

The

# SHORT WAVE

Magazine

50p

VOL. XXXIX

JULY 1981

NUMBER 5

**JRC** Japan Radio Co., Ltd.

# NRD-515

# NRD

# NRD

# NRD-515



The NRD 515 is a PLL-synthesised communications receiver of the highest class featuring advanced radio technology combined with the latest digital techniques. The new NRD 515 is full of performance advantages including general coverage, all modes of operation, PLL digital VFO for digital tuning, 24-channel frequency memory (option), direct mixing, pass-band tuning, etc. JRC's 65 years of radio communications experience will give you "the world at your fingertips". The NRD 515 is but a single item from the JRC product range which extends all the way to full marine radio installations for supertankers.

NRD 515 HF RECEIVER £948.75 inc VAT

## LOWE ELECTRONICS Ltd.

CHESTERFIELD ROAD,  
MATLOCK,  
DERBYSHIRE DE4 5LE. TEL. 0629 2817/2430

Frequency Band (kc/s)	Area	Services	Frequency Band (kc/s)	Area	Services
10-14	W.W.	R. Nav.	4,438-4,650	1	Fx.
14-70	W.W.	(a) Fx. (b) M. Mob. (c) Fx.	4,650-4,700	W.W.	Aero. Mob. (R)
70-90	1	(a) Fx. (b) M. Mob. (c) R. Nav.	4,700-4,750	W.W.	Aero. Mob. (OR)
90-110	W.W.	(a) Fx. (b) M. Mob. (c) R. Nav.	4,750-4,850	1	(OR)
			4,850-4,995	W.W.	(b) B'cst. (c) Fx. (d) Land Mob.
			4,995-5,005	W.W.	(a) B'cst.
			5,005-5,060	W.W.	(b) Fx. (c) Land Mob.
			5,060-5,250	W.W.	(a) B'cst.
			5,250-5,430	1	(b) Fx. (c) Land Mob.
			5,430-5,480	1	(a) Aero. Mob. (OR)
			5,480-5,680	W.W.	(b) Fx. (c) Land Mob.
			5,680-5,730	W.W.	Aero. Mob. (R)
			5,730-5,950	W.W.	Aero. Mob. (OR)
			5,950-6,200	W.W.	Fx.
			6,200-6,525	W.W.	B'cst. M. Mob.
			6,525-6,685	W.W.	Aero. Mob. (R)
			6,685-6,765	W.W.	Aero. Mob. (OR)
			6,765-7,000	W.W.	Fx.
			7,000-7,100	W.W.	Amat.
			7,100-7,150	1	(a) Amat. (b) B'cst. B'cst.
			7,150-7,300	1	Fx.
			7,300-8,195	W.W.	M. Mob.
			8,195-8,815	W.W.	M. Mob.
			8,815-8,965	W.W.	Aero. Mob. (R)
			8,965-9,040	W.W.	Aero. Mob. (OR)
			9,040-9,500	W.W.	Fx.
			9,500-9,775	W.W.	B'cst.
			9,775-9,995	W.W.	Fx.
			9,995-10,005	W.W.	S. Freq.
			10,005-10,100	W.W.	Aero. Mob. (R)
			10,100-11,175	W.W.	Fx.
			11,175-11,275	W.W.	Aero. Mob. (OR)
			11,275-11,400	W.W.	Aero. Mob. (R)
			11,400-11,700	W.W.	Fx.
			11,700-11,975	W.W.	B'cst.
2,000-2,045	1	(a) Fx.	11,975-12,330	W.W.	Fx.
2,000-2,045	1	(b) Mob. except Aero. Mob. (R)	12,330-13,200	W.W.	M. Mob.
2,045-2,065	1	Met. Aids.	13,200-13,260	W.W.	Aero. Mob. (OR)
2,065-2,300	1	(a) Fx. (b) Mob. except Aero. Mob. (R)	13,260-13,360	W.W.	Aero. Mob. (R)
			13,360-14,000	W.W.	Fx.
2,300-2,498	1	(a) B'cst. (b) Fx. (c) Mob. except Aero. Mob. (R)	14,000-14,350	W.W.	Amat.
			14,350-14,990	W.W.	Fx.
			14,990-15,010	W.W.	S. Freq.
			15,010-15,100	W.W.	Aero. Mob. (OR)
			15,100-15,450	W.W.	B'cst.
2,498-2,502	1	S. Freq.	15,450-16,460	W.W.	Fx.
2,502-2,625	1	(a) Fx. (b) Mob. except Aero. Mob. (R)	16,460-17,360	W.W.	M. Mob.
			17,360-17,700	W.W.	Fx.
			17,700-17,900	W.W.	B'cst.
			17,900-17,970	W.W.	Aero. Mob. (R)
			17,970-18,030	W.W.	Aero. Mob. (OR)
2,625-2,850	1	(a) M. Mob. (b) M. R. Nav.	18,030-19,990	W.W.	Fx.
			19,990-20,010	W.W.	S. Freq.
2,850-2,850	1	(a) Fx. (b) Mob. except Aero. Mob. (R)	20,010-21,000	W.W.	Fx.
			21,000-21,450	W.W.	Amat.
			21,450-21,750	W.W.	B'cst.
2,850-3,025	W.W.	Aero. Mob. (R)	21,750-21,850	W.W.	Fx.
3,025-3,155	W.W.	Aero. Mob. (OR)	21,850-22,000	W.W.	(a) Aero. Fx. (b) Aero. Mob. (R)
3,155-3,200	W.W.	(a) Fx. (b) Mob. except Aero. Mob. (R)	22,000-22,720	W.W.	M. Mob.
			22,720-23,200	W.W.	Fx.
			23,200-23,350	W.W.	(a) Aero. Fx. (b) Aero. Mob. (OR)
3,200-3,400	W.W.	(a) B'cst. (b) Fx. (c) Mob. except Aero. Mob. (R)	23,350-24,990	W.W.	(a) Fx. (b) Land Mob.
3,400-3,500	W.W.	Aero. Mob. (R)			
3,500-3,800	1	(a) Amat. (b) Fx. (c) Mob. except Aero. Mob. (OR)	24,990-25,010	W.W.	S. Freq.
			25,010-25,600	W.W.	(a) Fx. (b) Mob. except Aero. Mob.
3,800-3,900	1	(a) Aero. Mob. (OR) (b) Fx. (c) Land Mob.	25,600-26,100	W.W.	B'cst.
			26,100-27,500	W.W.	(a) Fx.
3,900-3,950	1	Aero. Mob. (OR)			
3,950-4,000	1	(a) B'cst. (b) Fx.			
4,000-4,063	W.W.	Fx.	27,500-28,000	1	(b) Mob. except Aero. Mob.
4,063-4,438	W.W.	M. Mob.	28,000-29,700	W.W.	Met. Aids Amat.

# TRIO

*pacesetter in amateur radio*

## TR9500

**70 cm FM, SSB and CW multimode mobile**

The TR9500, a 70cm multimode mobile giving SSB, FM and CW operation in a compact rig based on the phenomenally successful 2 metre 9000. Combining the convenience of FM with the "DX ability" of SSB on the 70cm band this is the rig all discerning VHF and UHF amateurs have been waiting for. Used alongside your existing 2 metre equipment a new spectrum of contacts becomes available. Repeaters, satellite working simplex and with the addition of your 2 metre rig Duplex communications are at your finger tips. Of course the matching accessories SP120 speaker, BO-9 system base and PS20 power supply are all available to enable you to build a base station system second to none.

The TR9500 features:

- FM, USB, LSB and CW.
- Similar in size to the TR9000.
- Two digital VFOs.
- Multiple scan facilities for various modes.
- 6 memories, 5 for simplex or repeater shift — and the sixth memory for a non-standard offset.
- Digital frequency display.
- Covers 430 to 440 MHz.



- Up/down microphone for manual band scan.
- RIT (Receiver Incremental Tuning) for SSB and CW.
- RF gain control.
- Mobile mounting bracket.
- Led indicators for on air and busy.

**Optional Accessories**

- PS20 fixed station power supply.
- SP120 fixed station external speaker.
- BO9 system base — with power switch, send/receive switch, memory back-up power supply and headphone jack.

## TS530S

*building on proven success*

The all new TS530S is firmly based on the reputation of the TS520 series and incorporates many of the features of the superb TS830S. Included are the three new bands and, of course, the rig has both digital and analogue frequency readout. Also available for the TS530S is a complete range of matching station accessories, the SP230 speaker, the VFO240 and, of course, the AT230 antenna tuning unit.

TS530S features:

- Single conversion receiver and transmitter using 8.83 MHz. 1.F.
- LSB, USB and CW on 160-10 metres including the new 10, 18 and 24 MHz. bands.
- Built in digital display with 6 digits and also analogue dial.
- IF shift (passband tuning).
- RIT (Receiver Incremental Tuning) and XIT (Transmitter Incremental Tuning).
- Built in speech processor.
- Narrow and wide filter switching.
- Noise blanker threshold level control.
- Also retained are the rugged reliable 6146B PA valves and the easy to use controls.



**Optional Accessories**

- SP230 external speaker with selectable audio filters.
- VFO 240 external matching VFO.
- AT230 antenna tuner/SWR and power meter/antenna switch, 160 to 10 metres including the 3 new bands.

Have your thought about selling or trading in your QSL cards? Not so daft as it seems, since our collectomaniac Director — John Wilson — is willing to buy or trade in QSL cards. They must be postally used, in other words have stamps on, and been sent to you from abroad. Particular interests are cards from former African colonies and places like Ascension, St. Helena, and so on. If you are interested, why not contact John Wilson at Matlock; it's an easy way to turn waste paper into money.

### A DATE FOR YOUR DIARY AUGUST 15th LOWE ELECTRONICS' OPEN DAY

On Saturday, the 15th of August, here at Matlock, we are having our first Open Day. All the staff will be in attendance, including the back room boys and girls. You will have the opportunity to meet them and find out how we tick. Guided tours by G3PCY and G8GIY.

# LOWE SRX30D

*a familiar name, but a whole new receiver*



A familiar name, but a whole new receiver behind it. Building on all the excellent features of the SRX-30, including the drift cancelling system covering 500 KHz to 30 MHz; the selectable sidebands and AM; the easy to use tuning system; we now introduce the all new SRX30D which incorporates the suggestions made by our customers. Outstanding new features are:—

- Extended coverage 200 KHz - 30 MHz.
- Digital readout in large green display units which give true unambiguous frequency information — even when you switch sidebands or use the clarifier.
- All new frequency synthesis using Plessey SL6 1641 double balanced modular ICs for a new high standard of performance.
- All new audio system which produces outstandingly good quality on the built in speaker, and is capable of driving external hi fi speaker units for even better sound.
- All new IF filters with optimum bandwidth for mode in use. Automatic filter selection from mode switch.

There is so much that is impressive about the SRX30D that you have to see it and handle it to really appreciate the performance.

We predict that the SRX30D will be a landmark in low cost, high performance SWL receivers. Just consider how much you should pay for a receiver covering 200 KHz - 30 MHz with accurate digital readout; high performance USB/LSB/AM with switched filters; drift cancelling frequency synthesis; built in mains supply and built in speaker; high quality construction and advanced design — and so much more.

Then look at our price for the SRX30D and you will be even more impressed.

**£195.00 inc VAT, Securicor carriage £4.50.**

### *Accessories for the short wave listener.*

		Inc VAT	Carr
HF5	80-10m vertical. No radials required when on ground post.	48.50	4.50
EIS	Small egg insulator. Glazed ceramic 40 cm long	.30	.25
EIL	Large egg insulator. Glazed ceramic 50 cm long	.45	.36
SIL	Ribbed strain insulator for dipole end or centre. 70cm long	.35	.36
<b>MIZUHO</b>			
KX2	Top quality 500 KHz-30 mhz aerial tuner. Perfect match for R1000.	29.90	1.50
AX1	Aerial switching system. Handles 6 aerials & 6 receivers	27.03	1.00
APM1	Audio peak and notch filter. Variable bandwidth active filters	33.00	1.00
SR1	Mini rack for above the system	14.09	1.50
MP1	Rack mount for APM1	5.20	1.00

# TRIO

*pacesetter in amateur radio*



Trio 8400 the new way to 70cm FM module, a fully synthesized 430-440MHz 10 watt output, mobile transceiver with memories, 2 separate VFO's all in a truly amazing compact package. Complete with up/down frequency shift microphone and car mounting bracket, the TR8400 is the way to go... 70cm is on the move.

**TR8400 70 cm. FM mobile.**

**£279 inc. VAT. Securicor carriage £4.50.**



TR-9000 The exciting TR-9000 2-metre all-mode transceiver combining the convenience of FM with long distance SSB and CW in a very compact, very affordable package. Because of its compactness the TR-9000 is ideal for mobile installation; add on its fixed station accessories and it becomes the obvious choice for your shack.

**TR9000 2 metre multimode.**

**£345 inc. VAT. Securicor carriage £4.50.**



TR-7800 Trio's remarkable TR-7800 2-metre FM mobile transceiver provides all the features you could desire for maximum operating enjoyment. Frequency selection is easier than ever, and the rig incorporates new memory developments for repeater shift, priority, and scan. The TR-7800 by Trio, the only FM mobile.

**TR7800 2 metre mobile FM rig.**

**£268 inc. VAT. Securicor carriage £4.50.**

## HEAD OFFICE AND SERVICE CENTRE

Chesterfield Road, Matlock, Derbys. Tel. 0629 2817 or 2430.

Open Tuesday-Friday 9-5.30, Saturday 9-5.00. Closed for lunch 12.30-1.30.

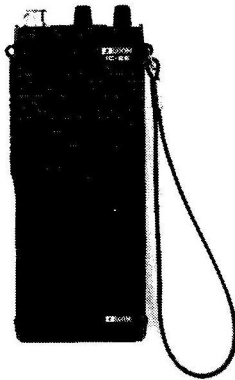
For all that's best in ham radio, contact us at Matlock.

For full catalogues send 48p in stamps with your address. Mark enquiry SWM.



# Thanet Electronics for **ICOM** the amateur's professional friends

**\* Buy direct from us and get two years warranty on all equipment \***



**It must be the most versatile portable available**

## IC-2E Handy Talky £159\*<sup>inc</sup>

**CHECK THE FEATURES**

**FULLY SYNTHESIZED** – covering 144-145.995 in 400 5kHz steps.  
**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.  
**BNC ANTENNA OUTPUT SOCKET** – 50 ohms for connecting to another antenna or use the Rubber Duck supplied.

**SEND/BATTERY INDICATOR** – Lights during transmit, but when battery power falls below 6V it doesn't light indicating the need for a recharge.  
**FREQUENCY SELECTION** – by thumbwheel switches, indicating the frequency.

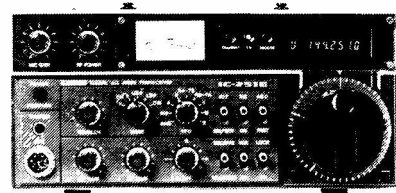
**+5kHz SWITCH** – adds 5kHz to the indicated frequency.  
**DUPLEX SIMPLEX SWITCH** – gives simplex or plus 600kHz or minus 600 kHz Transmit.  
**HI-LOW SWITCH** – reduces power output from 1.5W to 150mW reducing battery drain.  
**EXTERNAL MICROPHONE JACK** – If you do not wish to use the built-in 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.



## Enjoy VHF mobile at it's best-IC-260E

The IC-260E offers such extras as full frequency read out, upper and lower sideband, and scanning as well as FM and CW. Thus, it makes an ideal base station, when used with a DC power supply, as well as a mobile. Now supplied with up-down scanning mic.

**£339 inc\***



## Probably the Best 2M Multimode Base Station

Facilities include: FM, USB, LSB and CW. Built in scanner and memories. Bright green digital readout. Mains and 12 volt.

**only £479 inc\* IC 251E**

**On these, and all our other products:**

\* Free delivery for all transceivers, using registered first class post \* H.P. and Part Exchange welcome. All prices including V.A.T.

SEND FOR TECHNICAL DETAILS

Also available from our shop in Herne Bay are:

- \* MICROWAVE MODULES
- \* J-BEAM
- \* WESTERN
- \* ANTENNA SPECIALISTS
- \* RSGB PUBLICATIONS
- \* G-WHIP
- \* BEARCAT
- \* VIDEO GENIE COMPUTERS
- \* YAESU MUSEN

**IMPORTANT** We would like you to phone, or write to us so that we can give you as much detailed information as possible on any particular product. Use our 24 hour ansafone when calls are cheap.

**Thanet for**



**ICOM**

143 RECVLVER RD.,  
BELTINGE,  
HERNE BAY, KENT.  
Tel: 02273/63859



# A Great Little Baby

Covering all bands from 80m – 10m including the new ones.\* 13.8V DC operation. 100 watts RF output (40W on AM). \* TWIN VFO with in band duplex available \* Modes USB, LSB, CW and AM.\*

Digital readout with 3 tuning speeds down to 10HZ steps.\*

Noise blanker.\* Switchable preamp.\*

RIT\* IF Shift\* Dial lock and of course the usual SUPERB ICOM quality and performance.\*

**IC-730**

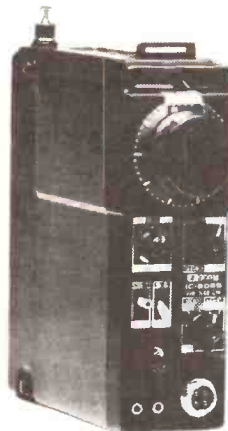
**£549\*  
inc**

Supplies will be slow at first so if you are interested, call us and get your name on the list for further details.



# The Portable Pair

**IC-202S £169inc\***



The IC-202S is a very well designed 2m SSB portable. It offers: 3W pep output on USB, LSB and CW. \* Large Battery capacity (HP11 type) or Nicads if you wish. \* A special VXO circuit to provide smooth tuning and crystal stability needed for SSB operation on 2m. \* Each of the four 200k Hz band positions allows operation anywhere in 2m. (Supplied with 144-144.2 and 144.2-144.4). \* Top of the band Oscar xtals available for "cross-pond working". \* It has a DC socket and SO239 sockets for mobile or base station working, barefoot or as a prime mover. \* Mobile mounting brackets, Nicad packs, chargers, cases all available options. You must agree, a very versatile well proved rig. The 70cm twin of the 202S having very similar features, covering the frequency range of 432-435.2 MHz. Their versatility is well worth an enquiry.

**All over the World  
they haven't been able  
to get enough!  
(But things are getting better)**



ICOM's new 9-band HF Transceiver – the IC-720A beats the lot!

Some features.

- \* 9 Bands Top Ten including new ones!
- \* General Coverage Receiver – 100KHz to 30MHz.
- \* Tuning down to 10Hz steps – YES! 10Hz – yet stable as a rock!
- \* Built-in Speech Compressor which really gets excellent reports.
- \* The famous ICOM Band Pass Tuning.
- \* Memory – it even does all the band changing for you.
- \* Self cancelling RIT.
- \* 3 rates of Tuning.
- \* Two Independent VFOs (in band duplex possible).
- \* 100 W Output.
- \* Modes AM,SSB,CW and RTTY.

A lot in a small packet for £795 inc. VAT (13.6V operation – matching mains PSU £100)

**IC-720A  
£795 inc\***

# IC-255E An experts mobile choice

**for only  
£255\*  
inc**



**NOW WITH  
IMPROVED  
FRONT-END**

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

- Crystal controlled Tone Burst
- Full band coverage – extendable to 148MHz if required
- Four digit LED display
- 25 Watts output or 1W low power
- A superb receiver using grounded gate FET front end
- Scanning over a user programmable range
- Memory scan
- Stop on empty or busy channels
- Tuning in 25kHz or 5kHz steps
- 5 Memories – retained while the power is connected to the rig
- Built-in 600kHz Repeater Shift
- Alternative programmable shift
- Reverse Repeater facilities
- RIT (± 3kHz for those off channel stations)
- Scan control from the microphone (optional mic available)
- Good loud audio
- Optically coupled tuning between control knob and CPU
- Multiway 24 pin socket on back for touchpad, computer, or external control
- Rugged modular PA (Guaranteed of course!)
- Mobile mount which can be padlocked
- Up-down scanning microphone available

**CAN YOU RESIST SUCH A TEMPTATION**

**Thanet for**



**ICOM**

TELEX : 965179



# Tono Theta 7000E A great computer on offer from Thanet

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

Some of the Outstanding Features  
COMMUNICATIONS COMPUTER THETA 0-7000E

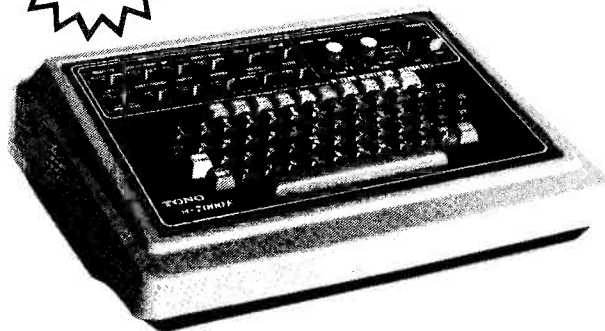
UHF and Composite Video Output \* Printer interface \* Wide range of transmitting and receiving speeds - 10CW speeds + BRTTY \* Built-in demodulator for high performance for 170, 425 and 820 Hz shift \* Crystal controlled modulator for ASFK - Hi or Lo tone \* Convenient ASCII key arrangement \* Large capacity display memory

- 2 pages 32chr x 16 lines split screen for Rx & Tx if required \* Automatic transmit/receive switch \* Anti-noise circuit \* Battery backed up memory 7 channels of 64chrs \* Send function \* Buffer memory - 53 character type ahead, rub out function \* Simultaneous access of the memory - 53 character type ah

LF (line feed) cancel function \* Cursor control function \* Word mode operation \* Automatic CR/LF (72, 60 or 80 chrs per line) \* Echo function \* Word Wrap around function \* Transmit/receive in ASCII mode or RTTY \* CW identification function \* Mark and break (space and break) system \* Monitor circuit & CW practice function \* Variable CW weights \* Cross pattern checking output terminal \* Log computer output provided \* Test message function (Ry and QBF).

Phone or write for the price list of accessories for this unit.

**FOR ONLY  
£640.00  
INC\***



# IC-451 UHF Base Station

ICOM are proud to announce the introduction of the 70cm version of their famous 2m base station - the IC-251. Of course, it is engineered to the usual high ICOM standards and includes such features as:-

- \* 3 memory channels
- \* Automatic repeater shift on switch-on
- \* Additional selectable shift for European DX
- \* Selectable channel steps for FM (supplied with 25KHz - others are diode programmable)
- \* Full power control on SSB/CW/FM
- \* Superb receiver performance using MOSFETS
- \* Multipurpose scanning
- \* Covers 430-440 MHz
- \* Xtal controlled Toneburst
- \* Cool running power supply

**\* £579 inc. V.A.T.**



# IC 240 → IC24G Same Quality... Same Performance... Even the same price... But now with 80 Channels



For a Limited Period Only

**£169 inc\***

The famous IC240 has been approved, given a face lift, and re-named the IC24G. Many thousands of 240s 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 IC24G 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 crystal controlled tone call. Hi-10w and lo-1w RF output is available, along with a 12½ KHz upshift, should the new channel spacing be necessary. The old IC240 proved to be the most reliable rig we have ever sold - the IC24G, 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

**STOP PRESS!  
At last a Linear!**

IC2KL Matching Kilowatt Linear.  
\* All solid state \* All bands 1.8 MHz to 30 MHz \* Full 500W RF output \* Switches bands automatically with 720A \* Protection against mismatching, overheating, overcurrent, overdriving and the P.A. units unbalancing.  
\* Broad band - no tuning necessary  
\* Appearance matches IC701, 720, 720A. Price £800 inc. VAT  
Matching Power Supply IC2KLPS £199 inc. VAT.

\* denotes 2 year warranty.

AGENTS (PHONE FIRST - All evenings and weekends only)

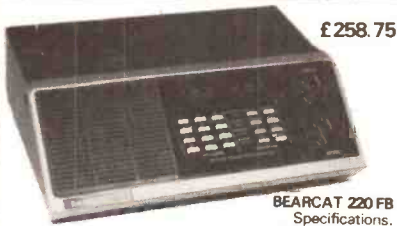
Scotland Jack GM8GEC (031-665-2420) Midlands Tony G8AVH (021-329 2305)  
Wales Tony GW3FKO (0874 2772) North West Gordon G3LEQ (Knutsford (0565) 4040)  
(Ansafone now available)



# STEPHENS-JAMES LTD.

47 WARRINGTON ROAD, LEIGH, LANCs. WN7 3EA **G3MCN**

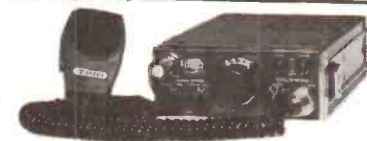
Telephone (0942) 676790



£258.75

### BEARCAT 220 FB

Specifications:  
Frequency range:  
Low Band Mobile..... 66-88MHz  
Aircraft..... 118-136MHz  
Amateur Band..... 144-148MHz  
Public Service & Marine..... 148-174MHz  
UHF Amateur..... 420-450MHz  
UHF Band..... 450-470MHz  
UHF Band..... 470-512MHz



### TR2300

TR2300 2m Synthesised Portable Transceiver. We have lost count of the number of this model we have sold over the last 12 months. Hikers, campers, climbers, you can hear them all over the country and reliability which is the essence of TRIO equipment. £166.75

JAYBEAM		
5Y/2m 5 element yagi.....	£11.27	
8Y/2m element yagi.....	£14.49	
10Y/2m 10 element.....	£31.05	
PBM/14/2m 14 element Parabeam.....	£44.80	
5XY/2m 5 element crossed yagi.....	£22.77	
8XY/2m 8 element crossed yagi.....	£28.40	
10XY/2m 10 element crossed yagi.....	£37.72	
Q4/2m 4 element Quad.....	£23.69	
Q6/2m element Quad.....	£31.39	
D5/2m 5 over 5 slot fed yagi.....	£20.12	
D8/2m 8 over 8 slot fed yagi.....	£27.40	
UGP/2m ground plane.....	£10.12	
MBM48/70cms Multibeam.....	£28.75	
MBM88/70cms Multibeam.....	£39.33	
TAS % 2m Whip mobile.....	£15.29	
C5m Colinear.....	£44.27	
C8/70cm Colinear.....	£50.00	
D15/1296 23cm Antenna.....	£34.04	
Carriage on Antennas	£4.50	



### TR7800

Continuing TRIO's policy of presenting the Radio Amateur with the finest equipment available, we were pleased to announce the NEW TR7800 2m FM Mobile Transceiver. 15 memory channels - Priority channels with simplex ±600 KHz or non-standard operation - "Priority alert" bleeps when signal on M14 priority channel. Frequency coverage 144.00, 145.955 in switchable 5 KHz or 25 KHz steps. Front keyboard for selecting frequencies, programming memories and controlling scan function. ALL THIS and MORE for £268.50.



### TRIO R1000

R1000 Receiver £285.20  
The latest general coverage from Trio. Frequency coverage 200 KHz to 30 MHz in 30 bands. Using an advanced PLL system. Full digital readout. Three filters 12 KHz for AM - 6 KHz narrow AM and 2.7 KHz SSB. Also incorporates a noise blanker. Operation is from 100-240 V AC or 12 V DC.



### TR9000

The TR9000 is a compact lightweight 2 mtr. FM USB/LSB/CW Transceiver with an outstanding array of functions. FM1 for 25 KHz steps (for mobile use) FM2 for precise 100 Hz steps (for base station use). Microcomputer control giving many advanced features. Built in 5-channel memory. New type microphone with UP/DOWN switching. Built in high performance. N. Blanker. Side tone for CW. ALL THIS PLUS MUCH MORE FOR £346.00 inc. VAT.

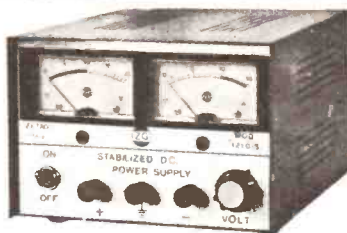
TRIO		
R820 Receiver.....	£690.00	
SP820 Speaker.....	£37.95	
SM220 Monitorscope.....	£197.80	
TL922 Linear Amplifier.....	£595.00	
PS-20 AC power supply for TS 120V.....	£44.85	
MB 100 Mobile mounting bracket.....	£17.25	
R1000 Receiver.....	£298.00	
TR2300 2m. Portable Transceiver.....	£166.75	
TR2400 Hand Held 2m. Transceiver.....	£198.00	
TL 120 Linear Amplifier.....	£128.80	
HS5 Headphones.....	£21.85	
HS4 Headphones.....	£10.35	
MC50 Desk Microphones.....	£24.15	
MC30S Hand Microphone 50K.....	£13.80	
TS 130V HF Transceiver.....	£404.34	
TS 130S HF Transceiver.....	£491.05	
AT 130 Antenna Tuner.....	£72.89	
PS 30 Power Supply.....	£85.10	
SP 100 Speaker.....	£26.45	
AT230 Antenna Tuner.....	£106.72	
SP230 Speaker.....	£33.14	
SP40 Mobile Speaker Unit.....	£26.89	
TR8400 UHF Transceiver.....	£279.00	



### R820 RECEIVER

THE ULTIMATE IN RECEIVERS

Frequency coverage 160-10m plus SW Broadcast Bands. All modes CW-USB-LSB-RTTY. Digital Readout. Noise Blanker. Fully variable. I.F. Bandwidth, plus Bandpass tuning, plus rejection notch filter. £690.00



### MOD. 1210 S

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Model	Maximum ratings quoted. Prices include postage.	
Model 125 10-15V 5amp.....	£29.50	
Model 156S 4-15V 5amp Twin Meter.....	£40.00	
Model 1210S 4-20V 10amp Twin Meter.....	£75.00	
Model 1210/1 10 amp 13V.....	£68.00	
Model 1220/1 13.5V 20amp.....	£90.00	
Model 1220/2 13.5V amp.....	£80.00	

### RECEIVERS AND TRANSCEIVERS

(inc. VAT and Postage)		
SR9 Tunable 144-146MHz Receiver.....	£46.00	
R512 Aircraft Band Scanning Receiver.....	£135.00	
Regency Digital Flight Scan Synthesised Aircraft Band Receiver.....	£215.00	
yaesu FRG7 Receiver.....	£199.00	
'Sky ACE' Hand Held Aircraft Band Receiver.....	£49.50	
AR22 2m Hand Held Receiver.....	£83.00	
SX200N Scanning Receiver.....	£264.75	
FDK 700EX Transceiver.....	£199.00	
FDK 750E Transceiver.....	£299.00	
Standard G78 UHF Transceiver.....	£209.00	
Bearcat 220FB Scanner Receiver.....	£258.75	



### J.R.C. NRD515D

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TR7 Digital Transceiver.....	£1,035.00
PS7 Power Supply.....	£207.00
RV7 Remote VFO.....	£136.00
MS7 Speaker.....	£29.90
R7 Digital Receiver.....	£969.00
Filters for TR7.....	£39.10
FA7 Fan for TR7.....	£20.70
MN7 ATU/RF Meter 250Watts.....	£124.20
MN2700 ATU 2 KW.....	£207.00
DL 300 Dummy Load 300Watts.....	£20.70
DL 1000 Dummy Load 1 KW.....	£37.95
TV 3300 Low Pass Filter.....	£18.40
AK75 Doublet Antenna 132' top with 470 ohm Feeder.....	£23.00

### TRIO TS530S NEW ALL BAND HF TRANSCEIVER



### TS830S HF SSB TRANSCEIVER AROUND £640 inc VAT

The new TS830S, the latest from TRIO. A high performance, very affordable HF SSB/CW transceiver with every conceivable operating feature built in for 160 through 10metres (including the new three bands). The TS830S combines a high dynamic range with variable bandwidth tuning (VBT), IF shift and an IF notch filter, as well as very sharp filters in the 455 KHz second IF. Together with the optional VFO230 (remote digital display VFO) which provides split frequency operation and 5 memories for frequency hold, the amateur has available today's advanced technology linked to the proven reliability and exceptional linearity of a valve PA.

