

# The SHORT WAVE

# Magazine

VOL. XLI

SEPTEMBER 1983

NUMBER 7

the **NRD515** receiver, a joy to own.....



If I am absolutely honest, I am not certain whether I own a NRD515 because of its unbelievable performance as a general coverage receiver or just for the sheer pleasure of having and constantly admiring probably the finest piece of equipment available today.

Perhaps it comes down to the same thing, certainly the other NRD owners I have spoken to have all expressed the same feelings, that the NRD515 is a receiver in a class of its own.

As a person not owning the receiver, you may ask what sets this particular one above all the others. This is difficult to define — the feel of the equipment when wandering over the crowded band, its signal handling capability and selectivity can only really be appreciated by use. Technically, the equipment is above reproach. JRC's manufacture and production control methods as applied to other items in the range are equally applied to their amateur products. The other items referred to, only

a small part of the vast range, are marine radio equipment, Marisat mobile terminal, Omega navigators, Doppler sonar, echo sounder/fish finders, communication satellite earth stations and a complete range of avionic beacons, radar and associated products. Indeed, a wide range application of electronic and radio technology for land, sea and air.

You may be forgiven for associating such advanced technology with complexity of operation, a piece of equipment that needs an operator with an electronics degree. However, this assumption is incorrect. The NRD515 is easy to use with the minimum of controls to ensure the operator really enjoys his listening time. Digital readouts, MHz, mode and filter bandwidth switches together with a VFO knob that will tune the band continuously without using any other control, from 100kHz to 30 MHz or vice versa. To assist with difficult band conditions the NRD515 has pass band tuning and the medium wave broadcast section to 600 kHz to

1.6 MHz has a preselector control to cope with crowded conditions.

To give real "armchair copy" JRC have introduced the NCM515 remote control keypad. As its name suggests the NCM515 enables frequencies to be quickly keyed into the receiver. Four memories are provided, two rates of frequency stepping in increments of either 100Hz or 10MHz and finally the ability to add to or subtract from the operating frequency by any frequency step. Add the optional 600 Hz CW filter and the 96 channel memory unit and, as the other NRD owners would say, "a joy to own".

NRD515 monitoring receiver.....	£985 inc VAT
NDH515 96 channel memory unit.....	£198.00 inc. vat.
NCM515 remote frequency controller.....	£125.00 inc. vat.
NVA515 speaker.....	£34.50 inc. vat.
CFL260 500 Hz cw filter.....	£39.10 inc. vat.
CFL230 300 Hz cw filter.....	£64.00 inc. vat.
ST3 headphones.....	£42.55 inc. vat.

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# LOWE SHOPS

**LOWE ELECTRONICS IN MATLOCK**, located on the Chesterfield road out of Matlock, that is the A632 and open Tuesday to Friday from 9 am to 5.30 pm (closed for lunch 12.30 to 1.30) and Saturday, open all day from 9 am to 5 pm. A visit to Matlock can be an outing for the family, the local scenery, the Heights of Abraham, Lovers Walk, etc. Ample free parking in our car park and when you have browsed then lunch in one of the towns pleasant restaurants. Amateur Radio with the family in mind.  
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**LOWE ELECTRONICS IN GLASGOW**, located at 4/5 Queen Margarets Road, which you will find off Queen Margarets Drive (take Great Western Road out of the City and turn right at the Botanical Gardens traffic lights). A quiet sedate part of the city, easy street parking and a warm welcome from Sim, our shop manager. Open all day from Tuesday to Saturday, 9 am till 5.30 pm during the week and 9 am till 5 pm on Saturday. Whilst in the area the Botanical Gardens are well worth a visit. The Glasgow Shop has a full display of our range of amateur radio products and a stock room to meet your every demand. For your Amateur Radio needs visit Lowe Electronics in Glasgow.  
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**LOWE ELECTRONICS IN THE NORTH EAST OF ENGLAND**, set in the delightful market town of Darlington, the shop displays the full range of amateur products sold by the company. Our address in the town is 56 North Road, that is the A167 Durham road out of Darlington. Open Tuesday to Friday from 9 am till 5.30 pm, Saturday from 9 am till 5 pm (closed for lunch 12.30 to 1.30). A huge free car park across the road, a large supermarket, bistro restaurant and banking facilities combine to make a visit to this delightful market town a pleasure for the whole family.  
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**LOWE ELECTRONICS IN LONDON**, our shop in the Capital City, easily found on the lower sales floor of the Hepworths' shop on Pentonville Road, within three minutes walk of Kings Cross railway station. Open all day Monday to Saturday, six days a week, from 9.30 am to 5.30 pm during the week and from 9.30 am to 5 pm on Saturday, a warm and courteous welcome, together with sound advice awaits those who enter. The entire range of amateur products is on display, backed by a considerable amount of stock. When in the City, visit Lowe Electronics.  
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## check the price, £128 inc vat.

- The rig you will forget you are carrying. . . .  
With overall dimensions of 140mm high, 69mm wide, 26mm deep and weighing only 260 grams (including aerial and batteries), the LS-20XE fits easily into your pocket giving perfect portable communication.
- Long range communication. . . .  
A newly developed dual gate MOS FET is used in the RF stage of the transceiver which considerably improves receiver performance. The internal 50mm diameter speaker ensures clear audio under difficult portable conditions.
- Full coverage of 2 metre amateur band. . . .  
The transceiver covers 144 to 146 MHz in 5 kHz steps and has repeater shift and automatic tone burst.
- Switchable output power for extended operation. . . .  
In order to extend portable operation, transmission power level is switchable, 1 W, 500 mW and 100 mW, so depending on the terrain and conditions, the most economical level can be selected.
- Simple to operate. . . .  
Simplicity of operation is a special feature of this rig and many optional accessories are available. Of major interest is the matching headset SH-2 having built-in vox, this convenient accessory provides simple and safe operation whilst cycling, walking, etc.

### ACCESSORIES

- SH2 Headset (VOX built-in). . . £19.50
- CA610 AC charger. . . . . T.B.A.
- CS612 Mobile charger. . . . . £6.50
- SH1 Speaker mike. . . . . £13.80
- SFT20 Soft case. . . . . £4.10
- AAA Ni-Cad battery (4 batteries required). . . . . T.B.A.
- CP615 Battery carrying pack. £10.25



## the Belcom **LS 20XE**, a new dimension in portable amateur radio.

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E

# just a selection.....

		Inc. VAT	Carr.
<b>TRIO EQUIPMENT</b>			
TW400A	2M/70cm FM Mobile transceiver	469.00	6.00
VS1	Voice synthesiser	24.50	0.75
TM201A	2M Mobile transceiver	269.00	6.00
TM401A	70cm Mobile transceiver	299.00	6.00
TS930S	New 160-10m transceiver with general coverage receiver	1216.70	6.00
AT930	Automatic ATU 80-10m ham bands. Fits inside TS930	141.91	6.00
SP930	External speaker unit with switched filters	59.34	2.50
SO1	Temperature compensated oscillator unit	138.92	1.00
TS430S	HF transceiver 160-10m with general coverage receiver	736.00	6.00
PS430	Mains PSU for TS430S with built in cooling fan	112.93	6.00
SP430	Attractive matching speaker for TS430S	29.44	2.50
MB430	Mobile mounting bracket for TS430S	11.27	2.00
FM430	FM option unit for TS430S	34.50	1.00
YK88A	6kHz AM filter. Can also use YK88C/CN/SN	33.40	0.75
TS830S	160-10m transceiver with the new bands. Successor to TS820	697.82	6.00
VFO230	Digital VFO with memories and digital readout	243.80	6.00
AT230	All band ATU and power meter. Matches TS830S	135.70	6.00
SP230	External speaker unit with switched filters	41.17	2.50
DS2	Optional dc pack for TS830S	50.14	1.50
SM220	Station monitor scope	209.07	6.00
BS8	Panoramic display for TS830/180/820 series	52.44	1.50
B55	Scan board as above but for TS520 series	52.44	1.50
KB1	Deluxe ball race knob for TS830/530 series	10.35	0.75
TS530S	160-10m transceiver with the new bands. Successor to the TS520	595.00	6.00
VFO240	External VFO for the TS530S	92.92	6.00
TS130S	8 band 200W pep mobile transceiver	559.36	6.00
TS130V	8 band 20W pep mobile transceiver	456.32	6.00
TL120	200W pep linear for TS120/130 series	167.67	6.00
MB100A	Mobile mount for TS120/130 series	18.63	2.50
VFO120	External VFO unit	98.67	6.00
SP120	Base station external speaker unit	26.45	2.50
AT130	100W aerial tuner including new bands	93.15	2.50
PS20	AC power supply for TS120/130V	57.96	6.00
MA5	New TRIO 5 band mobile aerial system. Absolutely complete	106.03	6.00
TL922	160-10M 2KW linear. 3-500Z tubes included	724.50	6.00
LF30A	HF lowpass filter. 1 KW rating	21.16	1.50
TS780	2m/70cm all mode transceiver	843.87	6.00
SP70	External speaker unit for all TS700 series	23.46	2.50
BU1	Backup battery case	8.28	0.75
TR9130	NEW 2m multi mode mobile/fix station transceiver	433.32	6.00
PS20	AC power supply for TR9000	57.96	6.00
BO9A	Base pinth for TR9130	39.33	6.00
TR7930	NEW MODEL 2m transceiver with large LCD display	305.21	6.00
SP40	Mobile speaker unit for TR7800, TR9000 and TR8400	14.26	1.00
TR2300	2m FM synthesised portable transceiver	152.03	6.00
VB2300	10W amplifier for TR2300	65.78	2.00
MB2	Mobile mount for TR2300 and VB2300	21.16	2.00
TR2500	Compact 2m FM synthesised handheld NEW MODEL	232.53	6.00
VB2530	30W amplifier for TR2500	69.69	2.00
ST2	Base stand and quick charger	51.98	2.50
SC4	Soft case and belt hook	13.80	0.75
MS1	Mobile stand and power unit	31.97	2.00
SMC25	Speaker/microphone	16.10	1.00
PB25	Spare Ni-cad battery pack	25.07	1.00
LH2	Deluxe leather case	24.15	1.00
BT1	6 piece AA size manganese battery case	5.98	0.75
DC25	DC power supply for TR25/3500 from 12 volts	16.10	1.00
TR3500	70cm hand held transceiver to match TR2500. Uses TR2500 accessories	250.70	6.00
PS10	Matching power supply for TR8400	64.86	6.00
R600	NEW MODEL. Synthesised GC receiver 150kHz-30MHz	257.60	6.00
R2000	NEW General coverage receiver with host of features. For suitable aerial tuner see UL1000 in Mizuho section	398.82	6.00
HC10	Digital station world time clock	67.62	2.50
HS6	Ultra light deluxe headphones	16.79	1.50
HS5	Deluxe headphones for all TRIO equipment	23.00	1.50
HS4	Economy headphones	11.27	1.50
DM81	Multi purpose dip resonance meter. 700kHz-250MHz	71.07	2.00
<b>HF GENERAL COVERAGE RECEIVERS, SEPARATE TRANSMITTERS</b>			
NRD515	New synthesised HF monitoring receiver	985.01	6.00
NHD515	Multi channel memory unit for NRD515	198.00	6.00
MCM515	Remote frequency controller	125.00	6.00
NVA515	Matching loudspeaker unit	34.50	2.50
CFL260	300Hz CW filter for NRD515	39.10	0.75
CFL230	300Hz CW filter for NRD515	64.00	0.75
NSD515	Amateur band transmitter	1223.60	6.00
NBD515	Matching power supply	148.35	6.00
JST100	Digitally synthesised 160-10m transceiver	998.00	6.00
NBD500G	Matching PSU for JST100	149.50	6.00
NVA88	Matching speaker for JST100	37.50	2.50
NFG97	ATU/SWR/POWER meter for JST100	150.00	6.00
SRX30D	Digital readout HF receiver 500kHz-30MHz AM/SB/CW/FM. Now supplied fitted FM detector as standard	215.00	6.00
<b>2m PORTABLES (non TRIO)</b>			
SB2X	New 2m SSB/CW portable. Covers 144-144.6 and 144.8-145	165.00	6.00

<b>VHF AMATEUR RECEIVERS</b>		Inc. VAT	Carr.
AR22	2m FM pocket synthesised receiver 141-149MHz	89.00	2.00
AR22	Flexible antenna	3.50	0.50
SR9	2m FM tunable/xtal receiver 144-146MHz	46.00	2.50
SR1000E	DAIWA 1000 channel PLL receiver 144-154MHz	83.50	2.50
AMR217B	2m FM scanner fitted 8 channels	126.50	2.50
FS10	2m FM high performance pocket scanner. Less crystals	85.00	2.50
<b>KEYS AND KEYS</b>			
CW3	Self contained morse practice oscillator	7.64	1.00
HK708	Straight key. Ball bearing pivots. Non skid base	13.20	2.00
HK702	Deluxe version of above on marble base	28.79	2.25
MK704	Squeeze paddle	13.20	1.00
EK150	Electronic keyer. Built in sidetone. Solid state or relay keying	87.99	2.50
MK1024	Electronic keyer with 1024 bit memory	149.50	2.50
DK210	DAIWA electronic keyer with speed indication. Needs paddle (MK704)	47.00	2.25
<b>ROTATORS</b>			
DR7500X	The superb DAIWA range For HF 3 element beams. Preset controller. 6 core cable	113.72	6.00
DR7500X	As for DR7500X but using the DAIWA round controller	125.00	6.00
DR7600X	Heavy duty. Will take up to 2 element 40m beam. Preset control	163.49	6.00
DR7600R	As for DR7600X but using the DAIWA round controller	176.29	6.00
KS065	Deluxe bearing for fixing stays to rotating mast	19.50	2.50
<b>MOBILE AERIALS</b>			
<b>HOKUSHIN RANGE</b>			
2E	2m $\frac{1}{2}$ , 3.4 dB gain, foldover base	9.00	2.00
2NE	2m $\frac{1}{2}$ , 4.5 dB gain, foldover base	13.77	2.00
430 Oscar	70cm $\frac{1}{2}$ + $\frac{1}{2}$ + $\frac{1}{2}$ supergain mobile aerial	16.50	2.00
320	2m stainless $\frac{1}{2}$ wave on PL259 plug	1.65	1.00
G4MH	MINIBEAM. Compact beam for 20, 15, and 10m	88.50	6.00
<b>MOBILE WHIPS</b>			
<b>REVCO RANGE</b>			
HG3F	2m $\frac{1}{2}$ stainless whip and coil	5.50	6.00
SW2	Low band stainless steel whip	1.80	6.00
SW1	High band stainless steel whip	1.30	1.00
SCC	Standard base mount for above whips	4.00	1.00
SCC/B	As above but with quick release bayonet base	5.49	1.00
MA200	Deluxe magnetic base with 3m coax	18.50	1.75
HG3FA	*NEW $\frac{1}{2}$ gain aerial for air band mobile. SCC base mount extra	6.90	6.00
<b>BASE STATION AERIALS</b>			
HF5	80-10m HF vertical. No radials required when on ground post	55.75	6.00
HF5R	Radial kit for use when mast mounting HF5	35.00	6.00
GPV5	High performance 2m base station coiliner	33.90	6.00
GP23	High performance 2M 3 section coiliner	39.00	6.00
GPV720	144/430MHz dual band base station vertical	33.90	6.00
GPV7	High performance 70cm $\frac{1}{2}$ + $\frac{1}{2}$ + $\frac{1}{2}$ base station coiliner	29.00	6.00
SCAN-X	65-520MHz discone for wideband scanner receivers	17.45	6.00
GDX2	The classic wideband aerial. 3 dB gain over the range 50-480MHz	45.50	6.00
<b>POWER AND SWR METERS</b>			
CN520	1.8-60MHz mini cross needle power/SWR meter	36.50	1.50
CN540	50-150MHz mini cross needle power/SWR meter	39.50	1.50
CN550	144-250MHz mini cross needle power/SWR meter	39.50	1.50
CN620A	1.8-180MHz cross pointer power and SWR meter. Up to 1 KW	57.00	2.50
CN630	140-450MHz cross pointer power and SWR meter. Up to 200 W	85.00	2.50
CN650	1.2-2.5GHz cross pointer power and SWR meter. Up to 20W	114.01	2.50
CNA2002	As for CNA1001A but 2 KW rating for tuner and power meter	228.00	6.00
CNW409	1.8-30MHz 200W general coverage tuning unit	130.00	6.00
CNW919	2m Power meter and antenna tuning unit	92.00	2.25
<b>ANTENNA ACCESSORIES</b>			
CS201	Two way 50ohm coax switch. 0-500MHz	13.95	2.00
CS401	Four way 50ohm coax switch. 0-500MHz	43.50	2.50
CX3A	Three way coax switch. 0-30MHz. Receiver or low power tx only	6.50	1.50
FB89A	1:1 50ohm balun. 1KW pep rating. For use as dipole centre	12.80	1.00
EIS	Small egg insulator. Glazed ceramic 4cm long	0.35	0.50
EIL	Large egg insulator. Glazed ceramic 5cm long	0.50	0.50
KRT100	Mini pocket meter. Up to 1000V ac/dc. 1000ohm/V	5.75	1.00
KRT200	18 range 20K/V station test meter	10.50	1.50
KRT500	43 range 50K/V top quality test instrument	19.50	2.00
GT1000	Excellent digital multimeter at a reasonable cost	39.50	1.50
AF608K	DAIWA all mode active filter. PLL system with incredible performance	63.25	2.00
LA2035	DAIWA 2m linear amplifier, very small. 0.5-3 W/30W at 13.8V	49.50	2.00
PC100	DAIWA 100 channel selective call unit for any transceiver	43.50	2.00

\*\*\*\*\*  
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 \* Here at our head office in Matlock, we hold the largest stocks \*  
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- ★ All modes:—LSB, USB, CW, AM±, FM, FM±, (±Option board).
- ★ Front end: extra high level, operates on 24V DC.
- ★ RF stage bypassable, boosts dynamic range over 100 dB!
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- ★ Three 6146B in special configuration — 40 dB IMD!
- ★ Extra product detector for checking Tx IF signal.
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- ★ Mic amp with tunable audio network.
- SP102:— Speaker, Hi and Lo AF filters, 12 responses!
- FV102:— VFO, 10Hz steps and readout, scanning, QSY.
- FC102:— ATU, 1.2KW, 20/200/1200 W FSD PEP, wire.
- FAS-1-4R:— 4 way remote waterproof antenna selector.

- ★ Rx 150 kHz-30MHz.
- ★ Tx 160-10m. 9 bands x 3 x 500 kHz Aux bands.
- ★ All modes AM, CW, LSB, USB, AFSK & FM (inc.)
- ★ IF shift & variable bandwidth 2.6kHz → 300Hz.
- ★ Inbuilt keyboard operation & scanning.
- ★ Switchable attenuator 10, 20, 30 dB.
- ★ Audio peak & notch filter — 40dB.
- ★ RF processor and Auto mic gain control.
- ★ 3rd order IMD — 40dB at 100W PEP.
- ★ AFSK shift 170, 425, 850 Hz selectable.
- ★ Multi channel memory + programmable scan limits.
- ★ Optional computer interface available.
- ★ Notch filter in IF (AGC immune to heterodynes).
- ★ Full break in keying. 500/600/700 Hz beat.
- ★ Unique analogue scale of digital type.
- ★ Comprehensive twin meter metering.
- ★ Memory retains mode information.

**FT 980 £1,215 now £ 1,150 inc.**

**INSTANT FINANCE**



**FT 707 £515 now £ 499 inc.**



**FREE FTV707 transverter frame with every FT 707. List £79.00**

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

- ★ 80-10 metres including WARC allocations.
- ★ Multimode LSB-USB-CW (W)-CW (N)\* and FM\*
- ★ 100W PEP output. (10W "S" version).
- ★ No tune design — inbuilt SWR meter.
- ★ Only 3 3/4" x 9 1/2" — Less than a foot deep!
- ★ Dual selectable pulse width noise blanker.

**FT 77 £515 now £ 459 inc.**

**FREE CREDIT COVER**



FT 77	Transceiver 100W output	£459.00
FT 77S	Transceiver 10W output	£399.00
MARK 7	Crystal Marker board	£9.60
FMU 77	FM Unit	£25.30
XF8.9HC(N)	600Hz or 300Hz (N)	£26.05
FV707DM	Digital Memory VFO	£170.00
FC 700	Antenna Tuner	£85.00
FP 700	Mains P.S.U.	£110.00
FTV 707	Transverter, frame only	£79.00
Modules:	432...£195.00 144...£109.65 70...£84.70	

**KDK FM 2030 £ 199 inc.**



**EXCEPTIONAL VALUE**

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

**SPECIAL OFFERS ON EX DEMO EQUIPMENT**

FT980 fitted options CW & AM Filters, Keyer	£ 1050.00	FTONE	£ 1230.00
FT77 fitted with FM unit & Marker unit	£ 435.00	FT902DM	£ 795.00
FP700 Power unit for FT 77	£ 99.00	FT101ZDAM	£ 600.00



**REMEMBER**

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



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- ★ 3 Bands\*1 2 metres, 70cms\* (10MHz) & 6M\* plugs-ins.
- ★ Full Duplex\*1 Cross band Tx & Rx simultaneously.
- ★ SSB-CW-FM! All optimally catered for, clarifier all modes.
- ★ Variable bandwidth and IF shift! SSB & CW.
- ★ Processor! Front panel mic gain and variable power.
- ★ Two main VFO's! A & B with 20Hz/1KHz steps.
- ★ Separate channelised VFO! (for FM operation).
- ★ Scanning! band scan, memory scan, memory mode.
- ★ Repeater splits! programmable and preset.
- ★ Instant reverse! and + & - splits and A/B.
- ★ Twin meters; PO/DISC, S/ALC. Duplex switchable.
- ★ Switchable; AGC, CW bandwidth, \* dial lock, noise blanker.
- ★ Priority channel operational split mode and split band.

FT 726R(2)	Transceiver c/w 144 MHz	£699.00
430T 726	430-440 MHz module	£230.00
50T 726	Six meter module	£170.00
SAT 726	Full duplex unit	£90.00

**FT 726R £699 now £675 inc.**

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- ★ 10 VFO's!!! Any Tx-Rx split within coverage.
- ★ Two frequency selection ways, no bandswitch.
- ★ Main dial, velvet smooth, 10Hz resolution.
- ★ Inbuilt keyboard with up/down scanning.
- ★ Dedicated digital display for RIT offset.
- ★ Receiver dynamic range up to 100dB!!!
- ★ SSB: Variable bandwidth and IF shift.
- ★ 300° or 600Hz\*, 2,400 → 300Hz\*, 6kHz\*, 12kHz\*.
- ★ Audio peak and notch filter. FM squelch.
- ★ Advanced variable threshold noise blanker.
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- ★ Mains and 12VDC. Switch mode PSU built in.
- ★ RF processor. Auto mic gain control. VOX.
- ★ Last but not least full break-in on CW.

- ★ 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).
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- ★ Digital\* plus analogue frequency displays.
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**FT 230R 2m**  
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**FT 730R 70cm**  
~~£299~~ now **£259 inc.**

- ★ 150(W) x 50(H) x 176(D)mm.!!
- ★ Up/down, memory/band scanning.
- ★ Easy "write-in" memory channels.
- ★ Memory back-up "5 year" lithium cell.
- ★ Ten memories with priority functions.
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- ★ Illuminated "any angle" LCD display.
- ★ Display to 100's of Hz and functions.
- ★ Two completely independent VFO's.
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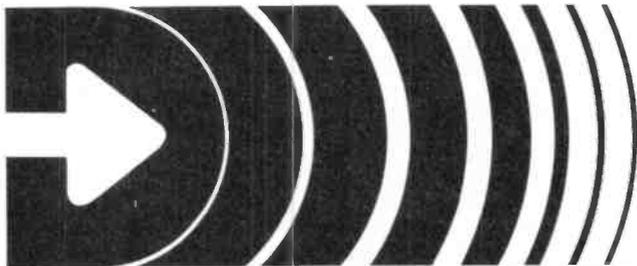


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is the definitive and long awaited answer to the Russian Woodpecker. Others claim to solve the problem of the distinctive RAT A - TAT TAT of the Russian radar system. **DATONG are the first to succeed with a fully automatic blanker.**

With the introduction of model SRB2 the Woodpecker is dead. Completely automatic in operation, SRB2 locks onto the Woodpecker within a second or so of its appearance and blanks it out completely. SRB2 adjusts automatically and continuously to changing pulse widths and phase changes that defeat the manual blankers. SRB2 can even deal with more than one Woodpecker at a time. User selectable between 10 and 16hz repetition rates, SRB2 connects in series with loudspeaker and antenna leads, and is equally effective on SSB, AM and CW. A power supply of 10 to 16 volts @ 150 ma is required.

Price: **£75.00 + VAT (£86.25 Total)**



**DATONG ELECTRONICS LIMITED**

## MODEL ANF

The value for money, stand alone automatic notch filter that doubles as a CW filter. Model ANF is small in size but neat in looks and big in performance. Simply connect model ANF in series with the loudspeaker lead of your receiver and from then on heterodynes, whistles and other steady tones that often make listening on the crowded amateur and short wave bands hard work will vanish automatically, as model ANF notches them out. A bargraph LED display shows you the frequency of the offending interference. At the push of a button model ANF becomes a good CW filter eliminating all but the signal you want to hear. Manual or automatic operation in notch and peak modes, plus automatic frequency control, makes model ANF extremely versatile and easy to use. A power supply of 10 to 16 volts DC @ 100 ma is required. Model ANF is supplied with connecting leads, and is identical in size to model SRB 2

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## ICOM's Latest The IC-751 HF Transceiver



Think about the IC-740.

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

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

Other standard features include: 36 memory channels with scan facility and start/stop timers, a marker, 4 variable tuning rates, Pass Band Tuning, notch, variable noise blanker, monitor switch, DFM (direct feed mixer) in the front end, full break-in on CW and AMTOR compatibility. The first IF is 70.045 MHz. Any XIT and RIT adjustment is shown on the display. The transmitter features high reliability 2SC2904 transistors in a low IMD (-32dB @ 100W) full 100% duty cycle. Power is restricted to 40W on AM and adjustable from 10W on all modes. FM and the IC-FL44A crystal SSB filter are both fitted as standard. As you can see from this brief description the IC-751 is certainly a transceiver worth considering - Why not call us for details?

## NEW! IC-271, VHF Multimode Base station



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

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

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

## IC-R70, HF Receiver



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

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

The R-70 also has separate antenna sockets for LW-MW with automatic switching, and a large, front mounted loudspeaker with 5.8W output. The frequency stability for the 1st hour is  $\pm 50$ Hz, sensitivity- SSB/CW/RTTY better than  $0.32 \mu\text{V}$  for 12dB (S+N):N, AM- $0.5 \mu\text{V}$ , FM better than  $0.32$  for 12dB Sinad. DC is optional

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## YAESU - Latest...

Latest news from YAESU - Expected in August is the new FT-757GX all-mode HF transceiver - 160 thru ten

of course plus general coverage RX. FM and all options fitted including dual VFO's, eight memories, programmable memory scan, full break-

in on CW, 100 watts PEP/DC output at 100% duty cycle and all this in a package measuring 238W x 93H x 238Dmm!

