV, LU, LV, MU, NU, NV, OV and PV, all using a small mobile rig and a six-element quad. This should greatly encourage those who are limited in the way of antenna and power.

G4ASR in Herefordshire worked 11 stations in the same group of squares, his best being SM2GHI at 2,155km. For him the opening lasted 33min, ending at 1533gmt, and all contacts were on ssb. GM4IHJ in Fife, who uses many interesting techniques to monitor propagation, watched the situation building up, and at 1430gmt was receiving weak signals from Finland. By 1455 these signals were up to S9, and he had three quick contacts on ssb with stations in LU and NU squares. When QRM became troublesome he went to the cw end of the band and had several contacts with OHs, the last being at 1540gmt.

GM8OEG in Dundee caught only the last 10min of the event but this was long enough for him to work OH0NC/M in KU, OH1DM in KV and OH5IY in NU. At 1525gmt, just as he tried to work OH3FG, the opening faded out, though Scandinavian fm continued on Band 2 until 1600gmt. GM4CXM worked 11 OHs (six of them on ssb) and one SM in a hectic period between 1510 and 1534gmt. GM3WCS worked 13 OHs and two SMs in squares JT, KU, KV, LU, NU, NV and NW between 1500 and 1540gmt. His best was OH7PI in NW. All of the reports from Scottish stations show very good correlation between "opening and closing times".

On the vhf net later, SM3COL gave his description of the event as seen from the other end. From his location in IW square he worked three new countries and seven new squares with contacts into G, GM, GI, EI and GW. One of his contacts was with a British station running 2·5W into a 5λ/8 whip antenna.

The next Es event was an even larger affair and came from a totally different direction. Opinions differ as to when it started and finished, but around 1745gmt on 5 June a really major opening occurred into Malta, Italy, Sardinia, Sicily, Corsica, Yugoslavia and the Balearic Islands. The event coincided with a VHF Field Day in Europe, and numerous French stations were caught between the two ends of the pipeline, and not being able to hear the signals from the Mediterranean continued to call the UK stations. The QRM became almost unbearable at times during an opening which lasted more than 2h. The propagation moved northwards as the event progressed, so that the 9H1 stations were the first to fade out, to be replaced by strong signals from the south of France, notably from the rare DD square which several UK stations worked. So many reports have been received that they cannot all be included. Stations from Scotland to the south coast worked strings of contacts with I, IW, IT9, IS0, 9H1, FC, EA, F and YU. Many individual "firsts" were achieved, and some of the Italian and Sicilian stations were clocking up huge totals. Since they were adding contest numbers to their reports for Field Day, their rate of making contacts could be measured. One IS0 was first heard giving a number of 32; some time later the score had risen to 146, and most of the contacts were with G stations.

There were many little cameos, some of which are worth recording. Keith Williams was driving his car in Wiltshire operating a 40W mobile rig into a 7λ/8 whip antenna. He heard IT9IKG in GY square at 1800gmt, and a rapid QSO followed with an exchange of 59 in both directions. David Dodd, G6DOX, in Cumbria, worked two IS0 stations in EZ square using only 25W to an eight-element Yagi. G4IGZ is among the few stations reporting who heard Corsica—he heard no less than three FC stations, but was forced to close down due to a local thunderstorm—in the circumstances some might have chosen to risk electrocution! GI8YDZ was also QRV and was the only station to report a contact with Yugoslavia; he worked YU2BCM in ID square. He wonders if his contact with IT9VHS in GY square at a distance of 2,390km is a new GI-IT record.

The third of these Es openings occurred on 8 June, and it was a very different event from the two just reported. From about 1800gmt many stations were listening on the 144MHz band because Band 2 fm was full of Spanish-language broadcasts right up to a frequency just below 105MHz. Reports are not conclusive, but it appears that very localized openings to Spain and Portugal took place between 1900 and 2000gmt. GM3WCS, who does not seem to miss much of what is going on, had his wife GM4COO at the controls and she worked CT4KQ in WA square at about 1953gmt using ssb. G4IGZ was on the spot again for a contact with CT4IB in WB square at some time between 1955 and 2035gmt which were the starting and finishing times of the event at his location. GM4IHJ worked CT4KQ in WA and EA4DF in YA, both around 1955gmt just as things faded out with him. Once again the more southern parts seem to have missed the opening. G4NRV (Kent) monitored 144MHz for a long time and heard G3IMV (ZL) working into CT but could not hear the dx stations in AL.

John Morris described methods for monitoring and working Es in *4-2-70* in the May 1982 issue. When all is said and done, however diligently you monitor, the real trick is to contrive to be in the right place at the right time—a none too easy task. Not all events are as dramatic as those which occurred on 25 May and 8 June. For example, Malcolm Hyde, G4IHZ (ZN) near Barnsley, was listening on 144MHz around 1730gmt on 15 May when he heard what he took to be a PA station calling CQ. On further investigation the call was recognized as 3A2CD from Monte Carlo, Monaco. A rapid contact followed, after which the Monte Carlo station disappeared into the noise. G4IHZ was using 18W to a 10XY antenna at 30ft. There was no evidence of Es on Band 2 fm at the time. Perhaps I should take down the large Tonna and throw out the 4CX250 because never yet have I heard, let alone worked, a 3A2 station on 144MHz!

Meteor scatter

The past two years have seen a considerable increase in the use of the meteor scatter mode using both cw and ssb. It is a mode now used all the year round at G8VR, and I have previously through *4-2-70* suggested a special award for ms work each year to encourage still further activity in this field. It was therefore something of a shock to read in the June *4-2-70* that G4KLN feels that ms lacks a certain amount of validity and that contacts made by this mode should be excluded from normal awards. The comment has provoked others to write on this topic, among them that experienced ms operator John Matthews, G3WZT. Since there is pressure on space this month, discussion of this subject will have to be held over until September. Meanwhile operators of any mode who have any comments to make, please write.

During June there were quite good conditions on sporadic meteors, with contacts possible on most days when schedules were arranged. The period 7-10 June bracketed the useful Arietids daylight shower and resulted in increased ms activity on ssb as well as cw. On 144MHz cw G4ASR worked LA1K (FX) and OE5EFM (HI), the latter on the random frequency 144·100MHz.

G4IJE has completed no less than 63ms contacts this year, and in the past month brought his squares total to 250 with ms QSOs with YU3DRW (HG),

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DK1PZ (EL), LA8OW (EU), IW3QEF (GF), F1GHU (BD), LA9BM (EU), YU3ZV (HG), C31XV (AC), YU7AJH (JF) and OH2BWL (MU), all on 144MHz. G6CPN (Bexleyheath) worked F1JG (CD) on ssb for his first ms QSO.

An activity night was arranged on 29 May, the vhf net being used to alert European operators to the fact that several UK amateurs would be listening and calling on the random frequency that evening. UK stations active were GW3NYY, G4IYA, G4IGO, G4IJE, G4ASR and G4ERG. A number of complete contacts resulted with OE6WIG (GW3NYY), OE5EFM (G4ASR) and YU3ZV (G4IJE), while OE3CEW just failed to complete with G4IYA. The event proved so successful that it will probably be repeated.

The period 6–22 August should generally be good for meteor reflections, and the peak of the Perseids shower should occur around 11–21 August. This is a major shower which traditionally produces some excellent long bursts on both cw and ssb, so anyone wishing to get some first-hand experience of ms working should listen during this period. Anyone not certain of the procedures used is referred to *4-2-70* August 1981 in which John Morris set out the full IARU Region 1 ms procedure.

Just as 70MHz would be expected to have an advantage over 144MHz in Es openings—because of the increased reflective properties of the ionized region at lower frequencies—so will 70MHz transmissions produce longer and potentially stronger meteor trail reflections, and 50MHz would presumably be even better. Meteor scatter operation on 70MHz is limited by the fact that there are virtually no stations in the UK far enough apart to be able to make use of this mode. To intercept a meteor trail which typically occurs at a height of 70 to 100km, a separation between stations of 900 to 2,000km is needed. There is a solution, however, and that is to elevate the antenna so that it points skywards and, if this is done at both ends of the link, points between the two stations can be found at the appropriate height to permit reflections to occur. John Morris drew attention to the high-speed (100wpm) component in the GB3ANG 70·06MHz beacon transmission in *4-2-70* May 1982, and suggested using the beacon as an ms source. Some amateurs have already done this. G4IJE has been comparing reflections between a simple dipole about 15ft above ground and a five-element 70MHz Yagi. With the Yagi in a horizontal position, more reflections are received on the dipole because it has a better vertical coverage. However, when the Yagi is elevated it vastly out-performs the dipole. G4IJE has exaggerated the elevation of the dipole and has set it up with its rear end almost on the ground while the front rests on a support to give about 45° elevation. The antenna at GB3ANG is, of course, not specially designed to give high-angle radiation, but nevertheless very good reflections can be obtained from this beacon, G3FDW and G4IJE are involved in some elevated antenna tests and more information will be given when their results are known.

The moral of all this is that if you want to work GM3WOJ/P on 70MHz from the Orkneys in August, elevate your antenna or discard the beam in favour of an antenna such as a dipole to provide some higher-angle radiation. G4IDE reports listening to the beacon and using his Sinclair ZX81 microprocessor to decode the fast cw. He says that he can directly display his copy (up to 1,000 letters/min (lpm)) on his vdu, and we hope that he will tell us more about this shortly.

Aurora

During the past two or three years there have been many auroras, some of them very intense. At G8VR a 27-day chart is maintained to help predict when an aurora might occur, and although this is by no means a complete record, it nevertheless shows no less than 39 days in the past 15 months when auroras could be detected in the south. This seemed to be a much greater count than in past years, so I asked Charlie Newton, G2FKZ, the IARU aurora co-ordinator, to explain why this might be so.

He said that on either side of the maximum of an 11-year solar cycle there are peak periods for auroras. The peak on the upward side of the curve occurred in 1978/79 and we are now at the peak on the downward slope. Charlie thinks that we shall have good auroral conditions this autumn and probably through to the spring of 1983, after which such activity will decline sharply, though not of course disappear. G2FKZ says that of the main solar phenomena causing auroras—disintegrating filaments, coronal holes, proton events and solar flares—it is the coronal hole which is the one which gives rise to the "bread and butter" auroras, those in which good dx is worked and the duration of the event reasonably long-lived. Disintegrating filaments can cause very intense auroras but they are usually of short duration. When listening to the propagation data given in the GB2RS news bulletins, any announcement of the passage of a coronal hole should be noted because the probability of an aurora occurring will then be high. A coronal hole will be virtually stationary on the sun, but as the sun rotates on its axis the hole appears to move across the disc. If the coronal hole is long-lived, then it may re-appear 27 days later to produce a further aurora—hence the 27-day chart.

Without going into more detail, a good indication of solar activity is provided by what is known as the Meurdon "A" Index which gives a daily figure based on geomagnetic information. This index is given in the GB2RS bulletins, and for a station in the south of England the borderline figure is about 30. If the index reaches this level then some auroral activity can usually be detected in the south. An index in the range 35 to 40 will produce good auroras in the south, but the further north one goes the lower the index required to give useful auroral conditions. In Scotland a figure of 12 to 15 will suffice, hence the many more occasions when the GMs can use this mode.

It is common knowledge that the best results are obtained in auroral contacts when one station is further away from the reflecting patch than the other, so that different path-lengths exist between the antenna and the point of reflection. If both are equidistant the results will be much poorer. When using an antenna with a sharp horizontal polar diagram, such as a 16-element Tonna, it is imperative that it be moved during an aurora—both to work into different regions, and to optimize the signal received from a given station. The active reflecting area can move about quite rapidly during an event. Transmitting the beam heading (QTF) with the report enables the operator at the other end to determine where the active area is by simple triangulation.

If a stamped addressed envelope is sent to the RSGB membership services officer with a request for auroral information, a 27-day chart will be supplied together with an explanation of the terms used in the GB2RS bulletins to describe auroral conditions.

As this is being written, the ionosphere is very disturbed. The "A" index rose quite sharply to a level of more than 50, which was quite unexpected at this part of the solar cycle, and there have been radio blackouts on the hf bands as a result of total absorption. There has also been some interesting sporadic-E, and of course some auroral activity.

One of the difficulties in reporting auroras here is that the results achieved vary greatly according to the location of the reporting station. This is not surprising in view of what G2FKZ says about index levels. In an aurora which occurred on 10 June, GM3WCS could be heard in the London area when he was working European stations which were inaudible in the south. Subsequently he reported having worked two LAs, four PAs, 11 Ds, five OZs, three SMs and many G stations, a mouth-watering collection for some of the stations less well placed for auroral working. One of these is G4MVR of Bromley, Kent; in this same aurora he was pleased to work GM3JFG in XR for a new square. He also heard several GMs and a few weak LAs, but for him the aurora was a good one, yet with his 100W and 11-element antenna, how different the results would have been had he been located in more northern latitudes. G3POI, also in Kent, uses a massive 160-element array for eme working, and has a very sensitive receiver. In the same aurora he worked his usual range of contacts—GM, LA, SM1BSA (JR) and one UR2—most of which were totally inaudible to other stations in the same area using more conventional antenna systems. G2FKZ explains that the level of index required for auroral working is related to the station capability. G3POI can work real dx on auroras which he hears when the index is around 30, whereas these would be very marginal for the average station. (It would be very useful if readers would write to say what they expect to see in these reports so that they obtain the information they require.)

Having said all that, some good aurora reports have been received. GM4IHJ lists those which were workable at his QTH as having been detected on 1, 2, 3, 27, 28 and 30 May; only those on 27 and 28 May were at all intense. G4ASR did quite well on 3 May, however, and worked six GMs and SM5MIX in HS square; he did even better on 27 May when he had contacts with two SMs, a PA0 and eight GMs. GM8OEG described the aurora on 27 May as "weakish" yet managed to work several Gs and a new square in G3CHN (YK). GI8YDZ in Co Antrim worked OZ1FGP as his best dx on 27 May.

More recently there have been two auroras which reached the south, one on 10 June and the other two days later. On 10 June G4IJE (Essex) worked GM3WCS and LA7KK, and heard other LAs and SMs. On 12 June the event started up in the early evening and lasted about 2h—there was a second phase around midnight. No reports of any outstanding contacts during either of these auroras have been received.

70MHz

As the sporadic-E season develops, some interesting 70MHz activity has been reported. On most days some Es has been in evidence up to and above 70MHz, and in a recent letter GM4IHJ says that even as early as May it was simpler for him to list the few days when there was no Es rather than those on which it could be detected.

Devotees of this band have used the conditions to extend their coverage using crossband techniques, and John Worsnop, G4BAO, of Cambridge claims a probable "first" during the big Es opening on 5 June when he worked I5CTE in FD60d between 1620 and 1625gmt. He transmitted ssb on

70,195kHz and listened on the now-familiar crossband frequency of 28,885kHz; signals were S9 in both directions. G4BAO used a homebrew transverter and linear amplifier running 60W p.e.p. into a four-element Yagi. This claim cannot be substantiated at the time of writing because G3UUT, also in Cambridge, wrote to report a similar contact with I5CTE "at about 1600gmt" on the same day, while G4IDE in Wolverhampton decided to get going after a three-year absence from the band just in time also to work the Italian. G3UUT and G4BAO both wish to place on record their thanks to Gordon Pheasant, G4BPY, not only for having provided the receiving converter used by I5CTE but also for his continued efforts in encouraging overseas amateurs to participate in 70MHz crossband tests. It is ironic that G4BPY admits to being elsewhere during these contacts so that he missed the opportunity of working the Italian on that occasion.

Also on 5 June, between 1900 and 1910gmt, G3UUT, G4BPY and G4IDE all worked HB9QQ crossband (70-28) and DK3SR was heard calling G3UVR on Merseyside. G4BAO thinks that G3UVR worked both the German station and HB9QQ. In a busy day's operating, G4BAO also worked ZB2BL two-way on 70MHz, and G4IDE and G3FDW report having done the same.

Throughout 5 June the Cyprus beacon 5B4CY was audible in Cambridge. G3UUT made contact with 5B4AZ on 28MHz, and said that Nick's transmitting permit on 70MHz had been withdrawn but that he hopes to be back again next year. Much of this was confirmed by G4BPY who has received a letter from Nick in which he said that he would endeavour to have the Cyprus beacon beaming towards the UK all this summer on 70,113kHz. On 8 June, HB9QQ and DK3SR could copy the UK beacons on 70MHz, but no crossband contacts have been reported for this period.

In view of the current interest in crossband working, it may be useful to compile a list of overseas stations equipped for 70MHz reception. To the information given above and the earlier transatlantic tests must be added the meteor scatter work by G4IJE and G8VR with YU3ES, DK1PZ and OZ1FDH, so initial entries in the list would seem to be: VE1ASJ, OZ1FDH, VE1YX, SM6PU, DK1PZ, I5CTE, DK3SR and YU3ES. There will almost certainly be others, so any information, including corrections, will be very welcome.

On 12 June the 70MHz contest was well supported, and with 2h still to go the leading stations had reached the 100-contacts mark. Conditions were not exceptional, but nor were they bad. More than 25 countries were logged at G8VR in a short period of listening, and G3JXN (London W5) worked into Cornwall, Isle of Man and Cumbria. More information when the results are published.

50MHz

Although the peak of the current solar cycle is well past, recent events on 50MHz have amply rewarded those who patiently monitor this band. So many reports have come in that it is not possible to print all of them, but the following summary may suffice to give a general picture of events on this band between 9 May and 5 June.

Several stations have reported crossband contacts with ZB2BL who transmitted on 50MHz. For talkback both the 14 and 70MHz bands appear to have been used, and GW3MHW suggests 14,280kHz as a crossband frequency. Stations making the contacts included GW3MHW, G4BPY, G4JCC, G5KW, EI6AS and F6GNP, but no doubt there were others.

Just prior to the large-scale *Es* opening in June, G4BPY was able to copy the Brazilian beacon PY2AA at strength S3 on 50,062kHz for the first time ever. This occurred on 4 June at 1603gmt, signals persisting until 1613gmt. At about this time Gordon was also receiving Spanish and Portuguese tv signals on Band 1, but on checking the 28MHz band, no South American stations were audible. On the following evening PY2AA was not heard, but 5B4CY on 50,498kHz was a good signal, and later, between 2140 and 2230gmt, FY7THF was copied at strength S2 on 50,039kHz. This heralded a minor transatlantic opening, for an unidentifiable PJ2 station in Curacao was heard working W4s on 50,110kHz. Gordon thought that he detected a reply from a W4 just as the band faded out at about 2230gmt. At the same time G3UUT was listening to both sides of a sideband contact between PJ6XX and W4DO. He believes the propagation was a combination of multi-hop *Es* and F2. During the same day GW3MHW received ZS6PW on 50,030kHz between 1530 and 1700gmt, peaking S8. 5B4CY was also a good signal at this time.

For several G stations, 5 June provided a first opportunity to hear the ZB2VHF beacon since it was audible in the UK from 0900gmt right through until 0100gmt on 6 June. On 5 June ZS6PW was heard on 50,030kHz by G3UUT, G4BAO and GW3MHW. This was again thought to be *Es* plus F2 propagation, and G3UUT quotes another example of it occurring on 25 May when during a crossband contact SM6PU said that he could hear the FY7THF beacon on 50MHz although it was inaudible in the UK at the time.

Recent events may encourage some to put together a simple 50MHz receiving converter. Even with a dipole the results achieved may well be worth the effort involved, and the equipment can always be used to monitor Russian tv on 49·75MHz which is a good *Es* indicator. Some beautiful ms pings and bursts on this channel can also be heard on most days of the year. Listening in the cw mode, some five or six stations will appear, each with a different bell-like tone, separated by a few hundred cycles so that interesting tunes result.

Expeditions

The Westmorland VHF Group plans to operate on 70MHz from the border country between 7 and 15 August, visiting Northumberland, Borders, and Dumfries & Galloway in squares YO, ZP, YP, XO and possibly XP. They intend to finish up in Durham for the Trophy Competition on 15 August. Operation will be from 1800gmt daily until they run out of contacts. The frequency used will be 70,225kHz and the group will monitor 3,718kHz daily at 0730gmt. Equipment will include a six-element antenna and an amplifier providing 100W p.e.p..

GW3NYY supplied news of a group which will operate from XM square during the Perseids shower. The callsign will be GB2XM and it will QRV from 8 to 15 August, operating on 144MHz cw and ssb. Some 432MHz and 1,296MHz operation may be possible. During mid-week the group will concentrate on meteor scatter contacts arranged through the 14MHz vhf net but weekends will be used for tropo contacts. Frequencies to be used are 144·070MHz cw and 144·225MHz ssb. They will have 2 × 16-element Tonnas and 400W p.e.p..

The Clyde Valley DX Group will operate from each of the four extreme points of Scotland in turn from 8 August. Special QSL cards will be issued for each location and a certificate for stations working all four. Both hf and 144MHz will be used; the 144MHz operation will be daily from 1800 to 0100gmt as follows:

South point: Mull of Galloway XO26d. Arrive 8 August. Operating until 0100gmt 10 August.

West point: Arnamurchan Point WQ29b. Arrive 12 August. Operating until 0100gmt 14 August.

North point: Dunnett Head YS24f. Arrive 16 August. Operating until 0100gmt 18 August.

East point: Buchan Ness ZR42h. Arrive 20 August. Operating until 0100gmt 22 August.

QSL cards will be sent via the RSGB QSL Bureau. The organizer is GM3ULP, QTHR.

Members of the Hadrabs expedition to AC square in the principality of Andorra were very successful and worked several UK stations using ssb ms on 144MHz. Signing C31YR on the vhf net, and C31XV on 144·185MHz, they were in evidence on most days during their stay on a mountain-top site 2,600m up and above the snow-line. Very strong and sustained reflections were received from them in the south of England, particularly during the peak of the Arietids shower. They are to be congratulated for their excellent operating and good administration despite the debilitating effects of the local beverages obtainable at bargain prices.

They had some interesting tropo contacts also, but were unfortunate to arrive on site just too late to get set up for the excellent *Es* on 5 June.

Beacon information

GB3SX, the 70·04MHz beacon located in AL71d, changed its callsign on 28 May and now signs GB3WHA. The new call derives from the initials of the late W.H. "Bert" Allen, G2UJ, who resided for many years in the area where the beacon is situated. G3UUT, QTHR, requests that reports on this beacon should go to him. This process of bringing beacons into line with the standard three-letter suffix continued with GB3SU (ZN61a) which since the end of May has been signing GB3BUX. Home Office permission to bring three Cornish beacons into service using the callsign GB3CTC has been received; more information when it becomes available. The Wrotham beacon GB2VHF on 144MHz is scheduled for repairs and other changes and may be off throughout August.

Repeater news

G8XDF, secretary of the Tyne & Wear Repeater Group, has provided information of a technical nature relating to the GB3TW repeater installation. The Wood & Douglas 144 FM2 R2 receiver has now been in service for more than a year and has proved very satisfactory. The logic unit in the repeater originally used 30 integrated circuits and 23 potentiometers, but has been replaced by a new unit designed by G8YWK which uses only 10 ics. G8YWK is now working on a further simplification of the design to reduce the number of ics used to four. The group is preparing to build a second system which will provide stand-by facilities to keep the repeater operational during maintenance. Further information is available from G8XDF, QTHR.

Operation from the Shetland Islands

Pete Weller, GM3XOQ, has provided more information on his move to the Shetlands. He is located in Dunrossness on the southern tip of the island in QRA ZT04d. The site has a good take-off to the south, and the equipment comprises a TS700 into a QQV06-40 amplifier. The antenna is an eight-element Yagi.

GM3XOQ/A was a very good ssb signal in the south on 15 May when he worked several G stations, most of them north of London. At the same time another Shetlands station GM4LBE/A was peaking S7 on ssb and also worked many southerners. However, it was not easy to get through the layers of more northern stations which responded to their every call. Conditions were obviously good on 15 May, as GM3XOQ/A worked two stations in AM square during the evening while using only 10W of fm. At the time his antenna was pointing north so that a friend, GM4LER/M, could hear him. Signals from Shetland are fairly rare in the south, so this evidence of regular operation from the region is very good news.

Finally

Please send all news intended for the October issue to arrive by 25 August (late news by 4 September) and for the November issue to arrive by 23 September (late news by 2 October).

RAYNET

G. Cluer, G4AVV*

I am grateful to a number of groups who regularly send me their newsletters, and the following contribution from a member in the newsletter of the Solihull & Chelmsley Wood group was particularly interesting. The views are the personal opinion of that member, and are not necessarily those of either the Solihull & Chelmsley Wood group or the Raynet Committee, but they do seem to be worthy of wider consideration. I am grateful to the controller and newsletter editor of that group for permission to reproduce the contribution article here.

"Raynet dress"

Whenever Raynet instructions include a reference to dress, there is a tendency to think of high visibility waistcoats, hard hats, armbands etc. These items are important if we are asked to take up "front line" positions in a real emergency situation but, in practice, we seldom find ourselves in these positions. Most of our major group activities in recent years have involved working alongside the user services in clean areas, eg control rooms, first-aid posts, marshalling points etc. If Raynet protective clothing is worn with casual clothing (jeans and T-shirts), the resulting appearance of members is more like that of a road-mending gang rather than an efficient communications organization!

"This subject of dress became very apparent to me on the occasion of the Papal visit to Baginton. Due to unforeseen circumstances, I was not required to take up the Raynet duties allocated, and this gave me plenty of time to observe the operations going on around me.

"All communications administration at Baginton was concentrated in a number of temporary cabins adjacent to each other. Communications networks were manned by Police, County Ambulance, Fire Service, SJAB, Red Cross and Scouts. All personnel from these organizations wore collars and ties all day in spite of the heat but they looked efficient for the job, and I am sure they commanded respect when dealing with each others' members and the public.

"We do not have a Raynet uniform and I am not suggesting that we should, but I feel some thought should be given by each member to dressing appropriately for Raynet activities, including a collar and tie (for men) on most occasions when working alongside user-service personnel.

"Doubtless some members will say that they will dress how they wish when carrying out a voluntary duty as a leisure activity, but if we want to stand out from other emergency communication services and be called in regularly, we should not miss out on these small pointers to being a responsible, organized body; If the user-service personnel of all ages look "official", we should also.

"All the above comments relate to the stage when a Raynet net is operational, and do not refer, of course, to the earlier activities of an operation when hard physical work setting up aerials etc may necessitate old clothes and protective gear being worn by all concerned. These remarks are not directed to specific members of any Raynet group but are simply my own thoughts on a subject that is seldom discussed and could be considered by every group."

*12 Bingham Road, Addiscombe, Croydon CR0 7EB.

RAE Courses 1982–3

(Continued from July issue, page 603)

Biggin Hill. Charles Darwin Education Centre, Jail Lane, Biggin Hill, Kent. Enrolment 14 September, 7-9pm. Details from course tutor R. W. Jones, G3YMK, c/o the college.

Farnborough. Oak Farm Centre, Chaucer Road, Farnborough. Enrolment 14 September. Course commences 23 September. For further details tel 0252 515045.

Hemel Hempstead. Dacorum College, Marlowes, Hemel Hempstead. Wednesdays, 6.30-9pm, commencing 22 September. Enrolment 6 September. Tutor C. Burke, G3VOZ. Further details from the college, tel (0442) 63771.

Langley. Langley College of Further Education, Station Road, Langley, Slough SL3 8BY. Enrolment 7-8 September, 12.30-8pm. The course follows a modular scheme: Thursday 5.30-7pm, operating techniques, on the air operation; Thursday 7-8.30pm, morse; Wednesday 7-9pm, theory. Students can choose modules to make an individual programme. The college has a fully-equipped station, G3XPL. Details from E. C. Palmer, G3FVC, at the college.

Manchester. North Trafford College of Further Education, Talbot Road, Stretford. Tel 061 872 3731. Monday or Thursday evenings 6-9pm. Enrolment 6, 7 and 8 September. Tutor J. T. Beaumont, G3NGD.

Stamford. Stamford College of Further Education, Deeping St James, Lincs. Course commences September. Details from Gordon Parker, G4EMK, QTHR, or c/o the college, tel Stamford 4141.

Walsall. The Civic Centre, Adult Education Department, Darwall Street, Walsall, W Midlands. Details from the centre, or tel Aldridge 52706.

OBITUARIES

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

Mr L. Barker, RS49799
Les Barker died on 15 December. He had only just joined the RSGB but had been a cw operator in the second world war. He was studying for the RAE at the time of his death.

Mr J. D. Chisholm, G2CX
"Chis" Chisholm, who died on 24 May, was first licensed in 1927 and took an active part in the affairs of the RSGB. He was a member of the T&R Committee in 1928, and with several others spent many hours producing the *T&R Bulletin*. He served on the Society's Council from 1929 to 1936, and will be remembered by many old-timers as the QSL manager from 1930 to 1939. He was also one of the respected "Empire Link Stations".

After an absence of some years he recently returned to the air to become active, notably on the daily "3 o'clock net" with many old-timers and members of RAIBC. The Society has lost another of it's early stalwarts who were responsible for laying the foundations of the Society as it is known today.

Mr R. J. Cockerham, G3WTF
Rob Cockerham died early in 1981. He had been a member of Bradford RS and a radio technician with the Post Office, working on a microwave link station. He left Britain in 1976 to eventually work for a missionary radio station, HCJB, in Ecuador, working all 12 transmitters, plus a personal microwave set. He joined the RSGB as soon as he was old enough to apply for a licence, and the hobby gave him great pleasure.

Mr E. Dungworth, G3KIM
Mr Dungworth died on 26 December. He was a keen member of the RSGB and an enthusiastic amateur.

Mr H. Leigh, G6II
Harold Leigh died in March. During his active life he was always helpful to hopeful young amateurs.

Mr M. D. Walmsley
Melvin Walmsley died on 9 April. He had been active for a number of years, and at the time of his death was concerned with the development of computer-linked operation, both cw and rtty, and the decoding of satellite transmitted data.

Also:

Mr R. Benton, RS34287, on 19 March;

Mr J. C. Codling, RS36215;

Mr A. Gwinn, G5LZ, on 22 February;

Mr W. O. Land, RS34761;

Mr C. D. Parker, G3XTV;

Mr J. J. Parker, G3DUV, on 1 May;

Mr W. G. Proctor, G4HGP, on 20 February;

Mr R. W. Smith, GM2FWK, on 10 May; and

Mr F. Thompson, RS38963, on 22 December 1981.

THE MONTH ON THE AIR

John Allaway, G3FKM*

THE RSGB has been saddened by the sudden death of a great friend of the amateur service, Brig-General Kamchai Chotikul, president of the Radio Amateur Society of Thailand, and well known to many as the owner of a fine signal from his station HS1WR, who became a silent key on 16 June. Kam did a great deal for amateur radio internationally, at WARC, and in his own country where amateur activity has been expanding—very largely due to his influence. Readers will certainly wish to join the Society and the writer in expressing their sympathy to Kam's wife, HS1YL, and to RAST.

