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RadCom

The Radio Society of Great Britain Members' Magazine

£3.95 Vol 79 No. 8 August 2003

INSIDE

History

90 years of it, in fact – part two of Pat Hawker's history of the RSGB starts on p20

Down to Earth

A beginner's guide to RTTY contests p54

Review

The OptiBeam OB9-5 Multiband Yagi reviewed p31

VHF/UHF

Summer Sporadic E p44

Kit

What's useful and what's not p28

REPEATERS
Results of the RA review of Internet Repeater Linking

IN PRACTICE
Buying components; No shocks

WHATEVER NEXT
A 3D mouse; Trend towards high-power transceivers

TECHNICAL TOPICS
Insulators, conductors and RF efficiency

TECHNICAL FEATURE
Build a novel 'pseudohet' transceiver

EXTRA 100KHZ AT 40 METRES!

Morse requirement abolished!

Read all about it in our WRC-03 Report on **p12**

WATERS & STANTON

GENERAL ENQUIRIES: 01702 206835/204965
FREEPHONE ORDERLINE: 08000 73 73 88

carriage charges: A=£2.75, B=£6, C=£10

3 STORES TO CHOOSE FROM

WEB ORDERING
www.wsplc.com

DON'T MISS
LOWE ELECTRONICS
OPEN DAY SATURDAY
SEPTEMBER 6th 2003

Come and visit Yaesu, Kenwood & Icom stands. FREE food and bargain prices. Opens at 10 am. Be there!

NEW ICOM IC-E208

£319 B

VHF/UHF FM Dual Band Mobile Transceiver
*Frequency range 144-146MHz, 430-440MHz Tx *55/50W (3 power steps each band) *Wideband Rx 118-173, 230-549 & 810-999MHz *512 memories with Alphanumeric names *FM narrow capability *104x2 DTCS, 50 CTCSS tone squelch operation *16 DTMF channels *Detachable front panel *Extra large LCD with choice of colours green, amber, yellow *Large combined tuning dial & band switch *HM-133 remote control microphone - supplied *Packet ready for 9600/1200bps through mini DIN or 1200bps through mic socket *Supply 13.8V

NEW YAESU FT-2800M

£159 B

**144-146MHz *FM *137 - 174MHz expanded Rx *RF Pwr 65/25/10/5W *25/12.5kHz channel spacing *High/Low deviation *Supply 13.8V DC*
The FT-2800M is the latest model from Yaesu with 65 Watts High Power, rugged construction, excellent receiver performance and direct keypad entry.

NEW YAESU FT-857

HF / 50 / 144 / 430MHz Mobile Transceiver
HF/6m 100W, 2m 50W, 70cm 20W. (13.8V DC)
Developed on the FT-897 and FT-817 transceivers. Built-in features 32 colour display, spectrum scope, AM airband aircraft reception, built-in memory keyer, detachable front panel.

£799 C

HF TRANSCEIVERS

ICOM IC-756 PRO II £1999 C

Flagship of the Icom range of HF transceivers. HF & 50MHz, features large colour LCD with spectrum scope, auto ATU and 32-bit floating point DSP unit.

ICOM IC-7400 £1449 C

SPECIAL OFFER

COMES WITH FREE SP-21& SM-20

HF/VHF 100W transceiver. Features large LCD with spectrum scope, auto ATU and same DSP system as IC-756PRO II. Supplied with free SP-21 speaker & SM20 desk mic.

ICOM IC-703 NEW £599 C

HF/ 50MHz Transceiver 0.1-10W Portable, Mobile, Base-Station. (9-15.87V DC) Designed especially for the Foundation Licence/QRP. Built-in features auto ATU, DSP memory keyer. (5W when using 9.6V batts) Battery and Carry Pack to follow.

ICOM IC-706 IIG DSP £799 C

HF/VHF/UHF mobile DSP transceiver. Its relative small size not only makes it a great mobile rig but also for fixed station use as well. HF general coverage and VHF & UHF .

ICOM IC-718 £499 C

HF 100W transceiver. Covers all HF bands plus wideband receive. C/w auto notch, dual VFO, SWR meter etc. Options include extnl ATU DSP & filters.

KENWOOD TS-2000 £1695 C

Top-of-the-range Kenwood transceiver. HF/VHF/UHF or up to 23cm with the optional module. Built-in auto ATU, DSP and its unique TNC.

KENWOOD TS-870S DSP £1399 C

HFDSP 100W base station. Excellent all round rig great for DX working with its ability to winkle out weak stations using its true IF DSP. No filters to buy.

KENWOOD TS-570DGE £849 C

HF100W base station with built-in auto ATU. Very popular rig, excellent performance on SSB and CW. Two fitted antenna sockets - very handy.

ICOM IC-910X with 23cm £1249 C

Icom's all mode VHF/UHF transceiver with 23cm. Large clear LCD with lots of facilities. 100W on VHF and 75W on UHF, 10W on 23cm. IC-910H version £1149

HF TX / LINEAR AMPLIFIERS

YAESU FT-1000 MKV £2349 C

200W HF transceiver, EDSP, Collins filter, auto ATU, 220V AC PSU - Acknowledged as one of the finest DX rigs on the market. Superb tailored audio and the ability to select Class A bias for dramatic signal purity.

YAESU FT-1000 FIELD £1749 C

100W HF transceiver, EDSP, Collins filter, auto ATU, 220V AC / 13.8V DC - Building on the success of the FT-1000MkV, the Field has become a respected leader in its class.

YAESU FT-920AF £1099 C

LAST FEW

100W HFplus 6m transceiver. 100kHz - 30MHz, 48 - 56 MHz Gen coverage Rx, 100 memories, Internal ATU with 100 tuner memories, large backlight LCD, Built-in memory keyer, 13.5V DC. Now includes FM unit and 6kHz AM filter.

YAESU FT-897 £989 C

100W HF rig plus 2m and 70cms (50W/20W) 13.8V external supply / internal optional FP-30V AC power supply / self powered portable using optional Ni-MH pack at 20W output. Compatible with FC-30 auto ATU and ATAS 120/100 antennas. The "must have" radio for 2003.

YAESU FT-847 £1199 C

1.8 to 440MHz, this all-in-one transceiver offers unbeatable value. 100W on HF plus 6m, and 50W on 2m and 70cm. You get genuine RF clipping on SSB for up to 6dB gain and there are 4 separate antenna sockets.

LINEAR AMP UK CHALLENGER III £1795 C

HF linear amp 160-10m including WARC bands. Output 1500W CW or SSB, 400W RTTY. Soft start and timer protection at switch-on. Front panel adjustable ALC.

LINEAR AMP UK RANGER 811H £895 C

HF linear amp 160-10m including WARC bands. Drive 10-100W, output 800W (max) CW. Soft start on switch-on. Compatible with all modern 100W HF rigs. Silent running Papst fan.

TOKYO HY-POWER HL-50B £265.95 C

FT-817 VERSION !

This model has been specifically designed for the FT-817. Enjoy up to 50 Watts output

TOKYO HY-POWER HX-240 NEW £229.95 C

HF TRANSVERTER

*144MHz (2.5/10W) in, 3.5/7/14/21/28MHz (30-40W) out. If you have an all mode (SSB/CW/FM) 2m transceiver and don't want the expense of buying an HF transceiver then this transverter might be for you.

HEAD OFFICE • 22 MAIN RD, HOCKLEY • ESSEX • SS5 4QS
ENQUIRIES: 01702 206835/204965 FAX: 01702 205843
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DERBYSHIRE • DE4 5LE ENQUIRIES: 01629 580800 FAX: 01629 580020
SCOTTISH STORE • W&S @ JAYCEE • 20 WOODSIDE WAY • GLENROTHES • FIFE KY7 5DF
ENQUIRIES: 01592 756962 FAX: 01592 610451-CLOSED MONDAYS

THE ONLY THING WE CUSTOMER SERVICE WON'T DISCOUNT

VHF / UHF TRANSCEIVERS

ICOM IC-2725E NEW £309 C

The Icom IC-2725 dual band FM transceiver is proving very popular. Easy to install, the controller is separated from the main unit - great where space is limited.

ICOM IC-207H £249 C

Great budget price dual band FM 50W/35W transceiver. Simple band operation. Front panel detachable from main unit if required.

ICOM IC-2100H £229 C

2m 55W FM mobile. Commercial grade, rugged construction. One piece die-cast aluminium chassis. Selectable green or amber display.

YAESU FT-8900R NEW £369 C

Want the best of all worlds then the FT-8900R is just the ticket! A rig with four of the most popular mobile bands - 10m/6m/2m & 70cm. Detachable head.

YAESU FT-817 £569 C

All bands & All modes gives you a totally portable HF DX or VHF/UHF station. *Ours includes* battery and charger.

YAESU FT-1500M £179 B

Remarkably small and compact, yet built like a Battleship!
Should last for years.
Look at the Price!

KENWOOD TMD-700E £449 C

Certainly the best dual band mobile transceiver with APRS. Does not need extra high cost boards to function. The only extra if required is a compatible GPS receiver.

KENWOOD TM-V7E £359 C

A lovely cool blue display, easy with 50/35W output. 50W/35W plus 280 memos and five storable operating profiles.

KENWOOD TM-G707E £289 C

If you are looking for simplicity and low cost, here's the answer. 2m &70cms with detachable front panel and "Easy operation mode." GREAT!

VHF/UHF TX & HANDHELDS

YAESU VX-7R NEW £299 B

6m/2m/70cm

Available in Silver or Black

The VX-7R is the best outdoor handie ever. The case, keypad, speaker and connectors are all sealed against water damage. Wide Frequency coverage from 500kHz to 900MHz the VX-7R is ideal for monitoring a variety of broadcasts. The display is a dazzling 132x64 dot matrix providing easy-to-read frequencies and information plus pictorial graphics.

YAESU VX-150 £109 B

The VX-150 is a fully featured compact yet incredibly rugged 2m 5W Handheld. Features include direct keypad frequency entry, CTCSS, DTMF, 1750Hz tone calling, wide/narrow deviation selection. It has a die-cast case, large high output speaker, illuminated keypad and battery voltage meter.

YAESU VX-110 £109 B

Combining the ruggedness of the VX-150 with the simplicity of 8-Key operation, the VX-110 is a fully featured 2m handheld ideal for the most demanding of applications. It has a die-cast case, large speaker and illuminated keypad.

ICOM IC-E90 NEW £269 B

The new E-90 offers triple band coverage of 6m, 2m and 70cms. Up to 5W output and rx coverage from 495kHz - 999MHz makes this a very attractive rig.

ICOM IC-T3H £129 B

The IC-T3H 2m handheld features tough quality but with slim looks. Its striking green polycarbonate case has been ergonomically designed. The rig is capable of providing a powerful 5.5W output with either Ni-Cad or Ni-MH battery packs. Supplied with charger and rechargeable battery.

KENWOOD TH-D7E £319 B

DATA COMMUNICATOR

One of the most successful handhelds over the past few years. It has a built-in TNC for Packet use. You can also use it for APRS operation in conjunction with an external GPS unit. Plus NMEA, 200 memos, and up to 5W output.

KENWOOD TH-F7E £259 B

WITH EXTRA WIDE RX COVERAGE

- 144-146MHz Tx/Rx: FM
- 430-440MHz Tx/Rx: FM

Up to 6W out with Li-ion battery and "scanner" style coverage from 100kHz to 1300MHz including SSB on receive! This is a great radio to have at all times when you are on your travels.

KENWOOD TH-G71E £199 B

If you want an excellent 2m/70cm dual-bander then you can't go wrong with the TH-G71. Fully functional with three power levels, 200 memories, CTCSS tone encoder/decoder, illuminated keypad and backlit LED.

VHF / UHF ANTENNAS

MOBILE ANTENNAS

DIAMOND ANTENNA (PL-259 base type) ***NEW***

CR-8900. Quad bander 6m/10m/2m/70cm. Length 1.26m, max pwr 60W with fold over base. **£72.95 B**

WATSON ANTENNAS (PL-259 base type)

W-2LE	2m quarter wave 2.1dBi 0.45m	**£9.95**	A
W-285S	2m 3.4dB 0.48m (fold over base)	**£14.95**	B
W-77LS	2m/70cm 0/2.5dB 0.42m	**£14.95**	B
W-770HB	2m/79cm 3/5.5dB 1.1m	**£24.95**	B
W-7900	2m/70cm 5.6/7.6dB	**£32.95**	B
W-627	6m/2m/70cm 2.15/4.8/7.2dB 1.6m	**£34.95**	B
WGM-270 *NEW*	2m/70cm On glass 3.7m coax 50W	**£29.95**	B

MOBILE BASES

DIAMOND

K-600M.
Deluxe boot mount SO-239, c/w 5m RG-58 & PL-259

AML	Gutter mount fold over type	**£15.95**	A
K-11	Universal gutter mount	**£24.95**	A
K-33	Adjustable hatch mount	**£23.95**	A
K-400	Adjustable boot mount heavy duty	**£26.95**	A
K-600M	Deluxe boot mount + cable	**£49.95**	B
DPK-TR	Stainless Steel boot mount (ECH)	**£18.95**	A

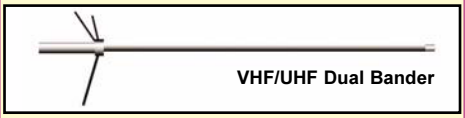
WATSON

WM-14B.
Large diameter 14cm magnetic mount SO-239, c/w 5m RG-58 & PL-259

W-3HM	Adjustable hatch mount	**£14.95**	A
WM-08B	8cm mag mount, 5m cable PL-259	**£9.95**	A
WM-14B	14cm hvy duty mag mount+cable	**£12.95**	A
WSM-88V	BNC mag mount plus 3m cable	**£14.95**	A
W-3CK	5m 5D-FB cable assembly+pigtail	**£18.95**	A
W-ECH	5m standard cable kit assembly	**£12.95**	A

BASE STATION ANTENNAS

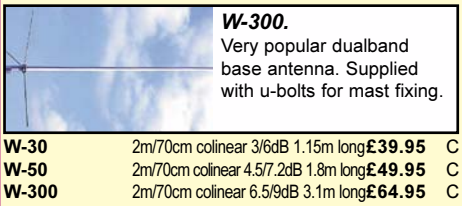
DIAMOND



VHF/UHF Dual Bander

X-200	2m/70cm colinear 6/8dB 2.5m	**£79.95**	C
X-300	2m/70cm colinear 6.5/9dB 3.1m	**£99.95**	C
V-2000	6m/2m/70cm 2.15/6.2/8.4dB 2.5m	**£89.95**	C

WATSON



W-300.
Very popular dualband base antenna. Supplied with u-bolts for mast fixing.

W-30	2m/70cm colinear 3/6dB 1.15m long	**£39.95**	C
W-50	2m/70cm colinear 4.5/7.2dB 1.8m long	**£49.95**	C
W-300	2m/70cm colinear 6.5/9dB 3.1m long	**£64.95**	C
W-2000	6m/2m/70cm 2.15/6.2/8.4dBi 2.5m	**£69.95**	C

DAB-DIR NEW £24.95 B

**Frequency 175 - 230MHz *Yagi beam *3 elements *Gain 5dBd *Impedance 75 Ohms *Boom length 51cm *Elements 3 *Max element length 88cm *Connector screw terminal *Internal balun *Weight 700g (with clamp) *Mast size up to 50mm*
Base station yagi antenna for Digital Audio Broadcasting (DAB). Complete with mast clamp.

DAB-OMN NEW £16.95 B

**Frequency 175 - 230MHz *Folded dipole *Gain 0.0dB *Impedance 75 Ohms *Elements 1 *Element length 67cm *Connector screw terminal *Internal balun *Weight 400g (with clamp) *Mast size up to 50mm*
Base station antenna for Digital Audio Broadcasting (DAB). Complete with mast clamp.

WATERS & STANTON

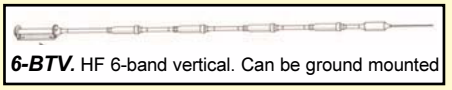
PRICE MATCH

THE ONLY THING WE CUSTOMER SERVICE WON'T DISCOUNT

HF ANTENNAS

VERTICAL ANTENNAS

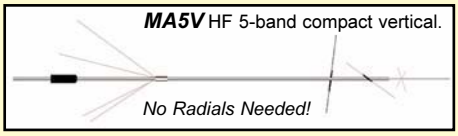
HUSTLER BASE ANTENNAS



6-BTV. HF 6-band vertical. Can be ground mounted

6-BTV *NEW*	80-40-30-20-15-10m 1kW PEP	**£239.95**	C
5-BTV	80-40-20-15-10m 7.64m 1kW	**£209.95**	C
4-BTV	40-20-15-10m 6.52m 1kW PEP	**£169.95**	C

CUSHCRAFT BASE ANTENNAS

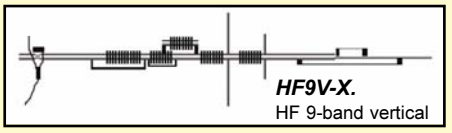


MA5V HF 5-band compact vertical.

No Radials Needed!

MA5V	20-17-14-12-10m 250W PEP	**£229.95**	C
R8	40-30-20-17-15-12-10-6m 1.5kW	**£529.95**	C
R6000	20-17-15-12-10-6m 1.5kW PEP	**£349.95**	C

BUTTERNUT BASE ANTENNAS



HF9V-X.
HF 9-band vertical

HF9V-X	80-6m 7.9m 1kW PEP	**£365.00**	C
HF6V-X	80-40-30-20-15-10m 7.9m 2kW	**£315.00**	C
HF2V	80-40m 9.75m (160m opt) 1kW	**£230.00**	C

HY-GAIN BASE ANTENNAS

DX-88. HF 8-band vertical

AV-640	40-6m 1.5kW, 300W 6m (PEP)	**£399.95**	C
AV-620	20-6m 1.5kW, 500W 6m (PEP)	**£299.95**	C
AV-14AVQ	40-20-15-10m 1.5kW PEP	**£179.95**	C
AV-12AVQ	20-15-10m 1.5kW PEP	**£139.95**	C
DX-88	80-10m 1.5kW, 250W 30m	**£395.95**	C

HORIZONTAL BEAMS & DIPOLES

CUSHCRAFT

Premier HF beam used around the world by serious DX'ers.

X-7	20/15/10m 7 el. Yagi 2kW	**£699.95**	D

Not got the space for a full sized HF beam antenna, then the mini beam MA-5B should be considered.

MA-5B	10-12-15-17-20m 4 el. Yagi 2kW	**£349.95**	D
A4-S	10-15 & 20m 4 el. Yagi 2kW	**£599.95**	D
A3-WS	12 & 17m 3 el. Yagi 2kW	**£399.95**	D
D-3	10-15-20m dipole element 2kW	**£249.95**	C

Don't want a wire antenna but can't fit a Yagi, then consider a rotatable dipole.

D-3W	12-17-30m dipole element 2kW	**£249.95**	C
D-4	10-40m dipole element 2kW	**£339.95**	C
D-40	40m dipole element 2kW	**£299.95**	C
TEN-3	10m 3 el. Yagi 2kW	**£219.95**	C
ASL-2010	13.5-32MHz 8 el. log periodic	**£799.95**	C

RADIO WORKS

A choice of quality wire antennas available to fit almost any circumstances.

CW-160	160-10m 76.8m long	**£139.95**	C
CWS-160	160-10m 40.5m long	**£134.95**	C
CW-80	80-10m 40.5m long	**£99.95**	C
CWS-80	80-10m 20.1m long	**£119.95**	C
CW-40	40-10m 20.1m long	**£94.95**	C
CW-20	20-10m 10.36m long	**£84.95**	C
CW-620	20-6m 9.7m (32ft) long	**£94.95**	C
G5RV PLUS	80-10m with balun 31m (102ft) long	**£64.95**	B

HF ANTENNAS

RADIO WORKS - Baluns and Isolators

T-4 Plus	Line Isolator1.8 - 54MHz 4kW	**£42.95**	B
T-4-500	Line Isolator1.8 - 30MHz 500W	**£32.95**	B

Use a line isolator to eliminate stray RF.

T-4G	Line Isolator 1.8-30MHz + gnd 4kW	**£42.95**	B
T-4G Plus	Line Isolator 1.8-54MHz + gnd4kW	**£45.95**	B

The **REM-BAL** is a 4:1 current type balun and is ideal for open wire to coax interfacing, especially external to the operating position. Unlike voltage baluns, current type baluns maintain output balance over a wide range of loads.

REM-BAL	Ladder line 4:1 balun 1.8-30MHz	**£49.95**	B
B1-2K Plus	1:1 current balun - for inverted V 's	**£28.95**	B
B4-2K	4:1 voltage balun loops/folded dipoles	**£42.95**	B
Y1.5K Plus	1:1 current Yagi balun 1.8- 54MHz	**£42.95**	B

Sundries

KEVLAR	200ft 400lb strain guy line	**£22.95**	A
LADDER	450 Ohm ladder line - per metre	**£0.90**	A

MOBILE ANTENNAS

HUSTLER

Standard Resonator 400W (mast sections not included)

RM-40S **RM-80**

RM-10	10m 150-250kHz	**£19.95**	B
RM-11	11m 150-250kHz	**£19.95**	B
RM-12	12m 90-120kHz	**£19.95**	B
RM-15	15m 100-150kHz	**£19.95**	B
RM-17	17m 120-150kHz	**£24.95**	B
RM-20	20m 80-100kHz	**£24.95**	B
RM-30	30m 50-60kHz	**£26.95**	B
RM-40	40m 40-50kHz	**£26.95**	B
RM-80	80m 25-30kHz	**£29.95**	B

Super Resonator 1kW (mast sections not included)

RM-10-S	10m 250-400kHz	**£24.95**	C
RM-15-S	15m 150-200kHz	**£26.95**	C
RM-20-S	20m 100-150kHz	**£31.95**	C
RM-40-S	40m 50-80kHz	**£37.95**	C
RM-80-S	80m 50-60kHz	**£51.95**	C

Lower Mast Sections

MO-1	54" (FOLD @ 22")	**£33.95**	C
MO-2	54" (FOLD @ 27")	**£33.95**	C
MO-3	54" (NON FOLD)	**£26.95**	C
MO-4	27" (NON FOLD)	**£22.95**	C

Mobile Mount Accessories

SSM-1	Ball mnt stainless steel spring&stud	**£45.95**	B
SSM-2	Ball mount	**£28.95**	A
SSM-3	Stainless steel spring & stud	**£24.95**	A
HOT	Trunk lip mount	**£24.95**	A
RSS-2	Stainless steel resonator impact spring	**£10.95**	A
QD-2	Quick disconnect adaptor	**£19.95**	A
VP-1	Multi-band adaptor	**£7.95**	A

PORTABLE ANTENNAS

MIZUHO (FOR FT-817)

ATX-WBN	Walkabout 80-6m Whip 1.5mBNC	**£49.95**	B

Special price on Walkabout whips, three to choose from with three different connectors.

ATX-WPL	Walkabout 80-6m Whip1.5mSO-239	**£49.95**	B
ATX-W38	Walkabout 80-6m Whip 1.5m 3/8	**£49.95**	B

Range of single band HF antennas with BNC connection. Ideal for FT-817.

AT-80	Single band 80m whip with BNC	**£24.95**	B
AT-40	Single band 40m whip with BNC	**£24.95**	B
AT-30	Single band 30m whip with BNC	**£19.95**	B
AT-20	Single band 20m whip with BNC	**£19.95**	B
AT-17	Single band 17m whip with BNC	**£19.95**	B
AT-15	Single band 15m whip with BNC	**£19.95**	B
AT-12	Single band 12m whip with BNC	**£19.95**	B
AT-10	Single band 10m whip with BNC	**£19.95**	B

ANTENNA TUNER UNITS

MFJ 989C VERSA TUNER V £379.95 C

High power tuner.*1.8-30MHz *3kW *6-way Antenna/ load switch *2 coax positions *Built-in 4:1 balun *X-needle meter *Peak & AV

MFJ 986 DIFFERENTIAL-T TUNER £349.95 C

Differential capacitor & Roller inductor.*1.8-30MHz *1.5kW *6-way Antenna/load switch *2 coax positions *Built-in 4:1 balun *X-needle meter *Peak & AV

MFJ 949E DELUXE VERSA TUNER II £159.95 B

Firm favourite with HF operators. *1.8-30MHz *300W *3-way Antenna selector *Dummy Load socket *Internal balun *X-needle meter *Peak & AV

MFJ 962D VERSA TUNER III £279.95 C

Ideal tuner for max UK legal power.*1.8-30MHz *1.5kW *6-way Antenna/ load switch *2 coax positions *Built-in 4:1 balun * X-needle meter *Peak & AV

MFJ 921 VHF DUAL BAND TUNER £74.95 B

This tuner helps you get perfect VSWR and offers some filtering as well.*144/220MHz *200W max *Power meter *Rear panel earth terminal

MFJ 906 6 METRE TUNER £89.95 B

Help match your 6m rig to your antenna.*50-54MHz *100W FM *200W SSB *X-needle meter, 0-60W & 0-300W *By-pass position for tuner

MFJ 931 ARTIFICIAL GROUND £94.95 B

Places rig near to actual ground potential.*1.8-30MHz *Ground current meter *Used where no earth ground is possible *Reduces TVI/RFI *Resonates random wire

MFJ 267 DUMMY LOAD/WATT METER *NEW* £129.95 B

Switch enables the dummy load to be by-passed*1.8-54MHz *300/3000W FWD *60/600W RFD *50 Ohms *3in X-needle meter VSWR/Pwr *reads PEP or AV *SO-239 x2 sockets *9-12V

MFJ 269 ANTENNA ANALYSER £349.95 B

Once you have used an antenna analiser you will wonder how you ever managed without one. The MFJ-269 covers 1.8 to 170MHz and 415 to 470MHz. The MFJ-259B 1.8 to 170MHz. Both operate as signal generators and frequency counters as well.

MFJ-259B	HF/VHF digital analyser	**£269.95**	B

RSGB Matters

2004/2005 President Announced

At its meeting on 31 May 2003 the National Council elected Jeff Smith, MI0AEX, to serve in the office of President from 1 January 2004 to 31 December 2005. Jeff is currently serving as the Regional Manager for Northern Ireland and is the Board member with responsibility for Membership Services.

Board and national council elections for 2004 – first call

In the elections for the Board and Regional Council members later this year there will be the following vacancies:

The Board (1 vacancy)

The President, Bob Whelan, G3PJT, stands down after completing his term as President.

Regional Elections

At the present time there are co-opted Regional Managers serving in the following Regions:

Region 2: Scotland East and the Highlands;
Region 7: South Wales;
Region 9: London and the Thames Valley.

These appointments cease on 31 December 2003. If the current incumbents wish to continue in post they must stand for election in their respective Regions.

Region 8: Northern Ireland.

Jeff Smith, MI0AEX, has to stand down on 31 December 2003, on taking up the office of President on 1 January 2004.

The Regional Council therefore has four vacancies. Members of the Society who wish to stand for election need to obtain the nominations and supporting signatures from at least 10 Corporate members of the Society. Forms for this purpose are available from the General Manager. For the Regional Vacancies, candidates are reminded that they must reside in the relevant Region. The formal notification of the vacancies will be included in the September edition of *RadCom* and voting papers will be despatched with the November 2003 edition.

G5RP TROPHY: NOMINATIONS WANTED

The G5RP Trophy is an annual award to encourage newcomers to HF DXing. It is awarded for making recent rapid progress in DXing, which only newcomers have the scope to do. However, the award is not limited to youngsters or the newly-licensed - the DX bug can bite at any age and after many years of experience. Seasoned HF DXers are able to reward and encourage newcomers by nominating an up-and-coming DXer for this award. Your nominations for the 2003 - 2004 award are needed now.

The trophy is awarded jointly by the Vale of White Horse Radio Society and the RSGB HF Committee, and will be presented at the RSGB International HF and IOTA Convention. Nominations should be sent to Colin Thomas, G3PSM (QTHR), or c/o RSGB HF Committee at RSGB HQ, or by e-mail to: hf.chairman@rsgb.org.uk, to arrive not later than 31 August.

NEW DRRMs FOR S WALES

Two new Deputy RSGB Regional Managers have been appointed in Region 7, South Wales. In District 72, Ceredigion, the new DRRM is Quentin Cruse, GW3BV, tel: 01970 639180; e-mail: gw3bv@thersgb.net Quentin

STOP PRESS... STOP PRESS...

On the day of going to press, the RSGB has learned from the RA that a Gazette Notice will be published shortly which will announce the end of the Morse requirement for access to the HF bands in the UK. From the date of the Gazette Notice all Full and Intermediate Class B amateurs will automatically have Class A privileges and will be allowed to operate on the HF bands with their existing callsigns. Watch the RSGB website at www.rsgb.org for the latest news.

is also the Wales representative of the Radio Amateurs Invalid and Blind Club. In District 71, Pembrokeshire, Dr Ian Jones, MW0CAB, tel / fax: 01437 763028; e-mail: mw0cab@lineone.net or pr.s@lineone.net has been appointed.

RSGB A BIG PRESENCE IN IARU CONTEST

During the IARU HF World Championship contest on 12/13 July, the RSGB 'headquarters' station GB5HQ was operating on both SSB and CW simultaneously on all bands from a number of locations throughout Great Britain. This year was the first time that GB5HQ had such a high-profile presence in this event. A total of about 12,800 QSOs were made in the 24 hours. GB5HQ Project Co-ordinator Dave Lawley, G4BUO, said that just over 20% of the contacts were with G stations. "The team is very grateful for all these QSOs, and for the many messages of support", he said.

The GB5HQ 15m SSB station, located near Royston in Hertfordshire.

RSGB OPEN MEETING AT TELFORD RALLY

An RSGB open meeting, open to members and non-members alike, will be held at the Telford Rally (www.telfordrally.org.uk), RAF Cosford, on **Sunday 31 August**. The meeting will take place in Conference Room 1 at 2.00pm. Visitors to the rally will have an opportunity to address the RSGB Regional Council with any queries they may have. At the same meeting, Charles Elliot, G4UJW, the RSGB EMC Membership Service Administrator, will launch two new RSGB initiatives for members. An event not to be missed! More information can be found on the RSGB West Midlands regional website www.r-clarke.org.uk /ham_westmids1.htm

CORRECTION

It was stated on page 6 of the July *RadCom* ('RSGB to Host Raynet 50th Anniversary Convention') that admission to the convention, to be held at the West Midlands Police Conference & Sports Centre, Tally Ho, Pershore Rd, Birmingham, on Saturday 25 October, would be free. This is incorrect, admission is £3.00 per ticket, available at the door.

HF CONVENTION DISCOUNT

Booking for packages at the RSGB International HF and IOTA Convention, to be held over the weekend of 31 October to 2 November at the Britannia Country House Hotel, Didsbury, Manchester, are now taking place. There is a **discount of £10** per person for bookings received before **31 August**. Check out the RSGB website at www.rsgb.org/hfc

G1MFG ATV COMPETITION

The winner of the G1MFG ATV equipment competition in the May *RadCom* was Ray Donno, G3YBK, of Exeter.

Oliver Tillett, G3TPJ (right), wins the RSGB Construction Competition trophy and a Yaesu FT-817 transceiver.

RSGB NATIONAL CONSTRUCTION COMPETITION

Judging of the RSGB National Construction Competition took place at the Epsom Radio Fair on 22 June. The judges, David Bowman, G0MRF, and Robin Sykes, G3NFV, commented that the standard of entries was very high although it was sad that there were no entries in the under-16 category. In third place, with his Z-match ATU built to match the Heathkit equipment line-up, was Bob Burns, G3OOU. In second place, Gareth Evans, G4XAT, built a magnetic loop antenna. Oliver Tillett, G3TPJ, won the first prize and was presented with the RSGB Construction Competition trophy by General Manager Peter Kirby, G0TWW, for his IBP beacon receiver. He also won a Yaesu FT-817 transceiver while Bob and Gareth won bhi Noise Eliminating Speakers. Grateful thanks to bhi and Yaesu (UK) for sponsoring the prizes.

GB2RS NEWS ON 5MHz

The GB2RS newsreaders involved with the new experimental reading on 5405kHz at 12.30pm local time each Sunday would like to thank listeners for the massive response in the shape of SINPO reports received so far. These, together with QTH locators, are proving to be very useful in assessing propagation conditions across the UK on 60 metres around the period of peak D-region absorption. These transmissions will continue from various sites each Sunday until further notice. A few special QSL cards are available for listeners who send reports by direct mail to G3LEQ (QTHR) or via gb2rs@boltblue.com

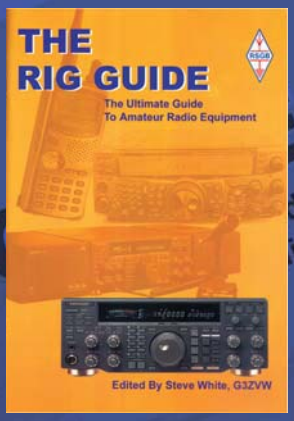
2003 LF EXPERIMENTER'S AWARD

Nominations are invited for this annual RSGB award also known as the Nevada Cup from its sponsor Nevada Communications Ltd. The award is for the most significant contribution by an RSGB member towards scientific or engineering development of receiver and / or transmitter design, modulation technique, aerial design or propagation on the former 73kHz or current 136kHz amateur bands. Nominations must either include a full description of the work or references to where it is published, and must indicate aspects which are original. Nominations should be addressed to the HF Committee at RSGB HQ or e-mailed to John, G3WKL, at g3wkl@btinternet.com by **Monday 22 September**.

RSGB THANKS STEVENAGE CLUB

Keith Holland, G3MCD, the RSGB Deputy Regional Manager for London, visited the Stevenage and District Amateur Radio Society on 24 June to give a presentation on receiving weather satellite images. While there, Keith presented the club chairman, Sean Williams, M1ECY, with a cheque from the RSGB as a 'thank you' for its support in supplying club members to help to run the RSGB stand at the Communications and Computer Show at Stevenage on 31 May/1 June. Stevenage is a thriving club with a membership of over 80, many of whom are Foundation Licensees who gained their licences through the club's Foundation courses.

Keith Holland, G3MCD (left), presents SADARS chairman Sean Williams, M1ECY, with the RSGB cheque. To the right, a weather satellite receiving antenna set up for Keith's demonstration.



The RSGB Rig Guide

If you are thinking of buying new or used equipment, The RSGB Rig Guide is here to help. The guide is packed with details of a vast range of current and older rigs covering all the major manufacturers.
This A4 guide lists against each product:

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Trade-in Value
Used Prices
Rig Specifications

The book also contains reviews of major equipment and useful advice for every buyer and seller of rigs.

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RRP: £649.95

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Connect up and go....

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RRP: £389.95

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Computer controlled receiver. 100kHz-1300Mhz

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RRP: £1569

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Full DSP HF, 6m & 2m 100W transceiver

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This new transceiver covers 50MHz, 144MHz and 430MHz bands and is equipped with a wide band receiver covering 0.495-999.990MHz in AM/FM/WFM modes. Standard 1300mAH Li-Ion and provides 5W output on all bands. All these great features are built into an ultra compact body, measuring only 58x87x29mm

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- Video interface: VGA compatible mini-D-Sub
- Power Management: VESA DPMS
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- Audio: twin 1W Speakers

Only £399.99 Zero deposit 12 x £36.66

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- Power Management: VESA DPMS
- Power Consumption: On: 45.6W, STBY: 5W
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- Weight: 7Kg
- Audio: twin 1W Speakers

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RadCom is published by the Radio Society of Great Britain as its official journal on the first day of the relevant month and is sent free and post paid to all members of the Society.
Closing date for contributions, unless otherwise notified, is five weeks prior to publication date.

Designed and printed by Space Matters,
60 Borough High Street, London SE1 1XF.

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HamClub (under 18)	£18.50
Affiliated Societies (UK or Overseas)	£42.50

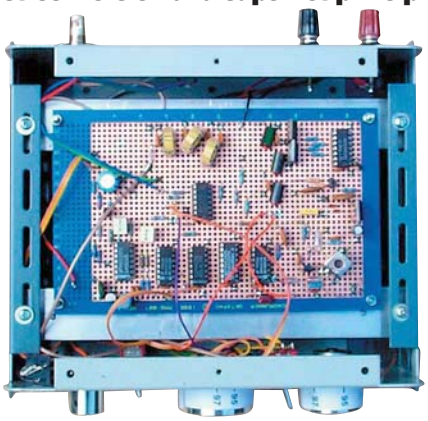
Subscriptions include VAT where applicable.

Special arrangements exist for blind and disabled persons. Details and membership application forms are available from RSGB HQ.

Contents

AUGUST 2003

p62
The 'Pseudohet' - a novel combination of the direct-conversion and superhet principles.



p28 – **The latest equipment from W&S, Nevada, AOR, Winradio and more.**

News and Reports

Reviews

Down To Earth – Amateur Radio From The Ground Up

Technical Features

Regulars

Morse Requirement Abolished, Doubling of 7MHz Spectrum. Good News from Geneva!

World Radiocommunication Conference Concludes its Work

The World Radiocommunication Conference concluded its work in Geneva on 4 July. As was widely anticipated, the mandatory international Morse requirement for access to the HF bands now no longer exists. Although the Radiocommunications Agency has stated that it will bring in code-free HF licences in the UK as soon as it is practical to do so, at the time of going to press the RSGB has not been informed of the date when Full and Intermediate Class B amateurs can start using the HF bands. An announcement will be made on GB2RS and on the RSGB website when this happens. Meanwhile, it looks like Switzerland might pip the UK to the post: a news story dated 8 July on the USKA (Swiss national amateur radio society) website says that the licensing authority there will be writing to all Swiss CEPT Class 2 amateurs "in the next few days" to give them "provisional authorisation" to start using the HF bands with immediate effect.

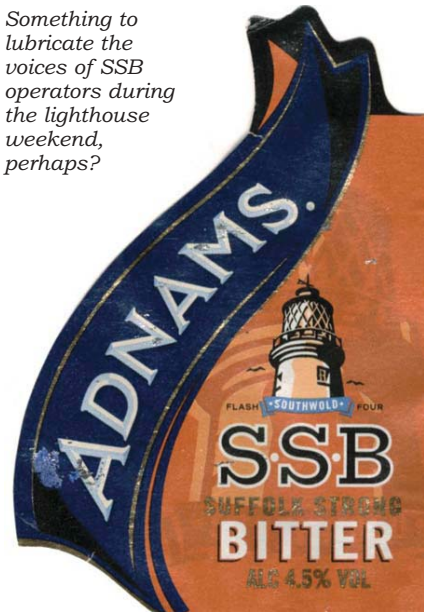
In a last-minute compromise move at WRC, delegates agreed that broadcasters in ITU Regions 1 and 3 would move out of the 7100 - 7200kHz band to make way for the amateur service. The new allocation will be handed over to amateurs from 29 March 2009, doubling the amount of spectrum available at 7MHz in Regions 1 and 3.

More details on both of these stories in our full WRC report on pages 12 - 13.

Sandford Mill Radio Museum Summer Opening

The Sandford Mill Science and Industrial Museum in Chelmsford will be open to the public every Sunday afternoon from **27 July** until **24 August**. The museum has an extensive collection of radio equipment from early spark transmitters to more recent high power transmitters such as the Marconi H1200. The Chelmsford Amateur Radio Society will be operating GB2MT each Sunday afternoon that the museum is open. The station will be sited in the wooden hut that originally housed the broadcast station 2MT (Writtle) in the 1920s and which has now been preserved inside the museum.

The 2MT hut inside the Sandford Mill Museum.



Something to lubricate the voices of SSB operators during the lighthouse weekend, perhaps?

International Lighthouse / Lightship Weekend 2003

This year the International Lighthouse / Lightship Weekend takes place over the weekend of **16 / 17 August**. Last year, over 385 stations were active at lighthouses and lightships throughout the world. Full details of the rules and an entry form can be found at http://lighthouses.net.au/illw/index.html A list of stations that have already confirmed their participation can be found at http://lighthouses.net.au/illw/2003.htm Further details from the organiser, Mike Dalrymple, GM4SUC (QTHR), or by e-mail: gm4suc@compuserve.com

Mobile Amateur Radio Gains Exemption from New Mobile Phone Law

The Department for Transport has issued a paper on the results of its consultation on a proposal for the introduction of an offence of using a hand-held mobile phone while driving. The consultation document suggested that "two-way radio microphones" should be included within the proposed ban which, if approved, would have effectively meant an end to mobile amateur radio in the UK.

In its submission to the consultation, the RSGB pointed out that amateur radio had been operated from motor vehicles since 1955 without any accidents being recorded. The Department for Transport's report on the results of the consultation states that, "Amateur radio operators, some commercial drivers such as taxi drivers and hauliers, and some of the emergency services use [two-way radio] to communicate with a base station. We accept that such 'press to talk' devices keep conversations short and are likely to have a lower risk. . . While the details of the extent of the exemption remain to be determined, the new offence will exempt the use of such devices."

It is expected that the new law will come into effect in December.

NEWS BRIEFS

• **Tim Stanley, G4DBL,** is intending to run a 'Holiday Net' during the holiday season. Many stations can be heard operating from holiday locations in the UK and Europe or while mobile during the summer and Tim thinks it would be fun to channel some of this activity into nets. He plans to run them on Mondays and Fridays around 3744kHz at 9.00pm BST, and on Wednesdays around 7050kHz at 1.30pm BST, starting on **28 July**, and running through August and the first half of September.

• On **19 September** the **Scunthorpe Steel Amateur Radio Club** is running a coach from Scunthorpe to the Leicester Rally. At the time of going to press there is still a number of spare seats on the coach, and they are being offered to anyone in the Scunthorpe area, ie Hull, Goole, Doncaster, Finningley, Gainsborough etc. Anoyne interested should contact Pete Batty, M3BAT, tel: 01724 848183.

• Eight members of the **North Wales Radio Society** will be operating GW0NWR/P from Bardsey Island between **16 and 23 August.** This is the fourth annual operation by the club from the island, which counts as EU-124 for the RSGB IOTA programme. Activity will be from 80 to 6 metres and the QSL manager is Ted, GW0DSJ.

Interference to 70cm Primary Users

There have been recent reports in the south of England of radio amateurs causing interference to the Primary users of the 70cm band. The Primary users of this band are the Fixed, Mobile and Radiolocation services. The Amateur and Amateur Satellite Services are Secondary users of the band and they shall operate on a strictly non-interference basis. That is, the Primary Services have first call on any frequencies in this band and radio amateurs are encouraged to listen carefully before transmitting to avoid interference to the Primary Services. The very heavy demand on this part of the radio spectrum means that radio amateurs can expect an increasing number of spot frequencies in the 70cm band to be occupied by Primary users.

A Missed Opportunity!

Up, up and away. The pylon, with conifer still attached, is removed and dismantled in front of the house.

17-year old John Nixon, M3JON, of Lowton, Warrington, sent in these photos showing the removal of an electricity pylon (complete with attached conifer!) from behind his house on 7 July. It was lifted over the roof tops with a giant crane, taking just four minutes, and placed in the road, where it took six hours to be dismantled. As John says, "unfortunately they would not let me have it to put my antennas on!"

Bolsover - Canada Link

Members of the Bolsover Amateur Radio Society will be operating GB2PF over the weekend of **16 / 17 August** during an annual festival commemorating the link between Canada and Bolsover. Peter Fidley, born in Bolsover in 1769, went on to become the chief mapmaker for the Hudson Bay Company, walking 47,000 miles during his mapmaking career. Look for GB2PF on 2, 20 and 40m (further details at www.barsg4rsb.homestead.com).

The GB2PF QSL card.

Telford Rally to be on Satellite TV

Is this a first in rally history? The Telford Amateur Radio Rally Group (TARRG) is arranging to video events at the Telford rally on 31 August, featuring the RSGB Open Meeting, 'EMC Clinic' and the raffle prize presentation by RSGB president, Bob Whelan, G3PJT. The video will be broadcast on digital satellite TV via SM6CKU's Club TV using the Astra 1A satellite. The broadcast is due to take place in October, probably on a Sunday (date and time TBA).

To receive the broadcasts you will need a 1m dish and universal LNB pointing to the satellite at 5 degrees east. Digital satellite receivers should be set to Frequency: 11.323GHz, Horizontal Polarisation. Symbol Rate: 6667. FEC: 1/2. VPID: 4130. APID: 4131. PCR: 4130. More details of Club TV on SM6CKU's website at www.parabolic.se

Summits on the Air

Richard Newstead, G3CWI, on a previous SOTA trip.

Richard Newstead, G3CWI (www.qsl.net/g3cwi), is planning a solo backpacking trip across South Wales between **9 and 17 August**. The objective is to activate 15 of the hills in the Brecon Beacons National Park on 40m CW for Summits on the Air (www.sota.org.uk). The walk will be over 90 miles with nearly 25,000 feet of ascent. In addition to HF radio gear, Richard will be carrying all his own food and camping equipment.

NEWS BRIEFS

Radio Study Courses

• **Steve Hartley, G0FUW,** and **Mike Coombs, G3VTO,** will be running another series of Foundation, Intermediate and Full RAE courses starting in September. The classes will run between 7.00pm and 9.00pm at Oldfield School, Kelston Road, Bath, each Thursday from 11 September to the May 2004 RAE. Students may enroll for any, or all, of the three levels of training but entries for Intermediate and Full must have passed the lower level examinations before starting the training. Full details can be obtained from Steve, G0FUW, tel: 01225 464394 or via e-mail: hartley_steve@hotmail.com

• **Adrian Dening, G4JBH,** is once again holding residential amateur radio training courses at Kilve Court (www.kilvecourt.org) in North Somerset in October. A Foundation Licence course will be held from 26 to 28 October and an Intermediate Licence course from 28 to 31 October. Both are open to all age groups. Kilve Court is a Georgian house situated in 25 acres of wooded grounds 12 miles west of Bridgwater. The cost of the courses includes accommodation and full board at Kilve Court. Further details from the Lead Instructor, Adrian Dening, G4JBH, tel: 01288 331113 (evenings) or e-mail g4jbh@compuserve.com

• The next **Chelmsford Amateur Radio Society** Foundation Course starts on 11 September. For further details contact Clive Ward, M0SIX, tel: 01245 224577; Mobile: 07860 418835; e-mail: training@g0mwt.org.uk or check the website at: www.g0mwt.org.uk

• **Colchester Radio Amateurs** have weekend Foundation courses on 27 / 28 September and 22 / 23 November. For details contact Frank Howe, G3FIJ, tel: 01206 851189; e-mail: info@m0exe.org.uk or look at www.g3co.ccom.co.uk/

• **The Loughton and Epping Forest ARS** runs Foundation courses over six Friday evenings. Contact Marc Litchman, G0TOC, e-mail: g0toc@hotmail.com or via the website: www.lefars.org.uk

• Other clubs or colleges starting Full RAE or Intermediate courses in the autumn who wish details to be included in the September *RadCom* should submit them to the *RadCom* editorial office (preferably by e-mail to radcom@rsgb.org.uk) to arrive by **Wednesday 13 August** at the latest.

The World Radiocommunication Conference 2003

Morse code is no longer an international requirement for HF band access. There'll be a doubling of spectrum at 7MHz for amateurs in Regions 1 and 3. Enhancement of amateur radio emergency communications plus more flexible allocations of callsigns. These are the headlines from this summer's World Radiocommunication Conference. Here's the detail…

The rooftop antennas of the 4U1ITU / 4U1WRC club station atop the headquarters of the ITU building in Geneva.

Photo: ARRL website www.arrl.org/news/stories/2003/07/03/4/?nc=1

The World Radiocommunication Conference 2003 (WRC-03) concluded, after four-weeks of negotiations, with a blueprint for the global radiocommunications sector that reflects its current and future needs. The WRC is the international forum where ITU Member States gather to revise an international treaty known as the Radio Regulations. It contains frequency allocations for more than 40 radiocommunications services ranging from amateur and professional radio services to mobile wireless technologies and satellite communications.

A number of landmark decisions were taken by the conference to deal with the increasing pressure placed the radio frequency spectrum, which is a limited natural resource. The demand for spectrum is the result of the exponential growth of information and communication technologies. This was reflected in an unprecedented number of agenda items (48) and individual proposals from member states (2500) that were dealt with during WRC-03.

More than 2700 delegates and other participants representing 145 administrations attended the conference, which took place between 9 June and 4 July in what proved to be the hottest June in Geneva for 200 years. For WRC-03, the IARU fielded its largest team of observers at an ITU conference in more than a decade. Heading the IARU observer team was its President Larry Price, W4RA, accompanied by IARU Secretary David Sumner, K1ZZ. Colin Thomas, G3PSM, attended as an adviser to the UK delegation.

(L-R) IARU team members Wojciech Nietyksza, SP5FM; Michael Owen, VK3KI; David Sumner, K1ZZ; and Robert W Jones, VE7RWJ. Robert Jones is serving as a consultant to the IARU.

Photo: Tim Totten, N4GN, ARRL website www.arrl.org/news/stories/2003/07/03/4/?nc=1

THE MORSE REQUIREMENT

WRC-03 delegates agreed to an extensive rewrite of Article 25 of the *Radio Regulations*, which defines the Amateur and Amateur-Satellite services. Article 25 had included a requirement that an amateur applicant "shall prove that he is able to send correctly by hand and to receive correctly by ear texts in Morse code signals", but permitted administrations to waive the requirement for operation for "stations making use exclusively of frequencies above 30MHz."

The reworded Article 25.5 now says, ***"Administrations shall determine whether or not a person seeking a license to operate an amateur station shall demonstrate the ability to send and receive texts in Morse code signals."*** IARU Secretary David Sumner, K1ZZ, said edits to the Article 25 rewrite - including the Morse issue - continued right up to the proposal's first reading in the Plenary. That included agreement upon a Canadian proposal to replace the word "prove" with the word "demonstrate." The practical difference is that the wording change now leaves it up to radiocommunications regulatory bodies in each country to determine if they wish to require a Morse code test for amateur applicants.

Some observers in the USA predict that the revised wording of Article 25.5 will spark a flurry of petitions for rule-making to the FCC (the US licensing administration) to eliminate the 5WPM Morse code examination as a requirement for HF operation. Here in the UK, however, the Radiocommunications Agency has already stated that it will bring in code-free HF licences as soon as it is practical to do so, and it is likely that the UK will be one of the first countries to take advantage of the revised wording of Article 25.5. An announcement will be made on GB2RS, on the RSGB website and in *RadCom* when Full and Intermediate Class B amateurs can start using the HF bands.

7MHz-BAND HARMONISATION

With the signing of the Final Acts of WRC-03 on 4 July, the Amateur Service achieved a major breakthrough, namely the doubling of the 7MHz frequency band for radio amateurs in Regions 1 and 3. From **29 March 2009** the frequency band 7100 - 7200kHz will be allocated on an exclusive basis to the amateur service in the majority of Region 1. A number of administrations in North Africa and the Middle East together with administrations in Region 3 have reserved the right, through the use of footnotes, to operate fixed and mobile service stations within this segment of the band on a Primary basis.

Although 2009 may appear to be some time away, the change is considered speedy in ITU terms (some of the timelines proposed during discussions on the 7MHz agenda item would have held off the changes until 2033!) This period will allow broadcasters time to

re-organise schedules as well as prepare for any engineering work that will be necessary. In the case of some older broadcast transmitters this may be a major undertaking. It is hope that early access to the 7MHz expansion band for UK amateurs will be negotiated with the Radiocommunications Agency, although this access may not be possible until 1 January 2005.

The WRC-03 action on 7MHz makes no change to the exclusive allocation in Region 2: US amateurs, for example, will continue to enjoy the full 7000 - 7300kHz band they now have. "History was made today," said David Sumner, K1ZZ, who called the agreement a big change over the *status quo*. "Never before in the history of radiocommunication has an HF broadcasting band been shifted to accommodate the needs of another service. But that's what happened at WRC-03."

While the result falls short of the IARU's goal of a 300kHz worldwide exclusive band for amateurs, David Sumner explained that ITU conference decisions are reached by consensus. "Building consensus requires give and take," he said, "and we didn't have much to give." He said the historic 7MHz compromise "took the cooperation of broadcasters and many, many others to enable us to bring this home for radio amateurs." He credited delegates and other conference participants - not all of them radio amateurs and including some who were strongly opposed to the proposal at the start - with making the compromise possible.

AMATEUR RADIO EMERGENCY COMMUNICATIONS

The revision of ITU *Radio Regulations* Article 25 has also enhanced amateur radio emergency communications. Paul Gaskell, G4MWO, the RSGB Radio Communications Voluntary Services National Co-ordinator, comments, "Whilst other overall benefits have been obtained for all radio amateurs, the following impact significantly on amateur radio emergency communications. ITU Radio Regulations Article 25.3 now reads: ***'Amateur stations may be used for transmitting international communications on behalf of third parties only in the case of an emergency or disaster relief. An administration may determine the applicability of this provision to amateur stations under its jurisdiction.'*** This is a notable change from the old wording: *'It is absolutely forbidden for amateur stations to be used for transmitting international communications on behalf of third parties.'*

"Secondly, a completely new regulation, Article 25.9A, has been approved, a provision which needs no explanation: ***'25.9A Administrations are encouraged to take the necessary steps to allow amateur stations to prepare for and meet communication needs in support of disaster relief.'*** This provision should be read in conjunction with Article 25.3, and it is hoped that administrations will make regulations that facilitate amateurs preparing for emergency situations and providing communications in emergencies and for disaster relief. This was an important IARU objective."

In addition, an administration may determine whether or not to permit those granted an amateur licence by another administration to operate an amateur station while that licensee is temporarily in its territory, "subject to such conditions or restrictions it may impose."

CEPT Co-ordinator Jan Verduijn of the Netherlands' Radiocommunications Agency, to whom Colin Thomas, G3PSM, says the Amateur Service owes a debt of gratitude for finding a solution to the difficult negotiations concerning the 7MHz realignment question.

Photo: ARRL website www.arrl.org/news/stories/2003/07/03/4/?nc=1

The Geneva International Conference Centre where WRC-03 took place is adjacent to International Telecommunication Union headquarters in Geneva.

OTHER AMATEUR RADIO-RELATED CHANGES

Another Article 25 change calls on administrations to verify "the operational and technical qualifications" of amateur applicants, using ITU Radiocommunication Sector *Recommendation M.1544* as guidance. A more detailed explanation of this and the other Article 25 changes is included in an article 'New Regulations for the Amateur Services', by Michael Owen, VK3KI, a member of the IARU team at Geneva, which is available on the IARU website (there is a link from the RSGB's site at www.rsgb.org 'WRC 2003 Reports'). The full text of the new Article 25 can be found on the RSGB website.