## KEEP AHEAD WITH THE YAESU FT-102!

**STOP PRESS**

We are pleased to announce a new price break through on this superb transceiver - phone or write for details.



### FRG-7700 HIGH PERFORMANCE COMMUNICATIONS RECEIVER



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

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

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

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

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



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

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



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

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



# AMATEUR ELECTRONICS UK



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## FT-980 ALL MODE HF CAT \*

This incredible new transceiver incorporates the highest level of microprocessor control ever offered in an HF all solid-state radio. Including a general coverage (0.15-30MHz) receiver with its own, separate front end, this amateur transceiver offers a new dimension in frequency control; whereby frequencies can be entered by either front panel keypad or tuning dial, and then scanned in selectable steps either freely or between any two programmable limits. Twelve memories include four with special protection, and two large digital displays allow full flexibility and control for split frequency operation while two meters allow full transmitter information.

Additional controls include IF Width and Shift on concentric controls, AMGC (Automatic Mic Gain Control) to set microphone input threshold, RF Speech Processor, ALC Meter Hold function, IF Notch and Audio Peak filters, Transmit Monitor, Noise Blanker and CW Full Break-in. Controls



\* Computer-Aided Transceiver

are also provided for FM Squelch and CW Keyer Speed when the optional FM and Keyer Units are installed. The most important feature of the FT-980 is that practically all of the above features can be controlled by the user's separate personal computer, when connected through an optional interface, also available from Yaesu. Where up to now the

few amateur transceivers that offered any kind of computer interfacing at all permitted only frequency control, the FT-980 permits almost total control of all functions from a separate micro-computer, including Mode; IF Width and Shift; Scanner Step, Speed and Limits; and switching of most other functions. (Microcomputers are not available from Yaesu.)

## FT-77 THRIFTY HF TRANSCEIVER



**UTILIZING THE NEW CAD/CAM\* MANUFACTURING TECHNIQUES, YAESU PRESENTS THE FT-77 AS A NEW MILESTONE IN RELIABILITY, SIMPLICITY AND ECONOMY IN HF COMMUNICATIONS.**

### Thrifty

Featuring efficient, all solid-state, no-tune circuitry, the FT-77 offers a nominal 100 watts of RF output on all amateur bands between 3.5 and 30 MHz, including the WARC bands. New CAD/CAM techniques plus the simple design of the FT-77 add up to one of the smallest, lightest HF transceivers ever; both in your hands, and on your wallet.

### Simple

The front panel control layout and operation are actually simpler than some VHF FM transceivers, with only essential operating controls; while the simple circuit design leaves fewer parts that could cause problems. Nevertheless, all of the essential modern operating features for HF SSB and CW are included, along with extras such as dual selectable noise blanker pulse widths (designed to blank woodpecker or common impulse noise), full SWR metering, and capabilities for an optional internal fixed-frequency channel crystal, narrow CW filter and FM Unit.

### Reliable

Computer-aided design of the circuit boards in the FT-77 ensures the most efficient component layout possible in the smallest space, while automatic parts insertion and soldering greatly diminish the chance for human error. Reliability and quality control are thus improved and simplified beyond the degree previously attainable in amateur equipment. This means longer equipment life with less chance of breakdown.

### Expandable

The extremely compact size and simple control layout make the FT-77 ideal for mobile operation, or as the heart of a complete base station with the optional FP-700 AC Power Supply, FV-700DM Digital Scanning VFO and Memory System, FTV-700 V/UHF Transverter and the FC-700 Antenna Tuner. The competitive price of the FT-77, coupled with the expansion capabilities presented by these accessories, make this transceiver the perfect choice for those new to amateur HF communication, or as a practical second rig for old-timers.

\*Computer Aided Design/Computer Aided Manufacture.

## FT-726R VHF/UHF Multi-bander



Combining all of the best features from Yaesu HF and V/UHF transceivers, the FT-726R opens a new world of operating ease and flexibility for FM, SSB and CW on the 50\*, 144 and 430/440 MHz amateur bands. The design of the FT-726R integrates the individual operating requirements of each of the three operating modes into one unit, and the user can then select which of the optional plug-in band modules he desires.

The VFO-A/B scheme has ten programmable memories, and can be tuned in 20Hz steps for CW and SSB operation, or in selectable steps for FM. FM tuning is accomplished by an indented tuning knob. IF Width and Shift controls are provided for CW and SSB operation, while both preset standard and user programmable repeater offsets can be selected for all modes. An optional Satellite Unit makes the FT-726R into a full duplex cross-band satellite transceiver.

\*144 MHz Unit installed, other Units available as options according to local regulations.

For full details of these new and exciting models, send today for our latest SHORT FORM CATALOGUE. All you need do to obtain the latest information about these exciting developments from the World's No.1 manufacturer of amateur radio equipment is to send 36p in stamps and as an added bonus you will get our credit voucher value £3.60—a 10 to 1 winner!

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### TRANSVERTERS FOR 2 METRE TRANSCEIVERS

MODEL No.	MMT28/144	MMT70/144	MMT432/144-R	MMT432/144-S	MMT1296/144	MMX1268/144
Output Frequency Range	28-30 MHz	70.025-70.5 MHz	432-434 MHz 433.6-435.6 MHz (Repeater Mode)	432-434 MHz 434-436 MHz (Satellite Mode)	1296-1298 MHz	1268/1270 MHz
Input Modes	SSB, FM, AM, CW					
Input Requirements	10 Watts with standard attenuator — MMR15/10 (3 Watts with alternative attenuator — MMR7/3)					
Output Power	10 Watts	10 Watts	10 Watts	10 Watts	2 Watts	2 Watts
Conversion Principle	SINGLE	DOUBLE	DOUBLE	DOUBLE	SINGLE	
Receive Gain	15dB					
Receive N.F.	2.0dB max.	2.0dB max.	3.0dB max.	3.0dB max.	1.2dB max.	
Input & Output Impedance	50ohm					
RF Connectors	SO239	SO239	SO239/BNC/N	SO239/BNC/N	SO239/BNC/N	SO239/BNC/N
Power Requirements	13.8V at 2.1A	13.8V at 2.1A	13.8V at 2.1A	13.8V at 2.1A	13.8V at 0.5A	13.8V at 0.5A



MMT432/144-R



MMT1296/144

### TRANSVERTERS FOR 10 METRE TRANSCEIVERS

MODEL No.	MMT70/28	MMT144/28	MMT432/28-S
Output Frequency Range	70.025-70.5 MHz	144-146 MHz	432-434 MHz 434-436 MHz (Satellite Mode)
Input Modes	SSB, FM, AM, CW		
Input Requirements	5-500mW (Continuously Variable)		
Output Power	10 Watts	10 Watts	10 Watts
Conversion Principle	SINGLE	SINGLE	SINGLE
Receive Gain	30 dB		
Receive N.F.	2.0 dB max.	2.5 dB max.	3.0 dB max.
Input & Output Impedance	50 ohm		
RF Connectors	SO239	SO239	SO239/BNC/N
Power Requirements	13.8V at 2.1A	13.8V at 2.1A	13.8V at 2.1A



MMT144/28



MMT432/28-S

### PRICES — including VAT

MMT 70/28	: £ 119.95 P&P £2.50	MMT 70/144	: £ 119.95 P&P £2.50
MMT 144/28	: £ 109.95 P&P £2.50	MMT 432/144-R	: £ 184.00 P&P £2.50
MMT 432/28-S	: £ 159.95 P&P £2.50	MMT 432/144-S	: £ 184.00 P&P £2.50
MMT 28/144	: £ 109.95 P&P £2.50	MMT 1296/144	: £ 199.00 P&P £3.00
MMX 1268/144	: £ 135.00 P&P £2.50		

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**TRIO TS-430S £736**



TRIO £ c&p

TS930S	9 Band TX General Cov. Rx.	1216.00	(-)
AT930	Int. Auto A.T.U. 80-10M Bands	141.90	(-)
SP930	Ext. Speaker with audio filters	59.00	(1.50)
TS830S	160-10M Transceiver 9 Bands	697.00	(-)
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AT230	All Band ATU/Power Meter	135.00	(2.00)
SP230	External Speaker Unit	41.00	(1.50)
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SP430	Matching Speaker	29.44	(1.50)
MB430	Mobile Mounting Bracket	11.27	(1.50)
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MB100	Mobile Mount for TS 130/120	18.60	(1.50)
SP120	Base Station External Speaker	26.40	(1.50)
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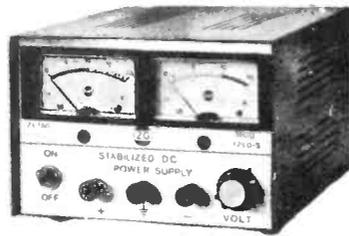
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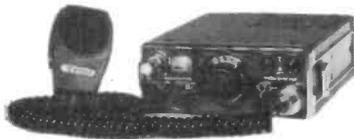
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# SHORT WAVE MAGAZINE

(GB3SWM)

ISSN: 0037-4261

VOL. XLI

SEPTEMBER, 1983

No. 479

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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.  
Telephone: 04-3871 5206 & 5207

Annual Subscription: Home: £9.00, 12 issues, post paid  
Overseas: £9.00 (£17.00 U.S.), post paid surface mail

Editorial Address: Short Wave Magazine,  
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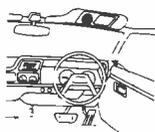
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FOR THE RADIO AMATEUR AND AMATEUR RADIO

*The*  
**SHORT WAVE**  
*Magazine*

## EDITORIAL

**Belgium**

The word on the disgraceful attempt by the ON authorities to take away virtually all the UHF and SHF amateur allocations is that the UBA has managed to obtain a stay of execution, although, at the time of writing, there seems to be an air of pessimism about the general outcome. The RSGB is watching this situation with considerable care, as there are hints that other European administrations might have similar ideas and it could well be that concerted action may be needed to save the day. It is understood the latest position will be broadcast both on the RSGB 'hotline' and in the Sunday news broadcasts.

**Satellite Problems**

'Our' latest satellite, Oscar 10, seems to be still in trouble; it all appears to arise from the damage which occurred at the third stage separation in the first orbit on June 16. An apology has been received from the European Space Agency, but this is little consolation to all those devoted people around the world who have poured both money and effort into producing a satellite for the use of radio amateurs — after eight successful shots from U.S.A., plus the Russian ones, the score for the Ariane launcher so far does not augur well for what is meant to become a European satellite commercial lifter.

*W. J. King*  
*23KFE.*

WORLD-WIDE COMMUNICATION

# COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

**T**HE month under review is claimed as being the hottest for something like 300 years; and this has had an effect on *CDXN*. For one thing the hot weather has driven people from their shacks into the open air, and for another we have had much static to put up with on all bands. Underlying the static, conditions could well have been quite good; we recall G4AKY saying around mid-month he was unable to copy a station on Top Band although he was banging the S-meter up to S9 in the 'clear' moments—and the station in question was South American. Your scribe came across rather similar situations on other bands.

However, now that the time for your scribe's quick break approaches, you may rest assured the hot and humid spell is over and done with . . . he *always* has rain!

## New Bands

We held a couple of reports over last time, and we will take these in right now.

G2HKU (Sheppey) had a little paddle on his key on 10 MHz CW, to find VK3MR, HB9PE, OY7ML, N3AXV, and N4FNG.

G4MVA (Snainton) worked DLs each day, OE, F, G, J88AH, H180MB, W1-5, 3V8AA, OK1FF, and OK2SPS, the latter Glyn reckoned as a new country on the band. On a different line, Glyn says that a good way of determining what's what is to listen for the German beacon signal around 10.140 MHz; this is audible every day at Snainton. Using a twenty-metre dipole, G4MVA has never failed to raise the States at night.

G2HKU chose the hot weather to finish his double-glazing, as an activity to keep him out of the shack, and so for the current month 10 MHz yielded OY7ML and FG7BP.

Although he didn't actually operate the band this time, G4MVA says that despite the static he heard most of Europe and U.S.A. at workable strength on the band.

A new contributor this month is GM4MPU (Paisley) who wrote in response to our comments on the lack of reports on Forty and the new bands. Mike has a 7 MHz dipole fed with twin-lead by way of a balun at the shack end, which loads up nicely on 7, 10 and 21 MHz, on a sloping site. So far, the FT-902 has raised F6CAX, DK3BH/A, VP8ANT, and FOAIU. Mike promises to continue reporting, the more so as

there is activity going on now which will get the aerial up higher—ten feet as the mean height is a little below average!

## Top Band

Has been hard work for anyone this month, thanks to the static levels. In fact we have just the one report, from G2HKU and he only mentions a single contact namely his regular one with PAOPN.

As far as the writer goes, he has been listening on the odd occasion; but when the static level is enough to see off a station that would have been within CB range, and on CW at that, one tends to become a mite discouraged!

## Happenings

Still on the Top Band front, *DXNS* says that VK9NS has put up a 'bobtail curtain' for Eighty and promises much more in the way of Top Band activity this coming winter. It also indicates that VK9NS's plans for a Kermadec operation are still looking good, with a November target date.

Another one who is looking at Top Band is ZK2RS, at present only on 14 MHz, but plotting big things while he is ZK2, which incidentally is until November 1984. He has apparently got permission to use a local BC station's vertical from 0830z weekdays and all day Sundays. Bob would appreciate advice on the best times to be around.

3D6AK is another planning to put up an aerial, having found he can hear the Europeans on Top Band.

That exercise to get some amateur radio activity in Cambodia, with XU1SS, seems to have run up against some snags in the matter of getting equipment going along the correct route, so all we can advise you to do is to listen at the right times and obvious frequencies. Personally, we doubt this one, somehow.

September is the hoped-for deadline for Albania, by DJ7FT and DJ0UJ; insofar as DL7FT was the sparkplug in the last successful ZA operation, from ZA2RPS back in the early seventies as memory recalls, then he should have a sporting chance of doing it again. On the other hand, it must be said that many ZA operations are announced, but few end up as QSLs on the wall . . . most are just plain old Phoney Phred at his tricks again. Only thing to do is to work them, and *then* worry as to whether the QSL

card will arrive! Still on the ZA tack, there has been a deafening silence from the OHs about the "training ZA operators in amateur radio" activity over the past few months—was that also a busted flush?

## Eighty

Again a band on which there is a scarcity of reports. G2BON (Aldridge) had his IC-740 out of action for most of the period under review—it seems the problem was a diode that went intermittent and upset the bias on the output transistors whenever it played up—which must have done them a lot of no-good. Tom says, though, that we wouldn't have had much of a report anyway, as he had never known a month of such generally lousy conditions, what between the static, the intruders, the *spurii* and all the rest of it!

G2NJ (Peterborough) on the other hand, says that while the band sounded pretty poor of an afternoon, it was surprising who was also listening around and could be scared up by a call or two. G4RIZ at Sevenoaks School, gave Nick a fifth QSO with his home-brew two-watt rig before departing on a trip to DL-land. Another member of the same school was G3RWB, again using home-brew gear but at 3 watts. G4POJ in Quarry Bank was worked again; he has one watt. G3UI of Halifax was heard running 750 milliwatts while working G4RAR near Derby. Outside the QRP signals, Nick mentions GB2SM, who was running a KW-2000, G4PVA/P located at Exmouth and using a G-Whip, plus G3SB/P at Much Wenlock in Shropshire.

## Forty

Shortages of input there may be this month, but not on 7MHz—and thanks to all who listened to our appeals for our favourite band! G4MVA says he Noronha and QSL to PY1BVY), FG0DDV/FS7, VP2MM, UU2M and 4J4F for a couple of odd Russian prefixes, CO8UA, all the W call areas except W7, 4K1A, 4K1D, ZL1AJY, C30A1A, 4U1UN one morning at 0630z, and the following in the Radiosport contest: OH, CX7BY, UI8, UL7 and smaller fry. The Big Gotaway was HC1LE, who worked a GW and then disappeared only to surface on 21 MHz even though he was being called by some notable G callsigns.

Down Under now, to VK6PP (Perth, Australia) who was once G3PPP. Tony finds the mornings around 0700 local to be good, giving 2300z as the best times, when from his end he hears lots of both CW and SSB stations at workable signal strength. For June, the VK6PP log contains 4K1, UH8, G3CCZ, G3IAF, SP3, F2, GM3YTS, UR2, UP2, UD6, YB, UK3, YO and UC2, all worked between 2250 and 2330z, on CW. That was the June listing, now for July, and we see U18, YB on SSB, G130QR on SSB, SP2ZCI/2 on SSB, A4, VE2, UB5, DJ, F9, W2, GM3PPE, GJ4/PA0ERA, GJ4/PA3BFM, G4MSK, UD6, YU and G4MUL, and again CW unless otherwise noted. The gear at VK6PP is FT-DX401 and FL-2000B, to a slightly bent and inverted-V dipole up at only twenty feet. Thanks for the report, Tony, and hope to hear again.

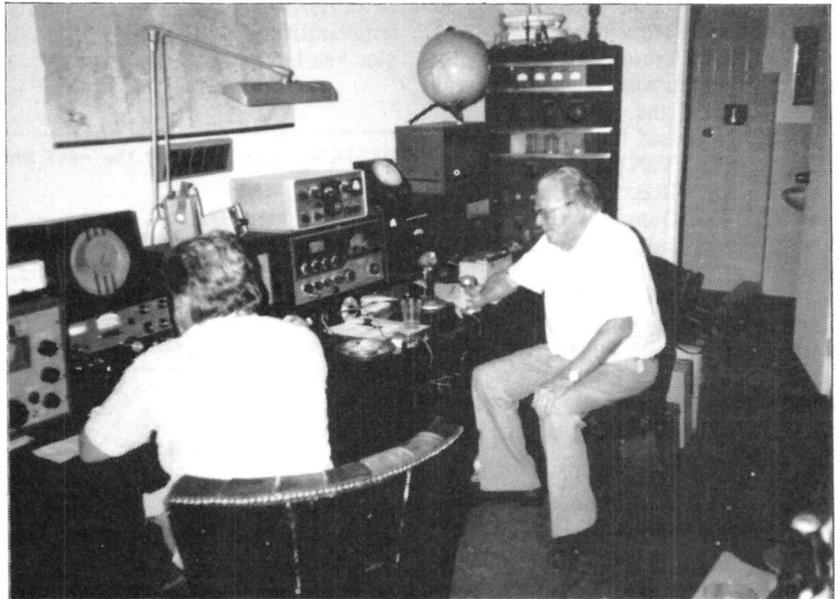
Now we turn to GM4MPU who says he is very pleased at the way his gear is pulling the stuff in through the static and QRM—or is it that the driver's just passed the Advanced test?—which led him to CW exchanges with UA9SET, LZ1KDP, LU9ABD and PP6SS; all were found in the hour around midnight GMT.

Even G3NOF (Yeovil) has been heard on the band—this happens about once a decade when Don decides to “do something” about his band score, and this time to work a few Welsh Castles. SSB contacts are noted with EJ0ARS, OH0BT, UK2ABC, UK5UDX and UR2QD.

## Ten Metres

This band is obviously just a pale shadow of what it was at the peak of the sunspot cycle, but there is no doubt that careful monitoring of the beacons is worth while; one or other of them should be heard every day, and there is always the odd CB operator to conduct to safety!

In one of those nice long chatty letters, G6QQ (Hoveton) comments on the different operating tactics as between his first days on the band back in the thirties, and his reincarnation as a ‘new boy’ in the Eighties. The infernal S-meter comes in for some stick—quite the most pointless fitment on the rig (we agree 100%)—but there are still lids who give reports by it. Such a one gave G6QQ an RST519 report—that translates as “perfectly readable faint signals barely perceptible”—so now you know! Another one that G6QQ doesn't like is the use of ‘VA’ after your last over when you intend to listen to the other chap's final words; this seems a good way of ensuring the other chap's words are QRM'd by breakers if he is DX-worthy. Far better to end with ‘KN’. Anyhow, to revert to the matter in hand, G6QQ monitored the band in



The station of William (“Can”) Draney, OA4EL. “Can”, who is seated on the right of the picture, is Canadian by birth but has lived in Peru for 40 years, and has been on the air for 62 years. The shack has a wide variety of equipment and OA4EL currently operates a Hallicrafters 32-A transmitter and Collins 75A-4 receiver.

photo: J. Taylor, G8YRM

between operations on the other allocations, but sad to say he neither heard nor worked any DX.

G4HZW (Knutsford) wrote at 2330z, just after finishing re-tiling the kitchen! Again all 28 MHz, all SSB, and the TS-820 and two-element Quad. The month began, as the previous one ended, with some odd propagation to the U.S.A.; in the meantime there were one or two openings to Africa and South America, and on the morning he wrote Tony heard some weak VK4 and VK5 signals—but the wallpaper paste was thickening fast! So—the crop for this month includes K1RAW (Ten-Tec Club No. 1), WA2UDT, KA1XN, WB2WTK, all worked between 2330 and 0030z; OH0BT (Aland), back-scatter contacts with G4LDZ, GD4PTV, G4OLG/A, then HV3SJ, 3B9FK (Rodrigues), ZS6SX, CP8HD, CX2BJ, R18AJG and VK6IV. In addition there were many Spor-E contacts into Europe, with the EA path seemingly open 24 hours daily.

Next we have GW4RGA (Prestatyn) who is a fugitive from the SWL column; Jim is a shift worker and works away from home, so time is somewhat limited. Nonetheless we hope for frequent, if not regular, reports. As far as Ten goes, GW4RGA didn't pick the right times, as he found only DH3EAL, DJ3HW and EA1CPS, all of whom were very weak CW signals.

Now for G3NOF (Yeovil) who says he found the band dead most of the time. There have also been periods of short-skip to EA, CT1, I, YU, YO on some days, and to F, OZ, DL, ON, and PA on

others; but no contacts were made with any of these.

Finally on this band, G2ADZ (Chessington) who pretty obviously has a receiver running for most of the time on CW. Each day Bill has heard a DX beacon at some time, usually ZS6PW, PY2AMI, or LU1UG. Sporadic-E propagation has resulted in the European beacons appearing at high strength, with DL0IGI and EA6AU notable—but the DX activity has been hopeless! Bill keyed with W9NXD/HR2, PY2UWW, CX4GL, Z21GN, 3B9FK, CE3WD and CN9CM.

## 21 MHz

Has been for most the preferred band. However, at the instant of writing it is trying to show a Ten-like desire to kid one it's closed—there's just one VE signal on CW at very good strength on an otherwise unpopulated segment! However, to return to our mutttons. G2HKU, managed CW with ZT8DC, 4X6NKF, VK6OH and a QRP one, using four watts, with 4X6NKF again.

Turning to G4MVA, Glyn worked EL0AP/MM off eastern U.S.A., 4X6NKF, EL2AE, CX7CO, a GW8 for real DX, FP0HOQ, T77C, 3B9FK (QSL via 3B8FK). PY0FE, CX1DZ (who called G4MVA when the latter was trying hard for HC1LE, which at least proved Glyn was getting out!) and TR8JLD, who is at Box 484, Libreville.

GM4MPU says his 7 MHz aerial seems to do well on 21 MHz too, so he

had an excellent chat with N0DAA in Missouri just to prove the point.

G6QQ found the odd time when the sun in the garden was too wearing, and so he went into the 'shade of the rig' where SSB was used (between 1230 and 1700z) to raise YV2NY, 9V1VP, K1AR, WB2YIK, KA2MRE, VE1BLS, KL7LF, 4X6WCY, 4X6IG and A4XCA. CW in the mornings found JH4DIT, JA6NNX, JR4GHQ, HL1AHJ, TR8JLD, KA1RE, WA4CNJ and W9GAH. Afternoons were occupied with JF6CTK, JF2EZA, K7OMR, W8UQG, W1HRJ, W1HT, KA1JKM, KA9KUH, N8DHB, VE3DTL, 6W8HZ, PY1QN, PY1JF, 4X4KT and 4Z4MK; and the period 2000-2100z was the peak with JA5RH, PP7JQ, PY2UWW, PY2ZEB, PS7DD, WB2VMU, K4II, N4HPW and WA4STA.

GW4RGA stuck to his key, and by this means found AC8I, AC0S, CX7BY, CYICE, EA8AGF, EL2AE, HH2VP, JA1HGY, KR0Y, WA5R, UA9CBR, UI8OAA, UK9AAN and UK9FER.

Turning to the report from G3NOF, Don didn't rate the conditions up to much; no Pacific stations were heard, and most signals were N-S in direction. In the mornings the short path has occasionally been open to VU-JA-VS5, with YBs on from about 1500z. North Americans were poor, and only heard a few times about 1400 or 20-2200z. QSOs were made with A4XVM, A71AD, CN9CO, CP1HL, DF8LY/3D6, ED9IAL (Alboron Is.), EA8YO, EM6F, F0CH/FC, F0-HUK/FC, G3HHL/MM in the Mediterranean, GD4PTV, HH2N, HH2V, HI3AMF, HI8GB/6, J87BS (Mustique), JY9FS, JAs, K2KTT/PJ7, K5DX, K5QY, KW7Y, LG5LG, N5AU, NA5R, OH1AA/OH0, OH0BT, P29NSF, S79ARB, S79MC, S79WHW, T77C, TE32CCC, TR8CR, TZ8DC, UD6DIF, V2AN, V3TV, VK3KHI, VP2MKS, VP5WJR, VP8AEN for Antarctica, YB5OD, YC4FS, YC0VL/0, ZB2FX, ZC4GO, XC4SR, ZD7BW, ZD7CW, ZD8JT, ZS5MY, ZS6BXB, 3X4EX, 4J4F, 5B0JE, 5Z4CI, 6W8HL, 9J2MY, 9V1VP and 9X5LR.

G2ADZ says in a slightly hurt tone that he has been driven to 21 MHz from Ten. He found plenty of Spor-E Europeans at all times, and some CW DX as noted on CW: TZ8DC, DL5KAT/3D6, XE3ARV, OD5LX (QSL to SM0DJZ) within a few yards of the old front line, 7P8CG (QSL to

KC0FH), 9K2FX who was reporting a temperature of 113° F, and YB2ARH, plus hearing many ZS stations.

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### "CDXN" deadlines for the next three months;

October issue - September 1st  
November issue - October 6th  
December issue - November 3rd

*Please be sure to note these dates*

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## Twenty

G6NUO (Great Barr) is not a call one associates with this piece, but Stan is a fairly regular correspondent to the *Magazine* on other matters, and he mentions that he heard W6LAS/SV/A/P operating on April 22 last on 14.243 MHz, working a net including SV10L, JY9RC, G3ZQQ, YU1GTU, G3MHM as net control, I5YBZ, UA31FK, IS0LLJ and EA7CPW, and first heard by Stan at 0619z. Now it is true that W6LAS, Gus, was reporting that he was on Mt. Athos and it is true he is a genuine licensed radio amateur, but we don't know more than that. Gus was only on for a short time, with virtually no warning, and to date we haven't heard of anyone with a QSL for this short session. One suspects that he was very close by, but perhaps not actually in the Mt. Athos enclave itself. The 'big' Athos DX-pedition which was proposed for shortly after just didn't get off the ground, but we see no reason to doubt that W6LAS was 'there or thereabouts' and one could hardly blame G3MHM for accepting a check-in to the net! If you don't know you've got a pirate, then the answer is to take a deep breath, work the station, send him a card if you like and chew fingernails *afterwards* - who knows, you *may* have tickled a new one!