G3YRW reports that his callsign is being pirated on the hf bands by someone calling himself "Bill" and giving his location as London. GM4ELV has written to say that his QSL to KB2DF/VP9 has been returned marked "Pirate". Dave has also had his own callsign pirated on 144MHz, but this has not stopped him earning QRP DXCC No 41 (No 3 for GM) on the hf bands.

Overseas news

Sheila and John Stratfull are now reasonably active from Bridgetown, Barbados, as 8P6QK and 8P6QI respectively. Sheila operates mostly during the mornings and afternoons, chiefly on 28MHz, and John takes over while she is cooking supper! Anyone needing a QSL for previous contacts with 3B8CV, VP2DB, J7DB, or for the Stratfulls' 8P6 calls should apply via the address in "QTH corner" or via the bureau.

A very interesting letter from Phil Weaver, VS6CT, president of HARTS, contains news of the recent departure of Lyell Louttit, VS6BE, who has returned to his native Australia after a long stay in VS6—he joined HARTS in 1946. Lyell, together with Stan Green, was the first station to use ssb from Hong Kong, and he will now be found on the bands as VK2BE. A dinner was arranged in his honour and was attended by Geoff Green, VS6DA/G3ZNV; Paul Bailey, VS6DO/G3TFP; "Drake" Drakeford, VS6EK/XU8LD; S.P.N.De Silva, VS6BS; Peter Larm, VS6AP; Dr George Tong, VS6GT; Hugh Hawkins, VS6XLW; Roger Mason. VS6DM/G3TDM; Ed Nance, VS6DX/K4DXN; Chuck Carney, VS6II/KB0H; and Phil himself, VS6CT/G4JMB. Hong Kong now has two beacons: VS6TEN on 28,290kHz, and VS6SIX on 50,075kHz. Both have 10W output, λ/4 groundplane antennas and transmit A1A. Other information of great importance to VS6 residents and others is that a licence similar to the UK Class B permit is now available. It is a restricted telephony licence for frequencies above 30MHz. Callsigns are in the series VS6XLA onwards, and on passing the morse test the "X" is simply dropped to produce the full callsign. A visitor who cannot show that he will be in Hong Kong for more than 90 days can now obtain a reciprocal licence if coming from a country which has reciprocal arrangements with the UK and will use his or her callsign/VS6. This licence lasts one year and costs HK $100. Phil is on the air regularly on Wednesdays at 1400 on 21,165kHz, and is looking for contacts with the UK.

DX news

Still the only signal coming out of Iran, EP2TY is reported to frequent the USSR nets on Wednesdays and Fridays at 1400 on 21,250kHz, and at 1600 on 14,250kHz.

Little has been heard of YI1BGD recently, but JA1DNG/YI has been heard and worked on 21MHz ssb from the UK in the evening. The operator's name is Sori and he is expected to remain in Iraq for a year. He also joins the DK9KE net.

Stations in the Kazakh Republic have been using the RX7 prefix to note the 250th anniversary of their region.

9M8PW is now reported to be keeping schedules with WB2KXC each Tuesday at 1030 on 14,306kHz. A71AA is HE Shaikh Abdullah Aziz of Qatar, and has been quite active recently between 14,200 and 14,215kHz from 1200 to 1500. Some 7,060kHz operation around 2200 is also noted by *Long Skip*.

The EX5 prefix has been in use by UB5 stations to celebrate the 1,500th anniversary of the city of Kiev, and the stations using 4D prefixes are located in the Philippines. The Philippine Amateur Radio Association is celebrating its 50th anniversary this year. 8J8XPO is the callsign of a special station located at the exposition being held in Hokkaido. Japan, between 12 June and 22 August.

DX News Sheet says that A51PN has not been on the air since December last, and that any further activity is unlikely.

The club station of the Brunei ARC has been active from 1600 near 14,040kHz using the callsign VS5AM. VS5DX has also been worked just above 14,200kHz after 1000.

Alain, 5R8AL, should have returned to Malagasy in mid-June. ZD9BV and ZD9YL are fairly active until 2300 when their power goes off. Both have been on 21MHz ssb, and Lorna is sometimes on 21,335kHz after 1830. At the time of writing, OH2BNL/C9 was appearing frequently on 21,200kHz around 1400 and talking to OH2BH. The latter is believed to have sent a beam to Mozambique, and the operator, who is on a UN mission, should be there until the end of August. He is hoping to be able to bring documentation away with him to satisfy the criteria for DXCC credit. Nothing has been heard of OK3TAB, who should have been heard as OK3TAB/D2 some months ago.

FB8WG is still active and according to *Long Skip* should be sought around 14,010, 14,170, 14,230, 21,010, 21,170, 21,285, 28,450 or 28,595kHz between 1130 and 1730. He is expected to leave Crozet Is for France in September. Anyone seeking a cw contact with Mauretania should look for 5T5RR, who is often to be found 5kHz above the low ends of 14, 21 and 28MHz from 1500. FR7CE looks for Europe from 1030 on 28,370kHz, at 1600 on 14,110kHz, at 1730 on 7,070kHz, and at 1900 on 3,785kHz.

DP0LEX, located at Atka Bay, Antarctica, is active every Thursday at 2000 on 14,210kHz. The station is operated by DK6RK and is located in ITU Zone 67. UA1PAM, on Franz Josef Land, closed down at the end of May.

CE0ZAD is believed to keep a schedule with QSL manager WB6WOD at 0100 on 14,240kHz, or at the same time on 21,345kHz with W7PHO. He has also been reported on 14,225kHz around 1530.

WB0MKR/KH3 is now AH3AC. WD8QGQ/KH7 will remain on Kure Is for some time and operates near 14,295kHz from 0300. Wake Is is currently represented by AH6DY/KH9, who has been near 14,335kHz from 0600.

Peter, G4DSE, reports that operation by VP8AEO/CE9 ceased about a year ago. He has now despatched QSL cards to all in the log—direct to those who have sent return postage, and via the bureau to all others. The task was completed in April, and those who do not receive bureau cards in reasonable time (? by December) should re-apply.

Top band

VK6HD reports that so far this year dx conditions have been very poor. Stations worked between 7 March and 3 April were G4AKY, EI9J, ZS5LB, G3RTY (on J3E), SM7BIC, SM6EHY and UK2RDK. He heard GD4BEG and 4N2SM on 17 April but nothing since, and has therefore been spending his time on 3,501 or 3,502kHz. When 3·5MHz is useless he goes to 7,005kHz. Mick will start looking for Europe from 1 September transmitting on 1,802 or 1,805kHz, listening between 1,820 and 1,825kHz, 1,830 and 1,835kHz, and 1,850 and 1,860kHz. Sunrise times at his location are as follows: 1 September, 2235; 11 September, 2222; 21 September, 2208; 1 October, 2157; 11 October, 2144; 21 October, 2131; 1 November, 2120; 11 November, 2112; 21 November, 2106; 1 December, 2104; 11 December, 2104; 21 December, 2108; 1 January, 2115; 11 January, 2121; 21 January, 2131; 1 February, 2146; 11 February, 2151; and 21 February, 2200. VK6HD still needs a contact with Jersey—would anyone in GJ who would like to arrange a schedule please write to M. E. Bazley, 6 James Rd, Kalamunda, W Australia 6976?

Dick Spenceley—KV4AA

Nudged by the bicentennial call of AJ3AA in 1976, Dick Spenceley, KV4AA, for many years dx editor of *CQ Magazine* has been on a QSO binge. Since that time contacts have been as follows: 1976, 36,480; 1977, 31,700; 1978, 48,100; 1979, 28,000; 1980, 25,000; and 1981, 25,720. This is a six-year total of 195,000 and a daily average of 88! On 16 May of this year the KV4AA total was 8,100, and a "slowdown" total of 20,000 is likely for 1982. Contacts were roughly 60 per cent cw and the rest ssb. Dick would like to know if he has any competition? Guinness *Book of Records* is said to be considering . . .

*10 Knightlow Road, Birmingham B17 8QB

KV4AA—see text

Expeditions

W4MGN was due to begin a two-month visit to Africa in mid-June and, although many of the countries he was hoping to visit will already have been visited, the last stage of the trip is still to come. He hopes to be S79ARB from 8 August, and 5Z4CZ on 12 August, mainly operating "contest style" on all bands 3·5 to 28MHz. QSLs for the entire operation should go via WA4VDE whose address will be found in "QTH corner".

The "Four Points of Scotland" expedition, GB4GM, hopes to be on the air from each of the four extreme N, S, E and W points of Scotland this month. Each location will issue a distinctive QSL card, and those who obtain all four will be able to claim a certificate which will be the main expedition award. Operations will take place as follows: 1200 8 August to 1200 10 August, from Mull of Galloway (extreme south); 1200 12 August to 1200 14 August, from Ardnamurchan Point (extreme west); 1200 16 August to 1200 18 August, from Dunnett Head (extreme north); and 1200 20 August to 1200 22 August, from Buchan Ness (extreme east). Operation will be on ssb and will be continuous during these periods. Intended schedules are as follows: 1200–1800 14,210kHz; 1800–2200 14,190kHz; 2200–0600 14,210kHz; 0600–1200 14,190kHz; 0900–1400, 21,170kHz; 1400–2200, 21,310kHz; 2200–0900, 7,080kHz; and 144,270kHz, 1800–0100. QSLs should be sent via the RSGB QSL Bureau.

The Schnectady ARA Inc will operate K2AE from Crown Point, NY, on 14 and 15 August, to commemorate the first construction of the fort by British and Colonial troops in 1759. It will operate in the lower 10kHz of the USA general class bands. QSLs go to PO Box 6, Alplaus, NY, 12008, USA; please send irc and sae.

Andorra

Information on how to obtain temporary transmitting licences in Andorra has been received from URA (Box 150, Andorra la Vella, Andorra). Those interested should write to URA enclosing two passport-sized photographs, a photocopy of their licence, dates of intended operation and frequencies and modes to be used. URA also invites visitors to join their association but this is not compulsory. The association applies for the C30 licence. No mention of fee appears in the notice.

All-time countries table

The commencement of a countries table was announced in June *MOTA*. At the time the intention was to include 10MHz because it was not felt that the table was likely to cause competitive activity on that band. However, following further discussion by the HF Committee it has been decided to omit 10MHz from the scores.

Welcome

The following non-UK members joined the RSGB during May: A4XYC, DL7FB, EA5OO, EI8AWG, F6DQM, ON1KWD, VE1PA, VE7ALJ and WB4LWX. Non-licensed new members included R. Schuenemann (DL), N. Jackman (EI), M. Asseal (F) and A. R. Gillman (HB).

QTH CORNER

CE0DFL	Marco Peza, c/o Postmaster, Isla da Pasqua, Chile.
ex-FB8XY	C. Leheyne, Maison Rouge, La Bruve-sur-Loire, F-72420 Vaas, France.
FK0AK	BP 38, Noumea, New Caledonia.
GM4GM	via RSGB QSL Bureau.
K5VT	Dr V. Thompson, Box 32487, Phoenix, Ariz, 85064, USA.
T32AG, T32AH	via KE0A, R. B. Klug, 318 3rd Av SE, East Grand Forks, Minn, 56721, USA.
VK9YC	via G4MBF/G8MBX only.
VP8AOB, VP8AOE, VP8AOH	via K0JW, S. D. Wilson, 185 Flint Way, Broomfield, Colo, 80020, USA.
W4MGN	via WA4VDE, W. Dunbar, RFD 5- Box 107, Canton, Ga, 30114, USA.
ZD9BV, ZD9YL	via W4FRU, J. H. Parrott Jr, 4640 Ocean View Av, Virginia Beach, Va, 23455, USA.
ZK1XG/N	(correction) via DB9CH, H. Klinner, Im Kranzer 17, D-8171 Gaissach, FR of Germany.
3B8FG	via 3B8AS, A. Solim, 13 Napier Broome, Beau Bassin, Mauritius.
4S7AJG	via K9AJ, M. J. McGirr, 13 Oak Hill Drive, Crete, Ill, 60417, USA.
4S7XSG	via DL7XS, N. Bartsc, Beizerweg 8, D-1000 Berlin 47, FR of Germany.
5B4IJ	via OE8PSK, J. Schnabl, Rudolf Kattnigstr. 10/6, 9500 Villach, Austria.
8P6QI, 8P6QK	PO Box 167, Bridgetown, Barbados.
9J2NO	via JA3RLI, N. Onoda, 37 Sasaya, Terado, Muko City, Kyoto 617, Japan.
9N1MM	(QSOs by K9AJ only) N7EB, E. M. Blaszczyk, 12802 Sun Valley Dr, Sun City, Az, 85351, USA.

World QRP Federation Activity Weekend

The World QRP Federation invites members of all QRP clubs which form the federation to take part in its first activity weekend. In addition, any other amateurs throughout the world who are also interested in QRP are invited to take part. The object is to promote as much QRP activity as possible on the internationally recognized QRP frequencies, and in particular to promote intercontinental contacts with low power.

The weekend will begin at 0001 11 September and finish at 2400 on 12 September, and activity will centre around the international QRP frequencies of 3,560, 7,030, 10,106, 14,060, 21,060 and 28,060kHz. The following times are suggested for contacts between continents—starting on the highest frequency band which is open at the time: 0700–0800, Europe–Oceania; 0800–0900, Europe–Japan; 1600–1800, Europe–N America, and 1900–2000 Europe–S America and Africa.

Reports on the event should be sent to members' clubs in order that an overall result of the activity can be made by Gus Taylor, G8PG, WQF secretary, at 37 Pickerill Rd, Greasby, Upton, Wirral, Cheshire. Member clubs include the G-QRP Club, Benelux QRP Club, JARL QRP Club, ARCI QRP Club (USA), Michigan QRP Club, VK CW QRPP Club, ARI QRP Club, AGCW-DL, the EA8 QRP DX Club, and the Grupo QRP do Brasil.

JOTA QSL Contest

A worldwide contest is being held in honour of the 25th JOTA, the 75th Anniversary of Scouting, and the 125th anniversary of the founder of Scouting—Lord Baden-Powell. It is for the best hand-made or hand-printed QSL cards designed by Scouts or Guides who are less than 18 years old. Each QSL must be marked on the reverse with the designers's name, address, age, name of Scout or Guide unit, and Scout or Guide Association. Entries must be mailed to JOTA QSL Contest, World Scout Bureau, PO Box 78, CH-1211 Geneva 4, Switzerland, to arrive by 31 December. There are five prizes in each category, and entries cannot be returned but will be used for an international exhibit at the 15th World Jamboree.

Awards

National Capital Award

For proof of contact with (or reception of) 10 stations in the National Capital Region of Canada, which consists of the cities of Ottawa and Hull and the surrounding area. The certificate will be endorsed for band or mode on request. Send list of QSLs giving callsign, location of station worked, date, band and mode, plus eight ircs, to Award Manager, Ottawa ARC, PO Box 8873, Ottawa, K1G 3J2, Canada.

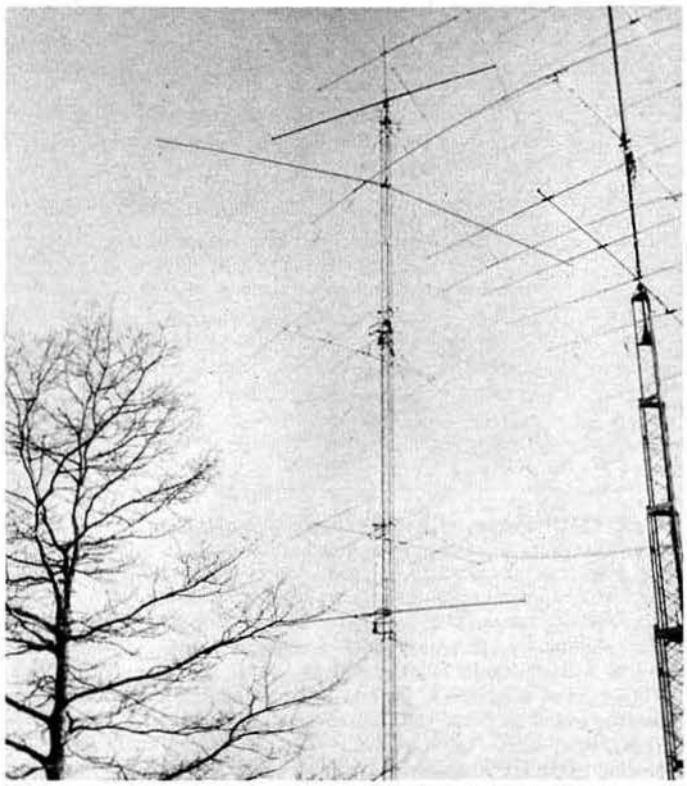
Diplome des Departements Francais de la Metropole (DDFM)
Diplome des Departements Francais de la Metropole sur 5 Bandes (5BDDFM)

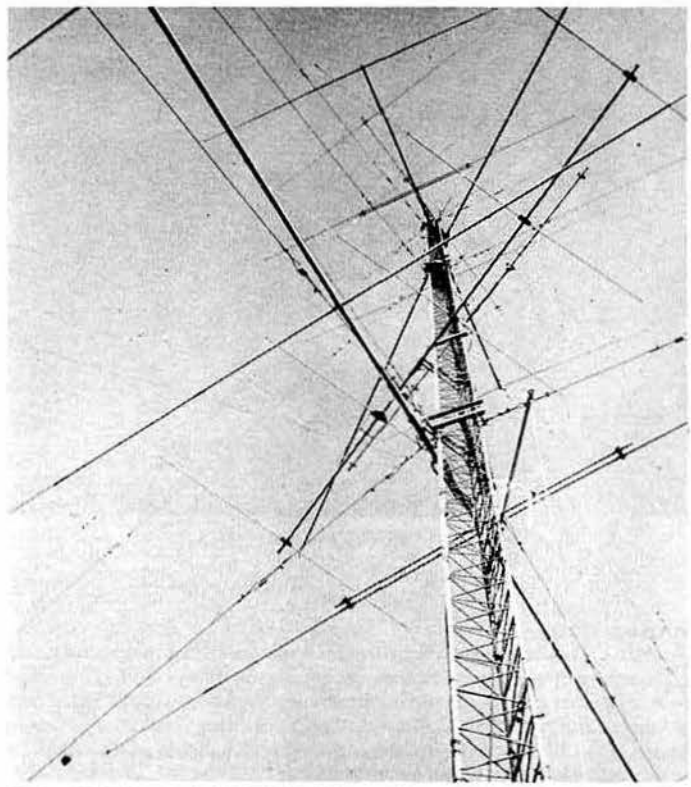
Awarded for confirmed contact with 40 different departements—on each of five bands in the case of the 5BDDFM, where at least 10 departements must have been worked on each band.

Diplome des Provinces de France (DPF)

For confirmed contacts with all 22 French provinces. For the 5BDPF all 22 provinces must be worked on each band.

For both ordinary awards the cost is 10 ircs, and the five-band awards 65





To European amateurs who go on the 3·5MHz band before leaving for work, Gene Boles, KR2N (formerly WB2FZO) will be well known. These photographs, by G3IMW, show his impressive array of antennas. The 120ft tower in the centre of the photograph on left has a 60ft boom of 3in aluminium tubing supporting phased inverted-Vs at 110ft, and also supports a 3×5el beam for 21MHz, a 2×4el beam for 14MHz and a 1·8MHz delta loop. The smaller tower on the right of this photograph supports a 2×5el 28MHz beam and a two-element beam for 7MHz. The photograph on right shows the view looking up the 120ft tower

national society) to Max Anouzet, F6FWH, 8 allee du Parc, F 63110 Beaumant, France.

Diplome de l'Univers Francophone (DUF)
Issued in four classes: DUF1 for contacting five different DUF countries in three continents, DUF2 for eight countries in four continents, DUF3 for 10 countries in five continents, and DUF4 for 20 countries in six continents. A medal may also be claimed by holders of the DUF4.

L'Univers Francophone sur 5 Bandes (5BDUF)
Bands must be selected as follows: two from 1·8, 3·5 and 7MHz, and three from 10, 14, 18, 24 or 28MHz. Claimants must supply proof of contact with 15 DUF countries in five different continents on two bands in group one, and 30 DUF countries on six different continents on the three bands chosen from group two. The fee for DUF1 is seven ircs, DUF2 nine ircs, DUF3 12 ircs, and DUF4 15 ircs. The DUF4 medal costs 20 ircs. Each endorsement costs six ircs. The 5BDUF fee is 65 ircs.

Note that all the awards listed above are also available to listeners for the appropriate number of confirmed reports.

Applications for DUF and 5BDUF should be sent to Edmond Dubois, BP 7, Aubencheul au Bac, F 59265 Aubigny au Bac, France.

Contests

European DX Contest
0000 14 August to 2400 15 August (cw)
0000 11 September to 2400 12 September (phone)
0000 13 November to 2400 14 November (rtty)
3·5 to 28MHz. Single-operator all band and multi-operator single-transmitter sections. The latter may only change band once within a period of 15min. Single-operator entrants may only operate for 36h—the 12h of rest may be taken in up to three parts and should be indicated clearly in the log. Europeans work non-Europeans and non-Europeans Europe. Exchange RS/T plus serial QSO number (from 001). Each QSO counts one point, and a station may be worked once per band. The multiplier for Europeans is the number of DXCC countries worked on each band added together. In addition call areas in JA, PY, VE, VO, VK, ZL, ZS, UA9 and UA0, as well as each USA state, will count as multipliers. Non-Europeans use the total number of European countries worked on each band. The multiplier on 3·5MHz is multiplied by four, on 7MHz by three, and on 14, 21 and 28MHz by two. The final score is the total QSO points plus QTC points multiplied by the sum total multipliers from all bands.

QTC traffic. An additional point may be earned by receiving a report of a previous QSO sent by a non-European to a European. A QTC contains the time, call and QSO number of the station worked, eg "1300/DA1AA/134". A maximum of 10 may be sent/received by a station to/from another and if 10 are not passed all at once, later QSOs may be used for the purpose (but not for QSO credit). It is advisable to use DARC log sheets which are available from WAEDC-Committee, Postbox 1328, D-895 Kaufbeuren, FR of Germany. Please send a large sae and some ircs. Entries must be submitted by 15 September, 15 October and 15 December respectively. Note that "dupe" sheets are required for each band on which more than 200 contacts have been made.

LZ DX Contest
0000 to 2400 5 September
CW only. Stations may be worked once per band, 3·5 to 28MHz. Activity must be confined to the following band segments: 3,510–3,590kHz, 7,005–7,040kHz, 14,010–14,090kHz, 21,010–21,125kHz and 28,010–28,125kHz. Exchange RST plus ITU zone (UK is 27). Six points are gained for working an LZ station, one for a QSO with own continent (including own country), and three for all others. Listeners count three points for two callsigns and two exchanges received, and one for two callsigns and one exchange. The multiplier is the number of ITU zones worked on each band added together. There are single-operator single- and multi-band, multi-operator multi-band, and listener sections. Logs are to be submitted in standard form with separate sheets for each band. A summary sheet showing zones worked on each band and the usual declaration should also be included. State continent on log. Post within 30 days of the contest to BFRA Contests, PO Box 830, Sofia 1000, Bulgaria.

Alaska QSO Party
0200 21 August to 0200 23 August
Work as many Alaskan stations in each of the four judicial districts as possible. CW and ssb—a station may be worked on both modes on each band but will only count once for multiplier credit. Send RS/T and serial QSO number (from 001). Alaskan stations will send their district number. QSOs made on 14, 21 and 28MHz count five points, and 10 points on 7, 3·5 and 1·8MHz. The multiplier is the total of districts worked on each band. Activity will centre around 10kHz into each USA General Class band

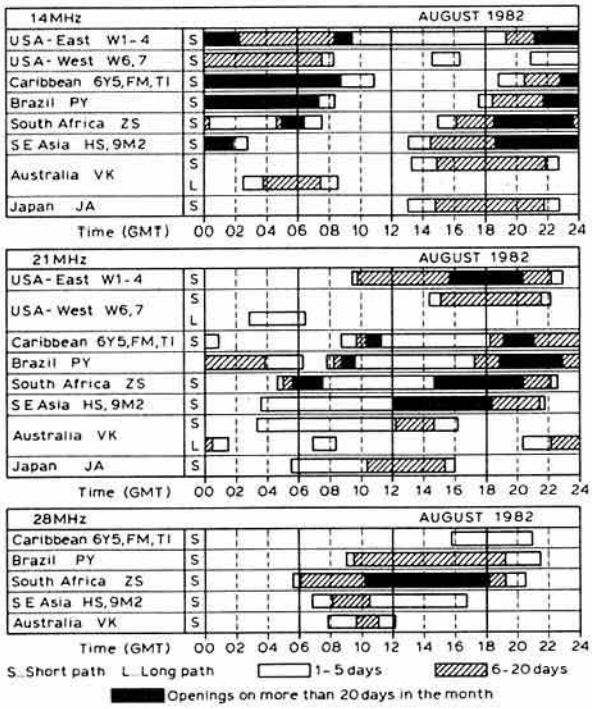
Propagation predictions

August is the last month for summertime propagation conditions, which on **28** and **21MHz** are worse than in winter. Traffic with N America will seldom be possible on **28MHz**, and even with S America it will not be possible on all days. Most certain will be traffic with Africa, which will be slightly improved compared with last month. Conditions for traffic with Australia and SE Asia will also be better than they were last month.

On **21MHz**, traffic with N America will be certain again in the early evening; chances increase the further south the calling station is located. Traffic with western N America will improve compared with last month. Because of seasonal changes, traffic with N and C America and E Asia will close down earlier. Traffic with S Africa and Australia will continue longer than in the previous months.

As compensation for poor summertime dx conditions, there remains the possibility of short-skip on the higher frequency bands. The **14MHz** band will remain a night-time dx band, but traffic with N America will worsen slightly in the early hours. In the late afternoon traffic will be possible with S Africa, SE Asia, Japan and Australia, but will be interrupted by European QRM. In the daytime, **14MHz** will be the ideal band for European traffic, and approaching autumn will increase the distances reached.

The seasonal increase in distances also applies to the **7** and **3·5MHz** bands during the latter half of the night. Local traffic on **3·5MHz** will only be interrupted by the dead zone through interference.



HF propagation study

Band predictions for August 1982

	28MHz	21MHz	14MHz	10MHz	7MHz	3·5MHz
GMT	000001111122	000001111122	000001111122	000001111122	000001111122	000001111122
	024680246802	024680246802	024680246802	024680246802	024680246802	024680246802
EUROPE						
Moscow	.....	....111.131.	1.2555556884	745433334689	763211112478	53.....4‡
Malta	.....	....1111132.	412666666886	977644445799	996321112578	‡‡4.....24‡
Gibraltar	.....	.....11.	2..355554774	853755445799	997532222578	‡‡52.....25‡
Iceland	.....	.....	12112452	4.1344444677	765532222356	5542.....24
ASIA						
Osaka	.....	...112111...	...131113563	....1...1462	.....14.	.....
Hong Kong	.....	...12222442.	2...11114786	1.....1476	153	.....2.
Bangkok	.....1..	..1233334531	4....1114787	3.....1478	1.....155	22
Singapore	....11..11.	..123433453.	4....1114787	3.....1478	1.....256	23
New Delhi	...1111.1...	..133433542.	531..1114787	62.....1478	3.....257	24
Teheran	...11111221.	..2434446752	7551..114799	852.....1478	63.....257	4.....24
Colombo	...1111121..	..1334446642	63...1114788	72.....1478	5.....257	2.....24
Bahrain	...12222221.	1.3444456764	8651..114799	862.....1478	73.....257	4.....24
Cyprus	....111.12..	..1555556752	756644456899	985311123589	863.....1368	‡3.....35
Aden	...223333311	323544557866	9851...13799	973.....1478	74.....257	5.....24
OCEANIA						
Suva (S)	.....	.....1...21.	..153111364.	..131...142.	...1.....1..	.....
Suva (L)	1.....31	32251.....74	..4631...451	..141....42.	...1.....1..	.....
Wellington (S)	.....	...111.1..2.	..3531111162	..231...134.	...1.....11.	.....
Wellington (L)	1.....11	43141.....65	23563....264	..341...341	...1.....11.	.....
Sydney (S)	.....	..133222....	1.1531113334	...2....1463	.....14.	.....2.
Sydney (L)	.....	21.12.....24	212541....85	...31...262	...1.....13.	.....
Perth	...1111.....	..2454431...	52..3111343.	3.....1473	1.....255	22
Honolulu	.....	.....1...21.	..132111241.	..341....1..	...11.....	.....
N AMERICA						
Barbados	.....111.12.	31.124332365	9856411...27	89741.....5	7851.....2	452.....
Jamaica	.....1..	2....2221234	8744311....5	69741.....2	4751.....	.52.....
Bermuda	.....1..	2....2221244	8634311...26	79741.....3	5751.....1	252.....
New York	.....	1....1111233	75221111..25	68641.....3	3751.....	.42.....
Mexico	.....	1.....111122	55232.11...1	37641.....	1551.....	.22.....
Montreal	.....	1....1111133	74221111..25	68641.....3	3651.....	.32.....
Denver	.....	11	4312...11..1	25641.....	.351.....	..2.....
Los Angeles	.....	1111	2212...12...	14541.....	.241.....	..2.....
Vancouver	.....	.....	21121...21.1	13541.....	.141.....	.....
Fairbanks	.....	.....	1.2431112211	.1331....1...	...11.....	.....
S AMERICA						
South Shetland	.....35453.	1557883	51..11.12678	86521....357	7851.....125	452.....2
Falkland Is	.....134353.	421..4556885	997521.12578	99741....247	8851.....15	552.....2
Rio de Janeiro	2243541	431..5444786	997531...279	99741.....48	7751.....17	542.....4
Buenos Aires	2232431	4312.5454685	99762111.258	99741.....37	7851.....4	552.....
Lima	.....11112.	31.122343355	88564111..16	89741.....3	6851.....1	352.....
Bogota	.....1.11.	21...13332344	8855411...16	79741.....3	5851.....	252.....
AFRICA						
Seychelles	...22333321.	213444557765	975...113799	962....1478	74.....257	5.....24
Mauritius	...223444411	3.3545557876	9651..113799	972....1478	74.....157	5.....24
Nairobi	...223445521	523544467976	9872...13799	985....1478	772.....157	54.....24
Salisbury	1..223555631	633644567987	9984...13799	9961....478	874.....157	55.....24
Capetown	...13345552.	...665567885	74.631.13799	9844....478	7851.....157	552.....24
Lagos	1..132556741	642664447997	99862...3699	8974....478	7851.....157	452.....24
Ascension Is	32234541	53..75446896	997431..1689	99741....378	7751.....157	552.....24
Dakar	22344641	541464445886	998641...589	99741....268	8851.....47	552.....4
Las Palmas	.....1.21.	1..144454762	874765555799	998642222489	88631....258	‡‡3.....25

segment. Send logs and summary sheet before 1 October to Alaska DX Ass'n, KL7AF, PO Box 1614, Kodiak Is, Alaska, 99615, USA.

Due to an unfortunate omission by *CQ* in its **CQ WPX Contest 1981 (CW section)** results, the callsign of **G3FXB** was not included among those listed on page 512 of June *MOTA* under the "top ten" category. In fact Al was listed next to G6UW with 1,902,930 points.