In other Amateur Radio-related items, WRC-03 approved revisions to Article 19 of the *Radio Regulations* to provide more flexibility for administrations to assign amateur callsigns. Administrations will be able to assign amateur stations callsigns with suffixes containing up to four characters, the last of which would be a letter. The prefix would be the national identifier and a single numeral (the 'call district' in some countries) specified in the *Radio Regulations*. For special events, the revision provides for even more than four characters for temporary use.

Delegates also provided a secondary allocation for satellite-borne synthetic aperture radars (SARs) within the 70cm band (432 - 438MHz), subject to limitations designed to protect the Amateur and Amateur Satellite services, among others.

Changes to **Articles 19 and 25** took effect on **5 July 2003**. In general, the other *Final Acts* will take effect on **1 January 2005**.

WHEN'S THE NEXT ONE?

Planning is already under way for the next WRC, tentatively planned to be held in 2007. Two items of significance to the Amateur Service are on the WRC-07 agenda being recommended by WRC-03 to the ITU Council.

The first calls for a review of "the allocations to all services in the HF bands between 4MHz and 10MHz" with a number of exclusions, including the band 7000 - 7200kHz that WRC-03 just reviewed. Since spectrum requirements for HF broadcasting are among the factors to be taken into account, this item either could present a threat to 7200 - 7300kHz, or it could provide an opportunity to look at that final 100kHz to bring us into line with Region 2.

The second item would "consider a secondary allocation to the Amateur Service in the frequency band 135.7 - 137.8kHz." Of course, this band is already allocated here in the UK, and is in the common table of frequency allocations used by European administrations. Canada has been pressing for such an allocation in the international Table but, earlier this year, the American FCC went along with objections from US utility companies that use the band for PLT (power line telecommunications) and denied a 136kHz allocation to US radio amateurs.

SUMMING UP

Colin Thomas, G3PSM, writes: "The past four weeks have proven to be very hard work, with some meetings starting at 0800 and sometimes lasting until the early hours of the morning. The results, however, have made it all worthwhile. None of these would be possible, however, without the support of RA delegation members and the cooperation of BBC and VT Merlin Communications staff members. In particular the Society and the amateur radio service owes a debt of gratitude to CEPT Co-ordinator Jan Verduijn of the Netherlands' Radiocommunications Agency, who had the responsibility of guiding agenda item 1.23 through the working group and committee stages of the conference. Although not a holder of a radio amateur licence, he treated the affected amateur, broadcasting and fixed and mobile service issues with the same evenhandedness."

The RSGB is very grateful to Rick Lindquist, N1RL, and Maty Weinberg of ARRL HQ for their assistance in the compilation of this report, and for their permission to reproduce text and photographs originally published on the ARRL website. ◆

Photo: ARRL website www.arrl.org/news/stories/2003/07/03/4/?nc=1

WEBSEARCH

RSGB:	www.rsgb.org **(follow the 'WRC 2003 Reports' link)**
ARRL:	www.arrl.org
IARU WRC2003 reports:	www.iaru.org/iaru-index.html#wrc2003
'New Regulations for the Amateur Services' article:	www.iaru.org/rel030703att3.html

Club and Region

Club News is a service for clubs and societies affiliated to the RSGB. The announcements are intended to notify non-members and potential members of your club of specific events, therefore 'informal', 'committee meeting', 'natter night' and 'ragchew evening' etc will only be included if space permits. Basic, unchanged details about RSGB-affiliated clubs are published annually in the RSGB Yearbook.

Region 1: Scotland West & Western Isles

WEST OF SCOTLAND ARS
15, Winter programme, GM3AXX. A M Fraser, GM3AXX, 01560 482720.

Region 2: Scotland East & the Highlands

COCKENZIE & PORT SETON ARC
1, 'Normal club night'. 8, Junk night. 16, 17, Lighthouse Weekend, Barnes Ness. Bob, GM4UYZ, 01875 811723.

Region 3: North West

CHORLEY & DARS
20, 'Wire Antennas', Bill, G3NQX. Sean, M1SMF, sean1226@hotmail.com
FYLDE ARS
7, Quiz. 21, Visit (TBA). Ken, G3RFH, 01253 407952.
STOCKPORT RS
5, Indoor DF hunt, Nigel Roscoe, G0RXA. 19, 'Field Day Operating', Ron Smith, G3SVW. David, M1ANT, 0161 4567832.

Region 4: North East

EGRAC
6, RSGB Regional Roadshow. 16, 17, Lighthouse Weekend. Baz, M5EXY,01964 613928.
GOOLE R & ES
6, Pub night. 13, Treasure Hunt. 20, On air. 27, Discussion night. Richard, G0GLZ, 07867 862169 .
HALIFAX & DARS
19, 'Introduction to ATV', Raymond Newsome, G1MSD. Tom, M0TKA, 01484 715079.
HORNSEA ARS
6, Interclub quiz. 13, Farriering. 20, 'Foxhunt'. 27, 'Ask the Panel'. Richard, G4YTV, 01964 562498.
SCARBOROUGH SPECIAL EVENTS GROUP
16, 17 International Lighthouse Weekend. Andy, G0VRM, 01430 801122.
SHEFFIELD ARC
4, Club night. 11, VHF radio. 18, Club night. Nick, G4FAL, 0114 2552893/
WAKEFIELD & DRS
5, BBQ at John, G7JTH, in Sandal. 12, 'Radio Parameters', Ian, M0BFO. 19, On air. 26, Contest training. Rick, G4BLT, 01924-255 515, www.wdrs.org.uk

Region 5: West Midlands

BROMSGROVE & DARC
22, 29, Operating the FT-1000MP. Chris, M0BQE, 01095 776869.
BROMSGROVE ARS
12, Test equipment, rig checks, rig problems. 26, Avoncroft Museum, telephone exchanges, coin boxes. Angus, G8DEC, 01527 875573.
CHELTENHAM ARA
1, Rig evening: bring a rig from your shack for others to see. 10, Club garden party at G3SNN's home. Ivan, G4BGW, 01452 731 956, ivan@g4bgw.freeserve.co.uk
COVENTRY ARS
1, Barbecue. 8, On air, Novice class, CW practice. 15, 'Walk and Talk', a walk enhanced with handheld transceivers. 22, Preparation for Town and Country Festival (TBC), on air, Novice class, CW practice. 23-25, Town and Country Festival Special Event Station. 29, Quiz. John, G8SEQ, 024 7627 3190, johng8seq@ntlworld.com
GLOUCESTER AR & ES
11, Control centre visit. Tony, 01452 618930, OH.
KIDDERMINSTER & DARS
5, 'Solving your PC problems', Roger Jarvis, G4OBA. Tony, G1OZB, 01299 400172.
MID-WARWICKSHIRE ARS
2, Field day, picnic at Draycote Water. 26, 145MHz 'foxhunt'. Bernard, M1AUK, 01926 420913.
SALOP ARS
5, Foundation or Intermediate Licence course (TBC). 14, 4th 'foxhunt'. 28, Telford Rally preparation. 31, Telford Rally. John, G0GTN, 01743 249943.
SOUTH NOTTS RC
1, Packet radio/DXCluster using Winpack and Baycom. 8, Construction Aerial Analyser, John, G4EDX. 15, QRP on air 5W or less from Clubroom. 29, Field day planning. Secretary, 01509 569746.
ST LEONARD'S ARS
14, Quiz. 28, Planning evening. Derek, G0EYX, 01785 604904.
TELFORD & DARS
6, Open evening, on air. 20, Telford Rally planning. 31, Telford Rally. Mike, G3JKX, 01952 299677.

Region 6: North Wales

CONWY VALLEY ARC
6, 'A Lifetime with Marconi International', George, GW3EIR. Wynne, GW6PMC, 01745 855068.
WREXHAM & DARS
5, DF 'foxhunt', Minera lead mines. 19, On air. Mark, MW1MDH/MW3MDH, www.qsl.net/wars

Region 7: South Wales

ABERYSTWYTH & DARS
28, Club net on S21 (call on S20), GW7OZP. Ray, GW7AGG.

Region 8: Northern Ireland

No club details received.

Region 9: London & Thames Valley

AYLESBURY VALE RS
13. Morse tuition, discussion, on air. Roger, G3MEH, 01442 826651, roger@g3meh.fsnet.co.uk
BROMLEY & DARS
19, 'Holiday Natter Nite'. Alan, G0TLK, 0208 777 0420.
CRYSTAL PALACE R&EC
1, Club projects, Morse practice. 15, BBQ. Bob, G3OOU, 01737 55 2170 or Victor, G1PKS, 020 8653 2946
COULSDON ATS
11, Annual barbecue at home of Pru, G4RWW. Steve, G7SYO, 01737 354271.
ECHELFORD ARS
14, Bring & Buy. 28, AMSAT, Howard, G6LBV. Robin, G3TDR, 01784 456513.
READING & DARC
14, Video evening & wash-up of McMichael Rally. Pete, G8FRC, 01189 695697.
RS OF HARROW
3, GB2DHH operating day. 16, 17, International Lighthouse Weekend. Jim, G0AOT, 01895 476 933 or 020 7278 6421.
STEVENAGE & DARS
5, Members' discussion. 12, Operating, M3 tuition. 16, 17, Foundation Course. 19, Members' discussion. 26, Video. info@sadars.org
SURREY RADIO CONTACT CLUB
4, 'My Favourite Things', Brian, G8DIU. Ray, G4FFY, 020 8644 7589.

Region 10: South & South East

ANDOVER RAC

REGION		RSGB REGIONAL MANAGER
1.	Scotland West & Western Isles	Gordon Hunter, GM3ULP
2.	Scotland East & the Highlands	Peter Thomson, GM1XEA
3.	North West	Kath Wilson, M1CNY/M3CNY
4.	North East	Geoff Darby, G7GJU/M3GJU
5.	West Midlands	Roy Clarke, G8AYD
6.	North Wales	LizCabban, GW0ETU
7.	South Wales	Ray Ricketts, GW7AGG
8.	Northern Ireland	Jeff Smith, MI0AEX
9.	London & Thames Valley	Paul Berkeley, M0CJX
10.	South & South East	Ivan Rosevear, G3GKC
11.	South West & Channel Islands	Barry Scarisbrick, G4ACK
12.	East & East Anglia	Malcolm Salmon, G3XVV
13.	East Midlands	Bryn Llewellyn, G4DEZ

RSGB REGIONAL MANAGERS AS OF 27 JUNE 2003.

Items for club news should be sent to the RadCom Office at HQ to arrive by the 26th of the month, ie approximately a month before publication (eg 26 January for the March Issue). News items should be sent in writing (fax, letter or e-mail: gb2rs@rsgb.org.uk) by the club secretary or the person responsible for publicity. Post cards for this purpose are available from RSGB HQ. A database of all meetings is shared between RadCom and GB2RS, so information only needs to be sent once.

al News

3, Picnic at Farley Mount. 5, PW's 70th Anniversary, Rob Mannion. 19, Preparation for Middle Wallop boot sale. 31, Middle Wallop boot sale. Terry, G8ALR, 01980 629346.

BASINGSTOKE ARC
4, Computing questions and answers from club's IT trainer, Dave, M3DHT. Peter, M1DGQ, 0118 983 6545.

FAREHAM & DARS
6, On air. 13, How I got interested and got my licence, Jim, M3JJN. 27, Car boot rally, selling by Mick, G4ITF and others. Steve, G7HEP, 01329 663673.

FARNBOROUGH & DRS
27, QSLing, Bob, G0YYY. Norman, G0VYR, 01483 835320.

HASTINGS E & RC
20, Geology, John Boothroyd. R C Gornall, G7DME, 01424 444466.

HORNDEAN & DARC
5, 26, Social evening. Stuart, G0FYX, 023 9247 2846.

ITCHEN VALLEY RC
16, 17 Hobbies Extravaganza at Royal Victoria County Park, Netley. Sheila, G0VNI, 023 80813827 sheila.williams@ivarc.org.uk

SOUTHDOWN ARS
4, 'Amateur Radio Observation Service', Barry, G4ACK; Foundation Licence info, Jim, G4DRV. John, G3DQY, 01424 424319.

TROWBRIDGE & DARC
6, The RSGB & New Licence Structure, Ian Carter, G0GRI. Ian, G0GRI, 01225 864698, evenings/weekends.

WORTHING & DARC
6, Discussion. 13, Plans for lighthouse weekend. 20, BBQ. 27, Construction evening. Roy, G4GPX, 01903 753893.

Region 11: South West & Channel Islands

APPLEDORE & DARC
18, Quiz. Brian, M0BRB, brian.jewell@ic24.net

BOURNEMOUTH RS
1, 'Bournemouth Disabled Amateur Radio Group and Raynet', Bob, G6DUN. 15, 'The Magic Mode – PSK31', David, G4BKE. Chris, M5AGG, 01202 893126.

CORNISH RAC
7, General meeting, on air. 11, Computer section. 15, 16, 17, Steam Engine Rally. John G4LJY, 01872 863849.

FLIGHT REFUELLING ARS
10, Hamfest (overnight camping on Saturday), Cobham Sports and Social Sportsground, Merley, Wimborne. Paul, M0EYT, pjmarsh@frars.org.uk

POLDHU ARC
12, Barbecue. Keith, G0WYS, 01326 574441.

SOUTH BRISTOL ARC
6, Computer clinic. 13, Summer darts match. 20, Amateur radio shareware. 27, On air. Len, G4RZY, 01275 834282.

WEST SOMERSET ARC
5, 'Designing an HF transmitting station'. Jean, G0SZO, 01984 633060.

Region 12: East & East Anglia

CAMBRIDGE & DARC
1, Morse training, building DF antennas. 8, Testing DF antennas. 15, 2m 'foxhunt'. 22, 'Contest Operating', Andy Summers. Ron, G3KBR, 01223 501712.

CHELMSFORD ARS
5, Table top sale. David, M0BQC, 01245 602838.

FELIXSTOWE & DARS
11, Internet linking. 25, Bank Holiday 'pub crawl'. Paul, G4YQC, paul.whiting@bt.com

HARWICH A R INTEREST GROUP
13, Video. Eugene, G4FTP, 01206 826633.

NORFOLK ARC
6, DX Mobile operation, Mark, G0LGJ, & Chris, G0DWV. 13, Informal and CW Instruction, SSB Field Day briefing. 20, Tacolneston transmitter visit, Andy Keeble. 27, Club dinner. Reg, G0VDO, 01603 429269.

Region 13: East Midlands

EAGLE RADIO GROUP
12, Walk across New Zealand, Tony, G3RKL. Terry, G0SWS, 01507 478590.

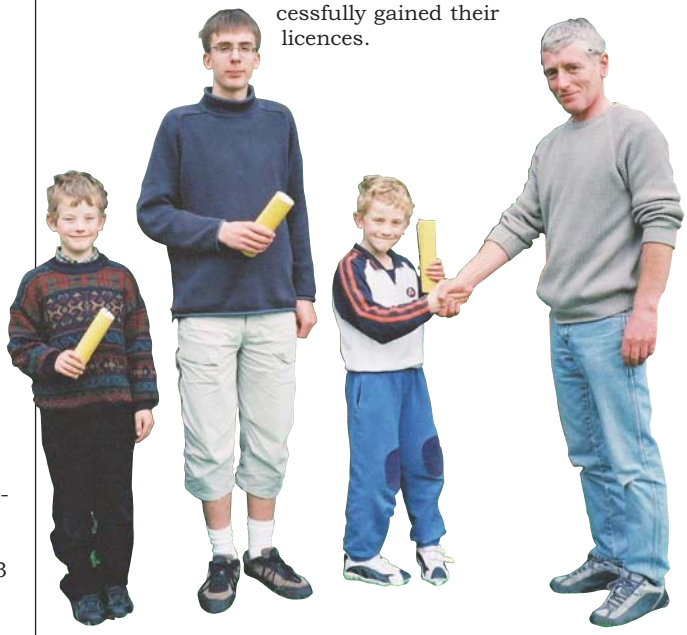
LOUGHBOROUGH & DARC
5, Talk TBA. 12, Open forum: our club in the 80s, QRP. 19, On air, try radio Internet link. 26, 6th (final) DF of 2003 on 160m. Chris, G1ETZ, 01509 504319.

NORTHAMPTON RC
7, On air. Phil, M0CTC, 01604 406887, northamptonradio-club@hotmail.com

Bromsgrove & DARC Foundation Course

The club started Foundation Courses in May 2002, with Chris, M0BQE, as the course tutor, assisted by John, G4OJS, and Mick, M0BQF. John, G4OAZ, helped with the Morse tests. The first course took place over five Saturdays and all four course members passed the examination. Subsequent courses in July and September last year ran over a whole weekend. By now the assistants had all become registered instructors, and another club member joined the team, Barrie, G4AHK.

The latest course was held on 10/11 May, this time with club member Peter, G4BBU, joining the team. Since the club started Foundation Courses, 21 students have successfully gained their licences.



The three latest students to pass their examination at the Bromsgrove & DARC in May. They are Simon and Magnus Whittle, and Merlin Cooper in the centre, with Mick, M0BQF, one of the course tutors.

Wigtownshire Club Receives 'Awards for All' Funding

The Wigtownshire Amateur Radio Club has been awarded £4520 by the 'Awards for All' to purchase a laptop, projector and software to run its amateur radio courses. Another four students took the first of the club's new-style Foundation courses on 1 June. The club's team of RSGB Instructors is quite excited with the prospect of having its own training equipment. In the past, a projector had to brought over 60 miles from Dumfries by the council Education Officer for courses. Over 20 new MM3 licences have been gained in this rural area since last October. Some students have travelled hundreds of miles to take part in one of the week-end courses. The club is also anxious to pass on the use of the equipment to other local (non-radio) volunteer groups that do not have such excellent resources of their own. This community spirit does a lot to promote amateur radio to a wider public.

Ross-on-Wye's Foundation Success

The third foundation course in the Herefordshire area was held in Ross-on-Wye by a group of amateurs led by Lead Instructors Wally Sykes, G0RIJ, and Keith Hales, G0RQF, with the help of Mike Davies and Allan Wood, invigilator Daniel Prout, and Wanda Sykes, M3RIJ, who looked after the catering.

James McCron, Sophie Romang, Ken Trow, Robin Hales, John Ramsay and Neil Gibson all passed the exam with good marks, Sophie winning a World Prefix Map after achieving 20 out of 20. These six bring to a total of 23 the new M3s licensed at the Ross-on-Wye group in the past nine months.

South Dorset Radio Society Museums on Air Event

The Museums on the Air event took place this year over the weekend of 14/15 June and once again the South Dorset Radio Society operated as GB2WNF from Nothe Fort. The same venue is used by the club for the International Lighthouse /Lightship Weekend, which this year takes place on 16/17 August.

Jon Illsley, G2FHF, and Richard Brokenshaw, M5RIC, set up the stations and antennas. On the Saturday 40m was very crowded and difficult to work, but 101 contacts were made during the day. Mark, M5MKW, operated a second HF station on SSTV and sent pictures of Nothe Fort to contacts around Europe. Rob Micklewright, G3MYM, from the Yeovil Amateur Radio Club is thanked for visiting the station and operating on 20m CW. The 100W 2m SSB station was very successful, with contacts all over England.

On the Sunday, HF conditions deteriorated, but Alex, G3KKJ, used 20m CW to work stations around Europe and North America. The PW 2m QRP contest was held on the Sunday and GB2WNF took part, although running high power. 79 stations in all parts of England, Scotland, Belgium, Holland, Wales and Ireland were worked. Jon Illsley, G2FHF, said, "This is the first year that we have had a serious go at 2m SSB and it definitely won't be the last. I would like to appeal to more clubs to make an effort to use 2m during special events, as it is greatly under-utilised."

GB2WNF was operated by members of the South Dorset Radio Society from Nothe Fort.

New Venue for TARS

The Torbay Amateur Radio Society (TARS) has moved location to the St John's Ambulance Hall, East St, Newton Abbot. The first meeting there took place on 4 July.

Tim Walford, G3PCJ, of Walford Electronics (left), deep in conversation with our very own 'Newcomers' News' columnist, Steve Hartley, G0FUW.

Yeovil QRP Convention

Derek Bowden, M0WOB, of the Yeovil Amateur Radio Club, and Tony Marriott, G0GFL, of the Blackmore Vale Amateur Radio Society (BVARS), kindly sent in some photos of the 19th Yeovil QRP Convention, which took place at Sherborne, Dorset, on 8 June. The convention is organised by the Yeovil Amateur Radio Club and was once again a great success.

At the convention, Rob Micklewright, G3MYM, was presented with a gift and thanked for his contribution to the hobby by the members of the BVARS. Rob has held RAE classes for 27 years and helped over 200 students gain their amateur radio licences.

Rob Micklewright, G3MYM (right), is presented with a gift on the Blackmore Vale Amateur Radio Society stand at the Yeovil QRP Convention.

All at Sea with Southport & DARC

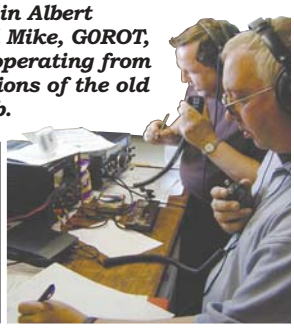
Over the weekend of 31 May/1 June, three members of the Southport & District Amateur Radio Club (SADARC) gave the world a chance to work an unusual maritime mobile station in the Irish Sea. Mike, G0ROT; Derek, G7LFC, and Keith, G0OXV, operated from on board the Madog on a trip from Liverpool to the Isle of Man and back again, along with a team of divers.

The three installed HF and VHF antennas on the ship and the old ship's engineer's lab became the 'shack'. The main problem was the cramped space, lack of seating and noise from the engine room. The Madog slipped its moorings at 2315 and headed into the River Mersey on the high tide. Once beyond the Liverpool Bar everyone settled down for a good night's rest whilst the Madog proceeded towards the Isle of Man at a leisurely 8 knots. On the Saturday, the team was in full swing with Mike operating on HF and Keith and Derek on VHF. Conditions were good, with contacts across the UK on 2m.

The divers were planning a night dive so Mike and Keith returned to the vessel and more contacts were made on 2m. Later it was discovered the band had opened to Spain shortly after they finally closed down!

SADARC's first Maritime Mobile expedition was thoroughly enjoyed by all - helped by two very calm crossings. The SADARC team thanks the owner and crew of the Madog for allowing them to operate and the members of Liverpool Diving Club who allowed the radio amateurs to sail with them.

The Madog berthed in Albert Dock, Liverpool and Mike, G0ROT, and Keith, G0OXV, operating from the cramped conditions of the old ship's engineer's lab.



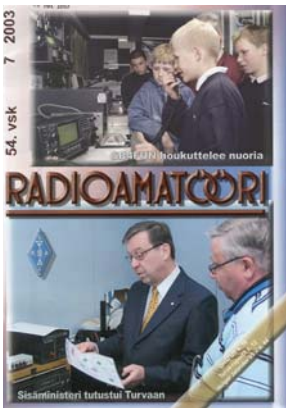
Chelmsford Constructors

The Chelmsford Amateur Radio Society recently held a constructor's competition. Notable among the entries was one by Foundation Licence-holder Denis Lewis, M3BIA, who produced a superbly-crafted Morse key. The contacts on the key were from a spare set of points from an old Peugeot car. Denis was awarded the 'First Time Entrant' prize. The first prize was won by Anthony Martin, M1FDE, who gave a very professional presentation of the design and development of a CTCSS tone oscillator for his'£5 rally-acquired VHF hand-held'. Club secretary David Bradley, M0BQC, produced a first class 20 metre QRP 'OXO' transmitter which won second prize.

Colin Page, G0TRM, constructed a pair of paddle-type Morse keys using round-pin old-style mains plugs, a l5 amp and a more compact 5 amp one. They were upturned on a wooden base and the paddle, slotted into the earth pin, was a nail file which had a convenient insulated plastic finger pad. He won third prize.

Close-up of the beautiful home-made Morse key by Denis Lewis, M3BIA, which won the 'First Time Entrant' prize in the recent Chelmsford Amateur Radio Society construction competition.

GB4FUN TO BECOME OH4FUN?



Jukka Heikinheimo, OH2BR, writes to say that he is planning to start an 'OH4FUN' project, similar to GB4FUN, in Finland. To launch the project in Finland, he wrote an article called, roughly translated from the Finnish, 'May GB4FUN be Converted into OH4FUN?' in the SRAL (Finnish national amateur radio society) magazine, *Radioamatööri*.

The idea was that the magazine would be received by SRAL members just before the annual summer camp from 17 to 20 July and which is attended by thousands of Finnish amateurs. The article was written to support the fund-raising effort for OH4FUN at the summer camp. The Finnish project already has an impressive list of commercial sponsors including Finnair, avionics and computer firms, and Helsingin Energia, the capital's power company. As Jukka says, "We must be in for a boom in amateur radio!"

We wish the Finnish team luck and hope to hear an explosion of newly-licensed OH stations on the air in the future.

The July issue of* Radioamatööri *magazine with the article on GB4FUN.

GB4FUN AT HUNDRED OF HOO SCHOOL

On 1 July, GB4FUN visited the Hundred of Hoo School, Rochester, Kent, to support the teaching of the GCSE and A level electronics courses that the school run. Derek Boyle, the Head of Physics at the Hundred of Hoo School, sent in this short report: "During the day 30 GCSE students were treated to an interesting and thought-provoking talk about amateur radio and communications in general. The students had just finished studying a section on AM radio receivers as part of their AQA GCSE electronics course.

"Just before lunch the A level electronics group was shown around the vehicle and Carlos explained the principles behind many of the aspects of communications theory that they had studied. Many of the students found the talk informative and helpful as it reinforced the work studied in their A level physics and electronics studies.

"Overall this was a useful and informative visit, which we are hoping to incorporate as a regular feature in our teaching." ◆

The GB4FUN Supporters' Honour Roll

We asked members when renewing their membership to include a donation to help to continue to finance the GB4FUN mobile amateur radio demonstration vehicle. The following is the list of those members who have kindly sent in a donation by the deadline date for this issue. Contributions continue to be wanted: if you would like to help, please send your donation to 'GB4FUN', c/o RSGB HQ.

GB4FUN 'Big Hitters'

A V Bryant, G3NVB

S Hartley, G0FUW

B G Davis	2E0BGD
M Hyman	2E1MBS
J Parry	5B4AFR
R Westerman	DJ0IP
G Pesch	DJ2XB
V Climente Valero	EA5OO
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P Lalibert	F3ET
Dr W Piotrowski	G0BOE
G M Russell	G0CAK
D H K Moore	G0DHM
D L Moss	G0DLM
Vale of Evesham RAC	G0ERA
G H Goddard	G0GNW
C G Wackett	G0GVN
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G A Lamb	G0LAM
P Hanson	G0NVY
C R Jenner	G0PPO
N R Steadman	G0SMI
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S R Adams	G0ULF
R B Verrall	G0VEB
G R Diaper	G1IUW
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G G P Holden	G2HIX
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P J Powell	G3EFI
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B Vaughan	G3MCV
J H F Wilshaw	G3MPX
G C Driver	G3NDE
G L Quarterman	G3NHX
R C Fenton	G3NQF
J H G Allsop	G3OGX
W A Gordon	G3SEG
A D Reffold	G3SQH
J W Franks	G3SQQ
L P Best	G3THM
J W E Jackson	G3TZZ
G R Gauntlett	G3VLL
J W Barker	G3WAL
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C J Hoare	G4AJA
J D Colclough	G4CWN
M E S Valente	G4EBN
D Nicklin	G4FHO
B J Tarry	G4FKP
Dr G T Hinson	G4IFB
P Hey	G4JHS
D B McLachlan	G4KOW
H C Mayor	G4MGB
M A Gould	G4OKE
G Cooper	G4OQX
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D C Simmons	G4PXA
K H Kirby	G4VKK
J T Gale	G4WYJ
R G Evans	G4XAT
A C Boniface	G4XSA
J F Sanders	G4YCL
K T Goodchild	G6EFO
R D Brothwood	G6ICH
D E Parr	G6OSO
W J Bennett	G6RBO
N A Golding	G6RIG
I M Douglas	G7MFN
P Edwards	G7MLQ
B Carter	G7SOG
S J Easter	G7URR
G Lindsay	G8BZL
A R Croft	G8CJM
P W Winwood	G8KIG
B Lewis	G8NHN
C C Eccles	G8NMK
O Futter	G8PIO
N R Doe	G8TBU
A D Cleave	G8XQN
M J Turner	GJ0PDJ
H J L Smith	GM1CQC
J J Horsburgh	GM1RDG
A W Turner	GM2HDH
J S McCaig	GM3BQA
W McGill	GM3LGM
J Carson	GM3OXK
D J Mackay	GM3SYO
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F J Rees	GW0JRF
A I Grant	GW4KPD
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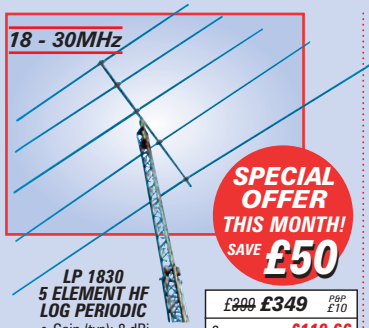

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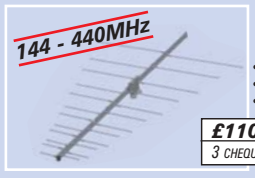

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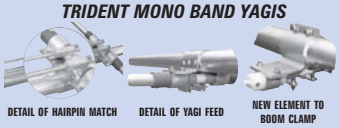

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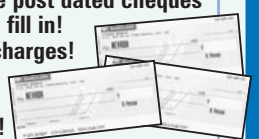

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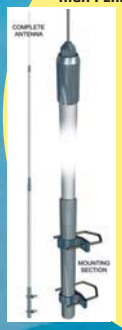

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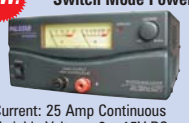

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90 YEARS

Serving

In the second and concluding part of Pat Hawker's potted history of amateur radio and of the Society that exists to serve it, Pat outlines the role of the Society and its members in WWII and post-war developments.

During 1938 and the spring and summer of 1939 amateur radio flourished despite the deteriorating international situation. Some enthusiasts were already members of the Royal Navy Volunteer Wireless Reserve, established in the early 1930s. An RAF Civilian Wireless Reserve (CWR) was formed in 1938 with the co-operation of the Society. Compulsory national service began in April 1939. The RNV(W)R and the Territorial Army mobilised as war threatened.

For 31 August 1939 my log book records four 14MHz contacts with European countries and then a note: "During the BBC news bulletin at 2100 heard announcement that licences have been withdrawn. All valves removed from transmitter. Further information awaited." There follows an entry dated 2 September (the day before Britain declared war with Germany) "GPO engineers removed transmitter." Receiving equipment was not impounded.

Not until February 1946, over six years later, does my log re-open with a 28MHz contact with Eric Cole in Athens who - as Chief Signals Officer, Land Forces Greece - had allotted himself the callsign SV1EC and was using his Corps BC610 transmitter (the military version of the 1940 Hallicrafters HT4 amateur radio transmitter).

For most of the intervening years the defence regulations made it illegal to have possession of valves of more than 10 watts dissipation, piezo-electric quartz crystals or any form of transmitting equipment. Yet amateur radio, far from disappearing, gathered innumerable new adherents, waiting eagerly for the official resumption of activity on some amateur bands in January 1946. Both old-timers and many newcomers waited eagerly for the resumption of activity - in the meantime putting their technical and operating knowledge into the struggle for victory.

Then President of the Society, Arthur Watts, G6UN, helped set up the VI organisation.

THE SECRET LISTENERS

Although a considerable number of amateurs were in uniform, either as reservists, territorials, or called up under the National Service regulations, there remained many members and other radio enthusiasts who were above or below call up age, in reserved occupations, or medically unfit. Soon many of these, as the result of co-operation between the Society's President (Arthur Watts, G6UN) and Lord Sandhurst of the Radio Security Service (RSS, MI8c), were asked if they would undertake on a voluntary basis "work of national importance". No indication of what this would be was given until they had

By Pat Hawker, G3VA, 37 Dovercourt Road, East Dulwich, London SE22 8SS.

Amateur Radio

rt 2: WWII and beyond

THE 'Y' SERVICE

The first draft of the Civilian Wireless Reserve (CWR - known as 'The Early Birds') had been called up for National Service and reached France on 5 September to form part of the RAF's 'Wireless Intelligence Screen', paving the way for the close relationship between radio amateurs and the Interservices 'Y' signal intelligence (sigint) services that monitored the radio traffic of the enemy and fed the Bletchley Park code-breaking operations that surpassed even the work of Room 40 in the 1914-18 war. CWR members whose skills were primarily technical rather than telegraphy were formed into RAF Emergency Fitting Parties installing radio and radar equipment. A CWR group leader and on the wartime RSGB Council, 'Rowley' Scott-Farnie, G(W)5FI, became a senior member of the RAF 'Y' service, serving in the UK and Middle East, where he was severely injured in an air crash.

Until his death in December 1941, Leslie Lambert, G2ST, one-time member of the Society and long-time 'wireless expert' in the Government Code & Cipher School, played an important role in the targeting of the Y service, working in close co-operation with Harold Kenworthy, G6HX, of the Metropolitan Police Radio. Lambert and Kenworthy, in the early 1930s, had traced the first clandestine station in the London area, operating a Comintern link with Moscow.

During the war, Kenworthy was in charge of the Foreign Office Y service and played a vital role in engineering the interception of the 12-rotor on-line Lorenz teletype and Hellschreiber traffic. He was awarded the OBE. He was later to become a founder member of the Radio Amateurs Old Timers' Association, for which John Clarricoats, G6CL ('Clarry'), organised regular luncheon meetings.

Emblem of the RAF Civilian Wireless Reserve set up in 1938. First announced at an RSGB Convention, its members were mostly radio amateurs.

signed the Official Secrets Act. They were not told that before being approached, a security trace would have been made by MI5 to ensure that nothing was known against (NKA) them. After signing they were briefed to listen for and report any unusual transmissions, initially to Box 485, Howick Place but later to Box 25, Barnet. All this was carried out in secrecy.

By late 1940, there were over a thousand of these Voluntary Interceptors (VIs), mostly pre-war amateurs or BRS members of the Society, listening at home for suspicious transmissions that could not be identified as coming from friendly or enemy Service or commercial transmissions. By the end of 1940 hundreds of RSS log sheets were being sent each day to Box 25, where a Discrimination Section sorted the wheat from the chaff and, together with VI Group Leaders (almost all pre-war amateurs) and nine RSS Regional Officers, encouraged the Secret Listeners to spend hours searching the HF bands.

Initially it had been intended that the VIs, together with fixed intercept stations and mobile DF units manned by the GPO, would on behalf of the Security Service (MI5) listen for and trace any enemy agents operating clandestine stations or beacons in the UK. In fact they found none. But within months, the VIs were helping to unravel extensive networks of covert HF networks throughout Europe, the Middle East, North and South America. Although they were not told, these networks of stations were those of the German Military Intelligence (*Abwehr*) secret service. These stations used procedures designed to make interception extremely difficult (no linked call-signs which often changed daily, no frequency netting, frequent coded changes of frequency etc) and used procedures and chat that appeared to make them Allied rather than German transmissions. They were ignored by the 'Y' services proper, but soon became a major source of counter-intelligence.

At first only the simple 'agent' ciphers were broken, but by December 1940, high-level *Abwehr* hand-ciphers were being read, although it was another year before the special type of Enigma cipher machine used by the Abwehr was broken at Bletchley Park by a young woman, Mavis Lever, working for 'Dilly' Knox.

In spring 1941, RSS (MI8c) was taken over lock, stock and barrel by the Secret Intelligence Service (MI6), the GPO contract cancelled, and a start made on building up RSS into a major source of intelligence on the activities of the German Secret Services. The VI system that had been built up by Lord Sandhurst was retained and expanded, and new large RSS intercept stations and the fixed D/F network and mobile D/F units established as part of the Special Communication Units. These were under the overall control of Brigadier [Sir] Gambier-Parry who appointed his deputy Colonel E Maltby as Controller, RSS based at Hanslope Park a few miles from Bletchley.

G-P (or 'Pop' as he was often known) had held the amateur call 2DV in the early 1920s and had headed Section VIII (communications) of SIS since its establishment in 1938-9. By 1941, Section VIII from its headquarters at Whaddon Hall, near Bletchley, controlled the world-wide SIS 'main-line' radio network, the special HF distribution system for BP's Ultra traffic to Army

Abwehr station of the type that RSS was intercepting. (Source: DL3CS.)

90 YEARS

Gerry Openshaw, G2BTO, in one of the RSS DF stations in its buried tank.

Commands, and the clandestine radio links with Intelligence and for a time SOE radio agents in enemy occupied country. G-P was also technical administrator for the 'black' propaganda broadcasts, responsible for the setting up and manning of several HF transmitting sites and the later 'Aspidistra' 600kW medium-wave broadcast transmitter built at Crowborough. The military section became the Special Signals Unit, later changed at the time of taking over RSS, to Special Communication Unit (SCU). By 1945 some dozen SCUs were set up, covering SIS and RSS fixed, mobile, overseas and training units. Section VIII included civilian and Service operators, a number of them pre-war radio amateurs.

In the summer and autumn of 1941, numbers of VIs were invited to become special enlistments (not paid from Army funds) in SCU3, either to man a new RSS 32-bay intercept station being built at Hanslope Park or to enlarge the staff of the Discrimination Section at Arkley View, Barnet. At 'Box 25', all logs from VIs and fixed intercept stations were subject to skilled 'Traffic Analysis', with the enciphered messages sent to BP for decoding. RSS decrypts were sent to SIS Section V (counter-intelligence) for distribution to a restricted list that included officers of the Secret Services and the Radio Intelligence Service at Box 25. Discrimination was run by Kenneth Morton-Evans, G(W)5KJ, who became Deputy Controller RSS.

By 1942, the RSS intercepts provided a detailed account of the activities of the German Secret Services. They gave advance warning of German spies despatched to the UK enabling them to be captured on arrival, most of them successfully 'turned' and then 'played back' - transmitting deception material to the enemy, often with RSS amateurs (G5SR, G2RX, G6GL) seconded to MI5 supervising or making the transmissions. Similar operations were undertaken in the Middle East by G5KW and G8KW.

It has been estimated that RSS intercepts accounted for almost 10% of the traffic decoded at BP, although it should not be forgotten that the main Y services, intercepting the traffic of the German armed forces, police and diplomatic traffic were responsible for over 90% of BP's Ultra decrypts. One must not exaggerate the contribution of RSS, important though it was.

WARTIME RSGB

The realities of war, even during the initial 'phoney war' period, were soon evident. Jack Hamilton, G5JH, and Ken Abbott, G3JY, both members of RNV(W)R were drafted on the outbreak of war as telegraphists on *HMS Courageous*; the ship struck a mine on 15 September and both perished. For the next six years among RSGB members there was a steady trickle of Service and Merchant Navy casualties, civilian air raid victims and deaths from tropical diseases, while others were taken prisoner of war. Fortunately the British casualty rate overall was significantly lower than during the first world war.

Quite early in the war, the Council began discussing and planning the future of amateur radio. This was stirred on by a series of articles and letters in *Wireless World* in early 1941. I have to confess that the first article 'The Future of Amateur Radio' was written, under a *nom de plume*, by a naïve 18-year-old amateur. It attracted a furious reply from 'Clarry', who appeared to feel that the magazine was attempting to usurp the responsibilities of the Society, but it sparked off further articles and letters. Looking back, there is little doubt that some of the ideas put forward at this time, combined with the contribution of amateurs to the war effort, played a role in the discussions between the Society and the Post Office on the post-war 150-watt (DC input) 'Amateur Radio Licence' (note the change from pre-war 'Experimental Licences').

On the outbreak of war, the

Whaddon-built simple MkVII transmitter / receiver and signal plan as used by many radio agents in occupied territory 1941 - 45. (Source: PA0SE.)

90 years of the RSGB pa

Council had taken the decision that the RSGB should continue - as far as was possible - its activities including the monthly *T & R Bulletin,* which in 1942 was renamed the *RSGB Bulletin.* The offices in Victoria Street were closed and the Society run from the north London home of 'Clarry' until 1943 when central London offices were rented on the top floor of Ruskin House, Little Russell Street - the Society's HQ for some 25 years, under increasingly cramped conditions.

Radio amateurs played a role in the efforts to establish uncensored communication with the POW camps without jeopardising the Red Cross conventions. Amateurs were inevitably among those taken prisoner in the series of military disasters in 1940-42 in Norway, France, Greece, Crete, the Western Desert, Hong Kong and Malaya - or shot down in enemy or enemy-occupied territory. Along with their 'evader packs' some aircrew were taught 'letter codes' and efforts were made by MI9 to smuggle radio books and components into the camps. Secret radio receivers were constructed in the camps, and it is believed that a few emergency transmitters were built, although there is no evidence that these were ever used to make contact. But some prisoners proved adept at scrounging local components, building and hiding small HF receivers, in Germany (Capt Shackleton, G6SN), Malaya (Tom Douglas, G3BA) and in Hong Kong (Herb Dixon, ZL2BQ). The RSGB set up a fund to supply parcels to POWs (run by 'Eddy' Edwards, G8TL) although I do not know whether this route ever carried MI9 components.

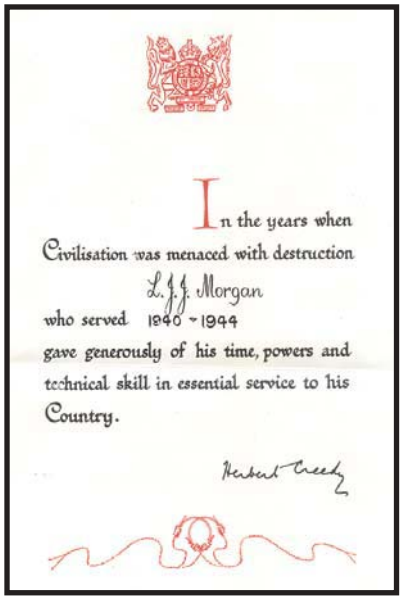
After a slight initial fall of membership to about 3800, there occurred an unforeseen phenomenon. The Service members and the RSGB's *Amateur Radio Handbook* (which became a recognised textbook for the Services), proselytised many thousands of recruits to the dormant hobby. By the end of the war, membership had more than doubled to 9646 and was to rise to some 15,000 in the immediate post-war period.

I would not wish to give the impression that the war was all beer and skittles or that radio amateurs did other than use their particular skills to aid the common war effort. [Sir] Martin Ryle, G3CY, who spent six war years working on radar counter-measures, has put it thus: "By the end of the war we were all very tired. Few of us knew precisely what we wanted to do... I certainly knew what I didn't want to do... I wanted nothing more to do with military equipment or to go on designing bigger and better radars in preparation for the next war." What most wanted was to get back on the air in pursuit of international friendship.

THE POST-WAR BOOM

In January 1946, little more than four months after the end of the war in the Far East, UK amateurs came back on the air, at first on 28MHz only then 1.7MHz in early 1946, and gradually 3.5, 7, 14 and 56MHz. Holders of pre-war 'AA' licences were granted a full licence, with the G prefix, subject to the 12WPM Morse test. For new licensees, a technical written examination was introduced, and for a time the new first-year licensees were restricted to Morse and 25 watts. But for several years, there was a long list of Service trades and qualifications that exempted applicants from the Morse or Technical or both examinations.

Since then we have seen 57 years of unbroken activity, with additional bands and modes and reciprocal licensing becoming available as the result of decisions made at meetings of the International Telecommunication Union or following negotiations between the Society and the licensing authority. Real dangers of losing 7MHz and 1.7MHz arose at the Atlantic City ITU conference of 1947, and we all owe a debt to Stan Lewer, G6LJ, the then President of the Society, and A H Mumford of the Post Office who succeeded in inserting a footnote which ensured that the UK alone retained a 200kHz allocation at 1.8MHz. For the first time the *Radio Regulations* divided the world into three Regions with some unfortunate consequences for European amateurs. The 7MHz band


In the years when
Civilisation was menaced with destruction
L. J. J. Morgan
who served 1940 - 1944
gave generously of his time, powers and
technical skill in essential service to his
Country.

The VI's wartime work remained secret for many years, acknowledged only by a discreetly worded certificate such as the one awarded to L Morgan, G2HNO, after WWII.

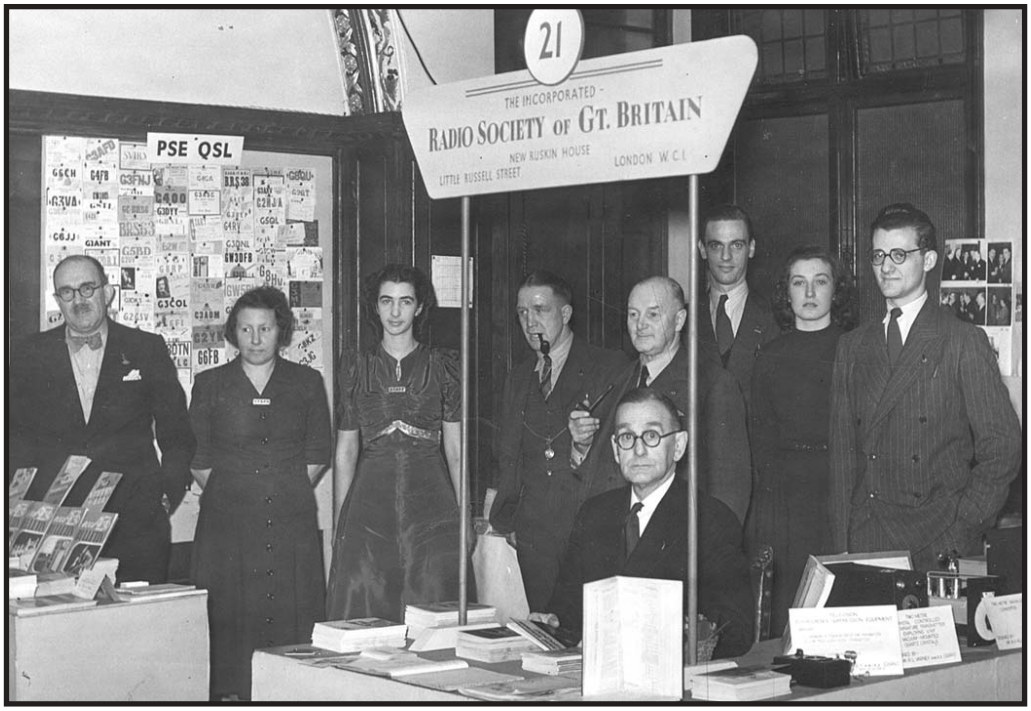
in Europe and Africa (Region 1) was restricted to just one-third of the Region 2 (the Americas) allocation, but amateurs were awarded a generous new allocation at 21MHz.

The International Amateur Radio Union, formed in Paris in 1925, had in the pre-war days been a near moribund organisation. Post-war, it was rejuvenated; an influential and active Region 1 Bureau set up, paid for by members' subscriptions to their national societies. This, together with the declining use of HF for international telecommunications, facilitated agreement at the World Administrative Radio Conference of 1979 to the award to amateurs of shared and exclusive narrow frequency allocations at 10, 18 and 24MHz.

The old harmonically-related band at 56MHz was soon lost to television, but a new 144MHz band granted together with a string of UHF allocations. UK amateurs were granted a 70MHz concession and in

Radio amateur VI group leaders (home region) and RSS officers at Leatherhead 1945. In the centre, with pipe, is Lord Sandhurst.

rt 2: WWII and beyond



The RSGB Amateur Radio Exhibition stand at the Royal Hotel, Bloomsbury, November 1948. Left to right: John Clarricoats (General Secretary); May Gadsden (HQ); Miss H Lightfoot (HQ); C Wakeman, G4FN; H Freeman (Exhibition Manager); Pat Hawker, G3VA (HQ); Miss G Thomas, later Gwen Hawker (HQ); P Bond, G3BEG. Seated: G Cpt H Evans, G6CH.

1985 permission to use part of the 50MHz band. Most recently we have access to LF allocations (initially 73kHz, then also 136kHz) and experimental access to spot frequencies at 5MHz.

The position today is good, but the old adage 'use or lose' still applies. Today the pressure has shifted from HF to VHF / UHF. Harmonic interference to VHF television had been noted in the London area pre-war, with remedies suggested in the *Bull* by H A M Clark, G6OT, but with the spread of television nationally, TVI for a time presented a serious threat and drove numbers of amateurs off the air. Membership of the RSGB almost halved in the 1950s from a post-war peak of over 15,000. TVI was only one of the reasons; many members were completing their education or learning new civilian jobs, marrying, moving home, facing local authority planning restrictions, etc. Open bread-board or chassis construction became unusable. The supply of low-cost wartime 'surplus' began drying up. Good screening and filtering became obligatory, spurred on by new 'TVI-proof' designs by Louis Varney, G5RV, and other professional engineers in the UK and USA. There was pressure on the Council to face up to the decline in membership, from which emerged the energetic Roy Stevens, G2BVN, one of the wartime 'Early Birds'. He played a major role in the Society until falling victim to a disabling and terminal disease.

Membership began to climb again, reaching a peak of an astonishing 37,096 in June 1985 when the attractions of home computing, video games and later the Internet and mobile phones began to attract away potential youngsters.

For HF operators, an early but important change came with the resumption of activities in 1946. Pre-war practice had been to use crystal-control, making transmitters 'rock-bound' on a few fixed frequencies - this meant that after a "TEST" call it was necessary to search over much of the band to find an answering station.

By 1948, the practice of 'netting' with both stations on the same frequency had become virtually universal - calling for the development of VFOs of good stability - a requirement also for the SSB mode used increasingly from the early 1950s. Until then, most UK amateurs made use of modified ex-Services or home-built transmitters but, in the 1950s, the old 6ft racks began to be replaced by 'table-top' units - sometimes home-built but increasingly factory-built by such firms as Panda Radio, Labgear (a Pye subsidiary) etc.

The majority of receivers were soon factory models, including many ex-Service HROs, AR88s and post-war models by Eddystone, KW Electronics, National, Hammarlund, Drake etc. In the 1960s, the SSB / CW transceiver became increasingly popular, pioneered by Collins with the KWM-1 (late 1950s), soon followed by KW Electronics with the lower-cost KW2000 series. Then the Japanese 'black boxes' began to appear, and it was not long before they began to dominate the amateur radio market throughout the world.

There was a gradual drift to factory-built equipment, much enhanced by the growing popularity in the 50s and

RSGB Headquarters 1968-88 at 35 Doughty Street, London WC1, the first property wholly-owned by the Society.

90 years of the RSGB pa

Hanslope Park station, 1946. The large unit houses the antenna distribution amplifiers designed by G6CJ in 1941-2 and which remained in use for many years. Each operating position was equipped with two HRO receivers.

60s of SSB on HF and FM on VHF. Poor old 'ancient modulation' (AM) suffered a largely undeserved fate, barely hanging on today even in bands with sufficient space to accommodate two sets of sidebands.

The move of UK television from VHF to UHF at the end of the 1960s greatly reduced the threat of TVI but the general problem of electromagnetic compatibility (EMC), most often in the form of interference to reception, has increased - and continues to do so. The work of the Society's EMC committee remains vital; the threat of Power Line Transmission of data is a real one.

In 1947, the Society launched the first 'Amateur Radio Exhibition' at the Royal Hotel in London, based on plans drawn up for an aborted 1939 exhibition. Over the years, this became an annual event at a series of venues, augmented by mobile rallies. The pre-war annual convention weeks were not renewed, but became occasional events usually in the provinces and later for a time at the National Exhibition Centre in Birmingham. Specialist interests prompted the VHF Convention and later the HF Convention.

In the early post-war years the Society organised an annual lecture programme at the IEE, Savoy Place, with the lectures often reproduced in the short-lived *Proceedings of the RSGB* introduced to overcome the continued paper rationing. One of the memorable lectures was 'Signals from the Sun' given by [Sir] Martin Ryle, G3CY, a pioneer radio-astronomer, later Astronomer Royal, who retained his licence and membership until becoming a silent key. Amateurs have played their part in satellite communications, data transmission that has progressed from mechanical teleprinters to digital electronic systems, and amateur television launched at one of the early amateur radio exhibitions in the late 1940s has its enthusiastic adherents, catered for by its own British Amateur Television Club.

'Clarry' retired in 1963, after over 30 years as Secretary-Editor and dominant figure in the running of the Society. A move of HQ to 35 Doughty Street, London, the first property to be purchased by the Society, was made in 1968; then in 1988 to the present HQ in Potters Bar.

Financially, the Society has had its ups and downs but remains in a strong position, with expenditure kept under tight managerial control.

The progressive miniaturisation of components that got under way during the war years was revolutionised by the coming of solid-state devices including discrete transistors, integrated circuits and most recently surface-mount devices. This has drastically reduced the size of equipment, though has had relatively little effect on amateur operating which in many ways remains much the same as when the Society was founded in 1913.

An American study some years ago concluded that the Amateur Service is a national and international resource whose curtailment would constitute a serious loss to the technological, economic and sociological welfare of all nations. But, of course, at the same time it offers a lot of fun and enjoyment for enthusiasts of all ages! Although in peacetime a prime benefit of the hobby is its contribution to the forging of international friendships, the American report underlined the value of having trained communicators in times of war. During WWII, of the 60,000 licensed radio amateurs in the USA, 25,000 served in the armed forces and 25,000 in defence industries or as instructors in special military schools. The percentage of British amateurs who put their skills towards the war effort was almost certainly even greater.

With the coming of the Foundation Licence and the proposed elimination of Morse as a licence qualification (but not as an operating mode!) it is becoming easier for both young and old to obtain an amateur transmitting licence. It must be the role of the national societies to ensure that the licence continues to be cherished and used wisely and well.

Amateur radio is one of the few hobbies [the only one? - *Ed*] to have been formally defined in an international treaty drawn up by 150 nations; redefined at Geneva in 1979 as "A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest."