G3NOF says he has heard in the mornings, between 0600 and 0800z, VK and ZL stations, with the occasional Pacific station and even the odd W6/W7, fading out rapidly after 0800z. Around 1700z there have been a few KL7s, and on occasion the short path to VK/ZL opened up around 2100. North Americans were very strong from around 2100. SSB contacts were made with ED9IAL, G4JVG/OH0/OJ0, KL7CQ, KL7Y, OJ0MA, VK2WU, and ZK1CH.

Turning to the GW4RGA letter, we notice Jim 'condescended' to go on SSB to chat with VP8ANT, but otherwise it was CW all the way, to such as AD8I, AD8J, CZ1ASJ, FP0HOQ, FP0HSW, G6ZY/EA6, EJ0WCY, HH2VP, HZ1AB, JA3YDS, JP1DYZ, KL7Y, KP4FO, KS8S, LU8DQ, N3JO, K8MFO/OH0, SN0JP, TO6ESB, U3WP, UA9CUP, UA9XWO, UK7PAL, UU2M, UV9DO, VE1FH, VE2DYX, VK2PP, W0WP, WA8YVR, WD8AUB, 4J4F and AB3A/4X. On a different line, Jim marvels how contests sharpens up ears - Jim finds he can work stations in contests that he can hardly hear, raising them 80% of the time with just his G5RV and 100 watts.

Now we go to the Broads, and G6QQ's hideaway at Hoveton, where the aeriels looked at SSB contacts with KC2OB, K3BFQ, W8GIO, plus CW to K1RH, K2NY, VK6HQ early one evening, and YV5AJE early one morning.

14 MHz from G4MVA's point of view wasn't all that bad, with KH6IJ around 0700 most mornings, plus such as UF6DA/U60, EM6FCR, EM6FCX, I1WXY/IA5, CT2AK, KH6IJ, TS8WCY in Tunisia and operated by 3V8AA, 7P8CL, WA7OEU (Washington), FO8JM (Tahiti), ZS1CT, TZ8DC, KA4BFT/HP1, CF5YA (a special for VE) and, in the Radiosport contest, 4J4F, UU2M, UH8, AB3A/4X, UK5OAR, GJ2LU, HZ1AB and all W call areas. Pick of the bunch was FO8JM at 0600z.

Next comes G2HKU, and his offering includes CW with HZ1AB, I1WXY/IA5 (Elba), FM7CW, PA0GMM/OH0/OJ0 - that's a fistful on CW! - OY7ML, VE6BBI, VK3BHK, VK2BPN, UA0BAP, VK5VQ and YV1AD, leaving FM7WD, OY7ML and EM6FCX to be hooked on the QRP rig with just four watts.

## QRT

Which is where we pull the trap up on the mail for another month; we hope that now the weather has cooled off a little and the static isn't so bad, that we will see much more in the way of letters, and in particular letters covering the new bands - all of them, we hope! - plus Forty, Eighty and Top Band too. In fact, the more the merrier, and of course addressed to your scribe, "CDXN", SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts. AL6 9EQ.

## ACCESSORY REVIEW

## TWO QRA PROGRAMS ON CASSETTE FOR THE ZX81

Designed by G8CEZ and sold  
in aid of the RAIBC

### Introduction

**T**HE cassette contains two programs for the ZX81 with 16K memory expansion module.

Program "A", entitled "FINDQRA", accepts an input of latitude and longitude and converts to QRA locator. The output is presented in mixed graphic and alphanumeric form.

Program "B", entitled "QRA", converts in the opposite direction and also performs a contest scoring function; it does not perform as a check-log.

The version of the cassette supplied for this review contained a revision to allow the choice of either "Fast" or "Slow" mode when running the "QRA" program.

### Hardware Requirements

The programs are intended for the Sinclair ZX81 computer with the 16K memory expansion module. A television receiver or monitor and a cassette recorder are required for display and program loading respectively.

For this review, we also used a cassette interface module made by Fulcrum Products Ltd., called "My ZX81 Loads!"

### Loading the Programs

Stories of cassette loading difficulties with the ZX81 are rife. Some people point the finger at the computer and some at the use of cheap cassette recorders. Because of these stories we used the interface module referred to above. This is interposed between the ZX81 and the cassette recorder and indicates by means of LED's when the signal level is acceptable.

Two dummy-runs into the start of the "QRA" program sufficed to find the extent of the tape header and to set the recorder level; the program loaded correctly at the next attempt and the same settings worked without any problems for the other program. We did not try loading without the module because we were eager to explore the actual program behaviour. Presumably all accomplished ZX81 users will have perfected their own program loading methods.

The loading times given in the documentation are 3 minutes, 30 seconds for "FINDQRA" and 3 minutes, 10 seconds for "QRA". The review cassette did not depart significantly from these loading times.

### Program "A", "FINDQRA"

This program requests input data in the sequence latitude then longitude, in each case prompting separately for degrees, minutes then seconds.

If the latitude entered is below 40°, the program prompts the operator to draw attention to the existence of an identical QRA above 40°.

When all data has been entered from the keyboard, the display clears and a grid, rather like that used for "noughts and crosses", is drawn on the screen. The program labels the centre square with the QRA locator code and flashes a pixel at the given position within the square. Following this, the program computes and displays the latitude and longitude of each corner of the square and the QRA's of each of the eight surrounding squares. Finally the pixel flashes again and the program run terminates. To enter a new location or to review the previous location it is necessary to restart the program and to re-enter the data.

The program takes about 12 seconds to display the QRA and about 67 seconds to label the surrounding squares, measured from the entry of the last data segment in each case.

The program accepts inputs in the following ranges:

Latitude: 14° 00' 00" N, to 62° 59' 59" N.

Longitude: 11° 59' 59" W, to 39° 59' 59" E.

This area extends from about Lake Chad in the south to Trondheim in the north and from west of EI and GI to about Moscow and Damascus in the east.

### Program "B", "QRA"

This program starts by asking the name of the contest; this is included in the display heading in subsequent execution.

The program then requests the QRA locator code for the user's own station. After this has been entered, the screen displays the latitude and longitude of the south-western corner of the home QRA square.

Having thus established its reference location, the program prompts for the QRA locator of the station contacted. When this is entered, the machine computes latitude and longitude, distance and bearing for the contact and the points for the QSO according to the RSGB scoring rules. All these current QSO data are displayed in the upper half of the screen. In the lower half are displayed the cumulative data for the contest, *i.e.* running totals of points using both the RSGB and IARU scoring rules, number of contacts, best DX in kilometres and best QRA square. The cursor rests at the foot of the screen prompting for the QRA of the next station contacted and the display is held until this is entered.

If the station contacted has a second QRA code letter near the end of the alphabet, the program asks the operator whether the station is above Latitude 40° North. The corresponding ambiguity in the east/west direction is not explored. It is outside the range of the program (and of normal VHF range from the UK).

The range of inputs acceptable to the program is as follows:

Latitude: 36° 00' 00" N, to 65° 57' 30" N.

Longitude: 12° 00' 00" W, to 38° 56' 00" E.

This range is similar to that of the other program at their western, northern and eastern boundaries. However, there is a marked difference in the positions of their southern boundaries; the range of "QRA" includes all of Portugal and Spain, Algiers but not Sousse, Sicily, Gozo but not Malta, Greece but not Crete.

The time taken depends upon whether the micro is operating in "Slow" or "Fast" mode and on the separation between the home QRA square and that of the contact. We did try "Slow" mode but found no merit in it by comparison with "Fast" mode although the latter exhibits hiccups in the display when computing. The program took 3½ seconds to fully process a QRA in the home square, 5 seconds for one at 5 kms. range or for one in the same large square. The longest processing time was approximately 12 seconds for a contact not requiring the "above 40° N?"; where this question was required, the processing time depends on the operator as well as on the computing speed.

One peculiarity noted with this program was that if the station contacted is in the home (small) square, the display gives "0 km. to QRA 0". It would be better if the message

were "0 km. to Home QRA". However this sort of close QSO is scored correctly.

The program was found to follow the RSGB scoring rules correctly, scoring low for contacts on the range boundaries and using for scoring purposes the calculated range before rounding it up for display.

### Ease of Use

We tried hard to make these programs crash because it is very annoying when a program 'hangs' with neither any indication of what is wrong nor any response to subsequent legal commands. In this respect we found "QRA" to be superior to "FINDQRA".

The "FINDQRA" program responds with error messages if out-of-range numeric data are entered. However, if alphabetic data are entered, the program crashes. In mitigation, it should be stated that both the traditional representation of latitude and longitude and the nature of the program's prompt would generally attract a numeric response.

The "QRA" program was much more rugged; well might it be considering the penalty for a crash later on in a cumulative scoring program. The program tests its input data and responds with an error message if the data is invalid. The error messages are very good; not only do they indicate what form of data you should have entered, it also displays what you actually did enter! These input checking routines do not noticeably slow up the program.

G8CEZ is to be commended on the error rejection measures in "QRA"; he has obviously given this aspect some thought.

### Documentation

The documentation supplied with the cassette is brief but adequate. It gives instructions for loading and running the programs and a summary of the scope of each. The loading times, lengths in Kbytes and lat./long. coverage of each program are stated. No program listings are included but the programs are listable.

The user is requested to confine any copying to the making of back-up copies so as to avoid cheating the RAIBC of potential income.

The cassette supplied for this review also had an extra sheet detailing the program amendment to allow choice of "Fast" or "Slow" mode although the extra lines of code were already on the cassette. Presumably purchasers of early versions of the cassette can obtain this amendment from G8CEZ if they have not already received it.

The documentation assumes that the reader is already familiar with the ZX81 computer; this seems a reasonable assumption.

The programs are stated to be in Basic rather than machine code; this facilitates addition of extra routines by the user. It also facilitates transcription of the programs, or parts of them, to run on other machines. The reviewers hope that anyone doing that will also think carefully about copyright and send one pound to the RAIBC.

### Suggested Improvements

Suggesting improvements to the results of someone else's sweat and toil is at worst a parasitic activity; at best it brings the benefit of an alternative point of view. These comments are therefore offered with some trepidation but in good faith and constructive spirit.

In the case of the "FINDQRA" program, we felt that the program would benefit from an option to give a more simple but speedier output of the QRA locator alone. Computing the remaining information given by the existing program is not always necessary but takes quite a long time. We agree that there are times when this data is of interest, especially where the location is on, or near, a square boundary and so it is right that it should be available, but only when called for. The case



"... solar powered here, OM..."

of a location on or near a boundary may also give rise to the need to check the latitude and/or longitude and to re-enter these data. In this case it is cumbersome to have to re-run the program from the very beginning, including the introductory caption. It would be preferable to hold the last result until some key were pressed, then to offer the user a menu choice of recall last result, enter a new location or exit from program.

In the case of the "QRA" program, it would be useful to be able to dump the results to a printer either at each contact or at some less frequent interval. To be fair, the author acknowledges this by his example of possible user-added routines and, of course, the routine would depend on which type of printer the user had connected to the machine.

### Other Comments

In his documentation, G8CEZ warns the user that data will be lost in the event of a mains failure and that the program and data will have to be reloaded. This would be serious under contest conditions, for example VHF Field-day, but could presumably be prevented by running the ZX81 from a suitable storage battery. There are monitors available which run from a 12 volt DC supply and consume only 500-700mA so it is not even necessary to lose communication with the micro in the event of a mains failure. Nevertheless, the facility to dump results to the printer at intervals would provide an extra level of protection.

### Conclusions

The "QRA" program is the star of the show. When we were asked to do this review our first reaction was "not another QRA program!" However, now that we have tried this one we consider that G8CEZ's program is the best we have seen. If you want programs ready to run, this one is good value; if you like to write your own, then buy this one and study G8CEZ's approach to error rejection.

The "FINDQRA" program did not come over as well as "QRA". It does what it sets out to do well enough; we just don't need to do that very often. The real problem with QRA locators is that you have to get the latitude and longitude off the Ordnance Survey map in the first place.

The cassette is available from R. A. Fuller, G8CEZ, 35 Chichester Walk, Wimborne, Dorset BH21 1SL, and costs £3.50 including post/packing. Of this price, £1.00 will be sent on to the RAIBC.

G6JFQ and G8ZKZ

## “THE NEIGHBOURS WOULDN'T LIKE IT!”

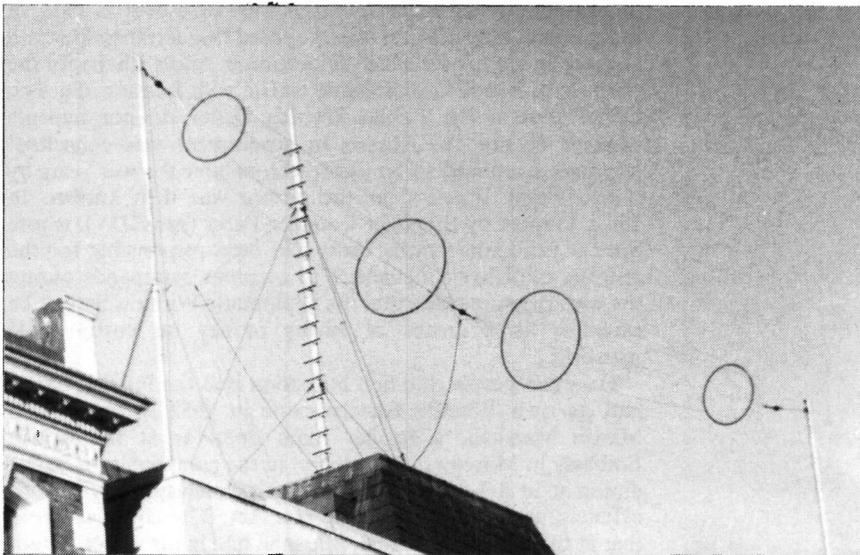
MICHAEL OCKENDEN, G3MHF

ANYONE whose planning application for a modest TA-33 has recently been refused may well envy the diplomatic immunity accorded to the aerial systems of foreign embassies located in London's Belgravia. High above the rooftops, in stark contrast to the decorative ballustrades of the elegant Georgian terraces, can be seen many fine examples of modern antenna technology. The high gain log-periodics and fat cage-dipoles ensure reliable communications with foreign capitals and other embassies and missions throughout the world. Similarly equipped British embassies overseas maintain

contact with the Diplomatic Wireless Service Radio Station at Hanslope Park in Buckinghamshire.

The allocation of callsigns to embassy radio stations is interesting for since an embassy is technically foreign territory, it would seem appropriate for a foreign callsign to be used. However, published lists of callsigns allocated to point-to-point stations indicate that in some cases 'loan' calls are issued by the host country (KNY25, Roumanian Embassy in Washington), while elsewhere an embassy will use a callsign from its own national allocation (SAM57, Swedish Embassy in Dacca). A third possibility is that a callsign is used which is not at all in accordance with the ITU lists (J5W, French Embassy in Rabat).

The Vienna Convention, signed by Britain in 1961 and ratified in 1964, is the legal basis for the use of diplomatic wireless. But long before this date, after considerable suspicion in the early days, countries began to turn a blind eye to radio stations inside embassies, coyly maintaining that commercial cable companies were used to transmit diplomatic messages. In 1920, the U.S. Shipping Board asked for permission to operate a *receiving* station in Britain for the purposes of listening to naval broadcasts from Annapolis and keeping watch on the international distress wavelength of 600

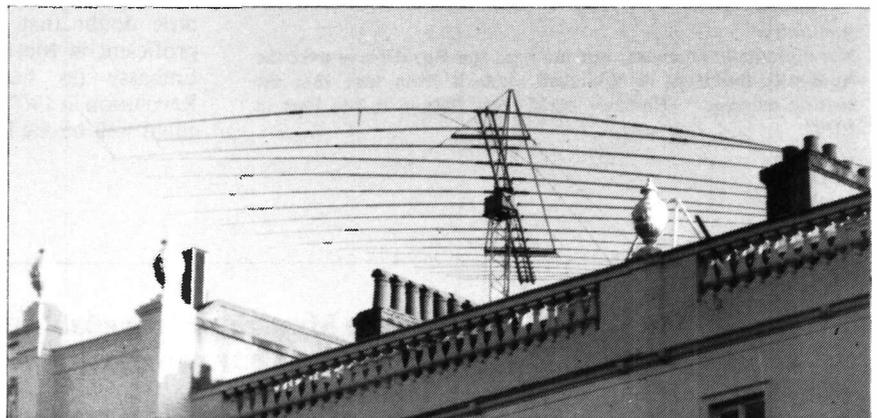


*Yugoslav Embassy:*

The curious sausage-shaped cage-dipole over the Yugoslav Embassy in Lexham Gardens, Kensington, is designed to give a wide bandwidth. Racal, who market something rather similar, quote 10kW Av/PEP as the power rating for their antenna. Since diplomatic immunity also extends to TVI, QRP operation is somewhat unlikely!

*Saudi Arabian Embassy:*

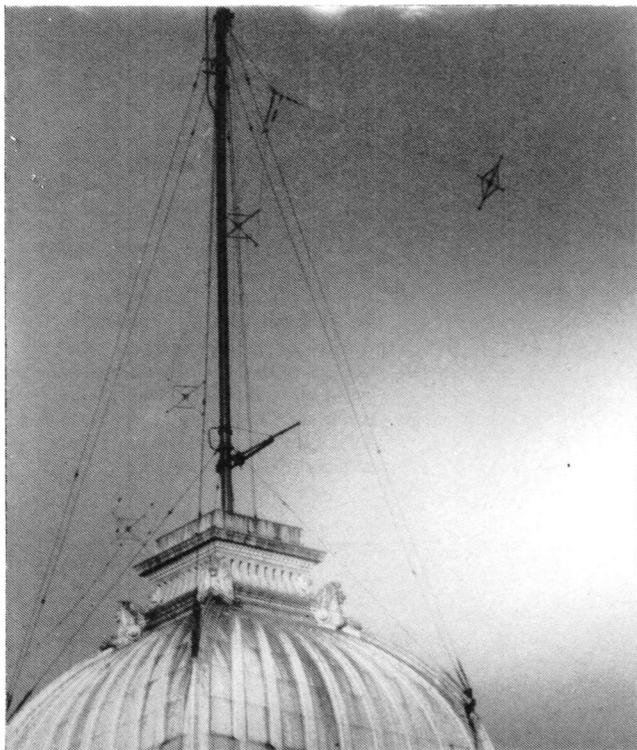
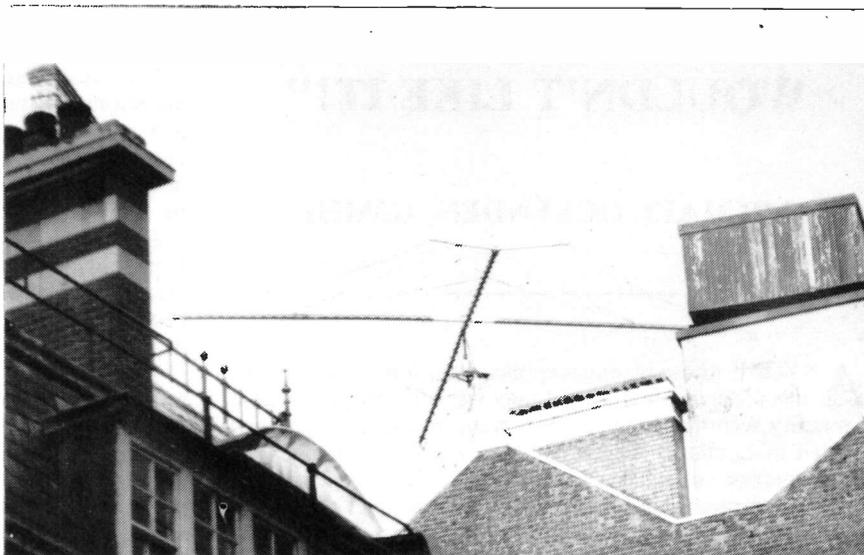
Assuming that you were able to obtain planning permission for a log periodic like this one on the roof of the Saudi Arabian Embassy, a listed building in Belgrave Square, would you get tax relief on a second mortgage to raise the £11,000 or so for the hardware and erection costs?



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*Nigerian High Commission:*  
Communications to Lagos from the Nigerian High Commission in Northumberland Avenue are assured by means of this horizontal wire beam which is squeezed in between the chimney stacks.

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*Admiralty:*  
Not diplomatic antennas, but those of the Royal Navy over the Admiralty buildings in Whitehall. Was it from here that the historic message "Winston's back" was flashed to the fleet in 1939?

metres in case any American ships were in difficulties. Permission was finally granted by Britain on the understanding that no transmitters were used. Yet in 1926, in independent Abyssinia, it was proposed that a transmitter and receiver be set up at the British legation in Addis Ababa for the purpose of handling diplomatic traffic with London. Foreign Office files at the Public Records Office do not indicate whether or not the Abyssinian government was consulted! Messages continued to be passed throughout the war years by 'Government Wireless' as the service was then known. In 1947, a report by Brigadier Gambier-Perry (*ex-G2DV*), whose Special Communications Units had been responsible for the relaying of 'Ultra' intelligence to overseas commands during the war, recommended that the Diplomatic Wireless Service be extended as a means of saving money on costly cable networks.

For most people, the first indication that the Foreign Office had its own Wireless Service came in 1952 when William Martin Marshall, a former radio operator at the British Embassy in Moscow, was arrested in the company of a Soviet diplomat in a London park and subsequently charged with offences under the Official Secrets Act. The court was told that at the time of his arrest, Marshall had in his wallet certain secret information about the Diplomatic Wireless Station at Hanslope Park. Marshall was sentenced to five years in prison and leave to appeal was refused.

In the early 1960's, Morse and Baudot circuits were gradually replaced by Piccolo, a more automated system developed by Foreign Office engineers. However, there can be little doubt that DWS operators are still required to be proficient in Morse. In the event of an assault on a British Embassy (as happened in China during the Cultural Revolution in 1967), an operator using CW from a portable set could well be the last link with Britain.

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**"Short Wave Magazine" is available to order  
through any newsagent.**

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## A LESSON, A MORAL AND A PLEA

### A CAUTIONARY TALE FOR CONSTRUCTORS — AND WRITERS

LES MAY, G4HHS

"I CAN'T get my compressor to work", said the voice at the other end of the phone. It was John and I knew all about that compressor, having received for the past month a day by day account of his struggles to get together exactly the right components, whilst he waited for the PCB to arrive. "Have you got the ICs the right way round?" I asked knowing the answer would be yes. "I've checked that and the transistors. One IC and a transistor get hot and the LED is on all the time." "Mm!", then a long pause while I tried to think of something constructive to say. "Don't worry, bring it in tomorrow and we'll get it going." I sounded more confident than I felt.

John and I took the RAE together, spent a year as G8's and then took the Morse test within a couple of weeks of each other. He doesn't build much equipment usually preferring to buy black boxes, having once asked me, "Why should I spend money on making something which *might* work when I can spend a bit more and buy something I know *will* work?" All the same I could be sure he wasn't likely to have made any very obvious mistake and I knew he had checked out the next few copies of the magazine for corrections to the circuit even before buying the components.

Over lunch next day I studied the description of how the circuit was supposed to operate as a prelude to trying to find the fault. Evidently the proof-reading had been skimpy because references to each of the multifunction ICs were confused, but even this promising start lead nowhere. Knowing how the circuit should operate had given me some idea of what voltages to expect at various points in the circuit and some clues about where to start looking for a fault.

That evening I noted the 1% resistors and the careful soldering but to be on the safe side I searched for solder bridges, misplaced transistors, ICs the wrong way round, wrong value resistors, dry joints and anything else which could be causing a fault. Baffled, I applied power and sure enough the LED showing the unit was in compression mode came on, even with no signal applied. A few preliminary prods with the voltmeter showed the transistors were hard on, with practically full negative rail voltage on all three leads of the *pnp* transistor buffering the output of the IC connected as a precision rectifier. "Ha! the IC" I thought. Power off and out came both chips. Still full rail voltage. Further prodding around the adjacent components began to suggest I might have missed a solder bridge to the negative rail. Prolonged search proved fruitless. A dud transistor? Could be. But three in the same circuit?

By now I had been searching for three hours for a fault in a two-IC, three-transistor circuit. Nothing seemed to make sense and I was thoroughly frustrated. Without any clear idea of where to look next I thought I'd better double check my initial assumptions starting with the lead out pattern of the transistors. The nearest catalogue to hand confirmed that the sketch I had made earlier and the circuit overlay, were correct. Better check with my copy of *Towers* just to be sure. All was revealed: there are nine versions of the BC212 in two quite different but superficially identical packages. The component list specified BC212's. Half my catalogues listed BC212's and the rest the 'L' or 'B' versions without mentioning there were two sorts of lead out.

It was a bit of a thin tale I had to tell John later that evening when I phoned to explain my lack of luck in getting the circuit to work. I wasn't wholly convinced by the explanation I appeared to have stumbled on. Finally we agreed I should buy some new BC212's and try substituting them.

Next day I got to the shop as the shutters were going up. "Any BC212's?" The assistant grabbed a tray full and asked "What sort? There are two sorts with different connections." For a moment I felt sure I was the only person in the world who did not know this secret. I bought three.

Ten minutes work after tea sorted out everything. John collected his compressor and an hour later phoned to tell me everything was working fine. His faith in homebuilding had been restored. For my part I had learned something new about a very commonplace transistor. And that is a lesson I shall not forget!

The moral of the story? Check first and solder second! It's the work of only a moment to check a resistor, and checking a transistor or a diode takes very little longer. Clip the black lead of the meter, switched to its lowest ohms range, to the lead you think is the base, then stab each of the other two leads in turn. If, as is usually the case, the black lead of the meter is connected to the positive terminal of the internal battery, then an *npn* transistor will show a lowish resistance between each of other two leads and base; clipping the red lead to the base should indicate a very high resistance. Reverse the procedure for *pnp* transistors. It takes less time to do than to describe and had it been done by John would have immediately revealed the anomalous base connection and prevented much frustration. Unbranded transistors can often be sorted and used in noncritical applications if this test is applied.

Please, potential authors, next time you write up your latest project, check that the average amateur can reproduce your masterpiece from the information you give. Obviously no-one is going to tackle a multimode transceiver without careful thought but the typical small project should be as bug free as possible. Most of us have limited test equipment, limited reference books and limited knowledge. If you used a particular transistor or type of capacitor because it was in the spares box then give a generic alternative if possible. When a particular component is essential then giving the supplier can be very useful.

It's not being condescending to explain carefully something you take for granted. Somewhere, someone is starting their first project.



"... give me a 'Roger'..."

# A NOVEL BAND-SWITCHED ATU

YESTERDAY'S APPROACH, BUT A  
HOME-BREWER'S DELIGHT – AND  
VERY EFFECTIVE, TOO

M. A. SANDYS, G3BGJ

THE type of aerial tuning unit known as the 'Collins Coupler' first became popular in amateur radio just before World War 2, although it had its origins somewhat earlier. Although the name 'Collins Coupler' seems to have been dropped, the circuit is still widely used for feeding random length wires and has been described many times. The justification for yet another article is that the version to be described incorporates some unusual features not previously presented, as far as is known, in the amateur radio literature.