Around the bands

G8KG is taking a well-earned break this month, and your scribe hopes that Smithy's holiday weather is better than that in the Midlands at the time of writing! All correspondents agree that conditions have been relatively poor, a combination of mid-summer and the falling off in Cycle 21.

This month's list of contributors is shorter than usual but the following kindly remembered to send in logs: G2s BOZ, HKU, G3s GVV, IMW, NWG, XBY, G4EHQ, GW4KGR and RS30694.

Stations listed in italics were using A1A.

1·8MHz. **2100** *UA2FCW.* **2200** *SM6EHY, UA9SJL, UQ2PQ.*

3·5MHz. **0300** CE6COR, LU3JCE, PY4-PY7. **0400** OA4BDW, PY2HDY, PY5AJK, PS7ADL, VP8AOE. **2100** TR8GM, UL7IBQ. **2200** *PY1MAG,* PY7, *UA9CBM.* **2300** ZP5JAL.

7MHz. **0600** CO1HJ, 6W8AR. **2100** *4K1A.*

10MHz. **0600** *VK6MR.* **1800** *ZS6BWF.* **1900** *JA5DQH.* **2000** *VK3MR, VO1AW, VE1ASJ, DL2GG/YV5, ZS5DN.* **2100** *EA6KW, FC9VN.*

14MHz. **0500** YS1GMV. **0600** D44BC, HK0AZW, J73PP, V2AU, 4U1UN. **0700** *FO8BI,* K5YY/J8, TI0HE, ZL4OY/C, 5W1DQ. **0800** AM9AM, JW0P, KH6, KL7, *ZL.* **0900** SM0AGD/MM (off 5W1). **1200** *DL3MO/OY.* **1600** VQ9CI. **1700** *7X2SX.* **1800** *F6IPA/3A.* **2000** HS1BV, HV2VO, 9Y50NP. **2100** A71AA, *KV4AA, VP9GD,* OH1TD/4U, 9U5WR. **2200** EK9F (Obl. 154). **2300** C53EK, *FM7CF,* W6-W7.

21MHz. **0500** *3B8FG, 4S7XSG.* **0700** *BY1PK,* FO8GW, JA, VK, *4S7MX, OZ7GI/5N9,* **0800** *FR7BP, HL1CX,* M1C, *KN8M/SV9,* 3B8FL. **0900** *BY1PK, FR0GGL,* TL8AC. **1000** *VP5JGX,* ZB2GR. **1100** JH8LDK/ST2, 5W1DQ. **1200** AP2P. **1300** A6XJA, YB (until 1500), 9K2BG. **1400** A4XJT, *DA1WA/HB0,* 3A2JH, *4S7AJG.* **1500** *JY9BR,* VS6CT, *VU2BK.* **1600** *W6TEX/CT3, WB0JNR/D4,* HS3FN, VS5GA, 9M2KZ, 9N1MM. **1700** DU7RLC, HS1AMH, *KH6CD,* VP8QE, VS5PP, *5T5ZR.* **1800** D44BC, *HZ1HZ,* VP8AOB, VQ9PG, YB0WR, 5V7HL, *9V1TL.* **1900** CE1BLL, FH8CP/MM, *4U7ITU,* 7Q7LW. **2000** J73PP, DF2AL/ST3, *VQ9XX,* OE1EHB/YK, ZP, 5H3DM. **2100** C53WH, HC, *JA,* V2AO, ZP. **2200** J6LHY, ZD8JGN. **2300** OA, PY, W6-W7, W0.

28MHz. **0800** *5Z4US.* **0900** *FR0GGL, DL2VK/ST3.* **1000** ST2FF, 5Z4GM. **1100** J28CL, JY9RV, NP4CC, 8Q7BN, PA0AAX/5N0. **1200** A4XIU. **1300** TL8CK, YB0ACE, *ZP.* **1400** *PY, W.* **1500** *HZ1AB, ZS1JJ.* **1600** *VU2GGS, XT2AW.* **1700** TU2CJ. **1800** IJ7JET, JH4THU. **1900** *JW6MY,* VP2MDG, 7Q7LW.

Once again thanks to all who contributed to the column this month, and also to the following for items extracted: *DX'press* **(PA0GAM)**, *CQ Magazine* **(W1WY)**, *DXNL* **(DL3RK)**, the *DX Bulletin* **(K1IN)**, the *Long Island DX Bulletin* **(W2IYX)**, *DX News Sheet* **(Geoff Watts)**, the *Ex-G Radio Club Bulletin* **(W3HQO)**, amd *Long Skip* **(VE3EUP)**.

Please send all items for the **October** issue to reach G3FKM by **2 September** and for **November** by **30 September**.

SWL NEWS

Bob Treacher, BRS32525*

144MHz activity

The first widespread sporadic-E of the summer occurred on 5 June and lasted for almost four hours. The event started around 1600 with strong signals from I8HAU/8 and Malta. Five Maltese stations were audible: 9H1s BT, CD, GB, GK and I. The propagation continued until 1945, with signals heard in the south of England from I, IS0, IT9 and FC. In London the following were heard, all with good signals: 1757, IS0RHF (EZ67h); 1759, IW0AKA (GB13a); 1804, IC8EGO (HA32g) from Capri Island; 1807, IS0PUD (EZ66a); 1812, IS0PDQ (EZ66a); 1819, IS0CSX/IS0 (EA16b); 1822, FC1KPK (EB14d); 1825, IT9VHS (GY74j); 1827, IT9IKG (GY73e); 1832, IJ7ET (IA46a) from Cheradi Island—this was an expedition station and QSLs should go via I7SOZ; 1859, IS0BCO (EZ56a); 1905, IS0WWL; 1927, FC6CPW (EB04d); 1934, IR0QDV (EZ58f)—nothing too exotic, just a special prefix for IS0 in use until 15 June to commemorate the death of Guiseppe Garibaldi. QSLs should go via IS0QDV; and finally IS0SCB at 1941 in EZ66a. Quite an extensive opening and certainly the best this year so far.

On the tropospheric scene the superb weather at the beginning of June failed to produce a really good tropo opening due to the inversion layer occurring at too high an altitude to influence conditions at 144MHz. However, there are several notable happenings to report, starting with fairly good conditions into PA0 from the London area during the early evening of 29 May. The following day saw the Bailliwick of Guernsey Activity Day, which gave Alderney to many for the first time in the shape of GU4NYT/P (YJ29c). GU4EON was a powerful signal from Guernsey, while GU6EFB/P from Herm and GU2FRO/P from Sark were harder to pull out of the noise. On 31 May there were fair conditions to the West Country, with G8SEE/P and G4LXJ/P being good signals from Cornwall and Devon respectively.

As well as the Es on 5 June, the European Field Day meant a good number of portables in Belgium and France in the nearer European QTH squares were easy to log. Stations in France were audible from as far south as the "H" squares. Conditions on 9 June were good to the east, and stations in DM, EN and FN squares were audible from the London area. DC4QF (DM67a) was particularly strong.

Signals from the RAF Scilly Isles expedition were audible in London on 19 June, but conditions were poor and their signals were not too strong. Indications of reasonable conditions to the north or south on 144MHz can be obtained by listening for the Paris beacon, FX0THF, on 144·895MHz in AI square, and the Angus beacon on 144·975MHz. Another one to watch for to the south is FX3THF from YI square on 144·905MHz.

To complete the vhf spectrum, we also have an auroral event to mention. There was auroral activity on 12 June, and GI8YDZ in WP square was by far the strongest signal at your scribe's QTH. GM8OEG and GM3ZXE were also worked from the London area.

The Perseids

Continuing with the vhf flavour this month, those who wish to chance their luck with meteor scatter should not miss the Perseids shower meteor activity which peaks on 12 August and usually produces excellent reflections for several days before and afterwards. Activity last year was high, and stations in many European countries were audible, including EA, DL, I, OK, OZ and YU. As the reflections are usually of very short duration, normal QSO procedure is not readily applicable. Anyone interested in this mode of operation and unaware of the "rules" is invited to send 40p to cover copying and postage to your scribe who will send the necessary data by return.

Several groups do plan special activities to coincide with the Perseids shower. G4JVG is known to be planning to be active from OH0 in KT square, but other special activity may be planned.

News and views

Letters this time from both our contributors in 7Q7. John Lord, ORS46084, reported his best dx as OH2BNL/C9 and JA1DNG/YI. Stan Porter, ORS45992, reported his local club membership up to five and that some of the awards he had claimed have been gratefully received.

*79 Granby Road, Eltham, London SE9 1EH

1982 hf countries table

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS47745	165	190	187	115	110	29	796	ssb/cw
BRS8841	178	177	198	122	93	14	782	ssb/cw
BRS46228	115	108	170	134	107	32	666	ssb
BRS44703	126	142	156	105	100	26	655	ssb
ORS46084/7Q7	147	185	170	41	13	0	556	ssb
ORS45992/7Q7	145	174	176	46	14	0	555	ssb
BRS1066	96	123	121	81	62	40	523	ssb/cw
BRS25901	87	102	132	78	91	25	515	ssb/cw
BRS35509	110	87	136	73	70	4	480	ssb
BRS31440	118	85	106	74	67	27	477	ssb
BRS30694	113	103	101	41	46	28	432	ssb/cw
BRS45033	161	96	141	3	6	0	407	ssb
BRS48675	68	91	100	49	36	18	362	ssb
BRS30493	47	89	112	40	31	6	325	ssb
ARS50886	63	101	88	30	28	2	312	ssb
RS45466	44	81	64	44	55	16	304	ssb
BRS18529	20	61	48	63	59	21	272	ssb
BRS25429	0	0	0	99	85	25	209	ssb

Steve Muster, BRS47745, managed several new countries, gained by listening to cw QSOs; TN8BI and A35LK, both on 14MHz, obliging. He was hoping to acquire some rtty equipment to widen the range of his listening capabilities.

Rhys Thomas, ARS45717, passed the RAE in December and was awaiting his GW6 callsign when he wrote. HF listening had suffered, but he had been monitoring the RS satellites, particularly RS6 and RS8, and provided details of some of the stations heard through them.

Tim Lake, ARS45184, had been listening to several USA stations arranging "third-party traffic" skeds for stations in the Middle East—a type of operation not allowed in this country. He also mentioned stations using the AM prefix, which is a special prefix for the World Cup football finals.

Brad Bradbury, BRS1066, had logged 21 countries on 10MHz, including FC9VN, DL2GG/YV5, VE1ASJ, DL7AEA/EA6 and 5Z4CS. QSLs received during June included PY1ARS and SM5GOJ on 1·8MHz, and HK0ZB and VK9NM/LH.

John Sutton, BRS35509, mentioned NQ4I/AM at 37,000ft over the USA, and WB6BJJ/AM on a flight from Lagos to New York. In 10 years' listening, these were his first aeronautical mobile stations.

It was good to hear again from Harold Moss, BRS18529. Other activities have reduced his listening habits, and his 1982 table score reflects very few hours by the receiver. He has converted several shower-curtain rods to form a new vertical antenna, and after installing it 9M2BB was the first station heard; later the same evening several PYs were heard on 3·5MHz. Harold has been carrying out tests with this new antenna and comparing the strength of signals with his trusty trap dipole—in many cases the vertical polarization of the new antenna provided better reception.

Robert Small, BRS8841, had a disappointing month to report for once. The only successes were on 7MHz where VQ9PG, 5Z4CX and 9U5WR provided three new countries. Robert now has 315/315 thanks to a QSL card from BY1PK. Well done! He also mentioned cards returned direct from CR9UT, FY7BO, HC8MD, KV4JC and ZE1GF, even though he sent their cards through the bureau.

Keeping records

This month we feature the system used by Robert Small, A8841.

COUNTRY	BANDS					
	1·8	3·5	7	14	21	28
CO			F√ cw	F√ cw	F cw	F
CN		F√	F cw	F√	F√	F√
CP		F√	F√	F√ cw√	F√	F√
CR9			F	F√	F√ cw√	F√
CT1		F√ cw	F√ cw	F√ cw	F√ cw	F cw

F stands for ssb, and the tick signifies that the country has been QSLd. As Robert remarks, "simple, but effective"

Newcomers

Martin Davies, RS46702, has been listening for several years on an SRX30 receiver and a long wire. Unfortunately he suffers from tv time-base QRM which curtails his lower frequency listening to after tv hours—he is not alone with this problem!

Chris Moore, RS47813, wrote on behalf of himself and two other listeners at a West Midlands handicapped and disabled persons day-care centre, of which he is the secretary. Their main receiver at the centre is an FRG7700 with a converter for 144MHz. A multiband trapped vertical is used on the hf bands, while their 144MHz antenna is a groundplane. All three are certainly keen, and one has already taken the RAE and is anxiously hoping for a pass slip. They all hope to be licensed within 12 months.

Finale

News, views and comment should reach your scribe no later than 23 August to meet the October deadline. Late news by 1 September.

CONTEST NEWS

7MHz Contest 1982 results

The HF Contests Committee is pleased to report that this year there has been an increase in the number of logs received from British Isles entrants.

In the SSB Section the winner was G3OZF, with G3RRS second, thus reversing last year's positions. While the standard of log keeping was generally good, unmarked duplicates still appeared in some logs. Perhaps the threat of losing 10 times the number of points claimed is not a sufficient deterrent? It is also suggested that entrants familiarize themselves with the ARRL DXCC Multiplier List, as multipliers were lost by several stations. G4DSE will be awarded the G6QB Trophy, and winners and runners-up in the other sections will be awarded certificates.

Equipment used by leading entrants

G3OZF: TS830; L4B; λ4 vertical; dipole; sloper.
G3RRS: TS830; FL2100; RA1772; two-el beam; Beverage.
G4DSE: T4XC; R4C; dipole.
G3OAY: Omni-D; dipole; vertical.

DX worked and breakdown of leading entrants' scores

G3OZF: A9, CN8, CP, EA8, EL, FK8, FM7, JA, LU, PY, UA9, UD6, UI8, UL7, VE1, VE2, VE3, VE7, VP8, W1-0, YK, YV, ZD8, ZL2, ZL4, ZS5, 4X, 5T, 6Y, 8P, 9K. (491 QSOs, 3,760 points, 74 multipliers.)
G3RRS: A9, CM, CN8, C6, EA8, HC, HK, LU, PY, TG, UA9, UD6, VE1, VE2, VE3, VE7, VP8, W1-0, XE, YV, ZD8, ZL4, 4X, 5T, 8P, 9K. (490 QSOs, 3,641 points, 69 multipliers.)
G4DSE: CE0, CN8, JA, KL7, LU, PY, T1, UA9, UH8, UJ8, UL7, UM8, VE1, VE2, VE3, VE4, VE6, VE7, VK2, VK3, VP2M, VP8, W1-0, ZD8, ZL2. (588 QSOs, 5,577 points, 61 multipliers.)
G3OAY: CN8, KL7, LU, PY, TG, T1, UA9, UH8, UJ8, UL7, UM8, VE1, VE2, VE3, VE6, VE7, VK2, VP2M, W1-0, ZD8, ZL2, 4X. (574 QSOs, 5,181 points, 59 multipliers.)

G3KDB

BRITISH ISLES SSB TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	G3OZF	278,240	12	G8VF	6,867
2	G3RRS*	251,229	13	G3SOX	6,688
3	G3TSL	231,490	14	G4KAL	5,220
4	G4BLX	95,460	15	G4KKS	3,876
5	G3VLX	37,488	16	G4AFJ	3,204
6	G4DBW	28,224	17	G3SWX	2,475
7	GW4BLE	17,835	18	G4NMA	1,980
8	G4EQI	13,087	19	G4BUO	1,599
9	G4NDL	11,176	20	G4FVK	1,485
10	G4KIU	9,062	21	G3ZGA	1,320
11	G5YC†	8,670			

*Operated by G4CEB
†Operated by G4MLM

REST OF WORLD SSB TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	EA8ZS	19,600	4	UD6DER	360
2	UA9CBO	1,968	5	WA2PHA	315
3	UI8ZAC	900			

EUROPE SSB TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	ON6TW	8,820	32	OZ4LX	510
2	F9KP	7,716	33	Y78XL	475
3	E17CC	5,590		Y54TA	475
4	UB5IFN	5,489	35	OH7NW	450
5	ON6RL	5,313	36	HA8KAX	440
6	DA1BJ	5,005	37	HB9DX	400
7	ON6PJ	4,875		OK3YK	400
8	YU3TXB	4,560	39	DK5KJ	360
9	EA3CCN	4,235		PA0KDM	360
10	UA3DCY	4,180	41	UB5ECH	350
11	EA4KR	3,900		UR2HB	350
12	ON5WL	3,816	43	EA1ADL	330
13	EA3CKX	3,768	44	UP2BBF	265
14	SM5ALJ	3,360	45	OZ7DX	260
15	YU7JDE	3,204	46	SM4BTF	240
16	OK1ARI	3,010		EA7BYM	240
17	YO4WU	2,600	48	UQ2MF	220
18	DJ5WS	2,580	49	SM5CSS	210
19	F8WE	2,300	50	OZ3ZK	180
20	Y45SA	1,900	51	YO6OO	165
21	Y44XF	1,600	52	Y42TC	140
22	HB9AQS	1,560		HA5KHC	140
23	LA3KBA	1,400	54	UA3EAL	129
24	DL9HN/A	1,215	55	UP2BAS	105
25	Y55XG	984	56	EA7AZA	90
26	LX1RK	960	57	YO4BXX	80
27	Y54UA	910		OZ6EI	60
28	PA0VSS	840	58	OK1KZ	60
29	F6EXQ	805		YU7SF	60
30	LA1KQ	720	61	YO2ALS	40
31	YO9CUF/3	708	62	YU7ORQ	30

Check logs: EA2ABJ, PA0JDC, YO2CJ, YU7AJD, Y31SC, Y58YF.

BRITISH ISLES SSB RECEIVING

Posn	Station	Points	Posn	Station	Points
1	BRS32525	47,080	3	BRS28198	15,370
2	BRS15822	24,130	4	BRS44395	3,920

Check logs: BRS47778, BRS48136.

REST OF WORLD SSB RECEIVING

Posn	Station	Points
1	4X4-1401	1,350

EUROPE SSB RECEIVING

Posn	Station	Points	Posn	Station	Points
1	NL 4276	4,750	6	Y2-4406G	805
2	Y2-EA-18589/A	3,835	7	SP-0060-JG	798
3	EA3-161566	2,256	8	Y2-929IN	510
4	SP 3003-LG	2,150	9	HA2-013	420
5	SP 1151-PO	1,155	10	YU1-RS954	150

Check log: NL 8297

BRITISH ISLES CW TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	G4DSE	340,197	20	G3ESF	59,800
2	G3OAY	305,679	21	G3EBH	52,675
3	G3OZF	273,978	22	G3PSM	51,430
4	G3SJJ	261,420	23	G4KGK	48,692
5	G3JKS	253,638	24	G4FDC	43,586
6	G3PDL	250,344	25	G4CCQ	36,960
7	G3OUF	235,980	26	G3TXF	33,530
8	G4CNY	231,014	27	G3NKS	33,005
9	G3IGW	194,298	28	G3AWR	28,525
10	G3SXW	192,504	29	G3YMC	27,825
11	G4DJX	174,300	30	GM3YOR	26,752
12	GM3RAO	164,784	31	G4EBK	26,350
13	G5MY	146,625	32	G4KRS	23,120
14	G3ZZD	141,725	33	GM4FNA	19,923
15	G4BUO	131,650	34	G2AJB	13,804
16	G4BLX	131,366	35	G3RDQ	5,420
17	GM4KGJ	97,060	36	G3ZGA	2,016
18	G3KSH	63,554	37	G3SWX	1,183
19	G3JRM	61,332			

Check logs: G2AOL, G3XTJ and GW3JI.

REST OF WORLD CW TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	K1MA	16,665	15	UA9FCI	3,570
2	UL7CT	11,232	16	UM8MDX	3,474
3	UJ8JAS	10,500	17	K5MM	3,192
4	K9BG	9,234	18	K1BV	2,826
5	UA9AFO	8,664	19	VE1CEG	2,700
6	UA9WBU	8,478	20	K2SX	2,415
7	UA9AFZ	8,376	21	UH8EAD	2,025
8	UA9MX	8,112	22	CN8CY	1,536
9	UA9FGO	7,248	23	VE3FGU	1,380
10	UL7TBM	7,080	24	UA9MR	1,314
11	VP2MIX	6,885	25	UA9COT	1,236
12	K2PZ	5,544	26	UA9CIQ	1,085
13	UL7CBM	3,990	27	W2PQZ	912
14	K7UR	3,840	28	JH7BDS	15

EUROPE CW TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	OZ2JZ	7,476	57	Y23TL	1,575
2	HA8OZ	6,611	58	UA3MAE	1,572
3	F9KP	6,430	59	OK1DVK	1,560
4	HA7SH	6,080	60	OK1AGN	1,552
5	YU7BCD	5,832	61	SM5ALJ	1,544
6	EI5DI	5,800	62	DJ3XK	1,491
7	PA3ADM	5,731	63	Y42ZB	1,477
8	SJ9WL	5,698	64	YO2CLE	1,440
9	OK1IMR	5,670		Y31TM	1,440
10	UB5FJ	5,650	66	HB9DX	1,400
11	DL5JQ	5,580	67	Y23HN	1,386
12	EI7CC	5,380	68	SM3CBR	1,356
13	UQ2PQ	5,150	69	Y5IWO	1,344
14	EI0CS	4,400	70	DF3QN	1,320
15	ON6TW	4,347	71	YU3TE	1,308
16	UQ2GFU	3,970	72	LZ1IF	1,260
17	UO5SA	3,780	73	YO4FM	1,230
18	PA3AMA	3,690		DK4HD	1,230
19	HA5KKG	3,663	75	HA0IR	1,218
20	Y44XF	3,564	76	PA0DIN	1,200
21	Y35YK	3,552	77	YO2CJX	1,176
22	UA3QBP	3,344	78	Y27IL	1,162
23	UC2AHR	3,208		YU7ORQ	1,162
24	Y22YO	3,128	80	LZ1KSN	1,150
25	HB9AGH	3,087	81	Y67YL	1,134
26	Y48WO	3,040	82	Y36YE	1,098
27	ON7JC	2,840	83	UA3LAB	1,050
28	UA3AGX	2,790	84	Y4IXH	1,015
	UP2OU	2,790	85	SM0MML	995
30	Y32JN	2,772	86	OK3FON	936
31	Y39YD	2,744	87	EA7AZA	900
32	UC2AHL	2,672	88	YU5XEC	895
33	LA8XM	2,584	89	OH7NW	875
34	DK9XT	2,568	90	LA2MA	825
35	UB5VK	2,548		OK1KZ	825
36	UO5OWC	2,493	92	Y24IF/P	765
37	UB5VBY	2,384	93	UA3LAC	725
38	Y5IVE	2,352	94	OH6RC	700
39	PA0ATG	2,322	95	OK2PAW	695
40	Y47ZG	2,320	96	EA5EV	675
41	UA6LHK	2,280		OK1MSB	615
42	YU2CRS	2,240	97	UA6XAE	615
43	UB5UER	2,198		Y23GB	615
44	Y2IKI/A	2,024	100	UB5KBV	550
45	Y55XG	1,976	101	UC2WBN	544
46	YU7SF	1,876	102	OK1AIA	540
47	Y78YN	1,836	103	OK3ZAB	515
48	SM0CCE	1,784	104	HA1ZD	480
49	OZ4HW	1,736	105	Y22OB	450
	YU7NFV	1,736	106	HA1SN	300
51	UA3PAE	1,708	107	Y66ZN	264
52	YO8KOH	1,694	108	Y5ISG	186
53	DL9OT	1,680	109	UA6ARX	130
	ON5WL	1,680	110	UQ2GHT	111
55	EA2CR	1,638	111	UQ2GFI	20
56	UA3WDN	1,596			

Check logs: DL9HN, HA4XX, LA1IE, OK2BOP, UA3DCY, UA4FDD, UB5DAX, YO3CDN, YO6BMC, Y25KH, Y26JD, Y3IZE, Y33XB, Y44WF, Y86VL.

BRITISH ISLES CW RECEIVING

Posn	Station	Points	Posn	Station	Points
1	BRS15822	66,825	2	BRS44395	20,300

EUROPE CW RECEIVING

Posn	Station	Points	Posn	Station	Points
1	SP9-1881-KA	4,970	7	OK3-26327	2,310
2	OK1-19973	4,500	8	Y2-10576/0	2,275
3	HA2-013	4,450	9	LZ1-M-290	1,820
4	OK2-20282	4,270	10	Y2-15127/N	1,015
5	UA3-142-198	3,735	11	SP-1151-PO	810
6	Y2-10626/0	3,200	12	NL-4483	140

Region Round-up Contest 1982 results

The level of activity was the same as for the 1981 event, although the three sections attracted different numbers of entries. Section A logs were received from 25 stations, while entries for Section B were up, with seven logs received. Unfortunately the listener section only produced one entry this year, but Brad Bradbury, BRS1066, is to be congratulated on a perfect log and a score of 9,690.

In Section A, the winner was Roger Western, G3SXW, who had never entered a Region Round-up Contest before. He found 35 multipliers among his 115 contacts and his log was a pleasure to check. G3SXW's equipment was a TenTec Triton 4, a 3·5MHz inverted-V with its apex at 40ft, and a 7MHz dipole. Chris Burbanks, G3SJJ, was second, and although he made 118 valid QSOs, he only found 32 multipliers. Third was Don Roberts, G3FKH, with 109 QSOs and 33 multipliers.

There was a real battle for third spot with five stations separated by only 356 points.

The standard of most logs was quite good, but several stations caused a good deal of confusion by submitting logs in bst, Please, next time, gmt only. Once again some stations failed to use the standard HFC1 and HFC2 forms. Small supplies can be obtained from RSGB HQ free of charge, although large quantities (100 log sheets) will cost £2.10p.

It was pleasing to note a number of logs from first timers, and it is hoped that the fun and satisfaction they gained from the first contest will prompt further activity in the future.

Certificates will be awarded to G3s: SXW, SJJ, FKH, WRR, G4s CZB and ARI, and BRS1066.

BRS32525

SECTION A

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	G3SXW	115	12,075	13	G5MY	87	8,613
2	G3SJJ	118	11,296	14	G2HLU	82	7,872
3	G3FKH	109	10,692	15	G3CCZ	81	7,290
4	G3OAY	110	10,560	16	G4EBK	81	7,018
5	G3OZF	106	10,494	17	G3ZDW	79	6,873
6	G4BUO	109	10,464	18	G3AWR	77	6,699
7	G3HVX	108	10,336	19	G3MCK	74	6,660
8	G3PDL	103	9,888	20	G4IDC	78	6,641
9	G4MCC (op G4HIU)	105	9,856	21	GI2FHN	79	6,636
				22	G4HZF	69	5,916
10	G3NKS	96	8,928	23	G4GLC	77	3,150
	G4JAI/A	93	8,928	24	G4KDL	43	3,096
12	G3UFY	95	8,835	25	G3GMM	34	1,632

SECTION B

Posn	Callsign	QSOs	Points	Transmitter	Pwr	Ant
1	G4CZB	76	6,583	1SFT30	10W	Inverted-Vs
2	G4ARI	70	5,852	F850	10W	Dipoles
3	G3WRR	57	4,394	TS120	10W	50ft long wire
4	G3HQH	66	4,096	FT7	10W	G5RV
5	G4MPK	47	2,640	HW8	3·5W	Trap dipole
6	GW3SB	39	2,552	HW8	3W	Dipoles
7	G4GUO	30	1,496	Argonaut 515	5W	Dipole

LISTENER SECTION

Posn	Station	Points	Receiver	Ant
1	BRS1066	9,690	FR101S	102ft long wire

Check logs are gratefully acknowledged from G3WP and G3ZOG.

May 432/1,296/2,304MHz Contest results

Abysmal weather plagued this contest, with gale force winds, rain and hailstones causing damage to tents and antennas in some locations. Even on less exposed sites groups found it necessary to limit antenna height and only those systems which had been well-engineered could be pointed accurately in the direction required.

Needless to say, propagation was poor for most of the contest, but in spite of this the number of QSOs recorded on the lower two bands showed a significant increase. This reflects the steady improvement in equipment and expertise.

This year just over half the 2·3GHz entrants used 2,320MHz, which aligns with the near-Continental allocations. It is hoped that by 1983 all equipment will operate on the new sub-band. Several stations found operation on 432MHz to be severely restricted because of interference from Syledis, which has a coded phase-modulated pulse transmission. As we have to live with this shared service for the time being some groups may need to use special techniques to reduce the problem to acceptable levels.

The overall winner of the multi-operator category was the Norfolk VHF/UHF CG, beating Hadrabs into second place this year. The entry for the single-operator category was disappointing, and this resulted in a three-way tie for first place. Certificates will be awarded as per Rule 9.