If we can hold good to that definition, the Society should see not only its centennial but another 90 years. Happy 90th Birthday! ◆

90 YEARS

rt 2: WWII and beyond

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(Length 7' approx)

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VHF/UHF MOBILE ANTENNAS

MICRO MAG 2 Metre 70 cms Super Strong 1" Mag Mount (Length 22") **£14.95**

MR700 2m/70cms, 1/4 wave & 5/8, Gain 2m 0dB/3.0dB 70cms Length 20" 3⁄8 Fitting **£7.95**
SO239 Fitting **£9.95**

MR 777 2 Metre 70 cms 2.8 & 4.8 dBd Gain (5⁄8 & 2x5⁄8 wave) (Length 60") (3⁄8 fitting) **£16.95**
(SO239 fitting) **£18.95**

MRQ525 2m/70cms, 1/4 wave & 5/8, Gain 2m 0.5dB/3.2dB 70cms Length 17"
SO239 fitting commercial quality **£19.95**

MRQ500 2m/70cms, 1/2 wave & 2x5/8, Gain 2m 3.2dB/5.8db 70cms Length 38" SO239 fitting commercial quality **£24.95**

MRQ750 2m/70cms, 6/8 wave & 3x5/8, Gain 2m 5.5dB/8.0dB 70cms Length 60" SO239 fitting commercial quality **£39.95**

MRQ800 6/2/70cms 1/4 6/8 & 3 x 5/8, Gain 6m3.0dBi/2m 5.0dB/70 7.5dB Length 60" SO239 fitting commercial quality **£39.95**

GF151 Professional glass mount dual band antenna. Freq: 2/70 Gain: 2.9/4.3 Length: 31" **£39.95**

SINGLE BAND MOBILE ANTENNAS

MR 214 2 Metre 1/4 wave (3⁄8 fitting) **£3.99**
(SO239 fitting) **£5.00**

MR260S 2 Metre 1⁄2 wave 2.5 dBd gain Length 43" SO239 fitting **£24.95**

MR 258 2 Metre 5⁄8 wave 3.2 dBd Gain (3⁄8 fitting) (Length 58") **£12.95**

MR 650 2 Metre 5⁄8 wave open coil (3.2 dBd Gain) (Length 52") (3⁄8 fitting) **£9.95**

MR268S 2 Metre 5⁄8 wave 3.5dBd gain Length 51" S0239 fitting **£19.95**

MR280S 2 Metre 6⁄8 wave 5.8dBd gain Length 58" SO239 fitting **£29.95**

MR 614 6 Metre loaded 1/4 wave (Length 56") (3⁄8 fitting) **£13.95**

MR 644 6 Metre loaded 1/4 wave (Length 40") (3⁄8 fitting) **£12.95**
(SO239 fitting) **£15.95**

SINGLE BAND END FED BASE ANTENNAS

70 cms 1⁄2 wave, length 26", gain 3.5dB **£24.95**
2 metre 1⁄2 wave, length 52", gain 3.5dB **£24.95**
4 metre 1⁄2 wave, length 80", gain 3.5dB **£34.95**
6 metre 1⁄2 wave, length 120", gain 3.5dB **£44.95**
6 metre 5⁄8 wave, length 150", gain 5.5dB **£49.95**
(All above end fed antennas are DC grounded, so are radial free!)

VHF/UHF VERTICAL CO-LINEAR FIBREGLASS BASE ANTENNA

SQ & BM Range VX 6 Co-linear:- Specially Designed Tubular Vertical Coils individually tuned to within 0.05pf (maximum power 100 watts)

BM100 Dual-Bander **£29.95**
(2 mts 3dBd) (70cms 6dBd) (Length 39")

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(2 mts 3dBd) (70cms 6dBd) (Length 39")

BM200 Dual-Bander **£39.95**
(2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")

SQBM200 Dual-Bander **£49.95**
(2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")

SQBM500 Dual - Bander Super Gainer **£59.95**
(2 mts 6.8dBd) (70cms 9.2dBd) (Length100")

SQBM800 Dual - Bander Ultra Gainer **£129.95**
(2 mts 8.5dBd) (70cms 12.5dBd) (Length 200")

BM1000 Tri-Bander **£59.95**
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")

SQBM1000 Tri-Bander **£69.95**
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")

SQBM 100/200/500/800/1000 are Polycoated Fibre Glass with Chrome & Stainless Steel Fittings.

SINGLE BAND VERTICAL CO-LINEAR BASE ANTENNA

BM33 70 cm 2 X 5⁄8 wave Length 39" 7.0 dBd Gain **£34.95**
BM45 70cm 3 X 5⁄8 wave Length 62" 8.5 dBd Gain **£49.95**
BM55 70cm 4 X 5⁄8 wave Length 100" 10 dBd Gain **£69.95**
BM60 2mtr5⁄8 Wave, Length 62", 5.5dBd Gain **£49.95**
BM65 2mtr 2 X 5⁄8 Wave, Length 100", 8.0 dBd Gain **£69.95**

MINI HF DIPOLES (length 11' approx)

MD020 20mt version approx only 11ft **£39.95**
MD040 40mt version approx only 11ft **£44.95**
MDO80 80mt version approx only 11ft **£49.95**
(aluminium construction)

ROTATIVE HF DIPOLE

RDP-3B 10/15/20mtrs length 7.40m **£99.95**
RDP-40M 40mtrs length 11.20m **£139.95**
RDP-6B 10/12/15/17/20/30mtrs boom length 1.00m. Length 10.0m **£199.95**

HF DELTA LOOPS

DLHF-100 10/15/20mtrs (12/17-30m) Boom length 4.2m. Max height 6.8m. Weight 35kg. Gain 10dB **£399.95**

HAND-HELD ANTENNAS

MRW-300 Rubber Duck TX 2 Metre & 70 cms RX 25-1800 Mhz Length 21cm BNC fitting **£12.95**

MRW-310 Rubber DuckTX 2 Metre & 70 cms Super Gainer RX 25- 1800 Length 40cm BNC fitting **£14.95**

MRW-232 Mini Miracle TX 2 Metre 70 & 23 cms RX 25-1800 Mhz Length just 4.5cm BNC fitting **£19.95**

MRW-250 Telescopic TX 2 Metre & 70 cms RX 25-1800 Mhz Length 14-41cm BNC fitting **£16.95**

MRW-200 Flexi TX 2 Metre & 70cms RX 25-1800 Mhz Length 21cm SMA fitting **£19.95**

MRW-210 Flexi TX 2 Metre & 70cms Super Gainer RX 25-1800 Mhz Length 37cm SMA fitting **£22.95**

All of the above are suitable to any transceiver or scanner.
Please add £2.00 p+p for hand-held antennas.

HB9CV 2 ELEMENT BEAM 3.5 dBd

70cms	(Boom 12")	**£15.95**
2 metre	(Boom 20")	**£19.95**
4 metre	(Boom 23")	**£27.95**
6 metre	(Boom 33")	**£34.95**
10 metre	(Boom 52")	**£64.95**
6/2/70 Triband	(Boom 45")	**£64.95**

CROSSED YAGI BEAMS All fittings Stainless Steel

2 metre 5 Element
(Boom 64") (Gain 7.5dBd) **£74.95**

2 metre 8 Element
(Boom 126") (Gain 11.5dBd) **£94.95**

70 cms 13 Element
(Boom 83") (Gain 12.5dBd) **£74.95**

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2 metre 4 Element
(Boom 48") (Gain 7dBd) **£24.95**

2 metre 5 Element
(Boom 63") (Gain 10dBd) **£44.95**

2 metre 8 Element
(Boom 125") (Gain 12dBd) **£59.95**

2 metre 11 Element
(Boom 185") (Gain 13dBd) **£89.95**

4 metre 3 Element
(Boom 45") (Gain 8dBd) **£49.95**

4 metre 5 Element
(Boom 128") (Gain 10dBd) **£59.95**

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(Boom 72") (Gain 7.5dBd) **£54.95**

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(Boom 142") (Gain 9.5dBd) **£74.95**

70 cms 13 Element
(Boom 76") (Gain 12.5dBd) **£49.95**

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ALL FITTINGS STAINLESS STEEL

2 metre 5 Element (Boom 38") (Gain 9.5dBd) **£39.95**
2 metre 7 Element (Boom 60") (Gain 12dBd) **£49.95**
2 metre 12 Element (Boom 126") (Gain 14dBd) **£74.95**
70 cms 7 Element (Boom 28") (Gain 11.5dBd) **£34.95**
70 cms 12 Element (Boom 48") (Gain 14dBd) **£49.95**

MULTI PURPOSE ANTENNAS

MSS-1 Freq RX 25-2000 Mhz, TX 2 mtr 2.5 dBd Gain, TX 70cms 4.0 dBd Gain, Length 39" **£39.95**

MSS-2 Freq RX 25-2000 Mhz, TX 2 mtr 4.0 dBd Gain, TX 70cms 6.0 dBd Gain, Length 62" **£49.95**

IVX-2000 Freq RX 25-2000 Mhz, TX 6 mtr 2.0 dBd Gain, 2 mtr 4dBd Gain, 70cms 6dBd Gain, Length 100" **£89.95**

Above antennas are suitable for transceivers only

HALO LOOPS

2 metre (size 12" approx) **£12.95**
4 metre (size 20" approx) **£18.95**
6 metre (size 30" approx) **£24.95**

G5RV Wire Antenna (10-40/80 metre)
All fittings Stainless Steel

	FULL	HALF
Standard	**£22.95**	**£19.95**
Hard Drawn	**£24.95**	**£22.95**
Flex Weave	**£32.95**	**£27.95**
PVC Coated Flex Weave	**£37.95**	**£32.95**
Deluxe 450 ohm PVC Flexweave	**£49.95**	**£44.95**

TS1 Stainless Steel Tension Springs (pair) for G5RV **£19.95**

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Convert your half size g5rv into a full size with just 8ft either side. Ideal for the small garden **£19.95**

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Complete with 25 mts of enamelled wire, insulator and choke Balun Matches any long wire to 50 Ohms. All mode no A.T.U. required. 2 "S" points greater than other Baluns.

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5ft POLES H/DUTY (SWAGED)

Heavy Duty Ali (1.2mm wall)
1 1/4" single 5' ali pole £7.00
1 1/4" set of four (20' total approx) £24.95
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1 1/2" set of four (20' total approx) £34.95
1 3/4" single 5' ali pole £12.00
1 3/4" single 5' ali pole (20' total approx) £39.95
2" single 5' ali pole £15.00
2" set of four (20' total approx) £49.95
(All swaged poles have a push fit to give a very strong mast set)

REINFORCED HARDENED FIBRE GLASS MASTS (GRP)

1 1/2" Diameter 2 metres long £16.00
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RG58 best quality standard per mt 35p
RG58 best quality military spec per mt 60p
Mini 8 best quality military spec best quality per mt 70p
RG213 best quality military spec per mt 85p
H200 best quality military coax cable per mt £1.10
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7-core rotator cable per mt £1.00
PHONE FOR 100 METRE DISCOUNT PRICE.

CONNECTORS & ADAPTERS

PL259/9 ..... £0.75 each
PL259/6 ..... £0.75 each
PL259/7 for mini 8 ..... £1.00 each
BNC (Screw Type) ..... £1.00 each
BNC (Solder Type) ..... £1.00 each
BNC for 9mm (RG213) £2.50
N TYPE for RG58 ..... £2.50 each
N TYPE for RG213 ..... £2.50 each
SO239 to BNC ..... £1.50 each
PL259 to BNC ..... £2.00 each
N TYPE to SO239 ..... £3.00 each
BNC to N-type £2.50
SMA to BNC £3.95
SMA to SO239 ..... £3.95
SMA to PL259 ..... £3.95
SMA to BNC (male) £3.95
SO239 chasis socket round £1.00
N-type chasis socket round £2.50
SO239 double female £1.00
N-type double female £2.50
SO239 double female £1.00

YAGI COUPLERS

YC-6m For 2 x 50MHz Yagi £29.95
YC-2m For 2 x 144MHz Yagi £24.95
YC-7m For 2 x 70cm Yagi £19.95

10/11 METRE VERTICALS

G.A.P.12 1/2 wave alumimum (length 18' approx) £24.95
G.A.P.58 5/8 wave aluminium (length 21' approx) £29.95

BALUNS

MB-1 1:1 Balun 400 watts power £24.95
MB-4 4:1 Balun 400 watts power £24.95
MB-6 6:1 Balun 400 watts power £24.95
MB-1X 1:1 Balun 1000 watts power £29.95
MB-4X 4:1 Balun 1000 watts power £29.95
MB-6X 6:1 Balun 1000 watts power £29.95
MB-Y2 Yagi Balun 1.5 to 50MHz 1kW £24.95

TRI/DUPLEXER & ANTENNA SWITCHES

MD-24 HF or VHF/UHF internal duplexer (1.3-225MHz) (350-540MHz) SO239/PL259 fittings £22.95
MD-24N same spec as MD-24 but "N-type" fittings £24.95
MD-25 HF or VHF/UHF internal/external duplexer (1.3-225MHz) (350-540MHz) SO239 fittings £24.95
MX2000 HF/VHF/UHF internal Tri-plexer (1.6-60MHz) (110-170MHz) (300-950MHz) £49.95
CS201 Two-way di-cast antenna switch. Freq: 0-1000MHz max 2,500 watts SO239 fittings £18.95
CS201-N Same spec as CS201 but with N-type fittings £28.95
CS401 Same spec as CS201 but4-way £49.95

ANTENNA ROTATORS

AR-31050 Very light duty TV/UHF £24.95
AR-300XL Light duty UHF\VHF £49.95
YS-130 Medium duty VHF £79.95
RC5-1 Heavy duty HF £349.95
RG5-3 Heavy Duty HF inc Pre Set Control Box £449.95
AR26 Alignment Bearing for the AR300XL £18.95
RC26 Alignment Bearing for RC5-1/3 ..... £49.95

MOBILE MOUNTS

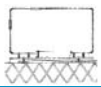
Turbo mag mount 7" 4mtrs coax/PL259 3/8 or SO239 ..... £14.95
Tri-mag mount 3 x 5" 4mtrs coax/PL259 3/8 or SO239 ..... £39.95
Hatch Back Mount (stainless steel) 4 mts coax/PL259 3/8 or SO239 fully adjustable with turn knob £29.95
Gutter Mount (same as above) £29.95
Rail Mount (aluminium) 4mtrs coax/PL259 sutiable for up to 1inch roof bars or poles 3/8 fitting £12.95
SO259 fitting £14.95
Gutter Mount (cast aluminium) 4mtrs coax/PL259 3/8 fitting £9.95
SO259 fitting £12.95
Hatch Back Mount 3/8 4mtrs coax/PL259 ..... £12.95
Roof stud Mount 4mts coax/PL259 3/8 or SO239 fitting £12.95

ANTENNA WIRE & RIBBON

Enamelled copper wire 16 gauge(50mtrs) £9.95
Hard Drawn copper wire16 gauge (50mtrs) £12.95
Equipment wire Multi Stranded (50mtrs) £9.95
Flexweave high quality (50mtrs) £27.95
PVC Coated Flexweave high quality (50mtrs) £37.95
300Ω Ladder Ribbon heavy duty USA imported (20mtrs) £15.00
450Ω Ladder Ribbon heavy duty USA imported (20mtrs) £15.00
(Other lengths available, please phone for details)

HF BALCONY ANTENNA

BAHF-4 FREQ:10-15-20-40 Mtrs LENGTH: 1.70m HEIGHT: 1.20m POWER: 300 Watts £129.95



MISCELLANEOUS ITEMS

CDX Lightening arrestor 500 watts £19.95
MDX Lightening arrestor 1000 watts £24.95
AKD TV1 filter £9.95
Amalgamating tape (10mtrs) £7.50
Desoldering pump £2.99
Alignment 5pc kit £1.99

TELESCOPIC MASTS (aluminium & fibreglass options)

TMA3 3" to 1 1/4" heavy duty aluminium telescopic mast set, approx 40ft when erect, 6ft collapsed £199.95
TMA2 2 1/4" to 1 1/4" heavy duty telescopic mast set, approx 40ft when erect, 9ft collapsed £149.95
TMA1 2" to 1 1/4" heavy duty aluminium telescopic mast set, approx 20ft when erect, 6ft collapsed £99.95
TMAF-1 2" to 1 1/4" heavy duty fibreglass telescopic mast set, approx 20ft when erect, 6ft collapsed £99.95
TMAF-2 2 1/4" to 1 1/4" heavy duty telescopic fibreglass mast set, approx 40ft when erect, 9ft collapsed £189.95

HF YAGI

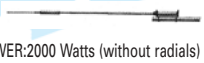
HBV-2 2 BAND 2 ELEMENT TRAPPED BEAM FREQ:20-40 Mtrs GAIN:4dBd BOOM:5.00m LONGEST ELEMENT:13.00m POWER:1600 Watts £329.95

ADEX-3300 3 BAND 3 ELEMENT TRAPPED BEAM FREQ:10-15-20 Mtrs GAIN:8 dBd BOOM:4.42m LONGEST ELE:8.46m POWER:2000 Watts £269.95

ADEX-6400 6 BAND 4 ELEMENT TRAPPED BEAM FREQ:10-12-15-17-20-30 Mtrs GAIN:7.5 dBd BOOM:4.27m LONGEST ELE:10.00m POWER:2000 Watts £499.95
40 Mtr RADIAL KIT FOR ABOVE £99.00

HF VERTICALS

VR3000 3 BAND VERTICAL FREQ: 10-15-20 Mtrs GAIN: 3.8 dBd HEIGHT:3.80m POWER:2000 Watts (without radials) POWER: 500 Watts (with optional radials) £89.95
OPTIONAL 10-15-20mtr radial kit £34.95



VR5000 5 BAND VERTICAL FREQ:10-15-20-40-80 Mtrs GAIN:3.5 dBd HEIGHT:4.00m RADIAL LENGTH:2.30m (included). POWER: 500 Watts £169.95

EVX4000 4 BAND VERTICAL FREQ:10-15-20-40 Mtrs GAIN:3.5 dBd HEIGHT:6.50m POWER:2000 Watts (without radials) POWER:500 Watts (with optional radials) £99.95
OPTIONAL 10-15-20mtr radial kit £34.95
OPTIONAL 40mtr radial kit £12.95

EVX5000 5 BAND VERTICAL FREQ:10-15-20-40-80 Mtrs GAIN:3.5 dBd HEIGHT:7.30m POWER:2000 Watts (without radials) POWER:500 Watts (with optional radials) £139.95
OPTIONAL 10-15-20mtr radial kit £34.95
OPTIONAL 40mtr radial kit £12.95
OPTIONAL 80mtr radial kit £14.95

EVX6000 6 BAND VERTICAL FREQ:10-15-20-30-40-80 Mtrs HEIGHT:5.00m RADIAL LENGTH:1.70m(included) POWER:800 Watts £249.95

EVX8000 8 BAND VERTICAL FREQ:10-12-15-17-20-30-40 Mtrs (80m optional) HEIGHT: 4.90m RADIAL LENGTH: 1.80m (included) POWER: 2000 Watts £269.95
80 MTR RADIAL KIT FOR ABOVE £79.00

(All verticals require grounding if optional radials are not purchased to obtain a good VSWR)

TRAPPED WIRE DI-POLE ANTENNAS

(Hi Grade Heavy Duty Commercial Antennas)

UTD160 FREQ:160 Mtrs LENGTH:28m POWER:1000 Watts £44.95
MTD-1 (3 BAND) FREQ:10-15-20 Mtrs LENGTH:7.40 Mtrs POWER:1000 Watts £39.95
MTD-2 (2 BAND) FREQ:40-80 Mtrs LENGTH: 20Mtrs POWER:1000 Watts £44.95
MTD-3 (3 BAND) FREQ:40-80-160 Mtrs LENGTH: 32.5m POWER: 1000 Watts £89.95
MTD-4 (3 BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts £44.95
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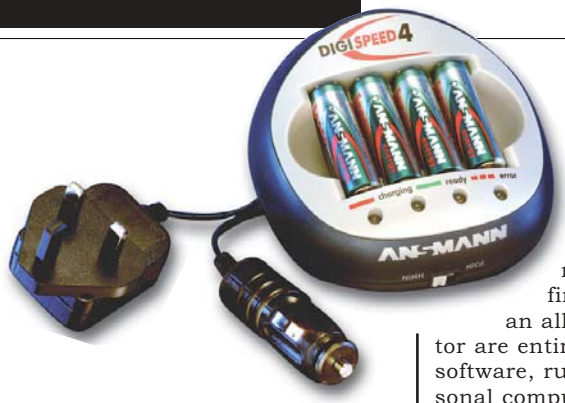


ANSMANN ULTRA-FAST CHARGER

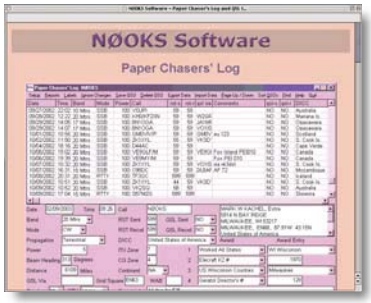
A new ultra-fast charger, suitable for NiMH or NiCd batteries (selectable via a switch on the charger) has been launched by charger, battery and power supply company **ANSMANN**. The **DIGISPEED 4** is available complete with four AA 2200mAh batteries and can charge one to four AAA or AA cells. Features include faulty cell detection, charge indicator for each battery position, microprocessor controller monitoring each individual battery position and peak detection to ensure batteries are not over-charged. More information from: **ANSMANN UK Limited, Latton Bush Business Centre, Southern Way, Harlow, Essex CM18 7BH; tel: 01279 838205; fax: 01279 838 206; e-mail: info@ansmann.co.uk; website: www.ansmann.co.uk**

WiNRADiO G303i

The **WiNRADiO G303i** shortwave receiver is a low-cost wide-band PC-based receiver intended for experimenting and hobby use. It is the world's first dedicated short-wave receiver on a PC (PCI bus) card and also the first commercially-available receiver where the final IF stage and an all-mode demodulator are entirely executed in software, running on a personal computer. The standard WR-G303i package includes a WR-G303i receiver card, application software, user's manual, a start-up antenna, audio lead and BNC-to-SMA adapter. We hope to review this receiver in *RadCom* shortly. It is available from **Falcon Equipment & Systems; tel: 01684 295807; e-mail: winradio@sda-falcon.co.uk; website: www.winradio.co.uk**

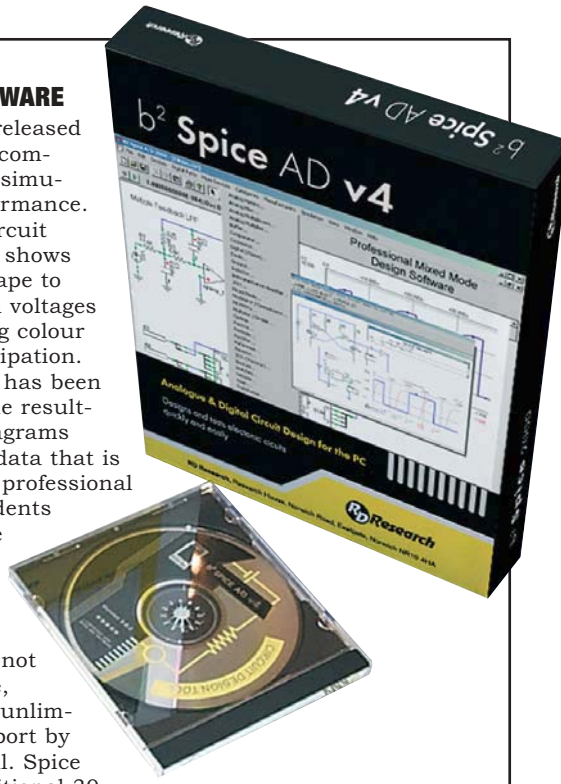
AWARD HUNTER'S LOGGING PROGRAM

Paper Chasers' Log is a new computer logging program that, the author says, "tracks more awards than all the other QSO logging programs together". Awards such as those from FISTS, QCWA, QRP-ARCI, SMIRK, SWOT and TenTen are catered for. Then there are the awards from all over the world including Worked All Africa, Celtic Peoples, Commonwealth Century Club to Northern Ireland Counties and Worked All Swiss Cantons. You can track Grid squares and WAB squares. There are many data-import routines to import your data from other programs. You can also print QSO and address labels. All this for US$25. Full details are at **www.n0oks.com**



SPICE CIRCUIT SIMULATION SOFTWARE

RD Research has released the B^2 Spice v4.2 computer program for simulating circuit performance. A revolutionary 'circuit animation' feature shows wires changing shape to reflect current and voltages and parts changing colour to reflect heat dissipation. The user interface has been redesigned, and the resulting graphs and diagrams produce accurate data that is of practical use to professional designers and students alike. The software comes with a comprehensive 400-page user manual with clear tutorials for those not familiar with Spice, backed up by free unlimited technical support by telephone or e-mail. Spice carries an unconditional 30-day evaluation: if for any reason a user is dissatisfied they may return it within 30 days for a complete refund; no quibbles, no questions. The price is £239 ex-VAT (upgrade price £119 ex-VAT). **RD Research, Research House, Norwich Road, Eastgate, Norwich NR10 4HA; tel: 01603 872331; fax: 01603 879010; e-mail: rd.research@paston.co.uk; Internet: www.spice-software.com**



AOR AR8600 MARK 2 RECEIVER

The **AOR AR8600 wide-band receiver** has been extensively enhanced and is now known as the **AR8600 Mark2**. Already recognised as a versatile receiver as it can be powered from 12V DC or from an optional internal battery pack. The RF performance has been further boosted, especially on the short-wave bands. The upper frequency range has been extended to 3000MHz (3.0GHz) with an enhancement to short wave performance by the addition of further band-pass filters and revision to IF filters. **AOR UK LTD, 4E East Mill, Bridgefoot, Belper, Derbyshire DE56 2UA; tel: 01773 880788; fax: 01773 880780; e-mail: info@aoruk.com; website: www.aoruk.com**

MAGNIFIERS FOR ENGINEERS & HOBBYISTS

The human eye needs a little help at times, particularly as one gets older, and it is worth taking care to select the right magnifier for the task.

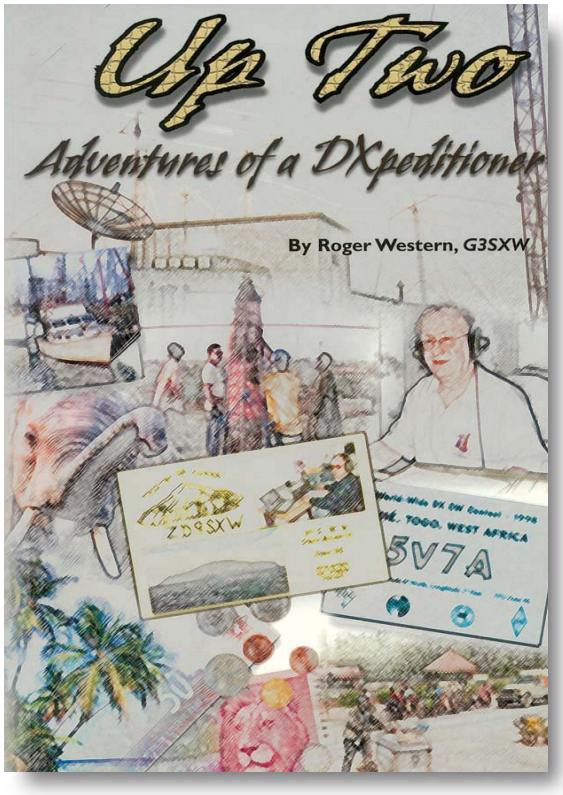
Horizon Magnifiers are specialists in the supply of a wide range of magnifying products. The company has a free mail order catalogue detailing magnifiers suitable for the engineer, technician, craftsman or hobbyist. Started in 1985 and run by Simon Fouracres, G4HVX, and his wife Liz, Horizon has a stock of high-quality magnifiers carefully selected from optical manufacturers in the UK, Germany, USA and Japan. The catalogue specifies magnification, size of lens plus, where possible, working distance and field of view and can be obtained from **Horizon Magnifiers, PO Box 44, Tiverton EX16 6YF; tel: 01884 254172; www.magnifiers.co.uk**

MOTORISED MOBILE ANTENNA

High Sierra Antennas of California has appointed Waters & Stanton plc as its exclusive distributor in the UK for its range of motorised antennas. W&S is launching the range with the most popular item: the HS-1800. This is a motorised antenna with a 6ft whip, stainless steel mounting bracket and remote controller for £399.95. Details from: **Waters & Stanton plc, 22 Main Road, Hockley, Essex SS5 4QS; tel: 01702 206835; fax: 01702 205843; www.wsplc.com**

UP TWO: NEW BOOK

Up Two – Adventures of a DXpeditioner is a new book by one of the UK's top DXers, contesters and DXpeditioners, **Roger Western, G3SXW**. A series of 22 chapters gives the background to the author's operations from some of the most remote places in the world, including Tristan da Cunha, Wallis & Futuna and Chatham Island. The book is not just an account of radio operating, but includes much incidental background on the countries concerned; Roger was resident in Iran for several years and witnessed the overthrow of the Shah and the Islamic Revolution first-hand, fleeing the country on one of the last flights before the country was effectively sealed off. Despite such adventures, his love of travel and of the peoples met in those far-off lands comes through strongly in the narrative. More recently, Roger was a founder member of the Voodoo Contest Group, which has taken top honours in the multi-multi section of the *CQ* World Wide DX CW contest from a number of countries in West Africa over the last decade or so. The book gives a good idea of the sheer scale of these contest expeditions and the logistics involved in transporting a bus-load of equipment and antennas across several land borders in West Africa. A further series of chapters includes one on 'Pile-up Operating' that should be required reading for all would-be DXers. Packed with anecdotes, *Up Two* is guaranteed to make your reach for your passport and phone your travel agent!



***Up Two – Adventures of a DXpeditioner*, published by Idiom Press, California, USA (www.idiompress.com), 238 pages, 23 x 15cm. UK orders £12.00 + £2.50 P&P direct from Roger Western, G3SXW, 7 Field Close, Chessington, Surrey KT9 2QD; e-mail: g3sxw@compuserve.com**

NEW PRODUCTS AT NEVADA

Most ATUs on the market today match balanced fed, open-wire or twin-feeder type antennas *after* the 4:1 input balun. This can be very inefficient and cause losses, especially on160m, as the balun is often mismatched on the antenna side. The new **Palstar AT1500 BAL** is a true balanced tuner that matches open-wire and twin-wire feeders *before* the balun, ensuring it 'sees' correct input and output impedance to give maximum power transfer and efficiency. The Palstar AT1500 BAL easily handles 1kW of power and retails for £599.

Nevada has announced the release of the **DR101** – the world's smallest portable **DAB Digital Radio**. DAB Digital broadcasts provide stunning reception even on earphones (as supplied with this radio.) The DR101 enables reception of the new digital programmes whilst on the move. The radio receives both the DAB Digital and 'normal' VHF / FM radio bands and sells for £169.

Roberts Radio has also joined the digital broadcasting era with four DAB radios: the **Gemini** range. Priced between £130 and £200, there's a radio for everyone. Three of the four are mains/battery portables, while the Gemini 4 is a 'Sports' personal DAB radio ideal for sports fans who want to tune into BBC Five Live Sports Extra for additional sporting events only broadcast on DAB. The Gemini 1 features a unique rewind function which enables users to go back in time to listen to audio that was broadcast a few seconds or minutes earlier.

The **Roberts C9950 Programmable Cassette Recorder**, of special interest to radio enthusiasts, has recently been released. The recorder features dual record speed, six separate timed recordings, voice activated recording, timed voice activated recording and remote switching of other equipment. The recorder can be left hooked up to a radio and can make either timed or voice activated recordings while you're away from the set. It can also switch the radio on via its internal timer switch. The C9950 sells for £80.00.

The **BPL Celeste MkII** is a new stereo portable radio that receives digital programmes from the **Worldspace satellite** system (see www.worldspaceradios.co.uk) plus AM / FM terrestrial radio. WorldSpace programmes are broadcast from a network of satellites 34,000km out in space without fading or interference. Reception is possible almost anywhere in the UK, Europe, Africa, the Middle East and Asia. There are over 40 stations broadcasting on the satellite 24 hours a day, including BBC World Service, CNN News, Bloomberg, multi-lingual, educational, sport, weather, plus specialist music stations such as 'the original' Radio Caroline. The Celeste is powered from internal batteries, external 12 volt supply or mains and costs £129.

Further details on all these items from **Nevada, Unit 1, Fitzherbert Spur, Farlington, Portsmouth PO6 1TT; tel: 02392 313090; fax: 023 9231 3091; e-mail: info@nevada.co.uk; website: www.nevada.co.uk**

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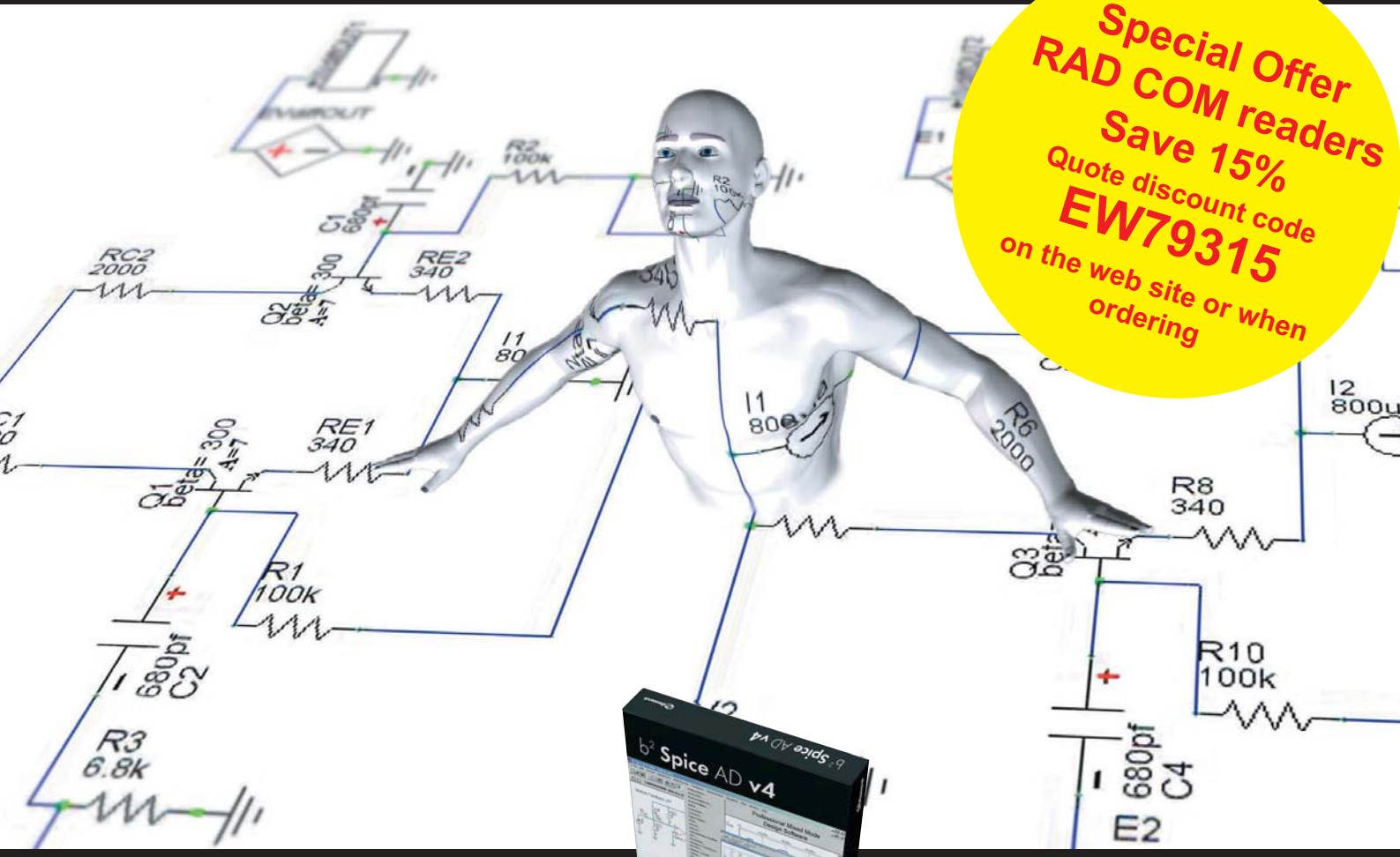

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By Peter Emmerton, G4IOV.
Email: g4iov@arrl.net

The OptiBeam OB9-5 Multiband Yagi Reviewed

Recently returned to the UK after a six-year posting to Ho Chi Minh City, Peter Emmerton, G4IOV/3W2EA, describes the OptiBeam OB9-5 antenna that he used in Vietnam.

I searched for an HF antenna for my location in Vietnam on the Internet. My criteria were: five bands 20, 17, 15, 12, 10m; no hose clamps; no traps; high performance; and low weight. I found OptiBeam, a company operated by Tom Schmenger, DF2BO, in Germany. My choice of five bands was driven by my location mid-way geographically between Europe and the USA. I use *PropMan 2000* to find the best propagation at any time of the day and I knew that I needed all five bands. My QTH is 110m above the River Saigon on the roof of a tall office building, and I did not want the risk of elements falling to the street below, as could be the case with hose-clamped elements. Eliminating traps and adopting NEC in the design process assured high performance. The OB9-5 weighs 25kg, with nine elements under a 5.1m boom. The longest element is 10.94m.

20, 17 and 15m each have their own dedicated driver and parasitic reflector, forming three interlaced two-element rear staggered Yagis. 12 and 10m each have their own driver, and share a common parasitic director, forming two interlaced two-element forward staggered Yagis. All five bands are fed by just one coaxial feedline. This is made possible by the German-patented 'OptiBeam direct coupled feed system', in which each driven element is driven in phase by lines consisting of a pair of square aluminium tubes energised by the coaxial feedline connection to the phase line below the 10m driven element. The phase lines are terminated fore and aft by tuned stubs. OptiBeam states that its direct-coupled feed system is extremely broadband and loss free.

ORDER AND DELIVERY

In the UK, OptiBeam antennas are available from Vine Antenna Products, but being in Vietnam I ordered direct from the manufacturer. First impressions count, and I knew from the first moment that customer service was going be Five Star. Tom Schmenger, DF2BO, gave detailed responses to all of my questions and provided the *EZNEC* printouts of the azimuth plots, elevation plots and SWR graphs for each band, and then e-mailed me the *EZNEC* data files for me to run on my own copy of the program. Detailed photographs of the construction, published on the OptiBeam Internet page, confirmed my decision to buy.

The OB9-5 was taken from stock and boxed on the same day that I wired the money, and delivery to Ho Chi Minh City Airport was within one week of placing my order. It arrived via Lufthansa Air-Cargo in one 2.5 x 0.2 x 0.15m cardboard carton.

ASSEMBLY

Opening the carton revealed each part labelled with an indelible black marker pen, and a water- and oil-proof file containing an inventory of parts individually signed off at the factory. Each element was bundled together with masking tape according to band, and whether it was a reflector, driver, or director. I laid them out carefully on the floor, and paired them with their own clearly-labelled element-to-boom mount. The mast-to-boom mount, boom sections, element-to-boom mounts, and the phase line termination stubs are pre-assembled. The boom is in three strong interlocking sections and its cross section is square, to prevent the elements rotating.

It is essential to read the instructions carefully, and then re-read them a couple of times. For many this will be their first encounter with high precision engineering and, as a rule of thumb, if something does not fit then you are doing it wrong. Meticulous attention is given at every stage of manufacture, and everything fits together perfectly.

Instead of hose clamps, OptiBeam uses stainless steel screws and self-locking nuts, inserted from the top. The top hole of the outer element is just larger than the diameter of the screw head and so it tightens to rest on the top of the inner element. This method provides maximum contact between the outer and the inner element and makes it quite impossible for the inner element to slide out and fall off. Even if the self-locking screws come off the screws will stay in with gravity.

Each join in the boom is secured with eight stainless steel nuts and bolts. The nuts are inside the boom, are self secured and self locking, and are invisible when the sections are joined. By raising the boom to the vertical a very tight and almost seamless joint can be obtained. The boom is marked to show the exact position of each element-to-boom mount.

I placed the boom on the stub of the rotator, calibrated it for due north and then set the approximate centre of gravity indicated in the instructions. Then I placed each element-to-boom mount (complete with elements) on the boom, keeping five of the nine mounts finger tight so as to permit the phase lines and stubs to be erected with relative ease. I checked the centre of gravity now bearing the elements, and allowing for the weight of

Top left: Close-up of the rear phase line termination stub.

Peter Emmerton, G4IOV/3W2EA, in his Ho Chi Minh City, Vietnam, 'shack'.

Immediate right: Peter Emmerton takes delivery of the OB9-5 antenna.

Right: The OB9-5 unpacked: elements pre-grouped with tape and all parts labelled.

the coax with RF choke.

I did not rush the installation of the phase lines, their cross over, and their termination stubs, as these are the heart of the OB9-5's performance and responsible for the OB9-5's very low SWR on all five bands. The phase lines are crossed over once just forward of the 17m driven element, highlighting that the OB9-5 consists of three Yagis (20-17-15m) in the rear stagger and two Yagis (12-10m) in the forward stagger. To connect the female coax plug to the phase line I found it necessary to loosen all nuts and screws in the assembly, and then tighten them when properly positioned. When the phase lines and the phase line termination stubs are tightened, the element-to-boom mounts can be tightened.

Finally I constructed an RF choke as instructed with seven 20cm-diameter turns of coax.

ON AIR

The OB9-5 performs exactly as expected from the *EZNEC* computer analysis. I used the SWR meter on my Yaesu Quadra linear amplifier, which provides SWR analysis before and after engaging the ATU. The SWR readings obtained without the ATU are fabulous and shown at **Table 1**.

Below, right: The OB9-5 up and completed.

In spite of low sunspot numbers, the OB9-5 provided me with wonderful DX. Ho Chi Minh City is UTC+7 and I usually operated from 1500 - 1700UTC. Switching across all five bands I easily gained access to Europe, and then South America, using 500 watts. My greatest surprise was the activity on 12m and on 10m. For years I had been using trapped and log periodic antennas and came to believe that 12m and 10m were just a myth that other people talked about, as I had never heard any activity on these bands. Now, with the OB9-5, I was able to actually use these bands. This clearly demonstrated to me the inadequacy of trapped elements and log periodic antennas on these bands.

EZNEC analysis is one of the best methods of comparing HF antennas, as reports will vary according to many factors ranging from elevation height to type of soil. The top of a tall office building in a city centre does not always bode well for propagation, but I achieved fabulous DX with the OB9-5.

EZNEC analysis shows that on 20, 17, 15, 12 and 10m the OB9-5 provides an approximate gain of 4.5dBd or 6.65dBi in free space, and 12dBi at 20m above ground, which is significantly more gain than expected from a two-element monoband Yagi. See **Table 2** for the *EZNEC* analysis.

At 20m above ground the gain tends towards that which one might expect from a three-element monoband Yagi on each band, with identical boomlength, owing to the careful interlacing and phasing of the elements. Bandwidth and front-to-back signal rejection are good.

Optimum front-to-back signal rejection is a matter of preference, and there is no right or wrong value. As the antenna is raised above ground the front-to-back ratio can also be expected to increase, and OptiBeam indicates front-to-back ratios of up to 18 - 25dB at 20m above ground.

OptiBeam points out that it is the OB9-5's combination of low take-off angle combined with high gain that is really important in achieving good HF DX. ◆

CONCLUSION

The OB9-5 is a fabulous Yagi antenna, offering five HF bands optimally interlaced on a five-metre boom with nine half-wave elements. It is constructed to exacting professional standards, and will last to be handed over to future generations.

It is often said that the antenna is the most critical ingredient in a radio station. Having invested in a Yaesu FT-1000MP MkV and a Quadra amp, I was determined to seek the best Yagi antenna available that met my criteria and I am delighted with what I found.

In the UK OptiBeam antennas are available from Vine Antenna Products, The Vine, Llandrinio, Powys SY22 6SH; tel: 01691 831111; fax: 01691 831386; e-mail: info@vinecom.co.uk; Internet: www.vinecom.co.uk The OB9-5 costs 1149 euros (approx £799, subject to currency fluctuations, contact Ron Stone, GW3YDX, at Vine for a firm sterling price.) OptiBeam's website is at **www.OptiBeam.de**

Frequency (kHz)	SWR Ratio	Frequency (kHz)	SWR Ratio	Frequency (kHz)	SWR Ratio
28000	1.3	28700	1.1	29700	1.4
24890	1.0	24895	1.0	24990	1.0
21000	1.2	21100	1.0	21450	1.1
18068	1.0	18100	1.0	18168	1.1
14100	1.1	14200	1.0	14350	1.3

Table 1. SWR without ATU for the OptiBeam OB9-5

Frequency (kHz)	RF Gain in Free Space (dBref)	Front-to-back Free Space (dB)	Take off at 20m above ground (Degrees)	RF Gain at 20m above ground (dBi)
28600	4.43	15.29	8.0	12.55
24895	4.48	16.81	9.0	12.57
21300	4.56	18.10	10.0	12.65
18100	4.59	12.14	12.0	12.66
14200	4.18	11.93	15.0	12.17

Table 2. *EZNEC* Analysis for the OptiBeam OB9-5

HF

Several correspondents have remarked on how poor HF conditions have been in recent months. One commented that, having received his HF licence just a couple of years ago after a long spell as a G8, although he was familiar with the concept of the 11-year solar cycle, he was in no way prepared for the significant downturn in conditions which we have been experiencing of late. Well, all I can say is, "you ain't seen nothing yet!" We can expect the solar flux to drop considerably more before we reach the trough of the present cycle, with the inevitable impact on high band conditions. The good news is that the low bands will experience less absorption than at the cycle's peak, and can support some excellent DX activity. You just have to be prepared, by way of decent antennas and, I am bound to say, reasonable power levels. I recall a comment in one magazine many years ago that 10 metres wasn't a serious DX band because, when the sunspots are co-operating, no real effort is required to work DX. You can work around the world with 10 watts and a wet noodle for an antenna. On the low bands, in contrast, you will always be up against higher ambient background noise, higher atmospheric absorption, and very few stations with directional, gain antennas. In these circumstances, it can really pay to work with higher power levels. The good news, if my own experience is anything to go by, is that running high power on the low bands is less likely to lead to EMC problems than doing so on the higher HF bands.

CHOOSING A RIG FOR HF

With the expected abolition of the mandatory Morse code requirement for HF operation, hopefully many former Class B licensees will be making the transition to HF in the near future. I hope you will find the various hints and tips I give in this column a source of useful information. Certainly, HF operation is different in many ways to what you might have been used to on VHF, though if you have chased DX on SSB or CW, especially on 6m when it is wide open, the transition shouldn't be too difficult.

But the very first decision you may have to make will be what radio to select. Frankly, the choice nowadays is quite overwhelming, and even modestly-priced rigs boast a huge range of features. Yes, it need not be expensive. I occasionally hear complaints about the cost of getting into the hobby but, to put things in perspective, the FT-101 MkI which you will have seen in the aged photo of my shack last month, cost me £200 secondhand in 1973, at a time when my annual salary was only about 10 times that. The equivalent nowadays would be about £2000, whereas for well under half that amount you can buy a brand-new transceiver, the performance of which would leave that old FT-101 in the shade.

Suppliers will want to sell you a rig on the basis of the bells and whistles. General coverage receiver, menu adjustment of a huge range of parameters, a multi-colour spectrum display, memory scanning, etc. Funnily enough, though, if you watch the various contest and DX reflectors on the Internet when a new HF radio is introduced, most of these aspects won't even get a mention. The discussion usually centres on RF performance (can it, for example, give clear reception of a weak DX signal on a busy 40m band in the heat of a contest?), the quality and selection of the filters (within the price range of amateur equipment, DSP is still no substitute for high-quality mechanical or ceramic filters), and the handful of features that serious HF operators consider to be of real importance.

Of course, at the end of the day it depends on what you are likely to want to do, which is why I usually recommend buying a cheap secondhand rig first, and using the experience to find out what actually matters to you. Do you expect to want to take the radio with you on holidays or other trips, and is size and weight therefore of importance? In the past, small HF radios were designed primarily for mobile operation. The designers therefore assumed the antenna would be a mobile whip, and the radios often couldn't handle the much higher signal strengths from home station antennas. The front panel was often fiddly, too, compared with a well laid-out home station transceiver. Then there is the question of how much power you want to run. On VHF you will be used to making up for low power (perhaps 10 watts in a typical case) with a high-gain antenna, offering you 10dB or more of gain relative to a dipole. On the low bands in particular, your antenna is more likely to have *negative* gain relative to a half-wave dipole so that, as I suggested in my introductory remarks, you might easily become frustrated with anything less than 100 watts to play with (yes, QRP operators will tell you of all the DX they work, but most are 'old hands' at HF, making up with experience what they lack in power).

As far as features are concerned, let me use my own experience as an example, and you can make any adjustments according to how your interests are likely to differ. My main HF radio is an FT-1000D, bought

Left to right are Phil Whitchurch, G3SWH; Barry, ZS1FJ / G4MFW; Stacey, ZR1SC and Andrew, ZS1AN. The photo was taken at the Nelson's Eye restaurant in Cape Town after the ZS1RBN Robben Island operation in April.

By Don Field, G3XTT, 105 Shiplake Bottom, Peppard Common, Henley on Thames RG9 5HJ. E-mail: hf.radcom@rsgb.org.uk

over 10 years ago. In that time I have rarely used it to listen outside the amateur bands, though it's nice to be able to listen to the new 5MHz allocations, or to check the WWV transmissions on 10MHz and elsewhere. I don't miss DSP, and when I have been in a position to use a radio with this capability I rarely use it, especially in a contest or DXpedition situation, where there is too much else to concentrate on to be spending time fiddling with minor adjustments (though I wouldn't detract from DSP entirely – it's ability, for example, to null out interfering carriers while operating on SSB can be quite extraordinary). And I have *never* used the memory or scanning features. But it is important to me to have good filters at 2.4 and 2.0kHz for SSB and 500Hz for CW and RTTY. Ideally I would like filters of 1kHz bandwidth too. But bear in mind that a full set of filters can add several hundred pounds to the cost of the radio, so maybe DSP is a bargain after all! Dual VFOs (and dual-receive) are important for effective split-frequency operation (see my discussion of this in the June 'HF' column). Beyond this, probably the most important feature has been the ability to interface the shack PC (for logging, etc.), sound card / RTTY modem (for datamodes), band data (for automatic antenna switching) and linear amplifier. As someone who operates far more on CW than SSB, full CW break-in is also important to me. If you use non-resonant antennas, an automatic ATU can also be a boon.

There is much more I could add, but space prevents it, at least this month. Every individual will have his or her own criteria, so that your list of what is important will end up looking rather different to mine and, like me, you may well end up with more than one HF radio in the shack simply because no one radio will do everything you want (in my case, for example, I have an FT-847, which is my back-up HF rig, gives me VHF / UHF capability, and is small and light enough to be taken on expeditions).

COUNTRIES WORKED, 2003

(sorted this month by Mixed totals)

CALL	CW	SSB	DATA	MIXED
G3XTT	199	142	106	214
G3YVH	187	130	0	213
G4WFQ	183	59	95	209
G3SXW	203	0	0	203
G0NXX	200	0	0	200
G3TXF	197	11	0	197
G4WXZ	140	138	0	189
GM0TGE	127	136	0	189
M3RDX	0	170	93	187
G4KFT	177	0	0	177
G3VDL	169	0	0	169
GU4YOX	121	123	0	167
G4IRN	165	0	0	165
G3LHJ	125	56	69	154
G4EDG (QRP)	150	0	0	150
G3ZRJ	145	0	0	145
G0ARF	0	0	140	140
G4OBK	127	20	61	138
M3CLY	0	138	0	138
MU0FAL	119	86	0	134
M0CNP	5	127	36	131
G3YMC (QRP)	128	0	0	128
ZC4VG	121	35	38	121
GU0SUP	0	0	116	116
ZC4DW	85	71	74	116
M5GUS	0	115	0	115
G0GFQ	0	112	0	112
G4UCJ	108	10	22	110
M0AWX	0	107	0	107
M5PLY				105
M0BVE	100	0	0	100
MM0BQI	27	28	81	100
G4FVK	52	82	0	94
GI0NQC	1	63	63	94
G4ZPL	0	2	87	87
G0LGJ/M	0	77	0	77
G0URR	0	0	75	75
G4YWY/M	0	69	0	69
GW4ALG (QRP)	65	0	0	65
M5AEF (1 watt)	27	52	0	59
G4DDL	54	6	19	58
G3URA	0	0	53	53
M3NPB	42	20	0	51
M3FSI	0	50	0	50
GM0ELV (QRP)	47	0	0	47

DX NEWS

Mike, GM4SUC, writes with a reminder that the **International Lighthouse/Lightship Weekend** takes place over the weekend of 16/17 August. Last year over 385 stations were active from lighthouses and lightships throughout the world. Full details of the rules and an entry form, together with a list of stations who have indicated they will be participating, can be found on the web page, or I am happy to send details in return for an SASE. OZ/DL2VFR will be on **Bornholm Island** (EU-030) 3-15 August. He plans to be on all the HF bands, mostly CW, with some SSB. Danny, M0GMT, aged 19, and Oliver, DJ9AO, aged 21 and both members of the WWYC (World Wide Young Contesters Club), will be operating from **Cambodia**, from 4 to 18 August, callsign to be confirmed. QSL via G3SWH, bureau or direct (QTHR). They will be on all bands, CW and SSB only. For further information and updates please visit the DXpedition webpage. Dan, JA1PBV, is heading to the South Pacific this month. First stop will be Guadalcanal, **Solomon Islands**, where he will be active as H44V from 5 to 9 August. Then he will move to Santa Cruz Island, **Temotu Province**, and be active as H40V from 11 to 16 August. He will be joined by Kazuo, P29KM (H44H). Dan also expects to operate as P29SI from Port Moresby, **Papua New Guinea**. Exact dates were not mentioned but it will probably be before and after the H44/H40 operations. From 1 September Dan will be back in **Afghanistan** as YA1BV and will stay until March 2004. QSL via JA1PBV. Paolo, VP5/IK2QPR, will be on from the **Turks and Caicos Islands** from 16 to 23August. QSL to his home call. Paul, W4/G4BKI, has moved to **Grenada** and is now J3/G4BKI. He will be active for one year under that callsign until he receives his J38 callsign. His activity is mainly on 20/15 CW (between 2000 and 2330z). QSL information can be found on the web page.

The compact but highly effective shack of Herb Asmussen, OZ7SM. Herb was resident in the UK for many years, when he was licensed as G0WAZ.

DXCC

The ARRL reports that eight operators have now reached the 3000-entity level in the DXCC Challenge. They are W4DR at 3079, W1NG at 3047, K5UR at 3043, SP5EWY at 3031, W9ZR at 3024, W1JR at 3015, I4EAT at 3011 and K8MFO at 3006. ARRL's complete update is available at the Challenge website.

NEW BARTG EUROPEAN AWARD

BARTG has announced a new European Award for datamodes operation. It is available in three classes for working / hearing either 60, 45 or 30 different European countries as defined in the ARRL countries list, and you can upgrade to a higher class as and when you increase your totals. There are band (mixed or single) and mode endorsements (mixed or all RTTY or all PSK31) but other modes may be added in the future. Contacts must have been made since 0001 on 1 January 1995 to be eligible. The cost is £6.00, $10 or 10 euros and payment can also be made by PayPal. Full details are available from the BARTG awards manager, Nigel Roberts, G4KZZ (QTHR), e-mail: awards@bartg.demon.co.uk or see the BARTG web page.