Of all the previous articles in *Short Wave Magazine* dealing with this type of ATU, possibly the best was "Aerial Hints, Tips and Ideas" by 'Old Timer', which appeared in the February, 1962 issue. Old Timer particularly stressed the importance of getting the number of turns in the link right, and correctly positioning the link for optimum output, something ignored in most articles on the subject. Old Timer's reflections were summed up thus: "Now you will see why I do not approve of band-switched ATUs . . . you can't get the link in the right position for all conditions . . . but if you use a separate coil for each band you can, by experiment, get the turns and position right for each coil". To someone of a curious and cantankerous disposition Old Timer's statement naturally invited the retort, "Why can't one vary the number of turns in the link or alter its position in a band-switched ATU?" It was in the contemplation of this question that the design presented here first took shape. The answer, it would seem, is that it *can* be done but it requires extra effort on the mechanical side and should only be attempted by those who like doing things the hard way!

## The Moving Link

On first examination there may seem to be a problem in placing a movable link on a band-switched coil because, if the link is wound around the outside of the coil in the traditional way, any attempt to slide the link along the coil will quite naturally be obstructed by the leads going away to the band-change switch. However there is no reason why the link should not move *inside* the coil in the manner of a piston in a cylinder; neither is there any reason why the link coil itself should not be tapped and switched to provide a variable number of turns. The leads going to the link may be made rigid and thereby serve as a rod to push the link into the coil. However, knowing what is required is one thing, finding a mechanical solution is quite another! How best to implement the scheme is left as an exercise for intending constructors (should there be any such adventurous spirits!) because it depends on a number of factors, ranging from the components available to one's skill in metal-work. Only the general principle of the coil mechanism is therefore given and this is shown in Fig. 1.

Although the actual unit contains some extra mechanical refinements to ensure smooth movement of the link, nothing was so complicated that it could not be done on the kitchen table using a hacksaw, file, and hand-drill. If assurance is required that the design is entirely practical, the writer's unit was built as long ago as 1965 and is still in use today.

## Mechanical Details

The circuit diagram of the ATU is shown in Fig. 2. More will be said about this later, after the mechanical aspects have been considered. Those components of the circuit diagram which play a part in the variable link may easily be recognised in the sketch of Fig. 1 as the numbering is the same in each case.

Referring to Fig. 1, the three rods A, B, and C which make contact with, and support, the link are free to slide in the holes drilled in two insulated brackets which are placed sufficiently far apart to prevent the link from sagging when fully extended. The brackets are of ¼" thick perspex. Ordinary bicycle spokes are used for the rods, as they have the necessary rigidity and have a convenient thread at one end. The link coil, of 14 s.w.g. copper wire, is shaped to just fit into the main coil, and the turns are threaded through three small perspex separators, which make it impossible for the link and the main coil turns to come into contact. The centre rod B goes to a tap

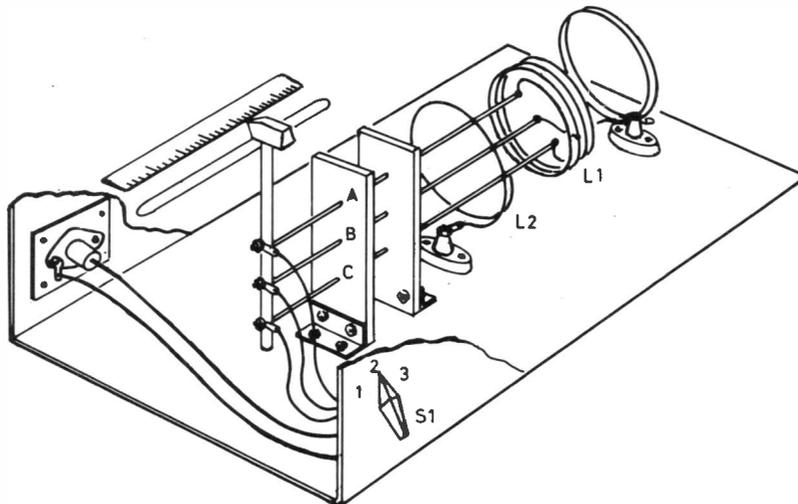


Fig. 1 MECHANICAL DETAILS OF THE VARIABLE LINK

Fig. 1. Showing how the link is moved by the sliding control, while the number of turns in the link is varied by S1.

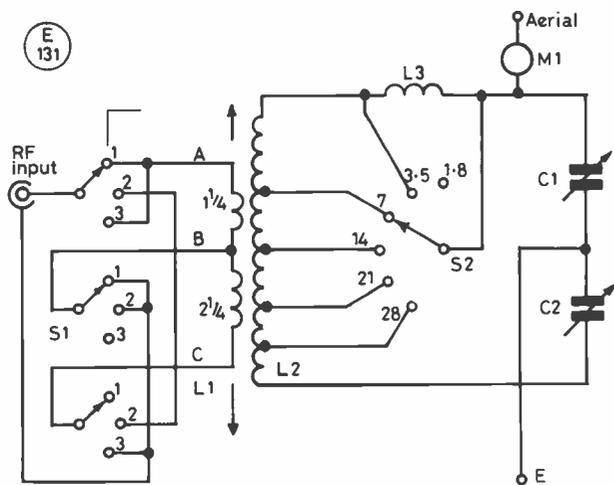


Fig. 2 CIRCUIT DIAGRAM OF THE ATU.

from the metalwork. The input socket is connected by coax to the transmitter pi-tank output. Metalwork is tied to terminal 'E' and this point may be connected to either the station earth or a counterpoise. The cabinet is mounted on insulating feet and may be left on top of the transmitter if this is a convenient position.

The three-pole, three-way switch, S1, permits three sizes of link, as follows: position 1, 1¼ turns; position 2, 2¼ turns; position 3, 3½ turns. The switching may appear unduly complicated, but was devised so that three link sizes are obtained using just three connections, the unused section is *not* short-circuited, and the unused section is connected to the earthy end of the section in use. Three leads A, B, and C connecting the switch to L1 form the rigid support for the link, the arrows indicating that the link can be moved in and out of the main coil, L2. Taps on L2 are selected by the one-pole, six-way switch to give coverage of all bands from 1.8 – 28 MHz. (The original design did not cover 1.8 MHz, and the Top Band coil L3 is a later addition.)

**Table of Values  
Fig. 2**

C1, C2 = 350 pF wide-spaced	L2 = 27t, 2½-in. dia., 8t per inch, tapped as follows: 3.5 MHz, 27t; 7.0 MHz, 14t; 14.0 MHz, 5t; 21.0 MHz, 3t; 28 MHz, 2t.
S1 = 3-pole 3-way ceramic	L3 = 30t, 22 swg enamelled close-wound, 1-in. dia.
S2 = 1-pole 6-way ceramic	
M1 = 1A thermo-couple RF ammeter	
L1 = 3½ turns, 14 swg, approx. 2¼-in. dia., tapped at 1¼ turns	

1¼ turns from one end of the link. The threaded ends of the rods support an upright ¼" diameter polystyrene rod, and each end carries a small soldering tag; the upright rod protrudes through a slot in the top of the cabinet where a pointer knob is fitted. Movement of the knob along the slot moves the link in or out of the coil, while the pointer registers against a centimetre scale cut from a perspex ruler and hence indicates the precise position of the link. Flexible leads are taken from the soldering tags to the link tap switch, sufficient length being allowed for extreme travel of the link.

In the writer's unit, but not shown in the sketch, a set of three springy metal strips make contact with the rods and are connected to the link tap switch; a push-button arrangement removes the contact pressure so that the link can slide freely in and out, while releasing the push-button locks the link in position. Eventual failure of these contacts led to the flexible leads being placed electrically in parallel and in fact these leads alone, though not such an elegant method of making contact with the rods, should be adequate for the purpose. The photograph of the complete unit in Fig. 3 clearly shows the link adjust control on the top of the cabinet.

Enough detail has now been given to allow an enthusiast to spend many happy hours devising his own solution. Jobs like this are essentially of the 'one-off' variety, artistic creations almost, allowing the constructor to express his individuality, so it is not considered needful to supply 'blueprints' showing every nut and bolt.

**Circuit Details**

Turning now to the circuit diagram of Fig. 2, RF input is through a coaxial socket mounted on a small insulated panel at the rear of the cabinet, thus isolating the link winding, L1,

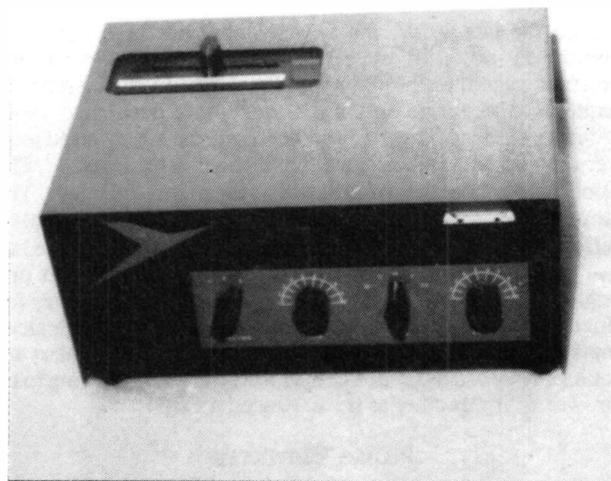


Fig. 3. An exterior view of the ATU showing the sliding link control on the top of the cabinet.

A one-amp RF ammeter is used for tuning purposes, though if running more than 70 watts input a 3A meter would be advisable. Tuning is effected by trying different settings of link size and position, then finding the settings of C1 and C2 for maximum urge 'up the spout', as noted on meter M1; once found, the settings may be recorded for future use. If the receiver uses the transmitting aerial for reception, it will be found that the link position for maximum received signal will also be the optimum position for transmitting. An SWR meter is not essential; when one was inserted in the line to the rig, it merely confirmed that the ATU was already correctly tuned on all bands.

Constructed in 1965 and still in everyday use, there can be no doubt of the unit's usefulness. It will load into any metal object attached to it! At G3BGJ, the ATU sits on top of the transmitter and feeds a much bent wire which goes up into the loft and totals some 70 feet; a counterpoise is used instead of earth and consists of about twenty feet of insulated wire tucked under the carpet, a configuration which loads up well on all bands.

## EQUIPMENT REVIEW

# DATONG SRB2 AUTO "WOODPECKER" BLANKER

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EVERY year, HF bands operators have to put up with increasing interference from a variety of sources. These include the deliberate intruders transmitting high power RTTY and data, ionospheric sounders, broadcast and attendant jammer harmonics which are heard far and wide, plus local interference from domestic equipment. Nevertheless, most operators would likely agree that *the* scourge of the HF bands is now the "Russian Woodpecker."

## The Woodpecker Transmissions

Since the late 1970s, the Soviet Union has been operating several very powerful pulse transmitters in much of the RF spectrum, regardless of all international agreements concerning frequency allocations and not causing interference to other legitimate services. These transmissions are usually referred to as over-the-horizon radars and have been christened, "The Woodpecker," because of the hammering noise they create. The transmissions are in the form of a series of very high energy pulses with a normal repetition rate of 10 Hz, though a 16 Hz rate has been used. Sometimes a short train of pulses is sent on one frequency but at other times the Woodpecker hammers away for minutes on end. Often these transmissions are in the amateur bands and seem to relate to the MUF in the direction the radars are looking. They often skip about the spectrum, one appearing to be "answered" by another as if carrying on a QSO!

## Noise Blankers

The effect on reception varies from a slight nuisance with low level pulses to a complete wipe-out of the wanted signal in the case of the strongest pulses. The simple diode noise *limiters* of yesteryear are unable to cope with the latter. Some of the blankers in the more modern receivers do a reasonable job in reducing the nuisance to a tolerable level, while others are pretty useless. Most noise blankers operate at one of the intermediate frequencies in a receiver and sometimes, particularly with broadband RF stages, the assault on the "front end" is strong enough to cause severe distortion in the first mixer stage. In such cases, noise blankers may make the situation even worse.

## The Datong SRB2 Auto Woodpecker Blanker

Ideally a noise blanker to deal with very high level pulses should prevent them reaching the RF stage of the receiver. This implies switching off the receiver electronically for the duration of the offending pulses and is the principle upon which the **Datong SRB2** works. The circuit is the subject of a patent application and a copy was not supplied with the review model. The accompanying sheets of *Operating Instructions* refer to

"... novel techniques to automatically generate blanking pulses," and these replace Woodpecker pulses with equal periods of silence, tailored to the exact length of the unwanted pulses.

## Description

The **SRB2** is very similar in appearance to the *Automatic Notch Filter* reviewed in the July, 1983 issue of *Short Wave Magazine*. There are three push buttons on the front panel, the first being an on/off switch, the second selecting either the 10 Hz or 16 Hz pulse rate, the third switching the unit in and out for before and after comparisons. A red LED indicates when the device is powered up and another one winks when the circuit is doing its blanking act. The rear panel contains two SO-239 sockets, two phono sockets and a DC power socket for which latter a plug is provided. Two screened leads about a yard long, terminated at one end on a phono plug are provided for audio connections, but PL-259 RF plugs are not.

## Installation

The **SRB2** is an entirely outboard device, requiring a 200mA unregulated DC supply between 10 and 16 volts. This was taken from the 13.8v accessory outlet in the station transceiver. The antenna is plugged into the antenna socket and the one marked "TX-RX" is jumpered to the receiver's or transceiver's antenna socket. The phono socket marked "Output" goes to the external loudspeaker or headphones, and the one marked "Input" to the external loudspeaker or headphone socket on the receiver.

## Operation

When the **SRB2** is switched on, a faint click will be heard, this being the internal antenna relay switching from straight through to blanker mode. If using the device with a receiver, the relay will remain energised all the time it is switched on but, if used with a transceiver, as soon as RF is sensed, this relay is de-energised thus bypassing the blanker circuits. No maximum transmitter power is mentioned in the literature but it is inferred that the relay will handle the 100 watts or so from the average transceiver.

With no Woodpecker noise the **SRB2** has no effect on the normal functioning of the receiver, but within a second of such interference starting up, the device automatically operates. No adjustments of any kind are necessary, as with some other noise blankers incorporated in equipment.

## Results

For some time after receiving the **SRB2**, the Woodpecker was rarely heard in any amateur band at times when it was convenient to carry out some tests. For instance, the occasional breakfast time QSOs with local and antipodean stations on the 14 MHz band which were plagued with colossal Woodpecker QRM a few months previously, were free of this nuisance. However, patience was rewarded when the annoyance did reappear in the 14, 18 and 21 MHz bands at various times, enabling thorough tests to be carried out.

It must be appreciated that this noise *blanker* actually removes part of the signal every time it receives a noise pulse at the chosen repetition rate. Consequently, the received signal has "holes" in it, a rather weird effect which takes some getting used to. On phone, the overall readability depends upon the rate of speech and, with rapid talking, whole words can be missed. Nevertheless, one does get the gist of the message. The benefits of the **SRB2** were most obvious when receiving weak signals which were quite unreadable until the device was switched on, but then became up to R3 or R4 *via* the blanker.

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are despatched by return of post.

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The *Datong* Model SRB2 Automatic Woodpecker Blanker.

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On CW, it is likely that the less experienced operator may have difficulty in reading through the holes and, if copying letter by letter, may end up with a somewhat garbled message pad, depending on the speed of sending. This is where the more experienced CW addict, who recognises whole words rather than individual letters, will cope much better.

The operating instructions consist of five, typewritten A4 sheets and include a section on getting the best results from the SRB2. These hints include using a faster-than-usual AGC setting and reducing the receiver RF/IF gain if any AGC "pumping" is noticed when receiving unusually wide pulses. Both these suggestions proved helpful. There are two internal adjustments which can be made which necessitate removing the works from the case. The first is to vary the drop-out time of the RF actuated antenna relay, while the second enables the user to set the sensitivity level at which blanker begins. Unfortunately, the four case-fixing crosshead screws were so tightly driven home that it was impossible to loosen them, hence no photographs of "the innards" this time.

The SRB2 was used with an Icom IC-730 transceiver and it certainly cut out the very strong pulses from the usual kind of Woodpecker transmission in a very convincing manner. There are a couple of minor points worthy of mention, though. The first is that, late at night, in the 14 and 18 MHz bands, the Woodpecker sounded rather more "hollow" and "softer" than usual, and with apparent selective fading the SRB2 had only marginal effect on such signals, even though the "Blanker Active" LED confirmed the circuits were in. The second is that the *Datong* literature states "... the AF blanker removes any remaining clicks from the loudspeaker." However, in the reviewer's installation, this proved not quite true, there being some slightly annoying clicks audible.

To sum up, this ingenious accessory should greatly enhance the performance of most receivers and transceivers, particularly those designed before the notorious Woodpecker was hatched. The Auto Woodpecker Blanker Model SRB2 is designed and manufactured by *Datong Electronics Limited* of Spence Mills, Mill Lane, Bramley, Leeds, England, LS13 3HE, to whom thanks are due for the loan of the review model. It can be bought either

direct or through various dealers, the current cost being £75, plus VAT of £11.25 for U.K. purchasers.

N.A.S.F.

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## Appendix

The SRB2 was demonstrated at the RSGB's National Amateur Radio Convention in Birmingham on March 5/6 this year and many potential customers have wondered why it has taken much longer than usual to appear on the dealers' shelves. The story is a very intriguing one. Because earlier novel designs had been copied abroad, *Datong* decided to file a patent application for this one before exposing the prototype at the Hamvention in Dayton, Ohio, at the end of last April. In mid-May, the Company received a letter from the Patents Office forbidding communication of any details of the invention to anyone until it had been vetted by the Ministry of Defence, in case it contravened the Official Secrets Act.

The Company was then in the embarrassing position of having bought in considerable stocks of components and being in receipt of firm orders from customers, yet unable to honestly explain the real reason for the delay. The matter was not resolved until June 30, by which time the sales effort had lost a lot of momentum. As Dr. Tong points out, what would have been his position if full details of the circuitry had been revealed at Dayton, but thereafter the Official Secrets Act had been invoked to prevent production?

This must have been a traumatic experience for such a small, innovative Company and a salutary reminder of the powers of the State in a "free" country. By way of compensation, it would be of some comfort to wonder if the MoD would commission *Datong Electronics Limited* to design some electronic counter measures equipment!

# VHF BANDS

NORMAN FITCH, G3FPK

## Oscar Ten

AT the end of last month's marathon edition, it was stated that AMSAT's Oscar 10 satellite had been placed into a new orbit, a second firing of the on-board rocket motor being planned for later. The attempt was made at 0031 on July 26 but turned out to be the "damp squib" phenomenon as there was no ignition at all. It seems that there was no fuel left, it either having all been spent during the first, longer-than-planned firing, or, if there was any left, it must have leaked away due to possible damage. This damage occurred when *A-O-10* was ejected from the third stage of the *ARIANE* launch vehicle and was entirely the fault of the *European Space Agency*, which has apologised to AMSAT for this mishap.

The net result is that the orbit is inclined at only 26.12° to the equator which is less than half that planned. The period is just under 11h. 40m. and the satellite will be in range from the U.K. for up to ten hours for orbits at the maximum elevation of about 55°. The *perigee* of nearly 4,000 kms. is more than twice the desired distance and means that the satellite will spend much more time in the intense *Van Allen* radiation belt. The long term effects of this could affect the working life of the electronics, but only time will tell.

The U-transponder was switched on at 1430 on August 6 to start a new era of amateur satellite communication. The maximum theoretical range is somewhat over 18,000 kms. which means that at some times, it will be possible to contact Australian stations from the U.K. and probably many exotic, Pacific areas. During the 2m. *AMSAT* net run by Ron Isaacs, G8CSI, in the London area on Aug. 7, it was stated that, since the satellite was not in the correct attitude, the lower gain, omni-directional antennas were in use. Even so, Trevor Stockill, G4GPQ, using about 800w. *e.r.p.*, heard his signal at S2 and worked JY9CF, DJ9PC, OE3EFS and F1ANY. No doubt, by the time this is read, many real DX contacts will have been made.

The current satellite calendar was received at the beginning of August and

includes *A-O-10* predictions in the form of AOS and LOS times with respective azimuths, and the time, azimuth and maximum elevation figures for each available orbit. It also contains the band plan which suggests communication uplink from 435.035 to 435.155 MHz, the inverted downlink QRGs being from 145.965 to 145.845 MHz. *AMSAT-UK* CW and RTTY bulletins are on 145.825 MHz and SSB bulletins are on 145.975 and 145.970 MHz. The *General* beacon is on 145.810 MHz and the *Engineering* one on 145.987 MHz. The current issue of *Oscar News* contains a comprehensive supplement on the new "bird".

A long while ago in this feature, your scribe mentioned the possible problem in monitoring one's own signal from a very distant satellite. G4GPQ found this to be a very real problem, so much so that Trevor's solution was to turn down the receiver AF gain control while talking. With a delay of up to 300 milliseconds, the effect is quite disorientating and it is just as bad when sending CW and hearing it coming back slightly delayed, particularly if you have sidetone!

Readers are urged to send in reports of *O-10* activities — and *s.w.l.* reports are just as interesting as those from licensed amateurs — so that a detailed assessment can be made of the problems and advantages of this new type of satellite orbit. A description of the TX and RX, plus antennas used for the experiments, will be of much help.

## Other Space News

It was only a matter of time before an amateur radio operator was included in the crew of one of *N.A.S.A.*'s space shuttle missions. Aboard mission *STS-9* will be Dr. Owen Garriott, W5LFL, who has permission to operate a 2m. transceiver from the orbiter. He will run about five watts of FM and, while over Region 1, will probably use 145.550 MHz (S22), but this will be confirmed later. The launch has been put back and is presently scheduled for October 28.

On the *E-M-E* scene, Clive Penna, G3POI, (Kent) worked KG6DX in Guam on June 19 for 2m. country no. 61. Pete Etheridge, G4ERG, (Humberside) is one of a growing number of 2m. operators to have worked Dave O'Lean, K1WHS, in Maine. Pete's PA uses a pair of the popular 4CX250B valves and he now has a *Kenpro* KR500 elevation rotator on his antenna, which is a single 16-ele. *Yagi*. He has heard fifteen stations *via* the Moon, the loudest being I2ODI who feeds his 16 times 20-ele. array with a mere two kilowatts! G3POI reports that the W6JKV expedition to T19 'lost their antennas', while K6MYC/HR6 had power supply problems.

## Awards News

Congratulations to Garry Clark, G6FSH, from Radford, Coventry in the West Midlands, who was elected member no. 358 of the 2m. VHF Century Club on July 15. He passed the R.A.E. in May, 1981 and got his licence in the following October, starting off with a *Mizuho* SB2-M one watt, SSB transceiver feeding a dipole. Later a 10w amplifier was added and the antenna changed to a 5-ele. *Yagi*. Next came a *Yaesu* FT-290 and 8-ele. *Yagi* at 100ft. *a.g.l.* Following a move last March, the antenna is now an 11-ele. at 35ft. with a 15-ele. 70cm. beam already up for future use. Garry operates on RTTY and also operates on 3cm. using a 3mw transceiver, home made, and 18 inch dish. Future plans include 70cm. and possibly 23cm. operating, and taking the morse test if his wife has passed her R.A.E.!

## Beacon Notes

On 2m., the Lannion beacon, FX3THF, is operational again on 144.905 MHz from YI13d. It beams east towards Paris so is not a very strong signal in the British Isles. From the Azores group of islands, CT2EE operates a beacon on 144.150 MHz when there is a possibility of *E's* propagation. He listens on 28.885 MHz in the 10m. band.

Mike Harsey, G8ATK, reports that the building on which 23cm. beacon GB3FRS on 1,296.850 MHz, is installed was struck by lightning in a recent storm. Following this, the output from the station was only 10% of the normal value.

## Contests

The weekend Sept. 3/4 sees a major event, the *IARU* Region 1 VHF (i.e. 144 MHz) Contest from 1400 to 1400 GMT. This is in two sections:— Single-op. operated by the licensee only (no club stations) and All-other stations. Exchanges to comprise report/serial no. and QTH locator with scoring at one point *per* kilometre. The *RSGB's* 144 MHz Trophy and SWL event runs concurrently with the same rules except that the usual radial ring scoring system is used. Note that there is no need to give this, "23 km. east northeast of Llansantffraid-ym-mechain, Powys" nonsense.

On Sept. 11/12, from 1800-1200 GMT, there is the International ATV Contest on 432, 1,260 MHz and 10 GHz. Exchanges to be a four figure group of your own choice on video only, plus call, QTHL and serial no. on video or telephony. Scoring is 2 pts. *per* kilometre for two-way QSOs and half that for one-way contacts. Entries to G3VZV (*QTHR*) by Sept. 30.

The *Cray Valley Radio Society* is promoting an activity day on Sept. 18 with a 432 MHz contest from 0700-1200 GMT, and a 144 MHz event from 1400-1700 GMT. There is a maximum power limit of 100 watts *e.r.p.*, and a "novice" section

for those licensed for less than one year. Exchanges to be report/serial no. and administrative county, with club members sending the letters "CV". The scoring is 10 pts. for working G3RCV and G8FCV; 3 pts. for non-members working members; 2 pts. for members working each other and one point for all other QSOs. Final score is QSO points multiplied by total of counties plus DXCC countries worked. Entries to list equipment used and be sent to Bob Treacher, 79 Granby Road, London, SE9 1EH for non-members of the CVRS. Members' entries to G4DFI (QTHR).

The last of this year's AGCW-DL VHF CW Contests is on Saturday, Sept. 24, from 1900-2300 GMT. All other details as per the June event — see page 186 of the June issue.

### Six Metres

John Baker, GW3MHW, (Dyfed) was the only reader to send in any 6m. news. So far, from a difficult QTH, he has worked all the Gs heard, and has had an MS QSO with GM3WCS. Up to July 29, nine countries had been worked; G, GI, GJ, GM, GU, GW, C3, TF and ZB2. John has had some 6m. to 10m. cross-band contacts with DK1PZ, EI9Q, I5TDJ, OZ9QV, SM6PU and YO2IS. His TX starts off with a 6V6 CO at 5.5 MHz, followed by two RK34 push-push frequency doubler stages feeding an RK34 balanced mixer. 28 MHz CW, FSK or SSB is fed into the common cathode to produce a 50 MHz signal. Another RK34 in AB1 follows in a push-pull, neutralised stage, the final on SSB being a push-pull tetrode linear amplifier. The antennas are 3, 6 or 9-ele. Yagis. When sending on 6m., 28.885 and 3.718 MHz are monitored, along with 70.195 MHz for possible cross-band contacts.

In this month's postbag came a copy of *Six News* No. 6, dated July 11, an eight page, A4 newsletter published by the UK 6 Metre Group, edited by G4JCC. It is very neatly produced and full of interesting reports from and about the activities of its 75 members. The subscription for new members is £5, the current annual renewal dues being £4. The next issue is scheduled for early October: details from G4JCC at 52 Salterns Lane, Hayling Island, Hants., PO11 9PJ.