G3VPK

432MHz MULTI-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	RF(dBW)	Ant	Best dx	Km
1	G3ZWK/P	2,538	236	AL45	+26	4x16Y	DK6HA/P	671
2	G8PUB/P	2,095	223	ZK05	+26	2x21Y	DG4FAO/P	746
3	G4LOJ/P	1,798	158	AM07	+26	27QL	DK0BN/P	549
4	G4APA/P	649	83	ZN18	+20	4x21Y	DJ4EA	577
5	G4LOO/P	408	76	ZL18	+22	2x48MB	DC6MV	480
6	G8DDC/P	390	88	ZL18	+17	18PB	DC6MV	478
7	G8OHM/P	331	81	YM50	+14	88MB	PE0MAR	423
8	G4JWD/P	303	71	ZL26	+15	21Y	PA0FRE	368
9	G3FVA/P	263	69	ZN61	–	23Y	G3ZWK/P	281
10	G3AMW/P	162	30	ZN18	+17	2x19Y	G8PUB/P	409
11	G4BVY	145	37	YM79	+17	21Y	PE0MAR	440

432MHz SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	RF(dBW)	Ant	Best dx	Km
1	G4MUT	86	26	ZL46	+17	21Y	G4APA/P	260

1,296MHz MULTI-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	RF(dBW)	Ant	Best dx	Km
1	G4ANT/P	8,554	39	AM07	+20	4x26QL	DJ5BV	458
2	G4JAR/P	7,414	47	ZK05	+17	2x30QL	PA0WRC/P	459
3	G4HWA/P	4,724	30	ZN18	+24	4x27QL	G3TDG	276
4	G3OHM/P	3,784	33	YM50	+15	4x23Y	G4ANT/P	235
5	G4GFX	3,113	25	YM79	+13	4x23Y	G4ANT/P	263
6	G4DDC/P	2,814	35	ZL18	+17	26QL	PA0FRE	348
7	G3ZUD/P	2,506	19	AN61	+22	6·5ft dish	G4JAR/P	256
8	G3UHF/P	2,434	19	ZN61	+12	6ft dish	G4JAR/P	257
9	G4NBS/P	2,131	20	AL45	+0	25QL	PA2DOL	258
10	G4KKB/P	1,870	27	ZL18	+13	2x15/15	G3UHF/P	188
11	G3WCB/P	1,097	19	ZL26	+0	15/15	G3OHM/P	114
12	G8NIP/P	639	11	ZN18	+0	2x36QL	G4ANT/P	161

1,296MHz SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	RF(dBW)	Ant	Best dx	Km
1	G4KIY	3,750	27	ZM40	+10	5ft dish	PA0FRE	321
2	G3WHK	2,725	31	ZL49	+18	4x23Y	G4HWA/P	265
3	G8FMK	1,113	18	ZL26	+13	27Y	G4ANT/P	207

2,304/2,320MHz MULTI-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	RF(dBW)	Ant	Best dx	Km
1	G8LMW/P	290	3	AN61	+7	4ft dish	G4LRT	113
2	G3ZIG/P	263	2·5	AM07	+3	4ft dish	G8LMW/P	95
3	G4ARD/P	209	3·5	ZL18	–7	Parabola	G4GZI/P	116
4	G4GZI/P	116	1	YM50	+6	4ft dish	G4ARD/P	116
5	G3WCB/P	0	0	ZL26	+0	1·5ft dish	–	–

2,304/2,320MHz SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	RF(dBW)	Ant	Best dx	Km
1	G4LRT	210	3	ZM45	+11	42QL	G8LMW/P	113
2	G8FMK	16	0·5	ZL26	–	11Y	G4ARD/P	32

OVERALL RESULTS—MULTI-OPERATOR SECTION

Posn	Group	Band posn 432	1,296	2,304	Points
1	Norfolk VHF/UHF CG	3	1	2	2,615
2	Hadrabs CG	2	2	–	1,692
3	Leicestershire SHF	–	7	1	1,293
4	South Bucks CG	1	9	–	1,249
5	Dunstable Downs RC	6	6	3	1,204
6	South Birmingham RS	7	4	4	972
7	Hillbillies	4	3	–	808
8	Malvern Hills RAC	11	5	–	421
9	South Manchester RC	9	8	–	389
10	Luton VHF	5	10	–	380
11	Harrow Reserves	8	11	5	247
12	Hull & District ARC	10	12	–	138

OVERALL RESULTS—SINGLE-OPERATOR SECTION

Posn	Callsign	Band posn 432	1,296	2,304	Points
1	G4KIY	–	1	–	1,000
	G4LRT	–	–	1	1,000
	G4MUT	1	–	–	1,000
4	G3WHK	–	2	–	725
5	G8FMK	–	3	2	373

IARU Region 1 VHF/UHF/SHF Contests 1981

The following are some significant results from this contest which have just been published by the German Amateur Radio Club (DARC).

VHF CONTEST

SECTION 1 144MHz SINGLE-OPERATOR

Posn	Callsign	Posn	Callsign
1	OK1OA/P	5	GJ4ICD
2	DK8SG	15	G6DDK
3	OE3WBA/3	20	GJ4JWA

Number of entrants: 628

SECTION 2 144MHz MULTI-OPERATOR

Posn	Callsign	Posn	Callsign
1	OK1KHI/P	9	G4BPO/P
2	OE5XXL/2	11	G4BWG/P
3	F6CTT/P	14	G4DEZ/A

Number of entrants: 578

UHF/SHF CONTEST

SECTION 3 432MHz SINGLE-OPERATOR

Posn	Callsign	Posn	Callsign
1	DJ9DL	34	G8JVM
2	DB1TP		
3	DF1JC		

Number of entrants: 293

SECTION 4 432MHz MULTI-OPERATOR

Posn	Callsign	Posn	Callsign
1	DK8VR/A	12	G4BPO/P
2	DK8MA/P		
3	F1ELL/P		

Number of entrants: 156

SECTION 6 1·3GHz MULTI-OPERATOR

Posn	Callsign	Posn	Callsign
1	DJ3ZU	4	G4BPO/P
2	DK0NA		
3	DL0SO/A		

Number of entrants: 66

SECTION 8 2·3GHz MULTI-OPERATOR

Posn	Callsign	Posn	Callsign
1	PE0MAR/P	3	G4BPO/P
2	PA0WRC/P		

Number of entrants: 11

SECTION 13 10GHz SINGLE-OPERATOR

Posn	Callsign	Posn	Callsign
1	I3DRE/3	35	G3YGF/P
2	I3LYK/3	36	G4KNZ/P
3	I3OPW/3		

Number of entrants: 47

OVERALL SINGLE-OPERATOR

Posn	Callsign	Posn	Callsign
1	PA0EZ	89	G8JVM
2	DK2UO		
3	DJ5BV		

Number of entrants: 408

OVERALL MULTI-OPERATOR

Posn	Callsign	Posn	Callsign
1	G4BPO/P	49	G8TFI/P
2	DL0FM/P		
3	F9FT/P		

Number of entrants: 173

Congratulations to Martlesham Radio Society for a magnificent achievement—overall winner in the multi-operator category in Region 1.

Entrants can receive a copy of the results by sending an sae to G3VPK, QTHR.

144MHz Low Power Contest May 1982 results

Support for this contest was very good, in spite of appalling weather in the north and west of the country. Overall conditions were below average although some good dx was worked, with high activity on the Continent. The co-ordinated timing of IARU Region 1 events again proved of considerable benefit.

The bad weather came in from the west during the day, and one station, GW4ERP/P, described this graphically: "0630bst, cold, some snow; 1000, wind picking up, slight rain; 1200, gale and heavy horizontal rain; 1500, wind stronger and rain heavier; shortly after aerial blown down and 12 by 12 by 12ft array reduced to nothing over 18in off the ground. Operation continued after much bending; taking the tent down afterwards was something else!"

In spite of the weather and poor conditions the event was very much enjoyed by all participants. The rules were also well-liked, especially the 25W power limit. Also worthy of comment was the very high standard of logkeeping, and all entrants are to be thanked for easing the task of adjudication. Certificates go to the leading stations and runners-up in each section. It was disappointing that only one swl entry (from RS32525) was received. The following are thanked for check logs: G2DHV, G2FWX, G6ECU, GW3JI, PE1AAP and PE1EWR/A. Late entries were received from G8UGY/P and G8XVJ. *G3FZL*

FIXED SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	G8YLH	1,579	225	ZL56	GM3ZXE/P	610
2	G3NNG	1,376	220	ZL23	DF0VK/P	647
3	G8ZHP	1,310	162	ZM29	DL6BF	525
4	G8RZP	1,253	169	AL45	DK2CV/A	485
5	G4DCV	1,215	120	AL67	DF4ZR/P	555
6	G3UKC	1,054	127	AL56	F6KFH	510
7	G8WJF	945	213	ZL29	F1EAN/P	545
8	GM8YJU	865	78	YO05	F1KAW/P	590
9	G4CXJ	787	145	ZL13	DF0OK/P	555
10	G3TBK	722	101	ZN77	DL6FAW/P	640
11	G4JZF	638	146	YM30	F1EAN/P	712
12	G8IXG	571	129	ZL46	DK0OK/P	510
13	G4HLX	552	135	ZL34	GM8BDX	468
14	G8TZE	521	115	YM80	F1EAN/P	255
15	G8WRB	507	121	ZL40	GM8YJU	443
16	G3IGO	506	68	AM37	DK0BN/P	533
17	G8OFA	505	95	AM61	F1KNO	566
18	G4NOK	463	117	ZN23	ON1AEY	473
19	G4DFI	449	95	AL41	DF0VK/P	518
20	G8ZQB	446	111	ZM35	GI4LKA	375
21	G6GGE	410	114	ZL49	G4EUZ/P	425
22	G8IZN	400	106	AL31	PA0PLY/A	337
23	GI8TBQ	375	35	XO33	ON1AEY	730
24	G4GUF	359	37	AM49	DK6DC/P	492
	G4LNV	359	81	ZL46	DF0OK/P	514
26	G6DVJ	352	70	ZL24	F6HMQ	415
27	G4ASL	344	70	ZL60	DF0VK/P	547
28	G6CAQ	335	121	ZL39	F5NE	370
29	G6UW	331	65	AM61	GI4JYJ	478
30	G4FVK	319	60	ZM39	F1KNO	610
31	G8VHL	317	71	ZN26	F1KAW/P	455
32	G8XGN	312	70	ZN23	F1KCT	550
33	G4AGO	302	78	ZL66	F6GCT	388
34	G3ORX	256	54	YL49	ON1RN/A	485
35	G3TUX	242	66	ZL77	G3VIP	280
36	G6AMN	240	74	ZL38	ON7KM/A	372
37	G8XTJ	220	64	ZL27	F5JY/P	267
38	G4IXT	212	76	ZL19	ON7CB	337
39	G4KCK	200	70	AL21	PE1EBF/A	307
40	G6DSA	192	73	YN68	F6HMQ/P	537
41	G8ZYL	188	58	AL43	G8YDW/P	315
42	G6FUZ	183	63	YN79	GM4CXM	350
43	G6CHE	153	51	ZM03	F1KAW/P	362
44	G4NYS	151	88	ZL37	PE0MAR/P	325
45	G8TBL	149	43	AL51	ON7KM/A	345
46	G3KKM	148	34	AL53	DJ4UF	401
47	G8XWA	127	45	YN19	G8YLH	291
48	G6CQJ	125	36	ZM80	PE0MAR/P	304
49	G8YGW	123	41	ZL56	ON1AEY	310
50	G6DCF	87	35	YN38	G6GS/P	295
51	G6CSY	76	36	AL41	G8TZE	171
52	G8UYD	70	30	ZN64	GW4ERP/P	129
53	EI8AYB	54	10	WN70	F1KAW/P	500
54	G4CYC	48	18	ZK15	F5JY/P	180

LISTENER SECTION

Posn	Station	Points	QSOs	QTH	Best dx	Km
1	RS32525	550	126	AL41	F6HRP/P	385

ALL-OTHER SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	G4LIP/P	2,477	229	AN61	DK1KO	668
2	G6EKR/P	2,391	252	AL56	DK0XX/P	570
3	GW4ERP/P	2,137	313	YN75	DJ0UO	694
4	G8KBQ/P	1,584	247	YL68	PE1EBJ	547
5	G3YMD/P	1,534	177	AL76	DG3YZ	531
6	G8LNC/P	1,313	266	ZK06	GM8HUU	601
7	G4DEZ/A	1,297	160	AL34	DK3JU	592
8	G4EFE/P	1,294	241	ZL53	DF8KV	580
9	G4LIN/P	1,292	203	ZM70	DF8KV	513
10	G3LRS/P	1,227	218	ZM26	PE1HTE	486
11	G4AAQ/P	1,181	272	ZN61	F1BHL/P	473
12	GW3OUL/P	1,179	211	YN75	G6DCV	372
13	G6GS/P	1,129	219	ZL69	GI8TBQ	505
14	G4NVA/P	1,106	222	ZN61	F1ERF/P	531
15	G3VER/P	1,105	233	ZL17	DL6FAW	619
16	G4DZO/P	1,087	185	AK11	F1EIT/P	528
17	G8YYB/P	1,050	203	ZL60	GI6ECU/P	549
18	G8ZWJ/P	954	125	AK22	DL0ZOM/P	549
19	G8SDS/P	946	150	YK28	PA3AVL	574
20	G4ILI/P	929	211	ZL01	ON7HP	547
21	G3STG/P	901	221	ZL76	PA3AXY	448
22	G4KKC/P	878	150	YL03	F1EAN	638
23	G8YDW/P	838	166	ZN11	F1KGT/P	568
24	G8REQ/P	793	159	YN37	F1KAW/P	441
25	G8SRC/P	737	175	ZL32	DF6KV	619
26	G3BZU/P	735	154	ZK05	GM8YJU	480
27	G4JFW/P	647	145	ZM26	F6HMQ/P	517
28	G8GBY/P	580	104	ZN18	PA3BPC/P	420
29	G4DAR/P	578	152	YM40	GM3GXE/P	465
30	G3FJE/P	573	173	ZM79	GI8TBQ	446
31	G4LWG/P	563	128	YO78	F1KAW/P	492
32	G4ARE/P	528	88	YK13	F1EAN/P	533
	G4KTP/P	528	94	YO20	F1BHL	680
34	G4NVC/P	510	120	ZL11	F1EAN/P	598
35	G3WKS/P	509	88	AK12	PE0NYJ	406
36	G6ABA/P	508	150	ZL24	DF0VK/P	610
37	G8DRE/P	497	97	YO46	G8YBB/P	401
38	G4LQG/P	495	109	ZN63	PE1AYI/P	480
39	G4AYM/P	477	137	YL20	F6HRP/P	370
40	G6BRH/P	475	81	AL03	PA0WRC/P	345
41	G4EUZ/P	468	77	ZP61	F1KAW	623
42	G4MEM/P	451	125	YL10	ON1AEY	401
43	G8HHQ/P	437	89	ZL73	GM3ZXE/P	638
44	G6FPQ/P	426	100	AK12	GM8YJU	520
45	GW3SRT/P	418	78	YM24	F1EAN/P	716
46	G6YB/P	372	74	YL47	ON1RN/P	530
47	G8JQV/P	368	83	ZO65	F1KAW/P	507
48	G6OI/P	334	94	YM49	F5JY/P	350
49	G6CRC/P	303	105	ZL30	PE1FJE	351
50	G8KMK/A	297	89	ZN21	G8LNC	310
51	G6DTD/A	281	75	YN58	F1KAW/P	410
52	G4NID/A	180	58	ZN74	F1KAW/P	383

Low Power Contest 1982 results

A significant increase in activity was a welcome feature of this event, reflecting the growing interest in low power operation. Over 100 QRP stations were active, many more than in previous years.

Entrants battled through fearsome QRM on 7MHz with the German HSC Contest in full swing. Incredibly, there were remarkably few errors in the logs, a tribute to the skill of the operators in difficult conditions. Most entrants enjoyed the contest and seemed satisfied with the rules, although a few would like to see the 1W section (introduced last year) restored.

The standard of most logs was good but there were a few which were difficult to decipher – being photo copies of the original; or awkward to handle – being on odd-sized homebrewed log sheets.

Dave Vizard, G3UKS, was the winner with a faultless log showing 123 contacts. He used a TR7 with an outboard pa to an inverted-V on 3·5MHz, and a two-element Yagi on 7MHz, both at 60ft. Runner-up was Cris Henderson, G4FAM, with 116 contacts made with an FT101B driving an external pa (EL90) to an inverted-L at 40ft. J. R. Cockrill, G4CZB, was third with a modified FT301S and an inverted-V antenna. George Burt, GM3OXX, took the 1W honours again with his homebrew transceiver/transverter, a 600ft long wire on 3·5MHz, and groundplane on 7MHz, both 130ft up.

Leading the overseas section was Fr Scheyvaerts, ON5AG, using an Argonaut transceiver and a Hertz antenna at 30ft.

Thanks are due to the G-QRP Club for publicising the contest, which undoubtedly helped to boost activity. Subject to the approval of Council, D. Vizard will be awarded the 1930 Committee Cup. *G3KKQ*

SECTION A

Posn	Callsign	Pwr (W)	3·5	7·0	Total
1	G3UKS	5	585	880	1,465
2	G4FAM*	5	595	830	1,425
3	G4CZB*	5	635	770	1,405
4	G3VTT	5	565	825	1,390
5	G3VIP/P	5	465	885	1,350
6	G4ELZ/P	5	435	870	1,305
7	G8DV	5	685	610	1,295
8	GM3OXX/A*	1	655	620	1,275
9	G3IGU	5	440	800	1,240
10	G4ERT	3	680	555	1,235
11	G4JFN	5	650	510	1,160
12	G4BLX	5	390	755	1,145
13	G3LCG	3	275	850	1,125
14	G3AZ	5	485	620	1,105
15	G3YNA	5	465	600	1,065
16	G3DNF	5	340	625	965
17	G3AWR	5	315	570	885
18	G4DVW	2	370	365	735
19	GI4GYE	5	165	270	435
20	G8QM	2	–	305	305
21	G4EFJ	3	–	85	85

*Certificate winners

SECTION B

Posn	Callsign	Pwr (W)	3·5	7·0	Total
1	ON5AG*	–	205	445	650
2	PA0WX*	–	240	295	535
3	DJ6FO*	–	–	500	500
4	PA0PN	–	165	240	405
5	PA0CMP	–	230	135	365
6	F3IM	–	30	120	150
7	EI4DZ	1/2	–	135	135
8	OZ1DVV	–	–	130	130
9	OK1DKW	–	–	125	125
10	HB9ASJ	2	15	80	95

*Certificate winners

Check logs acknowledged with thanks from G3MCK, G4BUO, G4DJX, G4EBO, G4HZF, G4KLQ and PA3BLU.

ROPOCO 1 1982 results

An increase in entries reflects the growing popularity of this style of contest. The performance of the entrants is measured more by their message handling accuracy than by their ability to amass contacts.

In the event, accuracy was at a premium since three stations submitted equal top claimed scores. Due to the high number of logs received, very full cross-checking was achieved, from which John Bell, G4HIU of Stockport (using the Marple Contest Club call G4MCC) emerged as the winner.

All entrants except G4FDC lost points, but sadly he did not improve his position as a result, although he has the consolation of holding the sole immaculate entry. A few fell foul of the unmarked duplicate penalty, astonishing in view of the limited number of contacts. The greatest loss of points was due to "jittery dot disease", in which

several repeats do not guarantee a correct transfer! Hence such splendid garbles as II16 HIW, 3XA 0KZ, OO11 0HR and the ultimate OA 88 22 EF!

That garbling extends beyond the contest itself is evidenced by the entry received for "ROPOCCO 1" – possibly available in your local Italian restaurant? The comments of many, all kindly, are enshrined in G3JJZ's description – the "laugh of the year" contest.

Finally, spare a thought for GM4LVW of Ayr, right at the edge of the action. How about some of you tartan types joining him in August! *G3XTJ*

Posn	Callsign	Points	Posn	Callsign	Points
1	G4MCC (G4HIU)	456	18	G4IXF	264
2	G3UFY	438	19	G4JKW	246
3	G4BUO	432	20	G4KRG	244
4	G3ROZ	426	21	G3BPE	236
5	G4BOU	400		G4JAI	236
6	G3SJE	394	23	G4IZZ	230
7	G3YCP	368	24	G3WJS	224
8	G4CZB	364	25	G3VFB	222
9	G3HQH	350	26	G3XOX	194
	G4KRS	350	27	G4KLQ	192
11	G4BLX	332	28	G4GSC	188
12	G3SHY	328	29	G4CSB	184
13	G4KGG	316	30	G3KKQ	176
14	G3JJZ	306	31	GM4LVW	130
15	G3AWR	276	32	G4KWU	116
16	G4HZF	270	33	G3GMM	104
17	G4DDX	268	34	G4FDC	100

Check logs received with thanks from G3MCK and G4KZD.

DF Qualifying Event Rugby results

Twenty-three teams assembled at the start of the Rugby Qualifying Event, which should have been at Midsummer Meadow, Northampton. This however was occupied by the organizers of the Northampton Marathon, so competitors moved to the adjacent Barnes Meadow.

Station A was located just east of Hunsbury Hill Fort, two miles SW of the start. A carefully adjusted signal level led some competitors to think it was much further away. Judging by the beaten undergrowth some competitors did a lot of searching on this site. Peter Lisle was the first competitor to arrive at 1433.

Station B was located along the North Buckinghamshire Way about 0·75 mile from the village of Whaddon, and some 16 miles south of the start. The transmitter was hidden in a thick hedge, along which the crew had tunnelled for 30ft. Most competitors spent some time following the antenna. The first competitor to find the transmitter was Ian Butson, who forced his way into the hedge at 1451.

There were 66 competitors and station crews sitting down to tea at Yardley Gobion, where the results were given and the prizes presented.

Thanks are due to Mrs Sue Lineham and her band of helpers for an excellent tea, also to the transmitter crews, and especially to Bill Mays for his time and efforts.

			Time of arrival	
Posn	Name	Club	Station A	Station B
1	M. Hawkins	Chelmsford	1435	1508
2	B. Bristow	Mid-Thames	1434	1525
3	R. Parsons	Burton-on-Trent	1452	1526
4	C. Plummer	Mid-Thames	1444	1527
5	P. Lisle	Mid-Thames	1433	1529
6	M. Easterbrook	Dartford Heath	1435	1534
7	D. Holland	S Manchester	1445	1549
8	G. Taylor	Aerial	1445	1552
9	R. Shepherd	Mid-Thames	1503	1602
10	T. Gage	Mid-Thames	1459	1603
11	E. Mollart	Mid-Thames	1451	1606
12	I. Butson	Colchester	1609	1451
13	W. North	Mid-Thames	1618	1458
14	W. Pechey	Mid-Thames	1618·5	1523
15	C. Merry	Dartford Heath	1448	1619
16	D. York	S Manchester	1622	1507
17	C. Wells	Mid-Thames	1623	1521
18	G. Whenham	Coventry	1625	1501
19	P. Williams	Slade	1627	1526·5
20	P. Woollett	Dartford Heath	1525	1630
21	J. Drakeley	Slade	1501	–

Two teams did not find either station.
C. Plummer and P. Lisle qualify for the National Final.

DF Qualifying Event Slade

Date: 22 August 1982
Map: OS 1:50,000 series, sheet 127, Stafford and Telford
Time: 1300bst for start at 1320bst
Location: One mile south of Church Eaton, ngr 844 156.

Competitors requiring tea should notify Mr J. R. Vickers, 6 Iverley Walk, Chawn Park, Stourbridge, W Midlands DY9 0YJ, tel 03843 77008, by 15 August 1982.

Stevenage & DARS 144MHz FM Contest results

The contest proved to be very popular and despite the poor conditions there was a high level of activity in both the horizontal (144·5-144·75) and vertical (145·2-145·575) fm sections of the band. Regrettably though there were no entries for the swl section.

Comparing the results of stations using the different polarizations one was struck by the fact that those who used horizontal antennas worked both more stations and greater distances that those using vertically polarized antennas.

Comments:
"Poor, very bad sigs to Continent", *G8RZO*; "Conditions average", *G8FVZ*; "Many thanks for an enjoyable contest", *G6EES*; "Rather flat overall but slight improvement in last hour", *G4MVR*; "Will try to do better next time", *G8XGN*; "Very enjoyable contest . . . thanks Stevenage ARS", *G8UEB*.

HIGH POWER SECTION (over 25W)

Posn	Callsign	Points	Best dx	Km
1	G8RZO	947	PE1GYC	410
2	G8KUC	617	PA3AJM/LX	371
3	G8YLH	511	G8PWX	420
4	G8UEB/P	341	G6ADH	277
5	G8KAX/P	315	G4JCX	355
6	G8PTP/P	212	G8YNC/A	264
7	G8ZPC	210	G6ECM	314
8	G8FVZ	166	PE1CPH	325
9	G4DFI	165	G8UYZ	290
10	G8VAY	132	G4DEZ	285

LOW POWER SECTION (25W or less)

Posn	Callsign	Points	Best dx	Km
1	G6ECM	406	G8ZPC	314
2	G8JAY/P	306	G6ECM	221
3	G4MVR	269	G6CRV	352
4	G6CHK	180	G8XGN	235
5	G8XGN	162	G6ADH	285
6	G8NNJ	158	G8WDT	169
7	G8ZYL	122	F1FYH	288
8	G6EES	103	G8WYR	130
9	G6DCL/P*	80	G8KUC	210
10	G6FJI	75	G8KUC	109
11	G6EKL/P†	51	G8YLH	86
12	G8JLM	46	G8RZO	101
13	G6CQJ	42	G8RZO	104
14	G8LXY	39	G8YLH	78
15	G4KVI	21	G8RZO	125

*QRP 2W
†QRP 2·5W

Contests calendar

1 August	432MHz Low Power *(Rules in June issue)*
7-8 August	YO DX HF *(Rules in July* MOTA*)*
8 August	DF Salisbury *(Rules in July issue)*
8 August	10GHz Cumulative 1982
14-15 August	European DX (CW) *Rules in August* MOTA*)*
15 August	70MHz Trophy & SWL *(Rules in June issue)*
21-23 August	Alaska QSO Party *(Rules in August* MOTA*)*
22 August	DF Slade *(Rules in August issue)*
28-29 August	All Asian (CW) *(Rules in May* MOTA*)*
29 August	ROPOCO 2 *(Rules in July issue)*
4-5 September	144MHz & SWL *(Rules in July issue)*
4-5 September	IARU 144MHz *(Rules in July issue)*
4-5 September	SSB FD *(Rules in June issue)*
5 September	LZ DX *(Rules in August* MOTA*)*
11-12 September	European DX (Phone) *(Rules in August* MOTA*)*
11-12 September	Cray Valley RS 12th SWL *(Rules in July issue)*
19 September	10GHz Cumulative 1982
19 September	DF National Final, Colchester/Chelmsford
25 September	AGCW-DL VHF/UHF CW *(Rules in March* 4-2-70*)*
26 September	RSGB Region 1 VHF *(Rules in July issue)*
2-3 October	IARU VHF *(Rules in July issue)*
10 October	21/28MHz Phone *(Rules in May issue)*
17 October	21MHz CW *(Rules in May issue)*
October/ December	432MHz Cumulatives
October/ December	1,296MHz Cumulatives
6-7 November	144MHz CW
6-7 November	Marconi Memorial CW
7 November	LF CW (WAB) *(Rules for all WAB contests obtainable from D. Roberts, G4FQO, 12 Chestnut Ave, Cranwell, Nr Sleaford, Lincs NG34 8HT)*
13-14 November	European DX (RTTY) *(Rules in August* MOTA*)*
13-14 November	1·8MHz (2nd)
5 December	144MHz Fixed

Looking ahead

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

5 September – BATC convention, Post House, Leicester.
11 September – Scottish Amateur Radio Convention & Exhibition, Aberdeen.
11 September – RSGB Zone C conference, at Scottish Amateur Radio Convention, Aberdeen.
26 September – Welsh Amateur Radio Convention, Oakdale Community College, Blackwood, Gwent. Details from GW3KYA.
9 October – Midlands VHF Convention, Wolverhampton Polytechnic. Details from J. P. H. Burden, G3UBX.
14-16 October – 11th ARRA Amateur Radio Exhibition, back at Leicester this year.
4 December – RSGB AGM, IEE, Savoy Place, London.

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 1983 issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **October** issue should reach them by **21 August** and for the **November** issue by **18 September.**

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 (North Western Repeater Group)—19 August. Globe Bowling Club, Willows Lane, Accrington. Sec Howard Aspinall, G3RXH.

Ainsdale (AARC)—3, 17, 31 August. Ainsdale Scout HQ. Sec Norman Horrocks, G2CUZ, tel 0704 77604.

Barnoldswick (Rolls-Royce ARC)—4 August ("Slow scan tv", a lecture by Peter Burnett, G4BLL), 8pm. Rolls-Royce Sports & Social Club, Barnoldswick. It is hoped that slow morse transmissions will commence in August from the club shack, refer to the schedule in *Radio Communication* for details. Sec Leslie Logan, G4ILG, tel Barnoldswick 812288.

Blackburn (East Lancs ARC)—3 August (No club meeting), 7 September (No details available), 7.30pm. Shadsworth Leisure Centre, Blackburn. PRO Norman Jenkin, G4CGT, tel 0254 75037.

Blackpool (B & Fylde ARS)—3 August, 7 September. Contact sec Jim Newland, G5ND, for venue and programme, tel 0253 64508.

Bury (BRS)—10 August (144MHz fox hunt). Informal meetings are on 3, 17, 24, 31 August, 7.30pm. Mosses Community Centre, Cecil Street, Bury. Gordon Cratchley, G3IXG, has relinquished the editorship of the club magazine *Feedback* after five years' sterling work. The club says "thank you" for all the hours Gordon has devoted to the magazine. Details from David Hensby, G8TKD, daytime tel Whitworth (070685) 2213.

Chester (C&DRS)—There are no club meetings in August. The first meeting of the 1982/83 session will be on 7 September at the new club QTH at the Chester RUFC, Hare Lane, Vicars Cross, Chester. An invitation is extended to all to come and see the new facilities. Sec Chris Hopley, G8ICT.

Leyland (LHARG)—9 August. Rose & Crown, Ulnes Walton, Leyland, 7.30pm. Sec Arthur Jolly, G4JCO.

Preston (PARS)—5 August. (Final discussion of the rally arrangements for 15 August), 2 September (Arrangements for SSB Field Day). The club runs fox hunts every Thursday during the summer months. It has a new meeting venue, the Lonsdale Club, Fulwood Hall Lane, Fullwood, Preston. Sec George Earnshaw, G3ZXC.

Stockport (SRS)—11 August (Lecture on antennas by Des Alimundo, G4HK), 25 August ("Video recorders", by John Bell, G4HIU), 8pm. Blossoms Hotel, corner of Bramhall Lane and Wellington Road, Stockport. 8 September (Junk sale at the Southlands Hotel, all equipment for sale must be taken in by the car park rear entrance). Sec Stan Aspinall, G3VSA, tel 061-437 1437.

Thornton Cleveleys (TCARS)—1 August (A treasure hunt at 11am, meet at the River Wyre Hotel), 6 August (Provisionally, a lecture by Harry Leeming, G3LLL, on interference), 13 August (A video film on satellites), 20 August (Fox hunt or a natter night for those who have given up the chase!), 27 August (Provisionally, a talk by Frank Hill, G3YWH, on hf antennas), 3 September (Talk on interference by Brian Philips, G8FWM, and Alan Clayton, G4EWS, also to be confirmed), 8pm. Thornton Cleveleys Sports Centre, Victoria Road, Cleveleys. Sec Mrs Jen Ward, G8YOK, tel Poulton-le-Fylde 890114.

Warrington (WARC)—10 August (RSGB video film), 17 August (Learning Basic), 8pm. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Ron Staples, G3MMD.

Warrington (UK FM Group Western)—5 August and 2 September, 8pm. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Gordon Adams, G3LEQ, tel 0565 4040.

Wirral (WARS)—4 August ("Problems night"), 18 August ("Coaxial cables", a talk by Jerry Rigby, G3KTJ), 1 September ("Flotilla sailing around Corfu", a talk on his holiday activities by Garry O'Keefe-Wilson, G4MIA), 7.45pm. Minto House School, Birkenhead Road, Hoylake, Wirral. Sec Gordon Lee, G3UJX, tel 051-677 1518.

Wirral (W&DARC)—11 August ("Know your new QTH", a celebration evening at the new club venue, the Irby Cricket Club, with an informal drink and a chat. There will be talk-in on S13.), 25 August (Surplus gear sale), 8 September ("Sun, earth and radio, part 1", a talk by Gordon Adams, G3LEQ), 8pm. Sec Gerry Scott, G8TRY, tel 051-630 1393.

This month RR1 reports the receipt of club magazines from Mid-Cheshire ARS, South Manchester RC, and Wirral ARS, thanks again. For the future, members in the region are asked to note that the Region 1 VHF Contest is to take place on Sunday 26 September organized as usual by G2CUZ. On Sunday 10 October a regional meeting is to be held at Chorley, full details in next month's "Club news".