CORRESPONDENCE AND TABLES

I'm somewhat embarrassed to be appearing at the top of the table this month! Hopefully some of you will take it as a challenge to put me in my rightful place lower down. Mark, G0LGJ/M, laments the poor conditions, but nevertheless his mobile activity gave him contacts with 9V1WW (Singapore) and 9M2TO (Malaysia), both on 18MHz. Ian, M3RDX, writes that this will be his last update for a while as he is moving house and setting up a new business. Good luck Ian, and we look forward to having you back in due course. Robin, M5AEF, has written with a report of his QRP holiday operation from the Peloponnese SV3, using an FT-817, telescopic whip

antenna and a 20/17/15m dipole. This operation resulted in just 24 contacts in 19 DXCC countries, with best DX AP2JZB (Pakistan) and UN9LV (Kazakhstan). Robin attributes the low number of contacts to the poor band conditions, but also comments on the number of people (including G stations) heard calling CQ who appeared to make little or no effort to pull through his weak signals. This is perhaps a reminder that, as I said earlier on, QRP operation on HF can be very tough going when propagation refuses to co-operate. On a rather different topic, Eddi, DK3UZ, takes me to task on my opening remarks about summer propagation in the June column. Eddi says he finds summer propagation better than winter, for two reasons. Firstly, that the high bands are still open when "righteous people get home from work" and, secondly, that summer brings Sporadic E, allowing some excellent intra-European contacts. Well, I wouldn't take issue with either of these statements Eddi and, indeed, I remarked that that there are some interesting DX opportunities in the summer, even on the low bands (XQ6ET from Chile has been an excellent signal on 160m, for example). But nevertheless, in terms of long-distance DX on both the high and low bands, it is a scientifically proven fact that, here in the Northern Hemisphere, September to March (equinox to equinox) brings the best propagation.

Mike, G3TMB, laments what he considers the increasing trend by European operators to call DX with only the last two letters of their callsign. This, of course, extends the QSO, when it takes place, to require an extra exchange where the rest of the call is filled in. Strictly, it is also against licence regulations, which require operators to sign their full call. I sympathise with Mike, though the practice has been with us now for many years, and is unlikely to go away. Fortunately it seems to be rare on CW, perhaps yet another good reason to try that excellent mode! I will undoubtedly be returning to the topic of how best to call a DX station in a future column. Larry, VQ9LA, writes that QSLs are being sent to his US callbook address, which means they can take many months to reach him. The correct QSL information is available on the qrz.com website. This is a useful reminder that, if you have Internet, that website is probably the single most useful place to start looking for QSL information. Finally, Mike, VP8NO (G3VUI), prompted by my mention of VP8NJS in the May column, writes about VP8 licensing. Currently, VP8 licences are all issued from the Falklands, for a £20 fee. No qualification is required. Because of this somewhat irregular situation, there are no reciprocal or CEPT agreements in place, so operations of the kind VP8/G3XTT or M0/VP8NO are illegal. Mike says that efforts are underway to bring things more in line with elsewhere.

WEB SEARCH

BARTG:	www.bartg.demon.co.uk
Cambodia expedition:	www.geocities.com/dxpedition2003
DXCC Challenge:	www.arrl.org/awards/dxcc/listings/challenge.html
J3/G4BKI:	stcgrenada.com/amateurradio.htm
Lightships weekend:	lighthouses.net.au/illw/
QRZ.com:	www.qrz.com
WWYC:	www.wwyc.net

SILENT KEYS

Tim, M3SDE / ZK1EQL, has drawn to my attention to a news item regarding Doug, VK4BP, who, along with his wife June, VK4SJ, had been active from the South Cook Islands (see April 'HF'). Doug was killed in a road accident during the last week of their trip while out sightseeing and while June was back at the hotel working DX. Our condolences to June and her family.

And I also note the death of Al, W8AH, a prolific DXer well known to HF operators and DXpeditioners over many years and high on the DXCC lists.

THANKS

Special thanks go to the authors of the following for information extracted: *OPDX Bulletin* (KB8NW), *The Daily DX* (W3UR) and *425 DX News* (I1JQJ). Please send items for the **October** issue by **16 August.** ◆

HF F-Layer Propagation Predictions for August 2003

	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz
Time	0000111111220	0000111111220	0000111111220	0000111111220	0000111111220	0000111111220	0000111111220
(UTC)	2468024680220	2468024680220	2468024680220	2468024680220	2468024680220	2468024680220	2468024680220
*** Europe							
Moscow	5.....224	63.....1556	15.1....2556	..643332562.	...7765587..	.....	.....
*** Asia							
Yakutsk	.....	.....	21.....13544	.2444345657 2	..16652.....	...22.....	.....
Tokyo	.....	.....3..	.....14..	.....112..	.....1.....	.....	.....
Singapore	.....	.....122.	.....452.	.....1651.	.....254..	.....131..	.....
Hyderabad	.....	1	1233	13551	..2111366 53.	..122336....	...12112....
Tel Aviv	6.....345	76.....3777	734....37774	..342224 77.7	...1..1.1...	.....	.....
*** Oceania							
Wellington	.....	.....	.....1...	.....1.....	.....	.....	.....
Well (NZ) (LP)	.....	.32.....	155.....21.	124.....131	.....1.	.....1.	.....
Perth	.....	.....	.....	.....	.....	.....	...11.....
Sydney	.....	.....1..	.....11..	.....	.....	.....	.....
Melbourne (LP)	.....	.....	.....	.....	.....	.....	.....
Honolulu	.....	.....	..1.....	..111.....	....1.....	.....	.....
Honolulu (LP)	.....	.....	.....	.....	.....1...	.....1...	.....
W. Samoa	.....	.....	.....	...111.....	....111.....	.....	.....
*** Africa							
Mauritius	.....	1321	.....243.	.....341.	.....132..	.....121..	.....
Johannesburg	24.....32	36.....5887	.1.....7872	.....1872.	..1....261..	..11...24...	...222232...
Ibadan	.....	12.....111	552.....2555	..72..136764	..886667885.	..68333487..	...6....5...
Nairobi	.....	1.....111	21.....1122	.3.....2344	.12....25662	..42112466 2.	...11.1121..
Canary Isles	35.....554	665.....2766	6661...14657	3.72....7677	...7666778 6.	...5544488..	.....11..
*** S. America							
Buenos Aires	1.....	665.....15	324.....13	1.2.....12	552	.....153.	.....12..
Rio de Janeiro	.....	111.....22	111.....122	221	....1...1863	....1...274.	.....13..
Lima	.....	1.....1	..1.....1	.....	...2.....142	.....12.	.....1..
Caracas	.....	.....	.....	...1.....1	....1.....1.	.....1..	.....1..
*** N. America							
Guatemala	.....	.....	.....	.....	.....	.....	.....
New Orleans	.....	.....	.....	.....	.....133335.	.....1123..	.....
Washington	.....	11.....1	332.....13	....1....145	.....333456.	.....111122.	.....
Quebec	31.....4	65.....57	..1.....22	.....123.	....1...36..	.....	.....
Anchorage	.....	.....	.....	.....111.	.....32.	.....	.....
Vancouver	.....	.....	.....	.....	.....111.	.....	.....
San Francisco	.....	.....	.....	.....	.....	.....	.....
San Fran (LP)	.....	.....	.....	.....	.....	.....	.....

Key: Each number in the table represents the expected circuit reliability, e.g. '1' represents reliability between 1 and 19% of days, '2' between 20 and 30% of days, etc. No signal is expected when a '.' is shown. **Black** is shown when the signal strength is expected to be low to very low, **blue** when it is expected to be fair and **red** when it is expected to be strong. The RSGB Propagation Studies Committee provides propagation predictions on the internet at http://members.aol.com/g4fkhgwyn. The page is updated monthly. The provisional mean sunspot number for June 2003 issued by the Sunspot Data Centre, Brussels, was 77.4. The daily maximum / minimum numbers were 116 and 38 on 11 June and 2 June respectively. The predicted smoothed sunspot numbers for August, September and October are respectively: (SIDC classical method - Waldmeier's standard) 54, 53, 51 (combined method) 65,52, 59. Longpath predictions are shown with (LP) following the path name. Higher input power and superior aerials have been used for these predictions; less well-equipped stations may find the longpath predictions somewhat inaccurate.

ICOM

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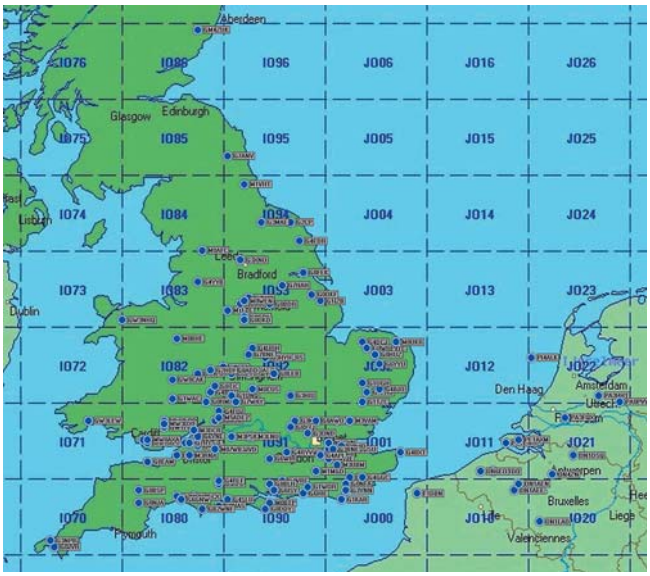
CONTEST

This month we'll start with something for the VHF contesters which I discovered courtesy of Geoff Morris, GW1ATZ. It allows you to take your contest log file and plot the contacts on to a locator map. This can be of interest for a number of reasons. It can help show the directions where particular sites work well and, perhaps more importantly, where they don't. As I learned recently it can also highlight incorrectly logged locators very quickly.

How does this work? The centre of the system is UI-View written by Roger Barker, G4IDE. This software is more commonly used for APRS work and has also featured in the article on Beacon^net. An add-in to UI-View written by Andy Pritchard, M0CYP, allows a log file created using the SDV logging programby EI5DI to be mapped. This is very effective and allows a very useful graphic to be displayed, an example of which is shown below, based on the GW5NF/P entry to the 2nd 144MHz Backpackers contest, 2003.

You can find more information, and links to download the software from GW1ATZ's website at http://gw3atz.users.btopenworld.com/page5.html



Contest Mapping from GW1ATZ, based on UI-View by Roger Barker, G4IDE.

CONTESTS THIS MONTH

Some quick reminders: RoPoCo2 is on 3 August and – whilst we're on the subject of contests with a more challenging exchange – the Worked All Europe CW contest is on 9/10 August. This has the challenge of passing 'QTCs', log extracts from the station you are working. The SARTG RTTY contest is on 16/17 August. On VHF, the sole RSGB contest is the 70MHz Trophy on 10 August. ◆

Contest Calendar

HF CONTESTS

Date	Time	Mode	Contest	Bands	Exchange
2 August	1000-2159	CW/SSB	EU HF Championship	1.8 – 28	RST + Year of first licence
3 August	0700-0900	CW	RSGB Ropoco 2	3.5	RST + Postcode received
9/10 August	0000-2359	CW	Worked All Europe	3.5 – 28	RST + SN
16 August	0000-0800	RTTY	SARTG RTTY	3.5 – 28	RST + SN
16 August	1600-2400	RTTY	SARTG RTTY	3.5 – 28	RST + SN
17 August	0800-1600	RTTY	SARTG RTTY	3.5 – 28	RST + SN
30/31 August	1200-1200	CW/SSB	YO DX	3.5 – 28	RST + SN

VHF CONTESTS

Date	Time	Mode	Contest	BandsExchange
5 August	2000-2230 Local	ALL	RSGB 144MHz Activity	144 RST+SN+Locator
10 August	0900-1500	ALL	RSGB 70MHz Trophy	70 RST+ SN + Locator + Postcode
12 August	2000-2230 Local	ALL	RSGB 432MHz Activity	432 RST+SN+Locator
19 August	2000-2230 Local	ALL	RSGB 1.3 – 24GHz Activity	1.3 –24G RST+SN+Locator
26 August	2000-2230 Local	ALL	RSGB 50MHz Activity	50 RST+SN+Locator

MICROWAVE CONTESTS

Date	Time	Mode	Contest	BandsExchange
10 August	0900-2100	ALL	3rd 24GHz Cumulative	24GRST+SN+Locator
31 August	0900-2100	ALL	4th 10&5.7GHz Cumulative	5.7/10GRST+SN+Locator

21/28MHz SSB CONTEST, 2002

UK OPEN

Pos	Callsign	21 QSO	28 QSO	21 MULT	28 MULT	Score
1	GM3WOJ	203	87	62	45	93960
2	G4DHF	91	178	33	53	69402
3	G3VHB2	19	48	58	28	68886
4	M5ZAP	201	55	45	24	52992
5	G3NLY 1	77	31	49	24	45552
6	G4IRC/P	160	41	51	23	44622
7	G4SVV	144	37	47	18	35295
8	G3SVD	95	55	26	31	25650
9	GW0GEI	124	23	42	13	24225
10	GW4CC	109	21	39	8	18330
11	MM0CPS/P	84	17	27	7	10302
12	M0BRA	77	29	21	11	10176
13	M5BFL	60	33	19	15	9486
14	G3PJV/P	84	20	19	8	8424
15	G3JRM	55	28	18	14	7968
16	MD5RIC/P	42	19	14	6	3660
17	G0MTN	45	11	13	8	3528
18	M5UGC	45	13	12	6	3132
19	GW3WWN	37	8	11	4	2025
20	G3ZGC	21	7	8	4	1008

UK RESTRICTED

Pos	Callsign	21 QSO	28 QSO	21 MULT	28 MULT	Score
1	G0TSM	70	35	25	16	12285
2	M5ARC	73	27	18	12	9000
3	G0AJH	66	24	15	9	6480
4	M0DDT	51	16	19	8	5427
5	G4IIY	56	4	17	1	3240
6	G4PIQ/P	39	7	13	2	2070
7	G0MRH	36	4	11	2	1560
8	M0BAO/P	18	14	6	6	1152
9	G0VQR	24	5	9	4	1131
10	G3VYI	21	5	10	3	1014
11	G0FYX	26	6	11	4	930
12	G4XPE	23	6	7	3	870
13	G4EDR	26	1	9	1	810

UK QRP

Pos	Callsign	21 QSO	28 QSO	21 MULT	28 MULT	Score
1	GM4HQF	35	13	13	3	2304
2	G3FNM	34	10	12	3	1980
3	M3WOK	23	8	0	0	552

OVERSEAS

Position	Callsign	21 QSO	28 QSO	21 MULT	28 MULT	Score
1	LZ9V	159	43	81	32	68478
2	UT3UA	206	6	84	6	57240
3	UX4MM	140	34	78	29	55854
4	RK3BX	116	66	0	0	40020
5	YO2BBH	142	77	0	0	32802
6	UA3DEE	132	1	75	1	30324
7	UT5EPW	129	78	0	0	29718
8	UN5PR	113	9	72	8	29040
9	RN3ZX	102	0	55	0	19890
10	RZ3BY	103	0	58	0	17922
11	YO6AJI	90	60	0	0	16200
12	N4UH	67	46	0	0	9246
13	UA9SP	33	17	26	16	6300
14	9M2/G4ZFE	25	20	23	19	5670
15	YO3FLQ	44	32	0	0	4224
16	RW2F	18	9	16	9	2025
17	PY2NDX	20	4	18	4	1584
18	RU3WR	19	1	17	1	1080
19	Z36W	245	99	1	1	838
20	RZ9ZR	15	3	12	3	810
21	PA0MIR	7	1	7	1	192
22	JG2REJ	2	0	2	0	12

OVERSEAS RESTRICTED

Position	Callsign	21 QSO	28 QSO	21 MULT	28 MULT	Score
1	US7IGF	172	36	87	27	71136
2	YT1RA	178	4	86	4	49140
3	LZ2L	134	29	75	24	48411
4	ZC4DW	79	64	54	38	39468
5	RN3FS	126	2	76	2	29952
6	YU1EQ	130	71	0	0	27690
7	YO3CZW	144	0	68	0	27540
8	YO6MT	127	0	72	0	27432
9	UT5UKY	120	0	73	0	26280
10	9H1DE	90	9	51	8	17523
11	YU1AAX	97	46	0	0	17,280
12	UY0MF	34	52	28	38	17028
13	IK7RVY	87	3	59	3	15930
14	RA9XY	78	1	54	1	13035
15	5Z4IC	6	73	5	46	12087
16	LZ2FM	49	25	34	19	11766
17	UY5TE	53	0	37	0	5883
18	UA4ACP	22	21	18	18	4644
19	YU1ZZ	41	30	0	0	3600
20	LZ2UZ	28	4	24	4	2688
21	EA7FRX	19	0	16	0	912
22	RK3DNX	17	0	15	0	765
23	RZ9IB	15	0	12	0	540
24	RZ3DH	13	0	13	0	507
25	RW9TA	12	1	9	1	390
26	UA9QFF	5	6	5	5	330
27	HA5MY	11	0	7	0	231
28	CE5GO	0	0	4	4	48
29	W9ROG	3	0	2	0	18
30	VA3IX	1	0	1	0	3

OVERSEAS QRP

Position	Callsign	21 QSO	28 QSO	21 MULT	28 MULT	Score
1	UA3DNR	100	64	0	0	19008
2	UA6ADC	90	65	0	0	17550
3	LZ2RF	45	24	36	8	6996
4	YO4AAC	33	0	26	0	2574
5	SP6IHE	18	2	17	2	1140
6	YO3KYO	27	22	0	0	891

By Tim Kirby, 11a Vansittart Road,
Windsor SL4 5BZ. E-mail: tim@g4vxe.com

AFFILIATED SOCIETIES (AFS) SSB CONTEST, 2003

A total of 208 stations representing 90 teams took part in SSB AFS this year. This is an increase of about 5% over 2002 and continues the steady growth in popularity of the event. Very nearly 10% of the entrants were Foundation Licence holders, a five-fold increase on last year!

Lichfield ARS demonstrated its complete mastery of the format by making a clean sweep of the awards. Its 'A' and 'B' teams took first and second slots with a comfortable lead over De Montfort University in third position. First, second and third places in the individual listings were occupied by G3NLY, G4XUM and GW3YDX, the Lichfield 'A' operators, in that order.

Certificates of Achievement are awarded to M3ABC and 2E0LIZ as the leading Foundation and Intermediate Licence holders. Also deserving of special mention is G3JJZ, whose log containing 147 QSOs was completely error-free.

Only a very few logs were submitted on paper and around half of the electronic entries were in Cabrillo format. One frequently asked question was how to mark duplicates and points in the new format. The answer is, of course, that you don't have to, as all dupe-checking and scoring is carried out during the adjudication process.

For some reason, remarks and details of equipment were few and far between this year. Those comments which were included addressed mainly the traditional problems of lack of band space, loud signals and receiver overload, and event timing (too early for those in the north, too late for those in the south). Lack of space often precludes publication of 'Soapbox' items, but the HFCC values them highly as an important source of feedback. ***Steve Knowles, G3UFY***

AFFILIATED SOCIETIES SECTION

Pos	Club	Station 1	Station2	Station 3	Total
1+	Lichfield ARS 'A'	G3NLY	G4XUM	GW3YDX	9190
2c	Lichfield ARS 'B'	G3BJ	G3NKC	G3SJJ	8090
3c	De Montfort University	G3RIR/P	M5ZAP	G3SDC	7510
4	Martlesham RS 'A'	G4BWP	G4MRS/P	G4WFR/P	6920
5	Cray Valley RS 'A'	G4BUO	G3RCV	G3JJZ	6710
6	Cheltenham ARA 'A'	G4ERP	G3NKS	G3LVP	6660
7	Horsham ARC 'A'	G4LRP	G3WZT	G4TPO	6520
8	Harlow & DARC	G3UEG	G6UT	M5IMI/P	6490
9	Contest Cambria	GW4BLE	MW5EPA	GW0RYT	6300
10	Grimsby ARS 'A'	G3TBK	G3RSD	G4EBK	5830
11	Hadley Wood CG 'A'	G3ZVW	M0XID	M5BXB	5620
12	Bristol CG	M0YYY/P	G3TKF	M3ABC	5570
13	Sutton & Cheam RS 'A'	G4ERW	G3WHK	M3BOF	5500
14	Newbury ARS 'A'	G3SVD	G3KLH	G3ZGC	5340
15	Crawley ARC	G3VKW	G6RC	G3YSX	5180
16	Stratford upon Avon & DRS 'A'	G3MXH	G4EZT	G3XZO	5140
17	Chesham & DARS 'A'	G0ODQ	G3RXQ	G3MEH	5000
18	Chiltern DXC	M0CDX	G3WPH	-	4690
19	Lichfield ARS 'C'	M0BEW	G3NAS	-	4650
20	Wythall CG 'A'	G0MTN	M0COP	M5UGC	4640
21	Echelford ARS 'A'	G0VDZ	G3KKQ	G4PRI	4600
22	Addiscombe ARC 'A'	G3SJX	M3EMO	G3UFY	4110
23	Harwell ARS 'A'	G3VPW	M0DDT	M0CUL	4060
24	Harwich ARIG 'A'	G4EYE	M0CGE	G0DVJ/P	3910
25	Clifton ARS 'A'	G0UJK	G0UXM	G0DCG	3810
26	Northampton RC 'A'	G3GWB/P	M0CTC	M3BHR	3800
27	Stirling & DARS	GM6NX	MM0ANT	GM0CLN	3670
28	Horsham ARC 'B'	G3LET	G3ZBU	M0CUR	3650
29	Horndean & DARC 'A'	G3LIK	G4FBS	M0JAK	3640
30	Dragon ARC 'A'	GW0GEI	GW3GUX	GW4DRR	3350
31	Reading & DARC 'A'	G0VQR	G0LHZ	M5ALG	3320
32	Torbay ARS 'A'	G3LHJ	G3SNU	M3NSB	3000
33	Weston-Super-Mare RS	G6PZ	G3TJE	-	2980
34	Cray Valley RS 'B'	G3YJW	G0VJG	G0WLF	2890
35	Flight Refuelling ARS	G0WAL	G4WEY	G4POF	2860
36	RNARS London	G3YAJ	G3YEC	G3OZY	2840
37	Newbury ARS 'B'	G3NVO	G4PSU	G4FON	2590
38	Farnborough & DARS 'A'	G4UEL	G0VYR	G3HEJ	2580
39	Cockenzie & Port Seton ARC 'A'	MM0DXC	MM0CPS	GM4ZRR	2270
40	Hadley Wood CG 'B'	G4KZD	M0BOX	-	2170
41=	Harwich ARIG 'B'	G4FTP	G3YYZ	M0ZZO	2130
41=	Horndean & DARC 'B'	G0ASZ	G0MBQ	G0UHM	2130
43	Chesham & DARS 'B'	G0VFW	G3XZG	-	2090
44	Stevenage & DARS 'A'	G4DDX	G2BKZ	M0DAL	2050
45	RAFARS Waddington	G3SET	G3SWO	-	1930
46=	Cray Valley RS 'C'	G4DFI	G3SXE	M3AEU	1840
46=	Strathmore ARC	GM4AFF	-	-	1840
48	Grimsby ARS 'B'	M0BZU	M3CAG	M0AJT	1770
49	Echelford ARS 'B'	G3WWT	M3PMT	G2HS	1730
50	Cheltenham ARA 'B'	G3SNN	M3NSZ	M3CGC	1670
51	RAFARS Devon	G3LUW	-	-	1660
52=	Martlesham RS 'B'	G4CXT	-	-	1630
52=	Wythall CG 'B'	M0AEJ	G0EYO	G0ICJ	1630
54	Eden Valley RS	G3JYP	-	-	1620
55	Bolsover ARS 'A'	G4AGE	G0THF	M3CFP	1610
56	Milton Keynes ARS 'A'	M0RPM	M0TIF	M0BZK	1440
57	Stockport RS	M0CGF	G3SVW	M3HQX	1410
58	Havering & DARC	G3TPJ	-	-	1370
59	Ripon & DARS	G3UNA/P	G4SJM/P	-	1350
60	South Dorset RS	M5RIC/P	-	-	1260
61	Farnborough & DARS 'B'	G0YYY	M0AHJ	-	1210
62	Verulam ARC	G3VER	-	-	1190
63	Harwell ARS 'B'	G4HLX	G0THY	G0UGO	1100
64	Torbay ARS 'B'	G4VTO	M0APB	G3BIT	1080
65	Surrey RCC	G3BFP	G4DJR	-	1030
66	Horsham ARC 'C'	M0DEY	G3PYC	-	1000
67	Stratford upon Avon & DRS 'B'	G0MRH	-	-	980
68	Glenrothes & DARC	GM3YBQ	GM0UZM	MM0EEY	880
69	Three As CG	G3TXF	-	-	800
70	Northampton RC 'B'	G3MPZ	-	-	750
71	Horndean & DARC 'C'	M0DES	M3BLH	-	740
72	Worthing & DARC	G4SLE	-	-	720
73	Bolsover ARS 'B'	M3MYK	2E0LIZ	-	680
74	Addiscombe ARC 'B'	G3WRR	-	-	640
75=	RAFARS Cosford	G0VBT	-	-	620
75=	Stevenage & DARS 'B'	M3JUH	G0UYN	-	620
77	Prudential ARS	GW0PRU/P	-	-	580
78	Colchester RAC	M3GUA	M3MHK	-	550
79=	Dragon ARC 'B'	GW3VVC	MW0MKC	-	540
79=	Mid Beds CG	G4BJM	-	-	540
81	Clifton ARS 'B'	M0BPQ	-	-	530
82	Reading & DARC 'B'	M3DHO	-	-	470
83	Newbury ARS 'C'	G0ORH	G3RVM	-	390
84	Harwich ARIG 'C'	M3HOW	-	-	370
85	Sutton & Cheam RS 'B'	G3ORE	-	-	330
86	Grimsby ARS 'C'	G2DWB	-	-	310
87	Echelford ARS 'C'	M0LPA	-	-	250
88	Scarborough ARS	G4FCH	M0MMX	-	240
89	Milton Keynes ARS 'B'	M0BZF	-	-	170
90	Cockenzie & Port Seton ARC 'B'	GM4LRU	GM4IKU	-	70

* RSGB Lichfield Trophy, + Flight Refuelling ARS Trophy, c = Certificate of Achievement. Checklogs acknowledged from G3KKP, G3VQO, GB4RS, GW3XEJ.

AFFILIATED SOCIETIES (AFS) SSB CONTEST, 2003, Individual Section

Pos	Callsign	Score	Pos	Callsign	Score	Pos	Callsign	Score
1*	G3NLY	3150	70=	G3SET	1430	138=	G0UHM	640
2c=	G4XUM	3020	70=	G3YAJ	1430	140=	G0VBT	620
2c=	GW3YDX	3020	72	G3LIK	1420	140=	G3BFP	620
4	G4BWP	2970	73	G4FBS	1410	142=	G3WWT	610
5	G3BJ	2900	74=	M0CGE	1380	142=	M3PMT	610
6	G4BUO	2830	74=	G3ZBU	1380	142=	M3CAG	610
7	G3RIR/P	2760	76	G3TPJ	1370	145	G2BKZ	600
8	G4ERP	2750	77	G3LHJ	1360	146=	M0RPM	590
9	G3NKC	2740	78	G4EBK	1310	146=	M0AEJ	590
10	GW4BLE	2650	79	G3MEH	1300	148	GW0PRU/P	580
11	G3TBK	2610	80	G0UXM	1290	149=	G3SXE	570
12	G3ZVW	2600	81	M5RIC/P	1260	149=	M0DEY	570
13	M0CDX	2590	82=	M5BXB	1240	151=	GW4DRR	560
14	G4ERW	2560	82=	M0DDT	1240	151=	M0AHJ	560
15=	G3SJX	2450	84	G4KZD	1210	151=	G3SVW	560
15=	G3SJJ	2450	85	G0WAL	1200	154=	M0DES	540
17=	G3RCV	2410	86	G3VER	1190	154=	G4BJM	540
17=	M5ZAP	2410	87	G0LHZ	1170	154=	G0EYO	540
17=	M0BEW	2410	88	G3SNN	1100	157	M0BPQ	530
20	G4LRP	2390	89	G3XZO	1090	158=	M0TIF	520
21	G3WZT	2350	90	G0VFW	1080	158=	M0DAL	520
22	G3SDC	2340	91	G0DVJ/P	1050	160	G2HS	510
23	G3UEG	2320	92=	G3XZG	1010	161=	G0SWO	500
24	G0MTN	2260	92=	G3YEC	1010	161=	G0ICJ	500
25=	G3NAS	2240	94=	MM0DXC	1000	163	M0ZZO	490
25=	G3GWB/P	2240	94=	G3YJW	1000	164=	M0AJT	480
27	G3NKS	2200	96	G4FTP	990	164=	M5ALG	480
28	G6UT	2170	97	G0MRH	980	166	M3DHO	470
29	G6PZ	2130	98	M0CUL	970	167	M3JUH	460
30=	GW0GEI	2110	99	M0BOX	960	168=	G0THF	450
30=	G0VDZ	2110	100	G0VJG	950	168=	G4HLX	450
32	G3WPH	2100	101=	G0WLF	940	170=	G3PYC	430
33=	G3SVD	2090	101=	G3SNU	940	170=	G4SJM/P	430
33=	G3MXH	2090	103=	G4UEL	930	172=	G4VTO	420
35	M0YYY/P	2040	103=	G4DDX	930	172=	M0APB	420
36=	G0ODQ	2030	105	MM0ANT	930	174=	G0THY	410
36=	G3WHK	2030	106=	G0VYR	920	174=	G4DJR	410
38	G3VKW	2010	106=	G3UNA/P	920	176=	GM4ZRR	400
39=	M5IMI/P	2000	108=	G4WEY	910	176=	G4FON	400
39=	G4MRS/P	2000	108=	M3BOF	910	176=	G3OZY	400
41=	G3TKF	1960	110	G4DFI	900	179=	M3CFP	390
41=	MW5EPA	1960	111	GM0CLN	890	179=	M3MYK	390
41=	G4EZT	1960	112	MM0CPS	870	181	GM3YBQ	380
44	G4WFR/P	1950	113	M3EMO	860	182=	M3AEU	370
45	G3RSD	1910	114=	M0CGF	850	182=	M3HOW	370
46=	G3VPW	1850	114=	G3TJE	850	184	GW3VVC	350
46=	GM6NX	1850	116	G0DCG	820	185=	M0BZK	330
48=	G3KKQ	1840	117	M0JAK	810	185=	G0ORH	330
48=	GM4AFF	1840	118=	G3UFY	800	185=	G3ORE	330
50=	M0XID	1780	118=	M0CTC	800	188	G2DWB	310
50=	G4TPO	1780	118=	G3TXF	800	189	M3NSZ	300
52	G3LVP	1710	121=	G0ASZ	780	190c=	2E0LIZ	290
53	G0UJK	1700	121=	M5UGC	780	190=	M3MHK	290
54	GW0RYT	1690	123	G4AGE	770	192	M3CGC	270
55=	G3RXQ	1670	124	M3BHR	760	193	M3GUA	260
55=	G6RC	1670	125=	G4POF	750	194=	M0LPA	250
55=	G0VQR	1670	125=	G3MPZ	750	194=	GM0UZM	250
58	G3LUW	1660	127	G3HEJ	730	194=	MM0EEY	250
59	G3KLH	1650	128	G4SLE	720	197=	G0UGO	240
60	G4CXT	1630	129=	G0MBQ	710	197=	G3BIT	240
61	G3JYP	1620	129=	G4PSU	710	199	M3BLH	200
62=	G3LET	1600	131	M3NSB	700	200	MW0MKC	190
62=	G3ZGC	1600	132=	GW3GUX	680	201	M0BZF	170
62=	M0COP	1600	132=	M0BZU	680	202	G0UYN	160
65c	M3ABC	1570	134	M0CUR	670	203	G4FCH	150
66	G3YSX	1500	135=	G4PRI	650	204	M0MXX	90
67=	G4EYE	1480	135=	G0YYY	650	205	G3RVM	60
67=	G3NVO	1480	135=	G3YYZ	650	206	GM4LRU	40
69	G3JJZ	1470	138=	G3WRR	640	207	GM4IKU	30
						208	M3HQX	0

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FT-1000mkV-FIELD	£1,899.00	TS-2000	£1,550.00	IC-7400	£1,299.00	DX-70TH	£599.00
FT-847	£1,145.00	TSB-2000	£1,499.00	IC-910H	£1,100.00	DX-77	£499.00
FT-920	£1,049.00	TS-870S	£1,299.00	IC-706mkIIG	£789.00	DR-610	£369.00
FT-897	£985.00	TS-570DGE	£829.00	IC-703	£575.00	DR-605	£269.00
FT-857	£795.00	TS-50S	£599.00	IC-718	£449.00	DJ-G5E	£265.00
FT-100D	£599.00	TM-D700E	£429.00	IC-2725E	£299.00	DR-150	£259.00
FT-817	£549.00	TM-V7E	£375.00	IC-207H	£275.00	DJ-X2000	£449.00
FT-840	£499.00	TM-G707E	£279.00	IC-2100H	£225.00	DJ-X10	£249.00
FT-8900R	£339.00	TH-D7E	£299.00	IC-E90	£269.00	DJ-V5	£239.00
FT-7100M	£299.00	TH-F7E	£249.00	IC-T3H	£129.00	DR-M06	£229.00
FT-2800M	£179.00	TH-G71E	£210.00	IC-R8500	£1,199.00	DJ-C5	£189.00
FT-1500M	£159.00	RC-2000	£199.00	IC-R75	£599.00	DJ-195	£159.00
VX-7R	£299.00	PS-52	£229.00	IC-PCR1000	£329.00	DJ-193	£139.00
VX-1R	£115.00	PS-53	£229.00	IC-PCR100	£229.00	DJ-X3	£115.00
VX-150	£110.00	PS-33	£199.00	IC-R3	£369.00	DR-135	£229.00
VR-5000	£549.00	MC-60A	£110.00	IC-R10	£275.00	DJ-496	£175.00
VR-500	£199.00	MC-80	£69.95	IC-R5	£169.00	EDX-2	£299.00
VR-120D	£159.00	SP-31	£82.00	SM-20	£125.00	DJ-X2	£165.00
VR-120	£139.00	SP-23	£68.95	SP-21	£69.00	DR-140	£219.00
MD-200A8X	£225.00	SP-50	£27.95	AT-180	£329.00	DJ-596	£199.00
MD-100A8X	£99.00	YK-88C-1	£61.95	FL-100	£59.95	DJ-C1	£99.00
FC-10	£299.00	YK-88S-1	£61.95	FL-103	£59.95	DJ-C4	£99.00
FC-20	£225.00	YK-88SN-1	£61.95	FL-223	£59.95	DR-M03	£239.00
FC-30	£229.00	YK-88CN-1	£61.95	FL-232	£59.95	DM-330MVZ	£129.00

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MJF-16010	£56.95	MFJ-934	£189.95	MFJ-969	£199.95	MFJ-949E	£159.95	MFJ-948	£139.95	MFJ-941E	£129.95
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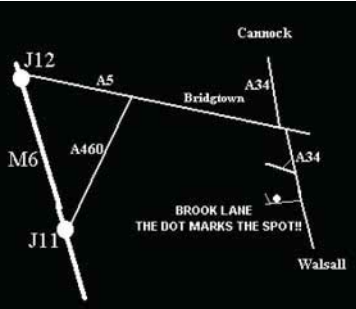

WALSALL, WEST MIDLANDS WS6 6BQ

SECOND HAND EQUIPMENT LIST

MAKE	MODEL	DESCRIPTION	PRICE
Accom	2000A	ATU HF Amp	£2,995.00
ADI	AT-600D	Dual band Handheld Transceiver	£129.00
AEA	MM-3	Morse Machine	£30.00
AEA	PK-232MBX	TNC	£125.00
AEA	PK-900	TNC	£200.00
AEA	PK-96	TNC	£90.00
AKD	6001	6m FM Transceiver	£135.00
ALAN	HQ-2000	2kW 26 - 30MHz SWR / Watt Meter	£25.00
Alinco	DJ-G5EY	Dual Band Handheld	£199.00
Alinco	DJ-X10	Wide Band Receiver	£200.00
Alinco	DJ-X3	Handheld Scanner	£99.00
Alinco	DR-150	2m Transceiver with Air-and Receive	£150.00
Alinco	DR-610	Dual Band Mobile Transceiver	£225.00
Alinco	DX-70	HF & 6m Mobile Transceiver	£399.00
Alinco	DX-70TH	HF & 6m Mobile Transceiver	£475.00
Ameritron	QSK-5	Amplifier Switch / Pre Heat	£200.00
AOR	AR-7030	Top Receiver	£550.00
AOR	AR-7030+	HF Receiver	£625.00
AOR	AR-8600mkII	Base Scanner / Receiver	£525.00
AOR	ARD-2	Decoder	£200.00
Bencher	YA-1	Low Pass Filter (1.8 - 30MHz)	£25.00
BNOS	12/40A	Top Quality 40 Amp Power Supply	£175.00
BNOS	LMP144-25-180	180 Watt 2m Amplifier	£200.00
Comet	CD-20		£40.00
Comet	CD-270D	SWR Power Meter	£49.00
Commtel	COM-510	Wide Band Scanner	£80.00
Daiwa	CL-22		£20.00
Daiwa	CN-103L	2m / 70cms Cross Needle SWR Meter	£40.00
Daiwa	CN-540		£20.00
Daiwa	DK-210	Electronic Keyer	£60.00
Daiwa	LA-20		£99.00
Datong	ASP	Automatic Speech Processor for FT-817, FT-77 etc.	£70.00
Datong	FL-2	Filter	£60.00
Datong	RFA	Broad Band Amplifier	£20.00
Diamond	SX-100	SWR & Power Meter - 1.6 - 60MHz	£65.00
Drake	R-7A	HF Receiver	£500.00
Drake	SW-8	World Band HF Receiver	£375.00
ERA	ERA	Microreader	£60.00
Fairhaven	RD-500VX	Wide Band Receiver	£525.00
Global	AT-2000	Manual Short Wave Tuner	£60.00
Grundig	SAT-100	Satellite Receiver	£400.00
Heil	ProSet 5	Headset HC-5 Insert Fitted	£75.00
Icom	AT-160	Automatic ATU	£175.00
Icom	AT-500	Automatic ATU	£275.00
Icom	CT-16	Satellite Unit	£80.00
Icom	IC-2100H	2m FM Mobile Transceiver	£150.00
Icom	IC-229A	2m Mobile Transceiver	£100.00
Icom	IC-2500E	70 / 23 cms Dual Band Mobile (RARE!!!)	£295.00
Icom	IC-2710H	Dual Band Mobile	£225.00
Icom	IC-271E	2m Multimode Transceiver - 25W	£299.00
Icom	IC-275E	2m Mobile / Base Transceiver	£245.00
Icom	IC-2GE	2m Multimode Transceiver	£60.00
Icom	IC-32E	2m / 70cms Handheld Transceiver	£99.00
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Icom	IC-505	50 MHz Multimode Transceiver	£275.00
Icom	IC-575A	50 MHz Multimode Transceiver	£450.00
Icom	IC-706	HF / VHF Mobile Transceiver	£450.00
Icom	IC-706mkIIG	HF / VHF / UHF All Mode Mobile Transceiver	£675.00
Icom	IC-707	HF All Mode, General Coverage Transceiver	£375.00
Icom	IC-7100	25 - 2000 RECEIVER	£575.00
Icom	IC-71E	Receiver	£325.00
Icom	IC-718	HF Transceiver	£399.00
Icom	IC-720A	HF & FM Transceiver	£400.00
Icom	IC-728	HF Transceiver	£400.00
Icom	IC-735	Base Or Mobile Transceiver	£399.00
Icom	IC-740	HF Base Transceiver	£350.00
Icom	IC-746	HF / 6m / 2m Built In ATU	£875.00
Icom	IC-751	HF Base Station With Built In PSU, General Coverage	£425.00
Icom	IC-756	HF / 6M All Band Transceiver	£950.00
Icom	IC-756pro	High Class Transceiver	£1,400.00
Icom	IC-781	Icom Top Class Transceiver	£1,600.00
Icom	IC-821H	Dual Band Base - All Mode	£599.00
Icom	IC-910	2m / 70cms Base Transceiver	£999.00
Icom	IC-R100	100kHz - 1.85GHz Receiver	£199.00
Icom	IC-R2	Handheld Scanner	£99.00
Icom	IC-R7000	MINT CONDITION!!! Receiver	£550.00
Icom	IC-R71E	Receiver	£325.00
Icom	IC-R72	Receiver	£350.00
Icom	IC-T8E	Quad Band Handheld Transceiver	£175.00
Icom	IC-W2E	2m / 70cms Handheld Transceiver	£140.00
Icom	PS-55	Power Supply Matching IC-735	£100.00
Icom	RC-7000	Remote Control	£40.00
Icom	SM-8	Desktop Microphone	£75.00
Icom	SP-12	Speaker	£30.00
Icom	SP-20	External Speaker	£99.00
Icom	SP-3	MINT CONDITION!!! Speaker	£50.00
Icom	SP-7	Speaker	£20.00
Icom	WR-2000	SWR & Power Meter with 3 Modules	£99.00
JPS	NIR-10	Noise / Interference Reduction Unit	£99.00
JRC	JST-245	HF 50MHz 1500w AC Base Transceiver	£1,295.00
JRC	NRD-345N	HF Receiver	£275.00
JRC	NRD-525	HF Receiver	£375.00
JRC	NRD-545DSP	HF DSP Receiver	£975.00
JRC	NRD-L2000	1kW Linear Amplifier Solid State (VERY RARE!!!)	£1,600.00
Kamtronics	KAM	Multimode TNC	£140.00
Kent	RA	Morse Paddle Key	£40.00
Kenwood	DM-81	Dip Meter Including Coils	£55.00
Kenwood	MC-60A	Desktop Microphone	£70.00
Kenwood	MC-80	Desk Microphone	£40.00
Kenwood	PS-10	Power Supply for TR-9130 etc.	£40.00
Kenwood	PS-430	Power Supply	£100.00
Kenwood	PS-50	Power Supply	£145.00
Kenwood	R-5000	Receiver	£499.00
Kenwood	R-5000	Receiver With VHF Converter	£600.00
Kenwood	RZ-1	Wide Band Receiver - Car Radio Size	£130.00
Kenwood	SW-100E	SWR Meter	£25.00
Kenwood	SW-200A	SWR Meter	£60.00
Kenwood	TH-215E	2m Handheld Transceiver	£99.00
Kenwood	TH-235	2m Handheld Transceiver	£85.00
Kenwood	TH-47E	70cms Handheld Transceiver	£80.00
Kenwood	TH-79E	2m / 70cms Handheld Transceiver	£175.00
Kenwood	TH-F7E	Dual Band Handheld	£199.00
Kenwood	TH-G71E	Dual band Handheld Transceiver	£170.00
Kenwood	TL-120	Low Drive Linear Amplifier 100W HF	£150.00
Kenwood	TL-922	1 kW Amplifier	£899.00
Kenwood	TM-241E	2M Mobile Transceiver	£120.00
Kenwood	TM-251E	Mobile Transceiver	£140.00
Kenwood	TM-255E	2m Multimode Transceiver (Fair Condtion)	£299.00
Kenwood	TM-431E	70cms Mobile Transceiver	£110.00
Kenwood	TM-D700E	Dual Band Built In TNC	£299.00
Kenwood	TR-2400	2m Handheld Transceiver	£50.00
Kenwood	TR-751E	2m Multimode Transceiver	£250.00
Kenwood	TS-50S	HF Mobile / Base Variable Power	£425.00
Kenwood	TS-520	HF Base Transceiver	£99.00
Kenwood	TS-570DGE	Mobile / Base HF Transceiver	£675.00
Kenwood	TS-60S	6m 100W Mobile Transceiver	£450.00
Kenwood	TS-700	2m All Mode Transceiver	£199.00
Kenwood	TS-850SAT	HF Base Station with Built In ATU	£699.00
Kenwood	TS-940SAT	Mains HF Base Transceiver with Built In ATU	£599.00
Kenwood	TS-950SD	HF 150W DSP Base Station	£1,200.00
Kenwood	TS-950SDX	Kenwood's Flag Ship	£1,650.00
Kenwood	VC-10	VHF Converter	£99.00
Kenwood	YG-455CN-1	270Hz CW Crystal Filer	£100.00
Kenwood	YK-88C-1	500Hz CW Narrow Filter	£40.00
Kenwood	YK-88CN1	270Hz CW Filter 8.83MHz	£40.00
Kenwood	YK-88S-1	2.4KHz SSB Narrow Filer 8.83MHz	£40.00
Kenwood	YK-88SN	1.8K SSB Filter	£40.00
Kenwood	YK-88SN-1	1.8KHz SSB Narrow Filter 8.83MHz	£40.00
Linear Amp	6 METRE	6m Linear Amplifier	£550.00
Lowe	HF-225	HF Receiver	£150.00
MFJ	MFJ-1272B	TNC / Mic Switch	£20.00
MFJ	MFJ-1278	TNC All Mode	£175.00
MFJ	MFJ-207	HF SWR Analyser	£50.00
MFJ	MFJ-259B	HF / VHF Analyser	£175.00
MFJ	MFJ-722	CW / SSB Filter with 5 Watts Amp	£59.00
MFJ	MFJ-784DSP	DSP Tunable Filter	£140.00
MFJ	MFJ-921	VHF 200 Watt ATU	£50.00
MFJ	MFJ-962D	1.8 - 30MHz, 1kW Antenna Tuning Unit	£199.00
Microset	SR-100	Power Amplifier with Pre-Amp (100W Output)	£99.00
Microwave	28/144	28 / 144 MHz Transverter	£125.00
Microwave	MML-432/50	50 Watt 70 cms Amp, with Built-In-PreAmp	£85.00
Microwave	Pre-Amp	Low Noise RF Switched Pre-Amp	£25.00
OptoElectronics	MiniScout	Frequency Counter	£129.00
PacCom	TINY II	TNC	£99.00
PacCom	TNC-320	TNC	£90.00
PalStar	KH-6	6m Handheld Transceiver	£99.00
Pres. Lincoln	10 METRE	10 Metre Multimode	£175.00
Quantek	FC-2000	1MHz - 2.4GHz Frequency Counter	£30.00
RadioShack	Pro-60	200 Channel Handheld Scanner (30MHz - 999MHz, WITH GAPS)	£99.00
RevCo	RS-2000	60 - 519 MHz Home Base Scanner	£79.00
Revex	V-540	SWR Meter	£25.00
Sabtronics	8610B	Frequency Counter	£30.00
Sangean	ATS-909	World Band Receiver	£130.00
SEM	MultiFilter	MultiFilter	£20.00
SEM	SEM	QRM Eliminator	£20.00
SGC	SG-2020	HF Transceiver	£450.00
SGC	SG-231	Automatic Smart Tuner - HF / 6m	£275.00
SGC	SG-3030	All band Antenna	£200.00
Shure	444D	Desktop Microphone	£35.00
Signal	R-532	Airband Receiver	£99.00
Sommerkamp	FT-290R	2m Multimode Transceiver	£150.00
Sony	7600-D	Worldband Radio	£80.00
Sony	SW-100E	FM/SW/MW/LW Portable Receiver	£90.00
SSB Electronics	LT-23S	23cms Transverter	£450.00
Standard	C-156E	2m Handheld Transceiver	£125.00
Standard	C-500	Dual Band Handheld	£99.00
Standard	C-510	2m / 70cms Handheld Transceiver	£125.00
Standard	C-510E	Dual Band Handheld	£99.00
Swedish	Key	Straight Morse Key	£25.00
Timewave	DSP-599ZX	DSP Filter	£225.00
Tokyo	HL-30V	2m - 25W Amplifier	£75.00
Tokyo	HL-35V	2m Power Amplifier with Pre-Amp	£89.00
Tokyo	HL-37V	Linear Amplifier	£60.00
Tono	MR-150	150 Watt 70 cms Amplifier	£175.00
Tono	T-777	Communications Terminal	£120.00
Tono	4M-70G	60 Watt UHF Transciever, Including Pre-Amp	£119.00
Transverter	QM-70	28/144 Transverter	£100.00
Trident	TRX-200	Latest Scanner	£175.00
Trio	TM-201A	2m Mobile Transceiver (Complete with Detachable Front & Speaker)	£99.00
Trio	TR-9000	2m Multimode	£199.00
Trio	TR-9130	2m All Mode Transceiver	£250.00
Watson	W-DB30	Dualband Amplifier	£89.00
Welz	AC-38M	200W Mobile Matching Network	£50.00
Welz	CT-150	Dummy Load	£50.00
Welz	CT-300	300W / 1kW Peak Dummy Load	£65.00
Welz	SP-15M	SWR Meter	£35.00
WinRadio	WR-1550E	Trunking Software	£450.00
Yaesu	ATAS-100	Yaesu Active Tuning Antenna System	£175.00
Yaesu	FC-30	Automatic ATU - FT-897, FT-857	£189.00
Yaesu	FC-700	Tuner - AS BRAND NEW (BOXED)	£129.00
Yaesu	FEX-767-2m	2m Module for FT-767	£175.00
Yaesu	FEX-767-6m	6m Module for FT-767	£175.00
Yaesu	FL-2025	Amplifier	£90.00
Yaesu	FP-30	Power Supply - FT-897, FT-857	£189.00
Yaesu	FP-700	Power Supply	£100.00
Yaesu	FP-707	Power Supply Unit	£80.00
Yaesu	FP-757GX	Power Unit for FT-757	£300.00
Yaesu	FR-101	HF, 2m, 6m Base Transceiver	£399.00
Yaesu	FRG-8800	Receiver Including Converter	£399.00
Yaesu	FRT-7700	Antenna Tuner for FRG-7700	£60.00
Yaesu	FRV-7700	Converter for FRG-7700	£60.00
Yaesu	FT-100	HF / 6m / 2m / 70cms Mobile Transceiver	£499.00
Yaesu	FT-100D	HF / 6m / 2m / 70cms Mobile Transceiver	£539.00
Yaesu	FT-1000D	200 W HF Transceiver (MAINS)	£1,600.00
Yaesu	FT-1000MPmkV	200W DSP HF Transceiver	£1,800.00
Yaesu	FT-1000MPmkV-Field	Top HF Radio - AC (2 Months Old)	£1,750.00
Yaesu	FT-101B	HF Base Transceiver	£99.00
Yaesu	FT-101ZD	HF Base Transceiver	£275.00
Yaesu	FT-1500M	2m 50W Mobile Transceiver with DTMF Microphone	£129.00
Yaesu	FT-2600M	Mobile VHF / FM Transceiver	£120.00
Yaesu	FT-290RMKII	2m Multimode Mobile Transceiver with Amplifier	£250.00
Yaesu	FT-41R	Handheld Transceiver	£120.00
Yaesu	FT-50R	Dual Band Handheld	£150.00
Yaesu	FT-5100	Dual Band Transceiver	£199.00
Yaesu	FT-51R	2m / 70cms Handheld Transceiver	£199.00
Yaesu	FT-650AC	26-50MHz 100w Base Station Transceiver (MINT!!)	£525.00
Yaesu	FT-690RMKI	6m Multimode Mobile Transceiver	£199.00
Yaesu	FT-7100M	Dual band Mobile Transceiver	£225.00
Yaesu	FT-726R	6m / 2m / 70cms / HF Transceiver	£575.00
Yaesu	FT-726R	2m / 70cms / HF Transceiver	£475.00
Yaesu	FT-730R	70cms Mobile Transceiver	£120.00
Yaesu	FT-736R	2m / 70 cms Base Transceiver	£575.00
Yaesu	FT-736R	6m / 2m / 70cms Transceiver	£650.00
Yaesu	FT-747GX	HF Transceiver - General Coverage	£325.00
Yaesu	FT-757GX	HF Transceiver	£350.00
Yaesu	FT-76R	70 cms Handheld Transceiver	£99.00
Yaesu	FT-790R	70cms Multimode Transceiver	£175.00
Yaesu	FT-790RmkII	70cms Multimode Transceiver	£250.00
Yaesu	FT-840	HF Base / Mobile Transceiver	£399.00
Yaesu	FT-847	HF 6m / 2m / 70cms Transceiver	£850.00
Yaesu	FT-920AF	HF / 6M Base Transceiver	£899.00
Yaesu	FTV-1000	200 W Transverter	£450.00
Yaesu	FTV-430MHZ	Module for Transverter	£99.00
Yaesu	FTV-707	2m Multimode Transverter Including Module	£125.00
Yaesu	FTV-901	Transverter including 2m Module	£165.00
Yaesu	FTV-902DM	Transverter	£225.00
Yaesu	FV-102DM	Digital VFO	£150.00
Yaesu	FV-901	Digital VFO	£175.00
Yaesu	G-650	Rotator	£300.00
Yaesu	KR-400	Rotator	£120.00
Yaesu	KR-600	Rotator	£140.00
Yaesu	MW-1	Remote Control Microphone & Infra-Red	£60.00
Yaesu	SP-55	Mobile Speaker	£15.00
Yaesu	SP-767	Extention Speaker (BOXED)	£70.00
Yaesu	SP-980	Speaker with Built In Filters	£60.00
Yaesu	System 600	HF Commercial Radio	£600.00
Yaesu	VR-120	FM / WFM / AM Receiver	£99.00
Yaesu	VR-500	Yaesu Handheld Scanner	£149.00
Yaesu	VR-5000	Top Class Base Scanner	£450.00
Yaesu	VX-1R	Handheld Transceiver	£120.00
Yaesu	XF-114SN	2KHz SSB Filter	£60.00
Yaesu	YO-901	Scope	£250.00
Yupiteru	MVT-3300	Handheld Scanner	£99.00
Yupiteru	MVT-7300	Multiband Handheld Scanner	£199.00
Yupiteru	MVT-8000	Base / Mobile Scanner	£199.00

By Bob Treacher, BRS32525, 93 Elibank Road, Eltham, London SE9 1QJ. E-mail: brs32525@compuserve.com

SWL

The invitation for listeners to add their addresses and e-mail details to the *RSGB Yearbook* listing has not provided the avalanche of details that was hoped for. SWL details were added to the *Yearbook* several years ago in an attempt to put listeners on an equal footing to our transmitting colleagues.

The details that listeners provided will be sent to the editor of the *Yearbook* and I hope that the additional entries will make it worthwhile for the listing to continue.