- ★ VBT variable bandwidth tuning
- ★ IF notch filter
- ★ IF Shift
- ★ Various filter options
- ★ Built in digital display
- ★ 6146B final with RF negative feed-back
- ★ Optional Digital VFO for increased flexibility
- ★ Innovative PLL system of frequency generation
- ★ RF speech processor
- ★ Adjustable noise blanker level
- ★ Adjustable audio tone
- ★ RF attenuator
- ★ RIT/XIT
- ★ SSB monitor circuit
- ★ Expanded frequency coverage

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<b>TRIO</b>			<b>YAESU NEW FM FT101's JUST ARRIVED WITH FM</b>			<b>MICROWAVE MODULES</b>		
TS830S	160-10m transceiver	639.52 (4.50)	FT101Z	160-10m 9band trans. FM	502.00 (n/c)	MMT28/144	10m linear transverter	99.00 (1.75)
VFO230	Digital VFO	194.45 (4.50)	FT101ZD	as above with digital FM	569.00 (n/c)	MMT144/28	2m linear transverter	99.00 (1.75)
AT230	All band ATU	106.72 (1.50)	DIG101Z	Digital kit	86.25 (n/c)	MMT432/28-S	70cm linear transverter	149.85 (1.75)
SP230	External speaker	33.14 (1.50)	DCT101Z	12v DC adaptor	34.50 (1.00)	MMT432/144-R	70cm linear transverter	184.00 (1.75)
DS2	Dc pack for TS830S	39.90 (1.50)	RV107M	Remote VFO	121.90 (n/c)	MMT70/28	4m linear transverter	115.00 (1.75)
DRC230	Digital frequency controller	163.13 (1.50)	FV107	160-10m 9 band trnsvr.	690.00 (n/c)	MMT70/144	4m linear transverter	115.00 (1.75)
YK88C	500Hz CW filter	26.45 (1.00)	FC107	Remote VFO for FT107	102.35 (1.50)	MMT1296/144Z	23cm linear transverter	184.00 (2.25)
YK88CN	270Hz CW filter	28.75 (1.00)	FP107E	230v AC power supply	106.95 (2.50)	MML144/25	2m 25 watt linear amplifier	59.00 (1.75)
TS530	160-10 metre transceiver	t.b.a. (4.50)	FP107	Internal model	97.75 (2.50)	MML144/40	2m 40 watt linear amplifier	77.00 (1.75)
DG5	Digital readout	103.50 (1.50)	FTV107	Transverter main frame	110.40 (n/c)	MML144/100	2m 100 watt linear amplifier	142.60 (2.75)
SP530	Speaker	t.b.a. (1.50)	FTV107/2	Transverter	207.00 (n/c)	MML144/100P	2m 100 watt linear amplifier	142.60 (2.75)
VFO520S	External VFO	98.90 (4.50)	FTV107/21	Transverter	101.20 (n/c)	MML432/20	70cm watt linear amplifier	77.00 (1.75)
YG3395C	CW filter 8 pole	37.95 (0.50)	50V107V901	Transverter	69.00 (n/c)	MML432/50	70cm 50 watt linear amplifier	119.00 (2.75)
DK520	Conversion kit	10.35 (0.75)	430V107V901	Transverter	175.95 (n/c)	MML432/100	70cm 100 watt linear amplifier	228.65 (2.75)
SM220	Station monitor scope	197.80 (4.50)	SP107P	External speaker	57.50 (2.50)	MM2000	RTTY to TV converter	169.00 (1.75)
BS8	Panoramic display	48.30 (0.50)	SP107	External speaker	27.60 (2.00)	MMC28/144	10m converter	27.90 (0.65)
BS5	Scan board	48.30 (0.50)	DMST107	12 channel memory	88.15 (n/c)	MMC50/28	6m converter	27.90 (0.65)
R820	Amateur band receiver	690.00 (4.50)	CW	CW filter for FT107	23.00 (0.50)	MMC70/28	4m converter	27.90 (0.65)
YG455C	500Hz CW filter	58.65 (0.50)	AM	AM filter for FT107	23.00 (0.50)	MMC70/28L0	4m converter	29.90 (0.65)
YG455CN	270Hz CW filter	60.95 (0.50)	YM34	Desk mic for FT707/FT107	18.90 (1.50)	MMC144/28	2m converter	29.90 (0.65)
YGB8A	6kHz AM filter	34.50 (0.50)	YM35	Up/down mic for	12.65 (0.75)	MMC144/28L0	2m converter	29.90 (0.65)
TS180S	160-10m solid state trans.	679.65 (4.50)	YM36	500 ohm noise canclg. mic.	11.90 (0.75)	MMC432/28-S	70cm converter	34.90 (0.65)
VFO180	External VFO	96.60 (1.50)	YM37	500 ohm mic for FT707/FT107	6.15 (0.75)	MMC432/144-S	70cm converter	34.90 (0.65)
SP180	External speaker unit	36.80 (1.50)	FT707S	80-10m 8 band trans 10w	465.75 (n/c)	MMC435/51	70cm ATV converter	27.90 (0.65)
AT180	Matching 200W ant. tuner	95.45 (4.50)	FP707	80-10m 8 band trans 100w	479.00 (n/c)	MMC435/600	70cm ATV converter	32.20 (0.65)
YK88C	500Hz CW filter	26.45 (1.00)	FP707	230v AC PSU	109.25 (2.50)	MMK1296/144Z	23cm converter, 10m output	59.80 (1.75)
YK88S	Second SSB filter option	26.45 (1.00)	FC707	160-10m atu	80.50 (1.50)	MMK1296/144Z3cm	converter, 2m output	69.00 (0.65)
PS30	AC power sply. for TS180S	85.00 (4.50)	FV707DM	Digital vfo for FT707	186.30 (n/c)	MMD050/500	500mhz digital frqncy meter	23.00 (0.65)
TS130S	8 band 200W mobile trans.	491.05 (4.50)	MR7	Metal rack	14.95 (1.50)	MMD800P	600 mhz prescaler	11.50 (0.65)
TS130V	8 band 20W mobile trans.	404.00 (4.50)	MMB2	Mobile mount	16.10 (1.50)	MMDP1	Frequency counter probe	14.95 (0.65)
DFC230	Digital frequency controller	163.00 (1.50)	FRB707		21.85 (1.00)	MMA144V	10m preamplifier	34.90 (0.65)
TS120S	80-10m 200W mobile trans.	399.00 (4.50)	FL2100Z	160-10m 1200 watt linear	385.00 (n/c)	MMA1296	23cm preamplifier	29.90 (0.65)
TS130V	20W mobile trans.	404.00 (4.50)						
TL120	200W pep linear	128.80 (4.50)						

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MB100	Mobile mount	17.25 (1.00)	YP150	150w dummy load/meter	83.00 (1.75)	MMF144	2m filter	9.90 (0.65)
YK88C	500Hz CW filter	26.45 (0.50)	YH55	8 ohm comm. headphones	9.95 (1.25)	MMF432	70cm filter	9.90 (0.65)
YK88CN	270Hz CW filter	28.75 (1.00)	FF501	Low pass filter	19.95 (0.75)	MMV1296	70cm to 23cm varactor tripler	34.50 (0.65)
VFO120	External VFO	89.70 (4.50)	QTR24D	24 hour quartz clock	25.70 (1.50)	MMS384	384mhz frequency source	27.60 (0.65)
SP120	External speaker unit	25.30 (1.25)	FP12	230v AC 12 amp DC	78.20 (2.50)	MMR15/10	15db atten. BNC terminations	9.90 (0.65)
SP40	Mobile speaker unit	26.89 (1.50)	FP4	230v AC 4 amp DC	41.40 (2.50)	<b>JAYBEAM ANTENNAS</b>		
AT130	100W antenna tuner	72.89 (1.50)	FRG7	0.5-30 MHz comm. receiver	189.00 (n/c)	TB3	HF 3 element Tribander	167.90 (4.50)
PS20	AC pwr. sply. for TS120/130V	44.85 (4.50)	BHGR7	Battery holder	5.00 (1.00)	VR3	HF Vertical Triband	42.50 (3.00)
PS30	AC pwr. sply. for TS120/130S	85.10 (4.50)	FRG7700	1981 version of FRG7000	309.00 (n/c)	<b>4 metre Antennas</b>		
MA5	5 band mobile aerial system	74.75 (4.50)	MEM	MEM with frequency memory	380.00 (n/c)	4Y/4M	4 element yagi	20.70 (3.00)
TL922	160-10m 2KW linear	695.70 (4.50)	FRG7700			PMH2/4M	2 way phasing harness	12.20 (1.00)
MC50	Deluxe desk microphone	24.15 (1.50)	FRG7700			<b>2 metre Antennas</b>		
MC35S	Fist mic 50K impedance	13.80 (1.00)	FT480R	Plug in memory	83.95 (n/c)	DC1/VWB	Wide band discone (100-470MHz)	41.40 (2.50)
MC30S	Fist mic 500 ohm impedance	13.80 (1.00)	FP80	2m 10w SSB/CW/FM trans PSU for FT480R	359.00 (2.00)	LR1/2M	Vertical colinear	24.15 (2.50)
LF30A	HF lowpass filter	18.40 (1.00)				C5/2M	5db glass fibre colinear	44.30 (3.50)
RD300	1KW dummy load	48.30 (1.50)				5Y/2M	5 element	11.25 (2.00)
SP770E	2m/70m dual band trans.	730.00 (4.50)				8Y/2M	8 element	14.50 (2.50)
SP70	External speaker	18.40 (1.00)				10Y/2M	10 element	31.00 (3.50)
TR9000	2m multimode mobile	345.00 (4.50)				PBM10/2M	10 element Parabeam	36.80 (3.50)
BO9	Base plinth for TR9000	32.20 (4.50)				PBM14/2M	14 element Parabeam	44.65 (4.50)
TR7800	2m FM syntsd mobile 25W	268.00 (4.50)				5X/Y/2M	Crossed 5 element	22.75 (3.00)
TR2300	2M FM syntsd portable	166.75 (4.50)				8X/Y/2M	Crossed 8 element	28.40 (3.50)
VB2300	10W amplifier for TR2300	49.45 (1.50)				10X/Y/2M	Crossed 10 element	37.70 (4.00)
MB2	Mobile mount	17.25 (1.00)				X6/2M/X12/70cm	Dual band	38.50 (4.50)
RA1	Rubber flex. antenna	6.90 (0.50)				PMH/2C	2 way phasing harness	7.50 (0.75)
PS1200	AC power unit and charger	29.50 (1.50)				Q4/2M	4 element quad	23.70 (2.50)
TR2400	2M FM syntsd handheld	198.95 (4.50)				Q6/2M	6 element quad	31.40 (4.50)
ST1	Base stand and quick chgr.	43.70 (1.50)				D5/2M	Double 5 slot-fed	20.15 (2.50)
BC5	12V quick charger	17.25 (1.50)				D8/2M	Double 8 slot-fed	27.15 (4.00)
SC3	Soft carrying case	11.50 (0.50)				UVGK/2M	Kit for vertical pol.	7.25 (1.50)
LH1	Hard leather holster	18.50 (0.50)				SVM/2M	Ground plane	10.15 (1.50)
PB24	Spare battery pack	14.26 (1.50)				HO/2M	Mobile 'halo' (head only)	4.50 (1.50)
TR3200	70cm FM portable	164.45 (4.50)				MMH/2M	Mobile 'halo' with mast	5.40 (1.75)
PL1	Spare power/charge lead	1.30 (0.50)				PMH2/2M	2 way phasing harness	9.90 (1.00)
R1000	Gen. Coverage Receiver	285.20 (4.50)				PMH4/2M	4 way phasing harness	23.00 (1.75)
TR8400	70cm trans. 430-440 MHz	£279 (4.50)						



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<b>70cm Antennas</b>											
CB/70cm	8dB colinear	50.00	(3.50)	CDE AR40 (5 core cable)	59.80	(1.50)	BEARCAT 220FB 66-512mHz	258.00	(n/c)		
DB/70cm	Double 8 slot-fed	20.70	(2.50)	Channelmaster 9502 (3 core)	42.00	(2.00)	SX200 26-512mHz	240.00	(n/c)		
PBM18/70cm	18 element Parabeam	25.30	(2.50)	Sky King SU4000 (6 core)	75.00	(2.50)	SR9 Tuneable 144-148 or 156-162mHz	46.00	(n/c)		
MBM48/70cm	48 element Multibeam	28.75	(3.00)	Jaybeam KR400 (6 core)	99.00	(2.00)	AR22 2m FM synthesized handheld	83.00	(n/c)		
MBM88/70cm	88 element Multibeam	39.30	(4.50)	CDE alignment bearing	7.75	(1.00)	AR22 flexible antenna	3.00	(n/c)		
8XY/70cm	Crossed 8 element	34.15	(3.50)	Channelmaster alignment bearing	11.75	(1.00)					
12XY/70cm	Crossed 12 element	42.32	(4.50)								
PMH2/70cm	2 way phasing harness	8.50	(1.00)								
PMH4/70cm	4 way phasing harness	18.00	(1.50)								
<b>23cm Antenna</b>											
D15/1296	Double 15 slot-fed	34.00	(1.50)								
PMH2/23cm	2 way phasing harness	25.40	(1.00)								
<b>Matching Transformer</b>											
MT75/50	75/50 ohms	3.60	(0.50)								
<b>Chimney Lashing Kit</b>											
DL	Double lashing kit	8.25	(2.00)								
<b>Wall Brackets</b>											
W6	6" wall bracket	2.65	(1.00)								
W21	21" wall stand-off bracket	10.35	(3.00)								
W24HD	24" wall stand-off bracket	14.70	(4.50)								
<b>Masts (Aluminium)</b>											
SPM	16' x 1" Portable Mast	15.15	(3.00)								
PME	4' extension	2.50	(2.00)								
A4	4'6" x 1 1/2" straight	3.80	(1.50)								
A5	5' x 1" straight	2.30	(1.50)								
A9	9' x 1 1/2" straight	6.50	(2.50)								
A10	10' x 2" straight	12.55	(2.50)								
A12	12' x 2" straight	14.95	(2.50)								
A14	14' x 2" straight	17.40	(3.00)								
<b>AZDEN EQUIPMENT</b>											
PCS3000	2m 25W transceiver	219.00	(n/c)								
PCS2800	10m 10W transceiver	179.00	(n/c)								
5m remote cable kit		25.00	(n/c)								
<b>AERIAL ROTATORS (complete with control boxes)</b>											
CDE AR30	(5 core cable)	47.00	(1.50)								
<b>ADONIS MICROPHONES</b>											
AM202G	Mobile safety mic	20.95	(n/c)								
AGM202S	Mobile safety mic	20.95	(n/c)								
AM202H	Mobile safety mic	29.00	(n/c)								
AM502G	Base station comp. mic	39.00	(n/c)								
AM802G	Base station 3 outputs	59.00	(n/c)								
<b>HF ANTENNAS (various manufacturers)</b>											
Mini-Prdts HQ-1	20/15/10m 2 ele.	99.00	(2.50)								
Mini-Prdts C4	20/15/10m vertical	49.00	(2.00)								
Mosley TD3JR	20/15/10m wire dipole	34.50	(1.50)								
Mosley "Mini-Beam"	20/15/10m 2 ele. 600w	99.00	(2.00)								
Mosely "Mini-Beam"	20/15/10m 2 ele. 2Kw	129.00	(2.00)								
Mosely TA32	20/15/10m 2 ele. 600w	89.70	(2.00)								
Mosely TA33	20/15/10m 3 ele. 600w	33.40	(2.50)								
Mosely Mustang	20/15/10m 3 ele. 2Kw	166.75	(4.00)								
Hy-Gain 12AVQ	40/10m vertical	43.00	(2.00)								
Hy-Gain 14AVQ	40/10m vertical	60.00	(2.00)								
Hy-Gain 18AVT/WB	80/10m vertical	87.00	(2.50)								
HF580	10m vertical 200w	48.00	(2.00)								
Radial Kit	for HF5	28.00	(2.00)								
Sagant EL40X	80-40 dipole (79" long)	36.00	(1.50)								
Jaybeam TB3HF	3 element 2Kw	167.90	(4.50)								
Jaybeam VR3HF	vertical 2Kw	42.50	(3.00)								
<b>2 METRE PORTABLES</b>											
SB2M	2m SSB portable	99.00	(1.50)								
AR245	(previously AR240A) 2m FM 5w	178.00	(1.50)								
AR245	optional case	4.10	(0.50)								
AR245	carrier helical	4.10	(0.50)								
AR245	12v DC car adaptor	4.10	(0.50)								
<b>VHF/UHF MONITORS</b>											
TM56B	FM Scanner 12v DC/230v AC	79.00	(n/c)								
008	8 channel FM monitor	69.00	(n/c)								
M161	16 channel FM monitor	59.00	(n/c)								
MF083	Marine/Broadcast scanner	85.00	(n/c)								

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**TRIO TS530**  
 Budget HF transceiver  
**YAESU FT290**  
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**WELZ PROFESSIONAL POWER/SWR METERS**  
 SP200 1.8-160mHz 20w-200w-1Kw ..... 49.95 (n/c)  
 SP300 1.8-500mHz 20w-200w-1Kw ..... 69.95 (n/c)  
 SP400 130-500mHz 5w-20w-150w ..... 49.95 (n/c)

**SHORT WAVE LISTENER AERIALS**  
 3-30MHz Inverted "L" ..... 9.95 (1.00)  
 3-30MHz Broad band dipole ..... 29.00 (1.00)  
 Mosley RD5 all-band dipole ..... 40.00 (1.00)

**AIR BAND PORTABLE MONITORS**  
 Sharp FX213 tuneable ..... 13.50 (0.75)  
 INGERSOLL MW/FM/Airband monitor ..... 12.95 (0.75)  
 R517 Professional Air Monitor ..... 49.50 (0.75)

## OUR PERSONAL SELECTION FROM TRIO RANGE

**TRIO TS830S £639.52**



A brand new model having all nine bands fitted and providing 200 watts input SSB/CW. Built-in 230V ac supply, 6146B tubes and full digital and analogue display. Plus a really comprehensive variable selectivity and notch filtering system. The DX'er's dream.

**TRIO TS130S £491.05**



Base or mobile this solid state HF transceiver covers eight bands SSB/CW with a genuine 10C watts output. No tune up, IF tuning and speech processing are just a few of its features. 12V dc operation with full digital display plus optional PS3C for 230V ac operation.

**TR2300 £166.00**



The TR2300 still amazes us at its value for money. Portable, mobile or base station it is equally at home in all 3 situations. 1 watt 80 channels complete with ni-cad ac charger. An ideal rig for the beginner.

**TRIO R1000 £285.20**



The receiver that revolutionised short wave listening. Full 30 band coverage 200kHz to 30MHz SSB/CW/AM. Both digital and analogue readouts are provided together with 230V or 12V dc operation facilities. Trio engineering at its best and at a very competitive price.

**TRIO TR9000 £345.00**



An all mode 2 metre transceiver that serves the dual roll of mobile and base station. Features include digital readout, 12½ or 25kHz steps in FM, five memories band scanning and a lot more! Send for coloured leaflet.

**TRIO TS530S £505.00 inc. VAT**



At last a budget priced HF transceiver with a lot of extra features built in. 9 bands, SSB, CW, digital readout, speech processing etc. Get your orders in now at this super price!

MONDAY — SATURDAY 9 - 5.30      **WATERS & STANTON ELECTRONICS**      EARLY CLOSING WED 1.00 p.m.  
**WARREN HOUSE, 18/20 MAIN ROAD, HOCKLEY, ESSEX**      Telephone (0702) 206835/204965      Telex 897406  
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**MAIL ORDER SLIP to: Waters & Stanton Electronics, Warren House, Main Road, Hockley, Essex. "Such Friendly People"**

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

Address .....

Please rush me the above. Cheque enclosed for £ .....

Please charge to credit card No. ....

**SMC SERVICE**

Free Finance on many items. Two year guarantee on Yaesu. Free Securicor on major Yaesu items. Access and Barclaycard over the telephone. Biggest Branch, Agent and Dealer network. Aply staffed, courteous, Service Department. "B Services" Securicor contract at £3.50! Biggest stocks of amateur equipment in UK. Twenty-two years of professional experience. No item too small — no minimum orders.

**GUARANTEE**

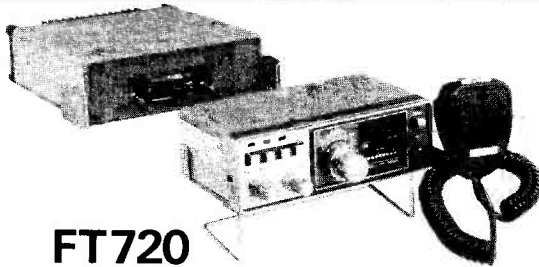
Yaesu's own warranty does not extend outside Japan. Repairs are the responsibility of the UK dealer selling the set. SMC's two year guarantee is backed, as UK distributors, by daily contact with the factory and many tens of thousands of pounds of spares and test equipment. Avoid-hawkers offering sets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

**FREE FINANCE**

On regular priced items from: Yaesu, Ascot SMCHS, CDE, HyGain, Channel Master, Hansen, SMC, MFJ, KLM, Mirage and Hy 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!!

**YAESU MUSEN**

As UK Agents, we show on the next 4 pages: 2 VHF/UHF FM mobiles, 4 VHF/UHF multimodes, 4 HF transceivers, 4 VHF/UHF Handhelds, not forgetting our 2 general coverage HF receivers. Whatever your interest we must have something for you. The problem is choice... (P.S. we don't forget the accessories — check out our recent advertisements for a smattering of our range).

**FT720**

**FT720 Control Head. . . . . £120.00 inc.**

- ★ Four easy write-in memory channels
- ★ Rx priority channel (auto check)
- ★ Scanning of band or memory channel
- ★ Up/down tuning/scanning from mic.
- ★ Scanning for empty or occupied channels
- ★ Optically coupled tuning control
- ★ Easy selection of up/simplex/down
- ★ Manual and automatic tone burst
- ★ String LED's for 'S' and PO. Seven status LEDs
- ★ 1½ W of audio to internal/external speaker
- ★ 3.3 (4.3) " D x 6" W x 2 (2.2) " H
- ★ **MMB3** Bracket for deck option. . . . . **£5.00 inc.**
- ★ **720RV** 10W, 2M deck. . . . . **£133.00 inc.**
- ★ **720RVH** 25W, 2M deck. . . . . **£143.00 inc.**
- ★ 144-146MHz (144-148MHz possible)
- ★ 12½ KHz synthesizer steps
- ★ ±600KHz repeater offset
- ★ 0.3µV for 20dB quieting
- ★ Rx 0.5A, Tx RV 3.5A, RVH 6.5A
- ★ 5.8 (6.5) " D x 6" W x 2 (2.2) " D
- ★ **720RU** 10W, 70cm. deck. . . . . **£156.00 inc.**
- ★ 430-434MHz
- ★ 25KHz synthesizer steps
- ★ 1.6MHz repeater shift
- ★ 0.5µV for 20dB quieting
- ★ Rx 0.5A, Tx 4.5A
- ★ 5.8 (6.5) " D x 6" W x 2 (2.2) " D
- ★ **E72S** Extension cable 200cms. . . . . **£23.00 inc.**
- ★ **E72L** Extension cable 400cms. . . . . **£28.00 inc.**
- ★ **S72** Switching box. . . . . **£56.00 inc.**
- ★ Permits control head with two decks
- ★ Single button change of band
- ★ Auto change of synthesizer steps
- ★ Auto change of repeater split

**FT720RV 10W 2 metre**  
**£253 inc.** VAT @ 15%  
 & SECURICOR



- ★ Covers 144 to 146 or 148MHz
- ★ 25/3 watt or 10/1 watt model (s)
- ★ CPU controlled digital synthesiser
- ★ 10KHz (+ 5KHz up) synthesised steps
- ★ Optional 25KHz steps in St version
- ★ 6 digit readout & memory channel number
- ★ Main tuning, by optically coupled encoder
- ★ Up/down tuning/scanning from microphone
- ★ Scanning for empty or occupied channels
- ★ Band scanning up or down the band
- ★ Four normal memory channels
- ★ Further memory for 'odd' split
- ★ Can scan memory channels only
- ★ ± 600KHz plus any split (to 4MHz)
- ★ Sub audio tone squelch option
- ★ Manual (EU) and Auto (UK) tone burst
- ★ High or low (1/10) power switch
- ★ Low noise mosfet RF stage
- ★ LED's for: — 'on Air' and 'Busy channel'
- ★ VSWR and reverse polarity protection
- ★ Punch in frequency on keyboard mic (K)
- ★ 0.5A Rx, 2.5A LTx, 6 A HTx (25)
- ★ 13.6 volts DC±10%
- ★ Case; 7" wide, 2¾" high, 10½" deep
- ★ Sensitivity: 1.3 µV for 20dB (2:1 SF)
- ★ Selectivity: 12KHz @ -6dB (2:1 SF)
- ★ AF output: 1.5W into 8 ohms
- ★ Spurious Emissions: better than -60dB
- ★ Tone frequency: 1750Hz (Auto/man)
- ★ CPU2500R 25W, standard mic. £250.00 inc.
- ★ CPU2500RS 10W, standard mic. £235.00 inc.
- ★ CPU2500RK 25W, keyboard mic. £260.00 inc.
- ★ CPU2500RKS 10W, keyboard mic. £245.00 inc.
- ★ SMC STEPPER installed in above add £20.00 inc.
- ★ WMT2500 workshop manual £5.00

**CPU2500RS 10W 2 metre**  
**£235 inc.** VAT @ 15%  
 & SECURICOR

**SOUTH MIDLANDS COMMUNICATIONS LIMITED**

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GM8GEC	Jack	Edinburgh	(031665) 2420
G13WVY	Mervyn	Tandragee	(0762) 840656
GW3TMP	Howarth	Pontybodkin	(035287) 846/324
GW8EBB	Peter	Swansea	(0792) 872525
GJ41CB	Geoff	Jersey	(0534) 26788
G4EQS	Simon	Redcar	(0642) 480808

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 Woodhall Spa (0526) 52793  
 ★ 9-5.00 Tues.-Sat. (+ appointments)



## FT780R

- ★ 430-440MHz (440-450 possible).
- ★ USB-LSB-CW-FM (A3J, A1, F3).
- ★ Input; 30W (PIP A3J + A1/F3).
- ★ GaAs Fet RF for incredible sensitivity.
- ★ NMOS four bit micro control.
- ★ Bandwidth 2.2KHz and 14KHz @ -6dB
- ★ "Dial set" clears unwanted non integral steps.
- ★ Very bright blue display to 100Hz.
- ★ Display indicates Tx and Rx (inc RIT).
- ★ Manual tone switch on microphone.
- ★ String LED displays for S and PO.
- ★ Digital receiver independent tune ( $\pm 10$ KHz).
- ★ Advanced effective noise blanker.
- ★ FM; 100KHz, 25KHz, 1KHz steps.
- ★ SSB; 1,000, 100, 10Hz steps.
- ★ Repeater access by use of dual VFO's.
- ★ Four easy write in memory channels.
- ★ Memory scanning with slot display.
- ★ Up/down tuning from microphone.
- ★ Priority channel on any memory slot.
- ★ Satellite mode allows tuning on Tx.
- ★ Scanning for busy or clear channels.
- ★ Size (case): 10" D, 2.3" H, 6.9" W.
- ★ LED's on air, clear, hi/low, FM mod.
- ★ FP80 mains PSU + SC1 console available.

**£ 409 inc.** VAT @ 15%  
& SECURICOR



## FT225RD

- ★ 144-148MHz inclusive Coverage.
- ★ Multimode USB-LSB-FM-AM-CW.
- ★ AC mains or 12V dc working.
- ★ Smooth Dual speed VFO.
- ★ Digital readout to 100Hz. Analogue 1kHz.
- ★ 22 Fix Channels (2 x 11) (2MHz).
- ★ Memory Option for split simplex.
- ★ "S"/centre zero/P output meter.
- ★ 20dB attenuator/switchable AGC.
- ★ Xtal tone burst/FM power cont.
- ★ Effective noiseblanker/ALC socket.
- ★ Lights/readout brightness.
- ★ Semi Break in CW with side tone.
- ★ Clarifier on Rx or Rx & Tx.
- ★ Clarifier works on VFO, xtal & mem.
- ★ Norm/Rev & Aux repeater.
- ★ Relay make-break-common sockets.
- ★ Plug in board construction.
- ★ 11.8" D x 11.1" W x 4.8" H (case).
- ★ Weight 20lb (9kg).
- ★ LED's for; MEM, Burst, NB & Attn.
- ★ LED's for; RPT, CLAR, VFO, MEM, On Air.
- ★ 25W + PEP A3J, 25W + F3.
- ★ Highly sensitive and selective.
- ★ Conservatively rated PA for low IMD.

**£ 565 inc.** VAT @ 15%  
& SECURICOR



## FT290R

- ★ 144-146MHz (144-148 possible)
- ★ Multimode USB, LSB, FM, CW.
- ★ 2.5W, PEP, 2.5W RMS, .300mW out
- ★ LED's; "ON AIR", "BUSY". MC meter; S,PO
- ★ Retractable integral telescopic antenna
- ★ Bandwidth 2.4KHz and 14KHz @ 6 dB
- ★ Optically coupled main tuning
- ★ LCD Frequency display with backlight
- ★ Readout to 100Hz
- ★ Digital Clarifier
- ★ 10 channels of memory!!
- ★ Memory with "5 year cell" backup
- ★ FM: 25KHz and 12.5KHz steps
- ★ SSB: 1KHz and 100Hz steps
- ★ Any TX - RX split with dual VFO's
- ★  $\pm 600$ KHz repeater split
- ★ Mobile mounting bracket available
- ★ Matching 10W linear Amplifier
- ★ Up/down tuning from microphone
- ★ AF output 1W @ 10% THD
- ★ Tone burst on 1750Hz
- ★ 58 (H) x 150 (W) x 195 (D) (1.3Kg)
- ★ RX, .70mA, TX; 800mA (FM maximum)
- ★ External supply 8.5 - 15.2V DC
- ★ 8 C Size Ni cads or Drys

**£ 229 inc.** VAT @ 15%  
& SECURICOR



## FT480R

- ★ 144-146MHz (143.5-148.5 MHz possible).
- ★ USB-LSB-CW-FM (A3J, A1, F3).
- ★ 30W PIP A3J, 10.1 W out A-1 F3.
- ★ Bandpass filter no tune design.
- ★ Excellent dynamic range and sensitivity.
- ★ Bandwidth 2.4kHz and 14kHz at -6dB.
- ★ Semi break in with side tone.
- ★ Very bright blue 100Hz digital display.
- ★ Display shows Tx and Rx freq (inc RIT).
- ★ String LED display for "S" and PO.
- ★ Digital receiver offset tuning.
- ★ Advanced effective noise blanker.
- ★ FM; 25 1/2, 1kHz steps.
- ★ SSB; 1,000, 100, 10Hz steps.
- ★ Any TX Rx split with dual VFO's.
- ★  $\pm 600$ kHz standard repeater split.
- ★ Four easy write-in memory channels.
- ★ Memory scanning with slot location display.
- ★ Up/down tuning/scanning from mic.
- ★ Priority channel on any memory slot.
- ★ Satellite mode allows tuning on Tx.
- ★ Scanning for busy or clear channels.
- ★ Size (Case): 8.3" D, 2.3" H, 6.9" W.
- ★ LED's; "On Air" Clar, Hi/Low, FM mod.
- ★ Matching PP80 Mains PSU available.

**£ 359 inc.** VAT @ 15%  
& SECURICOR



**FT101ZDFM**

- ★ 160-10 metres including new allocations.
- ★ Variable IF bandwidth 2.4kHz down to 300Hz.
- ★ 8 pole filters for razor edge selectivity.
- ★ Selectable CW fixed bandwidth CW-W and CW-N\*.
- ★ Semi-break in with sidetone for excellent CW.
- ★ Digital plus analogue frequency displays.
- ★ 6146B PA's with 6dB of negative feedback.
- ★ 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, front panel switch.
- ★ AGC; slow-fast-off, front panel switchable.
- ★ Clarifier (RIT) switchable on TX, RX or both.
- ★ Low level transvertor drive output facility.
- ★ Universal power supply 110-234V AC and 12V DC\*.
- ★ Incredible range of matching accessories
- ★ 4 models; Digital/Analogue - AM/FM

FT 101ZAM	£515.00inc.	SP901	£28.75inc.
FT 101ZFM	£529.00inc.	FV101Z	£121.90inc.
FT 101ZDAM	£585.00inc.	*FV101DM	£225.00inc.
FT 101ZDFM	£599.00inc.	FV901DM	£223.45inc.
FL2100Z	£385.25inc.	WMT101Z	£12.00

\*Option.

**£599 inc.** VAT @ 15% & SECURICOR



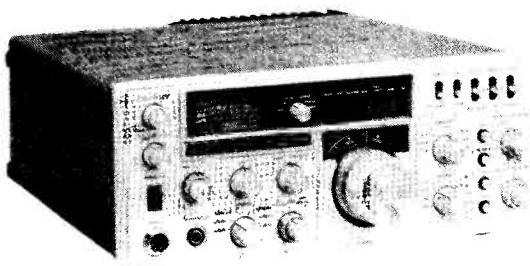
**FT902DM**

- ★ 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.
- ★ 6146B's with negative feedback.
- ★ VOX built-in and adjustables.
- ★ Instant write in memory channel.
- ★ Tune up button (10 sec. of full power).
- ★ Curtis Keyer - lambic, single or straight.
- ★ Switchable AGC and RF attenuator.
- ★ Optional 350 or 600Hz CW, 6kHz, AM filters.
- ★ Clarifier (RIT) switchable on TX, RX or both.
- ★ Audio Peak and tunable notch filter.
- ★ 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.

FT902DM	£799.00inc.	YR901	£369.00inc.
FT902DE	£713.00inc.	YVM1	£142.60inc.
FT902D	£724.50inc.	YK901	£115.00inc.
YO901P	£302.45inc.	FTV901(2)	£263.35inc.
FC902	£126.50inc.	WMT901	£12.00

\*Option.

**£799 inc.** VAT @ 15% & SECURICOR



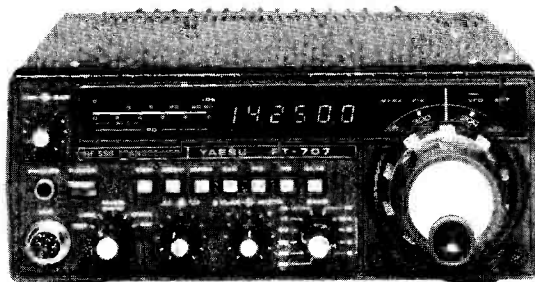
**FT107M**

- ★ 160-10 metres (including 10, 18, and 24Mhz).
- ★ USB-LSB-CWW-FSK-AM multi-mode.
- ★ Full broad band "no tune" power amplifier.
- ★ 240W PIP. 75 per cent power output at 3:1 VSWR.
- ★ 12 memory channels with clarifier on memory.\*
- ★ Digital Memory Shift gives offset from memory.\*
- ★ Up/down scanning control from microphone.\*
- ★ Variable IF bandwidth - 16 poles of selectivity.
- ★ Bandwidths: 6kHz\*, 2.4kHz-300Hz, 600Hz-300Hz.\*
- ★ Selectable CW "fixed" widths CW-W and CW-N.\*
- ★ Tunable Audio Peak (AFP) and Notch filter.
- ★ Diode ring mixer for very high Rx dynamic range.
- ★ Noise blanker - front panel adjustable threshold.
- ★ AGC; slow-fast-off switchable from the front panel.
- ★ Attenuator 0-20dB, plus RF gain on front panel.
- ★ RF speech processor fitted - front panel adjustable.
- ★ Digital (100Hz) plus analogue frequency displays.
- ★ Meter Reads; Vcc, Ic, ALC, Compression and SWR.
- ★ Semi-break in with side tone. Vox built in.
- ★ Choice of built-in or separate power supply units.

FT107M	£690.00inc.	FC107	£102.35inc.
FT107MDMS	£775.00inc.	FP107	£97.75inc.
FV107	£92.00inc.	FP107E	£106.95inc.
FTV107	£110.40inc.	Filters	£23.00inc.
SP107	£27.60inc.	WMT107	£12.00

\*Option

**£690 inc.** VAT @ 15% & SECURICOR



**FT707**

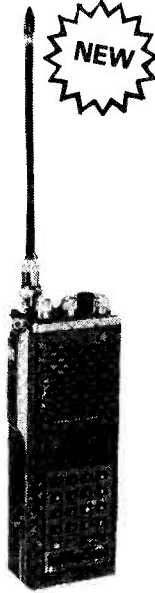
- ★ 80-10 metres (including 10, 18 and 24MHz bands).
- ★ USB-LSB-CWW-CWN-AM (Tx and Rx operation).
- ★ 100W PEP. 50% power output at 3:1 VSWR.
- ★ Full "broad band" no tune output stage.
- ★ Excellent Rx dynamic range, power transistor buffers.
- ★ Rx Schottky diode ring mixer module.
- ★ Local oscillator with ultra-low noise floor.
- ★ Variable IF bandwidth - 16 crystal poles.
- ★ Bandwidths 6kHz\*, 2.4kHz-300Hz (600-350)Hz\* -300Hz.\*
- ★ AGC; slow-fast switchable from the front panel.
- ★ VOX built-in and adjustable from the front panel.
- ★ Semi-break in with side tone for excellent CW.
- ★ Digital (100Hz) plus analogue frequency display.
- ★ LED Level meter reads: S, PO and ALC.
- ★ Convenient concentric AF/FR gain controls.
- ★ Indicators for: calibrator, fix, int/ext VFO.
- ★ Receiver offset tuning (RIT-clarifier) control.
- ★ Advanced noise blanker with local loop AGC.
- ★ 25kHz crystal calibrator feature.
- ★ Internal, xtal or external VFO control.