REGION 2—RR D. S. Smith, G4DAX, Red Roof, Goathland, Whitby, North Yorks YO22 5AN. Tel 094-786 333.

Barnsley (UK FM Group Northern)—1 August, 5 September, 3 October, 7.30pm. The Royal Hotel, Church Street, Barnsley. Sec G4LUE.

Halifax (Northern Heights ARS)—Wednesdays, 7.45pm. Bradshaw Tavern, Bradshaw, Nr Halifax. Sec c/o Geoff Milner, 3 Briggs Villas, Queensbury, Bradford, tel Bradford 882945. Note the change of sec's address. There has been quite a demand for the club's project, a single-board 144MHz receiver.

Pontefract (P&DARS)—5 August ("Construction of 2m df antennas", by G4AAQ), 19 August ("Converting cb gear for amateur use", by G3VTD), 2 September ("The RSGB", talk by RR2, G4DAX), 9 September (Club visit to the North Wakefield Radio Club junk sale), 16 September ("A look into industrial control systems", by Malcolm Haskill), 30 September (Film evening "Power stations"), 7 October (Power station visit). The Carleton Community Centre, Wakefield. Work on the new shack is now showing great progress. A QSL design contest was under way. The proposed 432MHz repeater has been shelved due to lack of support. Sec G4ISU.

Spen Valley (SVARS)—5, 19 August (Noggin and natter nights to break in the new QTH), 8pm. New programme starts on 2 September. Old Bank Working Men's Club, Mirfield, note new venue. Sec G4MLW, tel Heckmondwike 409739.

Wakefield (W&DARS)—10 August (Quiz), 24 August (On the air/natter night), 7 September (Homebrew evening), 21 September ("Interference", by G4DXA), 8pm. Holmfield House, Denby Dale Road, Wakefield. Sec G4BLT, tel Wakefield 255515. Due to alterations to Holmfield House the 10 and 24 August meetings will be held in Room C, Unity House, Westgate.

York (YARS)—Fridays, 7.30pm. United Services Club, Micklegate, York. Sec Keith Cass, G3WVO. The local Raynet involvement with the recent Papal visit was quite an exercise by all accounts. Following the demo station at the Great Yorkshire Show, preparations will be made to put on yet another at Tollerton on 14 August (GB2TS).

Not many entries this month—must be the holiday season. One of the nice things about being an RR is visiting rallies and meeting members, which must go some way to improving communications throughout the Society. However, I wonder if we have reached saturation point with the number of rallies being held throughout the year—a point of diminishing returns perhaps? *RR2.*

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

Atherstone (AARC)—12 August ("Fast scan tv", by Ian Bricknell, G8KRW), 19 August (DF hunt—2m, listen for G6ARC at 7.30pm), 7.30pm. The Tudor Centre, Coleshill Road, Atherstone. Sec G4IAG, tel Fillongley (0676) 41814.

Birmingham (Midland ARS)—17 August ("Design and production of printed circuit boards", by Chris Burkill, G8FTU), 7.30pm. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.

Birmingham (South Birmingham RS)—Thursdays (HF night on the air), Fridays (Construction and morse classes), 7.30pm. 1 September, 7.45pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G8RGQ, tel 021-459 8312.

Bromsgrove (B&DARC)—13 August ("RSGB", by local representatives), 27 August (QRP meeting), 8pm. Avoncroft Art Centre, Bromsgrove. Club net Wednesdays, 144·850MHz, 8pm. Sec G4LVK, tel 021-445 2088.

Coventry (CARS)—6 August (Treasure hunt), 13 August (Night on the air), 20 August (160m df hunt—practice event), 27 August (Night on the air), 3 September, 4 September (50th anniversary dinner—see sec), 8pm. Baden Powell House, 121 St Nicholas Street, Radford, Coventry. Sec G4HRY, tel Coventry (0203) 618648.

Malvern Hills (MHRAC)—10 August ("RSGB", by local representatives), 7.30pm. The Red Lion Inn, St Ann's Road, Great Malvern. Sec G4GFX, Wyche Road, Malvern, tel Malvern (06845) 62900.

Redditch (RRC)—12 August (Natter night), 26 August (Natter night), 8pm. WRVS Centre, Ludlow Road, Redditch. Morse classes available. Sec G3EVT, tel Alcester (0789) 762041.

Shrewsbury (Salop ARS)—5 August (Natter night), 12 August ("Transmission lines", by Eric Churchyard, G3TVR), 19 August (Natter night), 26 August ("Components", by John Hartley, G8AEV), 2 September (Natter night), 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec G6AKE, tel Shrewsbury (0743) 66969.

Solihull (SARS)—17 August ("Microwave operating", by Glen Ross, G8MWR), 7.30pm. The Manor House, High Street, Solihull. Club nets (G3GEI), Fridays, 9.30pm on 1,960kHz and (G8ZLJ), Sundays, 9pm on S19 or next lowest vacant channel. Sec G4JDL.

Walsall (WARC)—8 September ("VHF operating techniques", by G4KBA), 8pm. Forest Community Centre, Hawbush Road, Leamore, Bloxwich. Club net Fridays, 28·025MHz cw, 8pm and 3·70MHz ssb, 9pm. Sec G4GKC, tel Walsall (0922) 31675.

Wolverhampton (WARS)—2 August (Natter night), 9 August (Natter night), 16 August (Discussion of ideas for a new club project), 23 August (2m df hunt), 30 August (No meeting), 6 September, 8pm. Wolverhampton Chamber of Commerce & Industry, 93 Tettenhall Road, Wolverhampton WV3 9PE. Sec G8EDG, tel Wolverhampton (0902) 763617.

Worcester (W&DARC)—16 August (Members' projects and natter night at the Old Pheasant, New Street), 4 and 5 September (Contests at Kempsey Common), 6 September ("RSGB", by local representatives), 8pm. "Odd Fellows Club", New Street, Worcester. Sec G8TZE, tel Tewkesbury (0684) 293880.

REGION 4—RR M. Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey DE3 2BJ. Tel Derby (0332) 556875.

Derby (D&DARS)—4 August (Rally preparations at Lower Bemrose School), 11 August (Film show), 18 August (Night on the air), 25 August (Measurement evening), 1 September (Junk sale). Top floor, 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Derby (Nunsfield House ARG)—6 August ("How I started in amateur radio", a talk by Fred Ward, G2CVV), 13 August (Open evening), 20 August ("The workings of the library service", a talk by Rosina Peberdy), 27 August ("Power supplies", by Les Jackson, G3OZJ), 7.45pm. Room 7 Nunsfield House, Boulton Lane, Alvaston, Derby. Sec Ian Cage, G4CTZ, tel Derby 799452.

Grimsby (GARS)—9 August (Lecture—"2m linears and aurora"), 23 August ("Hobbies for all", arrangements), 7.30pm. Cromwell Social Club, Grimsby. Sec Trevor Matthews, G3RGC, tel Grimsby 884060.

Mansfield (MARS)—6 August (Social meeting only, due to peak holiday), 17 August (Social meeting), 7.30pm. Victoria Social Club, Princes Street, Mansfield. Sec Duncan Walters, G4DFV, tel Mansfield 648679.

Newark (N&DARC)—There will be no meeting during August. 2 September (Visit to Notts police operations room), 7.30pm. Palace Theatre, Appleton Gate, Newark. Sec Roger Hiscock, G4MDV.

Nottingham (ARCON)—5 August (Forum), 12 August (Activity night) 19 August (Fox hunt), 26 August (Activity night), 2 September (Preparations for SSB Field Day, and forum), 7.30pm. Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham. Sec Paul Chapman, G4IJL, tel Nottingham 623828.

REGION 5—RR J. S. Allen, G3DOT, 77 Rosslyn Crescent, Luton, Beds LU3 2AT. Tel 0582 508515, or at work, 0582 21151, ext 303.

Cambridge (CUWS)—University closed during August. Details of club from T. J. Gleeson, G8TUG.

Corby (CARG)—Informal meetings during August,

Friday evenings, Hightrees Scout Centre. Details from sec P. Richardson, G8MLA.
Dunstable Downs (DDRC)—13 August (Sprogg of the Year award—technical measurement evening), 27 August (Film night, "Voices in orbit", "Sea has many voices and no ordinary cargo"), 8pm. Chews House, Dunstable. Details from sec Clive Asquith, G4ENB.
Leighton Linslade (LLRC)—Closed during August. Details from sec John Hart, G8GIK.
Luton (Kent Process Controls ARC)—Closed during August. Details from sec G3DOT.
Northampton (NRS)—Thursdays, 5 August (DF hunt), 19 August ("FM technics", by G3NEV), 8pm. Kingsthorpe Community Centre.
Peterborough (GPARC)—The Southfields Junior School, Stanground, is closed during August, so informal meetings held in local pub. Details from sec G8ZVW.
Peterborough (PR&ES)—20 August (Planning for September rally). The Scout Hut, Occupation Road, off Lincoln Road, Peterborough. Sec G4KSW.
St Neots (SN&DARS)—9 August (Treasure hunt), 23 August (Video evening), 7.30pm. Horseshoe Inn, Oford Darcy, Nr Huntingdon. Sec G4FOH.
Shefford (S&DARC)—Club closed during August, opening again on 2 September. The Church Hall, Shefford. Sec Brian, G4MEO.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049481) 4240.

Aylesbury Vale (AVARS)—10 August (Junk sale), 8pm. Stone Village Hall, Stone. Sec M. J. Marsden, G8BQH, tel 0296-641 783.
Burnham Beeches (BBRC)—2 August (Talk on Oscar by G3RWL), 16 August (Fox hunt). St John Ambulance HQ, Slough. Sec G4LQD.
Chesham (C&DARS)—After 14 years, the club now occupies its own extensive premises, with 25 by 33ft of facilities. Nine months of hard work prevented the club from participating in contests, exhibitions and displays, in which it excelled in the past, but it will be more in the news in future. Anybody wishing to join the club, please contact sec J. Alldridge, 15 Whichcote Gardens, Chesham, Bucks, tel Chesham 786935.
Harwell (HARS)—17 August (To be arranged), 4-5 September (144MHz Contest). East Wing Room, AERE Social Club. Details from Ann Stevens, G8NVI.
High Wycombe (Chiltern ARS)—25 August (Film show and natter night), Sir W. Ramsey's School, Hazelmere. Details from G3NCL, or G4KVA.
High Wycombe (Mid-Thames DF Club)—Lowfield House, Bolter End Lane, Lane End, High Wycombe, Bucks.
High Wycombe (South Bucks Contest Club)—c/o 12 Waterside, Wooburn Green, High Wycombe, Bucks.
Newbury (N&DARS)—Heatherlea, Adbury, Holt New Town, Newbury, Berks. Sec G4JAZ.
Oxford (OURS)—62 Banbury Road, Oxford OX2 6PN. Details from sec G4KGA, Oriel College.
Reading (R Telephone Area RC)—c/o 40 Broad Lane, Upper Bucklebury, Reading, Berks.
Vale of White Horse (VWHARS)—First Tuesday in each month (Formal meetings with guest speaker), third Tuesday in each month (Informal, members-only meetings). SWLs and students of radio very welcome, 7.30pm. Club Room, White Hart Inn, Harwell Village, Berks. Details from sec G3SEK, tel 0235 89559.

REGION 7—RR Pat Walker, G8HMG, 12 Brownlow Road, Redhill, Surrey, RH1 6AW. Tel Redhill 64035.

Biggin Hill (BHARS)—Last Tuesday in each month. 31 August (No meeting), 21 September ("Running a QSL Bureau", by Arthur Milne, G2MI), 8pm. Biggin Hill Memorial Library. Sec Ian Mitchell, G4NSD, tel Biggin Hill 75785.
Croydon (Surrey Radio Contact Club)—2 August (Satellite communications), 16 August (Barbeque at Terra Nova), 6 September (Surplus equipment sale), 8pm. TS Terra Nova, 34 The Waldrons, Croydon. Sec Ray Howells, G4FFY, tel 642 9871.
Guildford (G&DRS)—Second and fourth Friday in each month, 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec Helen Mullenger, G8SXB, tel Aldershot 20384.
Redhill (Reigate ATS)—Third Tuesday in each month, 20 August (Members' evening), 8pm. Constitutional & Conservative Club, Warwick Road, Redhill. Sec Chris Barnes, G8FEE, 25 Hartswood Avenue, Reigate RH2 8ET.

REGION 8—RR K. A. Crouch, G8KEN, 14 Victoria Road, Capel-le-Ferne, Folkestone, Kent CT18 7IR. Tel 0303 55241.

Chichester (C&DARC)—2, 16 August (Informal meetings at the Bader Arms, Tangmere). Further details from Terry Allen, G4ETU, tel 0243 58 463.
Crawley (CARC)—Second Wednesday in each month, 8pm. United Reform Church Hall, Ifield, Crawley. Fourth Wednesday in each month (Informal at a club member's house). Details from G4LGQ, tel Crawley 37538.
Dover (SEKYMCAARC)—During August most activities will be outside. The G3YMD and G8YMD callsigns will be active with the station operating from the white cliffs of Dover. There will also be a fox hunt. For details of these and other events for August contact G8EGT or G3VSU.
Eastbourne (Southdown ARS)—2 August (Audio circuit design), 6 September (TBA but hope for talk on satellites), 7.30 for 8pm. Chaseley Home for Disabled ex-Servicemen, Southcliff, Eastbourne. Details from sec, tel 0323 643463.
Hastings (HERC)—18 August (TBA). First Wednesday in each month (Committee meetings), second, fourth and fifth Wednesdays in each month (Micro nights), all at 479 Bexhill Road. Third Wednesday in each month (Main meeting, at West Hill Community Centre), 7.30 for 8pm. Sec Alan Beecher, G8VEA, tel Hastings 216516.
Horsham (HARC)—5 August (Talk on amateur tv, by Worthing TV Repeater Group), 2 September ("HF antennas", by Ken Franklin, G3JKF), 8pm. Guide HQ, Denne Road, Horsham. Details from Tony Wadsworth, G3NPF.
Medway (MARTS)—6 August ("Security", by Sgt David O. Sullivan), 13 August (Visit to Police HQ, Maidstone), 27 August (RSGB film "The secret listeners"), 7.30 for 8pm. Details from Ruby Sivyer, tel Medway 61927, after 6pm.
Thanet (RCT)—August activities consist of operating evenings on Fridays. G2IC/P will be at the Phoenix Fair, 7 August, in Ramsgate. Details from Ian Gane, G4NEF, tel 0843 54154.
Worthing (WARDC)—3 August ("Caxton's apprentice", by Stan, G3LQI), 10 August (G8GKV on 10 gigs), 17 August (DF hunt and rag chew), 24 August ("The video scene", by Richard, G8LBN, and Martin, G8KOE), 31 August (Computing evening), 7 September (Feedback on field day), 7.30 for 8pm. Pond Lane Amenity Centre, Worthing. Details from Joyce Lillywhite, tel Worthing 63062.

REGION 9—RR W. J. Colclough, G3XC, Highview, Indian Queens, St Columb, Cornwall TR9 6LL.

Camborne (Cornish RAC)—5 August (Talk by John Guite, G4FNP, on Braille), 7.30pm. SWEB Room, Pool, Camborne. With reference to the talk "Beetling around Africa", by Peter King, G3WKP, which was scheduled for May but had to be cancelled, this will now be given at the October meeting. Pro S. Rodda, G6DFE, 1/2 Penrose Terrace, Penzance, tel 0736 3948 or 3524.
Exeter (EARS)—9 August (Construction night). Community Centre, St David Hill, Exeter. Informal meetings first and third Mondays, The Scout Hall, Emmanuel Road, Exeter. Pro Geoff Draper, G6EWN, 19 Sunnymead, Copplestone, Crediton, Devon EX17 5NQ.
Plymouth (PRC)—2 August ("Fox hunt", by G6EQM), 7.30pm. Tamar School, Paradise Road, Millbridge, Plymouth PL1 5QW. 16 August (Meeting to be held at The Tamar Hotel, Crown Hill, Plymouth, 7.30 assemble for 8pm). President Harry Griffiths, G2DFH, pro Peter Connor, G8XTE, tel 075537 319.
Saltash (S&DARC)—6 August (Details not available), 20 August (Talk by David Bunce, G8VJB, "Rock climbing in Cornwall"), 7.30pm. Toc H, Burraton, Saltash. Sec Kevin Hall, 12 Rashleigh Avenue, St Stephens, Saltash, Cornwall.
Torbay (TARS)—Fridays, 7.30pm. Last Saturday in each month, special meeting, 7.30pm. Bath Lane, rear of 94 Belgrave Road, Torquay. The club set up a station for NFD and a very enjoyable day was had by all. A reasonable number of contacts were made. Conditions were not good but plenty of short skip on 28MHz, with some dx on 14 and 21MHz. One interesting feature was a complete fade-out on 7MHz about 20min before finishing time, lasting for 10min. The only station to be heard on this band was G3PRC/A in Plymouth asking, "was there anyone out there?"! Details of the Torbay Rally to be held on 29 August can be obtained from G4DZH. Pro Les Mays, G2CWR, tel Paignton 558714.

Club secretaries—please help your RR by supplying details of club activities by the date shown at the top of this section.

REGION 10—RR P. A. Jones, GW4HAT, 68 Pastoral Way, Tycoch, Swansea SA2 9LY.

Aberystwyth (ARSGBG)—24 August, 5 October, 16 November, dates subject to confirmation, The Bay Hotel, Aberystwyth. The group is holding a mobile picnic on 8 August at Ynyslas Sands, just north of Borth, Dyfed, starting at 12 noon, with talk-in on 144·525MHz (S21). It must be emphasized that the event is totally informal and all are welcome. The sands are owned by The Nature Conservancy Council who will make a small charge for entry. Further details of this event and group meetings from Simon Mee, GW4CTV, tel Aberystwyth 828365.
Newport (NARS)—Club call GW4EZW. Mondays, 7.30pm. Brynglas House, Brynglas Road, Newport. Programme of lectures and films throughout the year with cw classes each Monday. HF dx group, construction and microwave groups meet each month on a Thursday. Club station operational on hf and 144MHz. Details from acting sec Doug Parrott, GW4LOD.
Swansea (SARS)—First and third Thursday in each month, 7.30pm. Lecture Room 'N', Applied Sciences Block, Swansea University College. Throughout this month club activities will involve the organization of HF NFD (SSB). Club net each Sunday, 1000gmt, 28·530 or 28·310MHz if QRM level high. Net controller Cen, GW4BIQ. Sec Roger Williams, GW4HSH, tel Swansea 404422.

RR10 wishes to remind club secretaries that regular news must be sent in if you require your club to appear here each month. If your club was not included in last month's issue make sure your secretary informs RR10 before the deadline.

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 ARS) (GW6TM)—Special meeting 22 August (Talk and demonstration by David Munkhouse of Lowe Electronics on Trio and other equipment. Visitors cordially invited), 2.30pm. Green Lawns Hotel, Bay View Road. 12 September (Coach trip to Telford Rally, bookings to be made by 22 August). Sec J.N. Wright, GW4KGI, tel 0745 823674.
Dolgellau (Meirion ARS) (GW4LZP)—5 August ("Open night", visiting amateurs and friends invited), 14, 15 August (24th field day). HQ, Nannau Country Club, Llanfacreth, nr Dolgellau, Gwynedd. PRO Len C. Bridges, GW6COM, c/o Irem Idris, Barmouth Road, Llanelltyd, nr Dolgellau, Gwynedd LL40 2TD. Sec W.K. Judge, GW4KEV.
Rhyl (R&DARC)—12 August (Talk, "Marine radio"), 26 August (DF hunt), 7.30pm. Ambulance Station, Rhyl. Sec B. Jones, GW8OYT, 6 Rhodfa Maes Hir, Rhyl, Clwyd, tel 0745 37284.

REGION 16—RR T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.

Braintree (B&DARS)—First and Third Monday in each month, 7.45pm. Braintree Community Centre, Victoria Street. Details from Alan Williams, G6CIV, tel Silver End 83516.
Ipswich (IRC)—11 August (Final planning for carnival station), 14 August (Ipswich Carnival in Christchurch Park), 25 August (Talk by RR G3PLF), 29-30 August (Demonstration station at "Wheels '82" rally in Christchurch Park). Details from Jack Tootill, G4IFF, tel Ipswich 44047.
Stowmarket (S&DARS)—2 August (Informal question and answer evening). Red Cross Hut, Station Yard. Details from Jim Lowe, G8SCB, tel Needham Market 721296.
Vange (VARS)—5 August (Junk sale), 12 August ("RSGB", by G3PLF), 19 August ("Teleprinters", by G3XPV), 26 August (Station on the air), 7.30pm. Main Hall, Barstaple 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.

Basingstoke (BARC)—18 August (Informal evening and natter night), 15 September ("Amateur television", by G8GYS), 7.30pm. Chineham House, Popley, Basingstoke. Sec G6CPA, tel Tadley (07356) 4964.
Bournemouth (BRS)—6 August ("RTTY", by G3VPC), 20 August (Talk on Lowe Electronics equipment by Mike Devereux), 7.30pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4EKE, tel Ferndown (0202) 877945.
Dogmersfield (UKHFM Group)—As a result of the agm held in May the following are now officers of the group: chairman, G8UAV; sec, G8YLH. Membership of the group has now reached 321, with members in Holland, Belgium, France, Germany and S Ireland. RR 17 was not informed as to where and when this group has its meetings.
Fareham (F&DARC)—Portable operations during community centre closedown for August. Meetings recommence in September, Wednesdays, 7.30pm. Porchester Community Centre. Sec G4ITG, tel Fareham (0329) 234904.
Farnborough (F&DRS)—11 August ("Electrical connectors", by G3TUX), 25 August (Talk by G3LTP),

7.30pm. Railway Enthusiasts Club, Farnborough. Sec G4BJQ, tel Farnborough (0252) 43036.
Poole (PRAS)—Last Friday in each month, 7.30pm. Poole Technical College. At the recent agm the following officers were elected: president, G3BCI; chairman, G4JYX; sec, G3XYD.
Salisbury (SR&ES)—Tuesdays, 7.30pm. Grosvenor House, Churchfields Road, Salisbury. Sec G2FIX, tel Salisbury (0722) 743837.
Southampton (Waterside Short Wave Club)—Centre closed for August so no meetings there. 15 August (HF picnic at Yew Tree Heath, near Lyndhurst, 1400, talk in on S20 and RB11 (GB3NF). Club call G4JYN. Sec G6DLJ, tel Fawley (0703) 891975.
Weymouth (South Dorset RS)—First Tuesday in each month, 7.30pm. Civilian Canteen, Army Bridging Camp, Wyke Regis. 22 August (Possible mobile picnic). Chairman G3SDO, sec G3ZGP, tel Weymouth (0305) 812893.
Wimborne (Flight Refuelling ARS)—Sundays, 7.30pm. Flight Refuelling Social Centre, Wimborne. The following officers have been elected: chairlady, G4LFM; 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 (CDARC)—4 August (Natter night), 11 August (Equipment evening), 18 August (Natter night), 25 August (144MHz operation on Baas Hill Common, Broxbourne), 8pm. Church Room, Church Lane, Wormley, Nr Cheshunt, Herts. This club is actively engaged in fostering newcomers to obtaining their RAE. It also holds morse classes and will be starting a class in September if enough people are interested. Details from Bob Gray, G6CNV, tel Dane End 254.
Chiswick (ABCARC)—17 August (Discussion of members' problems), 7.30pm. The Committee Room, Chiswick Town Hall, High Road, Chiswick, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.
Edgware (EDRS)—Second and fourth Thursdays in each month, 24 August (Visit to Verulam bring & buy sale, Edgware Project), 26 August (SSB Field Day briefing), 8pm. 145 Orange Hill Road, Burnt Oak, Edgware. Please note sec's new QTH, 11 Batchworth Lane, Northwood. No telephone yet. Details from G4MLU, tel 01-652 7402. This club holds regular morse classes.
Grafton (GARC)—13 August (DF hunt on vhf in collaboration with Southgate), 8pm. Meetings are now held at the Five Bells, East End Road, East Finchley, London N5. Sec Jim Chambers, G4IBK, tel 01-346 5841. All are welcome, in fact the club is going all-out to get new members from the area. At least you should not be thirsty at this venue! *RR19.*
Harrow (RSH)—6 August (Informal and practical evening), 13 August (DF hunt), 20 August (A visit), 27 August (Informal and practical evening), 7.30 for 8pm. Roxeth Room, Harrow Arts Centre, opposite the Alma Pub, High Road, Harrow Weald, Middx. Come up on GB3HR for instant talk-in to the premises on club night. Details from C. Friel, G4AUF, tel 01-868 5002.
St Albans (Verulam ARC)—24 August (Combined meeting with the Edgware club for a construction and bring & buy sale), 8pm. Charles Morris Memorial Hall, Tyttenhanger Green, Nr St Albans. Informal meetings on second Tuesday in each month, RAFA HQ, New Kent Road, St Albans. Publicity sec G3VJO, tel Redbourne 2761.
Southgate (SARC)—12 August (Social evening—come along for a get-together with tea, coffee and biscuits laid on. It is the first birthday in our new QTH), 7.30 for 8pm. St Thomas's Church Hall, Prince George Avenue, Oakwood, London N14. 30 August (DF hunt, details from G3ZVW). Sec John, G8EWG.
Stevenage (S&DARC)—5 August (Natter night), 19 August (Beginners' night), 8pm. Canteen, British Aerospace, Site B, Argyle Way, Stevenage. This club does hold morse classes. Details from Terry, G6CRF, tel Stevenage 62860.
South West Herts UHF Group—This group's 10GHz beacon is now back on the air. They would like some interested people to help maintain it, especially with cash assistance! If you can help, contact Peter, G3YXZ, 29 Standfield, Abbots Langley, Watford.
UK FM Group—For information on this group and future policy contact Pat Spenceley, G8LZA.

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ. Tel 0272 848140.

Bristol (BRSGBG)—Queens Building, Bristol University, 23 August (Details of the lecture will be given on GB2RS), 7.30pm. Further information from Chris Short, G8GLQ, tel 0272 621253.
Bristol (North Bristol ARC)—Fridays, 7.30pm. c/o Self Help Enterprise, Braemar Crescent, Northville, Bristol. Normal club meetings during August, some informal talks. Further details from Ted Bidmead, G4EUV, tel 0272 691685.
Bristol (Shirehampton ARC)—Fridays, 7pm. Twyford House, Shirehampton. Club will open during August for impromptu talks and demonstrations. Details from Ron Ford, G4GTD.
Cheltenham (CARA)—5 August ("A fresh approach to aerials", by G3GWW), 20 August (Natter night), 2 September ("The Doug Charman video tape"), 7.30pm. Old Bakery, Chester Walk, Clarence Street, Cheltenham. Details from John Holt, G3GWW.
Gloucester (GARS)—Chequers Bridge Centre will be closed during August. Next meeting will be on 2 September. Details from Tony Martin, G4HBV.
Portishead (Gordano ARG)—Fourth Wednesday in each month, 7.30pm. Ship Hotel, Down Road, Portishead. Details of the August meeting will be given on GB2RS. Please note change of sec, who is now Bob Coles, G8ROC, tel 0272 877789.
Yeovil (Y&DARC)—5 August (RSGB tape lecture "DX working etc", G3IOR), 12 August ("VHF propagation", by G3MYM), 19 August ("Receiver basics", by G3DSS), 26 August (Natter night), 7.30pm. Building 101, Houndstone Camp, Yeovil. Details from Don McLean, G3NOF, tel 0935 24956.

Mobile rallies calendar

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

1 August—RSGB National Mobile Rally, Woburn.

8 August—25th Annual Derby Mobile Rally. Lower Bemrose School, off Derby Ring Road, just follow signs. Talk-in on 144MHz fm. Open 11am-5pm. Free spot prizes, free admission, parking. Many new attractions, plus all the old favourites. Details from Mike Darn, 22 Reservoir Road, Brockwell, Chesterfield S40 4HF, tel 0246 202690.

15 August—Preston ARS 14th Annual Mobile Rally, Walton-le-Dale County High School, Brindle Road, Bamber Bridge, Preston (1 mile from M6 junction 29). Open 11am. Talk-in on 144MHz fm S22. Usual attractions including the popular bring & buy stall. Refreshments. Free entry and parking. Details and enquiries from Mrs D. Stevens, 13 Arrowsmith Close, Hoghton, Preston PR5 0DV, tel Hoghton (025485) 3304.

22 August—Bromsgrove & DARC will be holding their picnic this year at Avoncroft Art Centre, Bromsgrove. Talk-in on S22. On site parking. Licensed bar. Refreshments. Attractions for the whole family. Details from J. F. Burford, c/o the Art Centre.

29 August—BARTG Rally, Sandown Racecourse, nr London. Details from sec Edward Batts, G8LWY, 27 Cranmer Court, Richmond Road, Kingston-upon-Thames, Surrey.

29 August—Torbay Mobile Rally. ITT Social Centre, Old Brixham Road, Paignton. Talk-in on S22 from 1000h. Ample free parking. Trade stands and used equipment stall, draws. RSGB book stand. Hot meals and bar facilities. Details from G4DZH or G2CWR. Trade stand footage applications from G4DZH, tel 0803 523063.

12 September—Telford Mobile Rally, Telford New Town Centre Malls, Telford, Shropshire (exit 12 off M6 on to A5; A442 from N or S, follow signs to town centre). Opening 11am, but 10.45am for disabled, with special parking arrangements. Talk-in via GB4TRG on S22 fm and SU8/20. All the usual attractions, and even more space. Full catering and licensed premises on site. Unlimited parking. Further details from G8DIR, tel Shrewsbury 64273, G8UGL, tel Telford 584173, or G3UKV, tel Telford 55416, all QTHR.

12 September—Vange ARS Mobile Rally, Nicholas School, Basildon, Essex. 10am-5pm. Talk-in on S22 with callsign GB4VMR. Many attractions including trade stands, bring & buy, raffle, door prize and refreshments. Details from Albert Smith, G4FMK, QTHR, tel 0268 683805.

19 September—Peterborough R&ES Mobile Rally, the Wirrina Sports Stadium, Bishops Road, Peterborough. Situated on the river embankment with plenty of car parking space. Open 10.30am till 5pm. Details from D. T. Wilson, G4KSW, 4 Conway Avenue, Peterborough, tel Peterborough 76238.

26 September—Harlow Mobile Rally, Harlow Sportcentre, Hammarskjold Way, Harlow, Essex. Bar, restaurant, parking, bring & buy, trade stands. 11am to 5pm. Details from Phil, G8FRG, QTHR.

3 October—Great Lumley ARCS Rally, Community Centre, Great Lumley, Nr Chester-le-Street, Co Durham. Open 11am. Talk-in on S22. Usual attractions including bring and buy. Further information from Max Hanaghan, G8HPW, QTHR, tel 078324 3946.