GW AGAIN

My son Simon, now M3CVN, and I will once again be holidaying in Tenby, Pembrokeshire, this July / August. I hope to break the 200 DXCC heard barrier this year. With 179 heard, it will not be an easy task as almost all the 'easy' countries have already been logged. However, with a good many African countries still needed and with a few DXpeditions planned for while we are operating '/P', there is a reasonable chance of achieving the magic 200.

Our trip will be a little different this year as Simon intends to operate as MW3CVN/P. Although he will only be running 5 watts from a Yaesu FT-817, he hopes to activate some Worked All Britain areas on 40m SSB, as well as trying his hand at working some DX on the higher bands. If our holiday is a success - both from the transmitting and receiving points of view - future columns will tell the story.

NEWCOMER

This was a regular feature in the column a few years ago, but the number of 'new' listeners who contact me has dwindled. However, this month it is good to welcome Mike Loxton, RS188327. He is most appreciative of the help and assistance that John, GW0GIH, has provided in setting up his receiver, making up wire antennas, helping to tune his ATU, and designing an SWL QSL card for Mike to use. Mike's nearest radio club is 20 miles away from his Brecon QTH, so John's assistance has been invaluable.

There are several ways that a new listener can enlist help. For those within easy reach of a radio club, simply contact the club secretary to find out details of meetings, and go along. You really will learn a lot. Membership of most clubs is so diverse that most have experts in many facets of our hobby. You will also be able to get involved with the club's activities - special event stations, contest stations, DF hunts, etc. Most of all you will have someone at hand who you can ask advice from to make your listening more fun and more rewarding.

If, like Mike, you are some way from a radio club there are still ways to contact local amateurs. One way is to monitor the bands, listen for a 'local' amateur, write to him - take the address from the Society's Yearbook - explain that you are new to the hobby and ask if it might be possible to visit the amateur to see his shack and to discuss aspects of the hobby. You will find that most active amateurs are only too pleased to help.

Thirdly, you can 'go it alone' and buy one of the many books that the Society has on offer to improve your knowledge and your station. However, improving your ability to be a better SWL can only be achieved by listening on the bands - your understanding of band conditions and of propagation will grow, standing you in good stead for when you decide to become a radio amateur.

The combined SWL card of Bob, BRS32525, and Simon, RS177448, used for sending reports during last year's holiday operation from Pembrokeshire (see 'GW Again').

OLD SWL CARDS

Alan Jubb, G3PMR, saw the item regarding Peter's, ONL5923, collection of old SWL QSL cards. He had been clearing out the shack and came across a bundle of SWL reports from the 1960s. If Peter would like to contact Alan (g3pmr@shacklog.co.uk) he will gladly forward them. Others that feel the need to pass on old SWL reports can contact Peter at peter.destoop@pandora.be

MONTHLY REPORT

Robert Small, BRS8841, and David Whitaker, BRS25429, provide the news this month. Robert comments on another month of poor conditions passing, but it was not all gloom! He heard a rare new country on 24MHz thanks to N6XIV/KH9, but he was very weak. 7MHz highlights were YI1EM, ZA3/IZ2DPX and W5AA/HP3. 14MHz had shown signs of improvement, and the band is staying open until quite late now. Another rare one on 18MHz was NH2PW on 17m. 21MHz had been the best band of the month. Robert logged VQ9JC, 4W3DX, KP4DKE, 9M2/JI1ETU, BW4/UA3VCS and OA4AHW.

Turning to 50MHz, David reflects on some good Sporadic E openings to most of Europe. Several contests had provided good Es conditions - for a change! David was displeased that the Caribbean opening to V25XX, 9Z4BM, KP2A, FM5WD, 8P9HW and PJ2BR found its way down to London but not to his Yorkshire QTH! Also heard was FJ5DX, which was a new DXCC on 50MHz for yours truly. Simon also heard VP9/N0JK on CW. However, to balance my new one, David promptly heard YA4F while I was at the office. For good measure, David also reports UT2IC (KN88) and UX7MX (KN98). The YA and the UT took David to 53 DXCC entities for the year on 50MHz.

David also reported several Es openings on 144MHz, hearing 17 stations in I, DL and HB9. One of the openings might have been a combination of tropo and Es as some of the stations heard were from much shorter distances than is usual in Es openings.

LIGHTHOUSE / LIGHTSHIP WEEKEND

It's that time of year again! This month it is a year since the last International Lighthouse / Lightship Weekend, when over 385 stations were active at lighthouses and lightships throughout the world. This year the event will be from 0001UTC on Saturday 16 August until 2359UTC on Sunday 17 August. Full details of the rules and an entry form can be found at http://lighthouses.net.au/illw/index.html A list of stations that have already confirmed their participation can be found at http://lighthouses.net.au/illw/2003.htm ◆

MICROWAVE PROJECTS

2 NEW PUBLICATIONS FROM THE RSGB

Microwave Projects is aimed at those who are interested in building equipment for the amateur radio microwave bands.
Packed full of ideas from around the world, this book covers the subject with a variety of projects. The book has many contributors who have a wealth of experience in this area and they have produced many projects, design ideas, complete designs and modifications of commercial equipment, for the book.
This title provides much useful information as to what can be achieved effectively and economically.
Aimed at both the relative novice and the "old hand" the book also covers useful theory of designing microwave circuits and test equipment for the projects. the book includes chapters covering:

Signals Sources **Transverters** **Power Amplifiers**
Test Equipment **Design**

Microwave projects is a must have book for all those who are already active on the microwave bands and those looking for interesting projects to embark on.

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QRP BASICS

Do you want a new challenge? Have you ever wanted to try QRP? Do you want to improve your QRP station? Do you want to build a working transmitter or receiver? QRP Basics will help you do all of these things.

Written by the UK's QRP Supremo Rev George Dobbs, G3RJV, QRP Basics tells of the fun to be had by operating with low power, both from home and the great out doors. Advice is given on how to get the best results from a QRP station, how to try out QRP if you haven't before. A large range of commercial QPR equipment and kits are described. Much of the book explains how to construct your own station, including complete transmitters and receivers, and accessories. Even the experienced constructor will appreciate the sections on toroidal coils, construction techniques and equipping a workshop.
Finally, there are lists of contests, awards, books and organisations or interest to the QRP operator in the UK and the USA.

QRP Basics will enrich your amateur radio. It will inspire you to start building. It may even get you out in the open air. Quite simply, QRP Basics shows just what fun can be had from amateur radio.

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www.rsgb.org/shop or Tel: 0870 904 7373

VHF/UHF

Sporadic E (Es) propagation on the VHF bands is a welcome phenomenon. You can be monitoring 144.300MHz on what seems to be a quiet band when an Italian or Romanian station suddenly booms through like a local, after which all hell breaks loose for anything from a minute to several hours.

The E-layer responsible for this propagation mechanism is at a height of 90-120km so single hop distances (QRB) of up to approximately 2400km are possible. Greater QRBs occur, sometimes due to a tropospheric duct at one, or both, ends on 2m or multi-hop on 6m. The more intense the ionisation of the E-layer the shorter the QRBs that can be worked but most of the QSOs on 2m are in the range of 1400-1900km. For comprehensive information about Es propagation see the 'Further Reading' section.

144MHZ Es

In recent years Es propagation from the British Isles has been disappointing but so far this year it's coming up trumps. The first reported opening was on 20 May when Jamie Ashford, GW7SMV (IO81), worked EB7HAF and EA7DUD (IM76) in a very brief event at 1803. The first significant opening was on the 25th when Bob Harrison, G8HGN (JO01), worked an LZ, five YOs and four YUs in KN04-06, 13 and 34 between 1810 and 1855. Seven others were heard including HA2SU (JN97). Niels Montanana, G8RWG (IO91), also "worked a handful of YU, YO and LZ stations" in the same period. Syd Smith-Gauvin, GJ0JSY (IN89), contacted a YO and four HAs in JN97 and 98, again in the same time slot. Steve Burrows, M5BXB (IO91), worked an HA, six YUs, an LZ and a YO in JN97, KN04, 05, 13 and 22 grids.

There was a brief late evening opening on 4 June to Spain. G8RWG reports that signals were very unstable but Niels managed to complete with three EA5s and an EB5 in IM98, 99 and IN90 from 2056. GW7SMV reports QSOs with EA6SA and EA6VQ (JM19) and EA5EJZ (IM98) between 1934 and 2055. In a 90s opening from 1643 on the 5th Clive O'Hennessy, GM4VVX (IO78), completed with EH1GAR (IN51) and CT1FAK (IN50) for his first Es QSOs since moving to IO78 in 2000. GJ0JSY mentions a brief event on the 6th when he worked I8MPO (JN70) at 1757.

The next major event was on 16 June. David Butler, G4ASR (IO81), posted a list of the 23 QSOs he completed on the vhf-dx-discuss reflector. Between 1523 and 1636 he contacted 19 Is, EA6DD (JM19), EB6AG (JM18), F5IVP (JN23) and F1YJ/TK (JN42). ODX was I8MPO at 1829km. Welcome to Richard Staples, G4HGI (IO83), for his first report since reading my first 'VHF / UHF' column 27 years ago! He lists contacts with EA6/DF9UX (JM09), IS0GQX (JM49), TK/F1PNR/P (JN42) and IT9PMZ (JM68).

Chris Bartram, GW4DGU (IO71), completed 36 QSOs with the Mediterranean area from 1418 on the 16th with I0, 1, 5 and 8 stations, plus EA6VQ, IS0/IK6DZH (JN40), F1YJ/TK, IS0GQX and TK/F1PNR. The latest event at the time of editing was on the 17th when G4HGI added four SPs in KO02, 11 and 12 from 1710.

EA6VQ produces animated maps with the estimated Es cloud, which you can watch on his dedicated website. If you want to see new maps please join his mailing list - see the list.

50MHZ Es

Perusing Ted Collins's, G4UPS (IO81), daily reports from 19 May to 17 June, the only days when no European Es was recorded were 21, 22, 26 and 30 May and 1, 2, 11 and 12 June. Beacons heard were CN8MC, CT0SIX, ES0SIX, I0JX, I5MXX, IK5ZUL, IZ1EPM, LZ2CC, OD5SIX, OE3XLB, OH1SIX, SV1SIX, SV9SIX, S55ZRS, T99YVZ, YO3KWJ, 4X4SIX, 5B4CY and 9A1CAL. He reports that SR9FHA (KN09BW) is a new beacon on 50.026MHz first copied at S9 FSK on 6 June at 1608. IW3FZQ (JN55UW) was first heard at 0625 on 3 June on 50.001MHz CW at S9. EH8JF* (IL38) and EH8FE* were new Canary Islands stations worked / heard in the evening of 14 June. These Es sessions brought Ted a couple of new grids, EH4CTF/P (IM89) on 4 June and TF/G4ODA (IP24) on the 17th.

Bryn Llewellyn, G4DEZ (JO03), made over 100 QSOs all over Europe on 6 June including two LX stations for a new country. On the 9th he lists UR5FEO (KN56), RW1AY/1 (KO69), UY5HF (KN29), US0WJ (KN19) and UX0FF (KN45) plus 50 others. Nyall Davies, G8IBR (IO80), writes that he's not a great DX worker but enjoyed the 17 June event working into DL, I, LA, OE, OK, SM and SV8DTD (KO39), a double-hop QSO with S5 reports exchanged.

G8HGN found the band wide open to LA, OH, OK, SM and SP when he arrived home at 1800 on 17 June. Bob worked six new grids, OH4BC (KO19), SK7CA (JO86), OK1DCF (JO80), SP7FSF/A (JO91), LA/DL3BRC (JO48) and SP1KIZ (J084) until a thunderstorm curtailed the activity. Andy Durrant,

Auroras

G8HGN reports three phases in an aurora on 2m on 29 May but he missed most of the late afternoon session working only a GI and a G. The mid-evening phase was not very good but from 2211 in the third phase he completed 14 QSOs with DL, G, GW and PA stations on SSB. ODX was DL1NB (JN49) at 633km. Beam headings (QTE) were 40-50° in this period.

G8RWG worked a string of DLs and PAs on 2m SSB and at 2200 the best signals were at 40° when French stations in JN08 were auroral. Niels contacted EI and GI stations before signals began to fade around 2330. On 30 May Reg Woolley, G8VHI (IO92), worked LY2AAM (KO06) for a new grid on 2m.

GM4VVX completed QSOs with EI, G, GM, GW and PA stations on 7 May, 1700-1840. Clive reports events on 13-15 May but without any QSOs. On the 21st he contacted G, GI, GM, GW and PA stations, 1750-1830. Next day, 1400-1540 DLs and OZs were worked on CW. On the 29th from 1345 there were weak signals with QSB resulting in contacts with DK, G, LA, OZ and GW stations. Weak events occurred on 1-4 June and on the 8th only the GB3NGI beacon was auroral and the only QSOs were with EI and GI. On 4m Clive put out a CQ call on 29/30 May and worked GI4KSO (IO64) for a new country and grid and then G8GXP (IO93) for another new grid. On 6m on 30 May there was a little auroral activity to G and GM.

GW4DGU seemed to share a private aurora on 2m with SK6DK* (JO67) on 29 May. The event was widespread and started at 1440 with PA5DD* (JO22) ending at 2317 with DL8EBW* (JO31). ODX was DK1KO (JO53) at 1002km. Chris reports that the QTE varied from 70° at the start, through north to 330° at 1946 when he worked F5SE* (JN29). He completed 25 QSOs. GW7SMV was also QRV on 29 May on 2m and completed eight SSB QSOs with DD, F, MI, MM and PA stations in five grids, ODX being DD7DAC (JO31) at 742km. The mid-latitude A-index reached 59 this day.

By Norman Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey CR8 1EZ. E-mail: g3fpk@compuserve.com

G8PL, worked TF/G4ODA (HP94) on 8 June while Keith was mobile. On 6 May, Derek, G8TOK (JO01), worked CT1DHM (IN61) at 2255 after which he went onto 4m to complete a cross-band QSO. The CT completed further contacts with other Gs who were on 4m. M5BXB lists nine new European grids from Es contacts.

From the far north GM4VVX has had several openings from IO78 but they were not as strong as last year. On 20 May Clive mentions a late night event into ES, OH and YL in KO and KP fields. Midday on the 27th brought DL, OZ, PE and SP contacts. On 4 June in the late evening there was an opening to Western France, CT and EA; the CN8 beacon was S9 but nil activity from Morocco. Next day there was activity from EH and CT from IN50-53, IM58 and IN88. There was an erratic opening jumping between CT and 9A on the 6th. Next day brought another erratic event bringing QSOs with DK, EH, OK, SP and 9A stations the prize being HV0A (JN61) for a new country. Finally on the 9th Clive managed to complete a difficult QSO with LY2BAW.

David Dodds, GM4WLL (IO85), made 13 QSOs in the UKSMG Contest on 7 June working into F, HV, I, OE, SQ, S5 and 9A. Grids were JN05, 52, 53, 61, 62, 65, 66, 68, 76 and KN09. John Armstrong, GW3EJR (IO72), had a listen at 2145 on 16 June and worked TF/G4ODA then in IP34. He writes, "That made my day and I went to sleep a happy guy!" Thanks also to SWL David Whitaker, BRS25429 for a résumé of stations heard on the evening of 12 June.

50MHz TRANS-ATLANTIC

The first 6m opening across the North Atlantic occurred on 5 June from late afternoon when HI8ROX (FK58) was heard by G4UPS working a huge pile-up of stations. Also copied were WP4LNY and KP4EIT (FK68). G4DEZ worked FP5DX (GN16), KP4EIT and HI8ROX for a new country. On the 7th he worked VE1YX (FN74), FP8BU (GN16), VE1ZZ (FN84) and VE1CZ (FN85).

On the 12th G4UPS copied FM5WD (FK94) at 2112, V25XX working a huge pile-up at 2158 and 9Z4BM (FK90) at 2200. Others mentioned by BRS25429 included 8P9HW (GK03), PJ2BR (FK52) and YV1DIG. On the 14th G4UPS completed with PP8KWA (FI96) for a new grid at 2026.

METEOR SCATTER

G8VHI has been using FSK441 on 2m and completed with OH6HFX (KP14) at 1918km and LA/DL2NUD (JP88) at 1998km on 14 June, both new grids. Using the same mode, GW7SMV completed with IV3DXW (JN65) on 10 May and with LA5KO (JO59) on 12 June. GW4DGU suffers from a 'birdie' very close to 144.370MHz - the *de facto* FSK441 calling frequency - emanating from his local telephone exchange, so hasn't spent much time exploring the mode. Chris has made some conventional HSCW QSOs with those who can't or won't use FSK.

The Perseids meteor shower is predicted to peak around 2300 on 12 August with a ZHR of 122, according to the OH5IY software program, and six hours later there could be a secondary peak ZHR of 105.

TROPO

On 6m, Tony Jarvis, G6TTL (JO01), worked F5TXM/P (IN88) on the morning of 28 May but activity was low. On 70cm he contacted G3JJZ and G8DKK. In the morning of the 30th he worked ON4PS/P (JO20) on 2m and 70cm and ON4ZN (JO21) on 70cm. Reasonable conditions that evening brought QSOs with PAs and DLs on 2m.

G8HGN worked EI5FK (IO51) at 1708 on 6m on 5 June. On the 8th Bob got F1AZJ/P (JN28) for a new grid on 70cm. Next day the evening brought 2m QSOs with F1OET (JN38), DB4VO (JN39), DF9IC (JN48), LX2DX (JN29) and the prize of the night at 2118 I2FAK (JN45) his first tropo QSO with Italy. In the UK Activity session on the 10th he worked 15 stations with eight multipliers and gave away a few points in the *PW* QRP and RSGB Backpackers contests. ODX was M0AFC/P (IO84).

G8RWG was QRV in the French contest on 7 June and new grids for Niels included F5RZJ/P (JN26), TM8F/P (JN25), F5KDC/P (JN15) and TM8MB (JN35), ODX at 801km. Back on 1 May, G8TOK reports an excellent duct between EI and JO01 when Derek worked EI2JD (IO63) on 2m FM at 506km. They tried 6m, but nothing heard. On 2m on 31 May G8VHI contacted EA1BLA (IN53). Reg was QRV in the French contest and mentions TM6R (JN27).

Geoff Pike, GI0GDP, found excellent UHF conditions on the morning of 1 June when G8AIM (IO92) was 'armchair copy' on 70cm and 23cm. He also worked G4FEV (IO92) on 23cm. On 31 May GJ0JSY worked Gs in IO90 and 91 on 2m. GM4VVX was out /P at IO87WA for the 6-hour section of the 2m contest on 18 May and Clive made 25 QSOs, ODX being G0VHF/P (JO01).

GW4DGU reports a very fine opening down to Galicia and northern Portugal on 31 May/1 June. Chris suggests an elevated duct right across Biscay was responsible for 2m beacon EA1VHF being 60dB above his noise floor. He says that the real joy of this opening was that stations in IN52 on the wrong side of the mountains were able to get into the duct as was CT1DYX (IN51), the only CT worked, on SSB at 1237km whereas EI5FK in Cork worked six having a clearer path. There was some weak tropo to Iberia on 14 June when he contacted EA1EF/P* (IN73).

GW7SMV lists 14 2m SSB QSOs in the 30 May to 1 June period with DL, EA, F and GM stations, ODX being CT1DYX at 1234km. On 9 June Jamie worked GM4IFC/P (IO85) and on the 14th EA1EF/P.

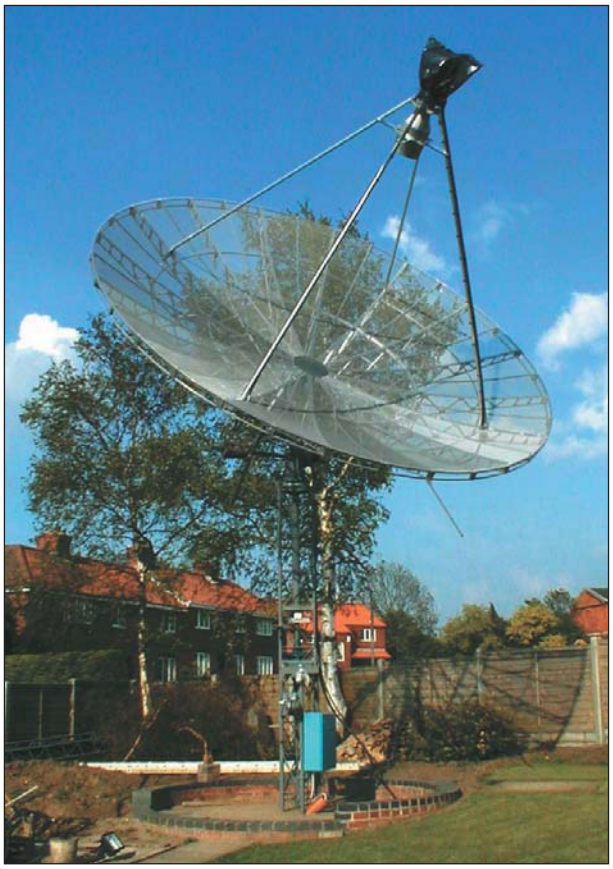

Photo: www.g4cch.com

This is the 5.4m dish antenna built by Howard Ling, G4CCH, for 23cm EME operation and commissioned in 2000.

MOONBOUNCE

The *432 and Above EME News* is now available in .pdf format - see the list - and the June issue runs to six pages. Over half of this issue is devoted to the first of a definitive, well-illustrated two-part article by Graham Daubney, F5VHX, on his Zero IF Radiometer project. It is a development of the article he prepared for the 2003 French VHF/UHF Conference.

The 10/11 May sked weekend was boosted by the Italian contest and propagation was good except for Faraday rotation on 70cm which was often 90° resulting in poor echoes. The high spot in May was the appearance of FY7DG on 70cm.

The only report from Britain was from Peter Blair, G3LTF (IO91), who was QRV on 70cm in the Italian contest although he didn't find many Italians! He completed with JA6AHB, DF3RU, JA9BOH, K6JEY (#373), OZ6OL, SP6JLW, KU4F, S51ZO and S52CW on the 10th and with EA3DXU, SK0CC, UA3PTW and PA0BAT next day. On 23cm on the 10th he completed with G4CCH, F2TU, ZS6AXT, OZ6OL, DK0ZAB, SM2CEW, DF3RU, G3LQR, IK2MMB, N2IQ, IK3COJ, SM3AKW and WA6PY and with LA8LF next day.

GW4DGU came back to 2m EME in March and has made 24 initials in four continents using just a single Yagi. The 9-ele F9FT antenna has been replaced

LOCATOR SQUARES TABLE Starting date: 1-1-1979

Callsign	50MHz	70MHz	144MHz	430MHz	1296MHz	Total
G3XDY	-	34	251	175	123	583
G3IMV	835	20	616	125	53	1649
G8VHI	-	-	217	76	40	333
G4DEZ	621	26	157	65	31	900
G1SWH	439	42	242	81	30	834
G8TOK	406	34	140	56	29	665
G6TTL	381	-	133	90	27	631
G3FIJ	278	29	108	51	23	489
G4FUJ	99	20	26	6	5	156
MU0FAL	503	-	28	9	3	543
G0JHC	1000	26	48	4	-	1078
G0FYD	676	1	285	20	-	982
GW7SMV	664	-	211	-	-	875
G4YTL	-	53	529	122	-	704
GM4JJJ	206	3	430	46	-	685
G8BCG	661	-	-	-	-	661
M5BXB	351	15	167	56	-	589
G8HGN	320	-	180	69	-	569
M3CLY	246	-	270	20	-	536
G4OBK	435	25	64	7	-	531
G7KHF	487	-	18	-	-	505
GM4VVX	324	5	132	-	-	461
G1UGH	280	-	130	18	-	428
G4ZHI	101	10	259	33	-	403
G0ISW	224	6	88	22	-	340
G1EFL	231	-	67	2	-	300
GW3EJR	295	-	-	-	-	295
M1DUD	244	1	32	1	-	278
G3FPK	30	-	246	-	-	276
G4APJ	176	-	58	25	-	259
GM6MEN	186	-	-	-	-	186
EA7IT	7	-	103	-	-	110
G8RWG	-	-	81	-	-	81
M3VAM	17	-	18	6	-	41

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Band of the month 1296MHz. Next deadline is 19 August.

by a 3.4-wavelength 11-ele Yagi modified slightly from a G4CQM design. It is not elevatable yet so benefits from good ground gain at moonrise and moonset. Chris is using a home-made HEMT preamp. Most of his contacts have been with 'ordinary 4-Yagi stations' and he has also worked a few 2-Yagi stations but has yet to make a single-Yagi to single-Yagi QSO.

His highlight was on 14 April when he completed with Guy Fletcher, VK2KU (QF56FG), using JT44 at moonrise. Other notable contacts have been with ZS6NK (KG46) using JT44, SV1BTR (KM17) on CW on 10 May, which Jimmy claims is the first GW/SV EME QSO on 2m, and OH7PI (KP42) on JT44.

The August sked weekend is 23/24 when London latitude stations will have 34.4 hours of Moon time. This is an apogee period and the declination starts at +26.47°, maximises at +26.63° and ends at +25.55°. The 144/432MHz sky temperature varies from 559/43K to 324/23K and the signal degradation ranges from -1.67dB to -1.38dB, referred to perigee.

FINAL JOTTINGS

Dave Gilligan, G1OGY, reminds us that the 70cm beacons will move to the 432.400-432.500MHz slot this year and you'll find links to the official QRG change site on his website - see the list. Angie Sitton, G0HGA, reports that the 2m CW reflector now has 78 members - details in the list.

My thanks to Prof Martin Harrison, G3USF, for the copy of the April *Six and Ten Report*. The deadline for copy for the October issue is **19 August** and for November it's **16 September.** The telephone answering and fax machine is on 020 8763 9457 and my CompuServe ID is g3fpk

FURTHER READING

The VHF/UHF DX Book, edited by Ian White, G3SEK, Ch 2 (available from RSGB Shop). ◆

WEB SEARCH

EA6VQ Es maps:	http://www.vhfdx.net/esmaps.html
EA6VQ mailing list:	http://www.vhfdx.net/signup.html
432 & above EME News:	http://www.nitehawk.com/rasmit/em70cm.html
70cm beacons:	http://www.g1ogy.com
CW Reflector:	http://morselady.topcities.com
CW Reflector home page:	http://morselady.topcities.com/vhfcwpage.htm

HELPLINES

IMPORTANT NOTICE
Respondents to items in the 'Helplines' column are advised not to send original documents, but to copy them and send the copies. This is to protect your (often valuable) property in those very few instances where the originals are not returned.

- **PAT, EI7CN**, has a BC348 with bandswitch in coilpacks broken. Any help would be greatly appreciated and expenses reimbursed. EI7CN, QTHR. Tel: 00353 5054 6886 or e-mail: patei7cn@talk21.com
- **TED, G8HLJ**, is looking for the circuit diagram of the 10mV / 600 ohm audio board for the Racal 1218, or a spare 1W / 8 ohm board. All costs will be met in full. G8HLJ, QTHR. Tel: 0151 632 0614.
- **DAVE, G4GMY**, would appreciate a copy of the operating instruction manual for the Trio CS-1012 oscilloscope. Costs and postage will be refunded promptly. G4GMY, tel: 01235 225 060 or e-mail: dggmy@rm.co.uk
- **KEITH, G3TTC**, is looking for manuals (originals or copies) for two oscilloscopes, the Philips PM3207 and the Telequipment D1015. G3TTC, QTHR. Tel: 01926 490 897, or e-mail: keith@g3ttc.freeserve.co.uk
- **DAVID, G3PTU**, needs the circuit diagrams for the Tektronix D1010 oscilloscope, and the Simpson 460 digital volt-ohm meter. G3PTU, not QTHR. Tel: 01274 877 211.
- **ALAN, G8GOJ**, needs circuit and wiring diagrams for the Standard Electric Lorenz AG (SEL) teleprinter type LO133. All expenses reimbursed. G8GOJ, QTHR. Tel: 020 8688 2564.
- **DENZIL, G3KXF**, wants details of any CW codes for the exclamation mark (!) and would like to hear from anyone who can help. OE barred was used for USA land-line telegraph; is there a later equivalent? What codes are generated by computer Morse keyboards, the AEA PK-232MBX and the Heathkit e-keyer with capacitive touch paddles, in its random character mode? Any costs gladly refunded. G3KXF, QTHR. E-mail: denzil@rodend.freeserve.co.uk
- **GEOFF, G4XMJ**, urgently needs a service manual for a Tektronix 547 oscilloscope. Postage refunded. G4XMJ, QTHR. Tel: 01273 845 325 or e-mail geoff.wiggins@ntlworld.com
- **JOE, G0SQF**, needs the manuals or any information on the following Marconi equipment: TF1066B/1 FM signal generator; TF2431 200MHz digital frequency meter; TF2432 500MHz digital frequency meter. G0SQF, QTHR. Tel: 01444 232 974 or e-mail: andrzejb@andrzejb.demon.co.uk
- **FRANK, G4WUM**, needs help in the form of information or a circuit diagram of the Wayne Kerr Component Bridge, model CT375. All costs will be covered. G4WUM, QTHR. Tel: 0191 489 4960.
- **JOE, G3DII**, is looking for a copy of the circuit diagram and, if possible, the handbook / service manual of the Trio TS-520 transceiver. Copying costs will be reimbursed immediately. G3DII, QTHR. Tel: 01526 353 362.
- **JEAN-PAUL, F1VA**, requires copies of the circuit diagrams for the Wiltron 5409A scalar analyser and probe 5400 – 6N50. F1VA, e-mail: f1va@wanadoo.fr
- **PHILIP, GW4HAT**, would like a copy of the manual / information sheets for the Emoto 1103 antenna rotator. He would also appreciate a copy of the operating manual (including external connections / circuit diagrams) for the Nagai Electric Ltd, Tokyo, NAG 2m linear amplifier, model 144XL. All expenses will be refunded. GW4HAT, QTHR. E-mail: philip@gw4hat.demon.co.uk
- **JOHN, M0CRW**, is looking for sources of information relating to the training and hiring to Merchant Ships of Marconi Radio Officers (Sparks), covering the period 1917 to 1929. M0CRW, QTHR. Tel: 01246 568 541.

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By Don Beattie, G3BJ, Hares Cottage, Woolston, Church Stretton, Shropshire, SY6 6QD.

IARU

A number of issues on the agenda of this summer's World Radio Conference were of direct interest to the Amateur Service. These included the proposed extension of the 7MHz band on a global basis, revisions to the rules governing the structure of call-signs and changes to Article 25 of the *Radio Regulations*, governing the Amateur Service. A full report of the outcome of the WRC as far as the Amateur Service is concerned is included elsewhere in this issue of *RadCom*.

A huge amount of effort went into the preparations for the Conference by many people on behalf of radio amateurs around the world. We owe a debt of gratitude to the WRC-03 team, led by IARU President Larry Price, W4RA, for the work it has put in over a number of years to present the case for amateur radio in Geneva this summer.

THE IARU

In this column over the next few months, I plan to outline some of the work of the IARU, and start this month with an overall description of what IARU is, and how it is organised.

The International Amateur Radio Union, which was founded in Paris in 1925 to represent the interests of radio amateurs world-wide, is a federation of national associations of licensed radio amateurs representing over 150 countries and separate territories around the world. One national society per country is recognised by IARU as representing the interest of amateurs in that country.

IARU is organised in three Regions, which broadly mirror the structure of the ITU and its related regional telecommunications organisations. The Regions comprise:

IARU Region 1: Europe, Africa, Middle East and parts of Northern Asia
IARU Region 2: The Americas
IARU Region 3: Asia-Pacific

THE IARU & ITU

The IARU is recognised by the United Nations as a Non-Governmental Organisation (NGO) by virtue of its consultative status with other United Nations bodies, ie the ITU, which in turn recognises the IARU as an international organisation. The IARU is extensively involved in relevant forums of the ITU, including its Radiocommunication and Telecommunication Development Sectors. It participates in all relevant world conferences and actively participates in ITU-R Study Groups, their Working Parties and Task Groups, the Radiocommunication Advisory Group, Conference Preparatory Meetings, and ITU-D Study Group 2.

The three IARU Regional Organisations separately participate in the work of regional telecommunications organisations such as the Asia Pacific Telecommunity (APT), European Congress of Postal and Telecommunications Administrations (CEPT), African Telecommunications Union (ATU) and Inter-American Telecommunication Commission (CITEL).

IARU REGION 1

Region 1 of the IARU is the one closest to home as far as RSGB members are concerned. The Region's objectives for 2003 - 4 are:

Promotion of spectrum requirements: The spectrum requirements of the amateur services are published on the IARU website. Particular emphasis is being given to restoration of 300kHz of spectrum world-wide at 7MHz, under WRC-03 agenda item 1.23.

Modification of Article 25: WRC-03 agenda item 1.7.1 calls for possible modification of Article 25 of the Radio Regulations. The IARU seeks deletion of provisions prohibiting communications between certain countries and international third party traffic. It agrees to delete the requirement for applicants to demonstrate competence in Morse code in order to operate on frequencies below 30MHz. The IARU seeks the addition of provisions on the disaster communications role of the amateur services.

Development of the amateur services: The IARU continues working with developing countries to promote growth of the amateur services and a 'friendly' regulatory environment. Region 1 is also actively seeking ways of encouraging more newcomers to become radio amateurs.

Strengthening the relationship between IARU Region 1 and its member societies: Improving the understanding and involvement of member societies in the objectives and activities of the IARU, improving communication flow and growing the number of active member societies.

Improving the range of web-based information provision on IARU matters: to make IARU more accessible to member societies and radio amateurs generally.

Above, right: Larry Price, W4RA, who led the IARU team at the World Radio Conference in Geneva this summer.

ORGANISATION & FUNDING

The officers for Region 1 are appointed through a vote of member society representatives at the triennial General Conference. These officers form the Executive Committee (or 'EC') of the Region. Each appointment is for a three-year period. Representatives of each Region in IARU propose candidates for President and Vice-President of IARU, whose term of office is five years.

The budget for IARU Region 1 is financed by a levy on each national society in the Region, based on the number of licensed amateurs who are members of that society. So in effect, a small part of each RSGB member's annual subscription (about 75p) helps finance IARU Region 1. Region 1 also helps finance, from this income, the work of the IARU International Secretariat, which coordinates global activity across the three IARU Regions.

Also appointed at the Region 1 triennial conference are Chairmen or coordinators of standing committees or working groups. These groups carry forward work of the IARU in the areas of HF, VHF / UHF / Microwave, Amateur Radio Direction Finding (ARDF), EMC, Radio Regulatory, European Commission liaison, Emergency Communications, Monitoring Service (intruder watch), Beacons, High Speed Telegraphy (HST) and support for amateur radio in the developing countries. Most work is done by e-mail, and there are very few actual meetings of people working in these areas. Each working group or committee has a modest budget for incidental expenses. The exception is the External Relations Committee, or ERC, which looks after the IARU Region 1 relationship with such bodies as CEPT and ITU. Here there is inevitably a need to attend some of the meetings called by these bodies, and to represent the amateur radio position. A significant part of the funds of Region 1 go towards the ERC work with ITU, CEPT and the European Commission. ◆

WEB SEARCH
IARU http://www.iaru.org

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Motorola GM950 (should be easyconvert to 4m)	£100
Microwave Modules MML144/200s 200w 2m Amp	£230
Microwave Modules MML144/100s 100w 2m Amp	£95
Tokyo Hypower HL 110 100w 2m amp	£120
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By Mark Lewis, GW7KDU, 14 Hornbeam Close, St Mellons, Cardiff CF3 0JA. E-mail: rmcwales@ntlworld.com

Repeaters

A summary of the results of the recent RA questionnaire on Internet linking.

The Radiocommunications Agency (RA) has recently published its review of Internet Repeater Linking. Permission to cross-link between amateur radio stations and the Internet for voice traffic was initially granted on an experimental basis in January 2000. At the end of 2001, the RA decided to review the experiment.

Since January 2000, some 420 Notices of Variation (NoV) have been granted to amateur radio licensees, giving them authority to establish Internet gateways. Some of these have been on a simplex basis, whereas others have been changes to existing or newly-established (dedicated) repeaters. One common feature of all the NoVs is the requirement that, whenever the link is in operation, it needs to be supervised so that it can be switched off in the event of inappropriate use.

The RA requested input from the amateur community. Among the questions to which the RA was seeking answers were:

1. Has the experiment been a success? A critical analysis of good and not-so-good points.
2. Are the appropriate bands and frequencies chosen? Should changes be made?
3. Internet links must be constantly attended whilst active; what are the difficulties associated with that requirement?
4. What abuse has been noted and what action was taken?
5. What usage and demand has been noted?

Altogether 132 replies were received. Most were from individuals, but there were several from clubs, repeater groups and RSGB committees.

Responding to the above questions, the following feedback was received. On the question about the success, the facility was generally acknowledged to be useful to those who, for reasons of licence restriction or station limitations, were now able to make contact with stations at distances far in excess of what they would normally achieve. Some criticism was made about audio quality and lag caused by delays in the Internet.

The choice of bands (VHF / UHF) was strongly supported, with the 70cm band being particularly popular. There was a request for more frequencies in the 2m band to be made available and also some interest in access via 10m, 6m and 4m was shown.

The requirement for attended operation seems to be causing unpredictable availability of links. The idea of using a 'monitoring team' that could remotely monitor and close down links was suggested. This would use facilities built into the computer software, to allow authorised users to control the links as required. The unattended Internet repeater in Sheffield has increased link availability, but attended operation of repeaters in general appears to be a good way of allowing normal local repeater traffic to continue without allowing the link to dominate.

The level of abuse on the whole has been very low. In the few reported cases of misuse, these had been overcome with the use of technical measures. The need to register callsigns before access is granted is seen as a good security measure by some.

Usage of the facility is variable. Some NoVs are put to good use with some gateway operators applying additional ones to provide extra capacity. Some holders of NoVs, however, either do not use them or use them very infrequently. This is seen as a waste of spectrum. The use of renewable NoVs has been proposed by the RSGB DCC.

Right: The link at GB3CL.

In general, the RA supports Internet linking and feels that there is little evidence at present of abuse. It is 'relatively comfortable' with the idea of moving towards unattended operation, the proviso for this being that there is some other means to monitor gateway operation and, if necessary, shut down a link.

CONCLUSIONS

On the whole, the correspondence received by the RA supports Internet linking. Its overall impression is that it is an interest for a small number of amateurs in the UK, but this is not surprising in a hobby with so many facets. Interest in linking is increasing, partly because more repeaters are being connected to the Internet by various means (ie on site and remote links). Most users seem happy with the choice of frequencies available, but there are some difficulties with the 2m band. Pressure to allow more frequencies in this band may cause problems for users of other modes here.

There are several discussion points about the future of Internet linking at the end of the review paper produced by the RA. The document is expected to be made available on the RA's website [1] but, at the time of writing, it had yet to be added. ◆

WEB SEARCH

[1] Radiocommunications Agency	www.radio.gov.uk
[2] Repeater Management Committee	www.coldal.org.uk/rmc

LATEST CLEARED REPEATERS

The latest clearance status can be obtained from the RMC website [2]. Please note that, even though an application may have cleared, it is beyond the control of the RMC as to when the keeper will bring the repeater into service.

Callsign	Type	Channel/Frequency	Keeper
GB3DN	2m site change	RV51	G1BHM
North Devon	In 145.1375MHz		
	Out 145.6375MHz		
GB3ET	New 70cm	RB13	G8GTZ
Winchester	In 434.925MHz		
	Out 433.325MHz		
GB3IR	New 2m	RV61	G4FZN
Richmond, Yorks	In 145.1625MHz		
	Out 145.7625MHz		
GB3YS	Site change 70cm	RB2	G3UGR
Yeovil	In 434.6		
	Out 433.050MHz		

REPEATER PROPOSAL STATUS AS OF 6 JULY 2003

Callsign	Type	Process Stage	Proposed Keeper
GB3AA	New 23cm, Alveston, North of Bristol	PU	G4CJZ
GB3BM	New 70cm wide, Southport	PU	G4WPS
GB3FJ	Site change 70cm, Lincolnshire	PU	G8LXI
GB3IN	New 2m, Huthwaite, Yorks	RA	G4TSN
GB3IT	New 70cm wide split, Tamworth	PU	G6NHG
GB3JF	New 2m, Lincolnshire	RMC	G8LXI
GB3KY	2m spec change, King's Lynn	RA	G1SCQ
GB3MI	New 70cm, Ballycastle, NI	RMC	MI0CRQ
GB3PK	New 2m, Ballycastle, NI	RMC	MI0CRR
GB3RB	New 70cm, Bolsover	PU	G1SLE
GB3WB	Site change 70cm, Weston-super-Mare	RA	G4SZM
GB3WJ	70cm freq change, Scunthorpe	RA	G3TMD
GB3WM	New 70cm wide, Woofferton	PU	G4AIJ

By Steve Hartley, GOFUW, 5 Sydenham Buildings,
Lower Bristol Road, Bath BA2 3BS. E-mail: newcomers.radcom@rsgb.org.uk

Newcomers' News

Over the last few months I have met a number of readers at club visits and rallies. Thank you all for your kind words about the column, but as I always say, this is your column as much as mine – keep the news and pictures coming in!

Tim Walford, G3PCJ, not only produces some fine radio kits but he also writes a newsletter for those interested in construction. *Hot Iron* is published quarterly and is available by subscription from Tim (see his advert on page 49).

In the latest edition there is a piece on an antenna design which was featured in *Practical Wireless* last year. The author claimed that the antenna has a low feedpoint impedance on all bands 1.8 - 433MHz. Tim asked his 'antenna guru', Eric Godfrey, G3GC, to answer questions about the antenna. In short, the design was thought to be something of a hoax. I looked up the *PW* article (August 2002) to find the antenna described as a G5IJ end-fed monopole, originally covered by Pat Hawker, G3VA, in the March 1996 'Technical Topics'. **Fig 1** and **Fig 2** show the antenna and toroidal transformer; full details of the latter are in the March 1996 article. Pat Hawker was also sceptical about the antenna's performance but revised his view after testing one on air; it functioned "particularly well on 7MHz", he concluded.

Now here is one of those strange coincidences that sometimes occur in life. During one of the visits mentioned above I was chatting to one of the newcomers at the Chorley and District Amateur Radio Club who told me he was using a G5IJ as part of his Foundation station. He too reported that it works well on HF.

Does anyone have any more details or reports? Is this a good antenna for the newcomer to the hobby?

M3 CONTEST?

David Cutter, G3UNA, wrote to ask if anyone had thought of organising a contest for Foundation Licence holders. As David points out, there is nothing stopping an M3 from entering any of the popular contests, but he wondered if newcomers might be less intimidated if there was a contest specifically for them?

What do you think? Should there be a new contest and, if so, on what bands? Should there be a separate category in one of the main contests, a trophy for the highest-placed M3, perhaps?

I recall the Poole and District Amateur Radio Society organising a 144MHz contest for Novice (now Intermediate) Licence holders a few years ago but it was abandoned due to lack of numbers taking part, despite some excellent prizes being offered. Now that the HF bands are available perhaps it would be different. Any ideas would be gratefully received.

IOW SUCCESS

A few months ago I received an e-mail from an Intermediate Licence student asking one or two questions about the syllabus and seeking out practice exam questions. More recently, Barry, M3BIW, let me know that he had been successful and now holds the callsign 2E1IOW, which is quite apt as he resides on the Isle of Wight.

He has been having some fun with his 145MHz hand-held working /M from the top of Snowdon. He managed a few contacts including one into Northern Ireland. Unfortunately, a combination of the wind and low temperatures prevented him from logging the callsigns, not a problem when mobile, but it does hinder the QSL process!

RAE RESULTS

The penultimate City & Guilds Radio Amateurs Exam saw nearly 75% of candidates gaining pass slips. Congratulations go to all 248 successful students and commiserations to those who didn't manage it this time - don't forget there is one more opportunity to sit the current RAE in December.

The examiners' report, expertly compiled by David Pratt, the Chief Examiner, draws attention to the questions that caused most difficulties and suggests where students might need to study more in the future.

The fact that a quarter of the candidates did not know that the transmitter power must be recorded in the log book was a little surprising. On the other hand I was less surprised to find that there was some difficulty in recognising the shape of a response curve for a 50Hz mains filter, in my 20 years of amateur radio reading I have never seen such a diagram. Just goes to show that there is always something to learn in amateur radio!

QSL REMINDER

Mike Evans, MW0CNA, is the QSL manager for a number of callsign series. He wrote to ask if newcomers could help out in a few ways.

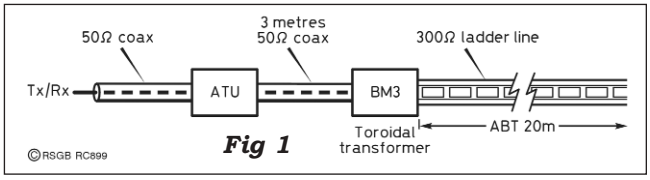


Fig 1

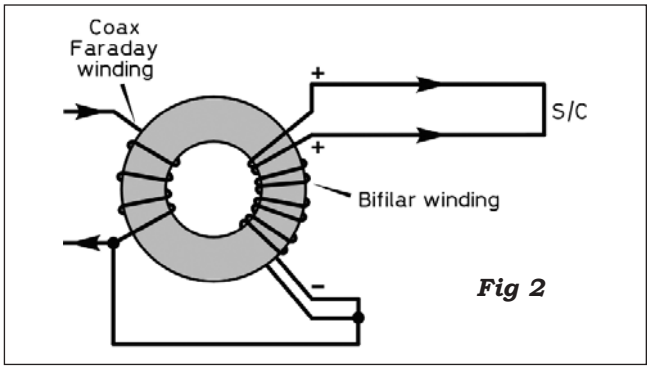


Fig 2

Fig 1: The G5IJ antenna, as described in 'Technical Topics', March 1996.

Fig 2: The toroidal transformer ('BM3' in Fig 1) used with the G5IJ antenna.

First of all he asks that you don't ask for envelopes to be held 'until full'. For some stations it may take quite some time for the envelope to fill (about 15 cards) and that means they clog up the QSL manager's space. As Mike says, a few extra 20p stamps to receive cards 'as they come' are hardly going to break the bank.

The second point is about returned cards. If you definitely do not want a QSL card for a contact, tell the other station. That will reduce the number of wasted cards in the system and cause less offence to the sender than having a card returned some time later marked 'not wanted'.

For newcomers who are do not know how the QSL system works, there is an excellent description in the *RSGB Yearbook*.

SYCOM CORRECTION

Eagle-eyed reader Stephen Roberts, M3ITI, spotted an error in the website address I gave for Sycom Electronic Components in the June column. Apologies to all those who tried the address only to receive a 'Gate Timeout' message. I have already apologised to Robin from Sycom when I saw him at the Yeovil Club's QRP Convention. The correct address is in 'Websearch' below. Thanks again Stephen. ◆

WEBSEARCH

Sycom Electronic Components:	www.sycomcomp.co.uk
City & Guilds Examiners' Reports:	www.kippax.demon.co.uk/c-and-g/

A Beginner's Guide

Since the advent of the use of the computer soundcard to decode digital signals there has been more activity on RTTY than ever before. One now hears more stations during a single day on RTTY than were normally heard in a week a few years ago. Much of this increase is due to the very effective, and free, MMTTY (1) program, by Mako Mori. This in itself has brought thousands of people world-wide on to the mode to enjoy the casual, friendly world of RTTY.

Many RTTY operators use RTTY contests simply as a way of increasing their DXCC totals, working towards a 'Worked All States' (WAS) or 'Worked All Zones' (WAZ) award, or picking up new prefixes and many of them continue to use *MMTTY* to this end.

RTTY CONTEST PROGRAMS

Whilst this is all very well, and can also give the 'novice' contester a flavour of what can be worked during an RTTY contest, *MMTTY* is *not* designed as a contesting program. It therefore does not have the capabilities of a dedicated contest package such as, say, *WriteLog* (2) or *RCKRtty* (3). These programs can recognise incoming callsigns preceded by "DE", track your score, show needed calls, multipliers and duplicate contacts and do much more to help you maximise your score.

While *MMTTY* will not always produce a contest log in the format specified in the rules (particularly if a 'Cabrillo' log is required), all specialised RTTY contesting programs, like the two mentioned, will produce the correct format needed when sending in your log. A 'Cabrillo' log, by the way, is a standardised log format in which all the information is in one file that includes the contest log, your name and address, callsign and comments. An alternative for producing logs is *Cabrillo Tools* by WT4I (4) which will convert various files into the correct Cabrillo format for you. This type of log is now required in all RSGB HF contests and most RTTY contests.

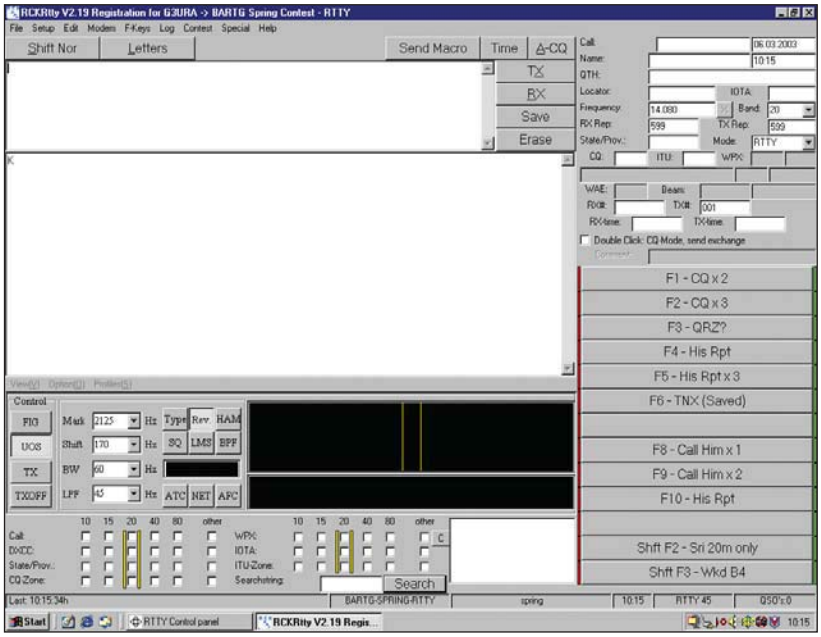
Most logs can be e-mailed to the contest address and will be acknowledged. Any comments you have about the contest can be included in the 'soapbox' section of the Cabrillo log, but not in your e-mail text, as this may only be seen by a 'robot' mail handler!

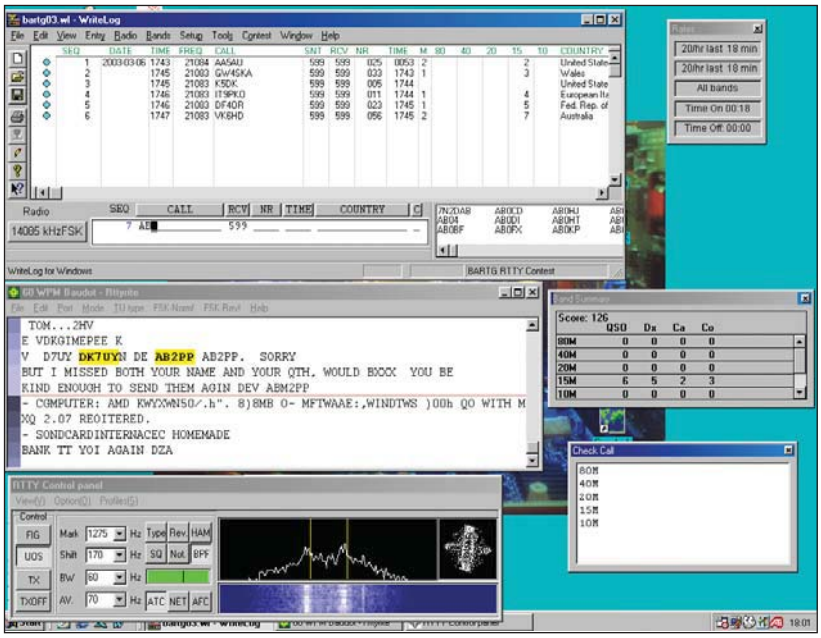
Always send in your log, no matter how many or how few contacts you made. Your log, yes *yours*, with only 20 or so QSOs in it, is used to verify the points claimed by the other contestants whom *you* worked. "But with only 20 QSOs, I'll come last", I hear you say. I doubt it! While trying out some new software, Dick, G3URA, ended up working just 16 stations in one contest and when the results came out, there were at least five stations below him. Despite a 'low' score there is also the possibility that you may be the *only* G, M or 2E station to submit a log in any particular class, meaning you could end up with a certificate for being the top G in that class. Before submitting your log, do read through it and make sure it looks OK. Ensure there are no obviously wrong calls or daft exchanges. Printing the log out and then looking it may help you spot anything untoward.

BEFORE THE CONTEST

Entering a contest can be a bit daunting the first time. The following few paragraphs are aimed to help the beginner take the plunge and offer a few tips from both avid contesters and a contest manager.

The first rule in any contest must be: "Read The Rules!" The rules for all major RTTY contests can be found on the web (5), and are also published in the British Amateur Radio Teledata Group (BARTG) (6) monthly magazine, *Datacom*, together with detailed operating tips for all the major contests. The rules will state date and time, the exchange required, where to send logs, and in which format they must be. The rules will say if there are different classes of entry, and a single band entry may suit you if you are restrict-





Top: Typical contest logging software screen: this is the RCKRtty program configured for the BARTG Spring RTTY contest.

Bottom: Using the WriteLog program for an RTTY contest.

By John Barber, GW4SKA, 29 Brithdir Street, Cathays, Cardiff CF24 4LE.
E-mail: ska@bartg.demon.co.uk; Phil Cooper, GU0SUP; and Dick Whittering, G3URA

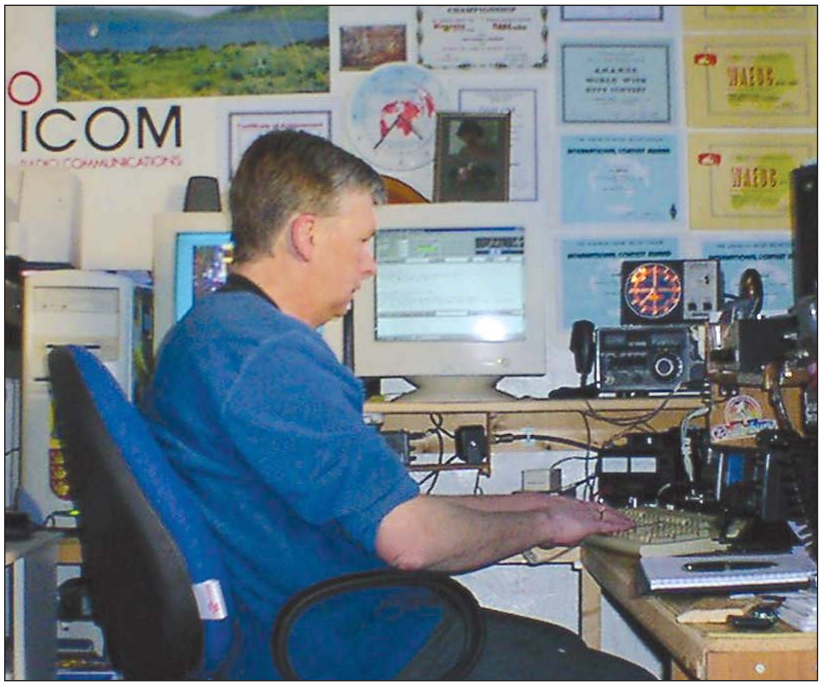
to RTTY Contests

ed by time or aerial considerations. Always keep a copy of the rules handy.