### Four Metres

Anyone reckoning there is not much to work on 4m. should ponder over Denis Jones's, G3UVR, score of 57 counties and seven countries from Merseyside. His latest include GM3WCS in Fife on SSB on July 13, and GM3UKV/P in Grampian and ZR square on CW on the 31st. Although we have no squares table for the band, he has notched up 39. Dave Robinson, G4FRE, (Suffolk) is still operating on the band and has added G4LRT (Northants.), G8LM/P (Leics.),

### ANNUAL VHF/UHF TABLE

January to December 1983

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		23 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	Counties	Countries	
G3UVR	57	7	88	25	62	14	—	—	253
G8TFI	—	—	58	16	60	15	23	7	179
G8FMK	—	—	58	14	45	11	37	7	172
G2AXI	34	6	58	14	38	9	6	2	159
G6DER	—	—	59	15	48	12	14	3	151
G8PNN	—	—	54	14	40	11	19	8	146
G3BW	27	6	52	14	29	6	—	—	134
G4FRE	38	5	77	7	53	17	14	6	133
G4MUT	29	4	46	14	29	9	—	—	131
G8ULU	—	—	43	20	34	13	11	7	128
G4ARI	25	2	80	18	1	1	—	—	127
G4ROA	—	—	42	9	38	10	17	7	123
G6HRI	—	—	67	12	35	8	—	—	122
GD2HDZ	39	5	31	9	29	8	4	4	121
G4NBS	12	7	43	11	37	12	15	2	120
G3PBV	2	7	35	20	33	12	9	4	113
GW3CBY	22	5	44	12	17	6	2	2	106
G4FRX	—	—	56	15	27	7	—	—	105
G6ECM	—	—	71	30	—	—	—	—	101
GW8UCQ	—	—	50	12	26	8	1	1	98
G6PFR	—	—	60	13	20	4	—	—	97
G3FPK	—	—	77	20	—	—	—	—	97
G4STO	—	—	39	12	27	4	9	4	95
G4DEZ	—	—	66	24	—	—	—	—	90
G3FIJ	17	1	39	10	18	2	—	—	87
G8KAX	—	—	31	9	35	8	—	—	83
GW4TTU	—	—	61	18	1	1	—	—	81
G6TTU	—	—	59	14	—	—	—	—	73
G8VVF	—	—	47	15	—	—	—	—	62
G8KMT	—	—	47	12	—	—	—	—	59
G8XTJ	—	—	49	9	—	—	—	—	58
G4NRG	4	1	29	11	3	2	—	—	50
G8RWG	—	—	42	8	—	—	—	—	50
G6HDD	—	—	37	10	—	—	—	—	47
GW4HBK	28	5	—	—	—	—	—	—	33
G4FKI	7	1	20	2	1	1	—	—	32
GM4CXP	—	—	18	12	—	—	—	—	30
GU4HUY	—	—	23	6	—	—	—	—	29
G2DHV	4	1	2	1	3	1	—	—	12

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

G3NFB/P (Staffs.) and G4ALE/P (Devon), those last three in NFD. Dave complains about, ". . . those 10m. crossband merchants who will insist on leaving keyers running on 70.200 MHz for appreciable lengths of time whilst listening on 28.885 MHz." He says that when they do pause, it is difficult to attract their attention, so wishes they would agree on another frequency, well away from the calling one. It seems that Dave is really complaining about "unofficial beacons". Those operating in this way should ensure they are complying with their licence conditions, particularly Clause 4(1). In any case, it would appear to be illegal to leave a TX running on one band while having a QSO on another.

Martin, G4HFO, and Julian, G4TJX, Blythe (Cnwl.) still have 4m. gear but find the band very quiet down there. However, they occasionally talk to G4PEM in Penzance. Terry Hackwill, G4MUT, (Berks.) mentions a crossband contact on July 7 with CT1WB (VB) at 1945, the CT being on 10m. He asks if crossband QSOs count for the tables, but the answer is, "No". Only in-band, direct contacts should be claimed by such modes as tropo, E's, etc., but no satellite or repeater QSOs.

Arthur Breeze, GD2HDZ, lists eight more 1983 counties and another country

all worked in NFD. They include G4IGY/P (Humberside), GM3WOJ/P ("D & G") and GW3UEY/P (Powys). GW3MHW's PA needs a rebuild, so John has not been too active of late. The new PA will use vintage TZ40 triodes. On July 7, he had a crossband contact with CT1WB who gave an RS59 report on John's SSB.

### Two Metres

On July 15 at 1839, John Heys, G3BDQ, (E. Sussex) called "CQ" on SSB and was answered by IW9AJZ/IH9 in GW11. This was an expedition from Sicily to the island of Pantelleria, which is in Zone 33, Africa, for continent hunters. John says that G3JMB also worked them at 1550 that day. The QSL information is P.O. Box 300, Palermo, Sicily. In the period July 28-30, G3BDQ worked many Scandinavian, East German and Berlin stations, some of the time using just 10w from an Icom IC-211E.

Mr. M. W. Newell, G3IUE, from Penzance in Cornwall, telephoned the office to report QSOs through a couple of VHF repeaters in the Azores Islands between 1607 and 1635. On R4, he contacted CT2AP in Terceira in MY square, and through R6, CT2BV in San Miguel in NX square and CT2EA/M. His

station consists of an Icom IC-251E, SOTA amplifier and Timothy Edwards designed preamplifier. The antenna was not mentioned. These interesting QSOs were on July 28.

Dave Sellars, G3PBV, (Devon) found most of the July 7 *E*'s going over his head. CT1AUW was workable in WA but he could not get through the pile-up. Just before fade-out at 2010, Dave did get EA7AG (YW) at S9 each way, but nothing was heard from ZB2VHF. On the 15th, operating -/A from Exeter University, between 1535 and 1605, 9H1BT, and 9H1FL, both in HV, IW9ANS (GX) and IW9ABZ (GY) were worked. The next day, Dave is pretty sure he heard a station signing, "stroke 5A" and this could have been G3JKI/5A. Later, it transpired via TO6HRP and G3CHN, that TO2YT (BK) has worked a G station with a 5A suffix. At 1713, G3PBV worked IW9ANS again, then IT9JLG (GY), but the big prize was IW9AJZ/IH9, this time in FW20b, since the 12°E meridian conveniently bisects the island. In both these latter openings, signals kept popping up and disappearing very quickly, and did not seem to extend very far inland. On the tropo. front, Dave worked ON7RB/LX/P on the 13th and who was on an *E-M-E* expedition.

G3UVR's only *E*'s contact was with EB7KU (WW) on July 7, with CT and CN8 missed. Dennis found tropo. conditions in July quite good at times and he managed to get GM8SAU on St. Kilda, (VR) on the 21st, and EI6BLB (UL) in Co. Kerry on the 28th. On the 9th, EI3VJV (Co. Wexford) and on the 29th EI2VNS/P in Co. Carlow, were rare additions. All those on SSB, by the way.

Tim Raven, G4ARI, (Leics.) lists some very choice Irish stations worked in the period July 25-28, viz.—EI3VJV (WM), 3VLL (WN/Louth), 9FD (WN/Meath), 8CZ (WN/Wicklow), 2VNV/P (VM/Cork), 6BLB, 2BBB (VM/Limerick), 5BLB (VN/Galway), 8EF (VO/Donegal) and 5EG (VM/Clare). So it would seem there is plenty of local activity in the Republic, since only the "V" calls are visitors. Further afield, Tim got OK1VVM/P (HK) on the 14th.

Peter Atkins, G4DOL, (Dorset) was pleased to override the *E*'s pile-up on July 7 and work CT1WW (WB) at 1845. Tiago was S9-plus-40 dB. and EA4AAW (WZ) was also contacted. Another CT1 in WA and an EA7 in YX got away, though. On the 11th, IS0RHF (EZ) was worked at 1729. Peter enters the Squares List with 100 worked since Jan. 1, 1975. G4FRE writes that, while all the big stations were setting up for NFD, he sneaked in to work 9H1BT (HV) with a mere 3w to a 5-ele. beam on July 2. G4HFO near St. Austell is lucky in having G6EQM in Plymouth tip him and son Julian, G4TJX, about *E*'s openings. Going back to June 15, Martin worked I7OGB (IB), a couple of YUs in KE a week later and, on July 15, 9H1CG

(HV) and IT9XIX (HX). However, G4TJX's prize was IW9AJZ/IH9 (FW) the following day, missed by Dad, who was at work.

Flemming Jul-Christensen, G4MJC, (E. Sussex) has now moved to a bigger "shack", so has not been too active until June when, on the 15th, he worked 18REK (HA). On July 5, LX1JA (CJ) popped up on a dead band at 1928 for a couple of minutes. On the 19th, 9H1FL and 9H1GB were contacted at 1507-1515. He is getting going on MS now, using a G4IDE, ZX81 program on EPROM with his own hardware, tested up to 1,200 w.p.m.? July 14 saw a number of tropo. QSOs with OZ, SM, D and Y stations, but no new squares. G4MJC was out on NFD with the local club and reports *E*'s QSOs with RA3YCR (RN52f) at 1731; YO5TP/P (LG38a) at 2109 and UB5FDF (OF65d) at 2115, all very points-worthy.

G4MUT offers IS0RHF on July 16 at 1717 as best DX of his month. Rod Burman, G4RSN, (Surrey) worked many German stations in DL, DM, EM and FM squares on the morning of July 13, but reckons the most amazing QSO was with DG8KAU/P (EK53) who was running a Yaesu FT-290 at 2w and who was S8; however, he was 7,000ft. up a mountain. John King, G6ADH, (Surrey) remarks on the rather fleeting *E*'s events this summer but did manage a 9H1 on July 19. But John was one of the lucky ones to get I0SNY/EA9 (XV) on the 7th, already QSL-ed with picture postcards. John mentions that very bad manners by a G6 prevented him working an IS0 who twice came back to him. This clot persisted in shouting his call up to a dozen times and was still calling the Sardinian station long after he had faded out.

Mick Cuckoo, G6ECM, (Kent) certainly made the most of the NFD *E*'s, which came in two events, Between 1030 and 1100 on July 2, he worked IW9ACT (GY) followed by four 9H1s, then between 1530 and 1730, LZ2DF and LK2KBI in LD, RA3YCR and UC2ABT (NN). On the 7th, Mick contacted CT1AWO and CT4PI (VZ), and EA7PZ and EB7KU in WX. On the 8th, another Russian, UB5GBY (QG). Thereafter it was tropo, the 12th and 14th producing many Scandinavians in the E, F, G and H row of squares. On the 28th, his list includes SM7LWC (HQ) and East Germans in FK and GM squares. To round off a very successful month, Mick worked lots more OZs and SMs.

Russell Coward, G6HRI, (Blackpool) lists EI5AOB (VN/Roscommon) on July 19; GM4COO/A (YS) and GM8SAU (VR) on the 21st, and EI2VNS (WM/Carlow) on the 29th. Keith Hayward, G6PFR, (Beds.) lists lots of new material for the various tables and used NFD to good effect. He too lists a fair number of GI and EI stations, counties represented being Down, Antrim and

Tyrone in the north, and Wexford and Meath in the Republic.

On July 16, Dave Gregory, G8JDX, (Plymouth) using 80w to a 4-ele. *Quad* indoors, put out a couple of CQ calls. The first was answered by HG8CE (KG), the second by IW9AJX/IH9 (FW). Must have been a pleasant surprise. John Moxham, G8KBQ, (Somerset) has not written for some time and his letter dated July 8, missed last month's deadline. On the 7th, he managed three stations *via E*'s; CT1WW, CT1AUW and EA7AG, all new squares.

Jim Rabbitts, G8LFB, (London) lists some choice QSOs in July, the early hours of the 14th bringing OK1VVM/P and OK1YA, both in HK, plus F, SM and DL folk. On the 16th, Jim worked 9H1B at 0707 GMT and at 1714 that day, he heard EA8XS (SO). On the 18th, more early *E*'s with YU1EU heard. On the 30/31, SM6HDY (FS) was the only new square among many OZ, SM and German contacts. In the 31st lift, Germans were heard calling UP2 and the OZs were working into YU and HG.

Gordon Emmerson, G8PNN, (Northumberland) found LA2RZ (CU) and DL6NAA (?) for a couple of new squares on July 12 and 13, while NFD brought five more 1983 counties and one country. John Fitzgerald, G8XTJ, (Bucks.) complains that all the good conditions seem to disappear when it comes to his fixed, annual holiday, but he did work DL6FAW/P (EK) on the 31st, for a new square. SMs were heard, but too weakly to work.

GD2HDZ seems to have missed any *E*'s that may have penetrated to the island so his new stuff is mostly British counties in NFD. Philip Murphy, GI4OMK from Belfast, sent in a very neat report and uses different colours for the various propagation modes. A very rare contact on June 27 was EI2VLP/P in UO80e, who was DK7UY on holiday. In the July 7 *E*'s, between 1800 and 1858, FIJG (CD), EA4AAW (WZ) and I0SNY/EA9 were worked. On the 9th, GM8SAU/P was contacted in St. Kilda and was using one watt to a shoulder-mounted, 8-ele. *Yagi!* On the 20th, there was a tropo opening across the two seas, to Holland and stations in CM and CL were contacted. On the 29th, Phillip worked EI6BZB (UL), GM4COO/A (YS), GM3JFG (XR) and GM6RPZ/A (XS).

George Szymanski, GM4COK, wrote to get up-to-date before going back to sea on the *Esso Fawley*, call sign GWFU. He mentions *E*'s QSOs on June 21 and July 2, but which only produced one new square. Some MS successes took place in June and on the 10th, there was an *Aurora* which brought QSOs with UQ2GMD (LR), UR2RQT (MS) and OH6NU/1 (KU). George mentions hearing GM8BRM and GM4EHP/M, both north of Aberdeen on 144.025 MHz, using FM. A polite request

QTH LOCATOR SQUARES TABLE

Station	23cm.	70cm.	2m.	Total
G3VYF	—	117	307	424
G8TFI	28	104	126	258
GJ4ICD	1	103	225	329
OZ1EKI	—	101	314	415
G3JXN	60	100	157	317
G8KBQ	6	92	179	277
G3COJ	37	87	154	278
G3PBV	18	87	169	274
G3XDY	30	86	131	247
G8FUO	3	86	80	169
G8ATK	15	81	129	225
GJ8KNV	12	76	191	279
G4RZP	—	76	147	223
G2AXI	9	76	121	206
G8RZO	—	75	148	223
G4NBS	14	75	94	183
G8ULU	21	73	109	203
G4FRE	20	73	25	118
G3IMV	—	72	329	401
G8PNN	34	72	113	219
G8HHI	12	70	133	215
G4JZF	—	68	140	208
G4TIF	—	66	153	219
G6ADE	—	64	70	134
G8FMK	26	63	77	166
LA8AK	25	62	200	287
G3UVR	—	61	190	251
G4NQC	32	61	146	239
G4ERX	7	61	132	200
G4HFO	—	60	112	172
G6HKT	—	60	89	149
G3NAQ	—	58	128	186
G8KAX	17	57	82	156
G4MUT	—	57	88	145
G4MCU	—	54	167	221
G4AWU	—	50	150	200
GD2HDZ	13	50	91	154
G6DER	14	50	88	152
G4ROA	13	50	60	123
GW3NYY	—	48	185	233
G4NQX	—	47	113	160
G4STO	20	44	113	177
G4TJX	—	40	87	127
GW8UCQ	1	38	96	135
G3BW	6	36	207	249
G8WPL	—	36	81	117
G4HMF	2	35	144	181
G6ADH	—	35	135	170
GM8BDX	—	33	53	86
EA3LL	—	30	261	291
G4KUX	—	30	105	135
G3FIJ	—	29	92	121
GM4COK	—	28	204	232
G4PCI	—	28	167	195
G4OAE	—	28	165	193
G8WUU	—	27	72	99
GM4CXP	—	26	163	189
G8WPD	—	24	139	163
G4FRX	—	24	56	80
G4RSN	2	22	76	100
G4IGO	—	19	246	265
G4R GK	—	19	70	89
G6HRI	—	18	44	62
G6HTJ	—	17	66	83
G4ERG	—	16	243	259
GW3CBY	5	16	79	100
G4NRG	—	14	68	82
G6DDK	2	13	127	142
G4MJC	—	12	110	122
9H1BT	—	11	210	221
G6PFR	—	9	41	50
G8XQS	—	4	76	80
G8VR	2	3	228	233
G6JNS	—	3	84	87
G4GHA	—	2	105	107
GW4TTU	—	2	84	86
G3POI	—	—	404	404
DK3UZ	—	—	317	317
G4IJE	—	—	311	311
SP2DX	—	—	280	280
G4DEZ	—	—	240	240
G3CHN	—	—	229	229
G3FPK	—	—	195	195
G3KEQ	—	—	194	194
GW4EAI	—	—	192	192
GJ8SBT	7	—	168	175
G6ECM	—	—	165	165
G8LFB	—	—	159	159
G8TGM	—	—	144	144
GM4IPK	—	—	139	139
G6HKS	—	—	127	127
GM8OEG	—	—	115	115
G8XIR	—	—	115	115
G4MEJ	—	—	114	114
G4DOL	—	—	100	100
G8VEV	—	—	97	97
G4MWD	—	—	95	95
G8RWG	—	—	84	84
G6ABB	—	—	80	80
G6DFT	—	—	70	70
G6ELQ	—	—	69	69
G4PEM	—	—	63	63
G6CNX	—	—	63	63
G8XTJ	—	—	55	55
G8ZYL	—	—	54	54

Starting date January 1, 1975. No satellite or repeater QSOs.  
"Band of the Month" 70cm.

that they should QSY brought the usual response that there were no restrictions in their licenses and, as it was after 1 a.m., nobody would be using CW anyway!

Tony Maund, GM6UNJ, (Benbecula, Outer Hebrides) advises that GM8SAU will be back on St. Kilda in September with higher power and better antennas. Tony runs 20w to a 12-ele. *Yagi* at present but hopes for 400w capability soon from WR square. His phone number is Benbecula (0870) 2384, extensions 437, 487 or 488 for making skeds.

## Seventy Centimetres

G3PBV managed a difficult QSO with GM8TFI/P (XO) on July 25. The QSB was quite dramatic with 10-15s. bursts every half minute, so MS-style exchanges took place. On the 26th, GD4SHF/P was worked in similar conditions. G3UVR worked GM8TFI/P on the 27th when they were in Central Region, XQ square. On the 20th, Denis had a CW QSO with GM4MOX (Fife). The only English county G4FRE has not worked is Warwickshire, where he was born. Anyone oblige? Dave lists DL and PE worked on July 10, SM6FYU (GQ) and LA8AK (DS) on the 11th, LA3FV (FT) on the 12th, and OZ9FW (GP), OZ7LX (FP) and Y23BD (GM) on the 13th.

G4HFO and G4TJX complain about the dreadful *Syledis* QRM they have been suffering in the southwest. It has been ruining the local repeaters. On July 7, excellent TV pictures were received from GU6EFB (YJ48g) and Martin sent a couple of photos to prove it. G4RSN worked DB6BX (DM) on July 13 for a new square on the band and now has 22 in the bag. G6ADH took advantage of the lift on July 11/12 to get two more countries, OZ and Y, plus six more squares.

Keith Hewitt, G6DER, (S. Yorks.) was on during the low power contest on July 31 and lists GI6ATZ/P (WO), GM4AEQ/P (WP) and stations in E. Sussex and Cumbria. On the 20th, GM4MOX (YQ) was a new sq. and county. He has also received TV from G6HMS in Lincoln and G6CBN in Co. Durham on the 25th and 26th. G6HRI now has 50w and worked GI8YDZ (WP) on the 5th, four EIs in Dublin on the 7th, a couple of PAs in CM sq. on the 10th, and GM8TFI/P (XQ) on the 29th.

G6PFR got going on the band on July 24 with 10w to an 18-ele. *Parabeam*. Keith's first QSO was GM8TFI/P in XO on the 25th, and GD4SHF/P was contacted on the 27th. In the low power event, he made 29 QSOs. G8KBQ is now up to 92 squares with DJ9BV (EN) the latest. John says that EI8EF (VO49j) intends to be active on 70cm. soon. All GD2HDZ's new ones came on NFD, including G8TFI/P (Kent) and G4RCD/P

(Durham) to pick out a couple. GM8TFI/P was GW3CBY's first GM on July 25 from Swansea.

## Gigahertz Bands

On 23cm. G3PBV is spending a lot of time modifying his *UPX-6* cavity and reckons to be making good progress. G4FRE is still running 6w solid state and recent QSOs include ON1JE (BL), G6ADE (S. Yorks.), G3JXN (London), F6DWG (BJ), OZ7LX (FP), G8VLL (Norfolk) and G8ECI (AN). Dave has yet to hear anyone in the "Y" squares. On July 14 he changed his *Gasfet* preamp from the *Eimac* PCB design to a lumped circuit design with improved performance. On 13cm., with 300mw, 42-ele. *Q-L-Y* and MGF1400 preamp., PE1GHG (CL), G3LTF (Essex), PE1HQO (DN), PA3AGS (CL) and G4LOJ (Norfolk) have been contacted and on July 13, Dave's signal was received in Luton by G8DKK.

Tony Collett, G4NBS, was one of the team that went to Scotland recently. They operated from XO10f on July 24/25; XQ80d (Central Reg.) on 26-28 and YP20j on 29-31. Heavy rain then messed things up so they returned home on Aug. 2. On 23cm. 21 QSOs were completed from XO; 18 from XQ and from YP, 21 different U.K. stations were worked, plus 12 PAs, 6 Ds and an OZ. G4KIY, G4KGC, G3JXN, G8AGU and G4NQC were worked from all sites.

From Coventry, G4ROA now has his 10w 23cm. PA all set up and tested. G8ATK is progressing well with 13cm. and G8KBQ is now QRV again on 23cm. with 1.3w through 15m. of LDF-4 *Helix* to 4 x 23 ele. *F9FT Yagis* at 10m. Anyone wanting a Somerset sked can ring John between 0930 and 1700 on 0458 33145. G8PNN nipped into YP sq. on July 12 worked 23 stations on 23cm. with 1w to a 28-ele. *Q-L-Y* at 10ft. in 46 mins. 18 PAs and 4 Ds in that tally for Gordon.

Pete Godfrey, G8ULU, (Kent) is another 1w station on 23cm. yet has managed SM6HYG (FS) at 1,018 kms. on July 12, and LA6LCA (FT) at 1,042 kms. on the 30th, along with ON, OZ, PA and Gs.

## Deadlines

That's all there's room for this month. The next deadline is **Sept. 7**, the following one being Oct. 5; please make a note in your diary. Everything to:— "VHF Bands", SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. 73 de G3FPK.

# BASICS FOR THE S.W.L. AND R.A.E. CANDIDATE, PART XII

## SUGAR-COATED THEORY

**L**AST time we devised a Yagi two-element beam, and indicated that the parasitic element could be either a *director* or a *reflector*. The difference, we agreed, was in the length of the parasite, a director being shorter than the driven element and a reflector being longer. Accepted standard information – and with aeriels there is a lot that has ‘ossified’, as G6XN’s book (“HF Antennas for All Locations”) so brilliantly showed – has it that gain is highest with the parasite as a director; but the practice seems to suggest that it is a little less touchy in tuning-up if the parasite is used as a reflector.

It doesn’t take much imagination to realise that one can go to three elements, using a director, a driven dipole and a reflector, with a corresponding increase in gain. At this point the design of a Yagi has left the realms of theory and come down to good old suck-it-and-see. However, even this method does require some idea as to what the goal is, so let us look at it. We want: (a) directivity, (b) that directivity to be maintained right across the band, and (c) gain. Now (a) is pretty obvious, and (b) is just saying we don’t want a director to turn into a reflector at the band edge; (c) is a bit more complex and needs a few words. All the figures in the books are based on a lossless aerial, at the chosen spot frequency, whereas we are going to have a lossy construction and we are going to use the aerial over a band of frequencies – and we may *not* tune for maximum gain. Why not? Because maximum gain and best polar diagram do not coincide in terms of the dimensions of the aerial! In other words, we can adjust for maximum gain, or we can adjust for some gain and best polar diagram. (Don’t let the pundits at the club kid you otherwise.)

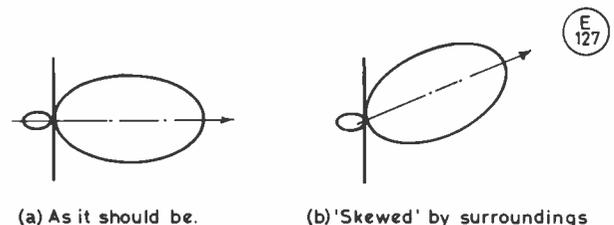
So, we can add all this up, and in the end we can say that a good two-element will have around four dB gain in its favoured direction relative to a dipole, and a three-element with luck might make six. If you are talking dBi (relative to an isotropic radiator) add 2.15 to these figures. The practical limit of gain at HF is about the 6dB we have just quoted. So why do people with beams crow about the marvellous ‘gain at DX’ – simply, we believe, that so very often the *directivity* is in fact knocking down the QRM. So, for all normal purposes, the writer says adjust for best polar diagram (notice, not even best front-back ratio!).

How do we go about it? Firstly, each element must be made with some form of adjustment at each end to the lengths *which can be reversed*. One director, one reflector, one driven element, and one boom. The driven element length needs to be adjusted in setting-up, too, and so does the element spacing, which means each element is able to slide along the boom and be locked to a particular chosen spot; but if you settle beforehand on a spacing of, say, 0.15 wavelength at mid-band between each element you won’t be far off. Now for the elements: the dipole length can start at the usual  $468/f = \text{feet}$ , while for the reflector we can use  $492/f$ , and the director  $440/f$ . Hoist it aloft, with coaxial cable hooked on, and put a signal generator on the bottom of the coax. You want a receiver with an S-meter and any old bit of wire, located at least ten wavelengths away. This being so it’s probably best to latch on to Old Joe down the road as the receiving set-up,

using a two-metre talk-back link. Be sure the generator is coupled to the aerial through some attenuation so that the aerial’s impedance changes across the band won’t upset the generator’s output level. Likewise, Old Joe wants an S9 signal off the front of the beam, and you would like to be doing the tests with a flat band.

Now, you turn the beam by ten-degree increments while Old Joe notes the signal strength he is receiving; if you have a very good variable attenuator around, it is probably best to set the receiver to S9 by putting lots of dBs in the attenuator and then Joe can just remove dBs to come back to S9, working all the time on the attenuator and not touching the receiver gains (hence the VHF link). Do this at mid-band and plot; do it at the HF band limit and plot, and at the LF end of the band and plot. Sure as God made little apples the plots will be lopsided about the sides and between front and back (see Fig. 1). If the lop-sidedness between opposite sides is bad, you have a site problem, and you may find it better to either do the tests at a different site, or move Old Joe to another spot, and repeat. Disregard the SWR totally at this stage. (On a good site, your lateral lopsidedness might be pretty small and variable with the season, but a bad ‘un will be caused by nearby electric wires, overhead telephones, and other metallic clutter, and you may have an awful problem). Anyway, now adjust one element a bit, say the reflector, and do a repeat run. If that seems better, go a bit further on the reflector in the same direction, and one more repeat the set of measurements. Again don’t forget the band-edges if you have been shortening the reflector. Turn to the director, and see if you can improve the polar diagram by adjustment of this element while leaving the reflector alone. Finally, tweak the driven element a little. Bear in mind that your final adjustment will give you lengths very much like the ones you started off with.