FT707	£529.00inc.	*FTV707	£82.00inc.
FT707S	£455.00inc.	707V	£80.50inc.
FP707	£109.25inc.	144TV	£101.20inc.
FC707	£80.50inc.	430TV	£175.95inc.
FV707DM	£186.30inc.	WMT707	£10.00

\*Option

**£529 inc.** VAT @ 15% & SECURICOR

- ★ 430-440MHz (440-450 option)
- ★ 25KHz synthesizer steps
- ★ 4 bit CPU chip for frequency control
- ★ Keyboard entry of frequencies/splits
- ★ LCD digital display with backlight
- ★ Ten channels of memory
- ★ Memory back up
- ★ 5 year lifetime cell
- ★ Up/down manual tuning
- ★ Manual or auto scan busy/clear channels
- ★ Priority channel with search back feature
- ★ Memory scanning feature
- ★ Scan between any two desired frequencies
- ★ Auto scan restart
- ★ Any split + or - programmable
- ★ Quick change Nicad pack
- ★ 1,750Hz tone burst
- ★ ± 7.6MHz EU split standard
- ★ Built in condenser microphone
- ★ 500mW AF to int/ext speaker
- ★ External speaker/mic available
- ★ 1W or 100mW RF output
- ★ RX: 20mA squelch, 150mA (max AF)
- ★ TX: 500mA at 1W RF
- ★ 0.4µV for 12dB SINAD
- ★ Double conversion 46.255MHz & 455KHz
- ★ Keyboard offers 16 tone DTMF
- ★ 168(H) x 61(W) x 49(D) mm.
- ★ c/w Nicad pack, helical



**FT708R**

- YM24A External speaker microphone..... £16.85 inc.
- PA3 12volt DC Adaptor..... £10.65 inc.
- NC7 Standard charger..... £24.55 inc.
- NCB Quick/Standard/DC PSU..... £41.40 inc.
- NC9C Compact charger..... £7.65 inc.
- FNB2 Battery Pack..... £16.10 inc.
- FBA2 Battery Sleeve..... £2.70 inc.
- MMB 10 Mobile mount..... £5.75 inc.
- FL7010 Linear, 10W..... £ TBA
- FTS32 Tone squelch..... £ TBA
- FTS32AE Tone encoder..... £ TBA

**FT708R, 1W, 70cms.**

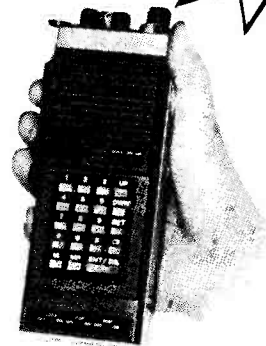
**£ 199 inc.** VAT @ 15% & POSTAGE

FT404R is a 2½ watt, 6channel, 70cm handheld. Similar in size to the FT207 and compatible with most of its accessories. Supplied c/w Nicad pack, helical, and carrying case.

**FT404R, 2½W, 70cms.**

**£ 179 inc.** VAT @ 15% & POSTAGE

- ★ 144-148MHz (144-148 possible)
- ★ 12.5KHz synthesizer steps
- ★ 4 bit CPU chip for freq. control
- ★ Keyboard entry of frequencies
- ★ Keyboard lockout safety features
- ★ Digital display to hundreds of Hertz
- ★ Display auto shutdown times
- ★ Four Channels of memory
- ★ Memory back up disable
- ★ Up/down manual tuning
- ★ Bandscan for busy or clear channels
- ★ Memory scanning feature
- ★ ±600KHz split built in
- ★ Any split + or - programmable
- ★ Easy change Ni Cad packs
- ★ BNC antenna connector
- ★ "On Air" and "Channel Busy" LEDs
- ★ Built in condenser microphone
- ★ 200mW AF to internal/external speaker
- ★ External speaker/mic available
- ★ 2.5/0.2W of RF output
- ★ Rx: 35mA squelch, 150mA full vol.
- ★ Tx: 250mA low, 800mA high
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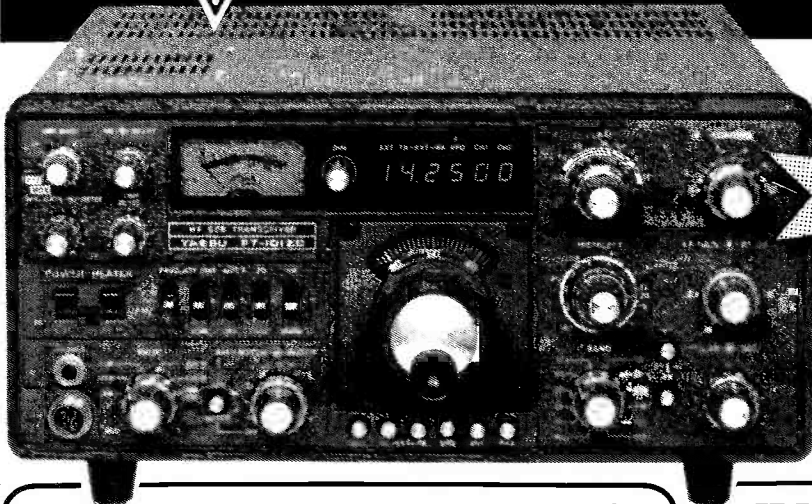
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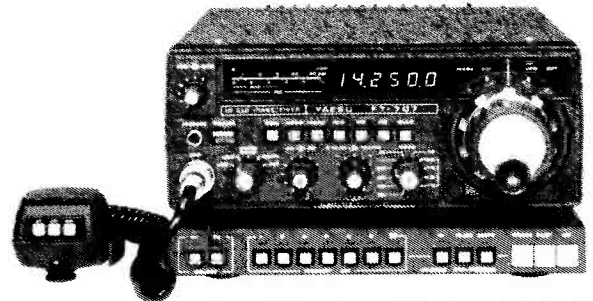
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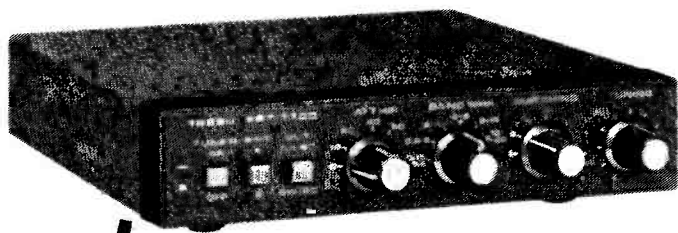
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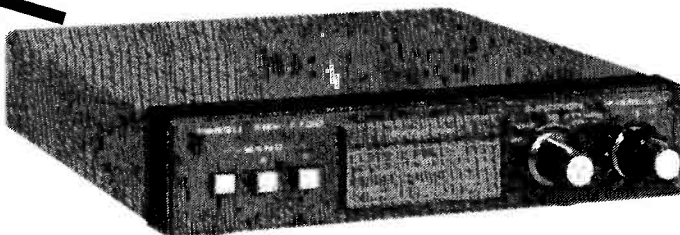
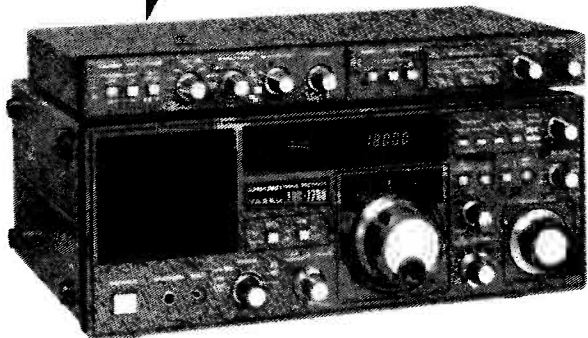
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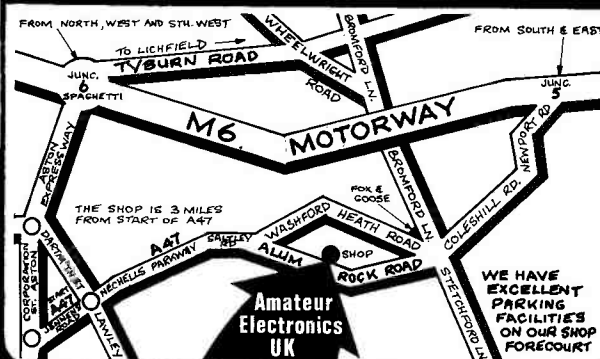


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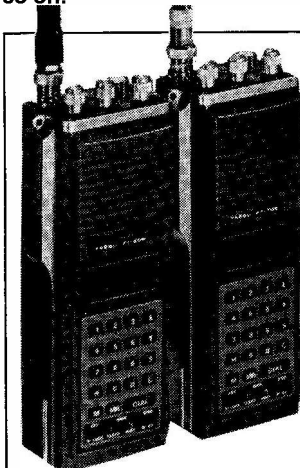
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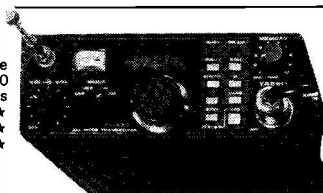
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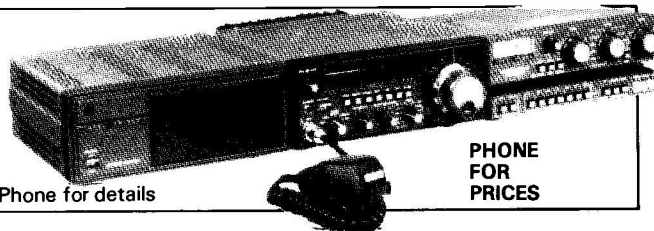
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# SHORT WAVE MAGAZINE

(GB3SWM)

ISSN: 0037-4261

Vol. XXXIX

JULY, 1981

No. 453

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Editor: **PAUL ESSERY, G3KFE/G3SWM**  
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Published at 34 High Street, Welwyn, Herts. AL6 9EQ, on the last Friday of the month, dated the month following.  
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# VHF BANDS

NORMAN FITCH, G3FPK

## Cyprus on Four

DAVID Butler, G4ASR, made a bit of VHF history during the 70 MHz Contest on June 7 when, operating portable in Powys (YM55F) he worked Nic Kyriazis, 5B4AZ for the first GW/5B4 QSO on 4m. The time was 1340. When first heard, Nic was S5, but at the time of the contact RST 529 reports were exchanged. Shortly afterwards, Gordon Pheasant, G4BPY, (Walsall) worked 5B4AZ for the first G/5B4 contact on the band. At the time, *Sporadic E* propagation was rife with lots of eastern European BC QRM. Congratulations to all concerned.

## Awards News

Mike Lee, G3VYF, holder of QTH Squares Century Club Certificate No. 7, was awarded his "200" sticker on May 13. His previous total was 182 and the further 18 cards submitted comprised 13 CW and 5 SSB QSOs, 8 on MS, 2 via E's, 6 through Auroras and just two on tropo.

Another two readers have joined the 2m. VHF Century Club. Bill Ledington, GW8PTS, from Monmouth in Gwent, receives Certificate No. 338. He has been interested in the hobby for many years and took the R.A.E. June 1978, making his radio debut on FM in August. His first SSB QSO was on April 11, 1979, Bill's station comprises the Yaesu FT-225RD and *Microwave Modules* 100 watts amplifier with Rx preamp., the aerial being the popular 16-ele. *Tonna Yagi* at 35ft. He is anticipating trying 70cm. later this year and is looking forward to some good tropo. and E's to boost the scores from a not-very-good VHF location.

Certificate No. 339 goes to Dieter Sommerfeld, DC2GR, from Villingen (EI73g) and whose list of QSOs goes back to May, 1977, and shows a 50/50 mix of FM and SSB contacts. His gear comprises the Icom IC-211E driving a 70 watts amplifier, the aerials being a ground plane for FM and a pair of 10-ele. *Yagis* for SSB. Dieter is also on SS/TV with an SC-420 and runs TV on 70cms. whereon the Tx provides 25 watts peak output. The aerials on 70cm. are a pair of 48-ele. beams and a ground plane. Future plans are for licence upgrading for CW work and SS/TV on the HF bands and "... more DX and more money?"

## The Satellite Scene

AMSAT-UK Secretary Ron Broadbent, G3AAJ, advises that the launch date for UOSAT is September 4. A detailed progress report on the project was published in *Oscar News No. 33*. AMSAT is receiving scores of requests from individuals and schools for full details of the project, complete circuit diagrams and information about the ground station receiving requirements. Ron has asked us to state that this information will not be made available till after the end of August as there are many technical problems yet to be sorted out, some of which will occur after launch. In any case, until everything is satisfactorily stabilised aloft, which could take a month or more, the bird will not be working. All correspondence concerning UOSAT should be sent to G3AAJ and *not* to the University of Surrey.

Both *Oscar 7* and *8* are functioning satisfactorily but, now that the *Sporadic E* season is in full spate, some severe attenuation of the 10m. downlink signals are likely to occur. Recent observations have shown that there seems to be a campaign of deliberate interference by a few FM operators in the London area who come on 145.95 MHz during a "pass." Readers are asked to note any call signs and send a list, with times heard, to G3AAJ for action. The band 145.800 to 146.000 has been agreed worldwide by the IARU and the ITU to be allocated to space communication. While it may be true that our licences permit us to use the entire 2m. band on any mode permitted, unless the Band Plan is observed, many serious experimenters will be denied the opportunity to enjoy the hobby to the full because of the selfish and bloody-minded attitude of a few morons.

## Beacon Notes

Roger Thorn, G3CHN, (Devon) has been in contact with Henri Roger, F5ZA, who is in charge of the 2m. beacon at Lannion, FX3THF. Henri relates that the equipment is already installed and in a "go" condition. However, the man in charge of the place will not permit FX3THF to commence operation until he receives written authority. It seems this could arrive tomorrow, next week, next month or next year! Nevertheless, it seems that the earlier interference problems have been solved with the new Tx.

Concerning 23cm. beacon GB3BPO on 1,296.83 MHz (AM77j), keeper Graham Murchie, G4FSG, told your scribe he has spent quite a bit of time keeping it on the air lately. The PA is a 2C39A valve which, with other valves, generates a bit of heat which is dispelled by a fan. The basic Tx is very stable but it seems that vibration from the fan is causing trouble of a mechanical nature to a component yet to be identified, resulting in some degradation of the signal.

## Repeaters

On VHF, repeater GB3SC (Dorset) on channel R1 was due to commence relaying from a new site on June 5. The June *FM Newsletter*, issued by the London U.K. FM Group, reports that a new repeater for GB3NL, "... is ready and will be installed as soon as the crystals arrive." GB3WL is operational again on R1. On the UHF side, Isle of Wight relay, GB3IW, on RB4 was due on over the weekend June 6/7. In Yarmouth, GB3YL on RB14 was due back in service on May 28, and the Hastings machine on the same channel has recently had an aerial change.

## Contest Matters

*Results:*— In the Single-op. section of the Apr. 4, 1,296 MHz Contest, the winner was John Tindle, G3JXN, (London) with 6,211 pts. Derek Poulter, G3WHK, (London) was second with 5,565 and Colin Wooff, G3SPJ/P, came third with 5,030 pts. The Multi-op. part was won by GW4LIP/P with 11,058 pts. who just nudged G4BPO/P with 11,016 into second spot, while G4ALE/P were third with 10,121 pts.

In the Apr. 5, 432 MHz event the winner of the Single-op. section was G3YTE with 742 pts. Second and third places were keenly contested, resulting in G4CQR with 593 and G3UBX with 590 pts. G4BPO/P just won the Multi-op. part with 1,789 pts., seven ahead of G4JUG/P. GW4LIP/P were third with 1,507 pts.

*Coming Events:*— On Saturday, June 27 there is the AGCW-DL, CW Contest on 2m. from 1900-2300 GMT. See p. 38 of the March feature for the scoring rules. The weekend July 4/5 is VHF NFD, of course. On July 19, from 0900 to 2000 GMT, there are the fourth legs of the 10 GHz *Cumulatives* and the Microwave Contest, the latter being for the 2.3 GHz band. August 2 is the date of the 144 MHz QRP Contest.

A new phenomenon seems to have become established in the run-up to 2m. contests. This is the practice of occupying a frequency for some hours before the "off", in order to stake a claim for its use throughout the event. This was first noticed by your scribe preceding the start of the May 2 contest. One particularly rude individual persistently called "CQ to the Continent" although it was pointed out to him that East Coast stations were already working stations he could not hear. He proceeded to lecture all his audience that he intended to stay there throughout the contest, that he was fed up with these G3s and G4s who, "... are always doing this to me ..." and that any fool could buy a rig for the HF bands and plug in an aerial and a microphone, but that it took brains to put a VHF station like his together. Well, he did stay on "his" frequency but only ended up with half the QSOs of some of those G3s and G4s he had earlier denigrated.

This "Klondyke syndrome" was again noticed before the start of the Low Power event on May 24. Of course, no licence conditions are being broken, but is this practice really in the spirit of what one assumes are supposed to be friendly contests? Most contest operation on SSB takes place in a 200 kHz band from 144.150 MHz. Assuming a practical "channel" spacing of 4 kHz, this suggests that it only needs fifty stations to adopt this technique for there to be no clear frequency for anyone else. Perhaps contest organisers could consider this matter and decide whether this practice should be discouraged somehow.

### Scottish News

VHF repeater GB3SS, near Elgin, was due to come on stream on May 27 using channel R0. The potential of illegal 27 MHz AM CB to cause interference was noted recently during a three-way QSO through the Ayrshire repeater on R2. Each time one of the stations came on, his conversation was punctuated by such CB inanities as, "negatory, ten four," etc. The source of the trouble was quickly located as a CB-er just 50 yards away, whose signals were getting into the AF circuits of the 2m. transceiver and being relayed along with the wanted message. If it can do that to amateur equipment, one dreads to think of the potential interference to other user services.

With the increase of illegal CB activity in Scotland — and elsewhere — has come an alarming increase in the theft of radio equipment. It seems that Alastair Fraser, GM3AXX, had his rig stolen by vandals but was fortunate in having it found within a few hours, discarded in a tenement close. His rig did not play the right tune for the CB-er who pinched it! Tommy Hughes, GM3EDZ, was not so lucky. Thieves smashed their way into his vehicle, then ripped off the door. These are examples of what Mob Rule has done for society, writes our Scottish correspondent.

### The Swiss Scene

Geoff Grayer, G3NAQ, has written from Geneva where he will be working for a couple of years. His Swiss call is HB9APY and he also holds the French call FOZY. Concerning the 4U1ITU station, Geoff says that the only VHF activity by resident club members is occasional satellite operation with only the occasional visitors attempting more. He intends to put the station on the air whenever conditions are good and has arranged for alerts when this happens.

He operated in the IARU Contests on March 7/8 and May 2/3 with rather poor results, about 100 contacts being made in F, HB, I and D. The station consists of a Trio TS-700, an *Electronic Developments* PA/preamp unit and his own Tempo 6N2 amplifier. The aerial is a 9-ele. Yagi on a rather long length of feeder. A better

aerial, with shorter, lower loss cable, and a masthead preamp. are needed. However, the IARC, which runs the station, is in dire financial straits as income from club members is too low to maintain the station. Also, up to now, the many visitors have been able to use the station free of charge so this is to change. Any donations to the club would be appreciated and would receive adequate advertisement since the station is visited continuously by amateurs from all over the world, and is a show case for amateur radio during the frequent ITU conferences. Immediate needs are a better aerial, low noise preamp., low loss relays and a second amplifier from about 10 to 60 watts. On 70cm. they have a *Microwave Modules* transverter and converter which are not operational. Your scribe will be pleased to pass on any offers of help to Geoff.

### Twenty-three Centimetres

During May, Ray Cox, G8FMK, (Oxon.) had 23 QSOs which provided two new 1981 counties; G4ERP/P (Glos.) and G4KUJ (Herts.). On the 10th. Ray was in contact with G3RQZ in Kent and, at the start, signals were S5, then got up to S9 plus 10dB. for half an hour but, over the following ten minutes, collapsed to the more normal S2-3 for the path over the Chilterns.

Tony Collett, G8GXE, (Berks.) was out portable with the South Bucks. Contest Club on May 2. Using his call on 23cm., 39 QSOs were made worth 2,760 points in not very good conditions with poor activity. The best DX were G4IRB/P at 186 km. and GW3NZS/P at 169 km. 34 of the QSOs were made before 2300 and all but ten were direct on the band, the others being "booked" previously via 70cm. A successful sked on the 4th. with G4KUJ gave Tony his 20th. all-time county and Trevor's QSL evidence for a *Supreme* award.

### Seventy Centimetres

At G8FMK, the only addition was the county on Warwickshire, thanks to G8DLX on May 1. Chris Easton, G8TFI, was out portable at Stokenchurch (ZL26f) for the UHF Contest on May 2/3, with the South Bucks. Group. He found activity poor with only 106 stations worked in the 24 hour period. Best DX was DF1JC in DL55d.

Chris, together with John and Jackie Brakespear, G8RZP and G8RZO respectively, operated -/A from the Isle of Wight in the latter half of the month, G8WAQ being the fourth amateur in the team. 70cm. was very poor with only about 12 contacts made. They did some TV, sending pictures to G8XEU in Worthing and G8LES in Thames Ditton. G8RZO points out how easy it is to put together a receiving station for ATV. Jackie says: "One simple up-converter for any TV can be made in a tobacco tin for

GTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G3VYF	—	88	222	310
G3POI	—	—	300	300
SP2DX	—	—	280	280
GJ4ICD	1	88	188	277
DK3UZ	—	—	264	264
I4EAT	—	25	238	263
G3IMV	—	—	252	252
G8HVY	22	83	141	246
G3JXN	41	82	110	233
G3XDY	30	83	120	233
G4CMV	14	59	157	230
G4ERG	—	16	199	215
G3COJ	24	74	116	214
EA3LL	—	15	194	209
G3BW	4	30	167	201
G3CHN	—	—	196	196
9H1CD	—	13	178	191
G3NAQ	—	58	128	186
G8LEF	22	62	101	185
GM4COK	—	12	172	184
G3SEK	—	—	182	182
G4IJE	—	—	181	181
G3PBV	12	59	104	175
GJ8KNV	2	54	119	175
9H1BT	—	11	163	174
G4BWG	—	38	136	174
G4IGO	—	8	165	173
G8ATK	5	56	111	172
G3FPK	—	—	168	168
G8HHI	6	47	113	166
G3KEQ	—	—	166	166
G8GXE	13	57	89	159
G2AXI	4	54	96	154
G8TFI	—	53	101	154
G4DEZ	—	—	151	151
G8OPR	1	38	111	150
G8JJR	—	38	108	146
G8LGL	—	25	121	146
G4ERX	5	45	92	142
G8MFJ	—	23	114	137
GD2HDZ	12	41	83	136
G4AWU	—	22	113	135
G8LFJ	—	24	107	131
G8IFT	15	34	81	130
G8FMK	15	53	62	130
G8KAX	9	41	78	128
G8KGF	—	28	99	127
G8RZO	2	30	84	116
G8IXG	—	—	116	116
G4HFO	—	46	68	114
G8RZP	2	24	87	113
G8VLQ	—	34	79	113
G4FBK	—	5	105	110
G8VR	—	3	102	105
G3FIJ	—	27	76	103
GJ3RAX	1	27	74	102
G8CXQ	—	—	96	96
G8KPL	—	7	87	94
G8EWM	—	25	67	92
G6UW	—	1	89	90
G4JZF	—	—	90	90
G8RMA	—	12	76	88
G8JAG	—	7	79	86
G4GHA	—	—	86	86
G8TGM	—	—	79	79
G8RWG	—	—	64	64
G8JGK	—	—	62	62
G8TIN	—	3	56	59
G8SKG	—	5	53	58
G8SVG	—	—	58	58
G4GSA	—	6	51	57
G8LXY	—	18	32	50
G4GXL	—	1	48	49
G8WRD	—	26	19	45
G8VFW	—	—	45	45
G4LDY	—	2	37	39

Starting Date January 1, 1975. No satellite or repeater QSOs.

about £6.00. I made ours, so it can't be that difficult as I've never touched a soldering iron before!" She mentions a circuit in the BATC's journal "CQ TV" No. 112 available from BATC Publications at 14 Lilac Avenue, Leicester.

Kevin McMahan, G8JJR, told your scribe that G8PRG, also from Doncaster, is on FS/TV and wants QSOs. Another Doncaster station, Bob Lane, G8VLQ,

has bought a Trio TS-770E and hopes to improve the aerial system soon to take full advantage of this two-band transceiver.

## Two Metres

Firstly Meteor Scatter, which mode is a growth one on 2m. Mike Lee, G3VYF, (Essex) is a keen exponent of the art and recent successful skeds have been made with SM2CKR (KX); YU3TTL (HG); SK7NM/1 (JQ) and, on SSB, IW3QBC (GG). Paul Turner, G4IJE, (Essex) is really hooked on MS work and confesses he feels withdrawal symptoms if he does not have an MS contact for a few days! On May 9 he worked OK1MDK (HJ), then on the 14th. the 1400, OK2BTI (JJ) which was over in 55 mins. On the 21st., YU2HW (HF) was contacted, this QSO giving bursts of 18, 16, 10 and 53 seconds, with Paul receiving a "38" report. The 24th. brought a new square, JO, in the shape of SP2DX, while on the 28th., he gave OE5EFM (HI) his first ever MS QSO, the latter using a borrowed keyer. On June 4, an attempt with UQ2GFZ (NR) did not come off, although Paul did get a 2 sec. burst. On June 7, OK2SGY (IJ) and SK7NM/1 (JQ) provided two new squares.

Paul has carried out some unusual MS tests with G4ERG and PA0HIP. These have involved both stations orientating their beams so as to eliminate any direct, tropo reception — in the case of the PA0, by both aiming at BF square. An earlier test with G4ERG in Hull was quite successful while that with PA0HIP (CL) was completed in 50 mins. with some tremendous reflexions, on June 3. Ken Willis, G8VR, has made a few MS QSOs recently, including CW skeds with I6WJB (HC); SM4IVE (HT) and SK7NM/1, the latter also being worked by Eddi Ramm, DK3UZ, (EN).

Next to the tropo. scene which has been generally unrewarding with the virtually resident low pressure systems to the west precluding any stable, high pressure areas building up. Mike Bull, G8WXJ, wrote concerning the Imperial College ARS's effort in the Low Power Contest on May 24 when they used the call, G5YC, more familiar on the HF bands. The transceiver was an FT-221 with *muTek* front end board, the aerial being a 16-ele. *Yagi* atop a fourteen storey building, about 200ft. *a.g.l.* They found conditions very poor and activity low, making only 170 QSOs. During the morning, nothing was heard to the east, so they concentrated to the north and northwest, best DX being one GM in YO square. Towards the end, a few continentals were worked, the best being DG1DJ at 518 km. The event produced contacts with eight countries and twenty

For G8FMK, the May 2/3 contest brought a QSO with GI8TBQ (Co. Down) with another two GIs heard. EI4AEB (WN) and GM3PXK/P (YP) were the only other stations of notable distance.

ANNUAL VHF/UHF TABLE									
January to December 1981									
Station	FOUR METRES		TWO METRES		70 CENTIMETRES		23 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	Counties	Countries	
G8FMK	—	—	59	13	43	7	23	2	147
G2AXI	32	4	51	10	40	7	5	1	144
G8GXE	—	—	52	11	44	9	17	5	138
G8VLQ	—	—	64	16	38	8	—	—	126
G3BW	3	4	58	22	21	6	2	2	114
GD2HDZ	12	2	49	11	30	8	2	3	112
G8TFI	—	—	58	13	31	9	—	—	111
G3PBV	—	—	51	11	36	6	5	1	110
G8RZP	—	—	58	11	34	6	—	—	109
G8HHI	—	—	34	8	41	8	13	2	106
G8RZO	—	—	51	11	34	6	—	—	102
G3CO	14	3	39	8	22	5	—	—	91
G8VR	30	3	34	13	6	1	—	—	87
G3FPK	—	—	69	16	—	—	—	—	85
G4ARI	18	2	54	10	—	—	—	—	84
G3FIJ	11	2	42	9	16	3	—	—	83
G4DEZ	—	—	62	19	—	—	—	—	81
GW3CBY	9	2	39	10	15	5	—	—	80
G4JZF	—	—	59	13	—	—	—	—	72
G8KAX	—	—	28	5	20	3	10	3	69
G4FKI	20	3	20	5	16	4	—	—	68
G4GXL	—	—	51	15	1	1	—	—	68
G8WUU	—	—	52	9	5	1	—	—	67
G8WRD	—	—	34	9	16	7	—	—	66
G8VJV	—	—	53	12	—	—	—	—	65
G8TIN	—	—	40	7	12	3	—	—	62
G4HAO	—	—	48	10	—	—	—	—	58
G8RWG	—	—	48	7	—	—	—	—	55
G8LXY	—	—	25	5	18	5	—	—	53
G8SKG	—	—	39	10	2	1	—	—	52
G8XTJ	—	—	44	8	—	—	—	—	52
G8RMA	—	—	29	11	5	4	—	—	49
G8TRW	—	—	35	8	—	—	—	—	43
G6ABB	—	—	32	6	—	—	—	—	38
G4LDY	—	—	29	5	—	—	—	—	34
GM4COK	—	—	21	12	—	—	—	—	33
GM4ELV	—	—	10	3	—	—	—	—	13

Three bands only count for points. Non-scoring band figures in italics.

May 8 saw a QSO with GD3ACR/P for the first GD of 1981 and the EI3VDL/P folk in WN were contacted on the 25th at S3, whereas a QSY to 70cm. produced an S7 signal. G8GXE had rather scratchy QSO on May 17 with GM8YJU, the first with a fixed GM station on tropo. G8TFI also worked Keith in Gretna that day, mentioning that the GM now runs 100 watts. Chris was QRV from the Isle of Wight for the Low Power event in good, sunny weather with a gentle, warm westerly breeze. The station was an FT-225RD with *muTek* RF board and two, 16-ele. *Tonnas* and over 220 QSOs were made at about eight points per contact. Best DX was to the north, with GMs in XQ and YQ, plus 25 to 30 PEs to the east. Slow QSB was apparent on signals with many weak stations heard on a relatively quiet band.

Now to the *Auroral* scene. The first half of May saw very disturbed conditions with many *Auroral* periods, most of which were rather weak events in the south. On the HF bands, there were many *s.i.d.'s*, one on the 13th lasting 111 minutes, for example. Even so, reports from readers are very thin on the ground. G8VR mentions QSOs with GM4COK (YP); LA8SJ (FT); GM4IAO (YR); GM3JIJ (WS); GM3ZXE (YQ) and SM4GGC (GT) which helped to boost Ken's squares total to 106. At G3FPK, only the "usual" *Ar* regulars were heard, such as SM4IVE, LA8SJ, GM3JIJ and other GMs.

With a marked decline in the kind of solar activity that causes *Auroras* came a notable increase in VHF *Sporadic E* propagation. It is quite evident that many 2m. operations are keen *E's* watchers for, the moment things get really going on 4m., then Band 2 FM, 2m., as if by magic, becomes well populated with CW and SSB folk calling "CQ DX."

The first definite *E's* heard at your scribe's QTH was on June 2 when odd eastern European stations were around. LZ1AB was a good signal at 1815 but was buried under a local G to F QSO. This event came too late for written reports to this feature so it will be interesting to learn next time who worked what. There was a short event on June 6, missed by your scribe who was busy decorating, and G4IJE mentioned that John Lemay, G8KAX, (Essex) worked an EA7 in YX square.

The first really extensive affair was on the 7th, well past the deadline. Nevertheless, a number of reports were subsequently received "on the wireless" as this month's column was being prepared. G4IJE caught the afternoon phase at 1356 when he worked YU7NXXA (KF77a) who answered Paul's CQ call on SSB. At 1402, LZ2XU (MD44e) was contacted on CW. The later session produced three more CW QSOs; — UC2AAB and 'ABN (NN18e) at 1743-6, then UB5EFQ (QH08d) at 1842. Paul passed on the news that Pete Etheridge in Hull, G4ERG, had worked a

station on the Black Sea in QE square, which is a very long haul from England.

G3VYF worked many stations on CW and added five new squares in this June 7 event, comprising MJ, NO, QH, QI and RI. A contact with YO2IS meant that Mike has now worked Szigy on three modes; *Ar* MS and now *E*'s. It seems the event ended around 1930 with YO2IS peaking S7 and then fading out.

John Hunter, G3IMV, (Bucks.) also caught the first phase and worked LZ2XU at 1355, LZ2KBI (LD05a) at 1400 and YO7CJH (LE59c) at 1405, the last being on SSB and the wife of YO7VS whom John has worked *via* MS. The evening phase started at 1732 with UC2ABN, followed by UC2AAB, UK5UCR (PK43b); SP8AOV (LL53d); UB5BAE (MJ38a); SP9HWY (JK56a); UB5EFQ; UB5EAG and, at 1856, RB5WAA on SSB, whose locator was not copied. John mentions a weird one at 1806, YO6AFP, whose signal had a distinct *Auroral* tone about it. As he was passing this information to G3FPK, G4IJE broke in to say it was still going, so this list is incomplete.

G8VLQ worked three SP9s in quick succession on SSB from 1828; APC (JJ17b); IHF (JK56f) and DSD (JK55e). At 1912, Bob got his best ever 2m. DX in RO5OAA (OH74c) a QRB of 2,215 km. He reported that G8NDF had worked into OG square. There are reports too that UT5DL (LI) worked into OZ and later into GM, northern G and PA, and that SM4IVE (HT) worked into Italy and YU. Quite obviously this was a major event and a study of the QSOs known thus far to have been made suggests a large blob of high ionization in the *E-layer* centred on the Berlin, Dresden, Jena triangle, possible of some 250-300 km. radius. Your detailed reports of stations heard and worked would be welcomed for next month.

### Four Metres

The most exciting 4m. news has been covered in the opening paragraph where-in it should have been mentioned that 5B4AZ appears to be crystal controlled on 70.11 MHz. The period from May 28 has seen some extensive openings to Gibraltar on both 4 and 6m. and ZB2BL has been on both bands. Jimmy's best 4m. DX has been GM4IGS in Troon, Strathclyde region.

Writing from his Brighton QTH, Peter Turner, G4IIL, reports his 4m. activities started on Apr. 14 when he hooked a *Magnum Four* transverter onto "... the ever faithful FT-200." On his first weekend in Wales, from Tregaron (YM61j) GW4IIL/A had good contacts with G2AMV, EI2DJ, G3TSJ, GD2HDZ and GW3MHW, of course. Indeed they can work each other with the PA stages off. The station was set up at the Brighton

conference at the end of April with disappointing results, just a few AM contacts locally.

John Baker's, GW3MHW, usual comprehensive report mentions that Dave Lewis, GW4HBK, (Gwent) runs a 50w. home made transverter and 2-ele. beam. Mike Probert, GW4HXO, (Dyfed) is on around 70.3 MHz with 2w. of CW, soon to be on SSB with a VFO and 4-ele. beam. G4JLJ in Newcastle is looking for QSOs and EI9Q in Co. Waterford is on the band with *Microwave Modules* gear. John contacted Dick on SSB on May 24. EI5R is supposed to be getting on 4m. soon. G3UUT has air tested the Angus beacon and, as soon as the licence arrives, he will take it to the site and install it.