Before the contest, set up some simple memory 'buffers' containing only the minimum information required for calling another station and exchanging the relevant information. It is also a good idea to add a couple of 'return' characters to the beginning and end of the exchange, as this can make your exchange stand out a little more.

For a contest where the time also has to be exchanged, the buffers might look like this:
"DE GW4SKA GW4SKA K" (Use this to answer a CQ. Never send his call and always send the 'DE', see below).
"RGR UR 599 001 001 1254 1254 DE GW4SKA K" (meaning I have your message, this is mine for you).

These will be fine in most conditions but be prepared to repeat the serial / time etc several times if copy is poor, like this:
"001 001 001 TIME 1254 1254 1254 QSL? BK." Set up a separate buffer for this. There is no need to repeat the RST as it is always 599 no matter what the conditions!



Co-author Phil Cooper, GU0SUP, operating RTTY from Guernsey.

DURING THE CONTEST

Never send any unnecessary information such as names, your rig, power or aerial details. Also, even if the station worked is a new country for you, never ask for his QSL information, as you can find this out after the contest. Remember that the serious contester will be aiming to make about two contacts every minute, so stick to the essential information only. Remember too, to call exactly on the other station's frequency and keep the 'AFC' and 'NET' controls turned *off* when answering a CQ.

Think about your exchanges and watch what others are doing. Most of us know our own callsign so seeing it three times before we see your callsign just once, is a real 'no-no'. For example, sending "GU0SUP GU0SUP GU0SUP DE G3URA PSE K" will probably not get you that much-needed GU multiplier!

Know what the 'multipliers' are. Are they countries? Prefixes? Zones? This will be explained in the rules, which you will have read before the contest, right? Are there bonus points for working different continents? If you run a 'little pistol' station where anything outside Europe is a bonus, don't forget that the Canary Islands, EA8, counts as Africa, and Cyprus, 5B4 or ZC4, counts as Asia. Both are fairly 'local' and easily worked.

Having a 'little pistol' station can have some advantages, as most of the time you will be in 'S&P' ('search and pounce') mode while the 'big guns' will sitting on one frequency calling CQ. You can pick and choose whom you work; they can't. Never forget that they *want* your call and will do their best to get you in their log. This is especially true if you have a regional locator in your callsign, such as GM or GI.

If they are rare DX and have a huge pile-up, worry not. If it is a 48-hour contest wait 24 hours and call them on the second day, when they will be crying out for contacts and will want you in their log. If you do have to wait patiently for your turn to work the DX, again, watch what is going on: there should be no need to ask for a repeat of his serial number, for example.

In some contests, such as the Australian ANARTS, points are based on distance worked and in these types of test it is far better to trawl the bands looking for DX rather than just work mainly European stations.

Watch out for time limits on band changes or off times. These will be in the rules. If, for example, you are limited to two band changes in 10 minutes don't work that one multiplier on 10 metres if you can't hear any other stations, or you will then have to sit on a quiet band until the 10-minute time period has elapsed (however, if you just can't resist working that VP6 before returning to 20m, you can always use up the rest of the time with a 'comfort break'!)

If you are keen to try CQing, even with your 'little pistol' station, think about doing so in the dying hours of the contest. Then, many of the big boys will start to search and pounce for those extra contacts that escaped them during the main part of the contest.

INTERESTED?

More information about RTTY contesting and the datamodes in general can be found by joining BARTG (6), from which several RTTY awards are available. There is also a popular RTTY reflector (7) where you can ask questions, find QSL routes, and compare contest scores. Other helpful information can be found on the 'RTTY Info' website (8), where there is an excellent RTTY tutorial for those wishing to learn more about the mode.

New RTTY operators will find contesting a very easy way to make a start on the mode without the need to type at furious speeds. Those with more experience will know that in any of the major contests held each year, they can find well over 1000 stations to work. Look at the contest calendar (5), read the rules, join in, but most of all, have *fun*!

We look forward to seeing you on our screens and seeing your calls listed in the results. Oh, and one last bit of advice: Read the rules - *again*! ◆

WEB SEARCH

(1)	www.qsl.net/hammsoft
(2)	www.writelog.com
(3)	www.rckrtty.de
(4)	www.wt4i.com
(5)	www.rttyjournal.com/contests
(6)	www.bartg.demon.co.uk
(7)	http://lists.contesting.com/mailman/listinfo/rtty
(8)	www.rttyinfo.net

By Peter Dodd, G3LDO, 37 The Ridings, East Preston, West Sussex BN16 2TW. E-mail g3ldo@ukonline.co.uk

Evolution of the Beam Antenna

PART 2 Peter Dodd, G3LDO, concludes his investigation into the development of the beam antenna, starting with the W5BDB 14MHz 'Signal Squirter' design of 1935.

W5BDB described details of his compact directional antenna in QST [12]. This antenna was, like G6CJ's design described in Part 1 last month, also a two-element 14MHz antenna that could be rotated, using a mechanical arrangement, from the shack. It was a lightweight design with a mixture of wood and aluminium tube used in the construction. The article is a clear unambiguous construction description with good diagrams, one of which is shown in Fig 12. It appears to be the first rotatable beam antenna design that could be reproduced by any radio amateur with the space to erect an antenna with a spread of 35 x 18ft.

W5BDB describes the construction: "The material used in the antenna in the final version is aluminium alloy tube 7/8in in diameter. Each side of the antenna consists of a 14ft section of this material with a 3 1/2ft section of a smaller tube that just telescopes inside the larger, providing the means of varying antenna length to the desired transmitting frequency. A small clamp is provided which allows a set screw to extend through a hole in the outer tubing, thus placing pressure against the inner tube and giving good contact between the two sections. The antenna is fed with EO1 transmission cable because of its extreme flexibility and ease with which it may be coupled to any final amplifier."

The reflector was mounted in a manner that space variations between the antenna and reflector might be made by moving the insulators supporting the reflector closer to or further away from the antenna. It was expected that the reflector would be further back from the centre than the antenna, which was desirable to provide a balance of weight since the antenna has the EO1 cable to support over a short distance. The reflector is of the same material as the antenna. W5BDB then describes how the performance was measured. It was the first time standing waves on a transmission line is mentioned: "Finally, after using the Signal Squirter on the air for some little time and becoming thoroughly convinced that the thing really did do the work, we went to work with the field-strength measuring equipment and started making final adjustments. There were several factors to be taken into consideration in doing this. First, the spacing between the two halves of the antenna; next, the exact length of the antenna; then, the spacing between the antenna and reflector; and finally, the length of the reflector.

". . . Element length change was easily made by sliding each end section of the antenna into or out of the larger section of tubing, the final adjustment being fastened firmly in place. A very critical point was the proper spacing between the two halves of the antenna itself, this adjustment being quite necessary to give the best match to the EO1 cable. This adjustment brought considerable improvement and eliminated a tendency for standing waves to appear on the feeder system. Final adjustment finally settled down at about 22in separation between the adjacent ends of the two halves of the antenna.

"Next came the location of the reflector back from the antenna. This spacing had been set arbitrarily at 17ft so that the reflector might be moved back further or up closer. The checks with the field-strength meter indicated very definitely that the spacing between the elements was important but not so critical as the actual length of the antenna and reflector. It was also found that the spacing between the two elements could be varied over a couple or three inches with little or no effect.

"After having found that the reflector seemed to do its best job when at about 16ft 10in instead of the usually recommended spacing of 17ft 4in, we started pruning the reflector length as the final step in adjustment. . . The final selection was 33ft 10.5in for our frequency of 14,215kc. The adjustments of reflector length were found to be quite effective and produced a noticeable difference as each change was made. In fact, it seemed at this stage of the game that the length of the reflector was fully as important as the antenna length, and that both of these were more important than the actual adjustment of space between the two elements in so far as critical and close adjustments were concerned".

G5PP 56MHz TWO-ELEMENT BEAM

Surprisingly, this is the first reference I can find of a parasitic antenna used for VHF, considering that the Yagi was designed for VHF in the first place. This two-element beam for 56MHz by G5PP [13] used a driven element and a reflector fixed to a wooden frame, which rotated within an outer supporting frame as shown in Fig 13. The elements were made

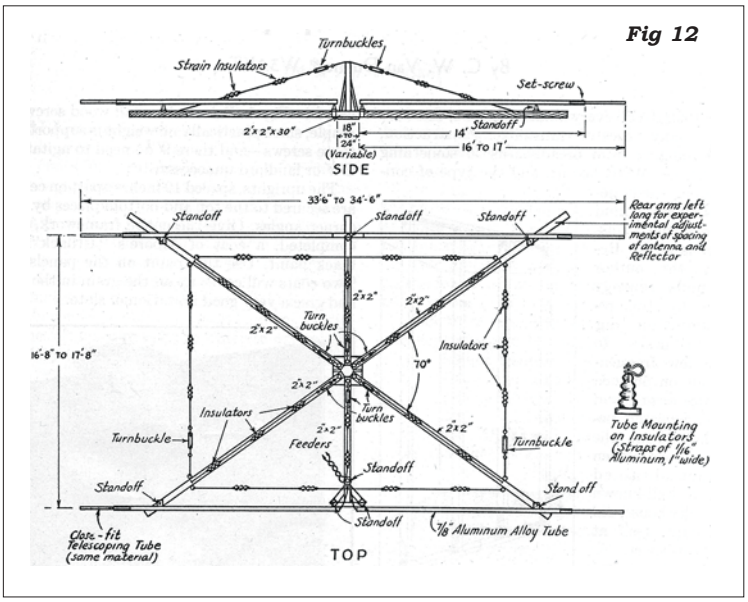


Fig 12: The W5BDB 14MHz two-element 'Signal Squirter'. This lightweight design uses a mixture of wood and aluminium tube in the construction. Note that the driven element is fed in the centre rather that the Zepp method in previous designs.

Fig 14. The W8CPC two-element 14MHz 'signal squirter'. (a) Antenna configuration showing the bent elements. (b) Construction details showing method of using supported thin copper elements and method of tuning.

from 5/16in (8mm) copper tubing, which were fixed to the inner frame with 'midget stand-off insulators'.

The driven element was fed using a Zepp type feed. However, G5PP notes: ". . . but the single or double wire matched impedance type antennas can be used equally successfully, particularly as the feeder lines of the matched impedance aerial gives less trouble than the Zepp type during rotation." I am not sure what this alternative feed method is but I assume it is a centre fed arrangement. The antenna was rotated from the shack by a cord and pulley arrangement.

W1QP / W8CPC COMPACT BEAM

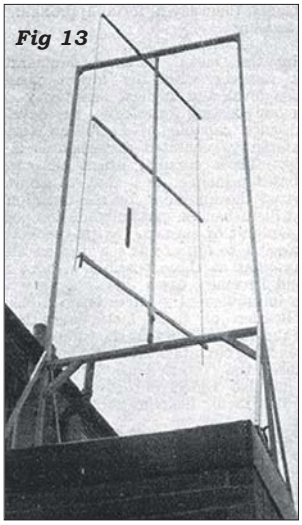
This compact version of a two-element beam was first suggested by John Reinartz, W1QP, and looks as though it was inspired by the W5BDB 14MHz as shown in Fig 12, where the strengthening wire could perhaps be the antenna element. A model was constructed for 14MHz by Burton Simson, W8CPC, and described in QST, October 1937[14].

This configuration is the same as the later VK2ABQ wire beam antenna and predates it by many years. A wooden frame was used to support the elements, which allows the element ends to be folded towards each other. The configuration and construction is shown in Fig 14. The elements were constructed from 1/4in copper tubing with brass tuning rods that fitted snugly into the ends of the elements. An additional brass rod was used as a shorting bar for the centre of the reflector.

The tuning procedure was interesting. The only test equipment available appeared to be an RF meter (0 - 5 amps), the transmitter PA current meter and the receiver S-meter. An RF meter was connected by short leads to the gap in the reflector and the driven element connected to the link coil of the transmitter by low-impedance twin transmission line. The brass rods at the ends of the driven element were adjusted for maximum transmitter PA current. The rods at the tips of the reflector were then adjusted for maximum RF current. These adjustments were interactive and would have had to be repeated. When the adjustments were complete the RF meter was removed and the gap closed with the brass rod. This tune-up procedure tunes the reflector to transmitter frequency.

Fig 13: The two element beam for 56MHz by G5PP used a driven element and a reflector fixed to a wooden frame, fixed inside a support frame.

Fig 15: The GM6RG twin vertical phased parasitic antennas, each comprising a driven element, reflector and three directors. Some idea of the size of the structure can be seen compared with the figure at the top of the ladder.



A 14MHz CLOSE-SPACED ARRAY

By 1938 parasitic antenna designs were becoming more practical and efficient. A description of a two-element beam in the RSGB Handbook [15] is an example. It consists of a radiator and director spaced one-tenth wave with the radiator fed in the centre by means of a double Q matching section and an untuned line. The input Q consists of 72 ohm cable whilst the lower Q has a pair of No 14 SWG wires spaced 1.5in. The Zepp type of feeding is now regarded as not very satisfactory for these frequencies, as it is difficult to balance, and feeder radiation may be considerable.

The antenna is designed for 14.1MHz. The driven element is cut to 16ft 7in either side of the centre and the director slightly shorter, approximately 16ft 3in on either side with a small tuning stub in the centre. An inch gap is left between the two sections of the radiator (driven element).

Several construction methods are described for the centre arm of the rotating framework. The antenna elements are insulated from the wooden framework with ribbed type insulators with brass inserts.

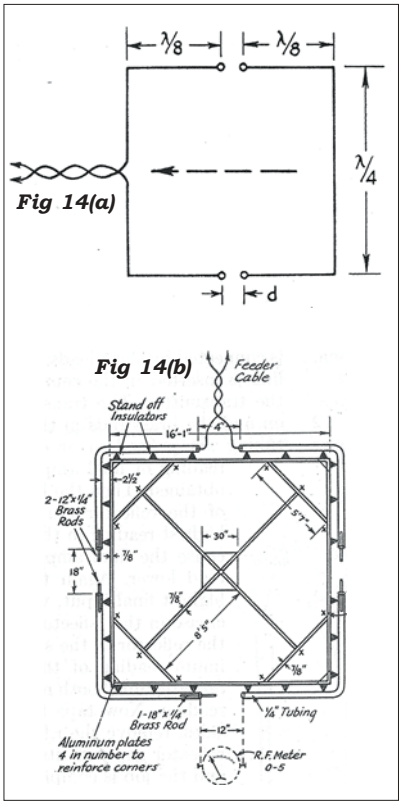
A 28MHz ROTARY BEAM

For some years GM6RG had operated DX using wire beams. He wanted a rotatable beam and embarked on an ambitious project [16] to meet the following specifications: "The problem was to design an aerial having a gain of over 12dB which would give an angle of radiation not higher than 16 degrees. It had to be rotatable to cover all the world; further, remote operation was required with means provided to indicate at the remote controlling position the exact direction in which it was aiming. Finally it had to be strong enough to stand any gale up to 80mph, and yet be as light as reasonably possible".

GM6RG calculated that he would need two vertical phased parasitic antennas, each comprising a driven element, reflector and three directors to meet the above specification. A fairly large structure would be required to support these wire antennas and lattice beams. The construction method he chose was the same as used by W3CIJ, described earlier.

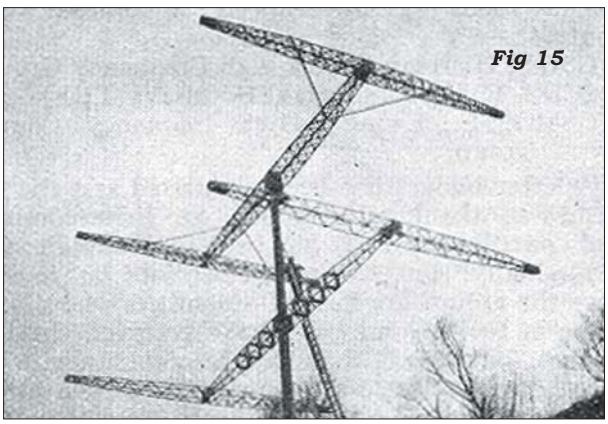
The large H centre of the top support structure was massive, with the centre section of the H being 45ft long and a local building contractor was employed to build it. He specified that the main supporting beam would have to be able to stand a steady weight of one ton!

The whole rotating aerial was supported on a Post Office pole, 50ft long and about 16in thick. This is set into the ground for about 8ft and is also stayed at a height of 20ft. The



antenna is shown in Fig 15. The antenna had a couple of modern features. For a start the whole antenna was rotated using an electric motor and gearbox that weighed 360lb! It also had an azimuth position indicator described: "On top of the gearbox, but insulated from it, is a 16-contact commutator, with 15 of the contacts in use. Fixed to the drive shaft is a wiper, wide enough to touch two contacts at a time. A 16-core lead-covered cable runs from this point down to the controlling position, and is there suitably connected to 15 lamps, so arranged that as the beam is rotated the correct lamp is brought into circuit. The lamps are arranged to illuminate that part of a great-circle map at which the beam is aiming".

This large antenna did not live up to its expectations. GM6RG says, ". . . although the original design had been adopted with the intention of obtaining a very narrow angle of radiation, this condition had not quite been met. Results were very good, but



since one of the (requirements was) to investigate the effect on fading of a restricted vertical coverage, such tests were not possible. Added to this, there was a severe storm in Galashiels, and although the rotary [beam] was not damaged, it offered such a large surface area to the gale that it was tossed about in the most violent manner. As a consequence it was decided forthwith to make alterations".

The new design [17] used the original heavy top central lattice structure as a boom to support a nine-element parasitic array using self-supporting tubular elements instead of wire elements, see Fig 16. It comprised one driven element, six directors, and two reflectors, all at a height above ground of 48ft. GM6RG describes it: "The lengths of the various elements for a working frequency of 28,460kc are as follows. Directors, 15ft 4in; driven element 16ft 6in; nearer reflector 17ft; further reflector 17ft 1in. The spacing is 3ft 6in between all directors and between the driven element and the first director, 7ft between driven element and nearer reflector, and 5ft between the near and more distant reflectors. The feed to the aerial is made by open 470 ohm line, and Y match, with a rather complicated system of wooden arms and insulators, which do, however, keep the line absolutely matched in whatever position the beam may be. It has been found much more satisfactory with very high-Q arrays, such as this one, to feed with a Y match and open line rather than by the more usual method of breaking the centre of the aerial. With the latter method it is impossible to keep the feed system clear of standing waves during tuning. . ."

I checked this antenna using EZNEC3 and found it had over 10dBi gain, which must have been very impressive for those days. It is difficult to know why GM6RG chose to use two reflectors - the second reflector contributes no improvement. If he had used one reflector and the director spacings (without changing his director lengths or numbers) closer to that recommended by Yagi [4] and 1CCZ [6] he could have increased the gain to over 13dBi with the long boom that he had at his disposal.

THE MODERN ALL-METAL BEAM

I spent some time trying to find the first instance of the all-metal construction that characterises the modern form of the parasitic beam antenna and was surprised at how late it made its appearance. The first instance of all metal constructed beams appears in the ARRL Handbook of 1947 [18]. The 'Antenna Systems' chapter has descriptions of parasitic beam support systems all constructed from wood, with stand-off insulators to hold the metal antenna elements in place. One design even uses a ladder for a parasitic antenna boom.

However, buried in a page of suggested antenna construction methods is the example shown in Fig 17. There is no description of it in the text but the caption reads "Pipe assembly three-element beam, 'Plumber's Delight' [note 4] with a folded-dipole driven element. Because all three elements are at the same RF potential at their centres it is possible to join them electrically as well as mechanically with no effect on the performance".

In the 'VHF Antennas' chapter of the same publication [18] there is a description of collapsible 50MHz two-element beam for portable use, which also uses this 'Plumber's Delight' construction and is illustrated in Fig 18. It comprises a radiator, which is fed with coaxial line by means of a T-match, and a reflector, which is spaced 0.15-wavelength behind the driven element. It is made entirely of 3/4in dural tubing, except for the vertical support, which is 1in tubing of the same material.

The fed section of the T-matching device is composed of two pieces of 3/4in dural tubing about 14in long. The two sections are held together mechanically, but insulated electrically by a piece of polystyrene rod, which is turned down just enough to make a tight fit in the tubing. The inner and outer conductors of the coaxial line are fastened to the two inside ends of the matching section. The positions of clips, which connect the T-match sections to the driven element, are adjusted for minimum standing wave ratio on the feeder. The idea for this antenna was suggested by W7OWX [19].

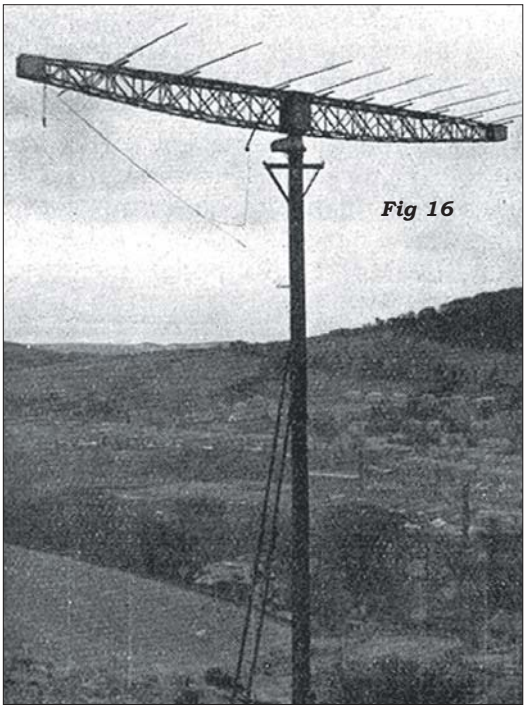


Fig 16: The new GM6RG design used the original heavy top central lattice structure as a boom to support a nine element parasitic array using self-supporting tubular elements instead of wire elements.

Fig 17: Pipe assembly three-element beam ('Plumber's Delight') with a folded-dipole driven element. The construction implies that it possibly came from the television industry.

The W6SAI Beam Antenna Book [20], [1955], was one of the most comprehensive books on parasitic beam antenna construction and design ever published. I have an old well-thumbed copy, given to me by the late Eric Knowles, G2XK, who used it to design a six-element 10m Yagi on a 37ft long boom. This book helped me with many beam antenna construction projects and probably helped fashion the commercial and home-made designs of Yagi antenna that prevail today.

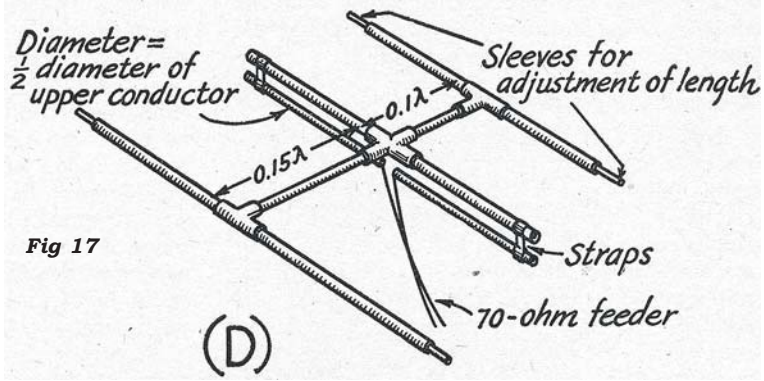


Fig 17

ACKNOWLEDGMENTS

I wish to thank John Crabbe, G3WFM, curator of the RSGB Museum and Library, for all the effort he put into searches for relevant articles, papers and books; to Laurie Mayhead, G3AQC, for the Yagi IEE paper [4] and to Robert H Welsh, N3RW, for information via e-mail.

NOTES

[Note 4] 'Plumber's Delight' is a generally-accepted name for all-metal construction parasitic beams, where the antenna elements are fixed to a metal boom without insulators.

REFERENCES

[12] 'The All-Around 14-Mc Signal Squirter'. M P Mimms, W5BDB, QST, December 1935.
[13] 'A 56 Mc Rotating Beam Antenna', R Palmer, G5PP, The T & R Bulletin, December 1936.
[14] 'Concentrated Directional Antennas for Transmission and

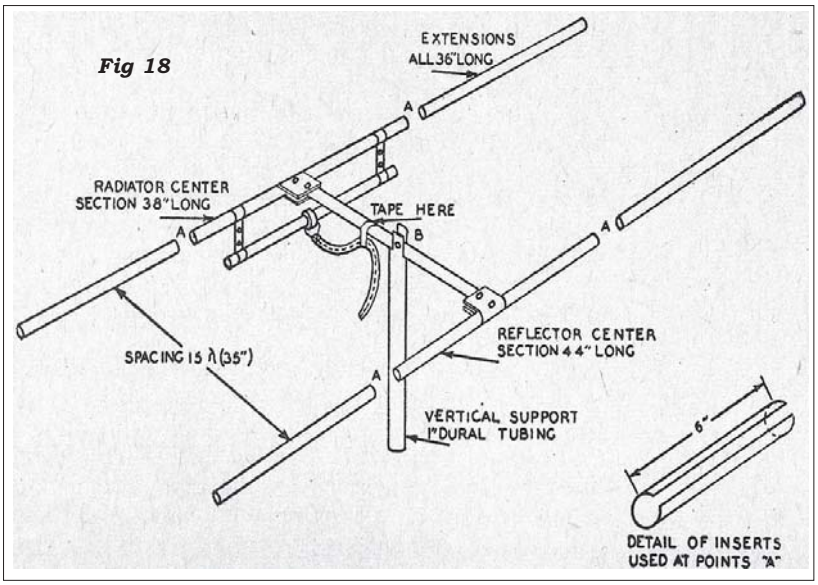


Fig. 18: Detail drawing of the collapsible 50MHz beam. For carrying purposes, it is taken apart at Points A and B, inserts of slotted dural tubing being used at Point A to hold the sections together. All extensions are the same length, the difference in element length being provided by the length of the centre sections.

Reception', John Reinartz, W1QP, and Burton Simson, W8CPC, QST October 1937.
[15] The Radio Amateur Handbook, RSGB, 1938.
[16] 'A 28 Mc Rotary Beam', Bryan Groom, GM6RG, The T & R Bulletin, June 1938.
[17] 'Rotatable Array Design', Bryan Groom, GM6RG, The T & R Bulletin, December 1938.
[18] The Radio Amateur's Handbook, 1947 edition, ARRL.
[19] 'Hints and Kinks', W7OWX, QST, April 1946, page 148.
[20] The Beam Antenna Handbook, William I Orr, W6SAI, and Stuart D Cowan, W2LX (1955). This book is now in its sixth reprint.

The drawings and photographs in both parts of this article are reproduced from the original publications dating from the 1920s to 1940s. ◆

'Party in the Park'

26–27 JULY 2003

To celebrate the RSGB's 90th birthday, the RSGB is holding a 'Party in the Park'. Each of the Society's 57 UK Districts has been invited to organise an event open to the general public. Each RSGB District will also have an opportunity to take part by putting on a special event station and operating the 'Special (Special)' callsign agreed by the RA for this commemorative occasion. The format of the callsign is GB90RSGB/*, where * is the RSGB district number, eg GB90RSGB/11. A complete list of the districts and district numbers can be found on page 14 of the June 2003 RadCom. A special 90th anniversary award certificate is available for those making contact with (or SWLs hearing) the GB90RSGB stations. Full details can be found on page 7 of the July *RadCom*.

The July *RadCom* contained a list of the 'Party in the Park' events notified to HQ at the time of going to press (pages 24 / 25). There is one correction to the details published last month - the correct telephone number for Paul Gaskin, G8AYY, the Solihull ARS contact for the GB90RSGB/52 station, is 0121 783 2996. Also, the Torbay Amateur Radio Society was scheduled to run the station GB90RSGB/112 from the Brixham area during the 'Party in the Park' event (see RadCom July 2003, pp24-25). Unfortunately, the club is no longer able to participate, and offers its regrets to prospective visitors.

The following six 'Party in the Park' events were notified too late to be included in the list published last month:

GB90RSGB/51

1. St Leonard's ARS (Stafford)
2. Stafford Castle, Castle Bank, Newport Road, Stafford ST16 1DJ (off the A518 just by the M6).
3. Derek Southey, G0EYX, tel: 01785 604 904; e-mail: g0eyx.derek@ntlworld.com
4. Sun 27/7.
5. Food 'n' socialising with a celebration of 25 years of archaeological digging at Stafford Castle from 11.00am, special event station on HF and 2m. The castle has a visitor's centre with a collection of artifacts from the digs and lots more. Plenty to do and see for all the family. Coverage and publicity from two counties (Staffordshire and Shropshire) with local papers, several radio stations and TV is likely.

GB90RSGB/51

1. Aldridge & Barr Beacon ARS
2. Aldridge Central Hall Community Centre, Middlemore Lane, Aldridge, Staffs (in the park)
3. Charles Baker, G0NOL, tel: 01922 636162; e-mail: catbaker@tiscali.co.uk
4. Sun 27/7
5. A joint club 'food, fun & games' day with the Cannock, Dudley & Wolverhampton Amateur Radio Societies, special event station on HF and 2m.

GB90RSGB/53

1. Stourbridge & DARS
2. Old Swinford Hospital School, Heath Lane, Stourbridge, Worcs DY8 1QX
3. John Clarke, tel: 01562 700 513; e-mail: john.clarke@iclway.co.uk
4. Sat 26/7
5. Demonstration and special event station operating on HF, 2m and Packet with celebrations, fun 'n' BBQ. Parents and pupils of the school are also invited. The school has a tradition of excellence dating back to its founding in 1667 and houses 593 pupils (boys) from 11 to 19 of which 365 are full or weekly boarders. The party is to be held within the grounds of the school.

GB90RSGB/104

1. Horndean ARC
2. Lovedean, Hants
3. Stuart Swain, G0FYX, e-mail: g0fyx@msn.com
4. Sat 26/7
5. Club barbeque.

GB90RSGB/104

1. Andover & DRC
2. TBA
3. T Cull, G8ALR, tel: 01980 629346.
4. Sat 26/7
5. Special event station.

GB90RSGB/105

1. Brickfields ARC
2. Riding Centre, Binstead, IoW
3. A Gardner
4. Sat 26/7
5. Special event station, displays. ◆

KEY TO PARTY IN THE PARK EVENTS
1. Organising club
2. Location of 'Party in the Park' event
3. Contact person
4. Date of event (Sat 26/7, Sun 27/7, both days).
5. What is happening.

RSGB 90th Anniversary Gifts

RSGB 90th Anniversary Pin

The RSGB has produced this special commemorative pin to celebrate our 90th anniversary. This metal badge is 22mm by 29mm, finished in a hardwearing glossy UV resistant glaze and has a durable butterfly clip.

This pin is free of charge to our members!

To obtain your badge:

Badges will be available at our Party in the Park events up and down the country by presenting your copy of the July RadCom. Should you be unable to attend a party, you can send a stamped self addressed envelope to the RSGB HQ who will send one to you (please ensure that the envelope is a 'Jiffy' type, to avoid damage). Stocks are limited and will be distributed on a first come first served basis.

RSGB 90 Year Ale

To celebrate our 90th Anniversary the RSGB has commissioned special ale to mark the occasion. The Ale is a 4.6% bottle conditioned ruby coloured premium ale with complex malt and hop flavours.

PLEASE NOTE: For licensing reasons this beer can only be supplied in 12s direct from the brewery itself. As usual you will be able to order from this site but all matters, monies etc will be handled by the brewery not the RSGB. Also we cannot accept orders for those under 18 years of age.

As this item is very heavy at 11.5kg we have included UK shipping in the price and this element represents over a third of the total cost. For overseas delivery please contact sales@rsgb.org.uk noting that we cannot accept orders for all countries.

Price **£25.00**
a case of 12 (including p&p)

RSGB 90th Anniversary Commemorative Mug

This quality earthenware mug is printed in luxurious gold finish to provide a useable and stylish item for everyday use.

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This classically designed Parker Ballpen is presented in a presentation box. Printed in red with the two RSGB logos this is a special pen ideal for every radio amateur.

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The 'Pseudohet' C

This article describes an experimental transceiver I developed a few years ago for Morse code (on-off keying) operation, using an unusual architecture (to use the fashionable term). I haven't come across it elsewhere, so it's novel to me, though for all I know, perhaps not in the big wide world. A components list will appear in the September issue.

Although some constructional details are given of a design for 18MHz, the main purpose of the article is to present the principle and circuit diagram in the hope of encouraging experiment. There are many inventive folk in amateur radio, and if what follows stimulates someone to come up with better ideas, the main purpose will have been achieved.

As the design was hatched some time ago, no guarantees are offered that all the components specified here are readily obtainable, though most certainly are. It would be foolish to claim availability, after even a few years. Components seem to disappear suddenly and rapidly these days, the bane of both the amateur constructor without a large junk box, and professional companies alike. So, some ingenuity may be needed.

The project came about after speculating about a radio with an intermediate frequency (IF) that was a fixed fraction of the input frequency, rather than a fixed frequency as in the traditional superhet. The questions and answers took years to coalesce, but the result is a working radio. It uses no crystal filters and, in operation, is very like a direct-conversion receiver.

Why 'Pseudohet'? Well, I thought I had to give it a name. There are several definitions of 'pseudo-' in my *Concise Oxford Dictionary*, some not very complimentary. The one which seemed appropriate is "resembling or imitating (often in technical applications)…", hence the contraction of pseudo-superhet.

THE PSEUDOHET TRANSCEIVER PRINCIPLE

I'm assuming that you're reasonably familiar with superhet and direct-conversion receivers. If not, the excellent references given at the end [1 - 5] will prepare you for what follows.

The block diagram of **Fig 1** shows a Pseudohet transceiver for 18MHz, with one spot frequency to illustrate the frequency relationships.

The input signal is mixed with a tunable local oscillator (LO) running at, for example, four-fifths of the input frequency, with an offset to give an audible beat note. This produces an IF at one-fifth of the input frequency. The local oscillator is divided by four and mixed with the IF to obtain the audible signal. Only one actual oscillator is required on receive. The IF has to cover one-fifth of the tuning range, and the tuning range is the local oscillator range times 5/4. For instance, if the receiver covers 50kHz of an amateur band, the local oscillator covers 40kHz, and the IF only covers 10kHz, and therefore can employ a relatively narrow filter. This reduces the chance of strong signals overloading the second mixer. [In most superhets, a large amount of IF gain is allowed to precede the final mixer (ie the product detector), on the grounds that the filtering which comes before it has removed strong interfering signals. Along the same lines, you can improve any receiver's strong-signal performance by placing a narrow preselector in front of it.]

As in the direct-conversion receiver, there is no crystal filter. The bandwidth is determined by audio filtering, and there is no rejection of the audio image. This means, for example, that two stations 2kHz apart in the band can each give a 1kHz audio frequency if the receiver oscillator is mid-way between them.

If the Pseudohet behaves like a direct-conversion receiver, why bother with the extra complexity? The main advantage concerns microphony, an unwanted effect that gets worse with increasing frequency. This subject is expertly covered in a new work [5], and in [6]. If you're a radio experimenter, [5] is worth adding to your library! Microphony in direct-conversion designs is primarily caused by local oscillator radiation and leakage, and is dealt with by such measures as good mixer balance, local oscillator screening and the use of an RF amplifier between antenna and mixer.

The Pseudohet prototype achieved good, if imperfect, microphony performance without an RF amplifier or internal screening. The reason its performance should be good is that the LO frequency is not close to the input frequency. The reason it is not perfect is probably due to energy at the input frequency from the fifth harmonic of the LO divided by 4. There is some local oscillator energy present at the receiver input, which can be picked up on another receiver in the same shack, but at a lower level than might be expected from a direct-conversion receiver built in a similar way.

The transmit signal is derived using a phase-locked loop based on a divider. A voltage-controlled oscillator is divided by 5 (in this example) and locked to the receiver local oscillator divided by 4. The VCO output is therefore 5/4 (ie 1.25) times the receive oscillator frequency. No mixers are involved and the

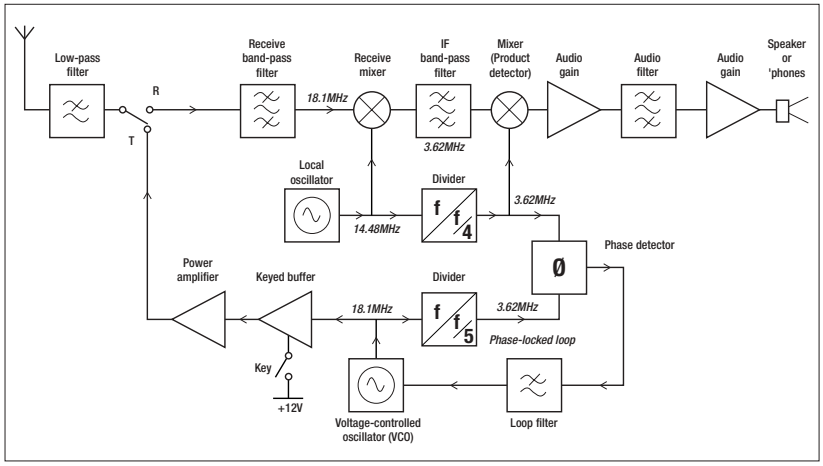
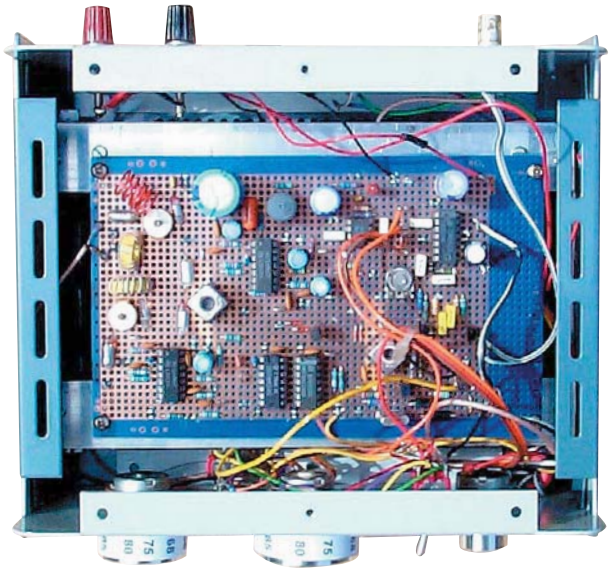
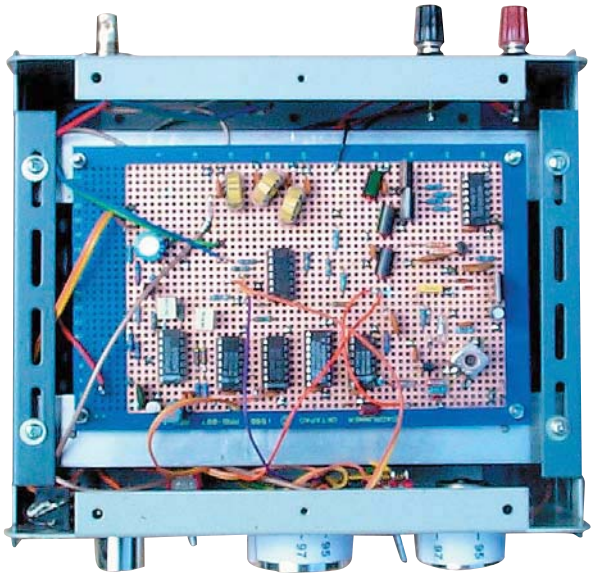


Fig 1: The Pseudohet transceiver.

By Ian Braithwaite, G4COL, 28 Oxford Avenue, St Albans, Herts AL1 5NS. E-mail: ianb@g4col.demon.co.uk





W Transceiver

A novel transceiver design

spectral purity is good.

Hum susceptibility is worse than for a superhet, due to the high audio gain, but need not be a significant problem if the receiver is not placed too close to power supply transformers.

Since only the oscillator, harmonics and sub-harmonics are generated, there can be no 'crossing spurs', where unwanted frequencies cross the wanted one and are not rejected by a filter.

Please note that, while division ratios of four and five have been used for receive and transmit, respectively, there is nothing magic about them, and other ratios could be used. The higher the ratios, the lower the first IF and the greater the expected microphony reduction. However, the image frequency is closer to the wanted signal and the narrower the input pre-selector filter has to be for a given image rejection.

DETAILED DESCRIPTION

My prototype Pseudohet was built for Morse code (on-off keying) communication in the 18MHz band. The approximate gain distribution (at maximum audio gain) is shown in **Fig 2**. Only modest gain is used at the IF between the two mixers, to avoid intermodulation distortion in the second mixer in the presence of strong signals. Most of the gain is at audio frequency. I may have been over-cautious here, and could have used more gain before the second mixer, and less audio gain. The circuit diagram is shown in **Fig 3**.

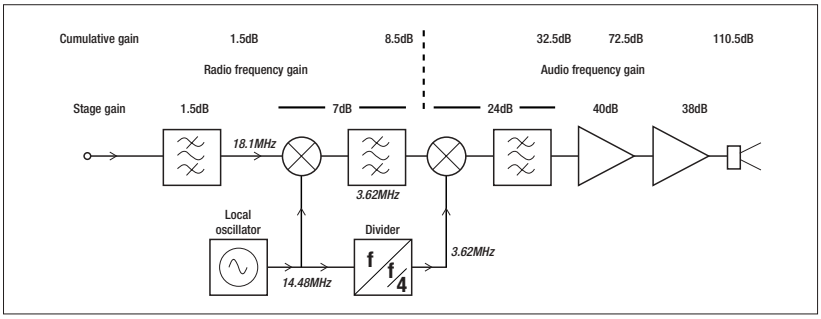
The local oscillator is a voltage-controlled crystal oscillator (VCXO) based around TR1. It uses a circuit I have come to trust - **Fig 3(a)**. The crystal is pulled with reactance, which is a combination of fixed series inductance and varicap diode capacitance. The varicap voltage is varied by potentiometers, one each for receive and transmit. These are fed from a regulated supply designed for a low voltage drop from the nominal 12V supply so as not to waste precious tuning range. Achieving a stable design proved quite a challenge, even though the result is quite simple. (A low drop-out IC regulator could be investigated for this.)

To assist in setting the transmit frequency potentiometer while receiving, a comparator compares the two pot voltages and switches between two LEDs of different colours, at the point of equality. This scheme has been found to work very well with a VCXO. Both controls cover the full but limited range of the pulled crystal. With the transmitter tuned right at the bottom of its range, the receiver can be offset on the high side, and with the transmitter at the top of its range, the receiver can be offset low.

The receiver input signals are selected by a two-section bandpass filter, **Fig 3(b)**, with common inductance coupling consisting of about 15mm of straight wire (24SWG or 0.56mm, but the diameter is not critical). This is preceded by a trap, to reject the receiver's local oscillator, and to reduce its level at the antenna. The pre-selector has some loss, but in stepping up the impedance from 50Ω at the antenna to the 2kΩ of the mixer, there is a small net voltage gain of 1.2 (1.5dB if you don't worry about the change of impedance when calculating decibels).

The mixer is a trusty old 1496 double-balanced Gilbert Cell type, which has considerably better strong signal handling capability than the much-loved NE612 (NE602 as was). The mixer output filter is a single-tuned circuit consisting of L7, C25 and C26. The –3dB bandwidth is in the region of 200kHz, which is rather too wide, since only 20kHz is needed at this point to cover the 18MHz band. The overall mixer gain is kept to only 7dB, to avoid overloading the second mixer. The gain depends partly on the *Q*-factor of inductor L7, but can be varied by changing the value of R24. The local oscillator is the VCXO.

The second mixer, shown in **Fig 3(c)**, is also based on a 1496 but, in this case, considerable gain is produced at audio frequency by using an audio tuned circuit as the output collector load (the 1496 outputs are transistor collectors without any built-in



Above, left: The receive board.

Above, right: The transmit board.

Below, left: Fig 2: Approximate gain distribution.

load resistor). This is tuned to 1kHz. With the components used, the gain is 24dB and the bandwidth about 130Hz. R36 is included to give a small increase in low frequency gain to help zero-beat on a received signal, and its value can be set to suit personal taste. The local oscillator is provided by the VCXO signal divided in frequency by four, using two flip-flops.

A low-noise x100 audio amplifier and output power amplifier provide up to an additional 78dB gain. As in the direct-conversion receiver, almost all gain is at audio frequencies. Note the heavy supply and bias decoupling on the second mixer and audio stages. This is essential in preventing audio oscillation, and reducing the effect of supply hum.

A two-transistor multivibrator oscillator provides sidetone. No automatic gain control (AGC) is provided.

Moving to the transmit section in **Fig 3(d)**, the voltage-controlled oscillator (VCO) uses a commercial Toko transformer to give inductive feedback, as in the Hartley circuit. The active device is a J310 junction FET. The oscillator signal is buffered by a TTL hex inverter, and split using two further gates. One branch goes to the transmitter buffer, the other to a divide-by-five stage. This signal is compared with the VCXO divided by four, in a phase detector built from TTL ICs, running at close to 3.6MHz. The phase detector is followed by a loop filter, which sets the loop bandwidth in the region of, from recollection, several hundred hertz. The loop filter output feeds the varicap diodes which tune the VCO. The phase-locked loop causes the VCO to track the VCXO but at 1.25 times its frequency.

As the VCO frequency range is small, so is the tuning voltage range. The voltage is fed to the control circuit (about which more later) via R122. If it strays outside the range 6V to ~10V, which could be caused by failure to lock or mis-adjustment, the transmitter is muted, preventing transmission on the wrong frequency.

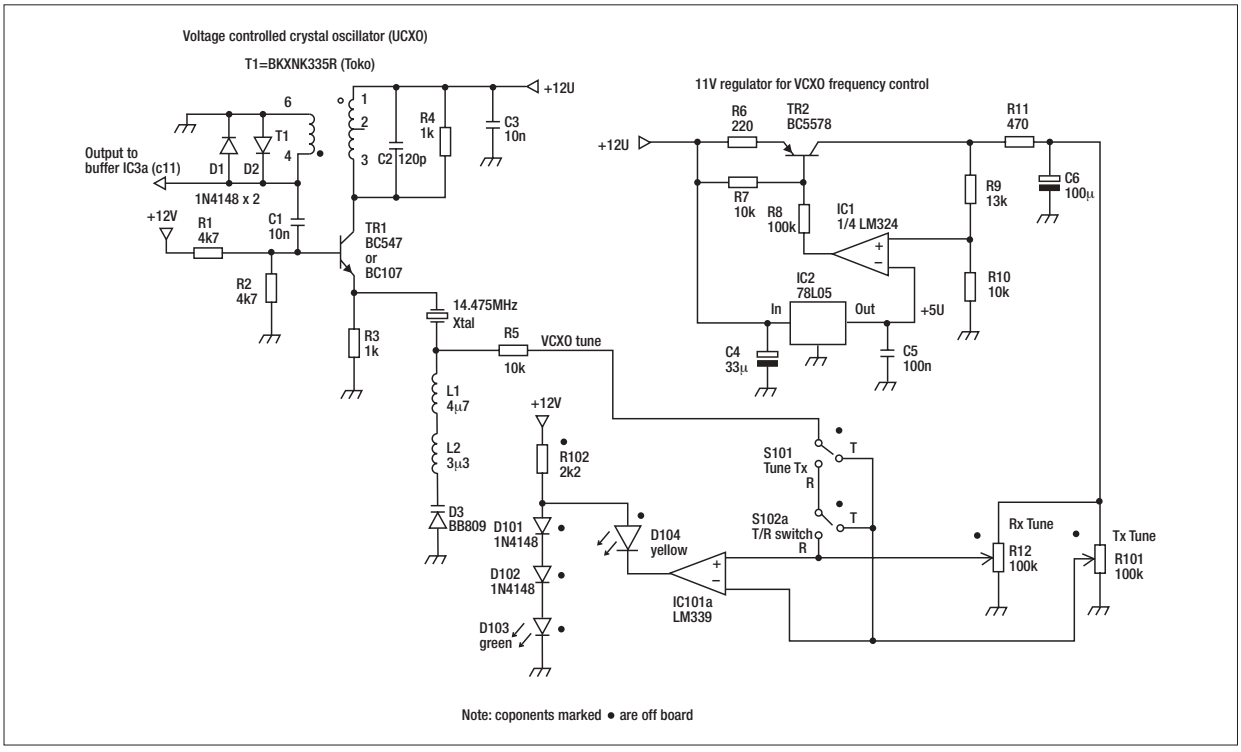
The VCO feeds the transmitter stages - **Fig 3(e)** - which are entirely switched-

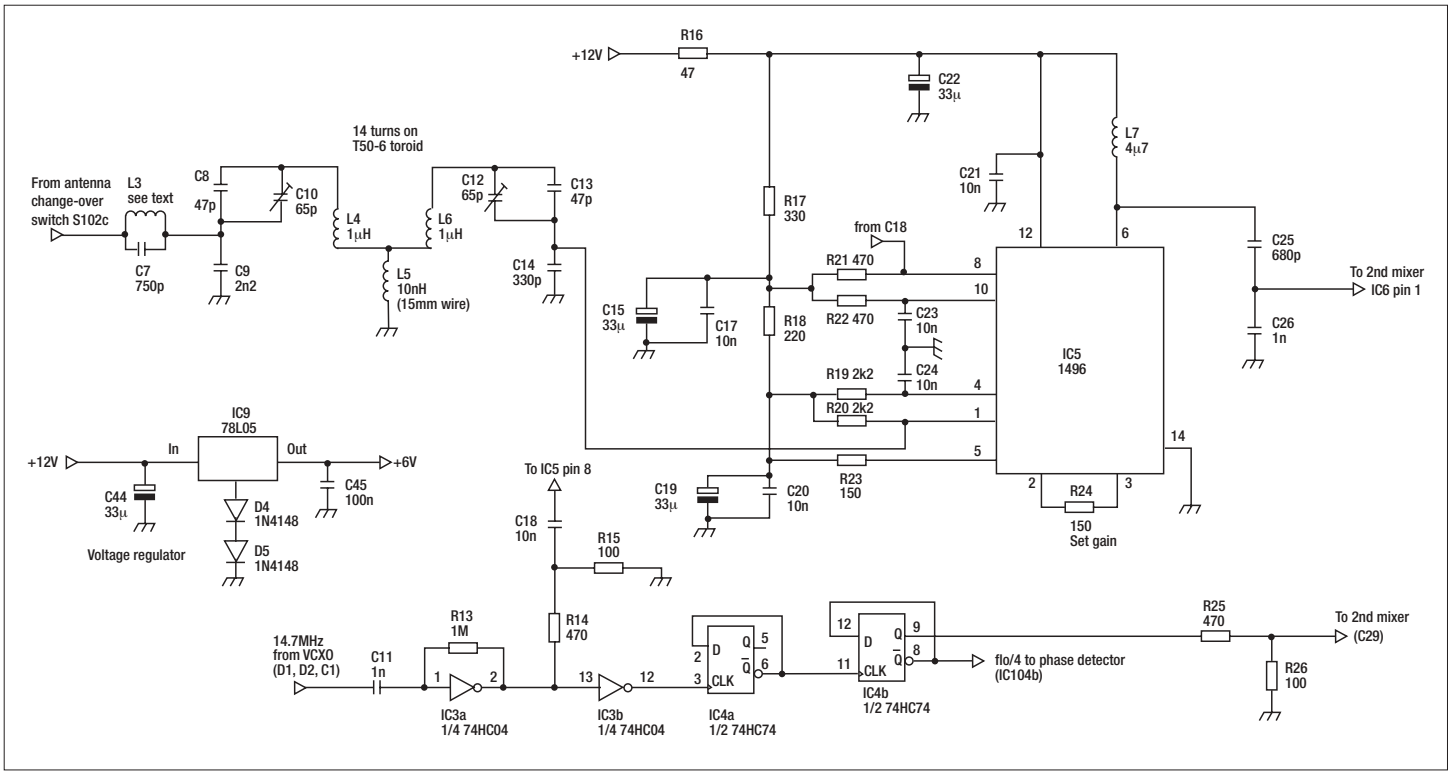
Right: Fig 3(a) The voltage-controlled crystal oscillator (VCXO) circuit.

Below: Fig 3(b) The 18MHz preselector and receiver input circuit.

Opposite page, top: Fig 3(c) The receiver second mixer, sidetone and audio stages.

Opposite page, bottom: Fig 3(d) The transmit VCO circuitry.





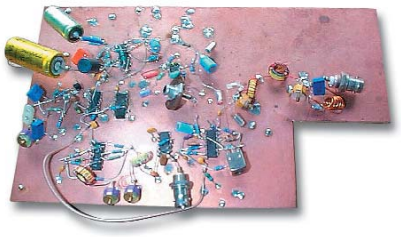
mode, no attempt being made to operate devices linearly. Hex inverters feed two VMOS FETs in parallel, producing approximately 5W output. The hex inverter IC supply is keyed using TR104 fed from the control section. The output harmonics, mainly odd order, are removed with a 7-pole low-pass filter. To produce a high quality transmit signal with low spurious content, using switching devices, demands a high-quality input signal, which is provided by the VCO. In effect, the phase-locked loop acts as a very narrow bandwidth bandpass filter. (The transmitter section design is identical to 18MHz VCXO transmitter in [7].)

The control section, **Fig 3(f)**, deals with keying and transmit / receive switching. The latter is done simply by mechanical switching of the transmit and receive power rails. You may prefer to switch electronically. IC101d feeds the keyed transmitter driver and the sidetone oscillator. IC101b and IC101c form a window comparator. As described above, when the VCO tune line strays outside the limits of 6V and ~10V (the latter set by R131 and R132), IC101d is prevented from keying the transmitter.

CONSTRUCTIONAL OUTLINE

The original prototype receiver was built on a copper ground plane and is shown in the photograph.