Special event stations

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

1-6 August, GB8ANC
The station will operate from the Herne Bay Sailing Club on 144MHz and possibly 432MHz, and marks the holding of the 1982 Albacore class dinghy National Championships at this club. Special QSL cards will be sent via the bureau. Details from G6ETA, tel Chestfield (Kent) (022779) 3262.

7-8 August, GB4ASR
This station forms part of the Alderholt Steam Rally, to be held near Ringwood, on the edge of the New Forest. The station will operate on hf and 144MHz. Details from David Pattle, G4NFN (QTHR as G8OUV).

14 August, GB2TS
The station will be at the Tollerton Show, York, and will be operated on all hf bands plus 144MHz fm by the York ARS. Details from Keith Cass, G3WVO, QTHR.

21-25 August, GB2TSR
The station will operate during the assembly period for the Tall Ships Race at the Ocean Terminal, Southampton. It will be operated by members of the RNARS and Horndean & DRC. The special QSL cards will count towards the society's and club's awards.
Operation will be on all hf bands and 144MHz. One day is to be a predominantly cw day on hf. It is hoped to produce some atv pictures. Details from G4BEQ, QTHR, on receipt of an sae.

27-30 August, GB2FI
This station, manned by the Barry College of Further Education RS, will operate from Flat Holm Island in the Bristol Channel from approx 1800gmt 27 August to 1200gmt 30 August, weather and tide permitting. It will celebrate Marconi's first radio transmission across water from the Welsh mainland to the island in 1897. Operation will be on all hf bands, 144MHz fm, and ssb. Special QSL cards will be available. Details from Adrian Butler, GW8XOJ, QTHR.

27-30 August, GB4TCF
The station will operate from 1800gmt on 27 August to 1700gmt on 30 August, on all hf bands and 144MHz using all modes. There will be displays including home construction, amateur tv, microwave equipment, home computing, Ranet and RSGB. It will be at the National Town & Country Festival at the National Agricultural Centre, Stoneleigh, Warks. Details from Roger Harris, G3ZFR, QTHR.

28-30 August, GB4NMW
The station will be run as part of the celebrations for the granting of the charter of the National Museum of Wales 75 years ago. Scheduled contacts have been arranged with other museum stations, and, if possible, with a Welsh speaking community's station in Patagonia. QSL cards will be sent via the bureau. The event will be run from Oriel Eryri, in Llanberis. Details from Llyr D. Gruffydd, Oriel Eryri, Llanberis, Gwynedd LL5 4JR.

4 September, GB2LFS
The Winchester ARC will be operating the station at the Littleton recreation ground, where the Littleton Flower Show and fete is to be held. The station should be operational on the hf and vhf bands throughout the day. For further information contact the sec, Mr R. Garwood, G6FBR, tel Winchester 66764.

12 September, G2NM
The station will operate from the QTH of the late Gerry Marcuse on 3·5 and 144MHz. Special QSL cards will be available via the bureau. Details from G4ETU, QTHR.

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 1982 for issues in brackets, are **25 August** (October), **23 September** (November), **21 October** (December), **18 November** (January 1983), **16 December** (February 1983).

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising officer.

FOR SALE

Yaesu FT107M, WARC, dms, internal psu, no fsk but fm, squelch modification fitted, matching beige atu FC107, WARC, eight months old, cost new £1,000, accept £700. Tel Mike Curtis, 01-445 2091, evenings.

Sony CRF320 professional rx, as new, few months old, applied for G4, quick no haggle sale, £450 or straight swop for FT101ZD. G8YGU, QTHR. Tel 0642-211685.

Exchange my Eddystone 770R Mk2 rx, 27-165MHz for 2m or 70cm handheld. G8CKM, QTHR. Tel Shawbury 250679, evenings.

Westminster/R460 10ch board, xtalled RB0-10, SU8, SU20, xtals worth £17 so bargain at £15. *Wanted:* Solidstate linears, 70cm, 10W in, 50W + out, 144MHz, 10W in, 100W + out. G8GHZ, 26 Westminster Gardens, Chippenham, Wilts. Tel 0249 4188, ext 154.

IC260E, used little, £220. TS120S, PS30, SP120, £380. TR2400, three chargers, £200. All in immac cond. Buyer collects. Tel 0492-58030, after 6pm.

FT290R 2m multimode tx/rx, nicads, carrying case, perfect, £210. Daiwa CN620A cross pointer swr meter, boxed, hardly used, £40. Top band ssb transverter for 14MHz, £15. Joystick and atu system J, £25. Oscilloscope S32A serviscope, £30. G4GSC. Tel Staines 51898.

HRO bs coils, psu, manual, many spares, £30. 2000 trader service sheets, £10. Tel Chiswick (01) 955-1728.

Icom IC251E, good cond 2m base station, best offer over £320. Icom IC240 2m mobile, late model, mobile mount, £120. Belcom Liner 2 144 tx/rx, ssb, first £70. GW4LEU, QTHR. Tel 0873 810490, after 4pm.

Ex-computer psu, 20A, 13-8V, fully regulated, not in a case, very heavy, £35. Will deliver Manchester area. G6BGW, QTHR. Tel 061-665 1722.

Yaesu FT227R hi-lo auto-tone reverse repeater, all on front panel, £145. Datong morse tutor, leather case, £40. IC2A, eight months old, £145. QTH 140m asl, three bed, extended, c/h, double glazed semi, nr Birmingham, £28,500. G8XSA. Tel 021-550 4541.

Hoxin 7λ/8 mobile antenna, comp with gutter mount, cable assembly, £10. Data Dynamics ASR33 teletype, comp with integral paper tape reader, punch, fitted on matching stand, good wkg order, £150 ono. G4JXU. Tel Basingstoke 28241, after 6pm.

Anyone interested in exchanging tx/rx with ps covering 80m, for my fb factory wired HW8 and ps? Cash adjustment and transport to complete exchange. G3KNF, QTHR. Tel 0202 671348.

Icom IC701 power supply, mic, as new, £500. G3AZT, QTHR. Tel Frilford Heath 390598.

FT101B, nice cond, orig panel cover, unmarked, Securicor delivered, £350. FT707, Securicor delivered, £450. FT480, nice cond, £300. Tel 0269 860649.

Eddystone EC10 a.m. fm bfo, £65. Oscilloscope, 3-5in gp, homebrew, fully wkg (parts cost £50), £20. Miniature gen cov transistor rx, fully wkg, £15. HB neat double conversion superhet, 9 by 6 by 6in. Buyers collect or £3 p&p each. G3VCJ. Tel 042-43 4726.

FT707, FP707, FC707, MMB23, Trio MA5, £650. YR901 cw rtty reader, YK901 ASCII keyboard, Ikegami PM950 vdu, £465. TS700S separate vfo spkr, £325. D75, £35. FL2, £55. Oskerblock, £25. Adonis AM802, £35. All manuals. G4LFB. Tel Welwyn Garden City 29756, evenings.

TR2300, in fine cond, orig box, clean manual, accessories, £130. BC221 frequency meter, orig box, charts, power supply, £20. Codar CR70A, PR30 preselector, suit swl, £35. All buyer collect. G8LPY, QTHR.

LS707 Belcom 70cm multimode, 430-439MHz, rptr shift, input listen, tb, cw PS707, £400 ono. Sota 50W linear (only with rig), £50. G3KEF. Tel 0279 413070.

RXs: Eddystone 960 solidstate 550-10, looks like 940, £85. Lafayette HA500 806 double-conversion, boxed, £70. Codar CR66 with PR30, £35. Codar CR45, £18. Codar Multi-6 solidstate, £15. All unmarked, exc wkg order, manuals. G3UJU, QTHR, after 10 August.

Atari video game, 15 cartridges, incl Space Invaders, Adventure, basic programming chess, Superman, Bowling, Combat, Breakout, Sky Diver, Night Driver, Casoni, Space War, Golf, brain games, Combat with set keyboard controllers, over £425 new, bargain, only £200. Tel Basildon 284489.

Radio & Television Servicing (published by Newnes), 26 vols from vol 1 to 1979/80, £100 or may split. Large selection of tv/radio service sheets/manuals (over 250), £15 to cover postage. G4NZX, 1 Sawston Close, Doncaster. Tel 0302 854985.

FT200/FP200 hf tx/rx, £200. Liner 2, psu, £80. Palm 2, 6ch, £80. Pye Cambridge, 2m, not wkg, £20. G4IFB, QTHR. Tel Gary, 01-642 1465.

Azden PCS3000, one owner, first class cond, 25W mobile/base station, cw remote head extension, cable, two mounting brackets, £150 ono. G4NWB, Tilney, Sellicks Green, Taunton, Somerset. Tel Blagdon Hill 391, evenings or weekends.

GEC RC411 professional monitoring rx, covers 10kHz-32MHz, in exc cond, manuals, spares, £375. Taylor. Tel 061-980 5662, after 6pm.

TS520S, mint, DG5, £350. R2000, mint, £200. Davtrend 13-8V 12A psu, unused, £45. G4HKL, QTHR. Tel 044-284 3474.

Standard C8800, 10W, five memories, good cond, orig packing, never used mobile, £160. Lowe FX1 wavemeter, £10. Heathkit Cantenna, 1,000W dummy load, £10. 2m 5λ/8 foldover whip, 7λ/8 whip, both use same base, £10. G8VOD, QTHR. Tel 0793 27913.

Yaesu FT480R, unmarked, super cond, £310. Pye fm Olympic mobile, xtalled 12 2m channels, £110. G4AJE. Tel 0480 69058, evenings.

HF mobile G-whip antenna covering 10, 15, 20m, comp with base, coils, used little, exc cond, £26. G4IBG. Tel Hove (0273) 731391, after 6 August.

FT480R, latest mode: reverse repeater switch, used little, full packing, manual, etc, £290 plus p&p. Part exch for TR2300? ASR33 ASCII teletype, 110 baud, £70. *Wanted:* 160m transverter, new TS130S, £500. G3WRT NOT QTHR. Tel Great Wenham 311665, after 7pm.

Video recorder, Shibaden, with edit facility, no leads but wkg, black & white, buyer collects, £100 ono. G4MIP, QTHR. Tel Ivybridge 4383.

ETM3B squeeze keyer, exc cond/orig packing, £25. Eddystone 898 dial, unused, £8. New RCA 7360, boxed, £6.50. All plus carriage. G3HTA, QTHR. Tel 03632 3333.

Microwave 144/40 linear, £44. Datong PL2 filter, £60. Datong asp processor, £45. Datong PC1 converter, £68. Datong mpu, £3.90. Trio MC50, £14. Tech Associates PN2, £11. SEM hf low noise preamp, £2.50. Shimwa 1110 filter, £6. G8NKU, QTHR. Tel Ely 860898.

R820 rx, good cond, SP820 spkr, must go, need cash, cost over £700 new, £475 ono. Tel Paul, Chipping Sodbury (0454) 310811, after 6pm.

Icom IC280E 2m, 10W, fm mobile, digital readout scanning three memories, £140 ono. Pye W15U uhf Westminster, six channels fitted, RB2, 4, 10, 13-14, SU8, toneburst, £90 ono. G3YBY, QTHR. Tel Shepton Mallet (0749) 4191, or 0925-39668.

Labgear LG50, some spares, £25. Marconi 120MHz counter, TF2410, plug-in TM9168A, manual, £50 ono. Wayne Kerr wideband noise source/noise factor meter CT410, £10 ono. Telequipment single beam scope, 5MHz ac, coupled new 4in crt, £10 ono. Neat cabinet, 15 by 9 by 9½in, 898 dial, 1mA meter, knobs, etc, £15. Cowl gill motor, £10. Osker SWR200 swr/power meter, calibration chart, manual, £15. Parts for 2m pa, 6-40A, base, silver-plated lines, case, mains trans, offers. Buyers collect. Tel Hughes, 0455 46614 (Leics).

Optiscan scanning rx, 30-50MHz, 68-88MHz, 150-170MHz, 450-470MHz, £100. GEC RC411 professional rx, 10kHz-31MHz, £350. Quad 33 control unit, quad 303 power amp, £100. Trio KT7500 fm/a.m. tuner, Sony TCK81 three-head cassette deck, adjustable bias, Dolby, offers or would exchange for amateur radio equipment. Tel Hastings 751114.

Pye PF5 handheld, leather case, battery, xtals for RB14, manual, £30. Some spare PF1 boards. GM8LMA, QTHR. Tel Chas, 0856 2797.

Plessey TDMS70 distortion measuring set, companion TSG10 telegraph sig gen, both units in mint cond, comp with handbooks, £90. Racal MA282 adaptor unit for use with RA66/RA117 combination, comp with cables, handbook, £35. Morris. Tel Bolton 52384.

No 19 set Mk3/T, rotary psu, No 38 set afv, vib psu, three 12-way conns, spare valves, fair cond, wkg, offers. G6HXB. Tel 01-574 2957 (Southall), after 6pm.

MMT28/144, £80. R.S. Isol; tf 200VA, £10. Jaybeam 10Y/2M, £22. All new. Full technical manuals CT212, RA137, CR100, 880/2, S27, LM series F meters, £6.50 each. CT436, SCR399/499, TCS series, £7.50 each. PF1 mic/spkr, brand new, £7. All plus postage. G3GUU, QTHR.

FT200/FP200 psu, exc first rig for new G4s, in first class cond, many dxs in logbook to prove, £195. G4MGF, QTHR. Tel 0843 22343.

DIY collectors' units: TU6, TU9, TA12C, TCS 19 set, pu 247, G2DAF tx, etc. Buyer collects. SAE GM3LRZ, QTHR.

Planning permission 40ft pole, brick shack, chalet, three rec, kitchen, wc, four beds, two bath/wc (separate but within same building, lounge, bed, bath/wc granny annexe), gas/solar heat, double glazing throughout, garage port, large shed, gardens front/rear, 70ft asl, £46,950. G4EUW. Tel Brightlingsea (020630) 3071.

Hygain TH3JNR, practically new, only up six weeks, cost £159, reasonable offers please. G3IVV, QTHR. Tel Frilford Heath (nr Oxford) 390714.

Sony ICF6800W, 29 shortwave bands, fm, mw, mains/battery operated, built-in antennas, low consumption, worldwide coverage, very selective, remarkable sensitivity, Sony retails at £407, reluctant forced sale, £275. Tel 01-876 5163.

Trio JR310 rx, vgc, only reason for sale, I am newly licensed and tx wanted. Delivery negotiable, £80. Tel Skelmersdale (0695) 22715.

Offers for FT277 (FT101) 160-10, all filters, fan, FR101 rx, 160-10 plus 2m, 4m, FT207R with whip, charger. G3HDB, QTHR. Tel 0926 53524.

IC215, 15ch, £90. MMC70/28LO, 4m converter, brand new, never used, £25. ZX81 computer, 16k ram, £100. 48-el multibeam for 70cm, £20. All items collection/delivery by arrangement. G3YKP, QTHR. Tel Lowdham (Notts) 4240.

Racal freq counter 801R2, handbook, £80. RTTY tuning unit CRM1, as new, no mods, handbook, £8. Comprehensive Creed 75 handbook, £5. Racal rx cabinet, £10. Morris. Tel Bolton 52384.

TS520, dc pack, £325. VFO520, £45. TS700, toneburst, £235. Lafayette HA55A rx, 108-136MHz a.m., £15. Trio TR7500, £150. Two mounts. G3BHT, QTHR. Tel 021-308 4764.

UHF Westminster W15U, £60. UHF ITT Star, £30. Spare Westminster control box, £12. Burndept Lion uhf, £15. R47M15E 15W uhf, £12. Storno COM662, uhf, £65. Creed teleprinter 54N4, £10. 70cm mobile

Viscount lowband, £5. Distortion factor meter, £10. G8BOY, QTHR. Tel 024 029260.

IC202S, all xtals incl Oscar, nicads, charger, leather case, manual, as new, £130 ono. Himound BK100 semi-auto key, as new, £10. Eddystone bug key, offers. Trio HC2 ham clock, as new, £6. G3BII, QTHR. Tel 04946 5528, evenings.

Yaesu FT101ZD, fm, Mk3, fitted cw filter, fan, as reviewed in May *Radio Communication*, only three months old, £540 ovno. Reason for sale cash needed towards house purchase. G3SYL NOT QTHR. Tel Poole (0202) 678364.

Pye Westminster, brand new, unused lo band, W15AM bs comp with ext spkr, remote control, multi-way cable, mounting brackets etc, in orig packing, £75 ono. G8MQH. Tel Worcester (0905) 640807, evenings.

FT707, scan mic, very little fixed station use only, going vhf again, £450. G4KCT, QTHR. Tel York (0904) 411864, before 9pm.

Radio Amateurs Handbook, 1968; *ITT Reference Data for Radio Engineers*, fourth edn; *Principles of Radio*, by Keith Henney, 1942; *Basic Electricity*, five vols; best offer for any of the above books or exchange for Joystick antenna and atu. Tel Highcliffe (Dorset) 6914.

Gen cov communication rxs, property late swl. Both Realistic, exc cond, DX160 with spkr, £50. DX300, digital, £100. Available through G8OTW, QTHR Enfield.

FRDX400S and FLDX400, vgc, the pair, £275. Prefer buyer inspect and collect. G4DOK. Tel Arundel (0903) 883174, after 8pm.

Oddzanz CD44 rotator, £20. CD44CU, £35. Cascaded filter mod TS820, £20. QRO mod incl pair 6146 whiskeys, £10. Pair used 572Bs, £10. G-whip plus 80m, £5. Post extra. G4CHP, QTHR. Tel Swainsthorpe (0508) 470365.

Rigonda Fiesta 6in tv for spares, all major parts ok, has minor fault, £12. Nuvistor 2m converter, 4-6MHz i.f., £10. 6CW4 valve, list £8, sell £3. Many valves. SAE list. Pair KT66, English, £10 pair. G3VCJ, QTHR. Tel 042-43 4726.

Pye Westminster dashmount W15AM, 6ch, comp with mic, cradle, spkr, leads, as new, wkg on 70-26, mag base, whip for comp ready-to-go mobile station, £80 ono. G4EAT NOT QTHR. Tel 0245 351673.

Tx/rx TS510 and PS510, £200. Buyer collects. G8WTY, QTHR. Tel Malvern 4968.

FDK Multi 700EX 2m tx/rx, as new, £140. Microtan 65 single board computer, offers. G6ARR, QTHR. Tel Bishops Stortford 505253.

Trio/Kenwood TS770E, any sensible offer considered. G8ORV, QTHR. Tel 0702 616239.

SX200N, as new, full manual, £170. IC211E, in mint cond, unmodified, a superb fm/ssb/cw tx/rx, computer controllable, etc, £370. Can deliver reasonable distance. G4HCL, QTHR. Tel March (0354) 740827, anytime.

FT290R, mobile mount MMB11, carrying case, full instruction manual, only £235 ono. D. A. Guest, G6GUA, QTHR. Tel Farnborough (Hants) 549045.

Lowe ASV1515 2m rx, 12ch, fitted R0-7, S20-23, 240V ac, 12V dc, mtg bracket, good cond, £45 ono. G6HXB NOT QTHR. Tel 01-574 2957 (Southall).

Transverters, Valradio, ideal for mains rigs, cros, test gear on field days, 24V dc in, 240V 50Hz out, model 024/500S, 500W, £549 new, £200. Model D24/200S, 200W, £284 new, £100. Both as new. J. Osborne, G3HMO, QTHR. Tel 01-701 2224, day, 01-639 5147, evening.

FT101, cw filter, fan, 12V, 230V, 160-10m, incl 30m, new driver, finals, Mk3 n lim, front end uses ic, as per *Radio Communication* mod, cw manuals, £325. Presently on air. G3AIK, QTHR. Tel Exeter (0392) 33266.

Colour your atoms! Encoder, suits 6847 chip, £30. Controller, two board micro, using 6502, with info, £70. 3U eurocard with 64-way ab plug, accepts ttl inputs for red, blue, green and sound, produces uhf PAL 2 output, £30. G8UZC, QTHR. Tel 01-579 2424.

Yaesu FT202R, £45. Mike Bowles, Evershot 494 (Dorset). Trio R600, three months old, under guarantee, mint, orig packing, instructions, £200 ovno. Halina Paulette electric 35mm camera, £15. 5kg chrome dumbell, various coaxial connectors, £70. G8MEN, QTHR. Tel 01-733 8878.

IC2E Icom 2m fm tx/rx, nicads, charger, case, λ/4 wave whip, only seven months old, mint cond, boxed, £140 ono. G4NEF. Tel Thanet 54154.

Acorn Atom 12k ram, 6522 fitted, all expansion connectors fitted, Atom Magic Book, cassette of programs from book, £140. G4IOK, QTHR. Tel Witney 4867.

Yaesu FT707, FP707, FV707DM, FC707, all one year old, £650. Tel Luton (0582) 593824.

Trio TS180S, dfc, 160-10m, new bands, second i.f., cw filters installed, exc rig, comp with psu, manual, £500. G4ASE, QTHR. Tel 0484-606043.

ZX81 computer, Sinclair built, 16k ram, psu, manuals, leads, £90. Fifteen games cassettes and compatible Sanyo cassette recorder, £15. Tel Rayleigh (0268) 743719.

MM2000 rtty to tv converter, as new, hb ps, £100 ono. G3FYP, QTHR. Tel York (0904) 53955.

Century 21 (Lowe SRX30) gen cov rx, virtually brand new, vgc, very sensitive, £100. Tel 041-639 3095.

Minibeam (G4MH) in top cond, £45. G3JKB, QTHR. Tel Tring (044282) 6122, anytime.

G-whip tribander antenna, 10/15/20m mobile, bumper strap mounts, comp, antenna never used, still in orig packing, £20 complete, will separate if necessary. Carriage extra. G4LFG, QTHR. Tel South Shields 566658.

PSU 3-5A, £9. Bantex Revco 5/8 mag antennas, £15 each. Transformer, new, 16V 16A, £10. 5-el beam, £10. Icom 25/1W synt fm, IC255E, as new, boxed, £185 ono. Gone multimode. 2W in 20W out linear, £20. RF switched. All ono. Haggle? Swap. G6HKD. Tel Weymouth 787747 or 834322.

Sinclair prog pocket calculator, case, battery, mains adaptor, prog library, physics, maths, finance etc, £9.50 ono. Camera outfit, 35mm Petri slr, ttl, f1·7 lens, case, 2 × conv, 135mm lens, case, all exc cond, £50. Will split. Tel Ashford (Kent) (0233) 22506.

Heath sine square generator, £12. Advance audio generator, £15. Marconi universal bridge, £30. Eddystone bug, £6. *Wanted:* dial scale for Eddystone S640 rx. American panadaptor 450/465 i.f.. Power pack for Pye marine hf tx, 1·6/16MHz or circuit. G3JDK, QTHR.

Wayfarer series Sommerkamp FT767DX hf rig, FP767 psu, FC767 antenna tuner, YM35 mic, really exc cond, boxed, hardly used, any trial, genuine reluctant sale, first £575 secures excellent rig. G4LFG, QTHR. Tel South Shields 566658.

Shack clearance: Creed 75R, £20. Pair large spkrs in cabinets, £15 each. Vortexion 50W valve pa/guitar, amplifier, £20. Pinball machine, £40. Honda motorcycle (1963) for restoration, £20. VCR139A with screen, sig gen, rf, £5. Will take offers for above. *Wanted:* IC2E, TS700G, or FT221 and portable multimode. G8WKA NOT QTHR. Tel 01-444 6409.

FDK 750E expander, 430A, vgc, 11 months, 144-146MHz,430-440MHz, cw, usb, lsb, fm, 10W, dual vfos, two rpt shifts, autotone, rit, rf gain, 750E mobile mount, both boxed, £380. Deliver 50 miles Birmingham. C. Littlejohns, G8UGJ, QTHR.

Swan 700CX tx/rx, psu, £400. Xtal osc 510X, £25. Vox unit, £20. Datong rfc, £25. Comp stn, £450. Collect or carriage extra. G3LAT, QTHR. Tel Northbourne 79115.

PET programs: I am selling off these in order to purchase amateur radio equipment. For speed, selling them as four packs (1) Galaxy One—24 games on disk; worth £25, want £15. (2) Invaders, Cosmic Jailbreak, Cosmiads, 3D Star Trek, Labyrinth; worth £38, want £25. (3) Treasure Trove 12, Rain dance, Demons, Kinetic model, worth £30, want £20. (4) Micro chess, Checker King, Temple of Apshai; worth £38, want £25; or (5) buy all four; worth £131, want £65. Note: (2), (3), (4), are on cassettes. First come, first served. R. B. Hughes, 17 Pentrosfa Road, Llandrindod Wells, Powys LD1 5NL.

FT101EE cw filter, 10MHz mod, 2 sets spare tubes, workshop manual, £300 ono. FT290R, carrying case, nicads, charger, hb 15W amp, Mutek preamp, £225 ono. Prefer buyer collects/inspects. G4GUO, QTHR. Tel Worthing 45400.

Garrard 401 turntable, SME arm, Ortofon cartridge on teak plinth, £70. Tandberg 3000X tape deck, 17,000ft Scotch Dynarange tape, £115. All for £170, or exchange FT480R with adjustment. Could deliver Hampshire, Essex, Kent. G3UYK, QTHR. Tel 0962 67819.

Shure 201 mic, never unboxed, £11. Old type xtals, four for £1. Various calibrator xtals, £2 each. Boxed valves, octals to nuvistors, incl special quality types. TT20s, 6DQ5s, 6146Bs, post extra. SAE enquiries. G8GI, QTHR. Stamford.

Trio TR900 2m multimode BO9 base station, adaptor for above, matching Trio psu, as new cond, incl internal preamp, 10 mths old, £315. G8SAF, QTHR. Tel 0723 581052.

4CX250B, base, chimney, £18.50. New vhf unit, 4X150D, base, chimney, £15. New valves: 4CX350F, £26.50; QQV03-20A(4), A2521, QZ03-10, £4.50; 6146(2), 5B254M(3), 5B255M(2), QV02-6, QV04-7, £3. Used, but ok: 6CH6(4), 6CL6(2), 5763(5), N78(4), 6BW6(6), 6BR7(2), EF86(3), EL91(6), 6J4WA, A1714, £1. 4CX350F(2), £10. 4X150A(2), £6. Shure 562T mic, as new, £20. Sub-chassis with two 4X150A valves, bases, chimneys, blower motor (24V), good basis for hf linear (*Radio Communication* Sept 1974), £11. Cowl gill rotator, direction indicator, £11. G2HCV. Tel 01-866 4871, home, 01-952 7722, work.

Going QRT: sensible offers invited for KW2000B external 4B vfo, ac psu; KW600 linear, spare 572B; KW108 monitorscope; KW109 Supermatch; Shure 444; Yaesu FT227R with 6A psu; unused Halbar 4-el quad, Hirschmann rotator, 20m low loss coaxial; Marconi Atalanta 15kHz, 28MHz, plug-in test meter; MMD50/500 frequency counter, BC221AK (modulated) built-in psu; valves, Eimac 4-1000A, cond unknown, two Eimac 4CX250B, two 813, two QQV06-40A, one 803. G4BEF, QTHR. Tel Norwich 52998, evenings.

Trio TR9000, 12 months old, £290. PS20, matching psu, £35. Orig packing, exc cond. G6CGW. Tel John, Disley (Nr Stockport) (06632) 3660.

Eddystone EA12, nice cond, £130. Pye tx, modified for fm, circuit, some xtals, £25. Avo sig gen, old, £5. 1in vidicon tube, £10. Rack, suitable micro etc, £7.50. Some odds and ends. G6GSH. Tel Bob, Yateley (0252) 871077.

Yaesu FT902 dm, comp with SP901 spkr, and YH55 headphones, all items in orig packing, only four months old, change of QTH forces sale, £780. Tel G6CHB, QTHR. Tel 0632 462606.

Collins 30L1 linear, £350. Collins S-line, £650. Both in exc cond. Trio 220 oscilloscope, new, 150 standard, 70cm, C7800, £195. *Wanted:* RTTY gear. G4NXP. Tel 0905 20838.

28/144 transverter, 144/146 i.f., comp, unused, 28MHz line amplifier, 25W out. Tel Ipswich 830147.

88mH toroids, American, suit BARTG, ST6 etc, £2 each plus 25p p&p. *Wanted:* Hygain 18AVT or 14AVQ. Chris Pedder, G3VBL, Thorncliffe, 5 Royalty Lane, New Longton, Preston, Lancs PR4 4JD. Tel Preston (0772) 612289.

SSTV/HF, the perfect start. SC77 (similar to Robot 400) transverter, plus Dentron HF200A solidstate tx/rx, comp with power supply, bargain, £300, with camera, £350. Buyer collects. G4KWA, QTHR. Tel 01-777 9061.

Trio TS700A 2m multimode, £200. FDK Multi 700EX 2m fm mobile, £140. Both plus carriage, or exchange both for mint SB220 2kW linear. C. Knott, G3WMX, QTHR. Tel Sennen (Cornwall) 405.

HF 4/2m station, FT401 SSM Europa B for 2 and 4m, power supply for transverters, 2m 6-el quad and 4-el Yagi for 4m, £375. G4LKC, QTHR. Tel Ramsey (0487) 822539.

Lowe SRX30 comm rx, 0·5-30m, orig packing, 2m converter, £110. Vintage table model broadcast rx Pye 45, five bands, exc cond, £35. Small Jap petrol engine, 34cc, connected to homebuilt portable 12V gen, handbook, £50. G3CGQ, QTHR. Tel 0582 25519.

Trio 2200G 2m fm rig, 12ch fitted, all accessories, auto toneburst, nicads, £85. G3UKV, QTHR. Tel Telford 55416.

Creed teleprinter 7ERP, comp, mint cond, sound cover, £45. Creed Envoy 110 baud ASCII printer upper/lower case, hard copy, ideal for computer, comp pedestal, sound cover, keyboard tape punch, reader sprocket or friction feed, £95. G8CPH, QTHR. Tel Ipswich 831448.

Trio 9000, exc cond, recent new pa slab, realignment by main dealers, going on 70cm, £270 ono. G6HEP. Tel Lincoln (0522) 30867.

KW2000B psu, spare valves, circuit diagram, Shure mic, £150. Buyer collects. Tel Andy, Norwich (0603) 24898, evenings.

Trio TR2300 2m fm portable, rev rpt mod, comp with case, nicads, charger, helical whip, mobile mount, cond as new, £130. G8XQZ. Tel 01-980 4811, ext 643, weekdays, Upminster (04022) 29613 after 7pm and weekends.

FT290R cw charger, nicads, helical, carrying case, in orig packing, ideal starter's rig, £215. G4KLX, QTHR. Tel Wirksworth 2037.

Matinee electronic organ, professionally built, fully assembled, tested, in exc cond, full documentation, two 49-note manuals, 13-note pedal board, 30 rhythms, £485. G3OPJ. Tel Bourne End (06285) 25541.

Trio TR9000 2m multimode, in exc cond, orig packing, £265. Matching PS20 power supply, £25, or exchange Yaesu FT221R. G6CAB, QTHR. Tel Ipswich (0473) 52892.