G3UUT has built and installed the new GB3SX beacon and aerial. GW3MHW asks we should "advertise" for a keeper for the Cornish beacon. They have a licence, site and Tx, but nobody to look after it. Any volunteers? John missed the opening to ZB on May 24 when ZB2VHF was received and some QSOs with ZB2BL occurred. He has received a note from Olof Karlsson, SM6PU, who is equipped for 4m. reception. He says many Gs are heard in Sweden. John suggests Gs get on the VHF net on 20m. when *E*'s propagation on 4m. is likely and that they monitor 28.885 MHz also when there is a possibility of *Ar* events. Angus McKenzie, G3OSS, (London) mentions that SM6PU has some crossband 10/4m QSOs on June 7. G4IJE has a 4m. receive system operating again with a 4-ele. beam and has been monitoring the band for *E*'s lately.

### Six Metres

GW3MHW has been hard at work trying to optimise a 6-ele. *Yagi* for 50.05 MHz and *gamma* matched. He has been carrying out some interesting comparisons with it and the 3-ele. beam at 35ft. John now has a vertically polarised 3-ele. and can switch quickly between the three. Harry Heath, G2AOK, (Glos.) heard beacon FY7THF on May 11 and is 99% sure he copied VE1SIX, too. Things were quiet till May 25 when ZS6PW peaked S8 at 1600 GMT, with ZB2VHF and ZB2BL on voice peaking S9. On May 28, GW3MHW heard ZS6PW and ZB2VHF again so went onto 10m. and called, working ZS3AK, a German amateur named Hans. Finally, John suggests monitoring GB2SIX's frequency, 50.02 MHz, until it goes QRT at 0830. If not heard on tropo., one would likely get meteor reflexions on occasions.

### Miscellany

Arthur Breese, GD2HDZ, asks we should again mention that U.K. postage stamps are *not* valid in the Isle of Man. He receives cards with *s.a.e*'s which cannot be used. If you need a direct QSL, please

enclose an IRC. Arthur also queries why many operators do not give their locations when putting out a CQ call. It would seem only commonsense to say where you are and where you are beaming, surely? On the subject of CQs, Chris Bartram wishes that others would take account of a *directional* CQ. It really should be obvious that, if somebody is calling for continental DX, he does not want answers from local stations. Your scribe never ceases to smile when, at the end of a call, he hears, "... is standing by for any possible call". There is a temptation always to inquire if the person is ready for an *impossible* call! This "Kay somebody please" on 'phone is also a bit daft.

Ray Cox, G8FMK, asks if we count the Irish Republic counties in our table and the answer is, "Yes." There are 26 of them. Flemming Jul-Christensen, G8RMA, will be back in his native Denmark for a couple of weeks from July 16. The first week he will be operating as OZ1EVA/A from FQ44f, and for the second week from his parents' home, as OZ1EVA in GP23h.

Your scribe has come across two people using the little *Mizuho* SB2M transceiver recently, both of which were putting out sproggies. One was a local who, when operating around 144.39 MHz, had strong rubbish of a wideband nature plus/minus 163 kHz and multiples thereof. The immediate ones were only 20 dB. down on the main signal. This was checked independently by G4IJE, 55 km. away. The other user was on 144.40 MHz and had the same kind of spurious emissions but plus 270 kHz and minus 255 kHz, as near as could be measured. Initial conclusion is that these *spurii* move at nine times the tuning rate. It would appear from the description of the block diagram that tuning is achieved by a VXO on around 15 MHz, multiplied nine times at that therein lies the problem. Some sums would indicate that the sproggies and desired signal would coincide at about 144.372 MHz to give an appalling signal. Anyone care to try?

### Deadlines

The deadline for the next issue is July 8, the latest it can ever be. For the September edition it is August 5. Everything to:— "VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts. AL6 9EQ. 73 *de* G3FPK.

### Stop Press!

#### G to 4X4 on 2m!

At 1600 GMT on June 11th, G3VYF made the first 2m. QSO with Israel, by working 4X4IX on SSB *via* Sporadic-E. The QRB is 3,515 km.

# A HIGH PERFORMANCE POWER SUPPLY AND CONTROL SYSTEM FOR 4CX350/4CX250 AMPLIFIERS, PART II

JOHN H. NELSON, G4FRX

The alarm system works as follows. TR8 and TR9 form detectors for the grid bias supply to each valve, and TR10 and TR11 perform the same function for each feed of the screen supply. Resistor values are arranged so that the presence of appropriate voltages holds the transistors just off, and the LEDs in their collectors do not light. Fine adjustment of the "just extinguished" point is provided by the present variable resistors RV2 to RV5. The grid voltage alarm will detect a drop in voltage of 1V by turning the associated LED fully on, and the screen supply will similarly detect about a 6V fall from the design figure of 350V.

TR12 and TR13 form an audible alarm driver, and are themselves driven from the diode OR gate D19-24. When all alarms are held off by the presence of the current operating voltages, TR12 is held off by R39 and hence TR13 is also held off; the junction of R40 and D23-24 is held at practically 24V. If the bias supply to either valve fails TR8 or 9 turn on, as detailed above (or both if the entire supply fails) and, since the base of TR13 is taken virtually to earth *via* D23 and/or D24, it is turned on. Equally, if either screen supply fails TR10 or TR11 turn on and the base of TR12 is taken high *via* D20 or D21, thus turning it and TR13 on.

Also supplying inputs to the OR gate are the EHT failure detector TR14, which derives its feed from the original "EHT on" lamp driver TR4, and the screen overcurrent relay RLG: both of these have an alarm LED associated with them. It should be noted, however, that in the event of a screen overcurrent fault the associated warning LED will appear only momentarily, since RLG itself resets the timer and hence removes EHT and screen supplies, causing itself to drop out very quickly. Continuous illumination of the "G<sub>2</sub> overcurrent" LED would therefore indicate a most peculiar fault which required an immediate switch-off to investigate, since it would imply something amiss in the EHT/screen interlocking or the timer and could result in valve damage.

It will be seen that in the event of any fault condition TR13 is switched on. In the author's case the resulting 24V was applied to a small piezo-electric bleeper of oriental origin, which produces an insistent (though by no means unpleasant) once-per-second tone. There are many bleepers about which will produce a continuous tone when 24V is applied, or the output from TR13 could be used to trigger an astable multivibrator, or whatever. One of the author's friends suggested a large 24V Klaxon which he had, but this suggestion was not well received!

An alarm test facility is built in *via* push-to-test switch S5 and D18. Obviously this only tests the audio warning and not the visual alarms, but this is quite useful and reassuring. In fact, with resistor values as shown, the audible alarm will sound before the grid bias or screen supply failure warning LEDs have got past the "just starting to glow" point, which in a way is slightly surprising if the component values are considered; perhaps TR12 in the prototype has a much higher H<sub>fe</sub> than this type of device normally possesses.

It is worth noting at this point that for optimum use of the alarm systems, the inputs to them should be derived from as far down the supply chain as possible. In particular, the inputs to the grid and screen voltage failure detectors are fed back from the amplifier itself, *i.e.* the cable carrying these voltages from the control unit to the amplifier also contains extra wires which carry

the voltages back from the amplifier supply input socket to the alarms. This is so that any breaks in the cable, such as may be caused by setting up the contest station in rather too much of a hurry and doing something unpleasant to the cable or the associated plug in the process, may be detected *before* trying to run the amplifier without, for example, grid bias . . . yes it *has* happened at G4FRX/A!

It will be seen that upon initial switch-on the "EHT fail" and both "V<sub>g2</sub> fail" alarms will be on until the minute has elapsed and the voltages are applied to the amplifier, and the audio alarm will be sounding. The author finds this useful insofar as this proves the alarm system to some extent and reminds the operator to have a quick check of all the pertinent voltages on the multimeter (the circuit if so configured that all voltages may be measured even though they are not supplied to the amplifier, with, of course, the exception of the EHT anode supply). The cessation of the alarm and the disappearance of all red LEDs in favour of a row of green indicators advises the operator that he may now launch his 400 watts into the troposphere.

It would be possible to use the basic alarm system to detect other failures, such as the loss of -12V from the ALC regulator; this was not done in the prototype since the output of this regulator drives the transmit/receive indicator, which is visually obvious. Of course, an unnoticed ALC regulator failure would result in the amplifier being driven by the full output of the exciter, but the EHT system, which is described in the third section of the article, would reduce the subsequent excessive demands on it and politely close down, thus activating the rest of the logic. An "EHT overcurrent" lamp then lights to show what has occurred.

At this point it is worth taking a closer look at the bias supply, *i.e.* TR7 and its associated components. The original G4AJW design is for use with the 4CX250B or R, both of which require much more negative grid bias voltage than the 4CX350A or FJ: and also, as he stated, the bias supply is capable of supplying a few milliamps. When the question of a re-design for the 4CX350 series occurred, it was necessary to consider the following requirements:

(a) the supply should be tolerant of short-circuits, since the 4CX250 family, admittedly under extreme provocation in the case of the 4CX350FJ, occasionally fail grid-cathode short-circuit.

(b) The alarm circuit would of necessity require some small current from the bias supply under any conditions, but to keep the effects of drift, etc., to a minimum and at the same time make the circuit capable of detecting a fairly wide range of voltage with good resolution R26, R27 and RV2 should not be excessively high in value — which, of course, would imply a fairly high amount of current being drawn from the bias supply.

(c) the 4CX350FJ would need at least -40V applied to its grid on receive (together with earthing the screen grid) to ensure its being fully cut-off and hence producing no shot noise — something which all members of the 4CX family are very prone to, as was discussed in the earlier article.

(d) the bias supply was to be as stable as possible.

After much juggling with resistor values and available voltages, the final circuit as modified is evolved as follows. The basic stabilised bias line is derived from an OB2 and is thus -108V; resistors R20 and R21 in the base of the emitter-follower shunt stabiliser are modified from their original values to suit the lower voltage. The Class-C voltage setting preset is deleted, since the 4CX350 series are for Class AB1 linear service *only*. Now if it is assumed that RV2 and RV3 are set to mid-track (which in practice is a reasonable assumption for the -18V required in the author's amplifier) it will be seen that the network R26, R27, RV2 in parallel with the corresponding R29, R31, RV3 has an effective value of about 6K. This network is effectively in series with the emitter resistor R23 and the combination is across the -108V line, with the junction of R23 and the rest of the network representing the bias output point. Since R23 has a value of 6.8K, it may be seen that, if RLE is not operated, the bias rail will take up a potential of slightly less than half the -108V line, *i.e.* about the -50V. This is ideal for 4CX350FJ on receive, and also gives the

shunt stabiliser a fairly consistent load to look into on transmit. Also, as was stated earlier, the discrimination of the alarm circuit is very good.

In the event of a short-circuit on the bias line, the net result is  $-108\text{V}$  appearing across the  $6.8\text{K}$  emitter resistor to earth. This implies a current of some  $16\text{mA}$  and hence a dissipation in the resistor of about  $1.8\text{W}$  which, since a  $6\text{W}$  resistor was used in this position, causes no difficulty (except, perhaps, a little hardship to the grid current meters!). There is also no risk of damage to the 2N3773.

The available range of bias voltage in the transmit condition, with component values as shown, is from about  $-9\text{V}$  to about  $-30\text{V}$ , which is ideal for use with the 4CX350 series. It will be found that, due to the load on the bias supply presented by the resistors in the base circuits of the alarm detector transistors, the bias potentiometers RV7 is linear over only about half of its track; but this does not matter in the slightest in practice, especially if a ten-turn component is used.

For those wishing to use the alarm system with any of the 4CX250 family and their appropriate voltages, the following points should be noted. The screen voltage chosen for any valve of this family, including the 4CX350, will to some extent represent a compromise between intermodulation performance, power gain, valve life and screen dissipation: these matters are, in fact, given more attention in the next part of this article, which will deal with a high performance screen supply. Suffice it to say for the moment that for the 4CX350FJ at VHF, *i.e.* the author's present amplifier, about  $350\text{V}$  will provide the best performance. However, for the 4CX250B and R it rather depends on whether Class AB1 or Class-C is to be used. A good compromise value for this valve is  $300\text{V}$ , which is about the optimum for SSB and not too high for Class-C working provided that the loading is correct. Together with the different bias supply requirements of the 4CX250B and R, this means that the resistor values in the alarm circuits require alteration. The 4CX250 family require about  $-90\text{V}$  for complete cut-off with average values of anode voltage, and it is therefore necessary to revert to the use of an OA2 to supply the basic stabilised supply of  $-150\text{V}$ . R26 and R29 become  $15\text{K}$  and R27 and R31 become  $2.7\text{K}$ , with RV2 and RV3 remaining at  $10\text{K}$ . R32 and R34 become  $33\text{K}$  for a  $300\text{V}$  screen supply. R23 remains  $6.8\text{K}$ , and a calculation on the lines of that shown above will give a value of about  $-92\text{V}$  on receive for the 4CX250B. The rest of the circuitry around TR7 reverts to the

values shown in the original design and, as mentioned before, TR7 itself can well be changed to a 2N3773. R18 can either revert to  $68\text{K}$  with the deletion of RV6 or, if it is preferred to retain the facility to set the timer reset point for a given value of bias voltage (*i.e.* to detect a set drop in bias voltage which corresponds to a safe anode dissipation for the valves), R18 can become  $56\text{K}$  and RV6 retained with a new value of  $25\text{K}$ . The performance of the alarm system is unchanged from that of the design for the 4CX350FJ.

## Construction

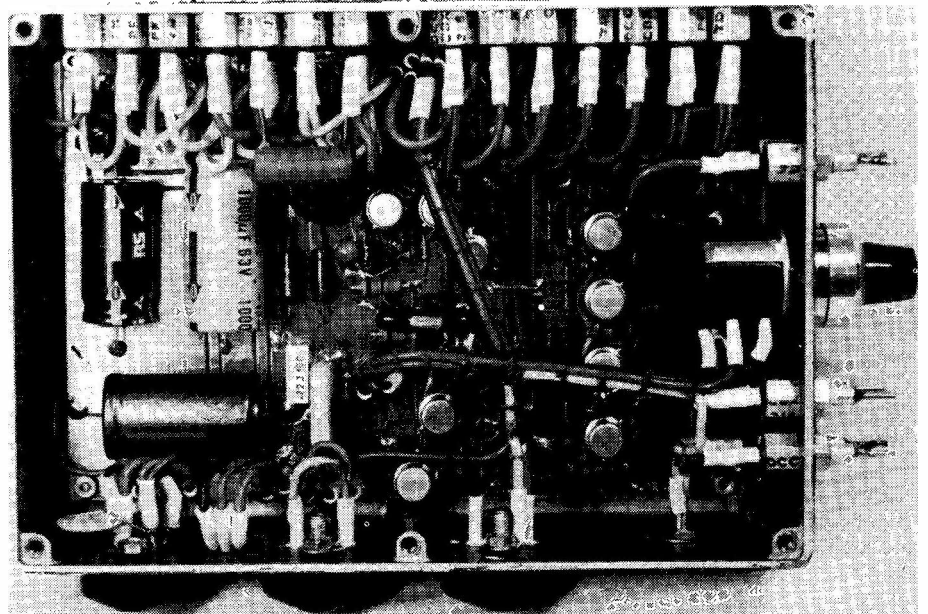
That completes the electronic description of the system, and we may now turn to a practical realisation of it, together with some notes on setting-up. The prototype was built on double-sided PCB, which was suitably mounted in the die-cast box. All connections into and out of the system were made with  $1\text{ nF}$  feedthrough capacitors of the bolt-in variety; it is appreciated that these are not easy components to come by in these days of miniaturisation, the solder-in type being more commonly found. The author is indebted to G3FPK for his suggestion that solder-in feedthroughs could be mounted on a suitably sized piece of brass and a slot cut in the side of the die-cast box into which the brass strip could be bolted. All components with the exception, as mentioned before, of the relays are mounted on the PCB.

Since it is felt that few would wish to build a "Chinese copy" of the supply as described, (although, hopefully, intending constructors might use some or all of the ideas discussed here), it was thought better not to give a blow-by-blow description of the PCB and a solemn description of the function of every feedthrough and piece of wire. It would be relatively easy to build it all on *Veroboard*, or, if one was not so concerned with size as the author, to implement the system on a somewhat larger single-sided board. The photographs should give constructors some ideas about the layout used and the mounting of the TO3 regulator and transistors, feedthroughs, bias control, etc.

## Setting-Up

Setting-up is rather easier than it may appear! The first essential is to check that the bias supply is working correctly and producing approximately the correct voltages on receive and transmit. Next, the ALC regulator can be checked and then forgotten until the control unit is completed. The relay supply can then be tested and should be producing  $24\text{V}$  with resistor values as shown round the

Looking down on the PCB. The three electrolytic capacitors on the left are C1, C2 and C9, with R23 adjacent to C1; below R23 is RV6, adjusting the timer reset point for the bias supply. R20 and R21 and the timing capacitor, C13, are seen below that. The three TO3 devices are mounted on the lower side of the box, and between the 78HG and the first 2N3773 can be seen the 7912 ALC regulator. The row of presets on the right are RV2 to RV5, which set the alarm detection levels; adjacent to these are the alarm detector transistors. RV7 is the bias control, seen on the right-hand wall of the box in this view.





regulator. All supplies should now be switched off.

Because of the various interlocks, the next series of tests should be performed systematically. It is rather easier on the ear if at this point the audible alarm sounder is disconnected and a suitable LED and limiting resistor placed between the collector of TR13 and earth. The connections to "RLG2" on the diagram should be bridged so that the LED and its limiting resistor R45 are connected to the relay supply, and all other alarm LEDs may be temporarily connected. First test the alarms by switching on the relay supply only; all alarm LEDs, including the one substituted for the sounder, should come on. If the bias supply is now switched on and RV7 set about  $-18V$ , it should be found that adjusting RV2 and RV3 to about mid-track should cause the bias failure warning LEDs to extinguish. Adjusting RV7 to lower the bias voltage should result in their reappearance and, as discussed, a reduction of 1V should be all that is required. The LED substituted for the sounder should of course remain on.

Next, a source of voltage appropriate to the screen grid supply to be used is required, and may be applied to the inputs of the screen voltage failure alarms. Again, a setting of RV4 and RV5 of somewhere around mid-track should extinguish the appropriate LEDs and, if the voltage source is variable, about a 5V reduction on the input lines should be detected and the LEDs come on again. Having tested both screen and bias supplies to one's satisfaction, the presets may be set roughly to where they will be in normal operation: if the input supplies are left connected, four out of the six alarm LEDs will now be extinguished, with the sounder substitute still on.

If the connections to "RLG2" on the diagram are now removed from the 24V line to simulate normal running conditions for RLG (it may be remembered that in the G4AJW nomenclature RLG is the screen supply overcurrent relay, and the corresponding component in the new design shown next month is given the same designation for convenience), the "G<sub>2</sub> overcurrent" LED should go out.

So at this stage, the only LED left on will be the "EHT failure" indicator, plus the temporary sounder substitute — it should now be obvious why the latter substitution was made! If it was not done previously, LP3 can be connected, and should not be illuminated. It is emphatically *not* recommended that the nearest handy source of a couple of kilovolts is used for testing this alarm! The EHT supply can be simulated in a rather less headlong fashion by applying the 24V relay supply *via* a resistor of about 1M to the base of TR5, not forgetting to connect the pull-down resistor R17 if this is not mounted on the PCB. When this test is performed, LP3 should come on and the "EHT failure" warning LED and also the sounder substitute will go out; the latter, of course, shows that the OR gate diodes are all doing their job, assuming that bias and screen supplies have been left connected as suggested.

This completes the testing of the alarm circuitry, and the timer and interlocking can now be tried out. The connections to points "RLA2" should be simulated as closed, *i.e.* the line taken to earth. RV6 is set to minimum resistance, "RLG1" temporarily simulated by a switch, "RLE1" simulated in the same way, and a substitute EHT contactor in the shape of a 680 ohm resistor installed. The switches representing RLE1 and RLG1 should initially be open.

The bias supply should be switched on first and, with the "RLE1" switch open, should be giving the desired value of grid bias voltage for the "receive" condition. The relay supply is now switched on, and the LED connected between the collector of TR3 and earth should come on. After a minute or so it should go out. Closing the switch simulating RLG1 and opening it again should bring the LED back on for another minute, thus showing that a screen overcurrent condition resets the timer and removes anode and screen voltages.

If the RLE1 substitute switch is now closed, the bias voltage will fall to its value for the transmit condition, and the TR3 LED should not come on. For 100mA standing current (the correct value for Class AB1 service) in a 4CX350FJ with 2.5kV on its

anode and 350V on its screen, about  $-17V$  is required on its control grid. It therefore seems sensible to set up the timer reset point for about  $-13V$ ; this will mean that at no time can the 350W anode dissipation of the 4CX350FJ be exceeded even under fault conditions, since  $-13V$  corresponds to a standing current under these conditions of about 130mA. This implies an anode dissipation of around 325W, which leaves a good margin for safety. Hence if RV7 is temporarily set to give a bias voltage of  $-13V$ , RV6 can be adjusted from its minimum resistance position to the point where the TR3 LED lights, demonstrating once again that the timer has reset and will stay reset until the bias voltage is increased to its correct value when, after the one minute delay, the LED will go out. There is a small amount of hysteresis in this circuit, incidentally, so a certain degree of patience is required when setting-up to find the optimum point: at least the constant adjustments will demonstrate the consistency, or lack of it, of your timer!

When the complete system is built and connected to the amplifier, all the required voltages, and the appropriate maximum anode current, can be determined for the anode voltage actually in use, bearing in mind that the object of this part of the circuit is to ensure that the rated anode dissipation of the valve can never be exceeded, or, at any rate, not by a fault in the power supply! "Fine tuning" of RV6 and the alarm setting presets can be done at that stage, and it is suggested that the latter are set up so that the smallest possible change from the correct bias and screen voltages is alarmed, as a pointer to the existence of either an incorrect adjustment or a possible fault. This leaves the control logic, with its ability to remove pertinent voltages and restore them in sequence, as either a back stop or, in the event of catastrophic as opposed to creeping failure, as the ultimate defence of the amplifier.

For the 4CX250B or R, all the figures mentioned above will of course be different but the principles remain the same. The required bias voltages and anode currents may easily be ascertained from the constant-current curves given on the valve data sheet (which, as an aspiring or existing amplifier driver, you have naturally obtained so that you can load your device properly . . . see the author's recent article in *S.W.M.*!).

The final test is the anode/screen voltage interlocking, for which RLC will be required. It should be found that if the simulated EHT supply (*see* above) is removed, RLC will drop out and should pull in again when voltage is re-applied. Again, in the G4AJW nomenclature, RLC applies power to the screen supply mains transformer and it performs the same function for the screen supply circuitry described in the next article.

Two other tests which may be performed at the same time as the system is commissioned are to set the delay in actuating RLE on "transmit" and to confirm that the EHT contractor does actually drop out when S3 is switched off. The "slow-on fast-off" feature described by G4AJW for RLE works well, but the actual delay is a function of the value of C19. If the appropriate equation is solved for the voltages in this circuit, the required value is of the order of 80 $\mu$ F which, of course, is midway between the preferred values of 47 and 100 $\mu$ F and quite likely to occur, as a result of the very wide tolerance of electrolytics, in either of those nominal values! The author decided to try out a few from the junk box until one was found that seemed to give about the right delay — this highly professional and state-of-the-art approach resulted in a 47 $\mu$ F 30V component, the fifth one tried, being pressed into service.

This completes the tests, and the unit should now be performing all its functions correctly and be ready for service.

*to be continued*

### Correction

With reference to *Part I* of this article in the June issue, the following corrections should be noted for Fig. 1 on pages 196-197: D1 and D2 are the wrong way round; RG2 should have a common line to ground (*see* text); R7 should be in the connection between the junction of R8 and R9 to the base of TR1; in the legend under Vg1a the word "multimeter" should appear, not "multiplier".



## SHORT WAVE LISTENER FEATURE

By Justin Cooper

JUST recently we made one of our rare forays on to VHF, and listened to the two sides of an argument as to the merits of a Class-B and a Class-A ticket; the "B" merchant was, in effect, sitting there with his FM rig, working all of ten miles through a repeater, and saying that there was nothing new to be learned on the HF bands, and much more on the VHF/UHF areas. As an argument, that is pure poppycock of course — there is far more to be learned about *communication* than he dreamt of, at HF, at VHF, and on the microwaves. And, in the final analysis, any exploration to the limits of the art of communication by radio brings one back to CW or RTTY. No way can telephony by any method compete. There is so much to be found out about, for instance, propagation at HF, and in the end the way it will be unravelled is by use of QRP, directional beams, and a great deal of collaborative effort. So also with the microwaves, and with the design of reliable repeaters, there is lots to be done. As for the SWL, probably his favourite area is learning about the mechanism of the listening process — how for instance does the brain cope with the business of copying a weak signal, whether SSB or CW, and how the errors appear until eventually the signal drops out so far as to be uncopyable. Has anyone, for instance, tried to actually put numbers to the difference in copying power of SSB telephony by the completely raw listener, and the chap sitting at 1500-plus on the All-Time HPX — there is no doubt whatever that there is a difference, and that the difference is greater as the QRM is increased.

### The Mail

We start our mail this time with the first of many letters asking questions; it comes from *D. Poulton*, 1 Broad Street, Renishaw, Sheffield S31 9UJ, and it includes a couple of photographs of a receiver, and a PSU. We are asked if we can identify it, and if we know where or what means are available to get data on the set. It is, almost surely, a Hammarlund HQ-120 Super-Pro; it has some 16 valves plus two more in the PSU. The paint finish is black, with the suggestion that it might originally have been green or grey, and it is fitted with the VT-series valves rather than the original 6K7, 6L7, etc., series around which it was originally designed. This HQ-120 would, from the above details, probably have been built during the last war, and have been in use by one or other of the British services. If anyone has any more ideas perhaps they would pass them on to Mr. Poulton direct, as he wishes to restore it to original electrical and mechanical condition.

*Mrs. T. Parry (Blackpool)* reports a change of receiver to the Trio JR-500S; this has been modified to accept Top Band signals, and thoughts are being turned to getting it to cover a big enough segment to enable two-metre reception through a converter, and in addition making it listen to FM. As for the last, we think it might be made to cope tolerably with FM by simply "slope detecting" — this was a ploy where the receiver was tuned off to one side of an FM signal so that the slope of the IF turned the FM to AM after which it was detected in the normal way for AM. About the time this comes to issue, Tina is to become a proud mum, and our best wishes go to her for this occasion, even if it does reduce the listening time!

Talking of FM and slope detection, our next letter tells us that *M. N. W. Thornton*, 151 Pettits Lane, Romford, Essex RM1 4ED, is doing just that to listen to the FM-ites with his FRG-7 and a converter. Michael mentions his success in the QSL line, and says that if any readers wish to QSL someone direct, then he has a copy of the 1981 *DX Listings*, and will assist with addresses provided an s.a.e. is enclosed.

*H. A. Londesborough (Swanland)* says, thankfully, that he has managed to be a little more active of late; he has an FR-DX400 as

the main receiver, plus a Datong UC-1 for general-coverage, and a Codar CR-70A as a standby; the aerial is a 60-footer, end fed through an ATU and running north-south. While he has a very good score on Phone, the preferred mode is CW.

Next, comes *S. Foster (Lincoln)* who has bounced back into the scoring as a result of sitting down for some 31 hours in the CQ WW WPX contest. Some 825 stations were noted in the log, and these were scattered among some 120 DXCC countries. Just in case anyone gets the idea that Stew has a super-duper set-up, we can tell you that it is in fact a pretty basic receiver and station, coupled to a Best Bent Wire aerial. Indeed the logging rate of some 27 stations an hour is by no means fast work — which should be of some encouragement to those who wish rather than try!

*P. W. Eggeman (Borehamwood)* seems to have been having a bit of bother with getting hold of his copy of *S.W.M.* — it is amazing just how long some take to travel quite short distances. However, there wasn't a lot of time for chasing prefixes, as A-levels have to be dealt with first.

Another one who appears to have been sitting-in on the contests is *L. Stockwell (Grays)* and as a result he goes up quite a way in the Ladder.

No sooner have we got used to the idea of *H. M. Graham* being in Moulton, than he moves again, this time to Chesham, where of course the paint-pots and garden tools are priorities; but it doesn't seem to have stopped Maurice listening around. However, the bands haven't been all that super of late, he comments; on the day he wrote, all he could hear at 1930 on 14/21/28 MHz was TV and BC noises, with not a single amateur signal! Obviously Maurice hadn't realised it was early-closing day.

Another dedicated contest listener is *M. Cuckoo (Herne Bay)*; he did 30 hours listening, and collected 72 of his 87 prefixes that way.

### Reports Wanted

Most of the regulars on 21 MHz will have heard K4NBN, beaming to UK between 1700 and 1900z on 21.342 MHz; Del likes working Gs and likes receiving letters from SWLs with reports on his signals. His address is: Del. W. Popwell, K4NBN, 1946 Sweetbriar Lane, Jacksonville, Fla. 32217, U.S.A. We ourselves could add that he is easy to hear when the band is open; at least two *Magazine* people have worked him and recall his phonetics — "No Bad News".

### Queries

*Mrs. R. Smith (Nuneaton)* continues to rise steadily up in the Ladder although she reckons it will be some time before she can catch K. Kyezor — after all, he started rather before her! Her little query concerns the ST1EL she heard during May, but, sad to say, we don't have any indications of his worth. So, for the moment, he has to be a Phoney.

On now to *J. Williams (Reading)* who questions the suffix on LU3AEN/D — we have to say that we should know, but have been let down by memory! Anyone care to educate both John and your J.C?

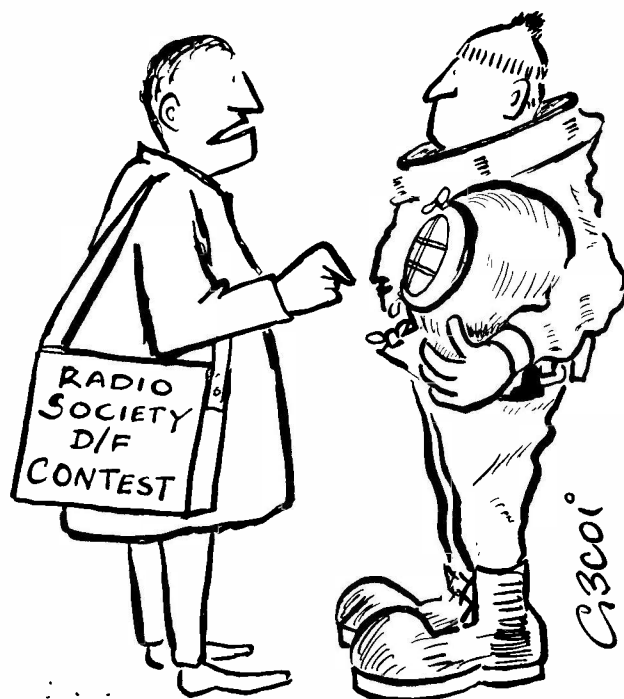
*D. W. Waddell (Herne Bay)* is so far up the Ladder that a suggestion from him as to its rules must be worth listening to. Now he has reached 1250 he says that in his view the idea of an All-Time Post War is grossly unfair to the younger generation and favours people like himself and K. Kyezor who were listening more years ago than they care to think about. A very valid point, to which proposition reader Waddell reckons the answer to be to run simply an annual Ladder, with no limits; this, says he, would be fairer to the youngsters. On the other hand, we feel that the present annual table is a place for newcomer to fight newcomer

and gain experience, after which the question of fighting a way to the top with the OTs can be tackled. As to the obsolete prefixes we doubt if anyone has yet got all the post-war prefixes booked in; to the extent that this is true, the argument fails. Not that we know of anyone who has ever counted the total possible post-war, or for that matter the current possibles. Perhaps among our readers there is a number-crunching addict with the data and the will to extract the answers?

### Technical

*J. F. Hobson (Ely)* remarks on the poor band conditions, as indeed do others implicitly — no need to dive into the receiver, the forecasters also have it noted, and suggestions are about that this may be a characteristic of this part of the sunspot cycle. However, John's question is interference from the family TV set. He says he can't stop it completely although he has done all he can in the aerial line, and what else is there before he slings a brick through the CRT? Well, now, there is not much doubt that the TV itself is somewhat of a variable factor. Ron Barker's article on the subject (*Short Wave Magazine*, June/July 1979) would be good reading on the general topic. It seems to us that, in essence, the problem is that the line output power required to scan a short tube is greater, and that the waveform generated is required to be of such a shape as to encourage the generation of all harmonics. Most of this surplus energy is mopped up in generating EHT, but some remains to plague us. This surplus of energy is unlikely to be directly radiated from the TV set wiring, which means there are only two routes out. These are along the mainslead, and up the TV aerial, probably the braid. Both arise from the proximity of the line timebase circuit, and magnetic fields from it. Since you can't throw the timebase away, you must stop the pick-up energy from leaving the TV set, which seems to suggest the ferrite ring trick used by the licensed types to stop their fundamentals getting into the TV set *via* braid or mains. A ferrite type covering the frequency range you listen on and having high permeability will serve (though you may get some benefit from *any* ferrite) and all you need to do is wind lots of turns of co-ax or mains lead into the toroid, and put it at the point where the pick-up energy leaves the TV. Since the magnetic field falls away rapidly with distance, any surplus cable or lead should be coiled up and parked as far away from the TV set as may conveniently be, so that there is minimal pick-up after the ferrite ring is passed.

A different problem worries *R. W. Roberts (Cardiff)* who has an HRO and wants a handbook or data. A start would be to get hold of copies of the articles on the HRO by G3KFE — three parts centred on Christmas 1965, and photo copies can be obtained from our Welwyn office, priced 75p for each part. Secondly, he says, it gave him a shock and what can he do about that? The answer could be the absence of an earth, or if the earth is present up to the PSU, its failure to be carried on and into the receiver proper. If the receiver is OK but unearthed and another unit which *is* earthed sits alongside, then touching the two together with a finger will cause a shock even though on paper there is no circuit — you have discharged the stray capacity lurking up the mains to earth. J.C. has fallen for this more than once! It is not safe to use the average SWL rig signal earth as the mains earth, simply because it will be too high resistance between spike and ground to permit an equipment earth-fault to blow the mains fuses. Finally, the question of a bed-sitter aerial. All we can suggest is the curtain-rail aerial, fed through an ATU, with as



“... don't forget, give them some long transmissions or NOBODY will find you ...”

much work as possible done on the earthing side — some quarter-wave radials for favourite bands can be “lost” under the carpet for example.

*K. Deaves (London SE5)* has re-started after a long break, by digging out his old Eddystone 358, and a two-metre converter; a listen to the two-metre FM talk was enough to put him in a tizzy with all the imitation CB talk. Hastily he returned to the lower bands, and started back in earnest. Now, Ken wants to know about HPX. Well, in G3SWM, G3 is the prefix and SWM is the callsign; so G2, G3, G4, G5 count as four prefixes, GM2, GM3, GM4, GM5 as four more, and so on. For the rest, see the Rules, which we publish as often as space permits and last appeared in the January issue.