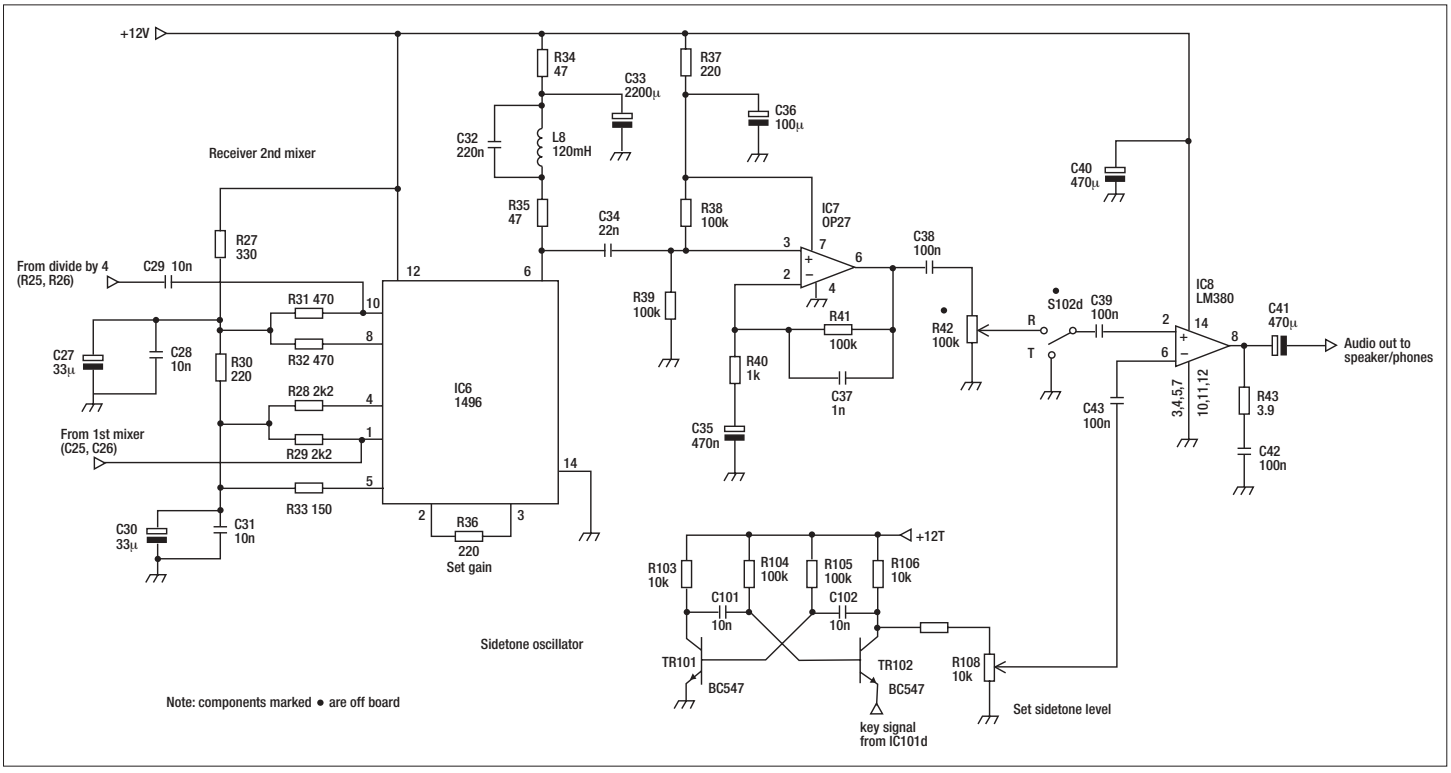
The cased transceiver was built using commercially-available 'colander ground plane' prototyping board. Only leaded components were used, the leads being bent and inserted through the holes in the board and soldered to the copper pads. Interconnections used fine wire strands extracted from multi-stranded insulated wire. Crossing connections employed enamelled solderable wire dispensed with a wiring pen. Ground connections were made with fine wire taken from the pad to be grounded, passed through an adjacent hole, and soldered directly to the ground plane. This technique works well up to several hundred megahertz, and the result can be acceptably neat.

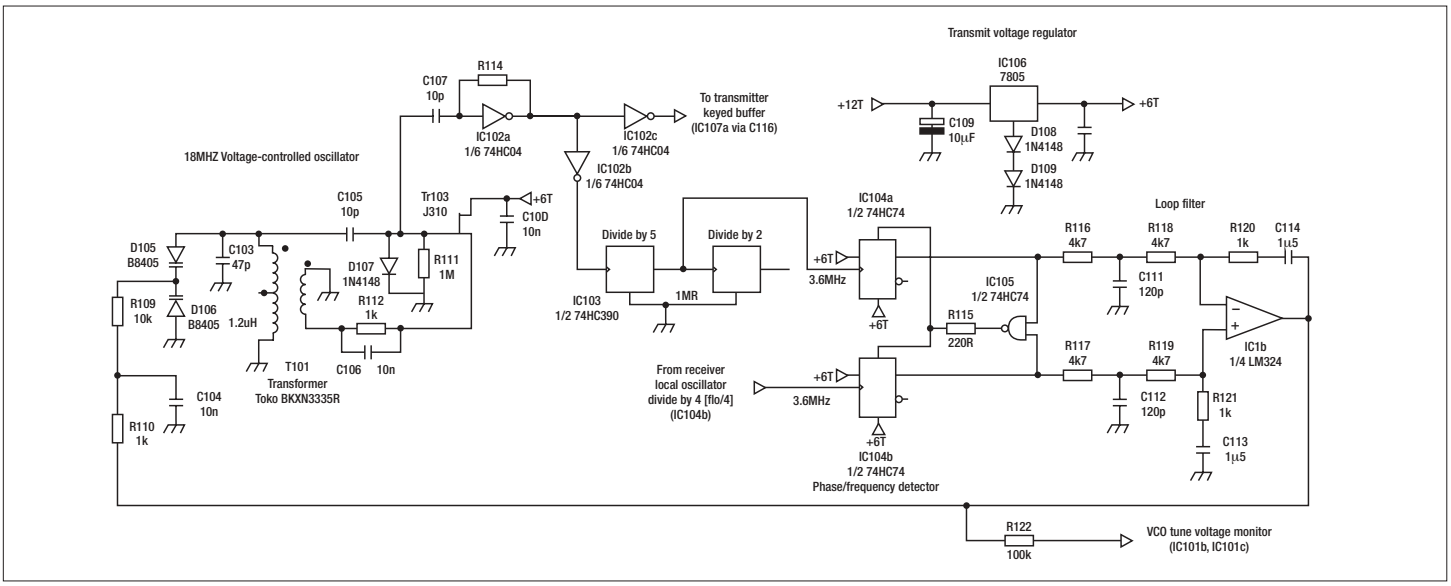


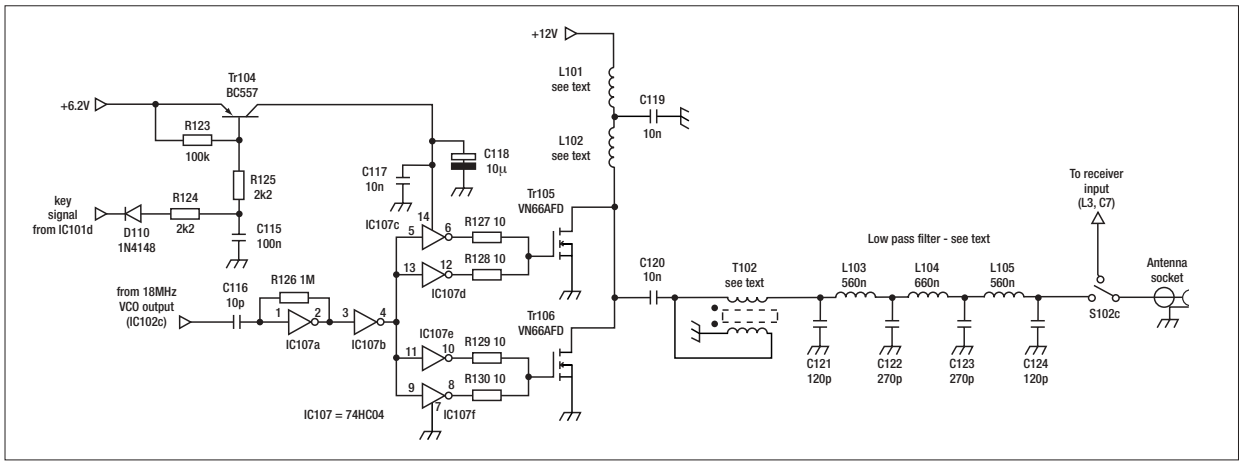
Left: The construction of the prototype on a copper ground plane.

Should re-work be required due to an error or improvement, this can easily be done, but be sure to remove solder from the joint as quickly as possible, as the pads sometimes peel.

Good advice handed down through the generations is to wire up the circuit following the circuit diagram, at

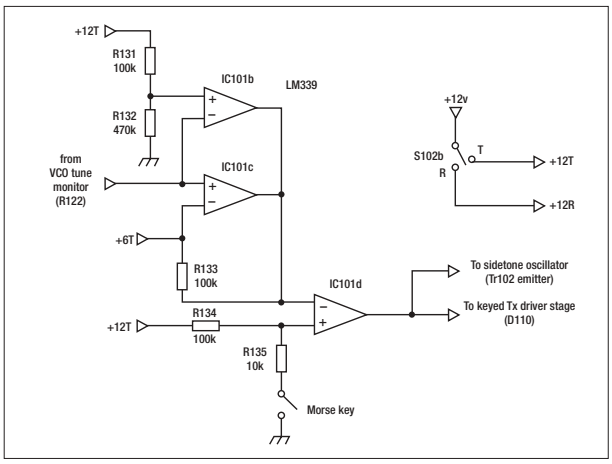






Right: Fig 3(e) The transmitter switched-mode stages and 7-pole low-pass filter.

Below: Fig 3(f) The control section - keying and transmit / receive switching.



least in sections, and to try to plan the layout so that sections requiring RF interconnections are placed as close to one another as is practical.

Transformer T102 was bifilar-wound on a 6-hole ferrite core, as described in [7]. A few turns of bifilar wire on a high-permeability toroid core should also be suitable.

CALIBRATION

Frequency calibration can be done using a signal generator and counter, or by listening to signals alongside a calibrated radio. I stuck a paper strip on the circumference of the tuning knobs, and marked frequency in pencil at intervals of several kilohertz. Once a mark had been made on one strip, the other knob was rotated until the LEDs swapped over, and a mark placed on its strip. The paper strip was removed and the positions of the marks measured with a ruler. A neat paper strip was produced on the PC using a drawing package, and the strip stuck on the knob in the correct position. The result isn't perfect, but accurate to kilohertz or so.

PERFORMANCE

The tuning range of the prototype is a little greater than 18.068 to 18.097MHz, which includes most of the Morse code section of the band. Receiver sensitivity is such that sub-microvolt signals are received comfortably. Stability is very good due to the crystal oscillator. Microphony is present but barely noticeable. Due to the high audio gain, the radio is prone to hum pick up from transformers in nearby power supplies. Interference from powerful HF broadcasting stations has not been noticed.

Fig 4 shows the transmitter spectrum from 0 to 100MHz. We see the wanted signal and its second harmonic, phase-locked loop reference sidebands spaced 3.6MHz either side of the wanted signal, the reference signal itself, and its second and third harmonics.

To obtain this plot, which has a fine spectral resolution, the spectrum analyser bandwidth was reduced below its normal setting and some of the peaks are larger than they appear on the plot. The spectrum is by no means bad, but the 3.6MHz phase-locked loop reference signal was larger than expected, at 47dB below the wanted signal. It should be relatively easy to reduce this with smaller coupling capacitors in the transmitter output stages, for example, and I believe that the spectrum meets the unwanted emissions requirements for commercial amateur radio gear [8]. However, it does illustrate that the home constructor without access to appropriate, and sometimes expensive, test gear cannot assume perfect or even adequate spectral purity.

The next two plots show the spectrum closer to the carrier. **Fig 5** shows the range within 5MHz of the carrier, and shows the phase-locked loop reference sidebands and an accurate measure of their suppression relative to the wanted signal. **Fig 6** shows a clean 50kHz span. No close-in signals were found.

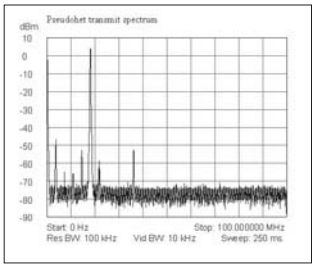
WHERE NEXT?

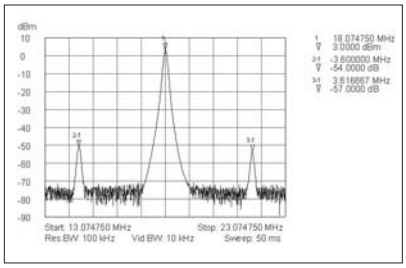
Where the Pseudohet goes, if anywhere, is partly or mainly up to you. It struck me recently that, with a fairly narrow first IF tuning range, a neat single-band phasing transceiver could be built, so that will be my next project, to get me going on PSK31. One day I may get around to trying a 50MHz version - the higher the frequency, the more its microphony advantage ought to show over a direct-conversion design for a given amount of screening. Other division ratios could be tried. Perhaps the system could be adapted for feeding a software radio where a superb channel filter can be implemented in digits. You may also be able to come up with a simpler design (I seldom seem to get there at the first attempt), or implement a very small radio using surface-mount technology. ◆

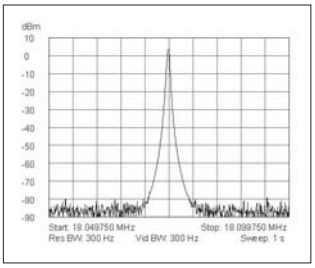
Below, left: Fig 4: The Pseudohet transmit spectrum.

Below, middle: Fig 5: Transmitter spectrum 5MHz either side of the carrier.

Below, right: Fig 6: Close-in transmitter spectrum 25kHz either side of the carrier.







REFERENCES

The following include the basics of receiver design:

[1] *Radio Communication Handbook* (RSGB).
[2] *ARRL Handbook* (ARRL).
[3] *Solid State Design for the Radio Amateur*, by Wes Hayward, W7ZOI & Doug DeMaw, W1FB (ARRL).
[4] *Introduction to Radio Frequency Design*, by Wes Hayward, W7ZOI (ARRL).

These treat direct-conversion receivers in detail:

[5] *Experimental Methods in RF Design*, by Wes Hayward, W7ZOI, Rick Campbell, KK7B, & Bob Larkin, W7PUA (ARRL).
[6] 'Improving Direct-Conversion Receiver Design', by Nic Hamilton, G4TXG, *RadCom*, April 1991, pp 39 - 43.

This covers the transmitter output section design in detail:

[7] 'A 5W 18MHz CW Transmitter', by Ian Braithwaite, G4COL, *RadCom* August 2000, pp 37 - 39.

The following document lays down the requirements for commercial amateur radio gear, including spectral purity:

[8] European Telecommunication Standard ETS 300 684 *EMC Standard for Commercially Available Amateur Radio Equipment.*

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The HS-1800 kit comprises antenna (grey or black), 1.8m stainless whip, quick disconnect, mounting bracket, control box and cable kit.

Installation

A little bit of effort brings about big rewards! The mounting supplied mounting bracket is designed to attach to a tubular pipe section or "stub mast." The best way of achieving this is to go to your local body repair shop and get them to weld up a bracket assembly and short vertical 1¼" pipe to attach to the chassis at rear of vehicle. (There are usually plenty of anchor points intended for tow bars etc). Also get them to attach the supplied earth lead to the chassis which should be ground clean. Once done you have a vert stable platform for your antenna. The main antenna can be removed from the bracket in less than a minute and the quick disconnect allows the top whip to be removed in seconds. And your welded up bracket can be removed when you come to sell the car with no visible trace!.

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PIC-A-ST

PART 13 SOFTWARE TRANSMITTER AND

This month concludes the construction of the PicAdapter and Status boards, these being the last boards which correspond to the Components List provided in Part 3. Details of a suitable stereo AF amplifier are also provided.

STEREO AMPLIFIER

It is not easy to find a good stereo amplifier which works well on a 12V rail. If you have a scrap car radio with speakers, that would provide an instant solution.

Fig 21 shows the circuit diagram of an inexpensive amplifier from the bottom end of the range. Reduce C7 and C8 for more top response. The PCB is given in **Fig 22**.

Should you need something with more output, take a look at the TDA2004 or TDA2005. In any event you will need to use decent speakers to get the full benefit of PIC-A-STAR's audio quality. Several builders have found it difficult to move away from 20W per channel into 12in speakers - including me.

Fig 21: A suitable 1W + 1W stereo audio amplifier. Stereo balance and gain are controlled in DSP.

PICADAPTER BOARD

See also the photograph last month. This board is pretty tight since it needs to fit within the envelope of the original DDS board. So, as you can see from **Fig 23**, it is somewhat three-dimensional. The spacing is eminently achievable provided the components are loaded in the correct sequence - which is critical.

Check meticulously for continuity and isolation as you proceed. When inserting the sockets / plugs, ensure the pin shoulders do not ground on the opposite side.

1. Fit C73 underneath (ie on the groundplane side).
2. Fit IC9 socket and ground pins 8 and 19 on the groundplane side.
3. Fit R43, underneath.
4. Cut a 9-way SIL header strip. Noting the larger diameter end fits to the PCB, cut off that end of pin 3 and insert to make PL1 pins 1-9, ie the inner strip. Solder all track-side pins - and pin 5 to ground underneath.
5. Repeat for the outer strip of PL1 - but cutting off the larger diameter end of pins 15 and 16. Use a spare 18-pin socket to ensure alignment.
6. Fit TR8, C72, R44.
7. Fit IC10 socket, grounding pins 1, 2, 3, 4 and 7 both sides.
8. Fit C68.
9. Fit SK2, grounding the centre pin underneath.
10. Fit TR7, grounding the emitter underneath.
11. Fit R46, R45, C67, R47 and last, X2.
12. If there is any chance of the board fouling the Pic 'N' Mix Display board, chamfer the copper both sides.

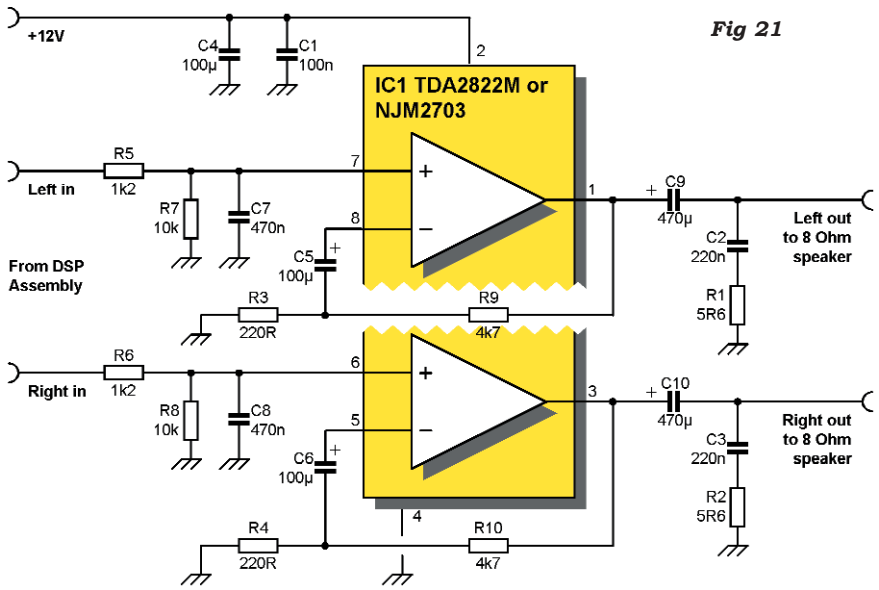
The original 4MHz crystal on the DDS board may be recovered and reused elsewhere, though you may want to postpone this until the PicAdapter is working.

STATUS BOARD

There are no special constructional issues here.

Cut all the IC socket pins back to their shoulders - except the grounded ones. A small trick for soldering the socket on the component side; fit another socket or a scrap chip into the socket first. This prevents the pins from wandering as they get hot.

Please note that should you wish to program this PIC in situ, you may not be able do so with D31 fitted, since it loads the programmer. For this reason, avoid giving reports to stations who are "12dB over S9" until the end of full integration and test - when this LED is finally fitted. ◆



Right: Fig 24: Double-sided Status board PCB with the ground-plane side unetched. The width of this board (3in) accommodates that of my RF front-end which sits behind the Status board. All components except the LEDs are surface-mounted on the track side. This allows access to both the components and to the LED pads. The latter is needed to adjust the LED lead lengths for flush-fit to the front panel. The four mounting holes are for the keypad which is mounted using short spacers. The 7-way ribbon cable from the Pic 'N' Mix Display board is routed between this board and the keypad and made off to pads / tracks provided on this board and thence via short wire links to the keypad itself. IC16 and IC28 are mounted in sockets with all pins - except their respective ground pin - cut back for surface mounting. No connectors are specified. The relevant pads have a 0.1in pitch.

By Peter Rhodes, G3XJP, Danvers House, Wigmore, Herefordshire HR6 9UF. E-mail: g3xjp@qsl.net

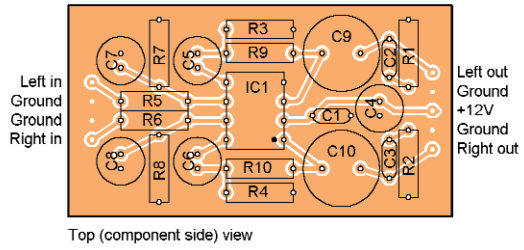
AR RECEIVER

Fig 22: Double-sided stereo amplifier PCB. This is a 'conventional' board with components mounted on the top, the track underneath. The component side is completely unetched. No connectors are specified, but the relevant pads have a 0.1in pitch.

Fig 23: Double-sided PicAdapter board PCB. The cut-out is to give access to the existing programming socket. IC10 and IC9 should definitely be mounted in sockets. To achieve the clearance height required you may need to fit first an extra 18-pin socket into the existing Pic 'N' Mix socket - as a spacer. SIL plugs / sockets are used for the remaining leads - with the sockets soldered directly to the track.

Component location

Fig 22

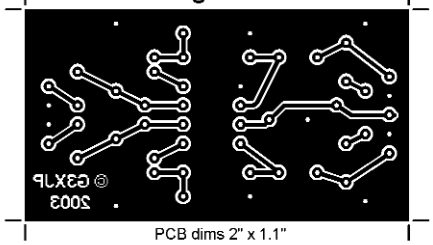


Top (component side) view

Component list

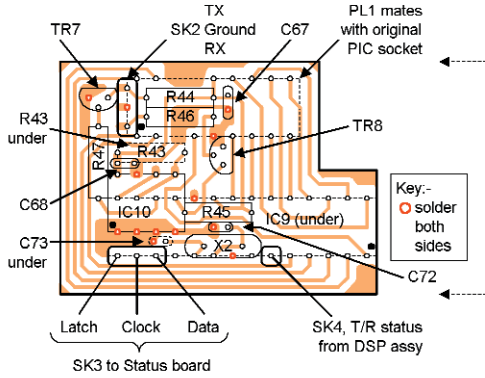
IC1	TDA2882M or NJM2703
C1	100n disc ceramic
C2, C3	220n dic ceramic
C4, C5, C6	100µ 16V electrolytic
C7, C8	470n 16V electrolytic
C9, C10	470µ 16V electrolytic
R1, R2	5R6
R3, R4	220R
R5, R6	1k2
R7, R8	10k
R9, R10	4k7

PCB track and drilling template
NB:- This image is mirrored



PCB dims 2" x 1.1"

Component location



Cross sectional view showing IC mounting

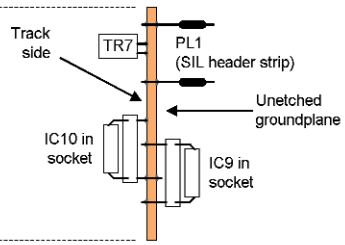
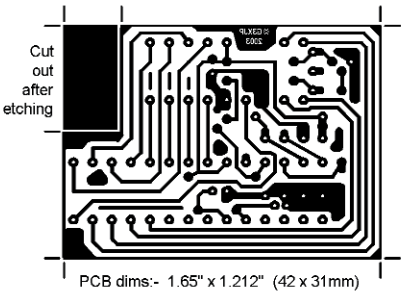


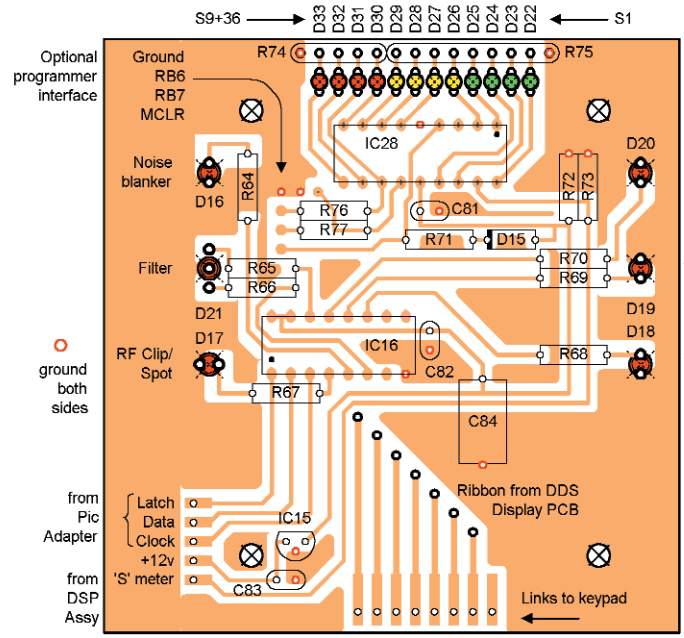
Fig 23

PCB track and drilling template
NB:- This image is mirrored



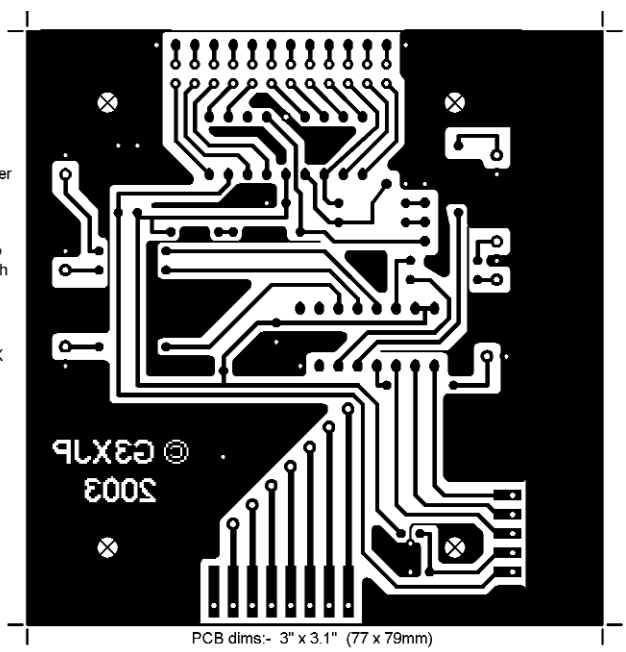
PCB dims:- 1.65" x 1.212" (42 x 31mm)

Component location
(track side, viewed from rear of front panel)



PCB track and drilling template
NB:- This image is mirrored

Fig 24



PCB dims:- 3" x 3.1" (77 x 79mm)

By Pat Hawker, G3VA,
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USA & THE POWER LINE THREAT

David Sumner, K1ZZ, Chief Executive Officer of the ARRL, in a trenchant editorial in the June 2003 issue of *QST*, warns that BPL (Broadband over Power Line) usually known in Europe as PLT (Power Line Transmission) "could be an intolerable polluter of the radio spectrum. That this would be merely an unintended consequence of BPL deployment – collateral damage, if you will – does not ameliorate the situation."

His warning clearly stems from an April 'Open Meeting' of the FCC (the American regulator of the spectrum) that adopted a Notice of Inquiry regarding 'Carrier Current Systems, including Broadband over Power Line Systems'. Fair enough, but ARRL warns that FCC, in its NOI, appears to be an active 'cheerleader' for BPL, and willing to consider what changes should be made to the existing interference rules "to promote and encourage the new BPL technology". The Commissioners state: "We further encourage present deployment of BPL that complies with our existing rules, noting that if, or when, our rules are modified, those rules will address prospective compliance."

K1ZZ writes: "The reason for our concern is simple – 'Access BPL' involves the introduction of RF energy in the range from 2 to 80MHz onto so-called 'medium voltage' power lines that [in the USA] run along nearly every road and street and into every neighbourhood... According to industry sources, data rates of up to 10MB/s are possible for distances of up to 2000 ft, and of up to 3MB/s for distances of up to 4000ft... This makes the technology potentially attractive for delivering broadband services such as Internet access. 'In-House BPL' involves much the same thing for LNS using the existing AC wiring in the walls of homes and offices."

K1ZZ admits that the FCC NOI does at least raise interference as an issue: "In both Access and In-House high-speed BPL technologies, multiple carriers spread signals over a broad range of frequencies that are used by other services [including amateur radio terrestrial and satellite among some half-dozen other authorised services in the HF spectrum] that must be protected from interference."

He adds: "Rest assured that the ARRL will do everything in its power to hold the FCC to that promise... We have a long, hard fight ahead of us."

There is no doubt that, world-wide, the data transmission industry is heavily promoting the use of power-line technologies despite the threat to all present users of the HF spectrum.

PROTECTING IC REGULATORS

Dick Greenbank, ZL2TGQ (*Break-In*, November/December 2002, p8), notes that although three-terminal IC voltage regulators are provided with internal self-protection in the form of current limiting, overload limiting, thermal shut-down, and safe-operating-area protection, they are still vulnerable to damage, and even destruction in certain circumstances. Regulators in general bench supply units may become unstable, or suffer transient damage in the presence of RF fields. Decoupling capacitors should be placed close to the input, adjust and output terminals and should have very low self-inductance; for example, multi-layer monolithic ceramic ('mono' capacitors). Under fault conditions, where the input to the regulator is inadvertently shorted, the decoupling capacitor at the output can dump sufficient charge into the regulator to cause damage. As a rule of thumb, a 10µF capacitor charged to 10V can damage the regulator under these conditions. There are two precautions that may be applied: first, to limit the value of the capacitor; second, to isolate the regulator by using a bypass diode."

Fig 1 shows ZL2TGQ's circuits for protecting fixed and adjustable voltage regulator ICs. General-purpose 1N4004 diodes are suitable.

INSULATORS, CONDUCTORS AND RF EFFICIENCY

In the 1930's with the majority of UK amateurs restricted to a power of 10 or 25 (a very few 50 or more) watts DC input, more attention was given to making HF installations as efficient as possible. Today, with most licences permitting up to 400W RF to the radiating element, there is less reason to strive for maximum efficiency. Exceptions are the QRP enthusiasts, the holders of the Foundation licence and the LF enthusiasts, where even a radiated power of 1W is by no means easy to achieve.

I recall a 65-year-old article by Robert Jardine, G6QX (*T & R Bulletin*, October 1938, pp211–213, 254), who had spent two months in the USA and had taken the opportunity to visit a number of American amateur stations. Among his listed conclusions was: "(4) RF power losses are not studied as in G (Britain). When a full kilowatt is available, 250 watts loss is considered neither here nor there. Poor aerial lead-ins, poor insulation, and proximity of kilowatt tank coils to metal panels must, in the many cases seen, absorb much RF energy which could easily be conserved for the aerials."

The late 1930s saw the introduction of new low-loss materials for insulation and dielectric purposes that we now take for granted. A still-valid article 'Insulating Materials for the Higher Frequencies', by Dr G F Bloomfield

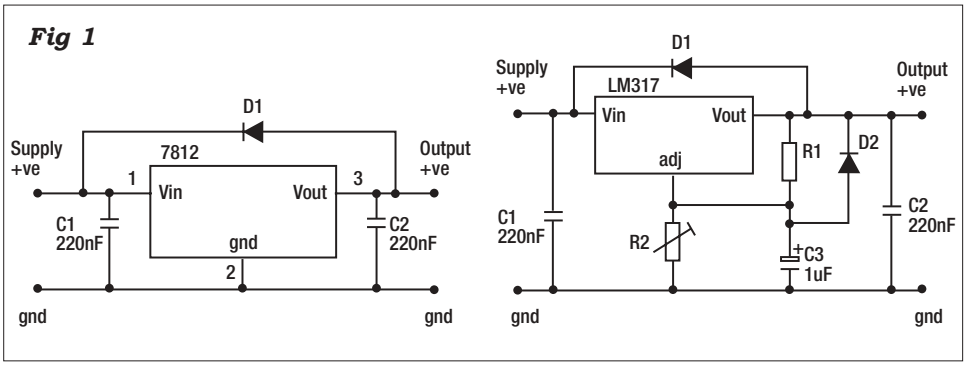
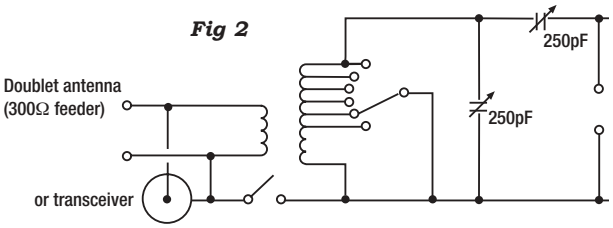


Fig 1: Circuits recommended by ZL2TGQ for protecting voltage regulator ICs used in general purpose power supply units. (Break-In)



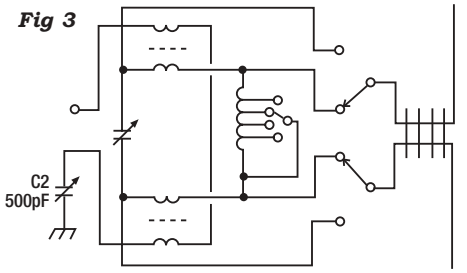


Fig 2: GW0GHF has converted his MFJ-949 T-match ATU into an SPC-type unit with a link winding to provide balanced or unbalanced connections - and now without using PVC tape to secure windings!

Fig 3: PA0FRI's implementation of his S-Match unit. (See March 'TT'.)

(*T & R Bulletin*, May 1938, pp635–639) stressed that the importance of utilising low-loss materials at the higher frequencies "cannot be over emphasised". The new materials were replacing older materials such as ebonite or bakelite for HF working. Many ceramics were effective but difficult to 'work' at home. Dr Bloomfield noted: "During the past twelve months a new material, polystyrene, has become available to the radio amateur and to the trade under various trade names. Certain grades of this material are every bit as good as, or in some cases even better than, quartz, mica and the ceramics, and can be sawn, drilled and manipulated generally as readily as ebonite..." Today, we tend to think of all plastics as good HF insulators, forgetting that this is far from the case: polystyrene and its improved variant PTFE, yes! PVC, usually no. Power factors vary widely.

In 1938–39, before the outbreak of WWII, there was very little use of low-loss coaxial cables by amateurs. Indeed, the first time I actually came across such cables was in 1942 at the newly-built Hanslope Park station, where the 'half-inch' variety was used in connection with the broadband 'aerial distribution amplifiers' pioneered by Dud Charman, G6CJ.

Special lower-loss flex was coming into use after 1936 for VHF television reception but, for amateur half-wave dipole antennas, amateurs still often used normal domestic twisted flex with rubber insulation, despite the appreciable RF losses (greatly increased by weathering and ageing). I recall using a twisted flex feeder about 15–20ft long on 14MHz CW (DC input to the power amplifier limited to 10W), but soon deciding I could get better results with the open-wire lines of Zepp antennas or even end-fed antennas. As an impecunious schoolboy, I had purchased the cheapest flex I could find, with little appreciation that it must have been dissipating most of the meagre RF output from my transmitter before a little finally reached the dipole element.

The more experienced amateurs (at least in Europe) gave close attention to the question of RF losses in materials used for antenna insulators, coil formers, stand-off insulation, the winding of coils to provide maximum Q, and the like. ASMUs [ATUs] as we know them today were seldom used other than in the form of tuned couplers for Zepp antennas, etc.

Today, with the large range of ceramics, plastics, etc, we tend, perhaps unwisely, to take their HF/VHF insulation properties largely for granted. I am afraid some installations (and I include my own) resemble the American stations seen by G6QX where much of the transmitter power is thrown away.

The true extent of the losses in poor-quality electric flex was brought home to me in the immediate post-war period when 28MHz was, for a time, the only band available. I used about 2ft of the old flex to provide link coupling between a buffer/doubler stage to a PA built on the upper chassis of an open rack. I found that on 28MHz I could hardly move the anode-current meter of the Class C PA. A pilot bulb coupled to the doubler tank circuit glowed, but there was no trace of RF in the tuned grid PA coil just a foot or two away. It was evident that the short length of poor quality flex was dissipating virtually all the 28MHz RF drive.

I was reminded of this old, half-forgotten incident as a result of correspondence with Brian Williams, GW0GHF. He had converted an MFJ-949 T-match ATU to provide a balanced output (primarily on 1.8MHz) much along the lines suggested by AD5X ('TT', March 2003. Fig 2, p73), by winding seven turns of 'hook-up' wire on a white pill bottle kept in place by winding some black PVC insulating tape around the link turns to keep them in place. This fitted snugly inside the large 3in diameter coil of the ATU.

He soon noticed that the coil now appeared to be heating up. The ATU heating problem that occurs on the lower bands is often due to the use of loading capacitors of insufficient maximum value, but the MFJ-949 had presented no significant heating problem when used previously to provide an unbalanced 1.8MHz output.

Recognising that the production of heat in an ATU signifies considerable loss of RF power, GW0GHF investigated. He found that the black PVC tape was lossy to RF. A MkII version is minus the tape, and the 'hook-up' wire is now enamelled 20SWG copper wire, held in place by small wire loops. This has virtually cured the heating problem!

A MkIII version now includes an electrostatic (cooking-foil) screen wound round the link winding – with a small gap (like a Faraday shield) to prevent the foil acting as a 'shorted turn'. He has also converted the T-match MFJ-949 into an SPC type: **Fig 2**.

It has been noted before in 'TT', in connection with the use of 'PVC' drain pipes as coil formers etc, that there appear to be two types of this material in common use. One, as GW0GHF found, is a lossy insulator at 1.8MHz and above, the other reasonably satisfactory throughout the HF spectrum. To check whether a material is a good RF insulator, a trick is to put some of the material in a microwave oven (be sure to include also some water in an oven-proof container) and check whether the plastic material rapidly heats up or remains cool. Any plastic material that remains cool in a microwave oven should prove a satisfactory insulator at HF and VHF.

WIRES FOR ANTENNAS

But what about the use of plastic- or rubber-insulated wire for antenna elements? This is a topic that seems to have attracted relatively little attention. The late Watson Peat, GM3AVA, used to tell a wartime story of how he once obtained from an Army workshop a large spool of insulated wire (possibly intended for field telephones) and put up what he felt would prove an excellent long-wire antenna for use with a Whaddon MkIII 30W transmitter. Unexpectedly, it proved virtually useless. Whether this was due to losses in the wire (iron?) or lossy insulation, or both, was never proved.

For some time I have used some old four-wire telephone-extension cable with a plastic covering as a large part of a long-wire loop antenna. It has always brought contacts, but I am beginning to wonder whether this should be replaced by enamelled,

WIRE	Q
New No 12 AWG, bare, soft-drawn solid copper	410
New insulated, solid No 12	410
New insulated, stranded No 12 THWN	350
New, insulated, 19 stranded No 26 Copperweld	270
New No 14 bare, soft-drawn solid copper	353
New No 14 bare, solid Copperweld	360
New No 14 bare, stranded Copperweld	194
Oxidised No 14 bare, stranded Copperweld	162
New No 14 bare, 7/22 stranded, hard-drawn copper	338
Oxidised No 14 bare, 7/22 stranded, hard-drawn copper	300
No 14 aluminium electric fence wire	260
No 8 aluminium clothesline	360
No 13 iron fence wire	25

Table 1: Comparison of Q for coils made with various wires at 1.8MHz.

hard-drawn copper wire, for long the traditional material for wire antennas.

This feeling has been intensified by an article 'Conductors for HF Antennas', by Richard Gamble, ZL1BNQ (*Break-In*, January/February, 2003, pp10/11). The author acknowledges that this is a simplified version of an article by Rudy Severns, N6LF, in *QEX* (date not given). In general, this does not discuss the use of plastic- or rinner-covered conductors for antennas, but does give interesting information on RF losses for a number of antenna materials, and comparison of the Q at 1.8MHz for coils made with various conductors.

It is pointed out that many types of wire, conductive strips and tubes can be, and are, used for antennas. The reference against which others are judged is solid, No 12, soft-drawn, bare copper. Other commonly-used choices include seven-strand, hard-drawn copper, solid No 12 Copperweld (copper-coated steel wire), 19-strand Copperweld aluminium fence wire, aluminium tubing, thin copper or aluminium strips, stainless steel wire or tubing, towers and galvanised steel guy wires.

ZL1BNQ strongly warns against the use of galvanised steel fence wire and multi-strand stainless steel electric fence wire through plastic ribbon. The use of silver plated conductors for coils etc is sometimes suggested: "The reason is that, although the conductivity of silver is only 6% better than that of copper, when the surface oxidises, silver oxide is a better conductor than copper oxide".

The RF ohmic resistance of wire at any given frequency depends on three factors: size, electrical properties of the material (including surface corrosion); and the resistance increase due to skin effect. For good conductors, the skin depth at 1.8MHz is given as 1.94mil, and at 14.2MHz, 0.69mil (one mil is one-thousandth of an inch).

The article shows that, above about 10MHz, due to skin effect, copper-coated steel wire (Copperweld) has much the same effective resistance as solid copper. Similarly for 7MHz and above, stranded Copperweld is a good choice having good mechanical strength and is reasonable to work with. For 1.8MHz and 3.5MHz, its resistance is quite a bit higher and could be a problem with some types of antenna, where solid copper or single-strand Copperweld would be a better choice. "In the case of steel wire, or copper-plated steel electric fence wire, the skin effect will be very small and the resistance very large. The copper plating on electric fence wire is simply too thin to be any help at HF."

Generally, copper or aluminium conductors are suitable for HF antennas. Flat strip conductors can reduce skin effect but, for outside use, have increased wind resistance. If we take a length of round copper or aluminium wire and roll it out into a strip approximately 0.01in by 0.625in, the thickness of the strip in skin depths will be increased by a factor of 4.6 compared with the equivalent round wire. At high frequencies, all the current is on the outer surface of the strip, so thickness of the inside does not matter.

In practice, wire loss for a given size and type of copper, Copperweld or aluminium conductor has relatively little effect on the performance of 14MHz dipoles, slightly more on 1.85MHz dipoles and ground-planes, but appreciable effect on antennas having low impedances. Iron conductors should be avoided. To measure the Q difference between wire types, ZL1BNC considers that the best way is to make a large coil, well-spaced, and measure on a Q-meter. He claims that new insulation (presumably enamel) had very little effect but added "weathered insulation may not be the same". **Table 1** shows his comparison of Q for coils made with various wires at 1.8MHz.

Stainless steel is also bad news with a resistance some 50 times that of copper. For radiating towers, he suggests, "try using a copper strip to encase the stainless steel conductor". Similarly, since most mobile antennas are electrically short and heavily-loaded, with very low radiation resistance, especially below 7MHz, stainless steel may not be a good choice, despite the mechanical and corrosion-resistance advantages.

I am still left wondering what is the effect of my plastic-covered telephone cable with its four copper strands, particularly after many years exposure to the weather? The long loop has a DC resistance of several ohms, but does the plastic covering absorb and dissipate a significant amount of HF power? Any ideas?

IMPLEMENTING THE PA0FRI S-MATCH ATU

The March 'TT' was compiled under stressful personal circumstances with the unfortunate result that, in the item on PA0FRI's S-match ATU, I inadvertently omitted a diagram showing a suggested implementation where a suitable roller-coaster was not available. One result was that Tony Naylor, G3GHI, reported difficulties in loading his transmitter to more than about 10W, although his old Z-match fully loads his 100W IC-735 rig to a doublet antenna with 450Ω feeder.

Fig 3 is the missing diagram, with additional switching to provide balanced or unbalanced output, plus an additional variable capacitor (C2 500pF) which, PA0FRI points out, should reduce the SWR. Hopefully this should provide a more flexible unit. See the March 'TT' for information on the development of the S-match tuner and how a T-match can be easily converted to an S-match unit.

Fig 4

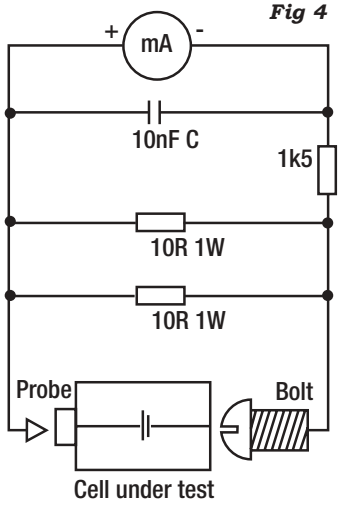


Fig 4:ZL2BCW's dry cell (battery) tester designed to check voltage under 300mA load using a 1mA FSD meter with an internal resistance of 100Ω, but could be adapted for other moving-coil meters and / or loads. (Break-In)

DRY CELL (BATTERY) TESTER

It has been noted before that, when using a series of 1.5V dry cells to form a battery, almost inevitably one cell will fail well before the others. If completely exhausted, the failed cell can usually be detected by a simple voltage test using a high-sensitivity meter, but until this point is reached the cell may still indicate a reasonable voltage off-load. The solution is to check the voltage under load conditions.

In the 'QRP for Ever' column of *Break-In* (November/December 2002), Mike Kerr, ZL2BCW, describes a simple device that can be used to test individual cells such as disposable Alkaline and Carbon-Zinc, including AAA, AA (Penlite), C and D cells. It could also be used to determine the state of charge of Nickel-Cadmium rechargeable cells etc.

As shown in **Fig 4**, the tester consists of a voltmeter accurately calibrated to read 1.6V full scale and a fixed resistive load of constant value. Fig 4 shows a 0–1mA meter, but virtually any meter up to 50mA FSD could be used by proper choice of the multiplier resistor (the 1500Ω component). A calibration chart can be attached to the case for reference purposes, or the meter scale directly marked from 1.0V to 1.6V in 0.1V steps. The resistive load (the two 10Ω resistors) should be capable of 2W dissipation and between 4.5 and 5.0ohm to ensure that the cells are able to supply at least 300mA to give a reading of 1.5V [this seems a lot to expect from an AAA cell unless the reading is carried out quickly. It might be better to be able to switch out one of the load resistors for smaller cells – G3VA].

ZL2BCW recommends that the test meter is built into a small, strong plastic box. The negative connection to the cell under test is made via a good, solid, brass bolt-head on the plastic case. The positive test lead consists of a few centimetres of good

quality insulated stranded wire with a red banana plug on the end.

He warns that the tester should not be used with Mercury, Silver Oxide, lead-acid, gel, or with cells other than Alkaline and Carbon-Zinc, otherwise both cell and tester could be damaged. An alkaline or carbon zinc cell in good condition should indicate a reading of at least 1.4V under load. He adds: "I pension mine off to torches once they drop to 1.3 or 1.2V. If the reading is erratic check that the cell is being held firmly; if this does not result in a stable reading, the cell itself is faulty and should be discarded.

"Rechargeable Ni-Cd cells can be tested and should give a reading of 1.4V immediately after being recharged. 1.2V is the usual reading for single cells in mid-life. When the reading drops to 1.0V or less, it should be recharged immediately, as the cells may be damaged if discharged below 1.0V. The rechargeable alkaline cells which have come on the market recently should give test results similar to the disposable cells."

ZL2BCW points out the advantages of using such a simple tester compared to using a digital voltmeter reading to up to three decimal places. You would still need to provide a load. The traditional moving coil meter 'settles' much quicker than a DVM, enabling the user to see immediately if the output voltage of the cell is sinking under load or otherwise varying. Tumbling digits are hard to read and, unlike a DVM, the device requires no battery itself.

SIMPLE CRYSTAL CALIBRATOR

Even in these days of frequency synthesisers or the earlier built-in calibrators, a crystal calibrator can still be useful. I still have in working order (thanks to G3 for replacing a defective crystal) one of the old wartime Class-D MkII wavemeters using an ECH35 frequency-changer valve. It not only provides 1MHz and 100kHz markers points, but also an interpolation VFO that fills in the points between the 100kHz markers on 1.9/4MHz and 4/8MHz (plus harmonics). Not as renowned as the classic American BC221 frequency meter, but nevertheless much-valued.

It is some years since I last included in 'TT' a simple crystal calibrator, and I noted with interest the article 'Simple Crystal Calibrator' by Kelvin Barnsdale, ZL3KB, the *Break-In* Technical Editor, (Break-In, January / February, 2002, p10). His introduction: "For those operators like me, who use ancient radios with no accurate frequency readout, this device (**Fig 5**) may be of some assistance. It generates reference signals up to the 20m band using an easily-obtainable computer crystal and locally-sourced bits. I built mine on a piece of strip board, and mounted it in a plastic box with a 9V battery compartment. The output can be connected to a short wire to act as an antenna. It has four selectable frequencies: 2MHz, 1MHz and 500kHz for finding the band edges, plus 50kHz for locating points within the band. As an example of the harmonics, the 500kHz signal will produce harmonic signals at 1500, 2000, 2500, 3000, 3500kHz etc.

"For example, if you want a marker at 3650kHz, first find 3500kHz with the 500kHz harmonic, then selecting 50kHz will produce signals on 3550, 3600, 3650kHz etc. Use the receiver in the CW mode to hear the markers.

"IC2a (CD4011) functions as a 4MHz CMOS crystal oscillator biased into linear mode with the R1 feedback resistor. The square-wave output is buffered by IC2b and passed to the input of the binary counter, IC1 (CD4520). The first half of IC1 operates as a straight binary divider, with the outputs 2MHz, 1MHz and 500kHz. These reference frequencies are manually selected by the four-way DIP switch, made into short pulses by C3/R3 to increase their odd harmonic content. The pulses are then buffered ready for the outside world by IC2d and coupling capacitor, C4. The spare gate IC2c is not used but could be put into service as an audio oscillator to modulate the output for receivers that have no BFO or CW mode."

For greatest accuracy, the crystal oscillator can be trimmed by CV1 to zero beat with a standard frequency station such as WWV on 2.5, 5 or 10MHz.

FEEDBACK

Stan Brown, G4LU, has pointed out that the current transformer calculations shown in the June 'TT' item on dynamic power limiting are theoretically incorrect. G3GKG replies: "I hold my hands up and admit that, judged by G4LU's esoteric standards, I have little idea how a current transformer works. However, I have confirmed by my experiments that, within the bounds prescribed by this design, the statement upon which my calculations are based is true enough for all practical purposes. I have measured the voltages produced by accurately-measured power levels, at various frequencies, with a range of resistance, R, values and found them to be within a few percent of those calculated by the simple formula. However, I did suggest in the June item making the value of R variable, so that it could be adjusted to produce the required voltage from a measured power level, rather than relying entirely on the result of the calculations..."

I have been passed an e-mail from Paul Beaumont, G7VAK, stating that he cannot make the balanced loop receiving antenna shown in the June 'TT' work, and suggests there are several circuit errors. I have checked the original source (*Electronic Design*, July 22, 1996, p112) and note that on the two occasions the circuit diagram of this device has appeared in 'TT' there should have been an extra connection to +6V taken from the junction of the drain of TR1 and the 30Ω resistor which is also connected to the positive side of the 50nF capacitor. Also, for TR2, the 'gate arrow' points to the 'drain' rather than the 'source' (balanced input). If anyone is still having difficulties, let me know, enclosing an SASE, and I will post them a photocopy of the original article.◆

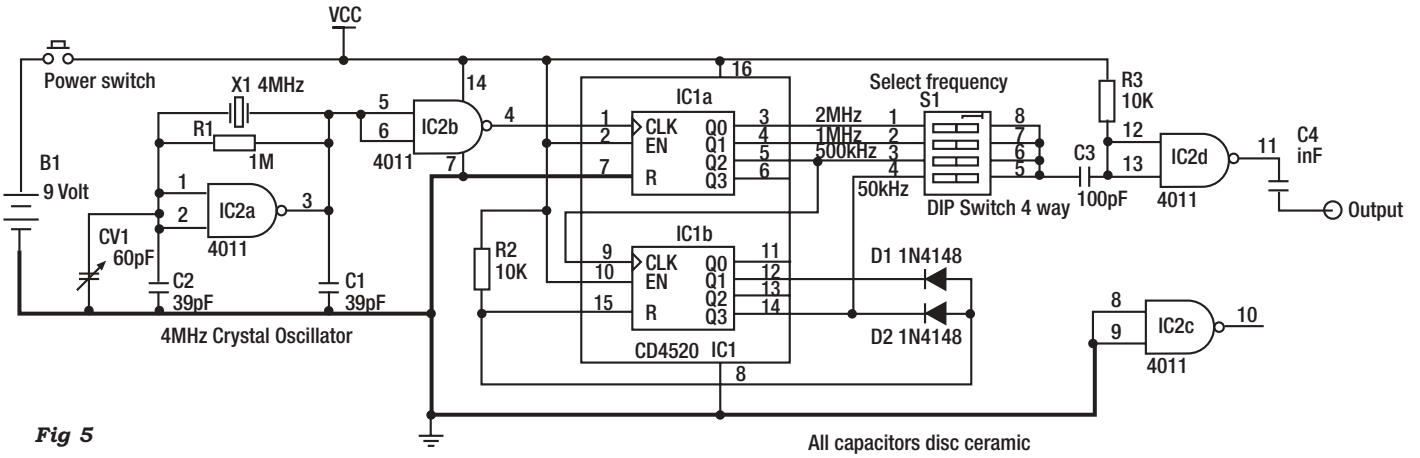
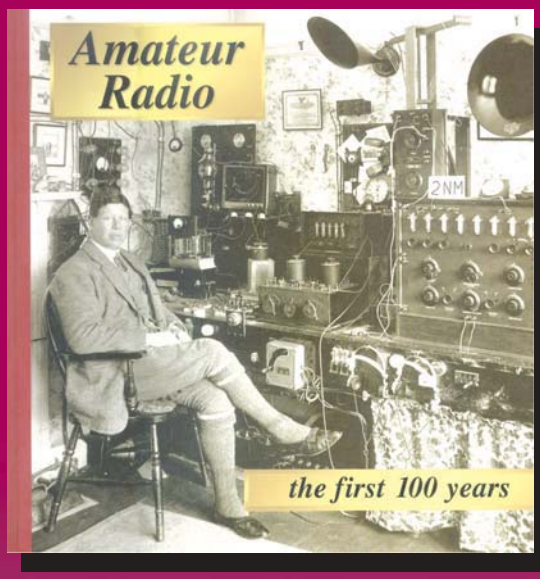


Fig 5

Fig 5: ZL3KB's simple crystal calibrator providing selectable 2MHz, 1MHz and 500kHz marker signals from low-cost 4MHz computer crystal. (Break-In)



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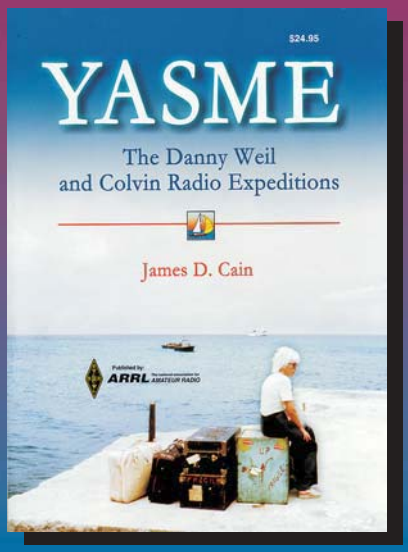

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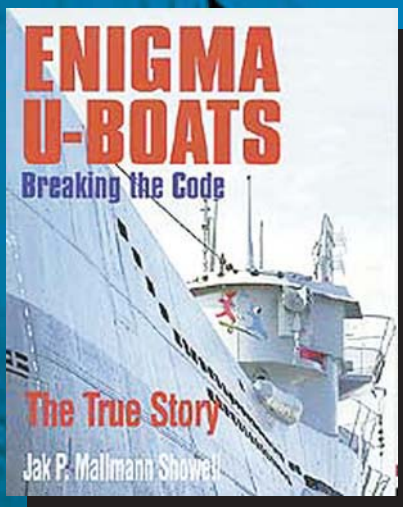

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Technical feedback

'Pull the Mains Plug Out!', by Harry Leeming, G3LLL (*RadCom* pp67/68, July 2003)

This article has been read and enjoyed by many members, hopefully reminding them of the perils of fault-finding or upgrading mains-powered electronic equipment. Two replies are worthy of note. One comes from Robin Page-Jones, G3JWI, the RSGB's Technical Director (Environmental), and the other from Geoff Blake, G8GNZ.