IC240, vgc, orig packing, £130. ASP 2m 5/8 base ant, unused, £5. Command rx, 1·5-3·0, unknown cond, £5. Comdel CSP11 rf speech processor, £20. Three off ICBP4 plus LC2 case for IC2/4E, all good, £10. G3ZYN, QTHR.

Shack clearance: must be the largest junk box in south Wales, everything must go, at silly prices, because of pending house sale. For further information contact Roger Alban, GW3SPA, QTHR. Tel 0222 499022, ext 3156 daytime, 0222 707794, evening.

HF5 radial kit for HF5, vgc, £50. Buyer collects or carriage at cost. G6FQK NOT QTHR. Tel 01-470 5620, evenings/weekends.

1,296MHz bandpass filter, 0·5dB insertion loss, bnc sockets, as per page 6.8 *VHF/UHF Handbook*, £20. *Wanted:* WG16 waveguide and couplers etc. W.H.Y? G3VVB, QTHR. Tel Mevagissey 842368.

Yaesu FT707 hf mobile, FP707 power supply, Shure

mic, all as new, boxed, £630. Stone, 16A Chapelfield, Radcliffe, Manchester. Tel 061-766 6078.

YC221 digital readout for Yaesu FT221R, brand new, £50. Yaesu FT202R handi, cw nicads, charger, R0, R3, R6, £85. GW4JBQ, QTHR. Tel Newport (0633) 55234, 9am-5pm, Monday to Friday.

FRG7, digital readout, good cond, £120. Selection Racal xtal filters incl separate usb/lsb types for 1,400kHz, £10 ono. G4NNU, 34 Durley Road, Seaton, Devon. Tel Steve, Seaton (0297) 20680.

KW Atlanta, £200. Drake 2C rx, 80-10m, spkr, £120. Hallicrafters HT32B tx, 100W, 80-10m, £125. All items good wkg order. Carriage by arrangement. G3HCM NOT QTHR. Tel 0203 473698.

FT207R, NC2 base charger, ac-dc adaptor, £150. HB linear transverter, 28/144, 2W out, similar to MMT28/144, £30. 70cm fm tx/rx on RB6, nicads, rubber duck, £30. Pocket TRS80, cassette interface, mint, £45. W.H.Y? G4GZS. Tel Rugby 815506.

FDK T1200 2m handheld, 142-148MHz fm, 3/1W, nicads, 10 memories, scanning, mains/12V chargers, spkr mic, exc cond, £135. *Wanted:* FT707 or IC730, FT290, heavy duty rotator. G4HPN, QTHR. Tel Bradford (0274) 585387.

Scope, Telequipment D53, dual trace, dc to 25MHz, in good wkg order, probes, manual, offers, or exchange/part exchange good hf rx. G3HCM NOT QTHR. Tel 0203 473698.

Collectors' items: Cossor 3467, Echo AD38 radios, Avo sig gen, Pye GEC Echo immediate post-war radios, several 9BA valve base chassis with psu, heater transformer, ideal cw tx, June *Radio Communication*, other gear to go to clear shack. For details tel 08277 2348.

FT480R Mk2 multimode 2m, new August 1981, mobile mic etc, boxed, £315. Microwave Modules up-converter MMC28/144, listen to 28/30MHz with 144/146MHz rx, £20. *Wanted:* Trio TS780 dual band rig, secondhand but vgc, for cash. Tel Paul, Worcester (08864) 588.

Exchange collection postal history in five albums, 1795-1841, later to approx 1960, bishop marks, Sundays, experimental, incl 40 1d red on cover, Maltese Cross, English, Irish, Scots, real investment, £2,000-£3,000, for FT101ZD fm or FT902 a.m. fm and accessories, mast and rotor. R. Anderson, 19 Golf Road, Mablethorpe, Lincs LN12 1LS.

Yaesu FT290R, nicads, charger, case, mag mount, £195. FL1 filter mpu, £40. Trio S20S 160-10 cw filter, £295. HQ1 mini quad, 10-15-20 balun, £65. Roller coaster, large C, £10. Yaesu spkr, £10. FX1 wavemeter, £15. G8XBB, QTHR. Tel 0767 314189, or 0462 813235.

TS520SE, bought Sept 1980, no mods, mic, £300. Buyer collects or pays carriage. G2DRW, QTHR. Tel Coventry 597135.

Jaybeam 14-el Parabeam, PBM14/2M, £30. ZX81, 16k memory, £85. No19 Mk2 hf rx, £25. Solarscope CD513-2 dual trace, 10MHz bw, £38. Cossor scope dual trace, 7-5MHz bw, £25. Universal impedance bridge (Marconi), £40. G6BZK. Tel 0323 29296, after 6pm.

HQ1 mini-quad antenna, Stolle rotator, control unit, 50ft cable, short mast on base, 6ft turning radius, all exc cond, 5-9 dxer, £75. G2DHI, QTHR. Tel 01-727 1767.

Silent key's (G3EHR) complete station: topband, hf bands, 2m band txs, USA BC342N rx, Cossor scope, both with manuals, loads of test and construction gear, must be seen to appreciate. Info on viewing, tel Cecil, Atherstone (08277) 2348, evenings.

Decca 103 swr, £20. KW E-Zee Match, £20. Shure 444 mic with 600Ω mod, £15 ono. GW4IUY. Tel Aberdovey 367.

FT101ZD Mk3 fm, FV101Z vfo, SP901 spkr, all as new, boxed, used for transverting/swl from new, extras, FANT101, cw filter, YD844 and YE7A mics, save over £150! System only £725, buyer collects. Creed 444, offers? Tel Paul, Worcester (08864) 588.

Heathkit SB200 linear, immac cond, £230. Heavy duty QRO psu, 4kV, 500mA, comp on 19in rack, offers. Pair of new Johnson 275 ceramic sockets, suits 3-500Z, £15. Pye Bantam lowband a.m., £25. G4HSB, QTHR. Tel Peter, 0642 816608, after 8pm.

IC240 2m synthesized mobile tx/rx, just back from Thanet after service, comp with box, accessories, etc, £105. Swap FT221R service manual for FT101ZD service manual, or sell £6. *Wanted:* RTTY software for BBC microcomputer. G4MID. Tel Ted, Mildenhall 715178, working hours.

UHF Pye Cambridge, fitted Modular Electronics preamp, high current 12V psu, £50 the lot. G4EIG, 187 Stockfield Road, Acocks Green, Birmingham.

ITT2020 (Apple 2 Plus) 48k ram, int Basic rom card, cw rtty/cw software, £475 ono. G3RRA, QTHR. Tel 0276 25040.

Standard C7800 70cm base/mobile fm tx/rx, synthesized 25kHz steps, five memories, scan etc, as new, £200. G4JTR, QTHR. Tel Reading 476873.

Two 11ft by 2in alloy poles with joining piece, guying collar, base plate, one 14ft by 2in, offers. Jaybeam 8Y2M, £8. Sinclair ZX81 with 16k ram, £65. *Wanted:* 14AVT or similar with radials. G4ILK. Tel Jim, Shaftesbury (0747) 2934.

Drake R4C/T4XB, AC4, MS4, ok for new bands, exc, £565. FT290R with case, £200. Helford tx/rx boards, near comp, £65. CT212 sig gen a.m./fm, calibrated attenuator, £25. 10XY beam, £26. Will deliver 50 miles. G3YIQ, QTHR. Tel Crewe (0270) 212227.

MMT 433/144R 70cm 2m transverter, as new, £135. KW2000 12V psu, £10. G-whip, 160m, coil unused, £5. G4IYS, QTHR. Tel 092-73 78934.

TR9000 2m tx/rx, £295. GM8BDX, QTHR. Tel 03612 2425.

Yaesu FT101Z, fan, manual, additional 600Hz N filter, operational on all three new bands, exc cond, boxed, £475 ono. Frequency counter CSC Max 50, up to 50MHz, £45 ono. *Wanted:* 70cm handheld. G6VS. Tel Blackpool (0253) 823541.

Hallicrafter rx, S27, 27-145MHz a.m./fm, £35. Texas Instruments FS990 laboratory computer, 8in floppies operating system, prom programmer, manuals etc, offers or would part exchange for radio equipment. Kodak 16mm cine camera f1.9, £25. Tel Hastings 751114.

Belcom Liner 2 2m ssb, matching psu fitted, preamp, piptone, 28MHz coverage, cw manual, mobile mount, vgc, £90 ono. G4GFD, QTHR. Tel 061-799 0519.

Datong PC1 hf converter, gen cov, 50kHz-30MHz, on 144MHz rx, exc performance, new, orig packing, £100 ono. Boris Diplomat chess computer, portable built-in board/pieces, as new, battery or mains, £35 ono. G4ABF, QTHR. Tel Malvern (06845) 66202.

Strumech P30 Versatower, head unit, Daiwa DR7500R rotator, Western DX32 2-el triband beam, all exc cond, £295. Buyer collects. G3VGA, QTHR.

TS510, PS510, good cond, £205. Professional switched mode power supplies, 15V, 14A, £60. 15V 7A, £30. Easily adjusted to 13-8V. Connah, G4FMD NOT QTHR. Tel Chelmsford 469103.

R1000 cw a.m. ssb rx, 0-5-30MHz, £195. FT480R, 143-5-147-5MHz tx/rx, ssb fm cw, £285. Both in new cond, used very little. G4HQ, QTHR. Tel 01-508 1620.

Yaesu FT290R, fitted listen on input, case, nicads, charger, MM 25W amplifier, band pass filter, dummy load 3-way coaxial switch, 10-el Parabeam, 20h use only, bargain at £275. No offers. G4NKH. Tel Blackpool (0253) 62925.

Yaesu FT220, £200. Kenwood KP202, case, charger, £60. Tektronix 545A, type L, type CA plug-ins, handbooks, £175. G8CEH, QTHR.

Yaesu FT902DM, new bands, matching FC902 atu, 12 months old, orig packing, handbooks etc, new cond, £700 the pair. Consider exchange 70cm and 2m multimode gear. W.H.Y? G6HSC, 3 Colchester Road, White Colne, Colchester, Essex. Tel Earls Colne (07875) 2846.

Trio TR2200 R0-7, S20-23, nicads, charger, PS1200 psu/chgr, 10W amp, fitted timer, toneburst, mobile mount, comp 2m stn, exc cond, £120 ono. G4MUH. Tel Okehampton 3514, evenings.

FT101ZD fm Mk3, fan, mic, 12 months old, rig offered for exchange. Required are KW separates: KW204, KW202, any KW ancillary equipment. Must be mint. Cash adjustment if necessary. *Wanted:* IC202 2m portable. G4KKG, QTHR. Tel Yeovil (0935) 25327.

TR7800 2m fm 25W, adjustable low power position, 15 memories, priority channel, memory scan, band scan, keyboard entries, repeater shifts, up/down mic, mobile mount, handbook, £160 ono. G6FLS NOT QTHR. Tel Terry, 01-656 3082, evenings.

TS520SE 160-10, MC35S mic, pristine cond, £360. Monitor mini 2m 12ch, 10 fitted, comp nicads, charger, pocket size, £28. SAE for details. G8SVH, QTHR. Tel 021-373 2985.

IC260E multimode, boxed, good cond, £230 ono. Small rotator, £30 ono. Yaesu CPU2500 key mic, 25W fm, mobile, £180 ono. GW8VGB, QTHR. Tel Swansea (0792) 203500, evenings, 53895, daytime.

TR2400 2m fm handheld tx/rx, good cond, comp with orig packing, charger, soft case, £130 ono. Cobra QM70 transverter, recently checked on spec analyser etc, wkg perfectly, comp handbook, £70 ono. G6BSG. Tel 02913 2613.

TR9000, accessories, orig packing, £290. Trio Kenwood xpu regulated to suit, £15. G2MF, QTHR. Tel Sheffield 360210.

SRX30D, unwanted gift, new, only used couple hours, £110. TR2300 1W portable tx/rx, unmodified, case, dc lead, 5/8 mag mount, rev rptr, mod details, £70 ono. Prefer buyer collect. All for urgent sale. G3KXF NOT QTHR. Tel Lancing 764599.

Cambridge AM25B xtalled 7026, 20W, spkr, mic, spare control box, vgc, manual, £25. Two TT100s, 400W p.e.p. out at 850V, data for linear, presently over £100, take £35. Dilecon capacitor, 500pF, £1.25. Carriage extra. G2XKA, QTHR. Tel Woking 73620.

KW2000A, mains psu, Shure mic, £150 ono. Codar CR70A gen cov rx, preselector, Q-multiplier, £25 ono. Codar AT5 tx, mains psu, xtal mic, £25 ono. All good cond with handbooks. G3ZTB, QTHR. Tel Crawley 512938.

Heathkit SB104A 100W solidstate broadband hf ssb/cw tx/rx, digital display, instant QSY, Heath built, plug-in boards, matching psu/spkr, manuals, all perfect, immac (12V dc operation also), cost £865, marvellous rig, £375. Collect/Securicor at cost. G4GTU, QTHR. Tel Rustington 4123.

Icom 202S 144-00-144-4, 144-8-145MHz, mint, £105. Mizuho SM2M 144-2-144-4MHz, mint, £55. G2BS, QTHR SW Durham. Tel 0833 37814.

VHF linear amp, 80W output, 10W input, solidstate, 12V, £75. B40 comms rx, £25. G4FBA. Tel Pontefract (0977) 701622.

Hi-fi equipment: Hafler DH101 preamp, recently built but lack of funds forces sale, new and unused, worth £250, boxed with instructions. Pickering XSV4000 and XV15/140E cartridges with spare styli, as new, home-made stereo fm tuner with digital readout, timer, etc, uses Ambit Mk3 Hyperfi circuits and DFM1A, walnut case, genuine offers please, need cash urgently (or may consider part exchange for Yaesu 70cm equip). G6HPQ NOT QTHR. Tel Tony, Southend 351936.

Sony CV2100ACE 0-5in video tape recorder, exc cond, comp service manual, seven tapes, £80 plus carriage. *Wanted:* morse keys, particularly key for B2 set. G3IRM, QTHR. Tel 0284 4318.

FT220, good cond, £150. Liner 2 Belcom psu, £75. 9R59D gen cov rx, £30. LC10FM Cambridge LE, bm hh P1 S20-21 14W, £45 pair. PF1 on LE Pye charger, £20. CT53 sig gen, £10. Tonna 16-el, £15. G8HOI. Tel Leicester 887642.

Trio TR7625 5/25W 144-146 fm, 5kHz steps, digital readout, toneburst, memory, mobile mount, good cond, used little, orig packing, £195 ono. G3JPM, QTHR. Tel 0440-83 448, after 6pm.

Icom IC251E, £390. MML144/100S, £85. Drake 12A psu, £45. Datong morse keyboard, £85. Channel master rotator, support bearing, £25. 4-el quad, £10. 19-el boomer, £30. Icom desk mic, ICSM5, £20. G6ADL, QTHR. Tel Kettering 710004.

FRG7 rx, mint, front cover battery holder, £140 ono. FR50B ham band rx calibrator, 10MHz, no mods, £70 ono. *Wanted:* DX60 tx, plus good cond vfo. Tel 0631 62536 or 0631 62965.

Yaesu FT101 cw filter, fan, mic, two spare 6JS6/C, junker precision key, good cond, no marks, £250. Buyer collect or arrange transport. G8CN, QTHR. Tel 0472 697881.

Pye 100W 2m base station amp, 6-40 pa, rack mount, internal ac supplies, £38. Thermionic Products 600W p.e.p. linear amp, 20-30MHz, mains powered, £298. SAE list of components etc. G3LGK, QTHR.

Trio TR7010 2m ssb tx/rx, exc cond, orig packing, 9-el Tonna beam (portable), good cond, both £100. High band AM10B Cambridge, good wkg order, £15. G8ITU, QTHR. Tel 0602 259829.

Icom 260E multimode, mint, orig packing, twelve months old, used little, cw 5A psu, fully prot, £285. Tel Braintree (Essex) 41950.

Trio R1000, orig packing, unused, 25 per cent off list, £221.25. FRG7000, mint, few hours use only, £200. FRT7700 atu, £20. MM2000 rtty converter, £125. Yaesu YC305, £55. Copley-May, G3AAG, Flat 21, 17 Clarges Street, London W1Y 7PG. Tel 01-499 0264.

Trio TS520SE, immac cond, fitted cw filter, accessories, £360 ono. KW E-Zee Match, £25 ono. Tel Rushden (Northants) 59169.

Rotator ART3000, disc brake, comp with top and bottom brackets, £45. Buyer collects. Tel 0274 674933.

Icom IC22A, fitted S16-23, R0-7, RR3, offers? Cushcraft ATV3 vertical antenna, 10-15-20m, £25. G3ZSQ NOT QTHR. Tel 0274 587218.

FT200, all 10m, Shure 444, Yaesu mics, £230. QM70 2m transverter, £55. Nearly new TH3JNR beam, balun CD45, rotator cable feeder, connections LAR 1kW feeder switch, £180. All with handbooks, A1 cond. GW4LTA. Tel Pontypool 50763.

TR2200GX, good cond, carrying case, 12ch, nine simplex, three rptr, nicads, λ/4 wave steel whip, helical, PL259 helical, earphone, charger, service manual, two mods, auto toneburst, lighted dial, £90 ono. G8TVV, QTHR. Tel Gosforth (0632) 842495.

Yaesu FRG7, superb cond, owner had exc results, £135 ono. HF5 vertical antenna, 18in wall brackets, £35. Reason for sales—shack in for major refitting. RS42604. Tel Mark, 01-686 6520.

MMT144/28 transverter, 144-148 down to 26-30, four months old, still under guarantee, cost, new £115, for sale at £78. Tel Worcester (0905) 26171.

G2DAF Mk2 rx, exceptional example mech filter, msf, mfj cw filter, accurately calibrated, £100 ono. G4MWN. Tel Melton Mowbray 64678.

Standard C146 handheld, R3, R5-7, S20-21, nicads, charger, rubber duck etc, £70. Pye notch filter, 100Hz, 1kHz, 600Ω, similar weighting network, £1 each. G3PTU, QTHR. Tel 0484 606506.

Drake TR4C, AC4 psu, RV4C remote vfo, spkr, £350. Rocquaine dfm offsets, £30. Codar PR30M preselector, £12. Eddystone 730/4 480kHz-30MHz, £120. *Wanted:* Trio R820 rx, SM220 monitor, prefer buyers collect. Carriage extra. G4LW, QTHR. Tel Trowbridge 3166.

Scopex 4D10 dual trace scope, cw Protectomuff carrying case, exc cond, £90 ono. G3VVL. Tel Mark Moor 324, after 6pm.

Yaesu FL1200 linear, hardly used, orig packing, £240. Delivered reasonable distance from Salisbury, 75 xtals, best offer, sae details. G3ESO, QTHR. Tel 0980 23001.

4m 4-el beam, £7.50. See also last month's ads. *Wanted:* FV901DM. Bencher paddle. 6/2m converter. MSF clock. SB620. Thruline elements. Info on ics used in Burroughs 2000. Microscope slides. Fax equipment. FT901 a.m. filter. G3AZI, QTHR. Tel 0772 37815.

Icom IC2E 2m fm handheld tx/rx, comp with spare rechargeable battery pack, mains car chargers, adaptor pack for external psu, remote spkr, mic, case, 10W amp (unassembled), all mint, still under guarantee, £150. G6EPT. Tel Tamworth (0826) 898024.

ZX81, comp with software, psu, factory built, good cond, only £55 ono. 14 Briar Close, Taplow, Maidenhead, Berks SL6 0JY. Tel Roy, Farnham Common 2756, after 4pm.

Yaesu FT230R, as new cond, in guarantee, surplus to requirements, only £210 for quick sale. G4IER, QTHR. Tel 0937 843217, evenings or weekends.

Miniature 600MHz frequency counter, Optoelectronics Opto 7000, as new, boxed, internal nicads, mains psu/charger, manual, £110. Tel Gravesend (0474) 63037.

70cm 6ch Pye mobile rig, 4W, £39 ono. 2m 15W Pye Westminster, remote, 10ch, £65 ono. 70cm handheld Pye PF1C, nicads, charger, £30 ono. All above in exc wkg order and cond. All fitted toneburst. 29MHz, 5W, 6ch handhelds, £80 pair. 5/7A 13·8V power supply, £10. Both items brand new, boxed, unused. Pye Cambridge Garex fm fitted, £12 for spares. G6HLK. Tel David, Staffordshire (0538) 382117, daytime.

1,100-0-1,100V 500μA transformer, four PL509 valves, 10 600mF 300V electrolytics, £15. Philips portable mw, lw, sw, fm, £15. Quantity valves, transistors, list available. Loudspkrs, mics galore, shack clearance. Carriage extra. G3OML, QTHR.

TR2300, nicads, charger, case reverse rep, exc cond, £115. G4NOD. Tel 0403 67023.

Pye PF1s, three sets, batteries, charger, 2·5 sets for spares, offers. G8TYD. Tel Dave, 0272 512066.

Yaesu FT101ZD, dc converter, mic, FC902, 160-10m atu, SP902, external spkr, all brand new cond, sell for £550 comp. GW4KDD. Tel Blackwood (0495) 224782.

IC22A 1-10W fm, R0-7, S8, S19-23, 144·8, RR7, 5, input R6, 0, preamp, auto tb, mobile mounting bracket, £110 ono. G6ATA, QTHR. Tel Steve, 0235 24184.

Moving, everything must go: hf, vhf and microwave equipment, antenna incl dishes, many components, BDP11/10 computer, vdus, other computer/micro hardware. Please send large sae for list. G3XNS, 10 Worth Park Avenue, Pound Hill, Crawley, RH10 3DF.

Trio TR9000, used little, service manual, £295. BO9 base plinth, £20. Jaybeam 13-el Parabeam, unused, £30. G8YFZ, QTHR. Tel Southport (0704) 42664.

Collins 75S3C amateur rx, Q-mult variable bfo, recently revalved, exc cond, matching spkr, £275 ovno. Hamsoku swr/pwr meter, cross needle indication, £25. R820 as new, £425. G4EKL, QTHR.

Racal RA17, sideband adaptor, many spare valves etc, £195. Tel 0621-783892.

Eddystone 750 rx, £45. Star SR40 rx, modified, 0·5-30MHz, £10. Heath TS23 stereo amp, 3 + 3W, £8. Xtal mic BM3 on desk stand, £2. All wkg. Buyers collect. G3SAO, QTHR. Tel 061-652 6529.

Yaesu FT227R 143-150MHz memo-scanner, 25/5kHz steps, £135 ono. FDK Multi U11 70cm fm, four simplex, eight repeaters, 2dB nf rx, £135 ono. Both with mobile mount, handbook, orig packing. G4JQP, QTHR. Tel Radstock (0761) 34216.

WANTED

For Boy Scout library: *RSGB Bulletins*, June 1952 -June 1953, July 1957-December 1966. Will arrange collection. State price. EI2W, QTHR. Tel Dublin (0001) 804645.

A510 rx, unmodded, WS29 can cases, cables, atu, WS18, 22, 48, 68, or other ex-Army signals equipment. G4MTQ, 55 Frobisher Drive, Saltash, Cornwall PL12 4PN. Tel Saltash (075-55) 5273, after 6pm.

MEM7700 memory unit. Antenna matching unit. KW E-Zee Match atu or similar. G3LP, QTHR. Tel Cheltenham 512481.

For the Wireless Museum: old radio magazines, books, catalogues, QSL cards, Gamages catalogue, any variety knobs, keys, valves, Mk3 aircraft tuner, 1916 White valve. Collection arranged. Details please to hon curator, G3KPO, QTHR. Tel Ryde (0983) 62513.

Modern all transistor a.m./fm vhf sig gen, eg Pye SG3V, Dymar 1525, good cash price paid. Tel Chris Walton, Southampton (0703) 551580.

Loan or purchase manuals, circuits for Heath model 10/105 and Telequipment type D43 dual beam oscilloscopes, costs reimbursed, transformer for 10/105 supplies. BRS40911, 41 Highfield Road, Beverley, North Humberside. Tel Tony, 0482 864398.

Beg steal or borrow a.m. Bantam manual or copy of same. Mel Evans, BRS47137, 4 Burdiehouse Street, Edinburgh EH17 8EY.

Rotator for 12-el vhf beam, 25W on 40W linear, 12V for vhf. Frequency counter to 300MHz. G3GZQ, QTHR Devon. Tel 03644 3608, weekends.

CDE control unit for CDE44 rotator. G3GHK, QTHR. Tel St Helens 58963.

Vacuum variable capacitors, 300pF and up, 3kV and up. Offers and your phone No to W. Sicke, DK7DF, 21 Stemmel Street, 5790 Brilon-12, W Germany.

FL50B tx, and FV50 vfo, wkg cond, cash waiting. G3TPV, QTHR.

For completion of WS123: headphones H124J, transit case, 939DO38 canvas carrying case, 969CO15. Case for hand/foot generator. For AR88: i.f. trimmer tool M86183-501 and headphones M1 58036. G4CCW, QTHR.

Power supply unit, variable voltage and current, 0-15A, 0-13·8V, transformer and rectifier not necessary, or stabilizer unit for 13·8V 12A 144MHz linear, 10-25W in, 100-150W out, homebrew or commercial tiltover mast-tower? Help/ideas for psu. G6HKD. Tel Weymouth 787747 or 834322.

Base for 8877 3CX1500 Eimac type, SK2210, SK2206 or 7-pin Septar ceramic base. Zener diodes, 8·2, 12, 28V, 50W. Commercially used time expired. 8877 valves. RAE correspondence course for xyl. Please write. G3YCP, QTHR.

144MHz QRO linear amplifier and psu using pair 4CX250s, 4CX350s. GI8UPV, QTHR. Tel 0232 620728.

A510 madly wanted as I operated one in 1956/7. Your price paid. I need circuit diagram for Army B44 Mk3, please, please, please. Tel Colin Johnson, Grimsby 824371, after 5.30pm.

QRP rig, cw, any considered. Dhuglas, 1 Crown Gardens, Glasgow G12 9HJ. GM4ELV NOT QTHR.

4CX250B valves, sockets and a high quality relay. GJ4ICD, QTHR. Tel 0534 26788, 6pm.

Antenna wire: anyone know where antenna wire of the type used with balloons and kites during the second world war can be obtained? It is a thin copper braided nylon fishing line, extremely light and practically unbreakable, ideal for a top band λ/2 antenna. Pat West, 5B4PW, 40 Evagoras Avenue, Nicosia 136, Cyprus.

Circuit diagram and component values for JXK 2m converter, 28-30MHz i.f. output, will copy and return. All postages refunded. G2AON, 51 Osgodby Crescent, Scarborough, N. Yorks. Tel 582493.

Radio & Television Servicing, 1972-3 edn. Hall, 35A Newmarket, Stornoway. Tel 0851-3580, evenings.

Yaesu FL2100 linear amplifier for FT101, comp with interconnecting leads, instruction manual, please write or phone giving price and details. R. Hartnell, 3 Town Mills, Wiveliscombe, Taunton, Som TA4 2LY. G4NYE NOT QTHR. Tel 0984 23762.

BC348 rx, versions without lf range only: BC312/342, versions with noise antenna system only; ART13 tx; BC639 vhf rx; info on GEC RC460R synthesized rf generator. *For sale:* Conrac colour monitor chassis, collect for £15. G8LIU, QTHR. Tel Uxbridge (0895) 30006.

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Circuit diagram/manual, tuning knob for wireless set No 38. Valves type 4215A/215A for old Western Electric rx. G4JNU, QTHR. Tel Reading (0734) 477573.

Manual HP686A, buy, borrow or photocopy, expenses paid. Helmer Lindquist, SM6CCD, Lyckev. 5,S430 91 Hono, Sweden.

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Shimizu SS105SS tx/rx, any cond, comp or otherwise. Also interested in the additional boards etc. G8ZRE NOT QTHR. Tel 08293 2531.

FRG7, A1 cond. Speech processor unit for Yaesu FL101 tx. Letters please J. Nelson, G4MKL, c/o 24 Fratton Buildings, Fratton, Portsmouth, Hants.

Beg or borrow, manual or any information you may have on Philips LDL1002 video recorder. Urgently required. Will reimburse any reasonable or unreasonable expenses. Tel Phil, 0332 556218, evenings.

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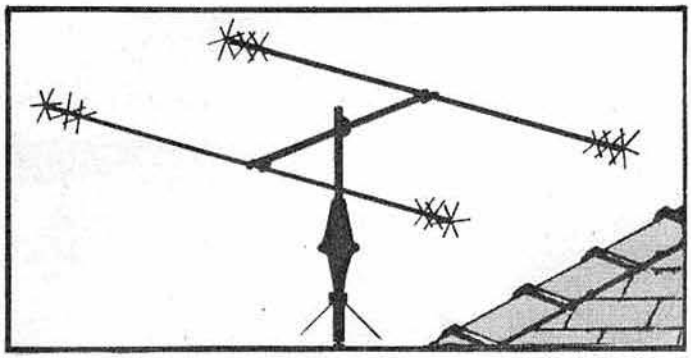

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Boom length	60 inches	Power rating	1400 watts PEP
Turning radius	7 feet	Input impedance	50 ohms
Operating frequencies	10m, 15m, 20m	Wind resistance	80 mph
Forward gain (ref D pole = 1:00)	3·6 dB	Weight	14 lbs
		Rotator requirements	AR40

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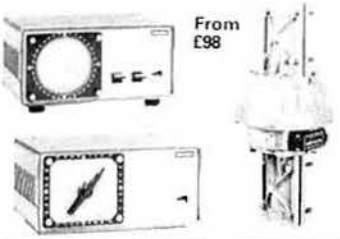

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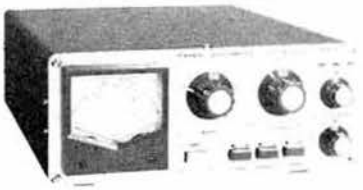

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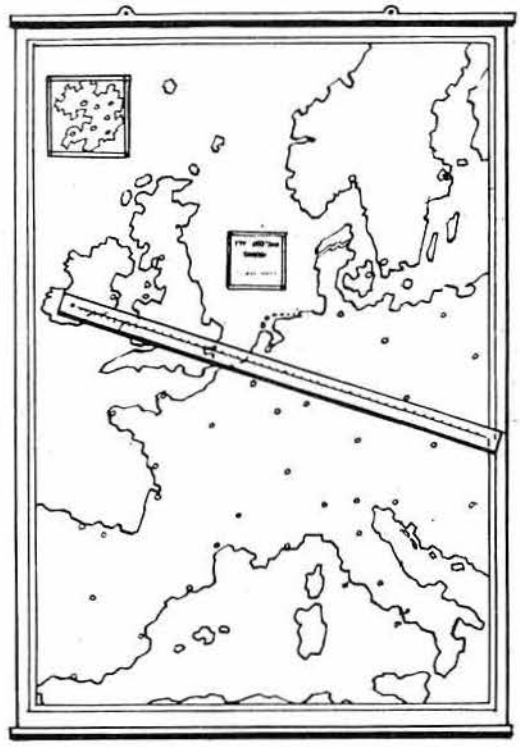

This locator set (map and ruler in kilometres and miles), a superior alternative to calculators, has been produced in co-operation with VHF/UHF specialists. Employing a special projection, it has a tolerance of less than 0.5% at a distance of 2,000 kms and is exact within 10kms.