Now we have a note from ex-G2AUB — he has an HRO as IF strip driven from a converter, and is picking up the CW prefixes preparatory to taking the morse test and getting back on the air. Nigel remarks on the number of buzz-saw noises emanating from Bulgarian stations — true enough but still far better in proportion than, say, thirty years ago.

*F. C. D. Barnes (Cardiff)* has some rude things to say about the CB pirates and their suppliers, but reckons there will be a spin-off from CB into amateur radio. This is in fact happening in some places — at Harlow in Essex they are collecting ex-CB types at the rate of around five per club meeting! Turning to the “oddities” list, of the four three are quite OK, and the FN7AV was almost surely a mis-copying of FM7AV.

*J. M. Short (Thornbury)* wrote to tell us he was QRT after snow brought the aerials down! All is not lost, however, as Jonathan was able to spend some more time at work on his version of the G3RJV QRP rig.

*J. Worthing (Shrewsbury)* found his old logs, and so the current offering is liberally bespattered with red ink pointing out where the old prefixes are not the same as the current ones, and, we must say, bringing back memories. On a different tack, Jeff is mildly pro-CB, but it saddens him to see how the bandwagon magazines dish out twaddle to CB-ers and how they in turn take it for true. Sadder still to your scribe's mind is the fact that these magazines and their readers are *pirates* until such time as the Government start issuing CB licenses and they have conforming gear.

## ANNUAL HPX LADDER Starting date, January 1, 1981

SWL	PREFIXES		
Mrs. T. Parry (Blackpool)	438	M. Hill (Bedworth)	207

200 Prefixes to have been heard since January 1, 1981, before an entry can be made. Entries in accordance with HPX Rules.

## HPX LADDER (All Time Post War)

SWL PREFIXES

### PHONE ONLY

K. Kyezor (Brandon)	2508	D. J. S. Williams	
B. Hughes (Worcester)	2334	(Wednesbury)	886
S. Foster (Lincoln)	2111	B. A. Payne (Leeds 18)	841
E. W. Robinson		D. J. F. Gordon	
(Bury St. Edmunds)	1892	(Chepstow)	833
M. J. Quintin		F. C. D. Barnes (Cardiff)	802
(Wotton-u-Edge)	1517	P. Eggeman (Borehamwood)	774
H. A. Londesborough		J. A. Darby (London SE16)	715
(Swanland)	1498	B. L. Henderson	
Mrs. R. Smith (Nuneaton)	1405	(Salisbury)	655
H. M. Graham (Chesham)	1354	B. Shepherd (Staines)	593
M. Cuckoo (Herne Bay)	1349	R. Baker (North Walsham)	590
M. Rodgers (Harwood)	1257	A. Stevens (Crowthorne)	589
M. Law (Chesterfield)	1201	M. N. W. Thornton	
J. Worthing (Shrewsbury)	1157	(Romford)	579
P. Ford (Longlevens)	1128	P. J. Boyce (Coventry)	502
N. Askew (Coventry)	1042		
R. Middleton		<i>CW ONLY</i>	
(Bury St. Edmunds)	1022	H. A. Londesborough	
J. F. Hobson (Ely)	1005	(Swanland)	1294
G. A. Davey		D. W. Waddell (Herne Bay)	1257
(Bury St. Edmunds)	970	J. Goodrick	
D. C. Casson (Reading)	957	(Bognor Regis)	842
J. Doughty (Bloxwich)	915	A. Rowland (Mansfield)	524
L. Stockwell (Grays)	908	J. M. Dunnnett (Prestatyn)	442
		N. I. Neame (Lancing)	400

**Minimum Score for an entry: 200 for CW, 500 for Phone. Listings include only recent claims and are in accordance with HPX Rules. A 'Nil' return is permissible in order to hold a place.**

We turn now to the *Bury St. Edmunds* crew, and *G. A. Davey* in particular; his main item of news is that work has commenced on gathering together the knowledge for a crack at the December RAE. We have our fingers well crossed!

*E. W. Robinson* mentions that their erstwhile 'third man', Ray Middleton, is now G6BJP, and that Robinson Jr. from Felixstowe who was once in the Ladder too, is now G6AYX. It seems as if SWL Robinson will have to look to his own RAE studies at this rate!

The "hump" period in the morse is affecting *D. C. Casson* (*Reading*) and, as he says, it is the "one step forward, two backward" thing about it that is so annoying — true enough, but as long as you know it is but a phase in the learning cycle, you can persist until you break through. This will happen suddenly and then the rate of progress will be that much quicker again. But, we wonder, which will come first — 1000 prefixes or a G4 ticket?

Now another bare list, this time from *P. Ford* (*Longlevens*) — never a comment, even on the weather! This is the situation with *M. Rodgers* (*Harwood*) too, and the latter list is interesting in that even at this high score, few of the prefixes could be described as rarities.

It's been some years since *J. M. Dunnnett* wrote in, but now he is settled at the sharp end of Wales, in Prestatyn, and has an AR88D, an SRX-30, full RTTY reception without a single 88mH toroid(!) but withal has a slight problem. This is simply that he has so far been unable to get as good a match to the aerial as with the older receivers. Much time has been spent on looking into this, and at the moment, the best that can be done is to tune the gate of a FET source follower. There's no reason at all why the SRX-30 should not be matched by an ATU, save the obvious one that the circuit in use is incapable of coping with the conditions it is seeing. In any case, a sharp ATU isn't doing its best, as the sharpness says the coupling is far too slack. After all, a tuned circuit coupled to the damping of a receiver on one side and an aerial on t'other *ought* to be flat if both are low impedance. The source follower is

merely indicating that the area of problem is on the receiver feed side. And, in a second letter — lo! — there seems to be the beginnings of success. That's why, in so many cases, even the dab fault-finder will spend time "prodding around" — he is accepting the facts of life that it is a rare circuit which doesn't have some unexpected bits of C or L in among the strays! Persistence always pays off in the end.

### Reflections

Now your scribe has reached the bottom of the clip, and the rain has stopped, there will be time to go out and inspect the aeriels. For the past couple of weeks we seem to have been afflicted with heavy thunder and rain static (neither encourages one to be too keen on the aeriels!) but it would be nice to have something a little better up for the autumn equinox, and before the holiday (we will be trying an ordinary mobile whip, with a counterpoise for each band rather than an earth, and it will be interesting to see how the scheme pans out). All of which reminds me that now is the time to look at the question of what to do in the station when thunder is about.

There *must* be some DC path to earth for the charge that builds up on the aerial, for safety reasons. Pulling the plug out of the receiver aerial socket, as most of us do in thundery conditions, isn't of itself enough. Consider and think a moment. There will be an earth on the rig, but by pulling the plug out, have you isolated the aerial from earth? Or, for instance, if you are using a vertical (ground-plane) aerial and no ATU, is there a DC path from earth to ground-plane, and from ground-plane to vertical section? If you use a pi-tank does this situation apply even when you are plugged in? What do you do about it? Fat sparks jumping across the ATU tuning capacitor may look impressive, but are *dangerous*. What's more, it is a bit late to think about what to do now!

So, what do we suggest, you say. Just this: make quite sure that a DC path to earth will always exist through the ATU or within the aerial system itself if no ATU is used. The end-fed, for instance, is usually grounded to DC through the inductance of the tuning coil, but one can do the same in a storm by way of a big switch where aerial and earth come into the shack. If one doesn't have a suitable switch, use a high resistance, say a megohm or so, to bleed the accumulating charge down to ground. Remember, there's not a lot you can do about a direct strike, which will wreck everything. You can do something to prevent static building up as we have shown, and this alone may help divert a direct hit — after all, the lighting conductor on a factory chimney in effect protects a circle of ground whose diameter equals the height above ground of the point. That rule of thumb will apply also to the shack. One of the points to consider is this: when you are away, and thunder threatens, your XYL is going to be the one to pull the plug out for you, and she won't take kindly to seeing (and feeling) blue flashes between inner and outer of the plug! Neither for that matter will the receiver like such treatment, and the insurers will be cross too. Take care, and organise your protection *now*.

### Activity

Over the past few weeks we have been thinking about having an SLP — Set Listening Period to the newcomers. The idea is for you all to come on and listen around on the same band at the same time, logging all you hear, and sending in the results. How about Sunday, July 12, 28 MHz, Phone or CW, or even mixed, between 0900 and 1300z. Log all you can, and who they are working. Since we aren't talking about a contest, don't discard the locals and the short skip just because DX might be about, and on the other hand if the band is only local or short-skip, don't forget that it does open when you least expect it. Keep the log times accurate, and let's have them with your letters and HPX scores next time round.

### Finale

Or, The End! At least until next time, for which the deadline is July 16th, addressed as ever to your scribe, "SWL", SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts. AL6 9EQ.

Meantime, don't forget the garden!

# THE S.C. DELUXE, PART II

## FURTHER IMPROVEMENTS TO THE S.C.D.

REV. G. C. DOBBS, G3RJV

**S**HORTLY before the G3RJV licence plopped onto my doormat, I set about finding a new receiver to exploit the coming first excursion on the amateur bands. A kindly G Two Letter call took me aside at the local club and offered me his standby BC348 receiver for all of £5. He handed it over to me with those oft used amateur radio words, "If you can't hear 'em, you can't work 'em". Wise old words, and the receiver is still the kingpin of the amateur's station.

The original receiver for the S.C.D. appeared in the March 1980 issue of *Short Wave Magazine*. A direct conversion receiver was chosen because, in accord with the S.C.D. "kitchen table" technology, such a receiver provides a convenient and simple compromise capable of good results on today's amateur bands. If the reader is not familiar with direct conversion techniques, rather than repeat my explanation, may I commend the original S.C.D. article. A direct conversion receiver has few tuned circuits and most of its gain at audio frequencies making it ideal for simple home construction. Its additional bonus is that it requires a local oscillator at the frequency of the transmission, allowing the transmitter oscillator to be used, without resort to mixing at other frequencies. The critics of direct conversion are usually those who have not tried the technique. If in doubt, the circuitry is so simple, that the answer is to build it and see for yourself.

### Receive Mixer

The circuit of the S.C.D. mixer is shown in Fig. 1. The receiver input is arranged to include the transmitter broad band pi-network filters to provide additional input tuned circuits; this is fed *via* C<sub>x</sub> to an input tuned circuit L1/VC1. Two diodes provide front end protection by blocking excessive RF voltages present on transmit. Capacitor C<sub>x</sub> is present in the circuit on transmit output so should not have too high a value to give unacceptable RF loss when transmitting; it should, however, be large enough to obtain sufficient receiver sensitivity. In the prototype a value of 100pF was used, but experiments could be tried with lower values. The signal is then fed *via* C1 to one of the gates of TR1, a dual gate MOSFET mixer. Although the 40673 type is named in the table of values, the equivalent, available from *J. Birkett* of Lincoln, was used in the prototype. (In fact, I have never owned a "proper" 40673).

The local oscillator is the S.C. Deluxe VFO taken from the output socket of Fig. 1 (see S.C. Deluxe, Part I) and fed *via* C8 into the other gate of the MOSFET mixer; the mixed signals

appear at the drain of the mixer. If the difference between the input signal and the VFO signal is, say, 800 Hz, a tone of this frequency will be present in the output; assuming the input signal to be keyed, this keying will appear on the tone. Obviously the VFO could be tuned either side of the input signal, so two outputs are available. Having a signal present on both sidebands can be a disadvantage, but having two signals to choose from can sometimes be an aid in avoiding QRM. R4 is the drain load, and C4 decouples the RF component of the output. The resultant signal is coupled *via* C5 into TR2, an audio preamplifier.

The mixer preamplifier circuits are very simple to construct, a suitable layout being shown in Fig. 2. The board can either be a home-etched printed circuit board or a piece of perforated matrix board with wire interconnections. The most critical part of the construction is the wiring around L1/VC1 which must be short and well screened to minimise breakthrough of unwanted signals; a suitable layout is shown in Fig. 2. (The original S.C. Deluxe used a 250pF solid dielectric tuning capacitor culled from a scrap "Far East Wonder" AM radio). If VC1 is more than about an inch from the mixer board a screen lead should be used to connect L1 to C1 on the board. So far I have merely described the original S.C.D. mixer arrangement, but now we consider improvements.

### Audio Amplifier

The S.C.D. used an integrated circuit amplifier, the LM380. This was chosen because it is inexpensive and requires very few external components. Of all the receiver circuitry for the S.C.D., and there was not much of it, the LM380 stage was the one I disliked. Useful little IC though it is, I prefer to use discrete component amplifiers for receiver audio stages. In such IC's the biasing is done internally and many are prone to cross-over distortion at weak signal levels, and the LM380 is not the quietest of amplifiers and has a high no-signal current requirement. For simple direct conversion receiver applications, a low noise, high gain, discrete component amplifier is probably a better bet.

The audio circuit for the S.C. Deluxe is one I first met through G3GW1's "Ebor" transceiver published in the Summer 1979 issue of SPRAT, the journal of the G-QRP Club; the circuit is shown in Fig. 3. It uses fewer components than most amplifiers of similar gain and, with careful choice of transistors, performs with very little noise. I have used it in several applications over a couple of years and found it more than satisfactory in quite sophisticated receivers. TR1 and TR2 are a pair of complementary low noise transistors and the output stage TR3 is the same type as TR1, although any suitable npn type would serve.

The table of values quotes a BC318/BC321 combination for TR1 and TR2, with another BC318 for TR3. These were used because I obtained a cheap stock of these pairs, but several other combinations are possible. These include: BC319/BC322, BC414/BC416, BC171/251. In the "Ebor" design, G3GW1 used a BC109/BC251 pair for TR1 and TR2, which seemed to work well and so probably would the correct pairing of BC109/BC179. As with all the circuits in this series see what is available at low cost. The S.C. Deluxe also used tantalum bead capacitors for the

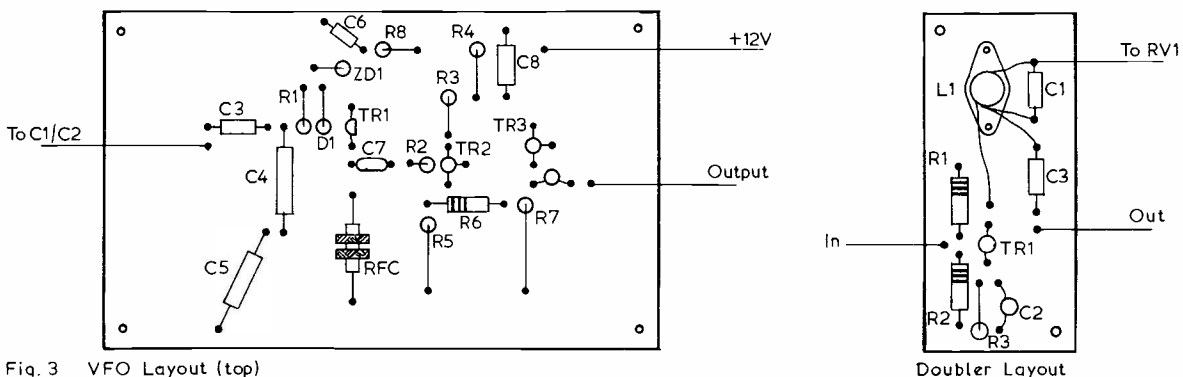


Fig. 3 VFO Layout (top)

Doubler Layout

D 669

Refers to Part I, see May issue.

Receive input coil wound on Amidon formers. L1a over earthy end of L1.				
L1	L1a	Wire	Former	Bands
34t	4t	24swg	T68-2	80/40m
20t	3t	22swg	T50-2	40/20(15)m

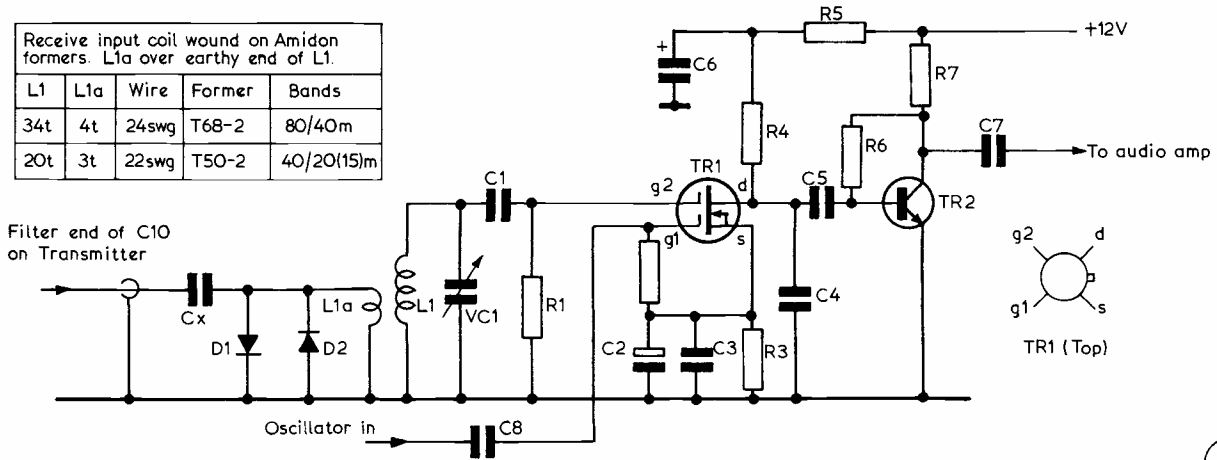


Fig.1 SCD RECEIVER MIXER CIRCUIT

D 678

polarised values C1 to C4. Their small physical size allowed a very convenient layout and again I obtained them cheaply. "Tants" can be expensive so the constructor may prefer to use normal electrolytic capacitors.

The layout for the amplifier is shown in Fig. 4, for which I etched a simple printed circuit board. The spacings assume the use of tantalum capacitors, so the use of electrolytics will require a modified spacing. As with the mixer board, it would be quite possible to use plain perforated board and interconnect with thin wire under the board. The layout of this amplifier is not too critical, the first time I tried it was using a plug in type breadboard. (No madam, that's not an electrical kitchen aid, it's a method of prototyping electronic circuits). The leads between the preamplifier, VR1 and C1 of the audio amplifier need to be screened.

**Attenuator**

One of the problems of simple direct conversion receivers is their susceptibility to cross modulation and broadcast breakthrough. Anyone who has used such a receiver on the 40 metre band in the evening will know the difficulty only too well: the amateur signals are there, but swamped by nearby broadcast stations. This is not surprising in a simple receiver with only one tuned stage to sort out the goods from the garbage. A simple, but effective, aid to overcoming this problem is to use front-end attenuation, achieved by applying a resistive network to the incoming signal to reduce its strength. It may sound dubious, if not silly, to reduce the incoming signal level to such a basic receiver — surely this will reduce the sensitivity. However, a direct conversion receiver with good audio stages should have more than adequate sensitivity, at least to match the range of a QRP transmitter stage. A greater problem is the Dynamic Range; that is, the range of incoming signal levels that the receiver front-end can cope with at any one time. It is this problem that is aided by attenuation. (Attenuation, in principle and practice, was discussed by the author in an article in the April issue of *Short Wave Magazine*).

**Table of Values**  
Fig. 1

R1 = 47K	C4 = 0.01 μF
R2 = 33K	C5, C7 = 0.22 μF
R3 = 1K	C6 = 100 μF elect.
R4, R7 = 4K7	TR1 = 40673 (see text)
R5 = 220R	TR2 = BC109
R6 = 1M2	VC1 = 250 pF variable
C1, C8 = 100 pF	L1, L1A = see text
C2 = 25 μF elect.	D1, D2 = 1N914 or similar
C3 = 0.02 μF	Cx = see text

Fig. 5 shows a very simple attenuator which can be added to the front-end of the S.C.Deluxe. What could be more simple than just one potentiometer? VR1 is merely a carbon track linear potentiometer acting as a potential divider to the incoming signal; this is the most basic form of the L-network attenuator which has the problem that the input and output resistances of the circuit vary according to the level of attenuation. However this is no real obstacle in a receiver as simple as the one we are using. There are just a few critical factors to consider in this circuit. The potentiometer must be a good, clean tracked, linear type; the value is not too important. A 5K linear potentiometer was used in the original S.C.Deluxe, although values from about 200 ohms to as high as 10K ohms could be used. It is essential to use screened leads both to and from the attenuator control, and if these can take a short route, so much the better.

The attenuator is placed before the input winding of the mixer tuned circuit. In Fig. 1 that is between Cx and L1a (D1 top) of the mixer input tuned circuit; also in Fig. 1, the input to Cx is taken from the PA side of the transmitter pi filters so that these filters can provide additional tuned stages for the receiver. Astute readers may question the wisdom of having Cx and the attenuator potentiometer connected to the output of the PA transistor even

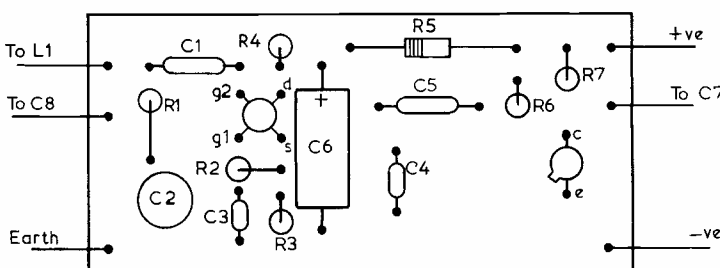
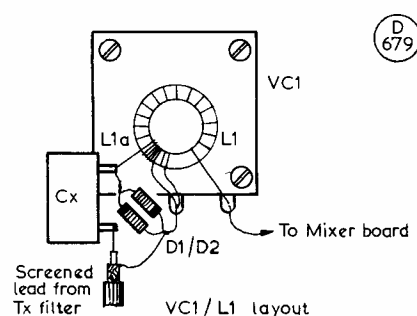


Fig. 2 RECEIVER MIXER BOARD LAYOUT



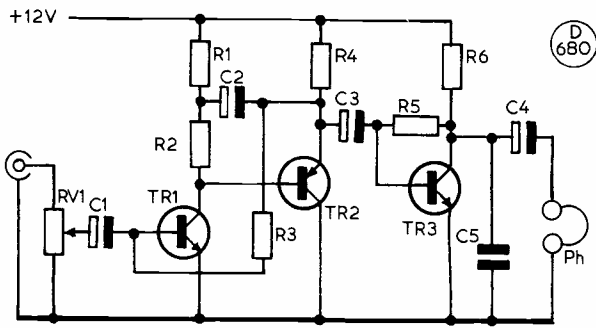


Fig.3. Audio Amplifier circuit

Table of Values  
Fig. 3

R1 = 2K2	C1 = 10 $\mu$ F bead tant.
R2 = 220K	C2 = 47 $\mu$ F bead tant.
R3 = 1M	C3, C4 = 4.7 $\mu$ F bead tant.
R4 = 2K7	C5 = 0.01 $\mu$ F disc
R5 = 82K	TR1, TR3 = BC318
R6 = 1K	TR2 = BC321

when transmitting. If in doubt, don't do it, but it did not appear to be a problem in the S.C. Deluxe as originally tested. Some RF will be lost from the transmitter so if the constructor really wants to conserve all the precious transmit signal, the input to the attenuator can be routed directly to the aerial changeover switch. I used the S.C. Deluxe without an aerial changeover switch, relying on D1 and D2 to protect the receiver front-end on transmit.

### Band-Pass Tuning

The inclusion of an RF attenuator highlighted the shortcomings of only having one tuned stage feeding the signal into the mixer. This one tuned circuit is also very critical to tune; when changing bands it must be peaked exactly to the required frequency. One or two of my correspondents about the S.C.D. receiver mentioned that they had fitted a slow-motion drive on their VC1 control. I used a far simpler, and cruder method of ensuring peak tuning. Simple direct conversion receiver input tuned circuits tend to be microphonic when they are peaked, so I tuned VC1 carefully by listening for a peak in the signals and then checked by tapping the case. This gave a lovely metallic "ping" in my S.C.D. audio output! (I think this is what they call "equipment-user interface"). One of the delights of simple equipment is that the operator operates! With a commercial "grey box", the operator becomes a "user". So much for the sermon — how can we improve the input tuned circuit?

A bandpass filter circuit on the input of the S.C. Deluxe receiver does it no end of good. The idea is to have several tuned circuits for the required band, loosely coupled, to provide tighter input tuning for the receiver; a suitable circuit is shown in Fig. 6. The tuned circuits L1/C1, L2/C2, L3/C3 all tune the required band; C4 and C5 are low values of capacitance to loosely top couple the tuned circuits; L1a is a low impedance winding to match the input

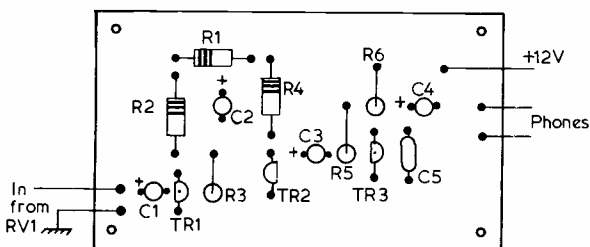


Fig.4. Audio Amplifier layout

to the receiver, and L3 is tapped to provide a suitable match into the mixer via C1 of Fig. 1. The filter is simply inserted into the circuit of Fig. 1 in place of L1 (L1a) and VC1.

Previously I have made bandpass filters for receiver inputs using toroid formers for the coils, but these formers cost good money. Some time ago I bought a lot of 3/16" cored formers in small screen cans for five pence each from J. Birkett of Lincoln. L1, L2 and L3 have identical numbers of turns and are close wound to fill almost the whole length of the former, the turns can be secured with model makers cement; L1a is wound over the earthy end of L1. The best method of making the tapping on L3 is to wind the number of turns to the tap and then twist the wire into a loop and continue the winding. Small silver mica capacitors for C1, C2 and C3 can be mounted inside the can, although if cheaper large types are available they can be outside the screened can.

It will be noticed that C1, C2 and C3 are not variable: the bandpass filters tune the whole CW sector of the required band. A great asset — no more fiddling to tune for a peak when changing bands. The alignment of the filters is performed in-circuit using the cores of the coils and listening on the receiver for a peak. If this is done in the centre of the usable CW sector, the filter will be sufficient for the required range within that band. This peaking can be done with a signal generator or just by listening to CW stations on the band.



Rev. G. C. Dobbs, G3RJV, author of "The S.C. Deluxe" and many other articles, seen working here on *Sprat*, the journal of the G-QRP Club. George, of course, was joint winner with G4BUE of the 1981 Short Wave Magazine article competition.

Now — the disadvantage is that there are two filters for the 40m. and 20m. bands, which originally were tuned with one variable capacitor; this means that the filters have to be inserted for the particular band in use. The most obvious way is to switch them over when changing band: both the input and output of the filter requires switching, so two changeover switches or a double pole changeover switch is required. I used two inexpensive slide switches mounted either end of the filters on the piece of printed circuit board which holds the filters; these switches were ganged using a plastic strip which gives a push-pull switching action. Whatever type of switching is used, all the leads must be well screened and as short as possible.

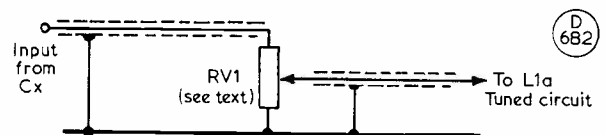
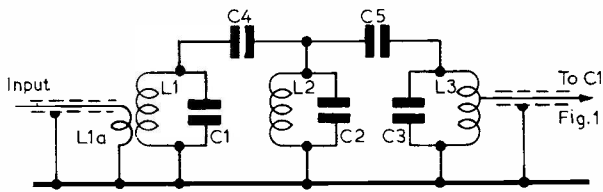


Fig.5. Attenuator circuit



	C1,C2,C3	C4 C5	L1	L2	L3
40m	200p	8.2p	22t 26swg L1a 3t	As L1	As L1 tap 17t
20m	100p	3.9p	14t 26 swg L1a 3t	As L1	As L1 tap 10t
All coils on 3/16" former, with core and can. Capacitors miniature s.m. C1,C2,C3 inside cans					

Fig.6. Bandpass Filter Circuit

D  
683

The bandpass filter helps overcome a lot of the problems experienced with the simple one-tuned circuit input. The attenuator, if fitted, should require less use. I also dispensed with

the idea of using the transmit pi filter as part of the receiver input circuit and took the input to the receiver directly from the aerial. The added complication of extra tuned circuits and switching is well worth the effort. Band changing also becomes much quicker, with a simple switch-over and no extra adjustments.

Quite a sophisticated rig, this S.C.Deluxe — if both transmit pi-networks and receiver bandpass filters are switched, there are no adjustments required to any any part of the transceiver when the switching of bands takes place. Eat your heart, Yaesu Musen!

With these modifications, the S.C.D. receiver gives a considerably improved performance. The audio filter shown in the original S.C.D. article in *Short Wave Magazine*, April 1980, can also be added between the audio preamplifier and the main amplifier board. In the third and final part of the S.C.Deluxe we will consider transmitter PA protection, an improved SWR meter, alternative aerials, and aerial tuning units and power supply safety.

**References:**

“Solid State Design For The Radio Amateur”, ARRL. “Sprat” (the journal of the G-QRP Club), Summer 1979.

**Components:**

J. Birkett, 25 The Strait, Lincoln.

# HALF-WAVE LOOP ANTENNA FOR 160 METRES

L. DIXON, G3XXQ

**S**INCE first being licensed the writer has been chiefly interested in the 160 metre band, and this presented no problems since a co-operative neighbour allowed his house to be the end support of a 200-foot-wire. This antenna allowed G3XXQ to chat to friends all around the British Isles with S9 reports, and to work into the States when conditions were good.

When new neighbours moved in the wire had to come down and it was necessary to think of a way of continuing to operate on the band, using an antenna which would fit into the available garden space.

The maximum length available was approximately 95ft., the house being roughly in the middle of this space — not too promising for a 160 metre antenna, it was thought. However, something had to be attempted, so a small mast was erected in the back garden against the fence, a wooden pole secured to the chimney using a Jaybeam double lashing kit, and a third mast lashed against a small tree in the front garden, the tree providing both support and camouflage.

A quarter wavelength of wire could be accommodated using these three supports, and the arrangement is shown in Fig. 1. A good earth is essential for a quarter-wave antenna, so some metal stakes were sunk into the garden and a length of reasonably heavy duty cable run up to the shack, this being in an upstairs bedroom; the domestic cold water system was hooked-up to this, and for good measure some wire radials were draped around the garden and also connected up. This antenna was matched to the 160 metre transmitter using a standard series-tuned ATU, see Fig. 2.

Now for the results. It was soon found that reports were down on the 200ft. wire by at least three ‘S’ units, the difference (on 160 metres) between good copy and being “down in the noise”. It was assumed that most of this reduction in transmitted signal strength was due to mainly two factors: first, losses in the imperfect earth system, and secondly, the current antinode being near the feed-point of the antenna, which was neither very high up nor in the clear.

After some thought it was decided that both of these problems could be overcome by inductively loading the antenna at the far end. With the correct value of inductance in circuit, the antenna could be made to ‘look’ like the original 200ft. wire which was a 3/8 wavelength at 1.8 MHz. Accordingly, a coil consisting of 60 turns of 18 s.w.g. enamelled copper wire, on a 2-in. diameter plastic former, was connected to the far end of the antenna at the top of the mast in the front garden. Approximately 15-ft. of wire was attached to the other end of the coil, this wire being tethered *via* an insulator to a peg near the base of the mast (Fig. 3).

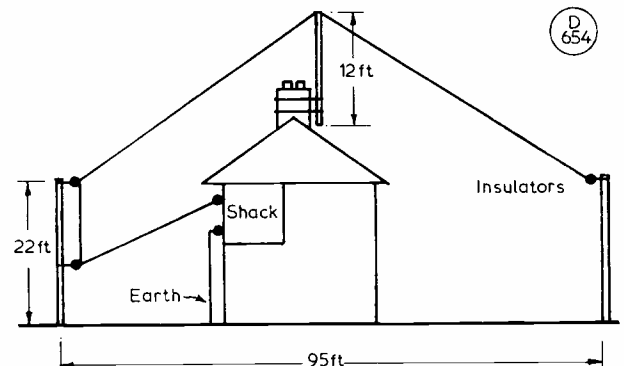


Fig.1. SIDE VIEW OF HOUSE AND QUARTER WAVE ANTENNA



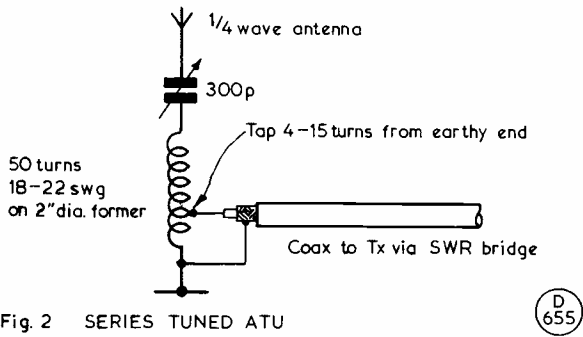


Fig. 2 SERIES TUNED ATU

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There are several ways of finding out if the amount of inductive loading is correct, and that the antenna is behaving as a 3/8 wave. The quarter-wave antenna requires a series tuned ATU to match it to the transmitter, whereas the 3/8 wave antenna requires parallel tuning (Fig. 4a), or can be matched using a single airspaced variable capacitor of about 500pF (Fig. 4b). If the newly loaded antenna can be matched using either of these systems then the antenna is working as a 3/8 wave; the loading is adjusted by simply changing the length of wire after the coil.

If an RF ammeter is available, then a significant drop in antenna current is noted when the 3/8 wave is connected in place of the quarter-wave. A better guide is to use a grid dip oscillator and adjust the end wire until the antenna is resonant as a quarter-wave on approximately 1.4 MHz; this method is shown in Fig. 5.

This loaded 3/8 wave gave much better transmitted and received signals, especially on sky-wave contacts, the current antinode — the ‘working’ part of the antenna — being up in the clear.

This antenna was used for a year or so and gave good service during this period, although it was not quite as good as the full sized antenna, as one would expect. After this period it was decided that a balanced antenna might be worth trying, the thinking behind this being that this might reduce TVI and AFI and that a balanced antenna would pick up less local ‘hash’, and television timebase noise which was becoming more troublesome as more neighbours were watching colour television sets with powerful line output stages.