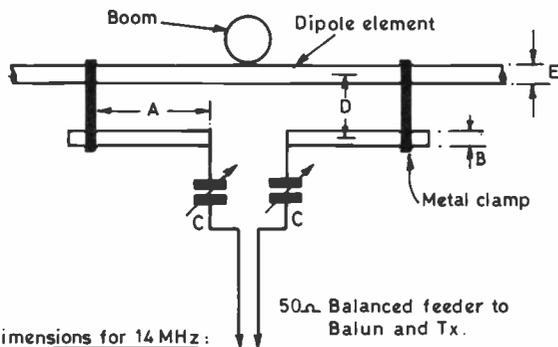
Now we come to the tricky part. You have adjusted for your preference in the matter of the polar diagram across the band. Now you must get the SWR to stay within bounds across the bands, so first you must define what those bounds are: 2:1, 1.5:1 or flat across the band? The writer reckons that the best way is to aim at better than 2:1 across the band, and be thankful if you are much better; in fact, maybe *suspicious* if it is too good! You will have some sort of matching adjustment to play with, perhaps a delta match, or a T-match employing capacitors as shown in Fig. 2. The idea is to adjust the length ‘A’ and the value of the capacitors until you get the best VSWR you can at mid-band. Lack of the capacitors isn’t a disaster, *if* you’ve got *lots* of time to spare! Of course, the feeder must be balanced, and of 50-ohm impedance. Immediately you are clear of the matching section on the way down, you can fit a balance-to-unbalance (balun) transformer of



(a) As it should be. (b) ‘Skewed’ by surroundings

Fig. 1 YAGI POLAR DIAGRAM (Number of minor lobes related to number of elements: only one shown for clarity.)

Fig. 1. Shows a theoretical polar diagram, such as might be achieved in ‘free space’ at (a), while in (b) we see the sort of thing that will arise from the effects of surroundings – RF is radiated into the surroundings where it is re-radiated in unwanted directions, producing the skewing. The effect is also sometimes seen as a result of improper construction or feeding practices. Polar diagram skewing will be seen quite markedly before any effect on SWR is noticed.



Dimensions for 14 MHz:

- A 40-48"
- B 1/2" outside dia.
- C 150pF max.
- D 6" centres
- E 1 1/2" outside dia.

(E 128)

Fig. 2 THE 'T' MATCH

Fig. 2. Shows the T-Match system; note the dipole element is *not* split at the centre—this is known as 'plumber's delight' construction and is best for strength. The dimensions shown are approximate and would serve as a useful starting-point. In the absence of the capacitors, dimension 'A' would be different. The two capacitors must be adjusted 'in step' to maintain balance.

1:1 ratio, and continue down in coaxial to the shack. However the practical chap says, "I can't get 50-ohm balanced"! and hangs up his balun right at the aerial terminals. This, one feels calls for one of those toroidal jobs which you can buy pretty cheaply, as a simple one made out of a length of feeder would probably serve equally well as a sparrow-perch. Finally, check the SWR across the band to see it's within the chosen limits. If it isn't, start again, until you can get it right—plus fourteen days confined to barracks and extra gardening!

Summing up, we have shown how the matching process has to go; but if you have gone through the setting-up and adjustment process as discussed above you will have a reasonable certainty that, despite the lack of any test equipment, you have ended up with an aerial that works as well as its mechanical design will let it. If you have a goodly collection of SWR plots (you will probably, for instance, notice changes as a given frequency as you rotate the aerial—it is 'looking at' something or other in that direction—and as between the centre and the edges of the band), these should all be repeatable measurements, and should be so repeated at regular intervals. In general, a change of SWR for the worse is due to either the aerial itself or to a new erection for it to 'look at', but an apparent improvement in SWR says that either the feeders are going sick or something has changed in the aerial, with feeders being the favourite.

### Quads

The Quad is *not* the miracle aerial some people claim it to be, but it does *seem* to be better than a Yagi at low heights. Analysing it, a two-element quad can be regarded as two two-element beams mounted one above the other and so bent that their ends touch; thus by feeding the lower driven element you feed the upper one as well. By the same argument, the parasitic elements are formed of a complete loop of wire. The Delta-loop is just a mechanical variation on the Quad. We don't recommend a newcomer to try a Quad unless he has built a few Yagi beams and found out what makes them tick, and he is ready to spend a lot of time getting the thing right. Not to mention that he has to have a healthy disbelief in his results!

### Phased Arrays

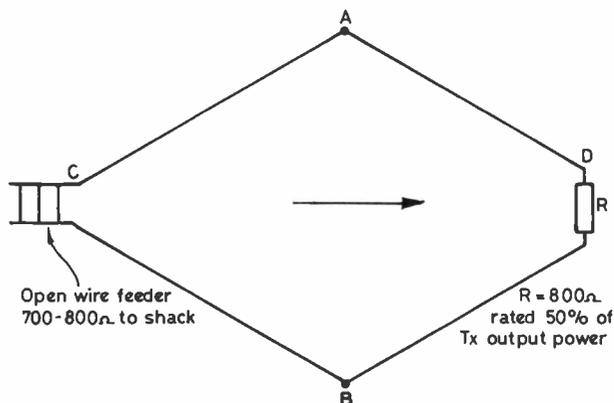
Having given some coverage to the Yagi and Quad, we can turn our attention to the other main class of directive aerials. These arrays are usually of two elements, such as the ZL Special and the W8JK, and are claimed to give bi-directional directivity and so to need no rotating. The only snag with them is very simple, and that is that usually they require the aerial to be feeding each element in *precise* phase relationships, and this is done by accurately adjusted lengths of coaxial cable. This is where the problem lies: for such an assumption to be true, one requires a defined load at the top end of the feeder, which implies each element is *exactly* the same as another, both in itself *and* in its environment so as to offer identical loads. Plus, of course, down below you have to so arrange things that each feeder gets its exact share of the transmitter RF output without any alteration in the phase relationships. . . . So, sometimes they work, and sometimes they don't, or they are superb at one frequency and a pain all over the rest of the band. All we can say is if you want to try them, get an ARRL *Antenna Book*, and G6XN's text, both of which are always in stock at Welwyn, and be prepared for battle. And, at the end, if your beam beams, great!—But if it doesn't, don't say we didn't warn you!

However, there are some variations on the phased array theme which obtain their phase relationships by the way the wires of the elements are arranged, such as the Vee and Collinear arrays. These are fine, if you've got enough real-estate to lay them out on; but since the writer has never been that lucky he doesn't know enough about them from personal experience to comment; all we know is that those who've got them swear by them—or at them!

### Urbanitis

Just what the blazes can you do with the urban garden lot of the usual postage stamp size? Suggestion one: sell it in favour of more garden and fewer mod. cons!

Seriously, the terrace house dweller does indeed have a problem, and no two solutions are the same. If the house is



Dimensions for 14MHz:

- Each leg  $3\lambda$  spacing A-B = 184ft
- Length of wire C-A-D = 420ft
- C-B-D = 420ft
- Supports at A, B, C, D.

Fig. 3 THE RHOMBIC AERIAL IN PLAN VIEW

(E 129)

Fig. 3. The Rhombic is the 'Rolls-Royce' of aerials but needs much real-estate. This is a practical compromise design which should be able to yield 10-12dB gain in the preferred direction on 14/21/28 MHz, and be usable with some gain on 7 MHz. Refer to standard texts—e.g. ARRL "Antenna Book"—for deeper discussion.

right at one end of the plot, then one wants a basically end-fed arrangement, and about all you can do is to work hard on the earth and shove up a long-wire with its preferred directions the way you want to aim your RF. If you have a house at the centre of the plot, then the whole range of centre-fed devices comes to you, starting from the centre-fed Zepp arrangement plus an ATU; and the variant of this known as the G5RV either full or half-sized. Or you can go the whole hog and ask for a 120-foot tower with a four-element beam for each band up there – but get the planning permission through *before* you put it up, and spend at least as much on making the neighbours like it!

If there are no outdoor aerials allowed at all, then you have to apply low cunning, plus the knowledge that any bit of metal will radiate, albeit unpredictably, if you can match it to the transmitter – and there is *always* a suitable ATU for the chap who is prepared to work on the problem. As witness, ZE3JO and is Artificial Leg Aerial, hanging from the shack roof and fed, it is recorded, by a piece of wire from the ATU wrapped round the big toe of the peg leg (Mal doesn't load the one he's wearing, of course!). Another chap we know used to use the bedsprings as a counterpoise against an end-fed wire. Other possibilities include an indoor dipole for one-band operation (for example, a Top Band half-wave dipole bent into the loft), and a mobile whip on a hinged mount which can be poked out of a window as a vertical. In the end it's a matter of using your noddles!

### Travelling-Wave Aerials

Up to now, our elements have been open-circuit at the ends, so there has been nowhere for the current to go but back; and we know that on a transmission line that means standing waves – remember? Right, so what we've been doing in fact is to try and generate standing waves on the aerial while minimising them on the feeder. Now we come to the types where the end of the element is terminated in a resistor; for example the Rhombic shown in Fig. 3. Here we are looking at an aerial many wavelengths long on each leg, fed with balanced feeder, and giving a quite fascinatingly good gain and polar diagram. If you transpose the feeder and the terminating resistor, the polar diagram reverses; but if you just disconnect the resistor and feed it, the missing backward lobes on the polar diagram reappear at full strength so that the aerial has a big lobe down the line of the aerial and another one straight back. What happens is this: if the resistor is fitted the RF floats down the aerial to the far end, creating the polar diagram we expect, and then the resistor absorbs all the power left so none can be reflected. If the resistor isn't there, then the reflected RF sets off back to the start, and generates its own polar diagram but facing the opposite way. Notice that by terminating the Rhombic, despite its enormous gain, you aren't using more than about *half* the transmitter output power!

Another aerial of this general type, which is much beloved of Top Band addicts, is the Beverage. Here we are again talking about a long, long wire (several wavelengths long) pointed in the direction from which we want to hear the signals, and supported at intervals of, for Top Band, no more than twenty feet, and preferably ten feet, for between one and

three wavelengths distance – five hundred to 1500 feet long roughly. The terminating resistance will be of the order of 200-400 ohms and could be a non-inductive variable resistor of carbon, or better, cermet type. To set it up, look for a signal from the backward direction, and tune the resistor for least signal. The Beverage is normally reckoned to be at its upper limit at 2 MHz, but there are recorded cases of them being



“... one of my other interests is Egyptology. . . .”

successful at 3.5 or 7 MHz. And, of course, it is a receiving aerial, working best over poor ground, but requiring a good earth at the receiver end. You will find the signal levels are down a bit, but the QRM level and the static is down even more!

### Conclusions

We have talked about aerials and hopefully whetted your interest. If so, go to some other texts: the RSGB *Radio Communication Handbook*, the ARRL *Radio Amateur's Handbook*, the ARRL *Antenna Book*, and then come back to G6XN's *HF Antennas for All Locations*, published by RSGB, and read him – he will make you think and question all the assumptions you have been making. Then question all of his, too . . . and out of it all will come understanding in your own terms, which is what matters.

Next time, we will have another change of tack. Till then, cheerio and good DX!

**For anything radio you want to buy, sell or exchange, use the Readers' Advertisement columns in "Short Wave Magazine"**

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## SHORT WAVE LISTENER FEATURE

By Justin Cooper

**Y**OU will by now have realised how this piece can control the weather . . . we talked about heating shacks last time around!

Still inside the shack, we wonder whether some readers have a super method for coping with the records. Many there are who don't even keep a log (which is missing half the fun of a long-term involvement in the hobby), but it is more with the business of the ancillaries, such as the HPX list, the countries-heard totals, and so forth; and of course weeding-out the duplicates, or in the transmitting sense, avoiding duplicate contacts.

As to HPX, our own arrangement involves four bits of paper; firstly the log, secondly the large number of sheets that constitute the 'master list', thirdly a 'dupe sheet' and, fourthly, the current entry list. As a prefix is heard, it is entered in the log, the dupe sheet is then consulted to see if it has already been heard. If so, then no more action is taken; if not, then it is entered as a prefix in the appropriate column of the dupe sheet, and as a complete callsign with the other data in the master list and the current list. Finally, a little cross is made against the line referring to it in the log; absence of this little cross is then an immediate signal when looking back that for some reason, such as visitors, the 'phone, or writing this column, we have got a bit behind. Every ten pages or so of the log we do a check and pick up any errors or omissions.

Perhaps the most important of these lists is the 'duplicate' list; it comprises a number of A4 sheets of paper, initially one for each letter of the alphabet and one for each numeral which could be the first element of a prefix, and each page is in alpha-numerical order in a spring-back binder. The requirement is *quick* reference, and so it is necessary to have a good idea of your own reading speed (J.C. is a fast reader, so a given page is filled up 'as they come' while a slower reader would probably do better having at least the beginning of a sort-out by splitting the page up into smaller groups). When the page is about full, it is removed from the file, and the prefixes on it put into alpha-numeric order on a new piece of paper. We now refit the re-ordered list in the binder with a fresh sheet above it for any new entries. It is very important that all the sheets in the book use the same alpha-numeric scheme, so that all one needs to do is to 'skim' the re-ordered sheets for the desired spot and then if nothing is found, look at the current sheet. Experience tells us that it is in the rewriting of the list into alpha-numeric order where the errors creep in, and so this part of the task is done with care and double-checked.

What about other documents around the station? Well, this is always a matter for debate, depending so much as it does on the operator's personal interests. The writer has the current volumes of the world and UK call books, and Geoff Watts' DX Prefix List. And if he had to cut down, Geoff's document would be the one to keep! At 75p a throw it has to be the best value for money in all amateur radio, and the writer allows his to get dog-eared and then replaces it, rather than go to great lengths of preservation. It has plenty of spaces for entering the new prefixes that appear from time to time, and when new a Prefix List is as up-to-date as a new Admiralty chart.

A map of the world to the Great Circle projection looks nice on the wall, and if you have some coloured pins and labels, it can help you to see which way your aerial is firing and how well. QSL cards for outgoing reports are a matter for one's choice; the writer prefers to make each report individually, and different as the circumstances differ, with room for a

covering letter. As to the incoming cards, the ones that matter are filed in suitable order, while the rest are used in the time-honoured manner to decorate the walls, contained in polythene hangers of ten, which is easier on the wall as well as providing a handy way of carting them about from A to B. The valuable ones are of two sorts: the ones of some sentimental value, and the sets of cards in alpha-numeric order covering DX countries in accordance with the DXCC list, accompanied by a check list showing which CQ Zone each card is in, and which band the contact was on.

### The Mail

The ladies first – *Mrs. J. Charles (Colchester)* says she has found it too hot to do much except sit and twiddle the receiver knobs, with a consequent rise in the HPX total. June is hoping against hope for a good enough collection next time to make it over the magic 1000; it would be nice to see. On a different tack, June has an interesting one in HW83BFI, a hot-air balloon flight from Annonay on June 4, 1983.

*Mrs. T. Parry (Blackpool)* seems to have been picking out the prefixes in good style, and finds it surprising that she has been listening for all but three years now in terms of table entries; perhaps Tina's most interesting catch this time was 1S1CK. The next thing is the question of whether or not to lash out on a second receiver or a small home-computer. Trouble with the home computer is that you need so much in the way of add-on extras to turn the box into a useful tool. For instance, much more memory is required for data storage, and since a tape is so slow, that means disc; and if one is to have a record, a printer becomes necessary. Then one needs to have the data and the programs stored somewhere else against the possibility of 'crashing' the machine and losing both program (not so important) and data. It depends on the space at one's command and also just how much one can find a use for it.

*Mrs. R. Smith (Nuneaton)* says she has been suffering from much QRM and family commitments too, not to mention a dearth of new prefixes – plenty of already-claimed ones of course! – so she offers an update of just three this time, which must be the shortest Ruth has ever entered!

We come now to the lads, and the first one on the pile is from *A. F. Roberts (Kidderminster)* who carries on adding CW prefixes to his score; but of late there has been some swing to VHF listening for a change – and of course staying outside in this hot weather.

Next we have three lists with no covering letters: *H. Bale (Cardiff)*, *G. W. Raven (London SE13)* and *A. Pyne (Bradford)* are all over the 1000 mark, and it is of interest to compare their entries. Messrs Bale and Raven are both topping

## ANNUAL HPX LADDER Starting date, January 1, 1983

SWL	PREFIXES		
T. Morris (Headingley)	474	T. Kirby (Cheltenham)	353
G. Skipton (Rye)	435	C.H. Kirk (Leeds 15)	353
G.A. Carmichael (Lincoln)	432	S.J. Bedford (Wakefield)	327
P. Oliver (Paisley)	390		

200 prefixes to have been heard since January 1, 1983 for an entry to be made, in accordance with HPX Rules, see this issue. At a score of 500, transfer to the All-Time listings is automatic.

up their North American shortages, but reader Pyne has been combing the short-skip stuff to be heard in summer to help fill in a lot of the more local, European, prefix shortages. He has one oddity in A82LC/AK; this is known to be the Leprosy Control Project station, but the suffix /AK is not understood. One thought is that it may have been an outstation on a field trip, but we don't have anything definite. Any readers with ideas? We'd like to answer Alex's question and satisfy our own curiosity too.

*B. F. Hughes (Harvington)* has been making good use of the time he has been able to put into contests, and we suspect his change of QTH has made a significant difference too; whichever it is, Bernard is now well out ahead of S. Foster, who headed the list for so many years.

We come now to a couple of letters from *P. Oliver (Paisley)* who has been waving his Realistic DX-200 at the bands with some success; and between the two letters Pete found time for a holiday in Ilfracombe in the sun. It's an ill wind that blows no good at all: Pete was also off work with a throat infection, but during that period the receiver got to be well worked – to the benefit of the totals.

*E. W. Robinson (Bury St. Edmunds)* sends in his 71st list for HPX, and adds a few more notes on the HW83BFI we mentioned earlier; it was a commemoration of the Montgolfier brothers' first flight, from Annonay, 200 years ago in 1783.

The question of an SWL living in a fringe area and his neighbours' reactions to his aerials is referred to by *D. Woods (Swindon)*; Douglas says his TV picture is often weak and snowy simply because the transmitter power has been reduced; and on occasion it is a complete wipe-out. Now, the neighbours have noticed his aerials, and promptly started accusing Douglas of being the cause of their poor pictures!

Turning to the letter from *H. M. Graham (Chesham)* we note that Maurice has all but drawn a blank on Ten metres, thanks to the fall away in sunspot count, the only one outside Europe being JY9CL on an otherwise dead band on June 24. Fifteen was a mite better, while on Twenty Maurice noted a couple of evening-time VKs. An interesting one was 18UDB/ID9, who said he was "in the little island of Dino in the south west Mediterranean". Dino doesn't appear on the Atlas we have here but we would guess it is one of the Lipari or Eolie group near the toe of the Italian boot.

*T. Kirby (Cheltenham)* wrote from Truro way, where he was holidaying, and remarks that he has observed on 28 MHz that if there is propagation at all, it is north-south, with east-west reserved for the very good days. This is indeed true, and is a sure sign of an open band beginning to fade away at sunspot peaks – the Ws disappear and are replaced by the South Americans as the MUF falls; and once it has gone below the level to support N-S activity the band goes dead except for the openings of relatively short duration which are down to what one may best describe as 'VHF-style modes'. These will continue to occur right through the sunspot minimum to come, but in the past have often been missed by the lack of activity on the band.

We come next to a letter from *Newport, I.o.W.* which cheerfully admits to being in a bad 'fist' and ends with an unreadable signature! However, a little detective work says *J. Goodrick* is the author. John is a bit of an award-hunter, as a means to give a bite to his SWL activities, and this of course means that he has to do two things: one is to arrange that his QSLs are easily retrievable from the files, and the other is to maximise his QSL returns. To this end he seems to have a special card of his own, on which he can give full details of band conditions, relative signal strengths both on the band and of any station nearby the one being reported on, level of activity, and so forth; plus room to say why a QSL is wanted from the chap, and room for up to twenty contacts to be recorded. Home-brewing the cards is much cheaper, once you have got the thing organised, says John, and with all the details fitted in there's precious little room for decoration!

## HPX LADDER (All Time Post War)

SWL

PREFIXES

PHONE ONLY			
B. Hughes (Worcester)	2727	P. Lincoln (Aldershot)	816
Mrs. R. Smith (Nuneaton)	2343	J. Heath (St. Ives, Cambs)	672
S. Foster (Lincoln)	2304	R. Wooden (Staines)	609
E. W. Robinson (Bury St. Edmunds)	2203	B. Patchett (Sheffield)	605
H.M. Graham (Chesham)	1600	A. J. Hall (Alvaston)	597
G.W. Raven (London SE13)	1491	D. Woods (Swindon)	589
Mrs. T. Parry (Blackpool)	1470	R.G. Hurst (London SE23)	548
M. Toms (Barkingside)	1400	A. Pilkington (Chesterfield)	518
M. Rodgers (Harwood)	1400		
N. Askew (Coventry)	1282	CW ONLY	
J. Doughty (Bloxwich)	1190	E. B. Ward (Ruddington)	1661
N.E. Jennings (Rye)	1165	J. Goodrick (I.o.W.)	1460
H. Bale (Cardiff)	1138	A. F. Roberts (Kidderminster)	1177
R. Fox (Northampton)	1123	J.M. Dunnitt (Prestatyn)	1127
A. Pyne (Bradford)	1113	H. Scott (Wetherby)	1105
D.J.S. Williams (Wednesbury)	1051	R. Fox (Northampton)	380
R. Everitt (Bluntisham)	1018	D.J.S. Williams (Romsey)	273
Mrs. J. Charles (Colchester)	966	RTTY ONLY	
S. Burgess (Stockport)	843	N.E. Jennings (Rye)	456
D.B. Shapiro (Manchester)	830	P. Lincoln (Aldershot)	392

Minimum score for an entry: 200 for CW or RTTY, 500 for Phone. Listings to include only recent claims and to be in accordance with HPX Rules, see this issue.

A very short note from *A. J. Hall (Derby)* – Tony has what he describes as a massive update of just two new ones, both heard on July 5.

Now we come to the familiar fist and wry humour of *E. B. Ward (Ruddington)*. Barry has succumbed to the lure of the contests when he should have been working on the studies – shame on you! However, the real reason for the increased activity is that the long-threatened new set of aerials are now up and tried, thanks to the assistance of the daughter's boyfriend who seems to have done a creditable imitation of a monkey around the eaves. The arrangement might be of some interest to others, so here are brief details: there are four dipoles, for 7, 14, 21, 28 MHz, using a common feed-line. All four dipoles are clamped to a braided nylon line with plastic cable ties, and the feedline is 75-ohm twin – a balun has not been tried yet so no coaxial. The aerial was pre-made, using the formula of  $478/f = \text{feet}$ , where  $f$  is the frequency; Barry aimed his at the low ends of the bands. Now, he lives in a Wimpey semi, so at the end of the house there is a bargeboard and the dipole is tacked to that, by way of the woven nylon, as a series of inverted-vees. Obviously the 7 MHz one is too long for this (so indeed is the 14 MHz one, but only by a whisker), so it is taken along the eaves at the front and the rear of the house. The feedpoint is thus at the apex of the roof at the end of the house, so the feeder comes down vertically, to above the ground-floor windows, where it is turned to horizontal and run neatly round to enter the ground-floor shack. All very neat and unobtrusive – and by the sound of it very successful. Signal strengths are improved, and for the moment at least the only snag is the absence of an ATU down below, or a balun at the feedpoint, which has the effect of allowing the TV timebase noises to be a little louder. As for Eighty, there are two possibilities: one is to use an ATU and load up what there is all-same centre-fed Zepp style, while the other one is an end-fed aerial taken down the garden to the young sycamore tree at the end, which has at last realised its obligations and started to search for the sun!

*N. Jennings (Rye)* says the fine weather has been ideal for a

## HPX RULES

- (1) The object is to hear and log as many *prefixes* as possible; a prefix can only count once for any list, whatever band it is heard on.
- (2) The /M and /MM suffixes create a new series: thus G3SWM, G3SWM/M and G3SWM/MM all count as prefixes, and where it is known to be legal, /AM also.
- (3) Where a suffix determines a *location* the suffix shall be the deciding factor, thus W1ZZZ/W4 counts as W4. Where the suffix has no number attached, e.g. VE1AED/P/SU, VE3UJ/P/SU, they are arbitrarily counted as SU1 and SU2 respectfully, and the same holds good for similar callsigns.
- (4) When the prefix is changed both the old and the new may be counted; thus VQ4 and SZ4 both count.
- (5) The object is to hear *prefixes* not countries, thus there is no discrimination between say MP4B and MP4K which count as one prefix.
- (6) Only calls issued for Amateur Radio operation may be included. Undercover and pirate callsigns will not be credited, nor any MARS stations be claimed.
- (7) G2, G3, G4, etc., all count separately, as do GW2, GW3, GW4, etc., and in the same way K2, W2, WA2, all count separately even though they may be in the same street.
- (8) Send your HPX list, in alphabetical and numerical order showing the total claimed score. With subsequent lists, it is sufficient to quote the last claimed score, the new list of prefixes, and the new total. Give your name and address on each sheet, and send to "SWL", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ, if possible to arrive before the SWL deadline for that particular month.
- (9) Failure to report for two consecutive listings, i.e. four months, will result in deletion from the Table, although there is no objection to a "Nil" report to hold your place.
- (10) Starting score 200. Phone Table is mixed AM/SSB, with a separate CW Table. No mixed Phone/CW Table, nor will AM-only or SSB-only entries be accepted.
- (11) Lists will be based on those shown in the current "Radio Amateur Prefix-Country-Zone List", published by Geoff. Watts (see Advertiser's Index in any issue of SHORT WAVE MAGAZINE).

spot of bowls, and also has been trying his hand at photographing the screen of his decoder when there are Morse or RTTY signals being displayed. Photography of a TV screen isn't too difficult if you have a decent camera; the main thing to remember is that your exposure setting must not be faster than 1/25 second, as this is the time required for a full frame scan. Faster speeds will only result in a print of some part of the screen, depending on the moment of shutter opening relative to the part of the raster being scanned at that moment. So the shutter speed must be set to the slow speed, and the correct exposure obtained by adjustment of the lens stop and, if necessary, by a change to a different speed of film. Thus, the camera needs to be on a firm support – which means a tripod or a clamp – and it should be square-on to the tube face.

C. H. Kirk (Leeds) wants to know why SWL appears only on alternate months . . . so J.C. can get some listening in himself! Seriously, the reason is the general pressure on space in the *Magazine*.

P. Lincoln (Aldershot) refers to our comments last time about active aerials. Peter uses a Datong AD370 and an Icom R70 receiver, and finds that the AD370 is at least as good as his long-wire on Top Band while on the other bands it outperforms the wire, a five-band vertical and the dipoles; the

only problem seems to arise when, on 21 MHz only, the IC-R70 pre-amp is switched-in and some BC stations appear on the band. Otherwise – a satisfied user! And of course, as Peter says, the situation on 21 MHz is probably a combination of the high-gain active aerial having very wide bandwidth (as it must of course) with the octave front-end filters which feature in the IC-R70.

T. A. Morris (Headingley) says that the RAE rather put a damper on things – but he doesn't make it clear whether he means the studying, or the actual examination! We *hope* it was just a matter of the effort of getting down to study, Tom!

Both G. A. Carmichael (Lincoln) and B. Patchett of Sheffield sent in lists with no comments – both with good additions to their score, so doubtless not wanting to take time out for writing letters!