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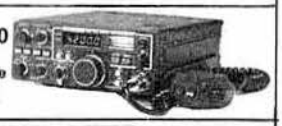

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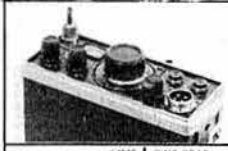

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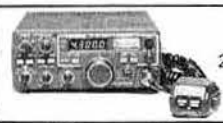

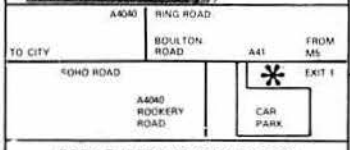

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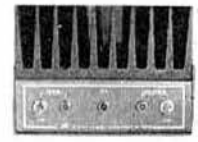

Further to our announcement in previous advertisements to produce 2 meter linear amplifiers, we have finally designed and manufactured a 80 watt version to suit the most popular QRP transceiver – the Yaesu FT290R, but is also suitable for any other transceiver having an output power of 2-3 watts. (And the price is right too.)

This decision was made after a survey amongst our customers who were owners of QRP transceivers their requirements were for a 80 to 100 watt basic amp. with no gimmicks such as receive pre-amp which only adds to costs and degrades the noise performance of the receiver.

Features: Quiescent current (no drive) 300 m/A. Minimum output power with 2½ watts drive – 80 watts with 13-8V. Suitable for FM and SSB. Fully RF switched or can be used via transceivers PTT line. Straight through operation when switched off. Provision for fitting "T" attenuator for higher RF inputs. Separate Led indicators to show "power" and "SSB" selected plus "ON AIR" indicator. Manufactured to high industrial standards. SO239 sockets fitted as standard. Finished in hard stove enamel colour storm grey semi gloss with matt black heat sink. Size 105 x 210 mm long. SPECIAL INTRODUCTORY PRICE OF ONLY **£98.00.**

Yaesu FT290R – £249.00. Mobile mounting bracket – **£22.25.** Set 2·2A nicads – **£21.50.**

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3SK88 MOSFET super low noise 1·1db @ 150MHz with 26db gain, 16db gain @ 900MHz with only 3·5db noise. Still a good device for 70cms approx 22db gain with 2·2db noise. Supplied with data sheet – new REDUCED PRICE ONLY **£1.20** ea. or two for **£2.20.**

RECEIVER PRE-AMP for 27-30MHz. Suitable for any receiver or transceiver covering these frequencies, circuit is designed around a dual gate mosfet giving a gain of 25db with only 1db noise. Gain is adjustable on PCB. 50ohm imp. in & out & requires 9-15 volt supply. Ready built on board size 60 x 40mm. PRICE **£8.00.**

We still produce our NBFM adapter for the FT101 up to "E" model. No holes to drill or PCBs to fit, small free standing unit which just plugs into the sockets at rear of FT101 still the best & reduced to **£70.00.** Data sheet available.

SEMICONDUCTORS: VHF RF POWER 2N6083 30 watt @ 2 mtrs over 7db gain 12v OK FM/SSB. With data sheet **£6.50** (the cheapest you will find), 2N3866 **75p**, BFW16A **75p**, PT4236A (2N4427) **75p**, 2N2631 (2N3553) **75p**, SD1212-6 3 watt @ 2 mtrs 12v 10db gain **£2.50.**

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CUT THIS OUT! (You'll need it one day!)

a Western "which tower?" report on . . . . . telescopic towers

A telescopic self-supporting tower is something to which many of us aspire but cannot afford. If one day, therefore, one can raise the necessary cash for such an investment, it is essential to make the right choice. Basically, the unit must be functional, i.e. do the job for which it was intended; namely to hold your antenna. What you don't want is a bent tower and scrap antenna. Here are some guidelines:

YOU MUST

1. Decide what height you require (then check price lists to see if you can afford it!).
2. Decide what antenna you wish to erect.
3. Determine the HORIZONTAL wind load of the antenna (from the manufacturer's specification sheet) and at what wind speed this load applies.
4. Look at the tower manufacturers' specification to see whether the tower you require will be strong enough to carry the wind load of the antenna at the stated windspeed. For example a Western 'Penetrator' DX-33 is 28kg headload at 75mph windspeed. At 100mph this windload increases to 50kg.
   A Westower type 3S/FBP (17·75m high) will take 57kg at 75mph. The load from a DX-33 at 75mph is only 28kg, well within the specification for the tower and is thus safe at 75mph. A '3S' tower would take 5kg at 100mph and so a DX-33 (with 50kg load at 100mph) cannot be put on a '3S' tower and survive a 100mph wind. A stronger tower is required. A Westower 3HD (Heavy Duty) takes 66kg at 100mph and would be suitable.
5. Ask yourself where you live! If that sounds stupid then let us explain. The effect of the wind blowing on your tower may be increased or decreased according to whether you are on a hill, in a valley or an 'average' situation. Decide this and then seek advice if you are in doubt.
6. Look at the quality of the fabrication. Good welds are smooth and flow into parent metal.

DON'T

1. Buy a tower unless you are sure of its specification. There are a number of relevant BRITISH STANDARDS which relate to towers. These are:
   a) British Standard CP3 "Wind Loads"
   b) British Standard BS449 "Engineering Practice"
   c) British Standard BS729 "Galvanising"
   d) British Standard BS4872 "Welding"

FACTS

1. The wind pressure at 50mph is 6·4lbs/sq. ft.
   The wind pressure at 100mph is 25·6lbs/sq. ft.
   As you see, as you double the windspeed you have 4 times the wind pressure. As the basic windspeed goes up so does the pressure on the tower and so must the overturning moment. We have seen specifications for some towers where the overturning moment goes DOWN as the pressure goes up! Not according to B.S. it doesn't!
2. There are three statistical factors known as S1, S2 and S3 in British Standard CP3. In order to provide the consumer with information about the strength of the tower, we at 'Western' assume average values for the "Ground Topography Factor" S1, the "Ground Roughness and Tower Height Factor" S2, and the "Statistical Factor" S3, which relates to the degree of security required and period of time over which security is required. At 'Western' we use S3 as "1" for security over 50 years.

COMPARISON OF TWO 18m SELF-SUPPORTING TOWERS

STANDARD TYPE						HEAVY DUTY TYPE					
Manufacturer	Model	Head Load 1 (kg)	Comment	Price 2 inc VAT	Comment	Manufacturer	Model	Head Load (kg) 3	Comment	Price 2	Comment
Western	3S/FBP	80	Western is stronger by 110%!	£623.30	Save £43.77 at Western	Western	3HD/FBP	115	Western is stronger by 67%!	£764.75	Save £101.95 at Western
Strumech	BP60	38.1		£667.07		Strumech	BP60/HD	69		£866.70	

NOTES 1. Figures taken at 60mph for comparison purposes.
2. Prices incude delivery in England/Wales excluding Devon/Cornwall for Western.
Prices include delivery over 100 miles and up to 200 miles for Strumech.
3. Figures at 75mph for comparison purposes.

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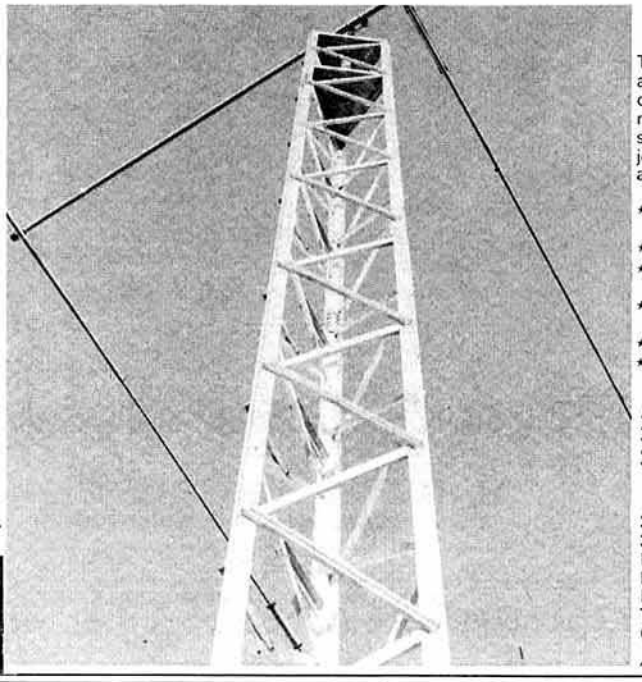

ALUMAST

The **ALUMAST** is a 15" (375mm) wide triangular cross section lattice sectional aluminium mast based on a 10ft (3·05m) section length. It is supplied "knocked down" in a tubular carton for ease of transport, but can easily be assembled needing no special tools or skills. The system includes top plate with bearing sleeve, rotor plate and a choice of a fixed base frame (FB-1) or one with hinge joints (HB-1) to enable the mast to be pivoted at ground level. Guy brackets are available for use at heights above 30ft.

- **Made from high strength corrosion resistant alloy using WESTERN EXCLUSIVE 'W' section leg extrusions.**
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- **Heights to 250ft (61m) with appropriate guy configurations (ask us for quotes).**
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- **30ft (9·15m) mast is delivered in a tube only. 10ft 6in (3·2m) long. 6in (0·126m) dia.**

A COMPLETE 30ft (9·15m) MAST for 375/PSS/3; FB-1; RMP-1; TP-1 **£258.74**

FULL PRICE LIST

375/PSS/3	30ft mast (3 sections)	207.00
375/PSS/1	Additional 10ft section	69.00
HB-1	Hinged base unit	34.50
FB-1	Fixed base unit	24.15
RMP-1	Rotor mounting plate	13.22
TP-1	Top plate with sleeve	14.37
GB-1	Guy brackets (set of 3)	12.65

All prices include carriage and VAT at 15%

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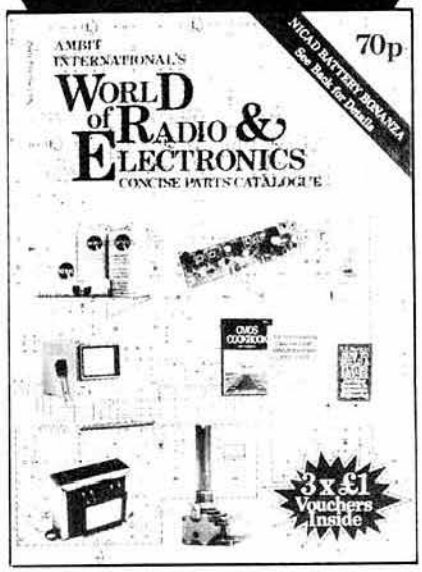

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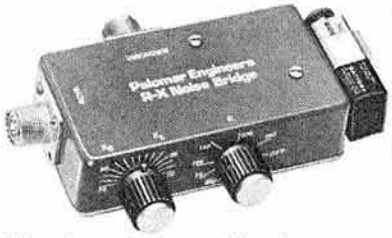
R-X Noise Bridge



- **Learn the truth about your antenna.**
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	L(M)	W(kg)	
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5 element†	3·5	3·2	£31.74(a)
144MHz			
4 element	1·37	0·5	£14.43(a)
9 ele fixed	3·30	1·9	£17.14(a)
9 ele portable	3·30	1·7	£19.40(a)
9 ele crossed	3·50	2·0	£31.68(a)
13 ele portable†	4·50	2·5	£30.22(a)
16 ele fixed	6·40	4·4	£35.19(a)
435MHz			
19 element	3·20	1·1	£20.13(a)
19 ele crossed†	3·30	1·8	£33.36(a)
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144/435MHz	L(M)	W(kg)	
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9 & 19 element†	3·3	2·0	£33.36(a)
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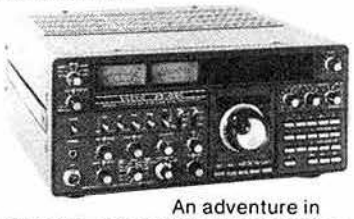
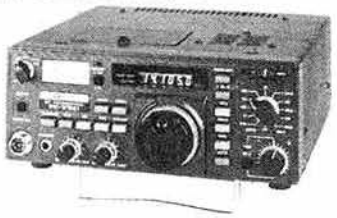


An adventure in electronics – and more! An astonishing piece of design and product engineering. Think of a feature, a facility, performance, reliability, flexibility, ergonomics, and value for money. The FT 1 has it all! We have the FT 1 complete with FM facility, AM and CW filter, keyer and microphone and two year guarantee – You have it! P.O.A.

ICOM 730
Mobile or Base Transceiver



An extremely compact 8 Band Transceiver with an output of 100 watts RF, dual VFO's with 10Hz, 100Hz and 1KHz tuning rate – plus an abundance of features including pass band tuning facility. **N.B.** Preamp and SWR Detector. **£586.00** including VAT and carriage. **Two year guarantee.**

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General Coverage Receiver
150Hz – 30MHz

Must be top of your list when shopping for a Receiver. You'll find it rewarding to use an antenna tuning unit and even more rewarding to get one from us! Buy an FRG 7700 or FRG 7700M and you can have the matching unit FRT 7700 completely **FREE.**
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Yaesu FT 230R 25 Watt, 2M Mobile 2 VFO's – 10 memories – priority – reverse repeater – scans band and memory. LCD readout in 12.5/25 KHz steps. We'll give you a FREE super 7/8 mobile antenna to go with it at **£239.00** including carriage and VAT.
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YAESU FT 290R

The world's leading portable from Yaesu, "the people who know your needs". 2.5 Watt all mode SSB/CM/FM, 10 memories – Price **£249.00** includes FREE nicads and charger, carriage and VAT.
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Big performance mobile station offering you all the options you expect in such a piece of equipment – all mode – full scanning, two VFO's, satellite mode etc. Price includes absolutely FREE your own choice from our stock, any VHF base or mobile antenna at **£379.00** including VAT and carriage.
Two year guarantee.

ICOM 720A
General coverage or amateur transceiver.

Silky smooth tuning and easy operation makes this a delight for the amateur or commercial operator – a host of features which make it ICOM's pride and joy. It can be yours, too, at **£883.00** VAT and carriage paid.
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SP230	External speaker unit	34.95 (1.50)
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YK88C	500Hz CW filter	29.60 (1.00)
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JAYBEAM ANTENNAS

2 metre Antennas		
C5/2M	5dB glass fibre colinear	£47.70 (3.50)
5Y/2M	5 element yagi	12.07 (2.00)
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5XY/2M	Crossed 5 element yagi	21.72 (3.00)
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C8/70cm	8dB glass fibre colinear	54.00 (3.50)
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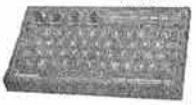

MODEL MK

- STRAIN-FREE sending: Converts "hunt and peck" typing to perfect morse. Just plug into any key jack and type.
- CONVENIENCE: no need for a power cable, four internal pen cells last for 300 hours and give continuous memory back up.
- EXCLUSIVE COLOUR CODED KEYBOARD DESIGN: Separate key switches beneath a tough polycarbonate membrane combine excellent "feel" with a splash proof wipe clean surface.
- LAVISH MEMORY: four 64-character memories with auto-repeat and programmable "pause" function, for all the routine sending.
- BUFFER MEMORY: ensures perfect sending despite less than perfect typing.
- COMPREHENSIVE CHARACTER SET: includes punctuation, procedure signals, accented letters. Plus a "merge" key for making any non-standard character.
- BEAUTY AND STYLE: only one inch thin and with four-colour panel Model MK looks every bit the thoroughbred it is. Model MK is supplied with output leads and spare connectors but without batteries (four HP7 pen cells).

MODEL D70: THE GO-ANYWHERE MORSE CODE TRAINER


MODEL D70

For building up your morse code reception speed there is no better method than the Datong "Morse Tutor".

You learn the code with the characters at normal speed but with an extra delay between each one. As you improve you reduce the "DELAY" control until, with it fully reduced, you find you are reading code at the chosen speed and with correct spacing.

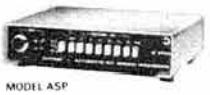
An important feature is that the unit is completely portable. This allows you to practise wherever and whenever you find it most convenient. The all-CMOS design gives about 60 hours of practice from a lowcost PP3.

MULTI-MODE AUDIO FILTER MODEL FL2


MODEL FL2

Model FL2 offers audio filtering capability which is totally in a class of its own. Although connecting in the loudspeaker line from any rig, Model FL2 simulates the effect of fully variable IF selectivity complete with pass band edges even steeper than those of multipole crystal filters. You can remove interference in SSB and winkle out weak CW to a truly remarkable extent. No less than twelve poles of tuneable filtering in Model FL2 can be used in six different ways depending on the mode switch. For example, for SSB you have independent low and high pass filters, each a 5 pole elliptic function type for knife edge cut-off, plus when needed, a separate 2 pole notch filter. All three filters tune linearly and separately from 200 to 3500 Hz. For CW all 12 poles are combined automatically to give incredible skirt selectivity and with independent calibrated controls for centre frequency and bandwidth.

MODEL ASP - THE "INTELLIGENT" RF CLIPPER


MODEL ASP

Model ASP modifies your speech signal direct from the microphone and makes it more effective at modulating your transmitter. The effect is as if the transmitter peak power were to increase by 6 to 10 dbs. "Intelligent" means that unlike other speech processors Model ASP automatically senses your voice level and reacts accordingly to always maintain the degree of true r.f. clipping selected (in decibels) by the panel push-buttons. Special circuitry does this without the undesirable side effects of simple a.g.c. devices. Adding a Datong r.f. clipper to a normal SSB transmitter has a similar effect to adding a linear amplifier but without the high cost and risk of TVI.

GENERAL COVERAGE RECEIVE CONVERTER

Reviewed Rad. Com. April '82


MODEL PC1

If you have a 2 metre all-mode receiving set up, just add Model PC1 in series with its antenna and you have a superb general coverage receiver. What better way to listen in to all the non-VHF amateur bands, not to mention everything else from 60 kHz to 30 MHz? For sheer value for money there is no better way to get high performance general coverage reception. After all what a waste it is if your expensive 2 metre all-mode rig covers one band only? Model PC1 will also extend the coverage of SX 200 type scanners to include all the long, medium and short wave bands as well. This is an excellent way to listen to your favourite short wave broadcast stations without the extra expense of a complete new receiver.

HIGH PERFORMANCE 2 METRE CONVERTER

One of the best 144MHz converters currently available. Reviewed Rad. Com. April


MODEL DC144/28

Model DC144/28 is designed to overcome the overload and spurious signal problems experienced by conventional converters, it uses a Schottky diode balanced mixer with about 7 dbm of local oscillator drive. This, coupled with a 3SK88 r.f. amplifier, gives an excellent combination of low noise figure and strong signal handling capability. Its input and output gain controls also help you get the best out of your main receiver without flattening it with excessive gain.

Model DC144/28 is available either as a complete cased unit (die cast box, SO239 connectors) or as a ready built and tested PCB module.

MINIATURE RECEIVING ANTENNAS


AD 370

If you don't have enough space to put up traditional receiving antennas, our active antennas are the answer. They need no tuning yet have constant sensitivity from 200 kHz to well over 30 MHz. Results are quite comparable to full size conventional antennas but the space saving is enormous. The indoor version (AD270) is 3 metres long and the outdoor version (AD370) is 2 metres long.

A TV-type coaxial feeder cable of any reasonable length can be used yet because the antennas are balanced dipoles any interference picked up by the feeder is rejected. Because of their wide frequency coverage Datong Active Antennas are ideal accessories for modern general coverage communications receivers.

VERY LOW FREQUENCY CONVERTER MODEL VLF


MODEL VLF

Model VLF adds the missing bands below 500 kHz to your existing receiver. It also adds MW and LW coverage to amateur bands-only receivers for news, time checks etc.

Connected in series with the antenna Model VLF allows you to tune the 0 to 500 kHz range (and above at reduced sensitivity) using the ten metre band (28-30 MHz) on your normal receiver.

"CODECALL" SELECTIVE CALLING DEVICE


CODE CALL

The Datong Codecall adds "selective call" to any radio voice channel. A single self-contained unit at each end of the link sends or receives a coded audio signal. When the correct code is received the receiver bleeps loudly.

The only connection needed to a transceiver is to the external loudspeaker jack. Sending is via direct audio into the microphone.

"Codecall" allows totally silent stand-by operation yet with confidence that when that specific call comes, you won't miss it.

Over 4000 different codes can be selected by internal link or by three 16-way panel switches, depending on the model. This practically eliminates false alarms.

PRICES All prices include delivery in U.K. basic prices in £ are shown with VAT inclusive prices in brackets

FL1	59.00 (67.85)	AD370	45.00 (51.75)	RFA	25.50 (29.32)
FL2	78.00 (89.70)	AD270 + MPU	37.00 (42.55)	Codecall (Linked)	24.00 (27.60)
PC1	105.00 (120.75)	AD370 + MPU	49.00 (56.35)	Codecall (Switched)	25.50 (29.32)
ASP	69.00 (79.35)	MPU	6.00 (6.90)	Basic DF System ●	125.00 (143.80)
VLF	22.00 (25.30)	DC144/28	31.00 (35.65)	DF System ●	131.00 (150.70)
D70	43.00 (49.45)	DC144/28 Module	25.00 (28.75)	Complete Mobile DF System ●	173.50 (199.50)
D75	49.00 (56.35)	Keyboard Morse Sender	112.20 (129.00)		
RFC/M	23.00 (26.45)				
AD270	33.00 (37.95)				

● See previous advertisement or price list for further details

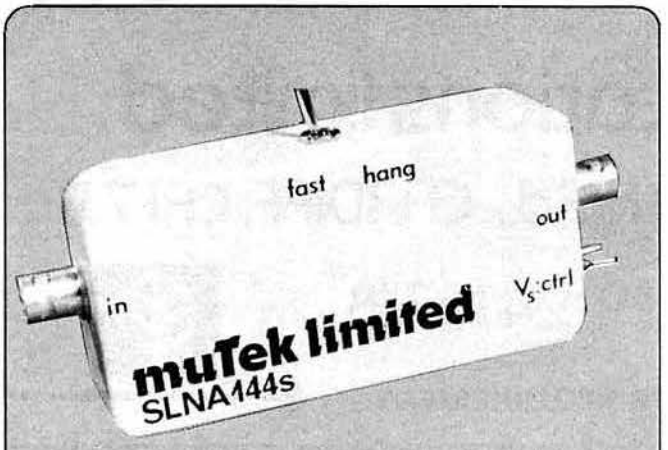
DATONG ELECTRONICS LIMITED

ALL DATONG PRODUCTS ARE DESIGNED AND BUILT IN THE U.K.

Data sheets on any products available free on request – write to Dept R.C.

DATONG ELECTRONICS LIMITED

Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England. Tel: (0532) 552461



As various reviewers have commented, our SLNA144s is a very fine preamp for the 144MHz band. It has been designed to complement most current transceivers—having the right combination of noise and gain parameters to ensure that the overall receiver sensitivity is limited by external factors such as sky and ground noise. Its dynamic performance is such that the following receiver will normally be the limiting factor with regard to large signal handling whilst the superb bandpass filtering will provide a substantial degree of protection against out of band signals.

The SLNA144s has been designed from the start as a preamplifier; not as an afterthought to increase the sales appeal of a power amplifier.

Each sample is individually tested by people who understand the design in a pretty fundamental manner. This results in what we still consider to be the best product of its kind available.

We've always tried to manufacture honestly specified value for money products which represent our conception of good engineering practice. It's sometimes very difficult to reconcile this with the fads and fancies of our marketplace—an example of this has been our decision not to succumb to the SO239 disease and fit this 50 year old connector design to our vhf equipment.

There are sound engineering reasons for this: in particular the mismatch uncertainties generated by the use of a non-constant impedance connector at vhf would introduce an unwelcome source of errors into our production noise figure testing. Accurate measurements of nf are difficult enough without making additional problems and we're not the sort of people to ignore them!

Another area which we've kept away from is in the use of consumer gasfets in our amplifiers. We've been aware of the 3SK97/8 series for nearly three years and looked at them critically a while back. Our conclusions were that although some samples could give reasonable noise performance they weren't that reproducible and the linearity wasn't that special. We've actually been able to do better with the current generation of bipolar transistors! The only way to get the sort of performance which makes it worth spending the money on a fet is to use professional devices—which we do in our GLNA432u series. Of course there is the 'I've got a gasfet—wowee!' syndrome but our customers have enough intelligence to take things on their merits.

Chris G4DGU.

TLNA432 s — rf switched 432MHz preamplifier
u — unswitched 432MHz preamplifier

These preamplifiers are very high quality low-noise bipolar transistor amplifiers covering the entire 430-440MHz band. Their noise measure is typically 1.4dB and they have an associated gain of typically 12dB. The device used is a modern highly linear low-noise transistor providing better performance at uhf than elderly devices such as the NE64535 or consumer gasfets like the 3SK97. We have paid our usual attention to excellent bandpass filtering in this case using helical resonators to ensure superb performance. As it is not possible to retain this order of performance with pin-diode or low-cost relay switching, the switched version uses proper coaxial relays to enable 100w + power handling capability.

THE RANGE

		£
SLNA 70s	70MHz switched preamplifier	33.90
SLNA 70u	Unswitched version of the SLNA 70s	20.38
SLNA 70ub	Unboxed SLNA 70u	12.41
SLNA 144s	144MHz switched preamplifier	33.90
SLNA 144u	Unswitched version of the SLNA 144s	20.38
SLNA 144ub	Unboxed SLNA 144u	12.41
TLNA 432s	432MHz 1·4dB nf/13dB gain switched preamplifier	54.90
TLNA 432u	Unswitched version of the TLNA 432s	26.40
TLNA 432ub	Unboxed TLNA 432u	18.50
BLNA 432ub	1·3dB nf/13dB gain sub-min 432MHz preamplifier	12.43
GLNA 432u-1	432MHz gasfet unswitched preamplifier .8dB nf/13dB gain	46.90
GLNA 432u-2	.65dB nf/13dB gain	56.90
BLNA 1296ub	Bipolar unswitched 1·3GHz lna 1.8dB nf/12dB gain	24.50
HDRA 95u-1	1.5dB nf/8.5dB gain professional Band II high dynamic range (i/p intercept +22dBm) preamplifier	29.90
HDRA 95u-2	11.5dB gain variant (i/p intercept +16dBm)	29.90
BBBA 500u	20-500MHz broadband high dynamic range preamplifier	26.40
BBBA 860u	250-860MHz broadband low-noise preamplifier	20.50
XBPF 700ub	Band IV-V tvi filter (a true bandpass on microstrip!)	2.95
PPSU 112	Preamplifier (12v nominal) mains power supply	6.90
CISA 001	SO239 to BNC male adapter—if you must!	1.60
RPCB 144ub	FT221/225 replacement front-end board—the one and only!	64.50

Antenna combiners and dish feeds—do ring for details. These are made by 'Parabolic' in Sweden ('Kungsimport' as it was).

All the above prices include VAT at the current rate of 15%. Postage on all items but combiners and dish feeds is now **£1.00**.

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Peter Ades, General Manager, Techtest Ltd, Street Court, Kingsland, Leominster, Herefordshire HR6 9QA. Tel: Kingsland (056881) 744

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MULTIMODE OPERATION
Never before possible from such a compact package, true multimode —USB, LSB, CW & FM—operation is yours to enjoy. With CW and SSB activity at an all-time high, you will not be left out of the satellite or DX action and you can still ragchew on FM simplex or even via a repeater (inbuilt ±600kHz shift and 1750Hz tone burst).

ADVANCED MICRO CONTROL
Advances in microprocessor circuitry allows selectable synthesizer steps, up/down scanning from the microphone, priority channel operation, and ten memories (with memory scan), all called up with fingertip ease.

LCD DISPLAY
A large, newly developed Liquid Crystal Display provides readout of the operating frequency, and an indication of a number of the control functions. It is highly readable under conditions of bright sunlight and is backed up by a lamp for night-time operation.

PROGRAMMABLE SYNTHESIZER
The optimum synthesizer steps for SSB/CW or FM operation are very different. That's why Yaesu gives you the flexibility of two synthesizer steps per mode: 100Hz or 1kHz per step on SSB and CW, and 12½kHz or 25kHz per step on FM. When changing modes from SSB/CW to FM, your FT290R is automatically set to the nearest standard channel when you start scanning or tuning.

TEN MEMORY CHANNELS
As many as ten frequencies may be stored into memory, for instant recall. The priority feature allows you to check a favourite frequency every few seconds, with automatic halting (FM mode) when the channel is clear or busy, as desired. Memory backup is provided by a built-in lithium cell, with an estimated lifetime of five years.

DUAL VFO SYSTEM
The FT290R features a digitally synthesized dual VFO system which provides tremendous flexibility in day to day operation. For example, one VFO may be set up in the SSB portion of the band, and the other in the FM sub-band, for immediate QSY when changing modes.

CONVENIENT FEATURES
Among the many features adding to the convenience of the transceiver is a built-in telescoping antenna, a high-performance noise blanker, a high/low power switch, and a battery condition meter. A clarifier (offset tuning) allows you to follow unstable or Doppler-shifted signals.

FULL LINE OF ACCESSORIES
See your authorised Yaesu dealer for details of the quality line of accessories. These include the YM49 remote speaker microphone with scanning controls; MMB11 Mobile Mounting Bracket; FL2010 2 meter 10 watt amplifier, FLC11 Leather Carrying Case; and the CSC1 Vinyl Carrying Case, Nicad C-Cells and a Battery Charger. Stop by and try the FT290R today!!

GENERAL

Frequency coverage:
144-146MHz

Modes of operation:
SSB (USB, LSB), CW and FM

Synthesizer steps:
SSB/CW: 100Hz, 1kHz
FM: 12·5kHz, 25kHz

Power requirements:
8 × C size dry batteries
8 × C size Nicad cells
External: 8·5-15·2V DC
Memory backup: lithium cell

Current consumption:
70m A on receive;
800m A on transmit (2·5W RF, FM)

Dimensions:
58(H) × 150(W) × 195(D) mm, 1·3 kg

TRANSMITTER

Power output:
2·5 watts at 12 volts

Carrier Suppression:
Better than −40dB

Spurious radiation:
Better than −60dB

Unwanted sideband suppression:
Better than −40dB

Tone burst frequency:
1750Hz (other models)

Frequency response:
300-2700Hz (−6dB)

FM Deviation:
± 5kHz (max)

Microphone impedance:
600 Ohms

RECEIVER

Intermediate frequencies:
1st IF 10·81MHz (SSB & FM)
2nd IF 455kHz (FM ONLY)

Sensitivity:
SSB/CW: 0·5 μV for 20dB S/N
FM: 0·25 μV for 12dB SINAD

Selectivity:
SSB/CW: 2·4kHz at 6dB down
4·1kHz at 60dB down
FM: 14kHz at 6dB down
25kHz at 60dB down

Image rejection:
Better than −60dB

Audio output impedance:
8 Ohms

Audio output:
1 watt @ 10% THD

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