A commercial ATU had been obtained with facilities for matching balanced feeders, so it was decided to try a loop antenna. The loading coil was dispensed with and the two ends of the antenna were connected together by a length of wire run around the side of the house, the wire running parallel to the ground at a height of

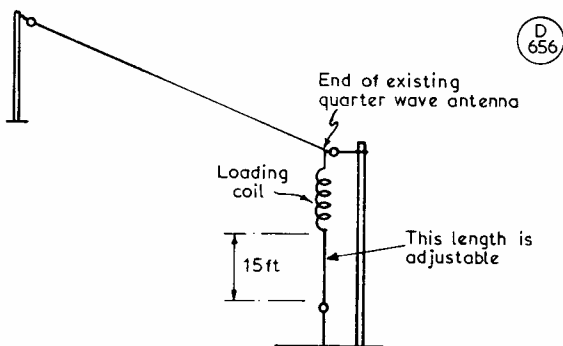
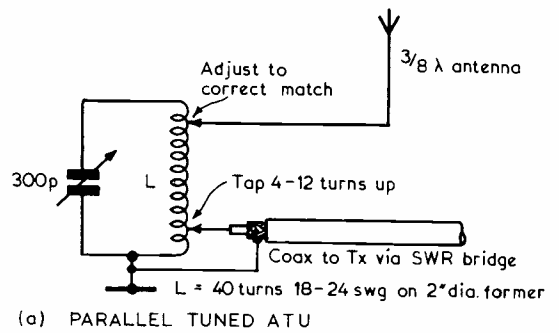
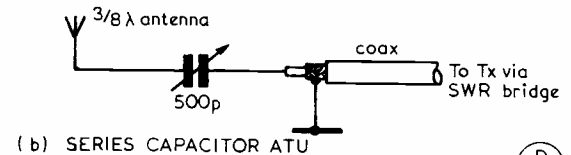


Fig. 3. END LOADING APPLIED TO QUARTER WAVE ANTENNA

D 656



(a) PARALLEL TUNED ATU



(b) SERIES CAPACITOR ATU

Fig. 4.

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about 8ft. Some 25ft. of open wire feeder was made up using PVC covered flex (16 s.w.g. soft copper wire would have been better) and plastic plant labels were used as spacers; any spacing from two to six inches would be fine.

This system loaded up without any problems. Transmitted signals were up, compared with the loaded 3/8 wave, and received ‘hash’ and television timebase ‘harmonics’ were down. The actual amount of wire in the loop is slightly less than a half wavelength; the layout of the loop is shown in Fig. 6.

The feed-point impedance of a closed half-wave loop is high and so quite high RF voltages will be present, even when running comparatively low power on 160 metres. The radiation resistance of a closed half-wave loop (measured at the point of maximum current) is very low, in the region of 5 to 10 ohms. This point of maximum current will always be opposite to the feed-point, so the feed-point determines where the current maximum is; in the writer’s case it is arranged to be at the highest point of the antenna.

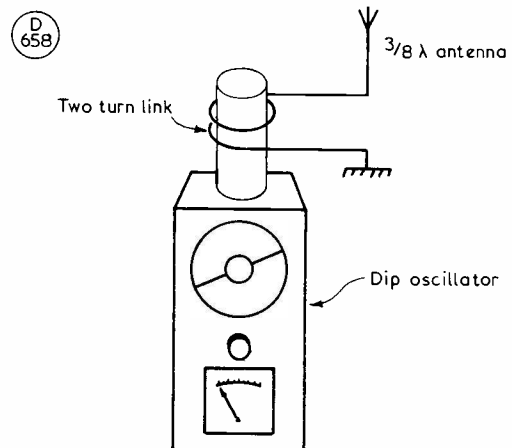


Fig. 5. MEASURING THE 1/4 WAVE RESONANT FREQUENCY OF AN END FED WIRE ANTENNA

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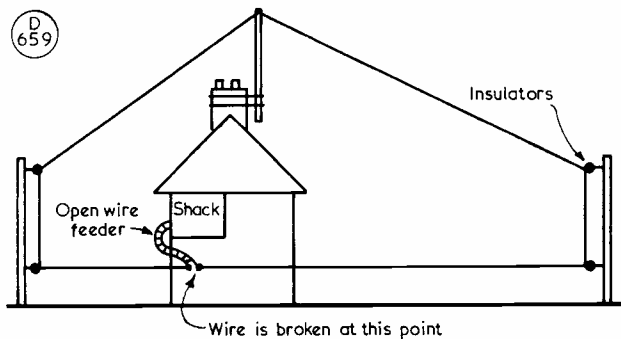


Fig. 6. THE HALF WAVE LOOP

The antenna could be fed with coaxial cable at the highest point and the *open* ends of the wire adjusted to resonate the antenna at the desired frequency. Three problems would arise, however. First, the feed-point impedance of the open loop would be a lot less than that of 50 ohm coaxial cable; secondly, the usable bandwidth of the antenna would probably be less than 200 kHz, the bandwidth of 160 metres; thirdly, the antenna could not be tuned up on other bands, whereas the closed loop fed with open wire feeder can be made to work on all bands.

The writer's antenna is particularly effective on 80 metres, on which band it is a full-wave quad element. Many Stateside stations have been worked on SSB and CW, using 100 watts output.

One local station tried out a loop which was largely in the horizontal plane, and found that his ground-wave signal was almost non-existent. When the antenna was modified so that it was more like the original configuration, both the ground-wave and sky-wave performance improved.

When the writing of this article was contemplated it was realized that not many amateurs would have an ATU like the writer's (Dentron MT2000A, a 'T' match network with a 4:1 step-

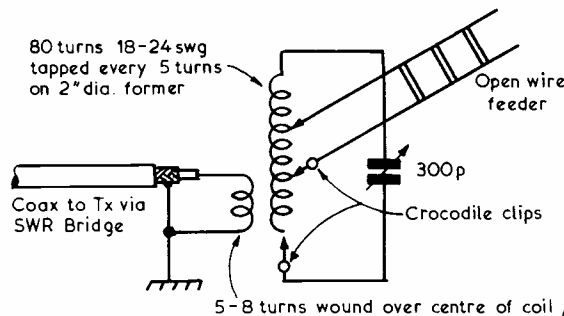


Fig. 7 BALANCED ATU FOR 160 METRES

down ferrite balun), so a simple balanced ATU was constructed and tested (Fig. 7).

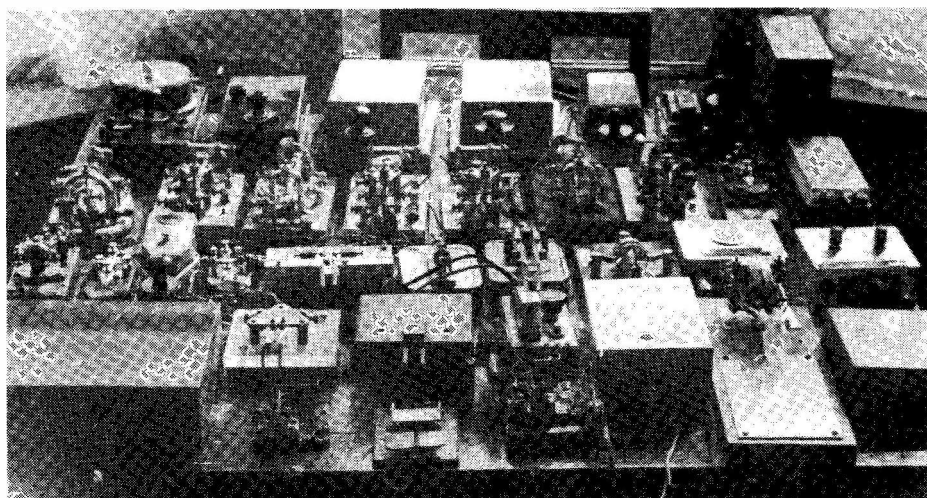
The performance was excellent and it has been tried by other stations with complete success. The feeders are tapped down the coil and the capacitor adjusted for minimum SWR.

This type of ATU will tune the loop on all bands, but is very tedious to adjust; once set up for Top Band, however, it makes a fine single band ATU. An insulated spindle is essential for the variable capacitor, as both sides of the capacitor are 'hot' to RF. (This also applies to the configuration shown in Figs. 2 and 4b).

### Conclusion

It is hoped that this article will encourage experimentation with 160 metre antennas and loop antennas for other bands. Many different shapes can be tried, depending on the space available, and good results will be obtained when the optimum antenna for the location is found. It is certainly not essential to have 265ft., or even 132ft., of garden space to enjoy 160 metre operating.

Arthur Kerford-Byrnes, G6AB, sent us this photograph of part of his collection of keying devices, and wonders how many of them readers recognise. Any offers?



# CLUBS ROUNDUP

By "Club Secretary"

## New Ones

**W**E have a letter from Mr. A. Thompson G6BKZ, 2 Fairfolds, Garston, **Watford**, about the formation of a new club in that place. If there is anyone interested, they should write to Mr. Thompson, or telephone him on Garston 79022. If at all comes together, we would like the necessary information for our records of course.

Next we have a letter from the **UK Horizontal F.M. Group**, who after having regular nets over the air for some time have decided to have an inaugural meeting, appoint officers and look for members throughout the UK and Europe. All the details from the Hon. Sec. — see Panel for his address.

## The Mail

First **Acton, Brentford & Chiswick**, who will be at the Chiswick Town Hall, High Road, Chiswick on July 21, when the members will be discussing ATUs.

**A.R.M.S.** covers the mobile interest, with regular issues of "Mobile News" and much that is of interest to the /M operators, whether at HF or VHF, at home or abroad.

**Ashford** — the one in Kent — is a small but lively club which has an Hq at the top of Hart Hill near Charing, which is located some ten miles from Ashford town on private property; they have a tower and various means of getting on the air, plus interest in video and computers, which come up at the regular Tuesday meetings. However, the venue isn't all that easy to find, so we would strongly recommend you to contact the Hon. Sec. — see Panel, and thus get the directions plus talk-in if that can be fixed up.

At **Barking** the production of the newsletter is down to the YLs in the club, Helen and Christine. The gang are open for business four evenings weekly: Mondays for construction, Tuesdays for Morse, Wednesdays for Operating, and on Thursdays the main meeting. For July, all attention is being focused on their entry in the Dageham Town Show, at Central Park, over the weekend July 11/12.

**Bournemouth** are now foregathering in their new place, the Conference Room, Coach House Motel, Tricketts Cross, Ferndown, 7.30 for 8 p.m. on the first and third Fridays of each month. It should be noted that entry is possible through the front in the normal way, or by a private entrance at the back (which short-circuits the bar)!

The letter and newsletter from **Braintree** indicates that they are to be found at Braintree Community Centre, which is in Victoria Street next door to the bus station; they have the first and third Mondays, usually taking the first as an informal and the "proper" meeting on the other one.

RTTY chaps, be they into mechanical or electronic teleprinters, all have a need for membership of **B.A.R.T.G.** whether it be for supplies, technical know-how, or just the newsletter and its contents. Details from the Hon. Sec. — see Panel.

The **Brighton** chaps are to be found on every 2nd Wednesday at 47 Cromwell Road, Hove. On July 1, they will have the annual Evening-Out at Brighton racecourse, with food drinks and raffle. July 15 will be taken as a talk by the Raynet lads, with a spot of recruiting thrown in! July 29 is down for a talk on test gear and how to use it.

At **Bromsgrove** there are two places to be mentioned; the Hq address is Avoncroft Arts Centre in Bromsgrove, and they also have a venue at the Parkgate Inn, which is off the A448. July 10 is

at Avoncroft operating the club station, but the usual Parkgate session is scrapped in favour of an aerial party at Sanders Park on 28th, for the Royal Wedding celebrations on 29th, for which they have been sharp enough to get GB2WED issued; for that bit of astuteness we reckon they will at least double the station QSO rate!

Now we head north of Watford, right to **Bury** in fact, where the 100+ members have Hq at the Mosses Community Centre, Cecil Street. All Tuesdays are used, but the second one in each month is set to one side for a talk or whatever, while the other evenings are devoted to operating, Morse tuition, discussions and so forth; there is an RAE class on the go, too.

**Cambridge** seem to be on the upswing, at Coleridge Community College; in term time they have the visual aids room, and the rig is in the Tower Room — details for July from the Hon. Sec. — see Panel.

**Cheltenham** have the use of the Old Bakery in Chester Walk, Clarence Street on the first Thursday and the third Friday of each month; on July 2, G4ASR will be analysing the 1980 Transatlantic Meteor-Scatter Tests, which should be quite interesting. July 17 is down for one of their rare natter evenings.

We have a quick blast from **Chesham** the scribe being a busy fellow. From this and our records, we find they have every Wednesday at the Chesham Whitehill Centre, and in addition they are putting on a special station signing GB4EOD on July 18 in Amersham, along with an exhibition on Disability. Details from the Hon. Sec. — note his different telephone number in the Panel.

## Deadlines for "Clubs" for the next three months —

*August issue — June 26th*  
*September issue — July 31st*  
*October issue — August 28th*  
*November issue — September 25th*  
*Please be sure to note these dates!*

Now to **Cheshunt**, at their home in the Church Room, Church Lane, Wormley on each Wednesday evening. July 1 is down for a junk sale, and on the 8th they will be out /P on Broxbourne Common to see if they can work their man in Yorkshire. Natter/CW practice nights are down for July 15 and 29, while on July 22 G8KHI will be talking about Computers in Amateur Radio.

**Chichester** will be out for the Annual Barbecue on Trundle Hill, Goodwood on July 7, and over the weekend 10/11th they will be running the special-event station for the 'Chichester 906' exhibition at the Guildhall, Priory Park. Thursday July 16 sees a normal club meeting and on July 19, of course, they will be at the Sussex Rally on Brighton Racecourse. The club room is at Room 34A, The Lancastrian Wing, Chichester High School for Boys, Basin Road, Chichester.

**Chiltern** have their place at the J. Hawkins furniture factory in Victoria Road, which lies off the A40 Oxford Road; they are booked in on the last Wednesday in each month. The programme details are not normally available far enough ahead for our deadlines, so the Hon. Sec. says if anyone cares to give him a ring in the evening, he can give them the latest situation. His address of course is in the Panel.

The **Clifton** move to the New Cross Inn was originally intended as a temporary expedient, but they seem to have taken root there, and there has been a slight upsurge in attendance. Every Friday it is, and on July 24 G8APV and G8DIU will be talking about and demonstrating UHF SSB equipment.

Down west now, to Cornwall and the **Cornish** club, at the SWEB Clubroom, Pool, Cambourne. On July 2 there will be a natter session; and of course the Cornish Rally is on July 19, at Cornwall Technical College, Pool. More details from the Hon. Sec. — see Panel for the new name and address.

Back into the south-east and we come to **Crawley**, where there is an informal on July 8, and the main meeting on July 22, when G4GHO and G3GRO will be talking about testing modern transceivers. This one is at Trinity United Reformed Church Hall, Ifield. The informals are held at members' homes so it would be best to talk to the Hon. Sec. should you wish to attend — see Panel.

**Cray Valley** have a talk by G4BWP on his trip to 9K2 and SV9, set for July 2 at the Christchurch Centre, but the venue for the July 16 will have to be elsewhere, so for this you must contact the Hon. Sec.

At **Crystal Palace** they are organised to meet on the third Saturday in each month at Emmanuel Church Hall, Barry Road, London SE22 starting at 8 p.m.

Having seen the back of the 'C' clubs we can turn to **Dartford Heath D/F**. Here we find that the attendance to the Friday evenings fell away and so were dropped, but the club continues very definitely to function well as a D/F outfit — full details from the Hon. Sec. at the address in the Panel.

Our next port of call is at **Derby**, the oldest radio club in Great Britain. Nowadays they are to be found on Wednesday evenings on the top floor of 119 Green Lane, Derby. July 1 is down for a junk sale, but we don't have the details for the rest of the month, for which we must refer you to the Hon. Sec. — see Panel.

**Edgware** have their programme teed-up for a long way ahead usually; in July we see VHF NFD at Mote End Farm, Mill Hill, then on 9th a Film Show, and an informal on July 23. Looking ahead, they have indicated no meeting on August 13, doubtless due to the holiday season peak.

The **G-QRP Club** goes from strength to strength, and attracts new members all the time. Once hooked, the pleasures and the new skills derived from QRP operation seems to make people try ever lower power. And, of course, there is no doubt about the way the club encourages the art of home-brewing station equipment. To get the details, contact the Hon. Sec. — see Panel.

Reading the **Guildford** newsletter over the past few months it became clear that at the AGM G4BHQ was going to make sure he got rid of all his offices in the club, come hell or high water — and he succeeded too! In the process of course a new Hon. Sec. had to be elected, and once again we find a club with a YL member in office. However, turning our thoughts from the politics to the club, the Hq is at Guildford Model Engineering Society Hq, Stoke Park, Guildford; G8JMP does the "Count Down to Take Off" on July 10, and on 24th G8PHG exhorts them to "Come off the Bottle!"

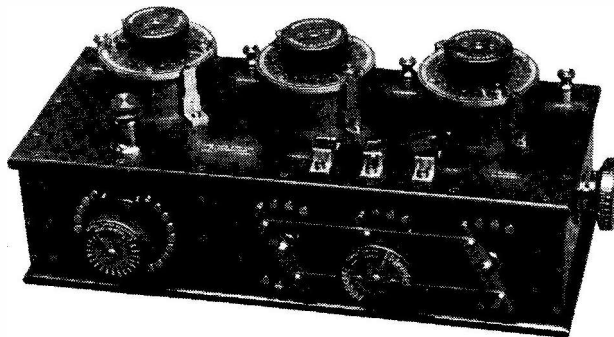
**Haveing** have their base at Fairkytes Arts Centre, Billet Lane, Hornchurch on Wednesday evenings, informal normally unless the programme says otherwise, which it does for July 8, when a Business meeting is indicated.

Looking on to **Hereford** we see the July dates in the "forthcoming attractions" section, as July 3 and 17. Doubtless they will be held at the Hq, County Control, Civil Defence Hq, Gaol Street, Hereford.

The **I.R.T.S.** had their AGM just before this came to be written, so at this moment we don't have any up-to-date information on what is going on in EI-land. The newsletter is the thing which gives us all the 'gen' and that had a difficult year; but we reckon anyone who is going to EI and wants an overview of licencing and clubs, could still write to the Hon. Sec. at the address in the Panel.

We have a nice a letter from the Hon. Sec. at **Louth**, in which he indicates that the club got off to a good start. July 14 is down as being an amateur television talk/demonstration by G4IPE in the club building, Pleasant Place, Ramsgate, Louth. Looking forward, they hope to have a new Hq sorted out around August, to enable weekly meetings and RAE and Morse classes to be run; so we suggest a telephone call to the Hon. Sec. to check the latest position before making a first visit.

At **Maidenhead** the group have been in the Red Cross Hall in The Crescent, Maidenhead on the first Thursday and the third Tuesday of each month. July 2 sees a discussion on second-hand



Marconi Ltd. sent us this photograph of the 1907 multiple tuner stolen from their Chelmsford premises on 25th February. The stolen item is readily identifiable by the serial number 8015 beneath the legend 'Marconi's Wireless Telegraph Co. Ltd'. Any collector offered this item should inform the police, or the Historian, The Marconi Company Ltd. (tel: 0245-353221).

and a surplus equipment, and July 21 they have a two-metre Foxhunt arranged.

We now head for **Mansfield** and here we have to tell you that at the time of writing their doings for the summer were not settled — no matter, you can meet them at the New Inn in Westgate on the first Friday of each month.

At **Meirion** they have sent in a note about their participation at Dolgellau Sports and Hobbies Exhibition on August 3-8, to include HF and VHF stations and various bits of gear on show, plus the vital thing — members who are available to talk to anyone showing interest. This forward look has edged out their July doings, so we must refer you to the Hon. Sec. — see Panel.

Up in Scotland, **Mid-Lanark** were a bit late telling us of their Open Day; however, we note they are normally in session on every Friday evening at Wrangholm Hall, Community Centre, Jerviston Street, New Stevenson, Motherwell ML1 4UQ.

A sympathetic letter arrived from G8GAZ, who is the record-keeping at **Midland**, regarding our query as to the new Hq address in Broad Street — it is in fact at No. 294A Broad Street; this is the City end, near the Registry Office and opposite the Birmingham Repertory Theatre. It looks as though the dates are the third Tuesdays in the month. On a different tack, we were quite surprised to hear of the Repertory Theatre in Broad Street, having in younger days spent many hours over many years waiting for a bus opposite the Rep. in Station street!

Now to **North Devon** where they foregather on the second Wednesday in each month; the even months being taken at Bideford Community College in Abbotsham Road, and the odd ones at Pilton Community College, Chaddiford Lane, Barnstaple. August is missed altogether.

We hear from **Norfolk** that they are still at Crome Community Centre, Telegraph Lane East, Norwich, on Mondays. July sees informals on 1st, 15th, and 29th; July 8 sees a Computer Demonstration, and on July 22, a Quiz, devised by G3PTB.

It seems quite a while since we heard of the **North Bristol** group but they have obviously thrived, having now around 100 members and an Hq with four separate rooms for lect., RAE course, Morse tuition, and of course the shack. They are to be found there every Friday evening, the address being S.H.E., 7 Braemar Crescent, Northville, Bristol 7.

Alternating with the formal meetings of **Northern Heights** we see they have natter evenings, so that their programme can be summed up as "every Wednesday evening at the Bradshaw Tavern, Bradshaw, Halifax".

The note from **Pembroke** makes mention of their GW20P Annual Bucket and Spade Party at Saundersfoot, at the Regency Hall on September 13. However, the Hon. Sec. would doubtless be pleased to give you the club data as well he is at the address in the Panel.

## Names and Addresses of Club Secretaries reporting in this issue:

- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB.  
 A.R.M.S.: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey.  
 ASHFORD: J. A. Clarke, G3TIS, Yeomans Cottage, The Street, Brook, Ashford, Kent TN25 5PF. (*Wye 812888*)  
 BARKING: A. Sammons, G8LZH, Lyndhurst Gardens, Barking, Essex IG11 5BZ. (*01-594 2471*)  
 BOURNEMOUTH: G. T. Lloyd, G8GTB, 4 Gorleston Road, Parkston, Poole, Dorset.  
 BRAINTREE: D. A. S. Holmes, G3JSV, "Thaddeus House", East Street, Coggeshall, Colchester, Essex CO6 1SH.  
 B.A.R.T.G.: J. Binning, G3AJS, 293 Perry Street, Billericay, Essex.  
 BRIGHTON: J. Trimmer, G4JDM, 7 Dale Crescent, Patcham, Brighton.  
 BROMSGROVE: G. Taylor, G4HFP, 6 Marlborough Drive, Stourport-on-Severn, Worcs. DY13 0JH.  
 BURY: M. Bainbridge, G4GSY, 7 Rothbury Close, Bury, Lancs. BL8 2TT. (*061-761 5083*)  
 CAMBRIDGE: D. Leary, G8JKV, 9 Priory Avenue, Swavesey, Cambs. CB4 5RY. (*Swavesey 93*) 31120  
 CHELTENHAM: G. Cratchley, G4ILI, 47 Golden Miller Road, Prestbury, Cheltenham. (*Cheltenham 43891*)  
 CHESHAM: A. Scott, G8PUC, 8 Lynton Road, Chesham, Bucks. HP5 2BU. (*02-405*) 785625  
 CHESHUNT: M. Bragg, 2 Elm Drive, Cheshunt, Herts. (*0494*) 32114  
 CHICHESTER: S. Talbot, G8FCX, 31 Pier Road, Littlehampton, W. Sussex BH17 5LW. (*Littlehampton 5082*)  
 CHILTERN: P. B. Stears, G4LMN, 127 Hughenden Avenue, High Wycombe, Bucks. HP13 5SS. (*High Wycombe 24095*)  
 CLIFTON: R. A. Hinton, 42 Sutcliffe Road, Welling, Kent. (*01-301 1864*)  
 CORNISH: A. C. French, B.Sc., G8TUI, 12 Pentalek Road, Camborne. (*Camborne 71743*)  
 CRAWLEY: D. L. Hill, G4IQM, 6 Reigate Close, Pound Hill, Crawley, W. Sussex RH10 3TZ. (*Crawley 882641*)  
 CRAY VALLEY: P. J. Clark, G4FUG, 42 Shooters Hill Road, London SE3. (*01-858 3703*)  
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London SE23 3BN. (*01-699 6940*)  
 DARTFORD HEATH D/F: A. Burchmore, G4BWV, 49 School Lane, Horton Kirby, Dartford, Kent DA4 9DQ.  
 DERBY: Mrs. J. Shardlow, G4EYM, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. (*0332 556875*)  
 EDGWARE: H. Drury, G4HMD, 39 Wemborough Road, Stanmore, Middx. (*01-952 6462*)  
 G-QRP Club: Rev. G. C. Dobbs, G3RJV, 17 Aspen Drive, Chelmsley Wood, Birmingham B37. (*021-770 5918*)  
 GUILDFORD: Miss H. M. Davies, G8SXB, 1 Dundee Cottages, Scotland Farm Road, Ash Vale, Aldershot, Hants. GU12 5HY. (*Aldershot 310 704*)  
 HAVERING: A. Negus, G8DOJ, 17 Courtenay Gardens, Uppminster, Essex RM14 1DH. (*Uppminster 24059*)  
 HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford. (*Hereford 3237*)  
 I.R.T.S.: C. Yeates, EI7AAB, 126 Beech Park, Lucan, Co. Dublin, Eire.  
 LOUTH: R. D. Wilson, G4IPE, 112 Uppgate, Louth, Lincs. LN11 9HG. (*Louth 0507*) 602220  
 MAIDENHEAD: J. Patrick, G3TWG, Bedford Lodge, Camden Place, Bourne End, Bucks. (*Bourne End 06825*) 25275  
 MANSFIELD: J. M. Coates, G4GYU, 30 Abbott Road, Mansfield, Notts. (*Mansfield 27257*)  
 MEIRION: Mrs. J. Jones, GW8SYX, 25 Fford Dyfrig, Tywyn, Gwynedd. *Tywyn 710 402*)  
 MID-LANARK: G. Hunter, GM3ULP, 12 Airbles Drive, Motherwell, Strathclyde, ML1 3AS. (*Motherwell 53394*)  
 MIDLAND: N. Gutteridge, G8BHE, 68 Max Road, Quinton, Birmingham B32 1LB. (*021-422 9787*)  
 NORTH DEVON: H. G. Hughes, G4CG, Crinnis, High Wall, Sticklepath, Barnstaple, Devon EX31 2DP.  
 NORFOLK: P. Gunther, G8XBT, 6 Malvern Road, Norwich NR1 4BA. (*Norwich 610247*)  
 NORTH BRISTOL: G. E. Taylor, G2HDG, 66 Burley Crescent, Downent, Bristol BS16 5PW.  
 NORTHERN HEIGHTS: M. Topham, G8NUC, 1200 Great Horton Road, Bradford. (*Bradford 73271*)  
 PEMBROKE: M. A. Shelley, GW3XJQ, 2 Dewing Avenue, Manorbier, Tenby, Dyfed.  
 PONTEFRAC: N. Whittingham, G4ISU, 7 Ridgedale Mount, Pontefract, W. Yorks. WF8 1SB.  
 R.A.I.B.C.: Mrs. F. Woolley, G3LWY, 9 Rannoch Court, Adelaide Road, Surbiton, KT6 4TE.  
 R.A.O.T.A.: Miss M. Gadsden, 19 Drummond House, Font Hills, Long Lane, East Finchley, London N2.  
 READING: C. Young, G4CCC, 18 Wincroft Road, Caversham, Reading RG4 7HH.  
 REIGATE: L. V. Cates, G4AVE, 13 Bolsover Road, Merstham, Redhill RH1 3NU.  
 R.A.F.: The Admin Secretary, R.A.F.A.R.S., R.A.F. Locking, Weston-super-Mare, Avon BS24 7AA.  
 ROYAL NAVY: M. Puttick, G3LIK, 21 Sandyfield Crescent, Cowplain, Portsmouth, Hants. PO8 8SQ. (*Waterlooville 55880*)  
 SALTASH: R. S. Pridham, G4BVB, Lambs Fold, Latchley, Gunnislake, Cornwall PL18 9AX. (*Gunnislake 832891*)  
 SEFTON: L. Gurney, G4LBJ, 1 Endbourne Road, Orrell Park, Liverpool L9 8DP. (*051-523 6077*)  
 SOUTH BIRMINGHAM: Mrs. G. Apperley, G4GZI, 35 Denise Drive, Harborne, Birmingham 17.  
 SOUTHDOWN: R. E. Holtham, G4EKS, 2 Benbow Avenue, Eastbourne, E. Sussex BN23 6AB. (*Eastbourne 31620*)  
 SOUTHGATE: Mrs. V. Austin, G8PZY, 89 Chaseville Park Road, Winchmore Hill, London N21. (*01-360 5832*)  
 STEVENAGE: S. Clarke, G8LXY, 126 Putteridge Road, Stopsley, Luton, Beds. LU2 8HQ.  
 STOURBRIDGE: M. Davies, G8JTL, 25 Walker Avenue, Quarry Bank, Brierley Hill, Staffs. (*Lye 4019*)  
 SURREY: R. Howells, G4FFY, 7 Betchworth Close, Sutton, Surrey SM1 4NR. (*01-642 9871*)  
 SUTTON & CHEAM: G. Brind, G4CMU, 26 Grange Meadow, Banstead.  
 SUTTON COLDFIELD: N. Sanderson, 130 Wilmott Road, Four Oaks, Sutton Coldfield. (*021-308 6567*)  
 U.K.H.F.M. GROUP: A. Dorsett, G8YLH, The Coach House, Dogmersfield Park, Dogmersfield, Hants. (*Aldershot 850678*)  
 UNIVERSITY OF N. WALES (Bangor): S. Brown, Amateur Radio Society, Dept. of Electronic Engineering, Dean Street, Bangor, Caerns.  
 VALE OF THE WHITE HORSE: A. Lovegreen, 16 Church Lane, Wallingford. (*Wallingford 37482*)  
 VERULAM: G. Dale, G3PZF, 16 Palfrey Close, St. Albans, Herts. (*St. Albans 57665*)  
 WACRAL: L. Colley, G3AGX, Micasa, 13 Ferry Road, Wawne, N. Hull, Yorks. HU7 5XU.  
 WAKEFIELD: R. C. Sterry, G4BLT, 1 Wavell Garth, Sandal Magna, Wakefield. (*Wakefield 255515*)  
 WATFORD: A. Thompson, 2 Fairfolds, Garston, Watford.  
 WEST KENT: B. P. Castle, G4DYF, 6 Pinewood Avenue, Sevenoaks, Kent TN16 5AF. (*0732 56708*)  
 WHITE ROSE: The Hon. Sec., White Rose ARS, P. O. Box 73, Leeds LS1 5AR.  
 WIRRAL: G. O'Keefe-Wilson, G8VPF, 20 South Drive, Upton, Wirral. (*051-677 1531*)  
 WORCESTER: M. Tittensor, G4EKG, 16 Durcott Road, Evesham, Worcs. WR11 6EQ. (*0386*) 41105  
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Close, Yeovil, Somerset. (*Yeovil 24956*)  
 YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

No such doubts at **Pontefract** where they like it to be all on record: the venue is Carleton Community Centre, Pontefract, every other Thursday. Thus for July they have July 9, when G3VTD will be talking about video cassette recorders, and July 23, when G3AAO will give some information and constructional data on the club project (which is an electronic keyer). Incidentally, if you are looking for them, try the top floor!

We mustn't forget the **R.A.I.B.C.** crowd — if you know anyone who is invalid or blind and would seem to be a candidate for **R.A.I.B.C.** (which is to say, they have an interest in listening and, maybe, going on for a ticket, either A or B Class) then put 'em up for membership. And, while you are about it enrol as a supporter yourself! Details from the Hon. Sec. — see Panel.

And, still with **R.A.I.B.C.**, we must not forget the Picnic event to which so many look forward to; it is down for July 5, and once again will be at the Fairground, Broadlands Estate, Romsey, Hants., using the entrance on the by-pass. This by kind permission of Lord Romsey.

## Old-Timer?

Then why aren't you a member of **R.A.O.T.A.** — the rules now are that membership is open to all those, SWL or licensed, who can prove that they have been involved with amateur radio for twenty-five years or more, this change arising from a meeting in April this year. Details of membership, says G2UV who sent the information in, are available from the Hon. Sec. — see Panel.

Back to our roundabout again, and this time it throws us off at **Reading**, where the gang are at the "White Horse" in Emmer Green, which is off the B481 Reading-Nettlebed road. At the time of their letter the speaker for July 7 awaited confirmation, but on July 21 G4ANB was down to talk about "Locator Systems".

The **Reigate** lot have their place in the Constitutional and Conservative Centre, Warwick Road, Redhill, where there is to be a junk sale on July 21.

The **Royal Air Force** group (**RAFARS**) lives in **R.A.F. Locking**; we hear they will be at Longleat, and at the local Flowerdown Fair, this last on July 4. Details of membership for

servicing and past members of the R.A.F., from the Hon. Sec. — see Panel.

The **Royal Navy** comes next, and membership here is open to serving and ex-RN people, and also to MN and foreign navy personnel, the detailed conditions being available from the Hon. Sec.

Time and space presses in on us, so we must hasten to reach **Saltash** — they are “at home” to visitors and members on the first and third Friday of each month, at Burraton Toc H.

Alternate Wednesdays sees the **Sefton** crew getting together, at Liverpool Prison Officers Social Club, Hornby Place, Hornby Road, Walton, Liverpool 9. Details of the July activities from the Hon. Sec. at the address in the Panel.

At **South Birmingham** the Hq is in use each week on the first Wednesday in each month for the formal business-and-lecture session. In addition every Thursday evening the shack is open for HF operation or whatever, and on Fridays they have an Open Evening, welcoming any visitors and opening the shack as well — all this at Hampstead House, Fairfax Road, West Heath.

**Southdown** are at the Chasely Home for Disabled Ex-Servicemen, Southcliffe, Eastbourne, on the first Monday of each month; for July, they are going out to enjoy “bangers and beer at Butts Brow”. On a different line, the article on giving a lecture in the current newsletter is thought-provoking, and should be more widely circulated.

While we were at Ally Pally we were nailed by the Hon. Sec. of **Southgate** who pointed out that the second Thursday in July will be the last at the Scout Hut in Wilson Street, Winchmore Hill; thenceforward they will be at the St. Thomas’ Hall, Prince George Avenue, N14., close by Oakwood Tube Station.

On to **Stevenage** where a new Hon. Sec. takes over the chores — see Panel for his address. He tells us they are still using the Senior Staff mess in the British Aerospace Plant B in Gunnelswood Road, and on July 2 Douglas Muir will talk about REACT there; July 16 is down for a natter session.

The July meeting of the **Stourbridge** group is in fact a visit to Air Call Birmingham Control Room — one would expect that a call to the Hon. Sec. would be needed in order to get in on this one — and we note there isn’t an August session.

Now **Surrey** which means T. S. Terra Nova, 34 The Waldrons, South Croydon on the first and third Mondays.

Not so very far away from Surrey are **Sutton and Cheam**, where they alternate between Sutton College of Liberal Arts (SCOLA) and Banstead Institute, High Street, Banstead; we must refer you to the Hon. Sec. for the July dates and doings, as our data doesn’t cover this month.

**Sutton Coldfield** are now based on Sutton Coldfield public library, Sainsbury Centre, on the second and fourth Mondays — more details from the Hon. Sec. at the address in the Panel.

Westwards again, down to **Torbay**, where the place to head for is Bath Lane, rear of 94 Belgrave Road, Torquay. The routine is to have informal gatherings every Friday evening, and a formal on the last Saturday of each month.