We come next to I. F. Thorpe (Bracknell) who has fallen into the old error of misunderstanding prefixes for callsigns. Perhaps for the benefit of other readers, I won't mind this exposition: a callsign consists of two parts, namely the prefix, which tells you the nationality and sometimes the location of the station, and the callsign proper which follows the prefix. For example, GB2SWM; the prefix is GB3 and the call-proper is SWM, and the two together make a unique combination. There is only one GB3SWM, only one G3SWM, only one GM3SWM, and so on. The object of the exercise is to collect prefixes, so only one GB3 counts, only one G3, only one GM3, and so on. In some countries, the number in the callsign tells you where in that country the station is located, for example (in general) the U.S.A., where a W6 will always be in the state of California. Until recent years an American station would always use a callsign appropriate to his call area, for a 'permanent' station, and a suffix consisting of the number of the call area in which the station was located when out portable; thus W6AM/5 would have been W6AM out portable in the fifth call area. Nowadays, the position is that the call area number only indicates the call area in which the license was initially issued, so W6AM could have a permanent station in W1 and still sign W6AM. In general, though, if you hear a W6, or a WA6, or a WB6 or such, he will be in California. To clarify it still further, the rules are being reprinted in this issue.

S. Burgess (Stockport) wrote in about the rules, and as a result of our answer he has made an initial entry; his starting total is 843 prefixes, and he seems to have been actively listening for several years, on all bands 80-10 metres.

Two letters from R. Everitt (Bluntisham); he seems to be well on with Morse, receiving at 14 and sending at about 12 wpm; and Richard notes that the best conditions for the JAs occurred in March and have fallen off again since. True enough, although they are usually to be found if you pick the right times and have an aerial that 'fires' in the right direction; but the equinoxes are the favourite time for good conditions world-wide. The observation that the peak is not exactly at the equinox is probably related to the relative population of radio amateurs in the two hemispheres, rather than 'conditions' pure and simple.

S. J. Bedford (Wakefield) says he is the custodian of his club's FT-101ZD and S.E.M. Transmatch, and now goes to meetings in fear and trembling lest they want to take it out of his hands!

An interesting letter from D. B. Shapiro (Manchester), who has been busy at the rig since the conclusion of the exams; and gaining experience log-keeping in VHF NFD with the Bury Club, the while keeping his own pad and pen at the ready so as to have a few more to add to the ladder score for himself. This lad's got *initiative!* Turning to a different theme, David wonders where he can find a list of the available DX nets which gives details of frequencies and bands. A little difficult, this one, as there are several, and we suspect that in the next few months there will be quite a bit of reshuffling of them to cater for the falling sunspot count. Some details appear in the *DX News Sheet* occasionally, and in most of the other DX

bulletins from time to time. Perhaps a keen reader has a list of his own already made up, and would be game to pass the word on in a letter to meet the deadline for next time?

Our last letter comes from *R. G. Hurst (London SE23)* who is mighty *pleased* to have his SWL time cut down – he has been out of work for a year but has landed himself a full-time job now. On a different line, Ray heard a 1A0 station, giving QSL address as I0MGM; this would have been the station of the Sovereign Military Order of Malta (SMOM) and rates as a country in its own right; it comes on at irregular intervals, and we believe the next effort will be fairly well on into autumn, say October or November.

## Finis

That's the end of the pile for another SWL and it just remains to say that the deadline for your letters for the next column is **September 22**, addressed as always to your old J.C., "SWL", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. Till then keep the ears going, and let's have all the prefixes and the queries. 73, 88.

## SWL Competition

Don't forget the competition we mentioned in the July column! See page 262, July issue, for details.

# CLUBS ROUNDUP

By "Club Secretary"

ONCE again we have a large crop of mail to deal with – quite unusual for this time of year! However, it no doubt tells us that the amateur radio movement is alive and healthy all over the U.K.

## The Reports

September's meeting for the **Acton, Brentford & Chiswick** crowd is on 20th; the venue as usual the Chiswick Town Hall, High Road, Chiswick. The subject is "Members Selected Items".

The **Bath** club has now been running for about 18 months and continues to grow. They foregather at the "Englishcombe Inn", Englishcombe Lane, Bath, at 7.45 p.m. on alternate Wednesdays. Other details from the Hon. Sec. – see Panel.

A new group is the one at **Belfast College of Technology**, formed at the beginning of the year. The group will be holding a series of talks on amateur radio subjects at the college, and open to the public. Subjects will include slow scan and fast scan TV, aerials, and more – details from the Hon. Sec. at the address shown in the Panel.

For details of the **Biggin Hill** gatherings we must refer you to the Hon. Sec. – see Panel – because the newsletter seems to hint at a change of Hq for the present term; however, we can tell you the date – September 20, which is for an RTTY Evening.

At **Bishops Stortford** the club foregathers at the British Legion Club in Windhill on the third Monday in each month. In addition, there is an informal gathering on the first Thursday of each month at the "Nag's Head" to drink ale and 'set the world to rights'. This is to be found on the A120 Dunmow Road.

Not far away is **Braintree**; indeed the two towns were once joined by a branch railway line. The club is based on Braintree Community Centre, Victoria Street (which is next door to the bus station), on the first and third Monday of the month. An additional event is on September 3, when they have their very own Garden Fete, at the QTH of G3OLU, the idea being to raise funds for equipment purchase. All the details from the Hon. Sec. – see Panel.

Turning to **Brighton**, the Hq is at the YMCA, Marmion Road, on alternate Wednesdays, with a Morse class on

Mondays. September 7 is an Open Evening at the time of writing, but September 21 sees a talk on the 'Vision' side of amateur radio, to be given by the Worthing TV Repeater Group members.

September 13 is the date for the main meeting at **Bury** when G3CSG will be talking about 'Japanese Morse' and his experiences of it during W.W.II. Normally, all the other Tuesday evenings are used for informal gatherings, but this time September 20 is cancelled as the Hq will be closed. The venue is the Mosses Community Centre, Cecil Street, Bury.

Heading now to **Cambridge**, we find they foregather every Friday evening during term-time at the Visual Aids Room, Coleridge Community Centre, Radegund Road, off Coleridge Road, on the south side of the city. On September 2, as the college is closed, they are planning a social event elsewhere – details from the Hon. Sec. at the address in the Panel. He can also tell you about their Field Day weekend for the IARU Region 1 contest, and the talk on aerials planned for September 9.

**Cheltenham** have their place at the Stanton Room, Charlton Kings Library, Cheltenham. September 2 is down for a talk on 10 GHz, while on September 16 it is a natter night. They are also planning both HF and VHF contest activity on the weekend of September 3/4 – they must have lots of operators!

The **Cheshunt** group foregather every Wednesday evening at the Church Room, Church Lane, Wormley, near Cheshunt. For September they have natter evenings on September 7 and 21, a trip to Brookmans Part transmitters on 14th, and a visit from John Nelson, G4FRX, of the RSGB, on 28th.

Southwards now, to **Chichester**, where the Hq is at the Green Room, Fernleigh Centre, 40 North Street, Chichester, on the first Tuesday and the third Thursday of each month. In addition, they have a station at the Chalk Pits Museum on September 18, commemorating Gerald Marcuse, G2NM, the pioneer of broadcasting.

For the next talk at the **Cornish** club, on September 1, G3NPB will take the stand, to explain some of the ins and outs of propagation. The venue, for the next few months will be St. Stephens Church Hall, Treleigh, Redruth, which is just off the old Redruth bypass.

Now **Crawley**, and here the venue is Trinity Church Hall, Ifield, Crawley; it looks to be on the fourth Wednesday, but we feel you should check with the Hon. Sec. – see Panel for details.

**Cray Valley** have G8MLO giving an illustrated talk on September 1, while the 15th is a natter evening. The venue is Christchurch Centre, High Street, Eltham.

It's the third Saturday evening in each month for **Crystal Palace**, where the venue is at All Saints Church Parish Rooms, Beulah Hill, Upper Norwood.

The meetings of the **Dartford Heath D/F** club are tied to the dates of the Sunday hunts; for September we see it is

September 6 at the "Horse and Groom" near Dartford Heath (NGR: 520 726).

On to **Derby** which means 119 Green Lane, every Wednesday evening. September 7 is the junk sale, and on 14th they have film show. G8SSL will be talking about ambulance radio systems on September 21, while on 28th it is Doug Pitt's talk on narrow-band television, postponed from last June.

**Derwentside** have their corporate being at the R.A.F. Association Club, Sherburn Terrace, Consett, Co. Durham, where the booking is for every Monday evening. We cannot give you programme details as it is their custom to only finalise the details a short while ahead.

We turn next to **East London RSGB** group, where the meetings are held on third Sunday of each month, at Wanstead house, Wanstead, London E11, which is about 100 yards behind Wanstead tube station. More details from the Hon. Sec. - see Panel.

Over now to **Echelford**, and here the routine is to get together on the second Monday and the last Thursday in the month, at The Hall, St. Martin's Court, Kingston Crescent, Ashford, Middx. On September 12, G3WZT will talk about M/S and Sporadic-E propagation.

The members of **Edgware** club all head for 145 Orange Hill Road, Burnt Oak, Edgware, on the second and fourth Thursday of each month; September 8 is informal, and on 22nd they have a talk on Basic programming by G3SJE.

On now to **Farnborough**; here the Hq is the Railway Enthusiasts Club, Access Road, off Hawley Lane, near the M3 bridge, Farnborough. The dates are September 14, for a pre-AGM discussion, and September 28 for the Constructional Contest.

We now turn our thoughts over the water, to **Fingal**; they can be found every Monday evening at the Scout Hall, Ballygall Road East, Dublin 11, where they have a new club HF rig and trap vertical erected. They also have two-metre FM gear available. Monday, September 5 should be interesting, as it is down for a talk by E12W, on "Fifty Years of Amateur Radio".

On first and third Tuesdays **Fylde** meet at the Kite Club at Blackpool Airport. September 6 is down for G4DGR to talk about what it's like to be rare DX - he was 5N2ABG. Then on September 20, the Morse classes will be starting and the rest of the meeting will be an informal.

September 18 is AGM time for **Glenrothes**, at their Hq at Provosts Land Centre, Leslie, Fife, Scotland. They have other gatherings there too, for the details of which we must refer you to the Hon. Sec. - see Panel.

Another AGM - that of **Gloucester** comes in September, on 7th, at St. Barnabas Church Hall, Stroud Road, Gloucester. The lads are to be found there, in fact, every Wednesday evening.

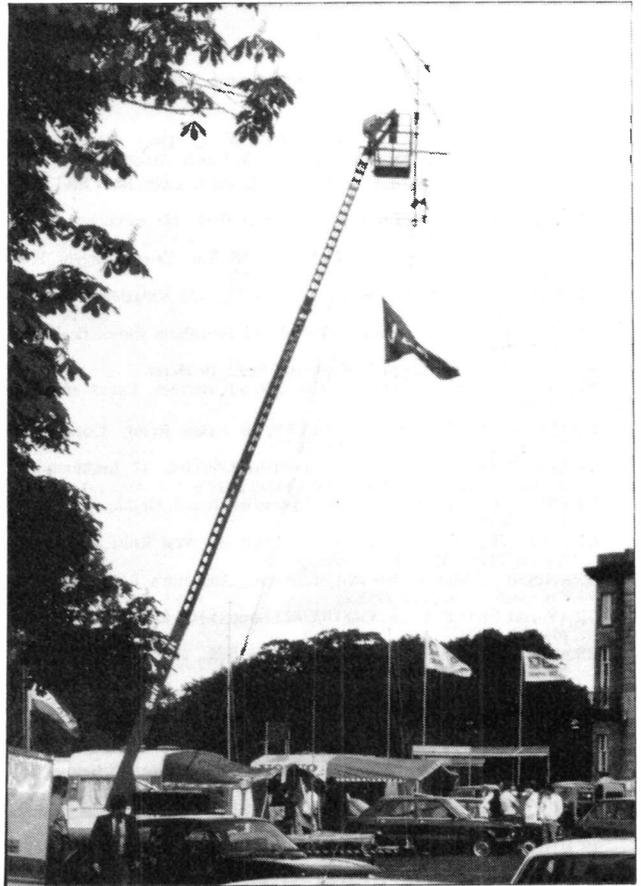
The **G-QRP Club** comes up for mention next, and this is a national one with some 2,000 members on the books now. Anyone interested in simple equipment, low power operating, or home-brew should seriously consider becoming a member.

A video evening is noted for the **Greater Peterborough** gang on September 22, writes the Hon. Sec. Find them at Southfields Junior School, Stanground - at least that's on our record, but the current letter doesn't say so for sure!

There are always lots of meetings for the **Hastings** group; the third Monday in the month is the 'main' meeting for which the venue is West Hill Community Centre, while the remaining Monday evenings are micro nights. Tuesday is Morse night, and on Fridays it is chat night, these latter being at Ashdown Farm Community Centre.

**Haivering** have informals on September 7 and 21. September 14 is a junk sale, and on September 28 they have a talk on circuit theory by G8MKN and G8HRC. All are at Fairkytes Arts Centre, Billet Lane, Hornchurch, Essex.

If you want to visit the **Hereford** club, the routine is to have meetings on the first and third Friday of the month.



Sefton A.R.C. organised a special event station, GB4WMS, at Wigan Motor Show in June. Above, the 52-ft. multi-purpose 'mast', which sported a 19-ele Jaybeam for 70cm., 16-ele Tonna for 2m., and four 15-over-15 slot Yagis for 23cm. Below, some of the members of Sefton A.R.C. who helped run the station: back row, left to right, G8ZWZ, G8YPL, G6ICR (Hon. Sec.), G6PZW, G4KIN, G6NRK and G6WFE. G6NIN (left) and G6EXC are at the front.



Unfortunately the club are for the moment without their normal Hq, and so for the details of the venue and the programme we have to refer you to the Hon. Sec. - see Panel for his details.

Away up north now to **Inverness**, where the group now meets at the Cameron Youth Club, Planefield Road, Inverness, every Thursday evening, with various activities on the go.

**Ipswich** are based on the "Rose and Crown" at the junction

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

- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB. (01-992 3778)
- BATH: T. Whitehead, 14 Arundel Road, Bennetts Lane, Bath BA1 6EP. (Bath 319150)
- BELFAST (College of Technology): James Barr, 121 Kitchener Street, Belfast BT12 6LF.
- BIGGIN HILL: I. Mitchell, G4NSD, 37B The Grove, Biggin Hill, Westerham, Kent TN16 3TA. (09594 75785)
- BISHOPS STORTFORD: B. J. Salt, G4ITL, 135 Kingsland, Harlow, Essex. (0279 20478)
- BRAINTREE: Mrs. P. Penny, G6TAF, 13 Newnham Close, Braintree. (0376 26487)
- BRIGHTON: W. Firmager, 26 Brownleaf Road, Brighton.
- BURY: B. Tyldesley, G4TBT, 4 Colne Road, Burnley, Lancs. (Burnley 24254)
- CAMBRIDGE: D. Wilcock, G2FKS, 6 Lyles Road, Cottenham, Cambridge CB4 4QR. (0954 505917)
- CHELTENHAM: Mrs. G. Harmsworth, G6COH, 42 Leckhampton Road, Cheltenham, Glos. (Cheltenham 25162)
- CHESHUNT: R. Frisby, G4OAA, 2 Westfield Road, Hoddesdon, Herts. EN11 8QX.
- CHICHESTER: T. M. Allen, G4ETU, 2 Hillside, West Stoke, Chichester, Sussex PO18 9BL. (West Ashling 463)
- CORNISH: J. Vinton, G6GKZ, Cheriton, Alexandra Road, St. Ives, Cornwall. (Penzance 795860)
- CRAY VALLEY: P. 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. R. Burchmore, G4BWV, 49 School Lane, Horton Kirby, Dartford, Kent DA4 9DQ.
- DERBY: Mrs. Shardlow, G4EYM, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. (0332 556875)
- DERWENTSIDE: P. Howes, G8WEJ, 26 Hadrians Way, Ebchester, Co. Durham DH8 0PE.
- EAST LONDON RSGB: C. Ramsay, G8VZD, 45 Bulwer Court, Bulwer Court Road, Leytonstone, London E11 1DB.
- ECHELDFORD: A. H. Othen, G8FSZ, 5 Millan Close, New Haw Weybridge, Surrey KT15 3NP.
- EDGWARE: H. Drury, G4HMD, 11 Batchworth Lane, Northwood, Middx. (Northwood 22776)
- FARNBOROUGH: I. Ireland, G4BJQ, 118 Mychett Road, Mychett, Camberley, Surrey. (Farnborough 543036)
- FINGAL: G. Birkhead, E19DZ, 103 Roselawn Road, Castleknock, Co. Dublin.
- FYLDE: H. Fenton, G8GG, 5 Cromer Road, St. Annes, Lytham St. Annes, Lancs. FY8 3HD.
- GLENROTHES: A. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife. (Kirkcaldy 200335)
- GLOUCESTER: A. J. Martin, 12 Redwood Close, Podsmead, Gloucester GL1 5TZ.
- G-QRP: Rev. G. C. Dobbs, G3RJV, 17 Aspen Drive, Chelmsley Wood, Birmingham B37. (021-770 5918)
- GREATER PETERBOROUGH: F. Brisley, G4NRJ, 27 Lady Lodge Drive, Orton Longueville, Peterborough. (0733 231848)
- HASTINGS: G. North, G2LL, 7 Fontwell Avenue, Little Common, Bexhill-on-Sea. (Cooden 4645)
- HAVERING: A. Negus, G8DQJ, 17 Courtenay Gardens, Upminster, Essex RM14 1DH. (Upminster 24059)
- HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford. (Hereford 273237)
- INVERNESS: R. Irwin, 40 Lawers Way, Kinmylies, Inverness IV3 6NU.
- IPSWICH: J. Tootill, G4IFF, 76 Fircroft Road, Ipswich, Suffolk IP1 6PX. (0473 44047)
- ISLE OF MAN: Mrs. A. Matthewman, GD4GWQ, 20 Terence Avenue, Douglas, I.o.M. (0624 22295)
- ITCHEN VALLEY: S. W. Bone, G4PPJ, 19 Tickner Close, Botley, Hants. SO3 2SW. (04892 3312)
- KIDDERMINSTER: A. F. Hartland, G8WOX, 22 Granville Crescent, Offmore Farm, Kidderminster. (Kidderminster 61584)
- LINCOLN: Mrs. P. Rose, G8VRJ, Pinchbeck Farmhouse, Mill Lane, Sturton-by-Stow, Lincoln. (Gainsborough 788356)
- MALTBY: I. Abel, G3ZHI, 52 Hollytree Avenue, Maltby, Rotherham, Yorks.
- MEDWAY: P. J. Poole, G4EVY, 5 River Drive, Strood, Rochester, Kent ME2 3JW. (0634 76463)
- MID-WARWICKSHIRE: Mrs. C. Finnis, G4TIL, 37 Stowe Drive, Southam, Warks. CV33 0NZ. (092681 4765)
- NORTHERN HEIGHTS: G. Milner, G8NWK, 3 Briggs Villas, Queensbury, Bradford. (Bradford 882 945)
- NORTH WAKEFIELD: S. Thompson, G4RCH, 3 Harlington Court, Morley, LS27 0RT. (0532 536603)
- PERTH: R. H. Barnes, GM6ESY, Pittendynie Cottage, Moneydie, Nr. Luncarty, Perth. (073882 575)
- PLYMOUTH: C. Stevens, 196 Lipson Road, Plymouth.
- PONTEFRAC: N. Whittingham, G4ISU, 7 Ridgedale Mount, Pontefract, W. Yorks. WF8 1SB.
- QTI (Talking Newspaper): Hon. Sec. c/o 79 Narrow Lane, North Anston, Sheffield S31 7BJ.
- REIGATE: C. S. Barnes, G8FEE, 25 Hartswood Avenue, Woodhatch, Reigate, Surrey RH2 8ET)
- R.A.F. (Lancs. Area): F. S. Jackson, G6FTB, 27 Prairie Crescent, Burnley BB10 1EU.
- ST. NEOTS: S. Foote, G4FOH, Whiteknights, 10 Old Farm Close, Needingworth, Huntingdon, Cambs PE17 3SG.
- SKELMERSDALE: G. Rogers, G60MN, 113 Foxfield, Fosters Green, Skelmersdale, Lancs.
- SOUTHAMPTON: K. Stanley, G6CPE, 35 St. Blaize Road, Romsey, Hants. (Romsey 514811)
- SOUTHDOWN: T. Rawlance, G4MVN, 18 Royal Sussex Crescent, Eastbourne.
- S.E. KENT YMCA: A. Moore, G3VSU, 168 Lewisham Road, River, Dover. (03047 2738)
- SOUTH ESSEX: D. V. Pritchard, 55 Walker Drive, Leigh-on-Sea, Essex.
- SOUTHGATE: J. Fitch, 16 Kent Drive, Cockfosters. (01-440 7353)
- SPALDING: I. Buffham, G3TMA, 45 Grange Drive, Spalding, Lincs. PE11 2DX. (Spalding 3845)
- STEVENAGE: C. Barber. G4BGP, 13 The Sycamores, Baldock, Herts. (0642 893736)
- STOCKTON: J. A. Walker, G6NRY, 7 Widdrington Court, Stockton-on-Tees, Cleveland TS19 8UF.
- STOURBRIDGE: M. Davies, G8JTL, 25 Walker Avenue, Quarry Bank, Brierley Hill. (Lye 4019)
- SURREY: R. Howells, G4FFY, 7 Betchworth Close, Sutton, Surrey SM1 4NR. (01-642 9871)
- SWALE: B. Hancock, G4NPM, Leahurst, Augustine Road, Minster, Sheerness, Kent ME12 2NB.
- SWINDON: W. Orr, G4IYW, 44 Fairlawn, Liden, Swindon. (0793 27227)
- THAMES VALLEY: J. Axe, G4EHN, 65 Ridgway Place, Wimbledon, London SW19 4SP. (01-946 5669)
- THANET: I. B. Gane, G4NEF, 17 Penschurst Road, Ramsgate, Kent. (Thanet 54154)
- TORBAY: Mrs. M. Rider, 7 Kingston Close, Kingskerswell, TQ12 5EW. (08047 5130)
- UK FM GROUP (Southern): T. Emery, G3KWU, Wilverley, Old Lyndhurst Road, Cadnam, Southampton SO4 2NL.
- VALE OF WHITE HORSE: I. White, G3SEK, 52 Abingdon Road, Drayton, Abingdon, Berks. (0235 31559)
- VERULAM: E. Bailey, G4KLQ, 50 Bettespaw Meadows, Redbourn, St. Albans, Herts. AL3 7EW. (Redbourn 3291)
- WAKEFIELD: W. Parkin, G8PBE, 14 Cleveland Grove, Lupset Park, Wakefield, WF2 8LD. (Wakefield 378727)
- WEST KENT: P. Reeve, G4GTN, 2 Court Road, Tunbridge Wells, Kent. (Tunbridge Wells 24689)
- WESTMORLAND: N. Martin, G6OPO, Flat 8, Broom Close, Sedbergh Road, Kendal, Westmorland LA9 6BG. (0539 31476)
- WIRRAL: N. B. McLaren, G4OAR, 596 Woodchurch Road, Oxton, Birkenhead. (051-608 1377)
- WORCESTER: A. C. Lindsay, G4NRD, 11 Durcott Road, Evesham, Worcs. WR11 6EQ. (Evesham 41508)
- YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

of Norwich Road (A45) and Bramford Road, where they can be found on the second and last Wednesday of the month; we have it that there are usually meetings of the clan on the other Wednesdays too, but this is dependent on other activities and should be confirmed with the Hon. Sec. His details are in the Panel.

A little nearer the mainland and we are in GD, where we find the **Isle of Man** group making its base at the Keppel Hotel, Creg-ny-Baa, every Monday evening with, as a general rule, an alternation of social evenings and activity nights.

Over to **Itchen Valley**, where the Hq is at the St. John Ambulance Hq at the corner of Blenheim Road and Desborough Road, Eastleigh, every other Thursday. There seem to be all sorts of activities going on or planned.

September 13 is the AGM for **Kidderminster**, and on 27th they have a talk on RSGB by G4EQI. Both are at Aggborough Community Centre, Hoo Road, Kidderminster.

At **Lincoln**, September 14 is down for a talk on the Lincolnshire Fire Brigade, and on September 16 they step out of the routine to have a junk sale and social evening; then on

September 28, G40SB will talk about home-brew gear. The intermediate Wednesdays are occupied with RAE/CW classes. All are at the City Engineers Club, Central Depot, Waterside South, Lincoln.

The **Maltby** gang have just completed their first year of activities, with a great deal of success to look back on – and they mean to go on the same way! Find them on any Friday evening at the Methodist Church Hall, Blythe Road, Maltby.

September 2 and 23 are the dates for **Medway** meetings, and on the other Fridays there will activity from the club station, at the Number One Hall, St. Luke's Church, King William Road, Gillingham.

On September 6 there is a junk sale and on 20th a two-metre fox hunt starting at 7.30 p.m. for members of the **Mid-Warwickshire** club, at 61 Emscote Road, Warwick.

On Wednesday evenings at the "Bradshaw Tavern", Bradshaw, Halifax, you can find the **Northern Heights** club gatherings. There are buses from Halifax passing the door, and we understand the Tavern is at Grid Ref 303 083.

Every Thursday evening is the form at **North Wakefield**, where the venue is the Working Men's Club, Carr Gate. Once monthly at least they have a formal meeting with talk, films, or whatever, the other evenings being of a more social nature.

Up now to **Perth**, where the locals have their Hq at the Perth City Sports and Social Club, Leonards Street, Perth, where they are to be found on Tuesday evenings.

A new venue is noted by the Hon. Sec. at **Plymouth**; they have moved to Penlee Secondary School, Somerset Place, Stoke, Plymouth, where on September 5 they have a talk on microwaves by G3VVB and a junk sale on 19th.

We head now to **Pontefract** where the meetings are held at Carleton Community Centre, Carleton, Pontefract, on Thursday evenings. September 1 was still open at the time they wrote, but on September 8 they have a talk on repeaters by G4EZV.

The group known as QTI Tape Magazine up till now is changing its name to **QTI Talking Newspaper**; they are now putting out their service of free recorded readings from amateur radio magazines to over 100 blind amateurs and SWLs world-wide, and new members are always welcome. Contact the Hon. Sec. for details at the address in the Panel.

At **Reigate** the club members head for the Constitutional and Conservative Centre, Warwick Road, Redhill, where they have the Upstairs Meeting Room booked on the third Tuesday of each month.

Another new club is up for reporting now; this is **RAFARS Lancashire Area**, and not surprisingly they have Hq at the R.A.F. Association club in Preston, and they will be there again on September 12.

The **St. Neots** crowd foregather on alternate Mondays at the "Horseshoe Inn", Offord D'arcy, near Huntingdon, and membership is open to all with an interest in amateur radio and electronics. More details on the current programme from the Hon. Sec. – see Panel.

The first session at the **Sheffield** Hq after the summer recess is on September 1, when they clear up the important details for the SSB NFD; from then on it is every Thursday evening at the Church Hall, Sheffield.



Geoff Pollitt, G4NPQ, won the G4INY Memorial Trophy with his home-brew transceiver, at the recent York A.R.S. home-brew night.  
photo: G4EMA

**Skelmersdale** are based on the Dunlop's Sports and Social club, White Moss Road, where they get together on Thursday evenings.