It is quite a while since we heard from **University College of North Wales** in Bangor. We understand they are intending to go to the Sussex Mobile Rally on July 19. Details from the Hon. Sec. — see Panel.

It is AGM time for the **Vale of the White Horse** gang, on July 7, at the “White Hart” in Harwell village — they have moved all their meetings to Tuesdays at the same place.

**Verulam** are most careful in getting the information to us; the main meeting is on July 28 at the Charles Morris Memorial Hall, Tyttenhanger Green, Tyttenhanger, near St. Albans; the informals are at the R.A.F.A in Victoria Street, St. Albans, where

the entrance is at the side of the building.

Membership of **WACRAL** world wide is now around the 500 mark — this group is for all Christian radio amateurs and SWLs, and details are to be had from the Hon. Sec. — see Panel for his address.

The **Wakefield** lads are in session on July 14 for G3WWF to talk about Propagation, and again on July 28, for a car Treasure Hunt. The indoors spot is Room 2, Holmfield House, Denby Dale Road, and the other date is set for 7.30 p.m. in the top car park of Holmfield House.

There are two venues for the **West Kent** meetings; the main ones are held at the Adult Education Centre, Monson Road, Tunbridge Wells, while the informals are at the Drill Hall in Victoria Road. The first named is in use on July 3 for a junk sale, July 17 for a talk on the amateur’s place in an emergency, given by the County Emergency Planning Officer. July 31 is down for a VHF Fox Hunt starting from the Drill Hall, and the Tuesdays not mentioned are also at the Drill Hall.

Quite a while since we heard from **White Rose**; their Hq these days is at Moortown Rugby Club, Far Moss, Alwoodley, Leeds 17, every Wednesday evening, when the business and lecture format is used. Informals also take place on Tuesday evenings (we think — check with the Hon. Sec. as the writing isn’t quite clear) and Sunday lunchtimes.

We have **Wirral** down as foregathering at the Sports Centre, Grange Road West, Birkenhead, on July 1 for a talk on aerials for confined spaces, and July 15 for a Treasure Hunt by Radio.

On July 6 at **Worcester** Hq, the “Old Pheasant” in New Street, the gang will no doubt be getting all ready for their Mobile Rally on July 12 at Droitwich High School.

The normal venue for **Yeovil** is in Building 101, Houndstone Camp; July 2 sends them off on a DX-pedition to Ham Hill, from which they return to hear G3MYM talk about “Skin Effect” on July 9. Single-hop propagation is considered on 16th, and there is Radio Quiz on 23rd, both being down to G3MYM again. Finally, they let him off the hook on July 30 and have a natter night.

**York** are at the United Services Club, 61 Micklegate on Fridays (except for the third one in each month) and also they have GB3OJS on July 4, and GB2GYS on July 14/15/16 at the Great Yorkshire Show at Harrogate. On a different tack they have a copy of a book by W3AMQ on the club in York, Pennsylvania, and it has provoked thoughts on a possible York net, with stations from all the Yorks around the world — an interesting thought indeed.

### Special Event Station — GB2STH

**July 30/31, August 1**, St. Helens and District A.R.C. will be operating GB2STH from the annual St. Helens Show, at the showground site, Sherdley Park, Marshalls Cross Road, St. Helens, Merseyside. Operation will be on HF and VHF/ UHF. Further details are available from P. Gaskell, G8PQD, tel: St. Helens 25472.

### Finis

That’s about it for this time. Don’t forget to check that you are up to date with your information — we need dates and what’s on, plus Hq address, and of course the Hon. Sec. address and telephone number for the Panel and our records. We don’t print the phone number if you don’t want us to, but it is very useful in pointing an enquiry in the right general direction. The dates for arrival are as in the ‘box’, and the address “Club Secretary”, SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts. AL6 9EQ.

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**“Short Wave Magazine” is the only freely available periodical in the U.K.  
published exclusively for the radio amateur, licensed or SWL.**

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David Foster, G3KQR, winner of the 1981 Thames Valley A.R.T.S. 'Caernarvon Trophy' for home construction, with a trio of beautifully finished telegraph keys — all of which are in regular use on the bands.

# MOBILE-AERIAL THEFT ALARM

STEPHEN McKINTY, G180YA

A LARGE number of amateurs operate 2m. FM equipment in their cars, and quite a wide range of aerials have been devised for this method of operation. These aerials can be attached in a number of ways, fixed attachment to the wing or roof is effective but can be undesirable when the car is to be sold, or if it is a company-owned car.

The other popular method of mounting is the magnetic base type. These not only do not damage the car, but can also be quickly removed and stowed inside if the car is to be left unattended for a period of time, and thus help prevent vandalism.

Unfortunately this ease of removal has its disadvantages as well. It is something of a nuisance to remove the aerial at every brief stop for a newspaper or packet of cigarettes, but leaving it unattended for only 30 seconds can result in the aerial being stolen. The circuit shown, Fig. 1, can help prevent this by sounding an alarm if the aerial is removed from the car.

It relies on the fact that when the magnetic base is placed on the bodywork of the car it will magnetise the surrounding metal, and this magnetism can be detected from the opposite side of the bodywork.

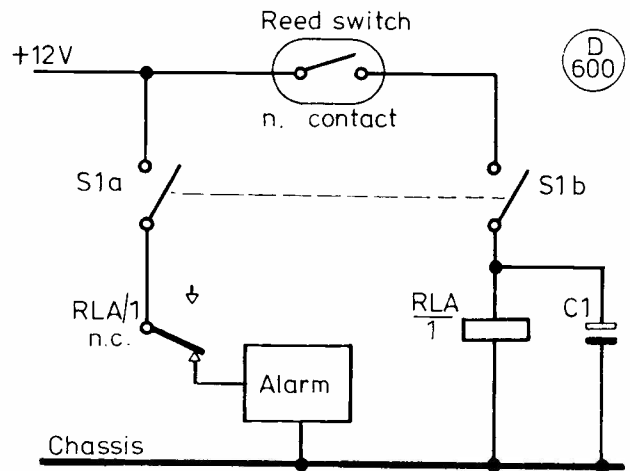


Fig.1 ALARM CIRCUIT

The circuit uses a small reed switch placed under the mounting point of the aerial, with its contacts held closed by the aerial magnet. These contacts supply power to RLA and keep contacts RLA1 open. If the aerial is removed, or the reed switch wiring cut, the relay will drop out and the alarm sound.

To allow the aerial to be removed by the owner, S1 (DPST) disables the alarm; S1a prevents the alarm being triggered, and S1b disconnects the power from the relay to prevent drain on the battery. Obviously if S1b opened before S1a, the alarm would be briefly triggered, and so C1 is included to hold the relay closed for a brief period after the switch is opened. Its value is dependent on the coil resistance of RLA and should be chosen by experiment to give a delay of 1-2 secs. If desired a diode such as a 1N914 can be connected across the relay coil to suppress switching spikes. The alarm can be any suitable warning device.



The new Northern Communications Wolf 1200 VHF FM monitor receiver. A full coverage 144-146 MHz VFO tunable receiver, with provision for up to 12 crystal channels which may be scanned automatically or selected in manual mode. The crystals, which are optional, are available ex-stock for £2.25 each for popular channels. The Wolf 1200 is supplied complete with mobile mounting bracket and operating guide, and can be used from any low current 12v. DC negative-earth source. Price is £46.00 inc. VAT and post/packing. There is also a marine band version available, the Wolf 1200/M, at the same price. Full details may be obtained from Northern Communications, 299-303 Claremount Road, Claremount, Halifax, West Yorkshire HX3 6AW.

# “A Word in Edgeways”

## Letters to the Editor

*The views expressed here are not necessarily those of the Editor, nor should they be taken to represent any particular SHORT WAVE MAGAZINE policy.*

*Dear Sir* — I noted with interest in February's column a comment by G3KPO of the National Wireless Museum, Isle of Wight, on the subject of SSB, and that it had been mentioned in *Radio Engineering* for September, 1925.

If he would care to turn to page 223 of Harmsworth's *Wireless Encyclopaedia*, published some two years earlier, under the heading "Beat Reception" he will find the subject discussed in full.

*Dennis Yates, Nottingham*

*Dear Sir* — I was pleased to read the Hobson's comments (May issue) on my letter in April's *S.W.M.*

It would seem from the tone of their letter that the subject touched a bare wire! Dare I suggest that Lloyd and Olivia would also have experienced difficulty with the offending CW beacon?

As to the oblique reference to vintage operators and vintage bands, *both* can be full of surprises. Top Band is used for cross-town nattering, but it is also used for working USA and Canada, as I have done on many occasions — with a lowly ten watts input. This kind of operating, of course, cannot be achieved with a limited antenna, limited experience, or limited inclination. Being an operator who prefers to work the CW ends of 20, 15 and 10 metres on the lookout for high-speed CW contacts, I do not experience the SSB QRM that troubles the Hobsons and their fellow 'blackbox' operators. However, I gather it must be fun, QRM and all, or they wouldn't do it — which after all is what it's all about!

What we must *not* do is to take our hobby so seriously that we lose the ability to smile at ourselves — and others.

Come come Lloyd, the G4 in question had a good laugh at my letter, so why did it upset you?

*Nev Kirk, G3JDK*

*Dear Sir* — If I understand John Cordeaux' letter (May) correctly, he is hoping for some of *Short Wave Magazine* to be devoted to Children's Band.

There are people who are either too stupid, or too idle, to show that they are competent to use non-type-approved radio (by passing an elementary exam); there are also those who would prefer a band which, through its high population, would make them un-policeable so they would not have to stick to any licence regulations. It is for these people to have access to radio equipment that CB has been created. (It must be said that in the Manchester area there are plenty of the second category on the 2m. FM band).

Now it seems to me that there is no more justification for wasting valuable *Magazine* space on non-technical CB-ers as there would be for wasting it on taxi radio operators. Neither have any similarity to amateur radio.

There is already a large number of more or less trivial comics specifically intended for the CB user; and if anyone actually needs help merely to connect microphone, mains plug and aerial to his black box, then these magazines are at about the right level.

I do not wish any ill to CB users, indeed from what I have heard of their band I wish them luck — they are going to need it. But let us not start any tie-up between amateur radio and CB; and in particular, keep the few amateur radio magazines we have for just that — amateur radio.

*A. Jaques, G3PTD*

*G3PTD need not worry: "Short Wave Magazine" always has been, and will remain, devoted entirely to amateur radio. Indeed, "S.W.M." is still the only freely available journal in the UK which provides this exclusive coverage — Ed.*

*Dear Sir* — I would like to comment on the letter of G4JQO and G4KQX in the May issue regarding Top Band. I wonder how many times they have told these 'amusing' stories about working beacons and the activities of the elderly G3's etc. In my view their comments are not in the best interests of amateur radio.

It must not be forgotten that much of 160m. working is done with home-brew gear, which is commendable and adds a further facet to the hobby. The AM mode also permits SWL's and pure beginners to listen with minimum outlay and gain some idea from which they may progress to more advanced listening. As an operator since 1961 using exclusively home-brew gear, mobile and fixed, on 160, 80 and 10 metres, I still find 160m. of interest. The Top Band operators in my area of Newbury, Reading and Swindon are considerate, interesting and helpful to newcomers and not critical of others' shortcomings.

Should Lloyd and Olivia decide to move to Newbury we may be able to lend them an antenna so that they can listen up 160 metres.

*Pat Painting, G3OUC*

*Dear Sir* — The article "Bitte QRX, Krieg" by G3MHF in the June issue brought back bitter-sweet memories of my own 'listening days' whilst serving in R.A.F. Signals during the war years, as I'm sure it must have done to other Wops and Woms.

Although numerous books, both official and unofficial, have been written about those far-off days, there must still be many fascinating stories which have not been put down on paper — perhaps because they were "off the record".

One such concerns air-sea rescue in the North Sea, a story I heard on several occasions but which I cannot confirm, as I was never connected with this branch of the Service.

If a pilot baled-out between England and enemy territory he fell into what was *very* cold water, and had to be rescued in a matter of minutes, not hours, otherwise he died of hypothermia. Despite its shallow depth, the North Sea can be most inhospitable, especially in winter, with grey skies, fog, mist and short choppy seas — all of which militated against ever finding a man floating in a Mae West with his head only a few inches above the water. So reliance had to be placed in radio direction finding, but an accurate 'fix', so essential to get even near the floating airman, was difficult to obtain with D/F stations only on the west of the North Sea.

Now, the Germans were having exactly the same problems in rescuing their airmen who fell into the North Sea, and it was realised that a much accurate 'fix' could be obtained if bearings could be exchanged between D/F stations on either side of the sea. This was strictly against all the rules and regulations, as any sort of communication with the enemy was forbidden!

Unofficially, though, bearings *were* exchanged, and as a result many lives saved. Whether or not the 'higher-ups' ever knew this was happening — and if so, turned a blind eye — is unknown, but it would be good to think that radio amateurs were involved in this use of wireless during the war.

Perhaps there is a reader who may be able to shine a little light on one of the few cases of co-operation for humanitarian purposes between wireless operators of the opposing sides.

*Douglas Byrne, G3KPO/G33WM*

*Address your letters for this column to "A Word in Edgeways", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.*



# COMMUNICATION and DX NEWS

*E. P. Essery, G3KFE*

THE month under review has been one of mixed blessings; despite the rainfall (around and upon G3KFE at least!) there has been more than the usual amount of local lightning, and of course old Murphy had to have his penn'orth and put the rain into the time-slot envisaged for aerial work. However, a visit to Ally Pally on the first day resulted in eyeball QSOs with lots of people, including G3MWF, G5AYL, and G4BUE — and we got out of the place with just a packet of green LEDs for a project, and no "big spend-ups" despite the temptations!

On a different note, we have it that Partridge Electronics Ltd., the firm of G3CED, the Joystick man and regular contributor to this piece with his QRP, has gone into voluntary liquidation. A sad event from many points of view, and one could have wished it not to happen in this Year of the Disabled because George has always employed disabled people as much as possible. On the other hand, he is way over the "normal" age for retirement, and so we hope he can go on doing the things he enjoys on the air for a long time to come.

So, to a consideration of the bands . . .

## Ten Metres

As always, summer conditions hit this band most, and for example, openings to North America have been relatively rare, with propagation swinging round to a more southerly direction, favouring Africa and South America.

G3NOF (Yeovil) found the long path to VK/ZL pretty poor, but around 1000 they came through short-path, along with some Pacific stations, while at 1600-ish, VU, 9M, 9V, VS5, and YB0 came through by short-path. Africans were often good in the afternoons and early evenings, while Caribbean and South American signals were around sometimes till 2100z; and of course the Russians have been about through the day. Don made his number with A4XIH, A4XIJ, A4XIZ, FM7AV, HC1BP, HH2BM, JY9RV, HZ1AB, JA3EQC, JH7BBK, RF8JDF, S79WHW, TU2JQ, UF6FFF, VS5DG, VU2LO, VU2TK, YB3BK, ZE1EE, ZS1UD, ZS5QM, 3B8AE/3B9, 5N0NAS, 8P6ON, 8P6OR, 9M20K, and 9V1UH, all as usual on SSB.

G4HZW (Knutsford) had run into a TVI problem, after two years trouble-free — the cause being, it would seem, that Winter Hill TV transmitter is on QRP temporarily, and turning Knutsford into a fringe area. However, even dropping the output by half, the FT-75 into a two-element quad still worked satisfactorily.

Prior to the TVI, there were SSB contacts, long-path, to VK/ZL, and the S.E. Asia openings in the afternoon. W4NLB got the prize as last W of the season, VK3VOS and VK3NES (both LP) completed April, and then JK1PDY, YB2DI (Java), N2DH/SV9 (Crete), HS4ANK, CE6COR, VK2BVD (LP again), PY2EGM who was running just two watts, JA6YBR, JA4IKD, JH5JSM, DU1FLA who gave Tony his 38th CQ Zone out of 40, 9M2FR, 5Z4SA for the 39th Zone (leaving just Zone 23 to get), UA9SET, and some more VKs; then the CQM contest which yielded 13 UA9/RA9 types, UK0AAO, UL7CBS, UK7PAL, and VU2IF, but never a smell of Zone 23; M1IPA on 19th May, after which the dreaded TVI struck, and output was cut to ten watts, which got out to 9G1RT, PY2BDY, ZD7HH, 5N0NAS, ZE1AR back to a CQ call(!), ZS6BNG, and S83W. In the meantime, a dipole for 21 MHz has gone up and been shown to work.

At G2DHV (Sidcup), there is now a two-element beam for this band, at 20 feet, there having been a complaint about the aesthetics of the four-element device — the first moan in some 49 years at the same spot! However, CW still manages to get out, and so PY4WG, EL2AV, LU5EEI, PY2DLK, VE3KYM, YV3AZC, PP5DY, ZS2CWD, ZS6XM, ZS6AEI, and A4XIH were hooked.

Poor old G2HKU (Sheppey) is horizontally polarised for the moment, having been attacked by a goggle-box which kicked him with a metal leg. Moral — never turn your back on a TV unless it is chained up! However, the QRP rig was set to work on Ten, with some four watts, and a few rattlings of the key brought in SM5GLW, and UK9KAF. Let's hope Ted is up and about again by the time this comes to be read.

G4BUE (Upper Beeding) has been doing some more experimenting with super-QRP; and during the weekend of the CQ WW WPX affair some interesting effects were noted, at the *distant* end. The idea was to find one of the Big Ones, sitting on his frequency and working the string, and then to call him, with very low power, and gradually step it up until G4BUE was heard. The chaps with good aeriels will respond to quite low power from G4BUE, but the lads with just the high power need much more oomph before Chris can make them hear. There seems to be quite a degree of consistency about this — the same stations respond in the same way time and again. Turning back to the super-QRP stuff, there was a WAC on the

Saturday of the contest with 250 milliwatts input, and a second WAC with 150 milliwatts; during the latter KG6DX, ZW4OD, EA8TY, UK2PCR, UK7GAA and K4KZE were worked in 19 minutes!

We must for the moment leave G4BUE — we will have more on his QRPp further on — and turn now to G4GMZ (Congleton) with a new QTH, on higher ground and with more room for aerial farming. However, for the moment the keying hand is diverted to such unacceptable activities as wielding a paintpot and laying bricks. But — a ten-metre dipole was put up between the gable-end and a fruit tree, with the guy tied to a garden bird-house used by some blue-tits; the height about 15 feet. At the home end the Old Lady (KW-2000B) was fired up, and some 30 watts of CW immediately raised W1CKU for a nice long chat. After this, the band seemed pretty flat, save for KV4CI who appeared out of an otherwise silent sky, and a ground-wave QSO with G4GLJ at 40 miles, and a half-QSO with a PY.

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**"CDXN" deadlines for the next three months —**

August issue — July 2nd  
 September issue — August 6  
 October issue — September 3rd

*Please be sure to note these dates.*

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G4LDS (Chelmsford) has had his radio activities interrupted by marriage, honeymoon, and then getting the house and the garden sorted out. However, there was the odd escape to the shack, and Ten saw QSOs with RA4, ZL2BED, JAs, VK5NRD, and ZS1LW on April 4; nothing then till April 9, when TG8NU and LU were raised at 1900z. On to the 11th, and this was quite a good day, starting with JAs, then called by three VKs. A call for Africa raised 9G1NV, and VE. Later in the day, a call for South America dredged up VP8PU followed by a series of LUs. On April 17, there was H44WH, UA4, 5B4JE, and next day more VKs. Then a week off to get wed, and on 29th there was UI8, 4X6BG, and 4X4FR (a new country); May 2 brought 9M20K and, after swinging the beam round to the West, HH2PW.

Ten for G3ZPF (Dudley) involved CW to a couple of PYs, SSB to VP2ARS, 5N1BCD, Ws and VEs, and the removal of the odd CB signal from the lower end of the band. And then — the aerial fell down!

### Top Band

The opposite end of our province; and, despite all the nastiness of the weather with the consequent high static level, the stalwarts still bang away, and still find their little surprises, *providing* they know where to look. One finds it so sad when a chap calls CQ around 1825-30 kHz and goes back to an OK or a G, when a look down at the bottom would have disclosed something in the real DX line calling him.

G2HKU offers his usual collection of interesting ones; SSB with PA0PN, plus CW to SP8BVJ, YZ9HDE, RA9AKM, DA1WA/HB0, SP9DH, GM3PFQ, and EZ5WBA.

W1BB's *Bulletin* shows some interesting and odd things happening. (Firstly, though, one must mention that W1BB is finding that age is taking its toll on his energy, and so he is doing less of the night-owl stuff; it only seems yesterday when we heard him breaking off a QSO to shin up to the top of the water-tower there and do a quick repair in freezing temperatures before coming down again and carrying on.) The absence of Loran from 1900 kHz, was enough to enable K2GNC to work three JAs for the first ever time between north-east U.S.A. and JA, with several other stations in the same part of the States listening, hearing the JAs, and not doubt *wishing!* VK6HD seems to have been doing his thing with some skill and panache, making his signals heard in all sorts of far-away places.

G4AKY (Harlow) missed the bus with VK6HD, as we told last time; however, a letter was speedily written and posted, and in the reply came the news that Dave had been heard by VK6HD — on a *different* date! Further news from Mike in the same letter was that during April he was able to work four Gs, DL, and EA8KY, but then had not heard anything outside VK (mind, though, his nearest outside VK must be VS5RP!) although he has a listen daily at his sunrise time. For those who are interested, July 1 sunrise is 2319z; 10th, 2317z; 21st, 2313z. August 1, 2307z; 10th, 2258z; 21st, 2247z. September 1, 2235z; 10th, 2222z; 21st, 2208z. October 1, 2157z; 10th, 2144z; 21st, 2131z. November 1, 2120z; 10th, 2112z; 21st, 2106z. December 1, 2104z; 10th, 2104z; 21st, 2108z. At VK6HD, the daily routine is to be on the band at sunrise time, looking at Top Band and Eighty, and operating the lowest one to be open. So — get on and call him, so at least he knows someone is in there and listening for him!

To return to G4AKY, it will be recalled that Dave had found four continents on one night's session, and was on the lookout for South America and VK. The VK we have discussed, but the South

American was again found by chance, when PY1ZAE was heard. So it's all stops out now for VK/ZL! On a totally different tack, the onset of M11PA on Top Band caused a certain amount of head-scratching among Those Present, but G4AKY went after him and raised him; his report to the M1 was RST279! Were that not bad enough, when the M1 station put it back to him, Dave pulled the headphone plug out, which knocked the keyer paddle to the floor (and to bits!) and made the last over somewhat fraught — good morse is not easy with the wreckage of the keyer in one hand and a bit of jumper in the other! Finally, to return to VK6HD, in Mike's letter to Dave, he indicates his usual spots are 1802 or 1807, QSX 1820-1852 kHz, and that UK stations should avoid 1829, 1830 and 1824 kHz, as these frequencies are badly QRM'ed in VK when the band is open. He also says that, when the band is open to G, he will only make short QSOs, exchanging RSTs and not much else, so as to get as many clients into the short time during which the path is open.

### Fifteen

Strange how blasé one can get about things — we have been pretty consistently giving this band the bum's-rush as being not really worth tuning-up on, but others have done some quite interesting and spectacular things.

G4BUE, for example, besides the 150 milliwatt input WAC we have already mentioned, has been going down as low as five milliwatts of input, at which level one has to forget the Argonaut PA, and take the output from the driver stage, lest one have more drive to the PA than output! At this level, says Chris, he finds himself unable to measure input adequately, so has to look at output power. To make sure of the position, Chris was at the time of his letter, preparing to get his output measurements calibrated. To return to 21 MHz, in the contest W7CPK, K5IU/C6A, YV1OB, UK8MAA, KP4KK/DU2, LU8DQ, N6YK/VP2A, and KP4CC were all raised with powers of less than one watt input, but the full five watts was taken to raise D4CBC and TYA11 for a couple of new countries — the score is now 214 countries worked with QRP.

Both Justin Cooper and your scribe received cards from K4NBN; Del is beaming to G on 21342 kHz most evenings, 1700-1900z, and would like to hear from more Gs and SWLs.

Another different tack now. G4LDS found himself on the end of a "rare drug" call from YUIPDP; it is a very long time indeed since we heard one of these, but Chris did the correct thing in passing the message straight to the local police. They came and heard for themselves and then departed to do the necessary — the Home Office, Interpol and so forth, The drug, Calciparin, duly went and arrived in time, and later a telex was sent from the Belgrade

hospital with their thanks for help. Marconi, for whom Chris works, put out a publicity sheet, and the word went round the local papers — as Chris says, at least it put the amateurs under the spotlight rather than the local CB merchants. Other 21 MHz contacts included a pleasant ragchew with VS6IC, plus 9V1UH, various Ws, HS4ANK and HS1BV in reply to a CQ, plus small fry of one and another sort.

The disturbed conditions are beginning to clear up, thinks G3NOF, but it was awful while it lasted. But you can't keep a DX'er down, so Don worked his SSB out to AH6CH/KH3, AP2MQ, AP2P, C31VK, C31WK, C5ADS, CP5EL, DU1CK, DU1ROC/6, DU6FER, DU7RLC, DK9XS/CT3, EA9GQ, FK8DH, G4COA/W0 (N. Dakota), H44JB, HM1SX, HS1AMB/P, J88AM, JA5JA1WCR/JR6, M11PA, P29NLS, P29NRL, S79MC, S79WHW, SV1KP/SV5, TL8CN, TY9ER, VKs, UL7LA, VP8AGY, VS5PP, VS6CT, VU2RX, YB0IX, YC2BJR, YC6HS, YC6NH, YJ8NPS, YK1AO, ZK1AR, 8P6KX, 8P6OR, ZM7JS (country no. 337 on Phone for Don), 6OODX, 6W8II, 7X4AN, W7QS/6, and WA0WNF for N. Dakota.

G4HZW in Knutsford has put up a dipole on 21 MHz, and has given it a whirl late at night, finding quite a few openings to W, for a bit of encouragement; as he says it makes a change as he has been on Ten ever since he got the ticket!

We nearly missed the G2DHW report on this band; George offers HZ1AB, JA6PX, A9XET, 9H1EC, VU2BK, CN8AD, 9H1MRL, and YB1AEE all on the key of course.

Then of course G2HKU and the QRP rig; CW at four watts was enough for UK9OAZ, UL7CT, EA5ET, K0MT (Colorado), HB9AQR, SV1IS, SM5CO who was also running QRP, and K8IF who was running five watts (and is also President of the QRP section of ARCI).

### Twenty

When there is a sunspot peak like the recent specimen, it is but natural that this band should be neglected — but it is rare to find a top-flight DX-chaser neglecting it to the point of not having an aerial and rig covering the band — so much of the real McCoy hides out here.

G2DHW looked briefly at the band, and worked UB5ZEA and a few other Europeans, just to let himself know things were OK.

Now G3NOF noted a lot of the short-skip phenomenon, plus the usual openings around the day, but he didn't spend a lot of time here. Don made SSB QSOs with AH6CH/KH3, AH6AY, C31VK, CT2DF, DA1WA/HB0, FK8CR, KV4AA, M11PA, VKs, and ZL0AAB who is probably better known as VK9NS.

G2HKU offers a bit on SSB and some CW too, full power and on QRP, all to

taste, CW accounted for FM7AV, K6DDO, UA6AQB, and WA4SNI at full power, plus QRP at four watts to UK3GAA, YU3TAN, OK3RXA, HA4KYN, UB5IBA, HG1W, UY5ZI, and YV5GRV; leaving SSB to ZL1VN, ZL3SE, ZL3FV, and WB0RSC in Iowa.

A new reporter is G2ACG (Dover), who has at the moment got use of the G3ROO "Tunbridge" QRP transceiver (a description of which is to appear very soon in *S.W.M.*) into what Dick describes as "an ordinary backyard aerial" — CW out to ZL1AZV, FP0FSZ, ZL3MA, VK2DM, UT5IT, UA6CYK, CN8CG, IS0RKN, and LZ1KBZ, plus SSB to VK2DM, YZ9CRM, LA1EBA, HB9BDG, SM3ATY, DK4PK/M, LA2QAA, ED5FPV, I3JVRV, DL8NU, YO3AJN, F9OJ, I1XSC, and SM5EWT. The aerial so rudely described is in fact a G5RV with centre at 30 feet and the ends drooping down to about 7 feet; we think it's doing rather well! Incidentally, this little rig of Ian's has gone the rounds and everyone has had lots of fun with it, and disproves the notion that "the ordinary amateur can't build and get working a SSB rig".

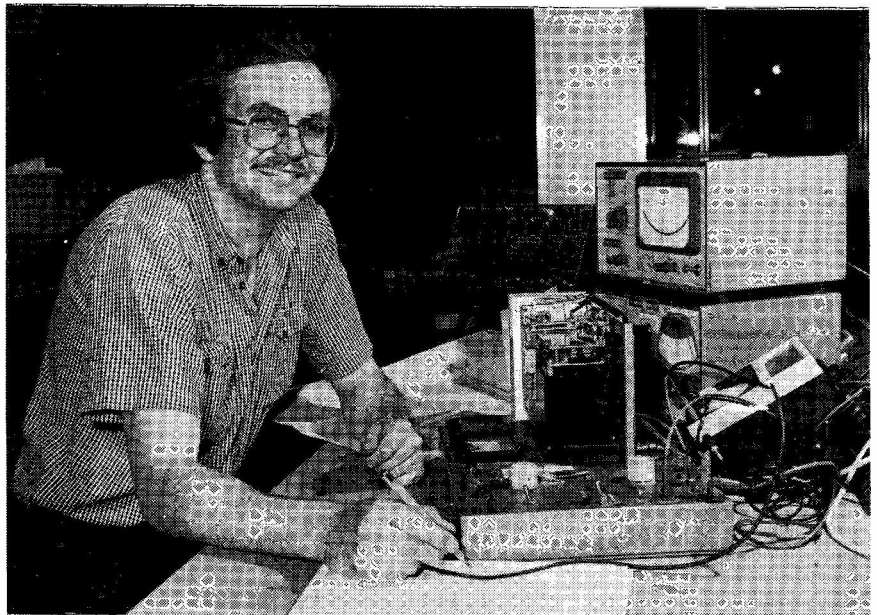
### Snippets

All lumped together with the LF-band reports this time round, as space presses in upon us somewhat. G2NJ (Peterborough) mentions waiting patiently on 80 for PA3AES/MM working a string of PAs; when he announced that he was going QRT, Nick just got in a quick call achieving a QSO towards his Maritime Club Award. Nick also mentions a QSO with G3TLF up in Hull, with a real crystalline note and good CW. Fred was always a good CW man and many an amateur has been helped to pass the morse by G3TLF, and all with the same key — obtained, covered in tar, back in 1964, from Ireland, and lovingly restored.

Also by way of G2NJ, we notice that G3KPO has finally worn down the patience of the Isle of Wight Tourist Board, and they have some rather nice QSLs, showing the spot in Alum Bay where Marconi conducted early experiments on one side, and the usual data on the back; the view side is nicely proportioned for the overprinting of call and QTH data.

The AGCW-DL QRP contest is on over July 18/19; five classes, including 3.5 watts or less input, 10 watts or less, multi — op 10 watts or less input, QRO stations, and SWL entries. Details from, and logs to: Siegfried Hari, DK9FN, Spessartstrasse 80, D-6453 Seligenstadt, Fed. Republic of Germany.

Although the 80-metre DX season is over, G3ZPF still keeps an eye on it, and while the pickings haven't been exactly fattening, the objective of picking up all the European countries on 80 has been all-but achieved — with just FC and 3A still outstanding. David proposes to write a



Chris Baker, G3LDS, who, as related elsewhere in *CDXN*, was instrumental in saving the life of a Yugoslavian youth recently, as a result of hearing YU1PDP calling "CQ, CQ, emergency". Chris has been licensed since 1974, and operates an FT-101 into a TA-33Jr. Photo by courtesy of Marconi Ltd.

sequel to GM3RFR's "For those who have fields" (*S.W.M.*, May) and is toying with "For those who don't" as a title! His own arrangement on all bands is an 84-foot doublet, inverted-vee style, fed with open-wire feeders to the apex which is just above the roof. (This is the one that after four years of "temporary" service fell down, last month!) The makings aren't too difficult so long as you live near enough to Woolworths for the bell-wire. Hence it's new name — Winfield Wonder-Wire. When David put it back up, he persuaded a local to try it and was amused to see how the lad was amazed at the improvement over his own vertical-sans-earth-'cos-the-man-said-so.

G4GCB (Belper) has for the past couple of years been toying with the manufacture of a Top Band double-sideband QRP rig; the transmitter side is based on an article in our February 1975 issue, and the receiver is to a *Practical Wireless* design. Sadly the carrier suppression in the balanced modulator (a two-diode variety) is only about ten dB — which doesn't suggest the two diodes are very much alike! Drive levels and matched diodes are important. Anyway, it was in a state to be roughly air-tested last month, fed *via* an ATU into a trap dipole with the feeders strapped against earth, and putting out some three watts maximum. This amount was enough to work all around the country with little or no trouble.

For those who are interested in the /MM goings on, there is a net operation on 14.303 kHz at 0800z and 1800z. On one day recently, the net heard of concern for a Bulgarian station, *en route* from Bermuda to the Azores, who had not been heard from. Next day, it was reported by an Azores station that a station with a Bulgarian flag had arrived — he went off

to confirm that this was the missing yacht, and came back with LZ1UN/MM to put him on the mike before the net closed.

On a different tack, the West of Scotland gang seem to be using Ten metres for their local net on Thursdays; having convened they split into groups for CW QSOs at set speeds for the SWLs to practice on, before reconvening at 2300, and 28.4 MHz, for SSB nattering.

As to the CB-er's intruding on Ten — our own feeling is that they should be bundled out of the band by hook or by crook, before they can settle. After all, they are *pirates* in any language. On the other hand, many clubs and individuals are finding the CB types soon get bored with it and want to learn about amateur radio, and we feel it is only right for us to help them all we can. Even if we can't convert them all, we can still turn a blind eye to them as long as they don't annoy us, or anyone else to our knowledge. But, if they get into our Ten-metre band, *have 'em out!* It is a case of use or lose, with a vengeance.

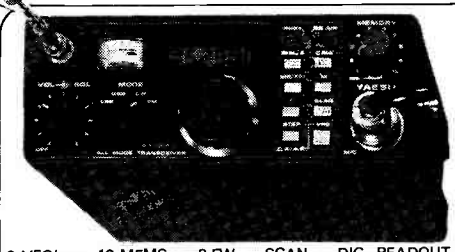
So — there it is; we seem to have been a bit discursive this time, to communications rather than DX, but maybe, once in a while it's no bad thing. Meanwhile, your conductor is sending the rig off for a warranty claim, and once that chore is done, we have a bottle of white wine to deal with — the empty is wanted for a base insulator . . .

### 73

Which is where we say *adieu* once more until next time. The deadlines for arrival are in the 'box', and are for arrival here: "CDXN", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. Meantime — have fun.