The **Southampton** club recently had their AGM, and elected some new officers, which reflect in our Secretaries Panel. The gang meet every Wednesday evening at Bittern Park School, Bittern, Southampton, and are eagerly awaiting the outcome of the committee's deliberations on the programme no doubt.

Now **Southdown**, and this means the Chaseley Home for Disabled Ex-Servicemen, Southcliff, Eastbourne, on the first Monday of each month. This gives us September 5, but we don't have details of the programme for that evening, even though we know October's!

September 8 is the **Southgate** date, for a talk on QRP operating by members of the G-QRP Club; the venue is St. Thomas' Church Hall, Prince George Avenue, Oakwood, London N.14.

**Spalding** have a visit from Mike Bowthorpe from the Peterborough *Tandy* store on September 9; the place for this – and all other meetings – is Maples Room, White Hart Hotel, Market Place, Spalding.

At **Stevenage** the venue these days is *TS Andromeda*, Fairlands Valley Park, Shephall View, Stevenage. On September 6, there is a talk by G4MEO on "Aluminium for Aerials and How to Use It"; then they have a beginners evening at Fairlands Community Centre on September 8, returning to Hq on September 20 for a subject to be confirmed.

**Stockton** is a new club to these columns, although it seems to have been running for a while; they are to be found in the Oxbridge Hotel in Stockton-on-Tees every Monday evening. We understand that they are starting an RAE class on September 5.

The **Stourbridge** group are to be found at "The Garibaldi" in Cross Street on first and third Mondays. September 5 is an informal and will be used to settle the last details of the club entry in the Stourbridge Carnival on 10th. The main meeting is on September 19 and will feature a talk on matching circuits and SWRs by Dave Yates, G3PGQ.

To **Surrey** now; they are based at *TS Terra Nova*, 34 The Waldrons, South Croydon, on first and third Mondays. September 5 is a surplus equipment sale, and on 19th they have a book sale, followed by the club station on the air and some Morse practice.

Still ploughing down the pile we come next to **Swale**, who have their Hq in Nina's Restaurant, 43 High Street,

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

October issue—August 26th  
November issue—September 30th  
December issue—October 28th  
January issue—November 25th

*Please be sure to note these dates!*

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Sittingbourne, Kent, every Monday evening. If you are visiting, it should be noted that the club stations G4SRC and G6SRC will be looking out on S20 FM between 7.30 and 8 p.m. for you.

Down now to **Swindon**, where the locals have a place at Park School, Marlowe Avenue, Swindon, every Thursday. September 8 is a Special General Meeting at which all members should attend for thirty minutes. They will also be taking enrolments for the RAE course. On September 15 they have an informal plus the opening night of the RAE course, followed on 22nd by an Open Evening, and on 29th another chat night and RAE class.

The first Tuesday of each month it is for **Thames Valley**, at Thames Ditton Library Meeting Room, Watts Road, Giggs Hill, Thames Ditton. Unfortunately we don't have the other details.

The meetings of the **Thanet** group continue to be held at the Grosvenor Club, Margate, on the second and fourth Tuesday of each month; September 13 is down for a talk by members of the RSGB Interference Committee, and on September 27 there is a talk by an official of *Seaboard*. The club is also setting-up an RAE course this winter – details from the Hon. Sec., see Panel.

On September 24 the **Torbay** club will have a talk by G3PVB on VHF and UHF working, at the club Hq, Bath Lane, rear of 94 Belgrave Road, Torquay. The members also gather at this venue for an informal every Friday evening.

Now we turn to the **UK FM Group (Southern)** who meet at Chineham House, Shakespeare Road, off Popley Way, Basingstoke on the first Wednesday of each month; on September 7 they entertain Frances Woolley, G3LWY, who will talk to them about RAIBC and its work.

Visiting speakers are the rule on the first Tuesday of each month for the **Vale of White Horse** group. The new venue for the club is the Canteen and Social Club, Milton Trading Estate, Milton; turn left at the main gate and the club is on the left.

All the regular meetings of the **Verulam** crowd are now at the R.A.F.A. Hq in New Kent Road, St. Albans – this road is off Marlborough Road. For the gory details we must refer you to the Hon. Sec. – see Panel for his vital statistics.

At **Wakefield** the alternate Tuesday meetings give us September 6 for a natter night, and September 20 for a Home Brew Equipment Evening. All meetings are at the Holmfield House, Denby Dale Road, Wakefield, which lies about ¼-mile out of town on a good bus route and just inside the city parks. They have a bar and good parking facilities.

Now to **West Kent** where a new PRO takes over, and he tells us that they have formal on September 9 when G3LNM talks about Top Band and VHF D/F hunting, and September 23 for an Open Evening; both at the Adult Education Centre, Monson Road, Tunbridge Wells. The informals are on September 13 and 27 and these are at the Drill Hall in Victoria Road, Tunbridge Wells.

At **Westmorland** the revived club seems to be thriving; find them on the second Tuesday of each month at the "Strickland Arms", just south of Kendal on the A6, sign-posted Sizergh Castle which is just past the club Hq. All are welcome who have an interest in the hobby.

The **Wirral (West Kirby)** crowd have an interesting name for their informals – they call them "D's and W's" for "drinking and waffling"! On September 7 they are at the "Shrewsbury Arms", Chester High Road, and 21st at the "Red Cat" in Greasby. Main meetings are at Irby Cricket Club, Mill Hill Road, Irby; September 14 is a talk on fire protection techniques by G8TCC, and on 28th they have a talk on QRN, causes and cures, by G4EFP.

**Worcester** will be at the Oddfellows Club, New Street, on September 5 for a look at Trio equipment displayed by *Low Electronics*. Then on September 19 they head for the "Old Pheasant" in New Street for the informal evening.

Finally, **York**, where to join in the fun just trot along to the United Services Club, 61 Micklegate, York, on any Friday evening, and meet this very friendly group.

## Finis

That's it for yet another month; deadlines for the next few months are shown in the 'box' as usual, and are for *arrival*, addressed to your scribe, **SHORT WAVE MAGAZINE**, 34 High Street, **WELWYN**, Herts. AL6 9EQ. Till then, don't forget to take the mower for a walk regularly!

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## Welsh Amateur Radio Convention

The Welsh Amateur Radio Convention celebrates its tenth anniversary this year, and the venue will again be Oakdale Community College, Blackwood, Gwent, on **September 25th**. Admission will be £1 and there will be the usual trade stands, plus a lecture programme on amateur satellites by Ron Broadbent, G3AAJ, and other attractions. Doors open at 10 a.m., with talk-in on S22.

## "Six Castles Award"

Swansea R.A.C.G. informed us, too late for inclusion in last month's issue (see p. 326) that their Six Castles Award special event station will now be operated on **September 11th and 12th** with the call GB2GC.

## More R.A.E. Courses, 1983-84

**Amersham:** Amersham College of F.E., Stanley Hill, Amersham, Bucks., Mondays 8-9 p.m. (Morse), Tuesdays 7-9.30 p.m. (Theory), commencing Sept. 19th, postal enrolment Aug. 24th to Sept. 6th, enrolment at College Sept. 7th. Further information from course tutors G4HES and G3NCL, both QTHR.

**Beckenham:** Beckenham Adult Education Centre, 244 Croydon Road, Beckenham, Kent (01-650 4208), beginners' Morse class Tuesdays 7.15-9.15 p.m., commences Sept. 20th, tutor Mr. Henschel. Intermediate Morse class Tuesdays 7.30-9.30 p.m., commences Sept. 20th, tutors Steve Palmer and Peter Grant.

**Borehamwood:** De Havilland College, Elstree Way, Borehamwood, Herts. (01-953 6024), Tuesdays 7-9 p.m., enrolment Sept. 12/13th 2-8 p.m., course starts Sept. 20th lecturer G. L. Benbow G3HB. Full details from the College.

**Dudley:** Dudley College of Technology, The Broadway, Dudley, West Midlands (Dudley 53585), Tuesdays 6.30-8.30 p.m., enrolment Sept. 6th. Further details from the College.

**Stockton-on-Tees:** Stockton & District A.R.G., Course starts Sept. 5th Full details from Club PRO, J. Walker, G6NRY, 7 Widdrington Court, Stockton-on-Tees, Cleveland TS19 8UF.

**Welwyn Garden City:** De Havilland College, Applecroft Centre, Applecroft Road, Welwyn Garden City, Herts., Thursdays 7-9 p.m., enrolment Sept. 2/13th 2-8 p.m. at De Havilland College, The Campus, W.G.C. (W.G.C. 26318/31344), commencing Sept. 22nd, lecturer G. L. Benbow G3HB.

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## Correction

There are three errors in "Display Modifications for 10-Metre Rigs" which appeared in last month's issue. The final sentence on p. 316, and the final sentence of the first paragraph on p. 317 should both read ". . . (SW1 *open* for simplex)"; also, in Fig. 8(a), S1 should be connected in series in the 'goes low on Tx' line, and not as shown.

# “A Word in Edgeways”

## Letters to the Editor

*Dear Sir*—This letter is prompted by two things: first, the publication of my article on the passive CW filter in the August issue of *Short Wave Magazine* and, second, the publication of the active CW filter article by Steve Price, G4BWE, in the March issue of *Radio Communication*.

Over the past 15 years, I have been observing the trends in the design and construction of audio filters for application to CW, speech and RTTY. In the last few years, I have noticed a pronounced emphasis on the publication of designs of active CW filters. The article by G4BWE in the March issue of *Radio Communication* is the most recent example of this trend. Other less recent examples of published active filter designs are:

(1) “Build an Audio Filter With Pizzazz!,” Robert E. Lee, K2TWK, *QST*, February 1982.

(2) “Understanding and Using Audio Filters,” D. DeMaw, W1FB, *QST*, April 1983. (This article includes the schematic diagram of a 3-section R-C active CW filter.)

I have no objection to the publication of active filter designs as it brings practical applications of this new technique to the attention of the radio amateur. What I do object to is the lack of information regarding the attenuation response of the active filter so its performance can be compared to other filters such as the passive LC 5-resonator CW filter using surplus loading coils, which was published in last month’s issue of *Short Wave Magazine*. For example, both Price and DeMaw provide no information regarding the shape factor of their filter responses so they can be compared with other filters. Lee does specify the 6 and 60dB attenuation bandwidths of his 8-pole CW filter ( $F_c = 750$  Hz) as 120 and 1125 Hz, so the shape factor can be calculated. Comparing the 9.4 shape factor of Lee’s active filter with the 3.5 shape factor of the *Short Wave Magazine* filter indicates the *S.W.M.* passive CW filter is considerably better than Lee’s active filter.

Mr. Price uses four active stages in his filter design, and this is equivalent to an 8-pole bandpass filter. He does not specify the bandwidths at the 60dB and 6dB levels so the shape factor cannot be determined. However, it appears that the 5-resonator (10-pole) passive CW filter will have a better attenuation response because it has two more poles as compared to Price’s active filter.

In the second paragraph of his article, Mr. Price explains that by eliminating features such as tunable centre frequency, variable bandwidth and notch controls, it is possible to formulate a relatively simple, straightforward design having a high level of performance. This active design may be simple and straightforward relative to other active filter designs, but *not* when compared to the passive LC filter! For example, looking at Figures 3 and 4 of Mr. Price’s article, we see that six integrated circuits and numerous resistors and capacitors are required. In addition, a power supply with positive and negative voltage regulators, filter capacitors and a mains transformer are needed. In comparison, the *Short Wave Magazine* 5-resonator LC filter requires only 5 inductors and 5 capacitors if the filter is to be used with a high impedance (1000 ohms or so) audio system. If the filter is to be used in an 8-ohm audio system, then two 8/1000 or 8/1200-ohm transformers are needed. In addition, because surplus inductors are used, the cost of the passive filter is less than that of the active filter, and the construction is simpler.

I want to state again that I have no criticism of the active filter designs that are currently being published, and I am grateful to the authors for making the effort to have their articles published. However, I do wish that the authors would

provide information regarding both the passband and stopband attenuation performance so the 3, 6, 30 and 60dB bandwidths can be determined and two shape factors can be calculated. This will permit the reader to intelligently compare the attenuation performance of different filters.

I suggest that editors request that stopband and passband bandwidths are provided by the author if this information is missing. I also suggest that editors request the author to provide the reader with reasons why any particular active CW (or speech) filter is superior in any respect to the passive LC 5-resonator CW filter described in the *Short Wave Magazine* article. Unless the active filter has better performance, is easier to construct, is less costly, or has some other significant advantage over the passive 5-resonator filter, there is apparently little reason to publish any more articles on the active CW filter. This recommendation is made with the intent of advancing the present state-of-the-art regarding amateur CW filters. I contend that the 5-resonator passive LC filter using surplus loading coils represents the current state-of-the-art of the CW filter for amateur radio applications, and the amateur should use this design until a better CW filter design is found.

I feel that it would be well worthwhile if those who have constructed and used the Price active filter or the 5-resonator passive LC filter communicate their experiences to the Editors of *Short Wave Magazine* and *Rad Com* so that readers may share other opinions regarding this matter.

*Ed Wetherhold, W3NQN,  
ARRL Technical Adviser  
Passive LC Filters.*

*Steve Price, G4BWE, was sent a copy of W3NQN’s letter, and responds as follows:*

*Dear Sir*—I have read the letter from W3NQN with interest and would like to make the following points in reply:

Firstly, the relevant performance figures for the G4BWE CW filter are detailed below:-

- (i) -6dB response 692 and 965 Hz.
- (ii) -60dB response 375 and 1850 Hz.
- (iii) -6dB bandwidth = 273 Hz  
-60dB bandwidth = 1475 Hz
- (iv) 6/60 shape factor = 5.4

I must emphasize that the prototype filter has been constructed using standard 5% tolerance resistors and capacitors, as recommended in my article (*Rad Com*, March 1983, pages 226–229). None of the components were selected or matched in any way.

Not surprisingly, the performance of any 8-pole design falls short of that achieved by the 10-pole filter of W3NQN. However, in my article I have described how a 12-pole (6 stage) version offering a predictably superior shape factor may be built as an alternative.

Before leaving the subject of performance figures and, in particular, shape factors I must take issue with W3NQN over his rather simplistic analysis of the design by K2TWK (*QST*, Feb. 1982). The K2TWK filter employs four cascaded stages, each stage being resonant at 750 Hz. The use of a common resonant frequency produces a narrow, peaked response characteristic and, in consequence the -6dB bandwidth is only 120 Hz. The resultant high figure for shape factor (9.4) may look disastrous on paper, but in practice the subjective performance of K2TWK’s filter is undoubtedly very impressive. Clearly, we should not try to read too much into figures.

Regarding the 'complexity' of my design I should point out that it is by no means necessary to build a mains PSU. Any 13.8 volt power unit, now almost a standard item in the amateur's shack, will power the filter quite adequately. All necessary modifications for single-rail operation of the filter are detailed in the article. Another possibility, not mentioned directly in my article, is the installation of active filters into the transceiver or receiver itself. Indeed, one of the greatest strengths of active filter technology is that the finished product may be constructed in an extremely compact form—perhaps on only 3 or 4 square inches of *vero* or PCB. The filter is then easily fitted into whatever empty space is available inside the rig and draws its power from the rigs supply rail. In contrast, LC filters are, to say the least, rather bulky. Also, the LC filter requires fairly precise impedance matching; and this factor alone makes it difficult to interface such a filter with existing circuitry. I note, for instance, that in order to use the W3NQN filter in a loudspeaker line it is mandatory to employ two matching transformers.

A further disadvantage of LC filter networks is that they introduce significant attenuation. This insertion loss, 3.3dB for the W3NQN design, does not itself constitute a large theoretical drawback. In practice, however, it is advantageous for a CW filter to possess considerable insertion *gain*. Gain is preferred so that when the filter is switched into operation, the total acoustic energy presented to the listener's ears is comparable to that perceived when listening in the much wider SSB filter bandwidth.

In answer to the argument regarding the publication of specific performance figures for filter designs appearing in the amateur radio press, I can only comment that I find the suggestion rather impracticable. It would be totally unfair to restrict writers in such a manner, and who is going to verify these figures anyway? Ultimately, it will be the demands of the ordinary reader and constructor that will dictate the form and content of constructional articles.

In conclusion, I feel that it is impossible, and indeed unconstructive, to attempt meaningful comparisons between very different filter designs with the object of naming any one example 'the best' for all applications. Finally, we should bear in mind that the amateur constructor is not necessarily obsessed either with absolute performance or simple cost effectiveness. The sheer pleasure and educational value of being able to explore at will both old and new, passive or active design techniques, without overriding economic or 'marketing' constraints is surely a freedom that many professional engineers must envy.

Steve Price, G4BWE

**Editorial comment:** *We feel that an exchange of ideas and experiences is always valuable and constructive and would very much like to hear from readers who have built W3NQN's design.*

Dear Sir—I have read with interest the article by N. E. Montanana, G8RWG, in the August 1983 issue of *Short Wave Magazine* in which an integrated circuit power controller is used to vary the input voltage to the primary of a high-voltage transformer. Having some small knowledge in this field of power control—you were good enough to publish one of my essays on this topic as part of a series on power supplies for 4CX amplifiers—I wonder whether I might be permitted to make some comments on G8RWG's approach? I apologise in advance for doing so at some length, but the use of an integrated circuit power controller under these conditions is likely to lead to expensive and, possibly, dangerous failures if certain factors are neglected.

The power control IC specified by G8RWG consists essentially of a triac and part of the appropriate trigger circuitry; depending on the device manufacturer and its precise

type, a diac or an asymmetrical silicon bilateral switch (ASBS) is used for triggering purposes. Integrated power control components of this nature are intended principally for resistive loads wherein the current and voltage waveforms are in phase. When triacs, or indeed thyristors, are used to control the power in an external load, it is a fact that an inductive component in a predominantly resistive load acts to soften the current waveform and to introduce a lagging power factor; this is a good thing from the point of view of reapplied  $dV/dT$  and RFI suppression considerations, and also the  $dI/dT$  demands on the switching device are somewhat reduced. This is, in fact, the reason why an IC power controller of this type can be used for applications such as speed control of some types of AC/DC electric motors in which the load impedance is chiefly resistive but in which there is an inductive component: a little inductance is a good thing. However, the device data sheet is quite specific concerning highly inductive loads. Integrated circuit power controllers are not suitable for driving such loads, and synchronous and induction motors fall into this category.

When the load is *predominantly* inductive, as is the case with the primary winding of a transformer in some circumstances, it is necessary to design specifically for this case and my own Figure 5 (*S.W.M.*, Dec. 1981, page 547) represents one approach to the problem. The main difficulty facing the designer is that an inductive load impedance can cause failure of the switching device to commute; this is due to the fact that when a voltage zero is reached at the end of a mains cycle, the current zero will be lagging some way behind and—depending on the parameters of the switching device and also those of the transformer and its applied load—it is commonly found that commutation does not take place. Allied to this latter point is the fact that a triac does not display symmetry of holding current in each quadrant. As a general rule, the holding current for operation in the first quadrant (*i.e.* MT2 positive) will exceed the holding current in the third quadrant by a factor of anything between 10 and 40 per cent. Although it is of less importance in this particular case, it is also true that the forward breakover voltage ( $V_{bo}$ ) of a triac is not symmetrical in each quadrant either. Conversely, there is also the problem of ringing in the transformer which can oppose the holding current of the switching device and cause premature commutations.

The net effect of all this, as well as other factors associated with the internal architecture of the IC and the method used to trigger the triac, is that the voltage applied to the primary of the transformer is likely to show some asymmetry. At worst, there is a grave risk of the phenomenon known as "single-cycling", whereby only half of the mains cycle is supplied to the transformer primary winding. This will inevitably lead to its destruction unless adequate fusing is provided, but even a small asymmetry in the primary waveform implies a DC component and subsequent heating. Bearing in mind the low primary resistance of most large transformers and thus the high prospective DC current which would flow, this is an important point.

These effects are especially likely to be manifest in the case of phase angles corresponding to about half-power, although single-cycling is also very likely at low phase angles (*i.e.* low power) due to ringing in the transformer and at phase angles somewhere near maximum. As will be seen shortly, the parameters of the transformer itself have a good deal to do with the actual results which will be experienced in practice, and it is for this reason that G8RWG's approach cannot be recommended as a general solution for power control with any transformer. Perhaps I should mention that in the course of development of my own circuit, two power devices of the type used by G8RWG and one transformer were destroyed.

The transformer is a crucial component, and to some extent one may "get away with it" when a component such as those commonly used for HV supplies in linear amplifiers is being

driven by an IC power controller. This is due to the high leakage reactance which is often (but by no means always) associated with transformers of this type and size. The conventional Norton transformation shows that the combination of high leakage reactance with heavy loading of the transformer secondary acts to make the primary impedance appear rather more resistive insofar as the switching device is concerned than is actually the case: it is in these circumstances that the power control IC is likely to work reasonably well. However, the combination of low leakage reactance (*i.e.* a smaller or, in most cases, a more efficient transformer) and a low degree of loading provides a predominantly inductive load impedance to the device. The effects of this have already been mentioned; failure to commutate implies loss of control and asymmetry or single-cycling imply stress in, or destruction of, the transformer.

The next important point is the effect of failure of the IC, possibly induced by one or other of the effects described. Invariably an IC power control device of the generic type used by G8RWG will fail short-circuit, and this possibility needs to be considered most seriously. The data sheet for almost any power semiconductor will mention the failure case: "the device . . . may physically fail by package rupture or expulsion of material", to quote the data sheet for G8RWG's device. If anything this is a considerable understatement: the device literally explodes, with unpleasant consequences for anything which happens to be in the way. I have seen a ragged hole of about an inch in diameter blown in a substantial heatsink by an exploding triac for which no fusing had been provided and which had carried a high fault current due to single-cycling in a small transformer. Most parts of the human body are somewhat softer than a heatsink.

To obviate this, there should be a fuse in the circuit: however, there was no fuse shown in the circuit of G8RWG's design and no mention of this topic. Correct fusing of power semiconductors is crucial, and the  $I^2T$  of both the fuse and the semiconductor require to be properly co-ordinated. Standard "mains" fuses are much too slow for this application, and a high-speed HRC fuse with optimised characteristics for semiconductor protection is required. An HRC fuse of the E-1000 class is recommended on the data sheet of the device used by G8RWG, and the E-1000-8 would be a good choice.

The matter of radio frequency interference (RFI) also requires consideration. Since thyristors and triacs generate essentially a step function of current when turning on into a resistive load—admittedly this is not quite true for a load possessing some inductance because of the consequent softening of the current waveform—the RFI generated has the frequency distribution of a step function; that is, a continuous spectrum of noise with an amplitude which decreases with frequency at a rate of 20dB per decade. This suggests that in the absence of filtering, severe interference would be caused to the MF broadcast and low HF bands at least. The filtering in G8RWG's design could contribute another 6dB per octave at best depending on the constructional techniques used—the capacitance of the heatsink in conjunction with stray line capacitance would tend to shunt the inductor and reduce its effectiveness—but unless built in a screened box and well filtered, there would still be a danger of heavy RFI. When I tried out the design I discovered that MF broadcast reception was affected up to a range of about 200 yards unless some precautions, not given in the write-up, were taken, and in an age when radio reception is often spoilt by extraneous noises perhaps more of a point should have been made of this factor. Predictably, the problem was worst at phase angle settings corresponding to about half-power. A related and inseparable problem is that of  $dV/dT$  suppression, which was covered in some depth in my own article. Given that the power control IC uses essentially a triac, which tends to be self-protecting by breakover in both forward directions, the unit is still vulnerable to spikes on the mains from various sources and, in

certain circumstances, the "soft start" feature in G8RWG's circuit could be defeated by a spurious  $dV/dT$  turn-on of the device. Insufficient  $dV/dT$  suppression could cause anything from uncontrolled full-power surges (followed by lack of commutation and, conceivably, single-cycling) to a permanent full-power state, depending again on the precise characteristics of the transformer and IC in use. Both RFI attenuation and  $dV/dT$  suppression could be provided by a mains filter upstream of the IC, together with a proper snubber network, a VDR to assist in surge suppression and such constructional techniques as would also be relevant: properly earthed die-cast or screened boxes, for example.

General safety would also be enhanced, along with RFI and  $dV/dT$  suppression, by using the device in the neutral side of the circuit instead of the line side.

In conclusion, as an avid home-brewer myself I realise that much of the fun and satisfaction of our hobby comes from seeking simple and easy ways to do difficult things and I am sorry to sound like an old killjoy. However, there is an important matter of safety involved in the control of high power and, having destroyed a good many components myself in the process of developing various approaches to the requirements, I feel bound to say that the G8RWG approach is very liable to cause expensive, if not explosive, damage. The use of a single and readily available device looks an attractive approach to the problem of power control in an inductive circuit but, although it may well work with some ICs and some transformers, it should *not* be taken as a satisfactory generalised solution. In this particular realisation, there is not much margin for design spreads in the triac and variations in the internal architecture of ICs from different sources, surges on the mains and other potential problems—and in any event the actual transformer used will be the ultimate determinant of how well or badly the system works. Certainly the single-cycling syndrome is extremely unhealthy for *any* transformer and the "half-power" setting in this design, particularly when used with light or no loading, would be the most potentially worrying case. This is, incidentally, why the circuit shown as my Figure 5—which has, I understand, been built by several people as an entity on its own to perform essentially the same function as G8RWG's design—is quite elaborate. It is necessary to ensure that the switching devices cannot fail to commutate under any circumstances, that a DC offset cannot appear in the transformer primary and that the unit will successfully and safely drive any and all transformers.

I apologise for writing a mini-essay on this topic and for pouring cold water on what G3VA refers to as the KISS (keep it simple, stupid) approach. In my defence, it is a fact that there is more to the control of high power into an inductive load than meets the eye, and loud explosions and other disasters can occasionally turn out to be a little more than hard on the nerves.

John H. Nelson, G4FRX

**Editorial comment:** *We apologise for not adequately vetting Mr. Montanana's deceptively simple circuit and will not insult readers' intelligences by offering lame excuses. We agree completely with Mr. Nelson's authoritative and detailed criticisms and can only reiterate that it is not advisable to use the circuit on page 306 of the August issue for power control of an inductive circuit. It is, perhaps, pertinent to mention that, while the manufacturers' data sheets for the particular devices make this point quite clear, neither Maplin Electronic Supplies Ltd. nor RS Components Ltd, do so in their catalogues.*

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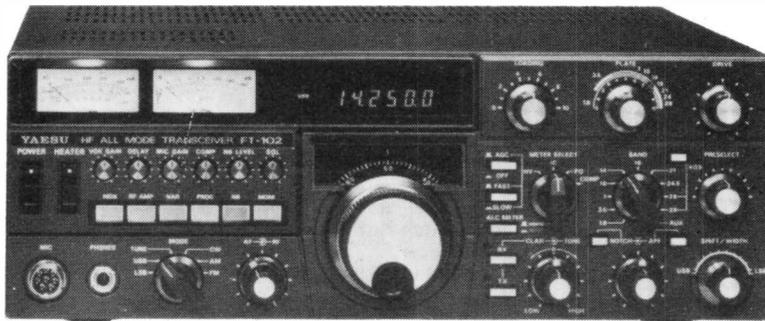
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