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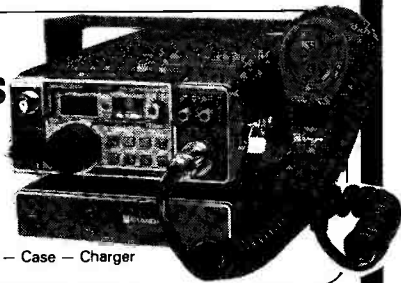


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### A QUART IN A PINT POT!

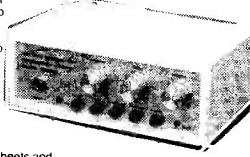
"Big is beautiful" sums up the traditional attitude to antennas, and indeed still applies to transmitting antennas. But for reception only, the Datong Line of Active Antennas has turned this conventional wisdom upside down. Now small is beautiful! What other antenna has an overall length of only 2 metres and yet behaves like a full size dipole from 30 MHz to 200 kHz? With the Datong Active Antennas you can even have a vertical dipole for top band—in that with a normal dipole! Put your finger on the gate of a FET wideband amplifier connected to a receiver and you can test the principle. The FET matches the high impedance antenna element (you to the low impedance receiver input). But, and it's a big one, you will hear lots of stations which are not really there. These are generated by non-linearities in the amplifiers. The challenge with "active antennas is to build an amplifier which combines extremely high linearity with high input impedance, low noise and high dynamic range. This in itself is no easy task but Datong do even more, we include differential inputs so that we can use a balanced dipole configuration. Compared with single whip systems balanced dipoles pick up less local interference and do not need a ground plane. Full details are given in our AD270/AD370 data sheet but briefly these antennas are ideal for general coverage DX reception. They give equivalent signal-to-noise ratios to much larger conventional antennas, but are only 2 metres long (indoor version is 3 metres overall). They also have a flat response from 200 kHz to well over 30 MHz. No external antenna tuner is required. Model AD270 is for indoor use while Model AD370 is engineered for outdoor use. The circuits are identical. Remember like in the FET example above it's easy to make a "lively" active antenna. But if you want one that doesn't fill the bands with phantom signals there is no substitute for the careful and thorough design which is our speciality. If you have acres of ground then go ahead and erect large conventional receiving antennas and use tuner units and attenuators (to stop your receiver overloading). If on the other hand you want similar results unobtrusively and without the hassle our active antennas are unbeatable.

### Model AD370

They also have a flat response from 200 kHz to well over 30 MHz. No external antenna tuner is required. Model AD270 is for indoor use while Model AD370 is engineered for outdoor use. The circuits are identical. Remember like in the FET example above it's easy to make a "lively" active antenna. But if you want one that doesn't fill the bands with phantom signals there is no substitute for the careful and thorough design which is our speciality. If you have acres of ground then go ahead and erect large conventional receiving antennas and use tuner units and attenuators (to stop your receiver overloading). If on the other hand you want similar results unobtrusively and without the hassle our active antennas are unbeatable.

### WHAT IS AN AUDIO FILTER?

Why buy a Datong audio filter when you can get other audio filters at lower prices? To answer this you first need to remember that the title "audio filter" can mean anything even down to a couple of 74's and a handful of parts. Only by comparing like with like can you make an informed decision. This means comparing features, performance and quality. If you send for our free data sheets and compare our products with the competition you will see that really there is virtually no competition at our chosen standard of performance. What other audio filter can tune into heterodyne interference like tune-up whistles and notch them out automatically like our model FL1? Yet Model FL1 is also such a good CW filter that it is used by professional traffic handlers as well as thousands of amateurs. What other audio filter has passband edges sharper than SSB crystal filters and yet which can be tuned at will from 200 to 3500 Hz? To put it of this inch our Model FL2 uses no less than 32 op-amps plus state-of-the-art pulse width modulation techniques. Two 5-pole elliptic filters and a 2-pole peak or notch filter in one box all independently tuneable add up to a lot more filtering capability for SSB, RTTY, CW than you will find in any other "audio filter" that we know of. To answer our question then an "audio filter" can be almost anything. On the other hand, the phrase "Datong Audio Filter" is a lot more precise. It stands for state-of-the-art filtering backed by extra capability, extra thorough design, and extra quality. If you need confirmation ask a user!



Model FL1

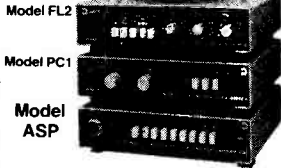


Model FL2

a lot more filtering capability for SSB, RTTY, CW than you will find in any other "audio filter" that we know of. To answer our question then an "audio filter" can be almost anything. On the other hand, the phrase "Datong Audio Filter" is a lot more precise. It stands for state-of-the-art filtering backed by extra capability, extra thorough design, and extra quality. If you need confirmation ask a user!

### MODEL ASP: THE "INTELLIGENT" RF CLIPPER

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 between two and three times. Unlike other speech processors Model ASP automatically senses your voice level and reacts accordingly to always maintain the degree of true rf clipping selected (in decibels) by the panel push-buttons. Novel circuitry avoids "hang-ups" by discriminating against noise spikes and non-speech inputs. We use the same principle of rf clipping in two other units, Models D75 and RFC/M. Both of these need manual adjustment of the input level to control the amount of clipping, but otherwise give the same benefits. The technique has been proven by thousands of satisfied users of "Datong Clippers". If in doubt why not ask one?



Model FL2

Model PC1

Model ASP

### MODEL D70: THE GO-ANYWHERE MORSE CODE TRAINER

Since its introduction in 1979 the success of our Morse Tutor has surprised even us. Its effectiveness at speeding people through the Morse examination is legendary and we are constantly being told success stories by satisfied users. (The unconfirmed record so far seems to be three weeks to pass the exam starting from scratch!) Generating 60 hours of random morse code from a low cost 9 volt battery, Model D70 gives you freedom to practice anywhere to suit your timetable and lifestyle. 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. You turn back your test!



Model D70

### VERY LOW FREQUENCY CONVERTER MODEL VLF

If your communications receiver gives poor results below 500 kHz Model VLF is the answer. 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.



Model VLF

- Products not shown in this advertisement
- Model Datest 1 Transistor Tester
  - Model Datest 2 Transistor Tester
  - R.F. Speech Processor Model D75
  - Model RFC/M.R.F. Speech Processor PCB Module
  - Model MPU, Mains Power Unit
  - Accessory Leads

**NEW PRODUCT**

**KEYBOARD MORSE SENDER**

**MODEL MK NOW AVAILABLE**

**SEE SEPARATE ADVERTISEMENT**



## INGENIEURBÜRO ULRICH HANSEN

VHF & UHF PREAMPLIFIERS: A new range from Ulrich Hansen of West Germany. A range of high quality in-line preamplifiers for 2 metres or 70 cms, featuring ultra-low noise figures and state-of-the-art design. The range includes R.F. switching capacitors from 60 watts P.E.P. to 500 watts P.E.P. and choice of silicon low noise devices or the latest gallium arsenide MESFETs for the best possible noise figure. Indoor or mast mounted options are also included. Full details free on request. These units represent a cost-effective way of improving your DX receiving capability.

PRICES: All prices include delivery in U.K. basic prices in £ are shown with VAT - inclusive prices in brackets.

FL1	59.00 (67.85)	VLF	22.00 (25.30)	AD270	33.00 (37.95)	MPU	6.00 (6.90)
FL2	78.00 (89.70)	D70	43.00 (49.45)	AD370	45.00 (51.75)	DC144/28	31.00 (35.65)
PC1	105.00 (120.75)	D75	49.00 (56.35)	AD270 + MPU	37.00 (42.55)	DC144/28 Module	25.00 (28.75)
ASP	69.00 (79.35)	RFC/M	23.00 (26.45)	AD370 + MPU	49.00 (56.35)	Keyboard Morse Sender	140.00 (161.00)

**DATONG ELECTRONICS LIMITED**  
Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England. Tel: (0532) 552461

# P.M.

## ELECTRONIC SERVICES

**PRICES SHOWN EXCLUDE VAT**  
**UK CUSTOMERS PLEASE ADD 15%**

**2 ALEXANDER DRIVE, HESWALL**  
**WIRRAL, MERSEYSIDE, L61 6XT**

Tel: 051-342 4443. Cables: CRYSTAL, BIRKENHEAD.

### CRYSTALS MANUFACTURED TO ORDER

Prices shown are for one off, to our amateur specs., closer tolerances are available. Please send us details of your requirements.

**A Low frequency fundamentals in HC13/U or HC6/U**  
 Adj. tol.  $\pm 50$ ppm. Temp. tol.  $\pm 100$ ppm 0 to 70°C.  
 6.0 to 19.999kHz £28.12 100 to 159.99kHz £9.25  
 20 to 39.999kHz £17.74 160 to 499.99kHz £6.19  
 40 to 79.999kHz £12.40 500 to 799.99kHz £7.30  
 80 to 99.999kHz £10.60

**B High frequency fundamentals/overtones**  
 Adj. tol.  $\pm 20$ ppm. Temp. tol.  $\pm 30$ ppm 10 to 60°C.  
 800 to 999.9kHz (fund) HC6/U £9.75  
 \* 1.0 to 1.499MHz (fund) HC6/U £10.35  
 \* 1.5 to 2.599MHz (fund) HC6/U £4.93  
 \* 2.6 to 20.99MHz (fund) HC6/U £4.48  
 \* 3.4 to 3.999MHz (fund) HC18 & 25/U £6.21  
 \* 4.0 to 5.999MHz (fund) HC18 & 25/U £4.93  
 \* 6.0 to 20.99MHz (fund) All holders £4.48  
 \* 21 to 24.99MHz (fund) .. £6.73  
 \* 25 to 30MHz (fund) .. £8.28  
 \* 21 to 62.99MHz (30/T) .. £4.48  
 \* 60 to 105MHz (50/T) .. £5.16  
 \* 105 to 125MHz (50/T) HC18 & 25/U £7.76  
 125 to 180MHz (O/T) .. £7.50  
 180 to 25MHz (O/T) .. £12.49

\*Delivery Normally 5/6 weeks (express available), all other frequencies 7/8 weeks.

**Holders:** Low frequencies HC13/U or HC6/U dependent on frequency.

**Mid and High frequencies** are available in HC6/U, HC18/U or HC25/U unless otherwise shown.

HC17/U (replacement for FT243) and HC33/U (wire end HC6/U) available as per HC6/U above at 30p extra on HC6/U price

Unless otherwise specified, fundamentals will be supplied to 30pf circuit conditions and overtones to series resonance.

#### CRYSTALS FOR PROFESSIONAL USE

We can supply crystals to most commercial and MIL specifications, with an express service for that urgent order. Also for commercial use, eg TV or computer crystals, etc., we can supply at very competitive prices. Please send S.A.E. for details or telephone between 4.30-7pm and ask for Mr. Norcliffe.

#### EXPRESS SERVICE

Many types of made to order crystals are available on our "EXPRESS SERVICE" - with delivery of three days on our class "A" service. Telephone for details.

**TERMS: CASH WITH ORDER - MAIL ORDER ONLY - S.A.E. WITH ALL ENQUIRES - PRICES INCLUDE P. & P. (BRITISH ISLES) EXCEPT WHERE STATED - OVERSEAS CHARGED AT COST.**

### TWO METRE CRYSTALS

CRYSTAL FREQUENCY RANGE USE (TX or and HOLDER)	4MHz-TX-HC6/U	6MHz-TX-HC25/U	8MHz-TX-HC6/U	10MHz-RX-HC6/U	11MHz-RX-HC6/U	12MHz-TX-HC25/U	14MHz-RX-HC25/U	18MHz-TX-HC25/U	4MHz-RX-HC6/U	4MHz-RX-HC25/U	50MHz-RX-HC25/U
144.4 (433.2)	b	e	e	e	e	b	e	e	e	e	e
144.480	e	e	e	e	e	e	e	e	e	e	e
144.800	c	e	e	e	e	c	e	e	e	e	e
144.850	e	e	e	e	e	e	e	e	e	e	e
145.000/ROT	a	a	a	a	a	c	b	b	b	a	a
145.025/R1T	a	c	a	e	e	e	b	e	b	e	e
145.055/R2T	a	c	a	e	e	e	b	e	b	e	e
145.975/R3T	a	c	a	e	e	e	b	e	b	e	e
145.100/R4T	a	c	a	e	e	e	b	e	b	e	e
145.125/R5T	a	c	a	e	e	e	b	e	b	e	e
145.150/R6T	a	c	a	e	e	e	b	e	b	e	e
145.175/R7T	a	c	a	e	e	e	b	e	b	e	e
145.200/R8T	a	c	a	e	e	e	b	b	b	a	a
145.300/S12	e	e	e	e	e	e	e	e	e	e	e
145.350/S14	e	e	e	e	e	e	e	e	e	e	e
145.400/S16	e	e	e	e	e	e	e	e	e	e	e
145.425/S17	e	e	e	e	e	e	e	e	e	e	e
145.450/S18	a	e	a	e	e	b	b	b	a	a	e
145.475/S19	a	e	a	e	e	b	b	b	a	a	e
145.500/S20	a	c	a	c	c	b	b	b	a	a	c
145.525/S21	a	c	a	c	c	b	b	b	a	a	c
145.550/S22	a	c	a	c	c	b	b	b	a	a	c
145.575/S23	a	c	a	c	c	b	b	b	a	a	c
145.600/ROR	a	c	a	c	c	b	b	b	a	a	c
145.625/R1R	e	e	e	e	e	e	b	e	a	a	c
145.650/R2R	e	e	e	e	e	c	e	b	e	a	c
145.675/R3R	e	e	e	e	e	c	e	b	e	a	c
145.700/R4R	e	e	e	e	e	c	e	b	e	a	c
145.725/R5R	e	e	e	e	e	c	e	b	e	a	c
145.750/R6R	e	e	e	e	e	c	e	b	e	a	c
145.775/R7R	e	e	e	e	e	c	e	b	e	a	c
145.800/R8R	a	c	a	c	c	e	b	e	a	a	c
145.950/S38	a	e	e	e	e	e	b	e	a	a	e

PRICES: (a) £1.95, (b) £2.32, (c) £2.50, and (e) £4.48.

**AVAILABILITY:** (a), (b), (c) stock items, normally available by return (we have over 5000 items in stock). (e) 4/6 weeks normally but it is quite possible we could be able to supply from stock.  
**N.B.** Frequencies as listed above but in alternative holders and/or non stock loadings are available as per code (e).

**ORDERING.** When ordering please quote (1) Channel, (2) Crystal frequency, (3) Holder, (4) Circuit conditions (load in pf). If you cannot give these, please give make and model of equipment and channel or output frequency required and we will advise if we have details.

**FORTHCOMING RALLIES**  
**Droitwich 12/7/81**

### 70 cm CRYSTALS

Due to the much higher multiplication involved (3 times that on 2m) all our stock 70cm crystals are to much higher tolerances than our standard range.

We are stocking the following channels: RB0 (434.60/433.00), RB2 (434.65/433.05), RB4 (434.70/433.10), RB6 (434.75/433.15), SU8 (433.20), RB10 (434.85/433.25), RB11 (434.875/433.275), RB13 (434.925/433.325), RB14 (434.95/433.35), SU18 (433.45), SU20 (433.50) - TX & RX for use with: - PYE UHF Westminster (W15U), UHF Cambridge (U10B), Pocketfone (PF1) AND UHF PF70 Range, and STORNO CQL/CQM 662 all at £2.32. For the U450L Base Stn we have the TX crystals for the above channels. The RX crystals for the U450L Base Stn together with TX and RX crystals for any other 70cm channel (eg RB/SU12 (434.90/433.30) RTTY, SU16 (433.40), SU22 (433.55) etc.) for most UHF equipments are available at £4.48 for crystals up to 63MHz, and £5.16 for 63 to 105MHz to amateur spec or £5.26 for up to 63MHz and £6.05 for 63 to 105MHz to the same closer spec as our stock items. Delivery approx. 5/6 weeks.

**4m CRYSTALS FOR 70.26MHz - HC6/U**  
 TX8.7825MHz and RX6.7466MHz or 29.7800MHz £2.32

**10.245MHz "ALTERNATIVE" I.F. CRYSTALS - £2.32**  
 For use in Pye and other equipment with 10.7MHz and 455kHz I.F.s to get rid of the "birdy" just above 145.0MHz. In HC6/U, HC18/U and HC25/U.

**CRYSTAL SOCKETS - HC6/U, HC13/U and HC25/U**  
 (Low loss) 16p each. 10p P. & P. per order (P. & P. free if ordered with crystals).

**CONVERTER/TRANSVERTER CRYSTALS - HC18/U**  
 All at £3.30. 38.6666MHz (144/28), 42MHz (70/28), 58MHz (144/28), 70MHz (144/4), 71MHz (144/2), 96MHz (1,296/432/144), 101MHz (432/28), 101.50MHz (434/28), 105.6666MHz (1,296/28) and 116MHz (144/28).

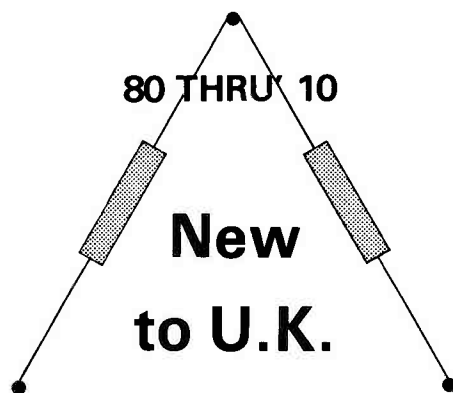
**TEST EQUIPMENT FREQUENCY STANDARD CRYSTALS**  
 200kHz and 455MHz in HC6/U £3.50  
 100kHz in HC13/U and 1MHz in HC6/U £2.95  
 5MHz in HC6/U and 10MHz and 10.7MHz in HC6/U and HC25/U £2.80.

### CRYSTALS FOR MICROPROCESSORS

Please let us know your requirements e.g. 4MHz HC18/U. 1 off, £2.00; 100 off, £1.10; 1000 off, 99p; 25,000 off, 50p.

### ANZAC MD-108 DOUBLE BALANCED MIXER

5 500MHz supplied with full details for only £6.95.



**MULTI BAND INVERTED 'V'**  
**TRAPPED DIPOLE**  
**RATED AT 2KW.**

ONLY 26m. LONG

**INTRODUCTORY OFFER**

*Sole Distributors:*  
**P. M. ELECTRONIC SERVICES**  
 &  
**M. & B. RADIO, LEEDS**

**£32.00 + VAT**  
 (£36.80 INC. VAT)  
**P&P £2.00**

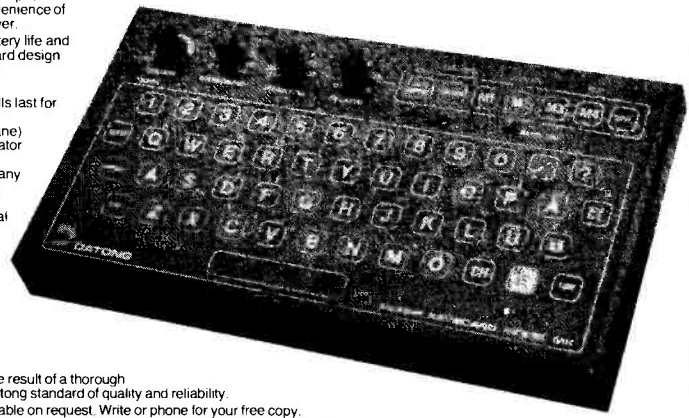
# KEYBOARD MORSE SENDER

Model MK for the first time brings the benefits of keyboard morse within reach of most amateurs. Its low price and comprehensive facilities represent a long awaited breakthrough. Now you can have the luxury and convenience of an advanced keyboard sender with lavish memory for little more than the cost of a good electronic keyer.

Model MK is designed for maximum versatility and ease of use. For example its unique 'one year' battery life and continuous memory retention make a power cable quite unnecessary while our special sealed keyboard design takes the hostile 'field day' environment in its stride, not to mention the occasional spilt cup of coffee!

Some of the highlights of Model MK's many features are listed below.

- **Compact** (only 30mm thick), attractively styled and completely self-contained. Four internal pen cells last for typically 300 hours. Simply plug into the Key Jack on your transmitter and type.
- **Exclusive colour coded keyboard design** (Key switches beneath a tough polycarbonate membrane) combines excellent "feel" with splash-proof "wipe clean" surface. Tactile, audible, and visual operator feedback is provided via key-click action, special "pip" tone, and LED.
- **Four independent 64 character memories** with auto-repeat facility (for automatic CQ's) and with any number of programmed pauses each with subsequent "continue" or "insert-then-continue" option. Memory contents are retained even when switched off or while batteries are replaced.
- **Separate buffer memory** ensures perfect sending despite less than perfect typing. Audible and visual warning is given of "buffer full" condition.
- **Dual speed ranges:** 5 to 33 and 20 to 132 words per minute with independent "weight" control. The high speed capability with auto message repeat is ideal for meteor scatter work.
- **Comprehensive character set** includes punctuation, procedure signals, and accented letters. Any non-standard character can also be formed using the "MERGE" key.
- **Built-in side tone** independent from "pip" tone. Each tone has its own volume control.



- **Separate send/receive output** available for fully automatic transmitter operation. Eliminates loss of first dot through VOX delay.

Like all Datong products Model MK is the result of a thorough design effort and is built to traditional Datong standard of quality and reliability.

The full data sheet on Model MK is available on request. Write or phone for your free copy.

Price: only £140 plus VAT (£161.00), includes delivery within U.K. Expected availability: Late June



## ABOUT DATONG...

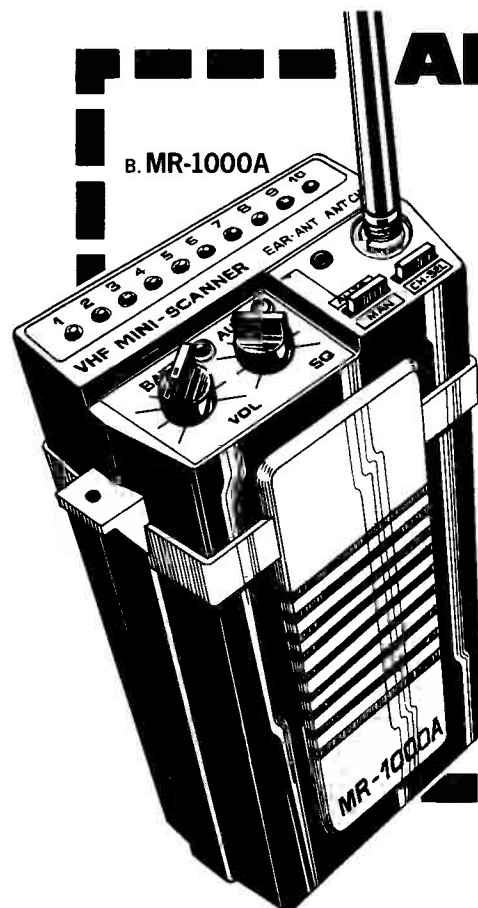
Model MK is the latest in a line of innovative British made products from Datong. Its highly competitive price is largely due to our commitment to modern manufacturing methods.

Our investment in automatic lead cropping and wave soldering equipment 18 months ago and more recently the introduction of computerised automatic test equipment has helped us to hold prices constant despite continuing inflation.

As well as helping us to control costs, these techniques promise to even further improve the reliability of our products.

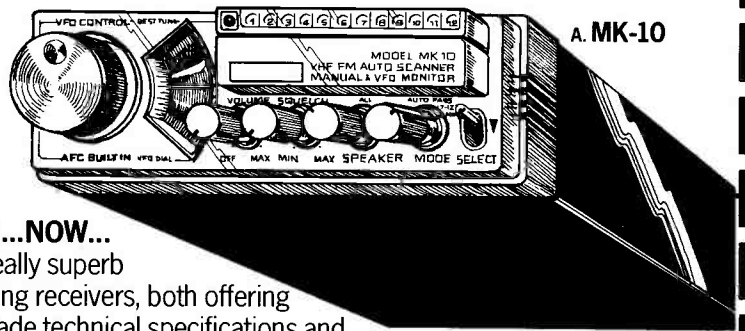
## DATONG ELECTRONICS LIMITED

Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England. Tel: (0532) 552461



B. MR-1000A

## AMATEUR RADIO EXCHANGE



A. MK-10

### HERE...NOW...

Two really superb scanning receivers, both offering top-grade technical specifications and unbelievable value for money. Come and try them in the shop, or phone your orders and enquiries. (24-hour answer service when we're closed.)

**A MK-10** VHF FM scanning receiver, covering 144-152MHz. Scanning or manual tuning through up to 12 crystal-controlled frequencies, **OR** VFO control on main dial. Automatic lock-out facility. Sensitivity  $\mu\text{v}$  (25 db S/N). 12v. **BASIC PRICE £69.**

**B MR-1000A** The finest-value pocket receiver ever offered. VHF FM scanner, 10 channels, and allowing scan or manual tuning across selected crystal-controlled channels. Complete with Nicads and charger. **BASIC PRICE £39.**

**CRYSTALS: AMATEUR BAND 145-145.775MHz £2 EACH.**  
**PRICES ARE POST-FREE AND INCLUDE VAT.**

**ALL OTHER FREQUENCIES INC. MARINE £4.00 EACH.**

**AMATEUR RADIO EXCHANGE,**  
 2 Northfield Road, Ealing, London, W13 9SY.  
 Telephone: 01-579 5311.

CREDIT CARD  
 SALES BY  
 TELEPHONE.







**ADVANCED ELECTRONIC APPLICATIONS**

MM-1	Morsematic Special Keyer	124.20	2.00
MK-1	Keyer	49.45	1.00
ISO-144	2m Antenna	34.50	2.00

**TEN-TEC EQUIPMENT**

<b>TRANSCEIVERS</b>			
515	Argonaut, 5W, 3.5-30MHz	276.00	5.00
546	Omni-D, Digital, Series C, SSB/CW 1.8-30MHz	736.00	5.00
570E	Century/21, 70W, CS, 3.5-29MHz 240volts	230.00	5.00
580	Delta, 200W, SSB/CW, 1.8-30MHz	469.20	5.00

<b>POWER SUPPLIES</b>			
210/E	115/230 VAC, 13VDC, 1A	27.80	2.00
280	117/230 VAC, 13.5VDC, 18A	92.00	5.00

<b>LINEAR AMPLIFIER</b>			
444	Hercules, 1kW with 115/230 VAC, Power Supply	920.00	10.00

<b>ACCESSORIES</b>			
206A	Crystal Calibrator	18.86	2.00
208A	Notch/CW Filter for Model 515	29.90	2.00
212	Crystal, for Model 515, 29.0-29.5MHz	3.45	0.50
213	Crystal, for Model 515, 29.5-30MHz	3.45	0.50
215P	Microphone, ceramic with plug	18.40	2.00
215PC	Microphone, ceramic with plug and coil cord	21.85	2.00
217	500Hz 8 pole Ladder Filter for Models 545/546	36.80	1.00
218	1.8KHz 8 pole Ladder Filter for Models 545/546	36.80	1.00
219	250Hz 6 pole Ladder Filter for Models 545/546	34.50	1.00
228	Antenna Tuner	59.80	2.00
243	Remote VFO for Models 545/546	103.50	5.00
247	Antenna Tuner	43.70	2.00
273	Crystal, for Model 570, 28.5-29MHz	3.45	0.50
276	Crystal Calibrator for Model 570	18.86	1.00
277	Antenna Tuner/SWR Bridge for Model 570	57.50	2.00
282	250Hz 6 pole Ladder Filter for Model 580	35.65	1.00
283	Remote VFO for Model 580	112.70	2.00
285	500Hz 6 pole Ladder Filter for Model 580	32.20	1.00
289	Noise Blanker for Model 580	29.90	1.00
1140	DC Circuit Breaker for Models 545/546 and 580	4.60	1.00
1150	Overvoltage Protector for Models 552/262 Series	9.20	1.00
1170	DC Circuit Breaker for Model 570	6.90	1.00

<b>KEYERS</b>			
645	Ultramic, Dual Paddle	55.20	2.00
670	Single-Paddle Keyer	23.00	2.00

**ENDS OF LINES (Whist stocks last)**

<b>TRANSCEIVERS</b>			
544	Triton IV 200W, SSB/CW 3.5-30MHz with digital readout	399.85	5.00
545	Omni-A, Analog, Series B, SSB/CW, 1.8-30MHz	448.85	5.00

<b>POWER SUPPLIES (When bought with Ten-Tec transceiver)</b>			
252MO/E	115/230 VAC, 13VDC, 18A for Omni	79.35	5.00
262M/E	230 VAC, 13VDC, 18A, Deluxe with VOX (Triton)	85.10	5.00

<b>ACCESSORIES</b>			
212	29-29.5 Crystal for Models 540/544	3.45	0.50
213	29.5-30MHz Crystal for Models 540/544	3.45	0.50
240	160m Converter for Models 540/544	57.50	2.00
241	Crystal Oscillator for Models 540/544	23.00	1.00
249	Noise Blanker for Models 540/544	18.40	1.00
AC-4	SWR Meter Lower Power	6.90	1.00
KR-5A	Single-paddle keyer, 6-14VDC	25.30	2.00
KR-50	Ultramic, dual paddle, 117 VAC/6-VDC	57.50	2.00

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<b>4 metre Antennas</b>	
4Y/4M	4 element folded dipole yagi with 1 1/4" boom
PMH2/4M	2 way phasing harness for two 4m yagis

<b>2 metre Antennas</b>	
DC1/WB	Wide band discone (100-470MHz)
LR1/2M	Omni-D, vertical gain colinear
C5/2M	5dB glass fibre colinear, omni-directional
5Y/2M	5 element folded dipole yagi with 1" boom
8Y/2M	8 element folded dipole yagi with 1" boom
10Y/2M	10 element folded dipole 'long yagi' with 1 1/4" boom and trombone support

PBM10/2M	10 element Parabeam with 1 1/4" boom and trombone support boom
PBM14/2M	14 element Parabeam with 1 1/4" boom and 45° braces
5XY/2M	Crossed 5 element yagi with 1 1/4" boom
BXY/2M	Crossed 8 element yagi with 1 1/4" boom
10XY/2M	Crossed 10 element yagi with 1 1/4" boom

XG/2M/X12/70cm	Dual band crossed yagi, 2 way phasing harness for circular polarisation
PMH/2C	4 element quad yagi
Q4/2M	6 element quad yagi
Q6/2M	Double 5 slot-fed yagi with 1" booms
D8/2M	Double 8 slot-fed yagi with 1" booms

SVMK/2M	Mounting kit for vertical polarisation for 2 slot-fed yagis
UGP/2M	Unipole and ground plane
HO/2M	Mobile 'halo' head only
HM/2M	Mobile 'halo' with 24" mast
PMH2/2M	2 way phasing harness for two 2m aeriels
PMH4/2M	4 way phasing harness for four 2m aeriels

<b>70cm Antennas</b>	
C8/70cm	8dB glass fibre colinear, omnidirectional
D8/70cm	Double 8 slot-fed yagi with 3/4" booms
PBM18/70cm	18 element Parabeam yagi with 1 1/4" boom
MBM48/70cm	48 element Multibeam yagi with trombone mounting
MBM88/70cm	88 element Multibeam yagi with trombone mounting
8XY/70cm	Crossed 8 element yagi complete with phasing harness and 'N' type connector
12XY/70cm	Crossed 12 element yagi complete with phasing harness and 'N' type connector

PMH2/70cm	2 way phasing harness for two 70cm yagis
PMH4/70cm	4 way phasing harness for four 70cm yagis
<b>23cm Antennas</b>	
D15/23cm	Double 15 slot-fed yagi with 'N' type connector
PMH2/23cm	2 way phasing harness for two 23cm antennas

<b>Mobile Antennas</b>	
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U5	70cm Colinear 5.6dB with 4 metres of coaxial cable
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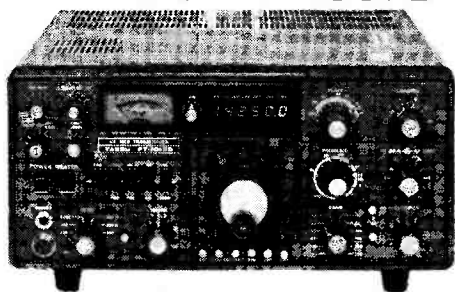
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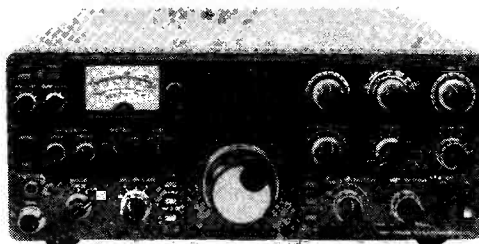


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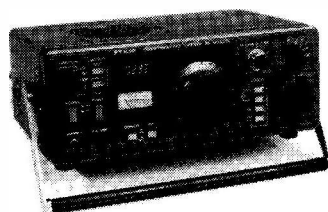
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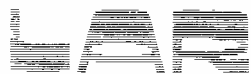
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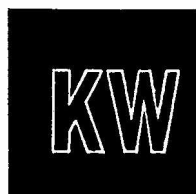
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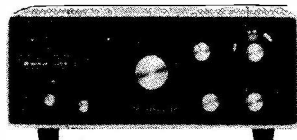


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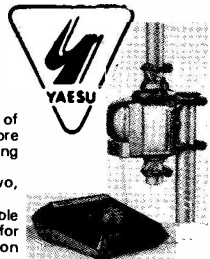
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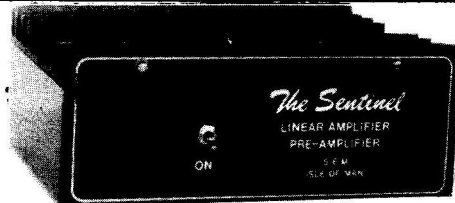
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R4	4.0305	8.0611	12.0916	15.0000	18.1375	45.0000
R5	4.0312	8.0625	12.0937	15.0027	18.1406	44.0083
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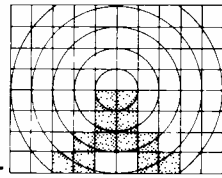
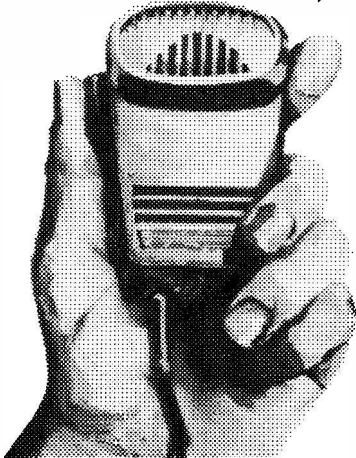
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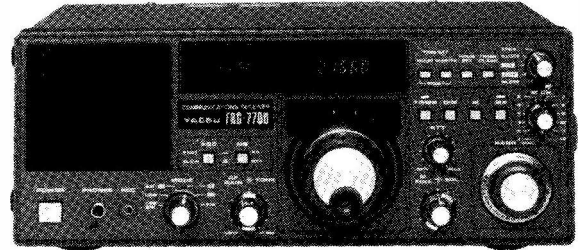
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