Pull the mains plug out!

Neither is critical of Harry's article, but each mentions aspects which complement it and may be of great use to readers.

Robin Page-Jones says "The article mentions the possibility of the neutral going high (if the neutral return from a piece of equipment is broken) but doesn't mention the problem of Protective Multiple Earthing (PME), where the neutral and mains earth are bonded at the input to the consumer's premises and both mains earth and neutral can rise above 'true' earth potential. In houses that are wired on the PME system, there is no separate earth conductor going back to the sub- station. With a PME system, a small voltage may exist between the consumer's earth conductor, and any metalwork connected to it, and the true earth (the earth out in the garden). Under certain very rare supply-system faults, this voltage could rise to a dangerous level. Because of this, supply companies advise certain precautions relating to the bonding of metalwork inside the house, and also to the connection of external earths. The Society has produced a leaflet (EMC 07) which can be downloaded from the EMC Committee's website (http://www.qsl.net/rsgb_emc/emc.html#leaflets) and is available upon request from RSGB HQ."

Another aspect is raised by Geoff Blake. He says "If you are working on any live or potentially-live equipment, and the need arises to replace an 'Electrostatic Sensitive Device' (ESD), never directly ground yourself. Professionals (should) use a grounding mat and wrist strap, both of which are grounded via high value (2 –30MΩ) resistor. These resistors provide a discharge path sufficient to prevent the build-up of a static charge, but prevent the flow of enough current to cause a serious electric shock.

"Regarding the incorrect wiring of single-pole switched mains connectors, this is a point that should be checked when installing, or having installed, the shack power wiring. Any amateur worth his salt will check this, and those who don't should employ an electrician, preferably NICEIC registered, to do so. Mains testing devices, which show that a mains socket is correctly wired, are not expensive.

"Harry's experience of electric shock from the HV supply of a commercial transceiver smacks of bad design. High voltage (and most other) supplies should always be fitted with bleed resistors to dissipate any stored charge in (at most) a few minutes - not a week or more!

"Finally, the environment in most shacks/workshops cannot be described as a 'risk free zone' and a wise amateur would regularly carry out a risk assessment of his shack and aerial farm and take appropriate measures, including instructing his / her family where to switch off in an emergency!"

Jess Alderman, G7PHH, adds "Now is the time to install a Sentry socket with a 15 or 30mA trip rating. I have used such a residual-current circuit breaker (RCCB) for a very long time now in my workshop; hopefully, any shock does little more than damage my pride.

"I have fitted all kinds of RCCB into people's shacks and they have all been very satisfied.

"A pre-war TV chassis I once worked on had a spring-loaded knife switch, which operated when the back panel was removed, short-circuiting the HT line to earth and discharging the capacitors!

"I always have an RCCB with me when I am working away from home."

Harry Leeming, G3LLL, comments "I am delighted that members are so interested in all aspects of safety; I only wish the computer magazines were as concerned.

"One point that perhaps I ought to clarify is the matter of earthed wrist straps, which seems to have caused some confusion. Were you accidentally to grab something live when wearing one of these, your body and the wrist strap would be 230 volts above earth. Whether or not you then received a severe electric shock would depend upon the insulation of the wrist strap. If this was not rated to BSI safety standards (and most of the cheap ones do not seen to have any safety standard compliance stamped on them), there would be no assurance that you would not be killed. They may well be perfectly adequate, as may a good clothes line in a rock climbing accident, but would you want to risk it?"


QRP

'QRP', *RadCom* p85, July 2003

In the box 'A Few Results', some antenna dimensions were incorrectly printed. The author of the information presented in the box, Des Vance, GI3XZM, offers the following clarification. "The fixed station aerials were quarter-wave or sometimes half-wave, while portables used eighth-wave modified CB whips or occasionally quarter-wave. The important point is that ordinary, simple aerials served in these very low-power tests." ◆

HELPLINES

- Dick, G0DIC, needs details of a source for the following battery: Varta Photo Special V741PX 15V. It measures 14.3 x 35mm. The Maplin code was FM09K (type BLR154/504), but has been discontinued by them. The battery is for the GPO multi-range analogue meter 12D, made by AVO. G0DIC, e-mail: mrfixter@hotmail.com
- Peter, ON4UAP (formerly G3UAP), asks if anyone has a copy of the December 1965 RAE paper? He would willingly pay the costs for postage or fax of this document. Peter Parker, ON4UAP, Ave. Kersbeek 116, 1190 Brussels. Tel/fax: 00322 332 0765.
- Tony, G7JAV, is going to Cyprus in October and would like to hear readers' experiences with Customs, airlines, etc, where the transportation of radio equipment is involved. Are there any problems to be anticipated after arrival? G7JAV, QTHR. E-mail: g7jav@thersgb.net
- Bob is looking for a manual or a copy of the Radio Set R106 Mkl and II (HRO) technical handbook. All costs will be refunded. Bob Wright, 245 Sandy Lane, Hindley, Wigan WN2 4ER. Tel: 01942 255 948.
- Dennis, G3LLZ, needs the circuit diagram and adjustment details for the Advance Instruments VM77C AC voltmeter. He is willing to copy and return any documents. G3LLZ, QTHR. Tel: 01793 828 188.
- Peter, G3SMT, would like to beg, buy or borrow a copy of the service manual for a JRC JST-245 transceiver. All expenses reimbursed. G3SMT, QTHR. E-mail: peter_torry@btopenworld.com
- Les, M0LFB, needs a copy of the circuit diagram for the Tono 250W-N 2m amplifier. All costs will be reimbursed. M0LFB, QTHR. Tel:020 7359 3841, or e-mail lesg6oug@lineone.net
- Ron, G4MNB, seeks any information on the Calscope Super 10, made by Scopex Instruments Ltd. All expenses will be paid. G4MNB, QTHR.

By Steve White, G3ZVW, 31 Amberley Road, London N13 4BH. E-mail steve.white@rsgb.org.uk

Whatever next

NEW INPUT DEVICE

For some years now, the vast majority of design work carried out on computers has involved the use of a mouse. OK, there are alternatives such as graphic tablets, but Rodents Rule OK! The question I would like to pose is, will they continue to do so? The reason I ask is that on the horizon there is a new invention that could replace the mouse in certain design applications. It is the brainchild of Ravin Balakrishnan, a computer science professor at the University of Toronto. His so-called 'ShapeTape' is a snake-like input tool that can be bent, twisted, pushed and pulled. It can be likened to a three-dimensional electronic 'Flexi-Curve' (once popular in drawing offices, and still available from stationery shops). Its output can be used to generate two- and three-dimensional shapes.

The ShapeTape is a long rubber ribbon with a spring steel core, embedded with fibre-optic sensors. Used in conjunction with a foot pedal, it interacts with specialised software that allows users to create virtual shapes on a computer screen. Held in both hands, the tape can be twisted and bent to change image sizes and shapes.

While the ShapeTape may not replace the mouse for everyday computing use, it may make designing complex shapes, such as cars, a lot quicker.

POWERPLAY

There's a trend that has been taking place in amateur radio for many years. It is a trend that continues to this day and it is going to continue further in the immediate future - increases in transmit power.

To set the scene for newcomers, I ought to mention that in the early days of commercially-built amateur VHF FM equipment a 10-watt mobile transceiver was the norm. Today, 50 watts would be more like it. Equally, for many years the output power of practically all solid-state commercial HF transceivers has been 100 watts. Only in more recent times has Yaesu taken it to the 200-watt level, with its FT-1000D and FT-1000MP MarkV transceivers, and Icom with the IC-775DSP. However, at this year's Dayton Hamvention, Icom and Kenwood unveiled major new items of equipment, both of which produce 200 watts of RF and include the 'magic' 50MHz band. Methinks I see a trend forming.

Kenwood's new model is known as the TS-0000 at the moment. Oddly enough, this is the same number that the TS-2000 was given in its preliminary product release. The 'new TS-0000' is a small, high power mobile transceiver with a detachable 'overheight' front panel, rather like an overgrown version of the TM-D700E. With its backlit controls, it is definitely intended for use as much in a vehicle as it is in the shack, and it will come in two versions – a 100-watt model with built-in auto-ATU and a 200-watt model without. These days it practically goes without saying that it will contain a memory keyer, a serial data port and DSP.

Icom's new radio - the IC-7800 - is quite unlike the Kenwood. It's big, very big, and it has an electrical specification to match. It also has a list of features that seems never-ending, so clearly it is going to be aimed at the very top end of the amateur market. I'm not going to attempt to review a radio I have seen but not touched, but I think it is valid to mention some of the facilities and the thinking that must have gone into it. Icom's big selling point is that the receivers (plural) of the IC-7800 have a +40dBm third-order intercept point, making the radio at least as good in this respect as the best commercial and military equipment. It also features four completely independent 32-bit DSPs – one for each receiver, one for the transmitter, and one for the bandscope. Incidentally, the bandscope is highly configurable and is claimed to be as good as a quality item of test equipment. In the IC-7800, radio meets computer because not only does it have an RS-232C interface, it also has a 15-pin D-type socket for an external VGA display, a USB keyboard socket and a network socket. How's that for remote control? Something completely new - in an amateur transceiver, at least - is flash memory. This means that personal settings can be transferred by means of moving across a compact flash card or Microdrive (exactly the same as the ones used in digital cameras), rather than cloned to another transceiver. Personal settings for multiple operators or various scenarios can also be stored in the flash card.

When you start to think about it, it shouldn't really come as a surprise that transmit powers are increasing. After all, semiconductor manufacturers are constantly producing new devices that have enhanced performance, so it's entirely logical that equipment manufacturers should use them. The main consideration though is the power supply. For Icom's IC-7800 this isn't too much of a problem, because it is a dedicated mains-powered base station, but the prospect of Kenwood's TS-0000 drawing as much as about 40 amps on transmit from a vehicle battery or a power supply in the shack means that users are going to have to be extremely careful to minimise the DC resistance of connections (even 0.1 ohm distributed between all the cables and the contacts of the connectors would result in a drop of about 4 volts when transmitting at full power). ◆

Above, left: The forthcoming Icom IC-7800 – the HF to 6m transceiver with everything. When you consider the fact that the colour TFT display is 7in across, you get a good idea of the overall physical size.

The forthcoming Kenwood TS-0000, a 200-watt HF to 6m mobile.

ALINCO Keep

ALINCO DX-70TH

Fully Featured Portable HF+6mtr Transceiver

The DX70 TH packs a hefty 100W punch on all Ham bands 1.8 - 50MHz. It is backed by a superb receiver with narrow filters fitted as standard. Make no mistake - this is a real DX operators transceiver ideal for use at home, or for that portable DXpedition.

- TX - all HF + 6mtr
- 100W output on HF & 6mtrs
- RX - general coverage 150kHz - 30-MHz, 50MHz - 54MHz
- SSB, CW, AM, FM and digital modes
- 100 memories
- Detachable faceplate and remote mounting kit available
- Speech processor standard
- Narrow filters fitted as standard

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The DX-77 is a design achievement that puts a HF desktop transceiver within your reach! And this is no 'bare bones' radio, nor is it a converted 'channelised' adaptation. The DX-77 was designed from the beginning to be a quality Amateur Radio, full of features to enhance its performance and your enjoyment.

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- All modes, FM, LSB, USB, CW & AM
- 100 memory channels
- Built in speech compressor
- Front mounted speaker, loud clear audio
- Optional keyer

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- 3.5MHz-30MHz (with over 3 metre element)
- 200W PEP power handling
- Power for tuning = 7-20W
- 13.8V DC ±10% operating voltage

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HFM-1

A stainless steel, heavy duty HF mobile antenna complete with spring base. Covers 3.5 to 30MHz when used with the Alinco EDX-2 Automatic Tuner. Alternatively it may be base matched with any type of tuner for mono band or multi band use. Power handling with the EDX-2 is 150W.

- Covers: 3.5 - 30MHz (when used with EDX-2 auto ATU)
- Length: 2.7 metres

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- Extended RX capability 136 - 174MH, 420 - 470MHz
- 50W (2m) - 35W (70cms)
- 100 memory channels (+ CALL Channels)
- Cross band full duplex
- Tone search function
- Cable cloning function
- Channel indication mode
- CTCSS encoder fitted

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A fully featured 2 Metre FM Mobile thats crammed full of extras!

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- Channel Scope View - See activity either side of your channel
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- CTCSS encoder
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- Squelch Timer
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- DTMF tones and autodial memories
- Tone bursts
- Three scan modes
- Theft Alarm feature
- Wide and narrow FM TX/RX
- 12VDC direct input (5W output)
- High-power NiMH battery (4.5w output VHF/4w UHF)
- Busy Channel Lock Out
- Mosquito Repelling feature *(experimental)*
- External Terminal Control
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DJ-X2000 Intelligent Scanning Receiver

- Covers 100kHz - 2,149.99MHz
- 2000 channel memory
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- 'Flashtune' reads the frequency of a nearby transmitter and instantly takes your receiver to it
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  - Multi voltage 110V-240VAC mains charger for easy use anywhere in the world
  - 4.8V DC 700mAH NiCad battery pack
  - Belt clip
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- New 2 metre (144-146MHz) handheld
- Easy to use, direct entry keypad
- Wide RX possible (typical 135-173MHz)
- Up to 5 watts output (0.8W low power)
- 40 memory channels + 1 call channel
- Large range of accessories available

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Compact Dual Bander

- New dual band handy transceiver
- 5W/1W/0.5W output power
- Super wide receive (76-999MHz)
- Includes wide FM mode
- CTCSS Encode+decode, DTMF squelch and 4 different European Tone Bursts
- 200 memory channels +2 call channels
- Alphanumeric Display, up to 6 characters
- Autodial memories
- Up to 6 character alpha-tagging
- 4 scan modes, 5 programmable scan banks
- Input voltage display with over voltage warning
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Advanced Scanning Receiver

- Receives: 100kHz - 2000MHz
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- Advanced scanning features: Programmed scan (up to 10 groups) Programmed memory scan
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  - Mode scan
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  - Band encursion scan
  - Priority scan
  - Any channel ship scan
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UHF Pager Sized Handheld

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- Large illuminated display
- Loud clear speaker horn system
- 100 memories+1 call channel
- Multi Scan functions
- 38 CTCSS tones for selective calling
- S-meter
- Cable Cloning
- External device control feature (outputs 3Vdc 5mA signal from an accessory port when squelch opens)
- Additional features, including anti-theft alarm and experimental mosquito repelling tone!
- Huge selection of accessories available

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Ultra Modern Scanning Receiver

with 8.33kHz for airband

- 100kHz - 1300MHz
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- 700 memory channels
- Steps: 5/6.5/8.33/10/12.5/ 15/20/25/ 30/50/100kHz
- Auto descrambler
- Bug detector
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- Attenuator
- SMA Antenna
- Battery saver cct
- Size: 56w x 102h x 23d mm
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- Supplied c/w: 3 AA dry cell battery case, carrying strap

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- Earphone

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The ULTIMATE Lightweight Scanner

with 8.33kHz for airband

- Receives: 522kHz - 999.995MHz
- AM WFM NFM
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- Bug detector - detects presence and frequency of bug giving audible warning
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- Internal or external supply
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- Illuminated backlight display
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Right: The three-wire mains filter, manufactured by Belling Lee.

BUYING COMPONENTS

Q How do I buy the mains filter that you described as 'Farnell 439-666' in the June column?

A There has been considerable interest in the idea of using a three-wire mains filter to keep your RF out of the mains wiring, and to keep mains-borne interference and voltage spikes out of your equipment. In truth, only part of any improvement is likely to come from the filter, and the rest would be from having organised your mains wiring and the grounding in the shack, as explained in June. Also, you may find that the interference doesn't go away because it is due to radiation from your antenna, or pickup by the antenna. Sorry, but interference problems tend to be like that – they often depend critically on local details.

A few people had difficulty in identifying the filter I had recommended briefly as 'Farnell 439-666'. Let me explain at greater length, because this question touches on the general topic of buying components. I've written about this topic before, and there's a very long page on the 'In Practice' website; but readers change, so it's time to say it again.

First, Farnell is not a manufacturer of mains filters. Farnell is one of the major component distributors (see below) and 439-666 is simply their stock code for that particular filter. The actual manufacturer is Belling Lee (see the photograph), and their product description is part number SF4200-16/01, two-stage 16A mains filter with earth line choke. But you hardly ever buy small quantities of any electronic components direct from the manufacturer any more - you go to one of the major distributors.

Table 1 shows what I found on looking for that filter in the catalogues and web sites of the major distributors who will deal with amateurs – see below for explanation of the details.

The big surprise was that CPC has the same filter for much less than Farnell's price. Thanks to G7UIG/ M3UIG for pointing this out, and my apologies to anyone who has bought from Farnell before seeing this. (But, as we go to press, CPC's stocks are limited and I can't help feeling the price is due for a jump!)

Distributor	Price	Stock code	Order line	Ease	Web
CPC	£18.40	FT00572	08701 202 530	***	www.cpc.co.uk
Farnell	£26.99	439-666	08701 200 200	***	www.farnell.com/uk
Rapid		not available	10206 751166	***	www.rapidelectronics.co.uk
RS	£19.98	206-7320	01536 201 201	*	rswww.com
Maplin		not available	0870 264 6000	***	www.maplin.co.uk

Table 1: The result of searches on the web for the mains filter.

Moving away from this particular component, let's compare the more general aspects of service from these five different distributors. This is for a typical amateur customer who orders by phone or through the website catalogue, and wants to pay by credit or debit card. For best results and fewest problems, follow these rules.

1. **Look up what you need** from the distributors' catalogues, CD-ROMs and websites. Catalogues and CD-ROMs are generally replaced twice a year; so if you have friends who throw the old ones out from work, arrange to have them thrown your way! Clubs: here's a very useful service you can organise for your members.

2. **Nobody stocks everything you need**. For a major project you'll probably have to order from more than one major distributor, and also perhaps a few specialist dealers. Check the 'In Practice' website for a list of general and specialist distributors and their contact details, and see below for brief profiles of the major distributors mentioned in Table 1.

3. **Estimate the total cost**. All the distributors' prices in **Table 1** exclude 17.5% VAT. Orders above about £30+VAT are generally sent post free, by next-day or three-day delivery; for orders below that value, there will be an additional handling or carriage charge of a few pounds, but details vary between distributors and change from time to time. With help from readers I try to keep the 'In Practice' website up to date, but have given up on printing specific details here in *RadCom* – they change too quickly.

4. **Do be businesslike**. Prepare your lists carefully, get all the order codes before you order.

5. **Order by phone or web** and **pay by credit/debit card**. You'll be told if anything is out of stock or delayed, so you can decide whether to wait or to cancel that item and get it elsewhere. Paying by plastic automatically takes care of any price variations, and you'll only be charged when goods are actually sent. Anything that is delayed will be charged only when despatched, and will be sent post-free.

6. **Don't be amateurish!** When ordering from the major distributors, never ask about items that aren't in the catalogue, and never ask for anything without an order code. And don't dither when you're told the total cost of your order – you should already have estimated how much it would be.

I make no apology for being so tough about these points. If we amateurs get a reputation for wasting the distributors' time (and therefore money) our small order facilities may be cut off. For the sake of all of us, please help maintain a good impression!

Table 1 also gives my assessment of the ease of telephone ordering, for private individuals who want to pay by plastic. With one exception, the major distributors treat all their customers the same – large or small, everybody uses the same catalogue and order lines, and those distributors get three stars for their efficient, friendly and helpful telephone service. If you've done your preparation before you pick up the phone, you'll get along fine. The one-star exception is RS Components. Its Electromail retail operation quietly closed some years ago, and standard RS order line is for account customers only. By telephone or on the web, non-account customers have to go through special procedures and be fairly determined... or else decide it's easier to spend their money elsewhere.

All the major distributors have their chosen areas of coverage, and their

IN PRAC

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Website: www.ifwtech.co.uk/g3sek E-mail: g3sek@ifwtech.co.uk

particular strengths and weaknesses. **Farnell and RS** compete head-to-head in trying to cover almost everything, and their catalogues include pretty much the same items usually at very similar prices. Electronic components are reasonably priced, considering that you're getting top quality branded components and you're also paying for their enormous breadth of stock. However, as you move away from electronics into tools, safety equipment and computer/office equipment, Farnell and RS prices become much less competitive with other suppliers outside the electronics industry. Also you have to buy low-value components in minimum quantities of 5, 10 or even 50 for small resistors; this reflects the primary focus of these companies on business customers. Since these two companies are such close competitors, the difference between them is largely one of service... and I've already had my say about that.

Rapid Electronics is an interesting smaller company with a product range narrower than that of Farnell and RS, but their prices for small components are often lower. Rapid historically have an educational focus, which is sometimes useful for amateurs too – for example, they offer kits of resistors and capacitors in common values, which are excellent value for money.

Maplin used to be very good for components, but that range has narrowed considerably in recent years as the company focus has moved towards ready-built consumer electronics. However, Maplin still very much caters for amateur buyers, and probably remains the best source for very small quantities of common components. Maplin is the only distributor in Table 1 that also has a national chain of shops, but you shouldn't expect the entire catalogue range to be on offer in quantity at every shop (except for the Barnsley branch which is in Maplin's national warehouse). It's always best to phone ahead and check whether the shop has what you want. You can also phone the shop to order goods from the catalogue for collection a few days later, but it will probably work out cheaper to use the national order line and have the goods delivered to your home.

CPC is a new name to most amateurs, though it has long been a major supplier of consumer electronics, accessories and spares to the retail trade. In recent years it has expanded its range of basic electronic components (largely through its sister company Farnell) and it has also been accepting telephone orders from individuals paying by plastic. The problem until recently was that before you could order, you first had to know the stock codes from the catalogue... which was hard to get. That has all changed since the new CPC website came on-line. You can now browse the web catalogue to identify the items and stock codes, and then either order through the website or by phone. This will now make CPC a major competitor to Maplin in consumer electronics, with a much wider range at comparable prices. Equally important, if you know how to identify a spare part and know how to fit it, you now have access to CPC's huge range of spares, covering not only major-brand consumer electronics but also domestic white goods.

Finally, may I remind you about the list of specialist distributors on the 'In Practice' website. You particularly need to know about the ones who supply RF components that the major distributors don't stock. (Sorry, this list is far too long to print in *RadCom*... but if you don't have web access, you must surely know someone you could ask for a printout of that page.)

NO SHOCKS

Q I just tried to measure the secondary resistance of a large transformer with my old AVO meter – and still haven't recovered from the electric shock! What happened?

A An old-style moving-coil multimeter will push quite a large current through the transformer winding, especially on the lowest resistance range that you were probably using. Did you notice that the resistance seemed to change as you continued to hold the test prods on the transformer terminals? That was because the large inductance of the winding was opposing the build-up of current through it. By the time the reading had settled enough to be read, the current from the meter had significantly magnetised the transformer core.

Your mistake was to be holding the ends of the test prods on the terminals with your fingers. The instant you broke the circuit, the magnetic field collapsed and generated several hundred volts between the terminals – and between your fingers. If you hadn't provided a current path yourself, you'd have seen a spark as the circuit was broken. (For the mathematically inclined, V = L.di/dt, so the faster you reduce the current, the larger the voltage 'kick'.)

There is a very simple way to avoid nasty surprises like that: before you make the test, short-circuit any other winding on the transformer. (Thanks to AG6K.)

DROPPED SMD

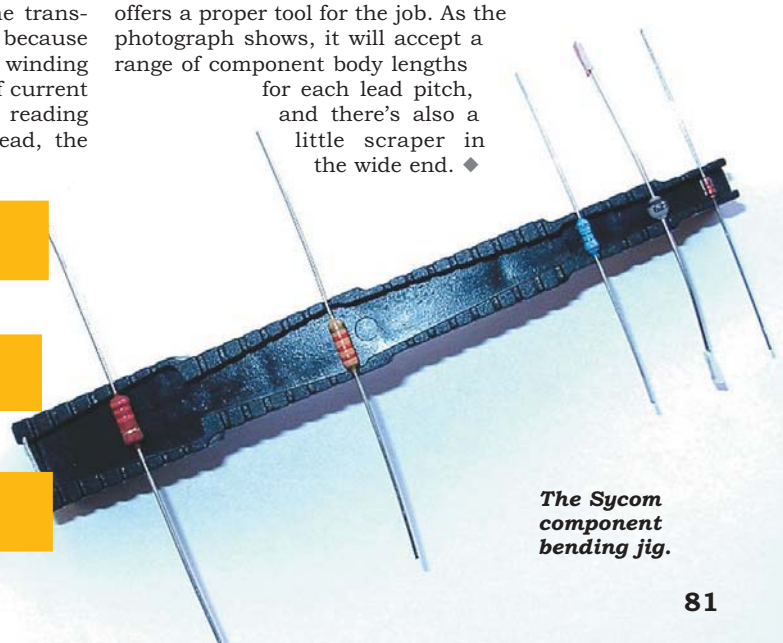
Q If you've ever dropped a tiny surface-mount device on the floor, you already know what the question is!

A "Every week or two, I put a piece of silk over the end of the vacuum cleaner nozzle and do a 'workshop sweep' in the places where the dropped SMDs tend to gather. I usually get a few, plus some other useful bits." This tip came from Barry Lennox of New Zealand, via the Internet newsgroups sci.electronics.design and rec.radio.amateur.home brew. As usual with newsgroups, there's a lot that may not interest you... and occasionally there's a little gem like that.

BENDING JIG

Q How can I bend component leads neatly to fit into a PC board?

A PC boards are usually laid out on a 0.1in grid, so a simple way to form leads to multiples of 0.1in is to bend them over a broken strip of Veroboard (June 1998). It costs nothing, but it's fragile and easy to lose. Now, for the constructor who has everything else, Sycom (01372 372 587, www.sycomcomp.co.uk) offers a proper tool for the job. As the photograph shows, it will accept a range of component body lengths for each lead pitch, and there's also a little scraper in the wide end. ◆



The Sycom component bending jig.

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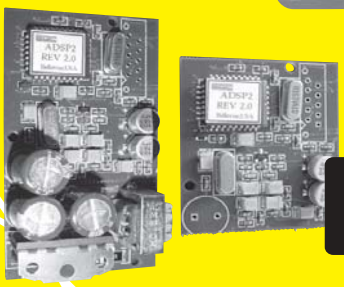

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Antennas

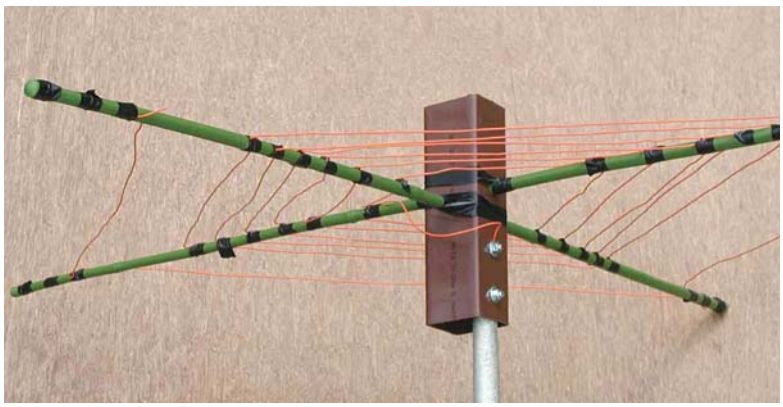
I decided to try to replicate the loaded vertical described by Des Vance, GI3XZM, in the June 'Antennas' column. You may recall that he used a length of aluminium tubing, which was resonant at about 15.7MHz. Top loading was added and the resonant frequency fell to 10.8MHz. By adding a five-turn helical coil the resonant frequency became 6.4MHz. By including the variable capacitor in series with the connection from the centre of the coax to the bottom of the pole the system was easily tuned to 7MHz.

My aluminium pole was a similar length but I used a simpler method of constructing the loading unit. It comprises a short off-cut from a square section of plastic ducting (as used to run coax cables along the side of the house) and two lengths of 1.2m (4ft) green plastic-covered canes from the garden centre (see photo). Holes are made in the plastic ducting for the plastic-covered canes which are held in place by black plastic tape. I used thin plastic-covered wire for the coil, also held in place with plastic tape.

I have an area of wire netting under the lawn so I used this as a counterpoise. The resonant frequency of my antenna was around 6.8MHz so I used a series variable capacitance at the feedpoint to bring the antenna into resonance. The SWR at 6.8MHz was around 1.1:1 and at 7.02MHz was 1.4:1. It looked good.

However, according to the antenna modelling program EZNEC, the feedpoint of a full-sized vertical fed against a good horizontal ground is around 45Ω (depending on the nature of the ground). With an electrically short loaded antenna the feedpoint is much lower and in my case should have been around 20Ω. The fact that it was nearer to 50Ω meant that there was additional series resistance, which in this case turned out to be earth resistance. Although the antenna had a nice low SWR it had a lot of loss. By adding radials, as described by GI3XZM, the feed impedance dropped to below 30Ω reducing the earth losses considerably - and the SWR shot up to 2:1. It just goes to show that a low SWR doesn't necessarily mean that the antenna is good. The characteristics of an antenna are often displayed using an SWR plot relative to frequency and as you can see this can sometimes be misleading.

A useful indication of antenna characteristics can be obtained using a plot of impedance relative to frequency, as shown **Fig 1**. This can be done using an SWR analyser, such as the MFJ-248 or one of the Autek instruments, such as the RF-1. This measurement should be done at the feedpoint of the antenna (which is not usually a problem with a vertical antenna) to avoid complicating things with transmission line impedance transformation effects.



Top loading arrangement constructed from a square section of plastic ducting and two lengths of plastic-covered canes.

Ideally the curve should pass through the zero reactance, 50Ω resistance intersection (SWR 1:1) at the frequency of interest and is usually achieved with a matching device such as a gamma match. The GI3XZM method is to use a variable series capacitor at the feedpoint to raise the impedance of the feedpoint and positioning the curve through the 1:1 SWR intersection at 7MHz.

EH / CFA ANTENNAS

You might find the URL www.eh-antenna.com headed 'Welcome to the Wonderful World of EH Antennas' interesting. It contains the following statement: "For more than 120 years all antennas have been Hertz antennas, except the Crossed Field Antenna. In the future all antennas will be EH Antennas. Fortunately, any antenna can be converted to an EH Antenna with a minimum of effort. We have filed an additional patent clarifying the scope of the original patent, extending its coverage such that any antenna can be converted to an EH Antenna and be under the umbrella of the patent."

John H Davis, KD4IDY, in an e-mail on the LF reflector, notes: "You should be careful how you construct your plain everyday 'Hertz' antenna or it may infringe a patent. Perhaps it would be too much to ask of our patent offices to require proof that an invention actually works. I wish we could at least return to the days when it was not possible to patent and re-patent techniques already known to the state of the art (in this case, electrically short verticals and dipoles), simply by virtue of sticking a new name on them or claiming a new theory of operation." ◆

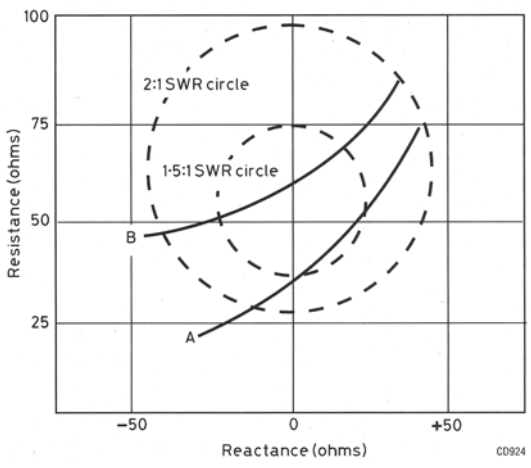


Fig 1: Antenna impedance variations over a frequency range; A is for a vertical with a good radial system and B is my antenna with the chicken wire ground. The lowest frequencies are at the lower left of the curves.

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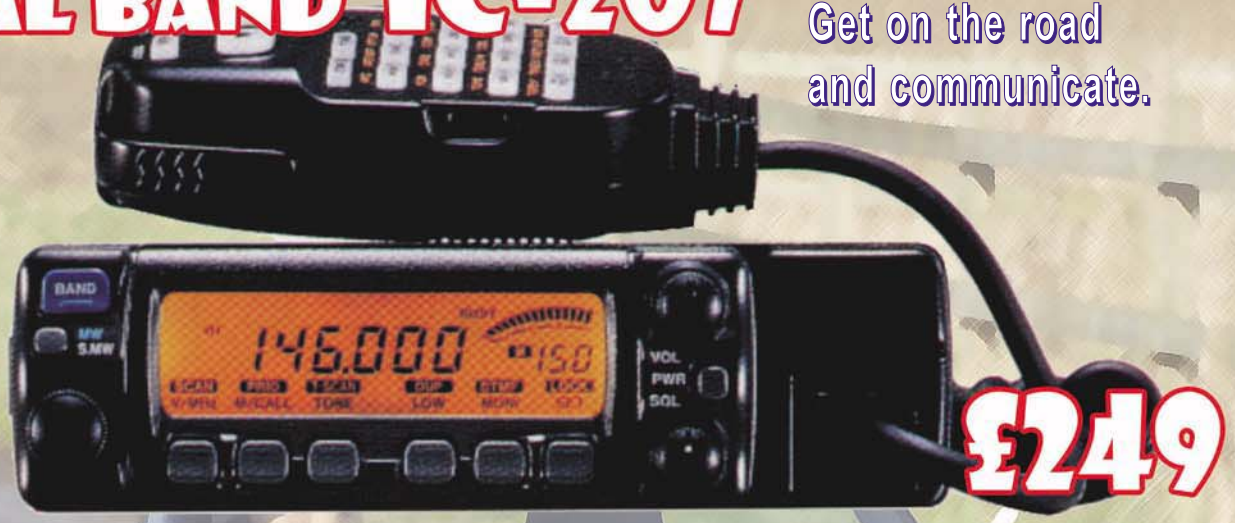

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By Andy Talbot, G4JNT, 15 Noble Road, Hedge End, Southampton SO30 0PH. E-mail: data.radcom@rsgb.org.uk

Data

This month's column is devoted completely to James Miller, G3RUH, of AMSAT-UK for a description of modern Forward Error Correction techniques. Currently, some of the operators of the AO-40 satellite are beginning a series of experiments with FEC to improve reception of the telemetry data, sent at 400b/s Binary Phase Shift Keying on the 2.4GHz beacon frequency. We looked at simple error correction based on Hamming codes and parity in October 2000, and here James takes us further into the modern heavy error correction techniques now possible with the increased processing power of the latest devices.

FORWARD ERROR CORRECTION

"All communications channels are subject to errors, whether voice or data. Voice communication errors usually result in "pardon?" and a request for a repeat. Something in the voice message was unclear; maybe a word was obliterated, and the repeat, called an 'automatic request for retransmission' or ARQ, takes care of it. Maybe the received information made no sense in context; if a discussion was about 'printed circuit boards' and the middle word was obliterated, then the recipient could probably fill in the gap with negligible probability of error because there's a strong element of redundancy in the phrase.

"Data links have limits too, and many strategies exist to deal with them. For example, packet radio links use ARQ; a packet of data contains a checksum, and corruption in transmission is easily detected and a repeat can be requested.

"But not all links are bi-directional; examples include Compact Discs, digital radio, digital TV, and space probe telemetry systems. A very popular amateur radio use is in G3PLX's PSK31 (RadCom December 1998, January 1999), where the designer deliberately avoided ARQ methods. So what's in our toolbox?

"Methods for dealing with errors on one-way data links are called 'forward error correction' or FEC for short. This is achieved by adding redundancy to the data in a prescribed way. The recipient then exploits this additional information to detect and correct errors in the received message.

There are two historic classes of error-correcting codes, 'block codes' and 'convolutional codes'. Each has many variants. Encoding is always very easy; decoding is invariably computationally very intensive. Sometimes both kinds of error-coding are employed, as we shall see.

"PSK31 (in one of its modes) uses Convolutional Encoding. Each original data bit gives rise to two data bits. To avoid confusion, these are called 'symbols'. The encoder is simply a five-stage shift register and some exclusive-OR gates. See Fig 1. Any particular bit entering the shift register has an influence over the subsequent 10 symbols. The Viterbi convolutional decoder (named after its inventor), typically contains a bank of 32 detectors which are in effect 'resonant' to the received stream. So it's able to recognise errors and reject them. The performance of this scheme is roughly equivalent to an increase in power or 'coding gain' of 4dB. Convolutional codes are used extensively on digital satellite TV links because they result in smaller user antennas (eg the Sky Minidish), and / or lower satellite transmitter power.

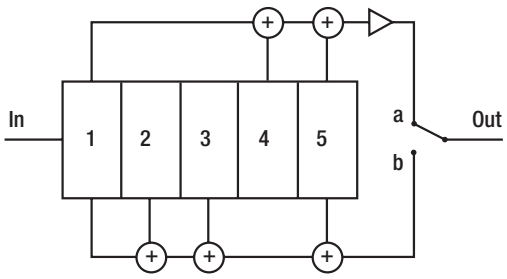
"Block codes process information in defined chunks. They take many forms, from the relatively simple Hamming codes, where a block of (for example) four bits is augmented by three 'redundancy' or 'parity' bits. These can detect and correct one bit error per seven-bit block only. Much more powerful codes, such as the Reed-Solomon family, might take 223 bytes, add 32 parity bytes making a 255-byte block. This is called a (255,233) RS block code. This code can correct up to 16 bytes per block. CDs use RS encoding to protect against corruptions due to misreads.

"Some systems combine convolutional coding and block coding in series. Data are first block-encoded. Then the bits are shuffled about in an orderly fashion called interleaving. Next, the new stream is convolutionally-encoded. As you'd expect, decoding reverses this sequence. Now, as the noise level increases, a convolutional decoder will begin to make mistakes. These usually occur in short bursts while the decoder recovers. So when the convolutional decoder's output is de-interleaved, the mistakes can be dispersed thinly whence they are easily mopped up by the block decoder. Such a concatenated FEC scheme is much used by NASA's deep space missions, originally for the Voyager probes of the 1980s, and result in nearly 9dB 'coding gain'. All for the sake of some simple logic gates in the spacecraft.

"Amateur use of such strong FEC has been proposed by Phil Karn, KA9Q, for AMSAT satellite telemetry links to combat some of the limiting factors of spinning spacecraft. AO-40 telemetry is transmitted continuously in PSK at 400b/s on 2401.325MHz. When its antennas are not pointed at the Earth, signals are still strong, but are punctuated by dropout due to the satellite's 3RPM spin. KA9Q's proposal [1], has recently been implemented on an experimental basis on AO-40. Initial results confirm expectation, in that signals which would normally be rendered totally useless by channel imperfections are overcome, and the telemetry is recovered intact.

"The P5A amateur mission to Mars [2] projected for 2007 - 2009 will, of necessity, use strong FEC, and studies are underway to identify the most appropriate methods.

"For a given amount of power and a given level of noise, there's an upper limit on the amount of information you can pass over a channel. This was proved over 50 years ago by Claude Shannon in his paper 'A Mathematical Theory of Communication', *BSTJ* July / October 1948, and the more compact 'Communication in the Presence of Noise' in *Proc IRE*, January 1949. Achieving that information transfer limit, however, had to wait for suitable technologies, notably the integrated circuit, which led to cheap, and reliable computation. Everyday technology is now within a few dB of that ultimate limit, and recent French developments known as turbo-codes are even closer. We may well adopt them for Mars." ◆

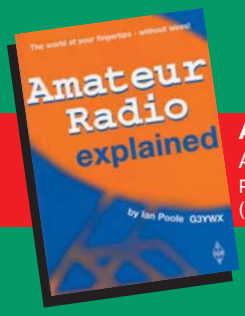


Left: Fig 1: A K = 5, R = 1/2 convolutional encoder.

WEB SEARCH

[1] KA9Q AMSAT FEC telemetry proposals	www.ka9q.net/ao40/
[2] Amateur Mars mission	www.amsat-dl.org/p5a/index.htm

BEGINNERS



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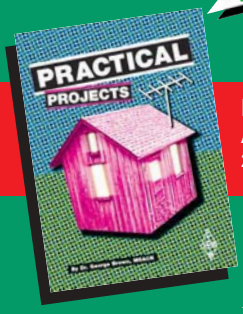

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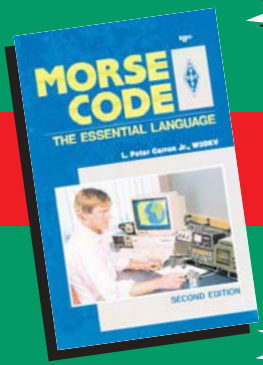

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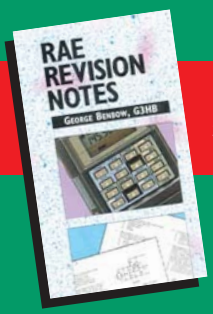

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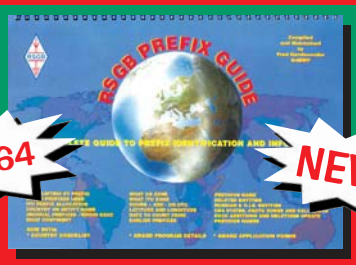

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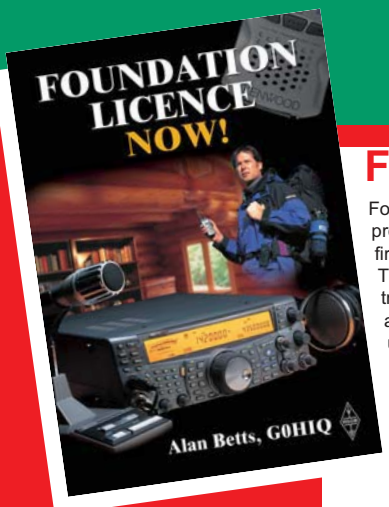
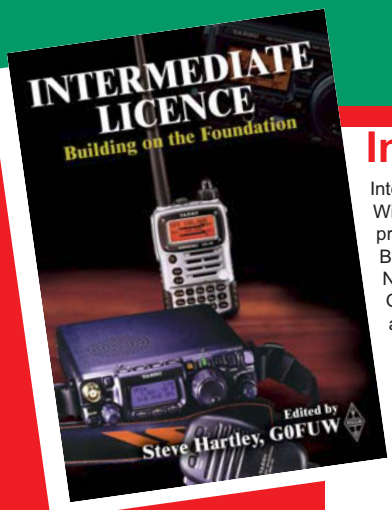


Foundation Licence - Now!

For those wanting to know more about the new Foundation Licence the RSGB has produced "Foundation Licence - Now". The book contains all that is required to obtain that first step into Amateur Radio hobby - gaining the Foundation Licence - Now!
This is not simply a textbook; we provide insight into the technical basics, receivers, transmitters and antennas. How and where to operate with your new licence are covered along with safety considerations and electromagnetic compatibility. Written in an easy to use and understand style this is the ideal book for young and old alike.
In addition to the basic book the RSGB are also providing free of charge an information and materials pack. The Pack Not only includes the New Foundation Licence application form but many other useful items such as current Band Plans etc. Making this a very useful addition for every radio amateur beginner.
2002 Edn, RSGB, paperback, 297 x 210mm, 36 pages.

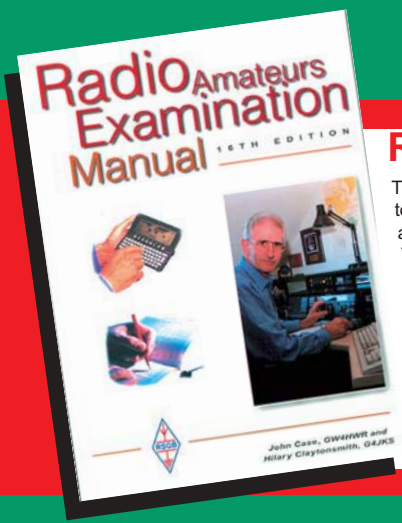
ONLY £3.39 - Non-members £3.99



Intermediate Licence Book

Intermediate Licence - Building on the Foundation
With the introduction of the new Intermediate Licence Syllabus the RSGB is pleased to present our companion book for those working to pass the exam. Intermediate Licence - Building on the Foundation draws heavily on the decade of success enjoyed by the Novice Licence scheme and in particular the Novice Student's Notebook by John Case, GW4HWR. However, this is more than a new edition with it adopting the easy to read and understand style of the hugely popular Foundation Licence - Now, that many readers will be familiar with. The book is broken down into manageable half-hour worksheets and contains practical exercises along with plenty of helpful advice and safety tips. This is the course workbook for the Intermediate Licence, and as such contains all the information covered during the 20 hours recommended for the course. This is the ideal book for every Intermediate Licence student.
1st Edn, 2003, RSGB, paperback, 210 by 297 mm, 80 pages

ONLY £4.92 - Non-members £5.79



Radio Amateur's Examination Manual

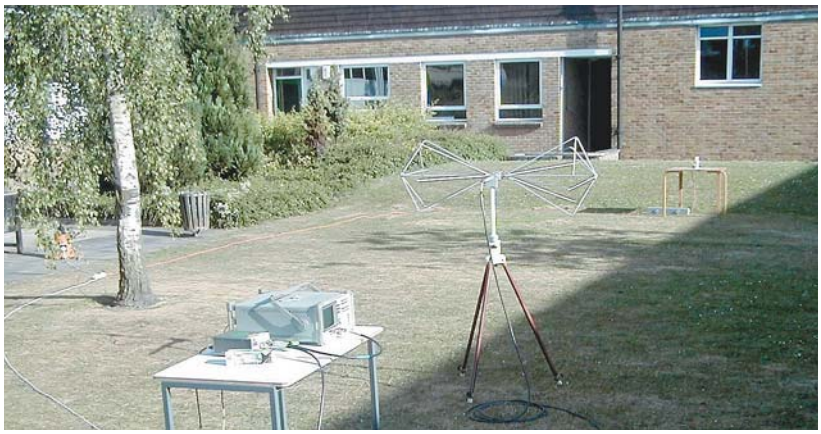
The RSGB's RAE Manual is recognised as the standard textbook for courses leading up to the Radio Amateurs Examination. It is presented in an easily understandable format and takes the candidate step by step through the syllabus topics.
This edition has been completely revised to take account of the changes in the RAE with effect from May 1998. In addition, it now incorporates many sample questions originally published in How to Pass the RAE. A complete sample paper from City and Guilds is also included to familiarise the candidate with the typical examination format. A bright design and larger format makes the book an easier read.
All those studying for the RAE in classes or at home will find this book indispensable.
16th Edn, 1998, RSGB, paperback, 292 by 199 mm, 172 pages.

ONLY £12.74 - Non-members £14.99

For full information visit our website - www.rsgb.org/shop or Tel: 0870 904 7373

EMC

This month's 'EMC' includes items on Broadband over Powerline in the US, wideband communications, compact fluorescent lamps and touch lamps.



Right: EMC testing of emissions from a compact fluorescent lamp

BROADBAND OVER POWERLINE

In the US, in-house Power Line (Tele)Communications (PLC/PLT) systems have been developed for home powerline networks but, so far, there has been less activity in 'access' PLT systems, from the electricity company to the customer's home. This is because the US uses a completely different mains power distribution network compared to Europe. The US generally uses 'medium voltage' distribution along streets at 7.2kV, mainly on overhead wires, with pole-mounted transformer drums, each feeding several houses. If these overhead wires are used for PLT, which is known as Broadband over Powerline (BPL) in the US, then the RF signals inevitably radiate.

According to an editorial in the ARRL journal *QST*, June 2003 (p9) by David Sumner, K1ZZ, 'Access' BPL is claimed to provide data rates of up to 20Mbit/sec at distances of up to 2000ft and 3Mbit/sec up to 4000ft, using frequencies of 2 - 80MHz on the 'medium voltage' wires. A demonstration has been conducted in Maryland but the ARRL was not invited. The US Federal Communications Commission (FCC) has adopted a Notice of Inquiry (NOI) and the ARRL will be making comments. The ARRL anticipates a long hard fight ahead.

Whatever happens in the US is likely to lead to pressure for the same equipment to be permitted in Europe. This is already happening with home powerline networking cards which are on sale in Europe with a CE mark yet, according to the Austrian National Society, ÖVSV, some do not comply with the relevant European EMC standard.

WIDEBAND COMMUNICATIONS

The 'Freemet' club of NPL (formerly National Physical Laboratory) deals with free-field electromagnetic metrology. On 17 June, Freemet held a meting about Wideband Communications at the RA, Whyteleafe, Surrey.

On behalf of the RSGB EMC Committee, I gave a presentation on PLT EMC in relation to amateur radio. Prof Trevor Clarkson of the RA gave a presentation on 'Regulation of Wideband Communications', including information on measurements of PLT trials at Crieff. Jonathan Stott of BBC Research spoke about protection of radio services from interference, particularly the new HF digital broadcasting service Digital Radio Mondiale (DRM) in relation to PLT. Other presentations covered Ultra Wideband radio (UWB) and EMC standards.

The event was attended by some influential people including Peter Kerry of the RA who is Chairman of CISPR, the international EMC standards committee and Thierry Brefort of the European Commission, DG Enterprise in Brussels, who is dealing with Mandate M313 on EMC of telecommunication networks.

LOW ENERGY LAMPS

Following the item on RF noise generated by Compact Fluorescent Lamps (CFLs), in the February 2003 'EMC', I bought a pack of two from a local shop at a price subsidised by London Electricity. Neither appeared to generate excessive RF interference at VHF, although I sent one back under guarantee when it failed after only a few weeks compared to an advertised life of 12 years.

Dave, M5ABH, then kindly sent me two Osram 15W CFLs (see photo) that he had removed from houses near his company's Private Business Radio base station in Nottingham. I tested them and found that they both radiated RF noise, but one was noisier than the other and radiated broad band noise from about 140–220MHz. It appears that, as well as switching at the intended frequency of around 50kHz, some have a parasitic oscillation centred on 180MHz. RF designers sometimes call this effect 'hooting' or 'taking off'. M5ABH reports that the 20W type is more likely to be noisy than the 15W type and that some become more or less noisy as they warm up or as they age.

I found that the noisier of the two CFLs generated noise right across the 144–146MHz amateur band when operating in my radio shack. I then ran a mains extension cable up a tree at the end of the garden and powered the CFL about 5m above ground and 15m from my VHF aerials. The 2m aerial is an 8-element Yagi 8m above ground and the transceiver is a Yaesu FT-480R in SSB mode with a receive pre-amplifier in a Microwave Modules 2m linear amplifier. When the aerial was pointing towards the CFL but aiming above it, there was a rough buzzing noise at S2–3 across the whole 2m band, which was a significant source of interference to weak-signal reception.

I then did some more tests using pre-compliance EMC test equipment, an HP8591EM spectrum analyser with an EMCO biconical measuring antenna (see photo). The CFL is on the wooden table in the distance and the grey box on the ground is an MDS21 absorbing clamp to reduce signal propagation along the cable on the ground. Although the tests were not done on an open-field EMC test site with ground plane, they were done outdoors at a distance of 10m and

By David Lauder, GOSNO, 20 Sutherland Close, Barnet EN5 2JL. E-mail: emc.radcom@rsgb.org.uk

should give a general indication of the emission characteristic.

The EN55015 standard for CFLs does not currently require any RF emission tests above 30MHz but this is likely to change in the future. I tested radiated emission levels from 30–230MHz using the EN55022 Class 'B' limit for Information technology Equipment (ITE). The section of the plot from 140–230MHz is shown in Fig 1, with the CFL on and off. The 'off' curve mainly shows the noise floor of the EMC measuring equipment, which is not particularly sensitive compared to radio communication systems. This 'on' curve shows a broad peak centred at around 180MHz. The measurement bandwidth is 120kHz and the sweep was slow (30 sec) with a peak detector. The results with a Quasi-Peak (QP) detector were slightly lower.

There is still a detectable emission in the 144–146MHz amateur band and also at the lower end of the 217.5–230MHz Digital Audio Broadcasting (DAB) band. The emission on frequencies used by 'high band' PBR (around 165MHz) is much greater, so it is easy to see why M5ABH has been searching out these devices near his PBR site.

It must be emphasised that VHF noise generation appears to be confined to a minority of CFLs of this type and may be related to particular batches. Even the noisy examples appear to comply with EN55015, which does not currently require tests above 30MHz. Nevertheless, there are a lot of these around, so if you hear a rough buzzing noise across the 144–146MHz band on weak signals after dark, this could be the reason. If you have a suitable receiver and aerial to receive above 146MHz, check whether the noise level appears to rise with a peak around 180MHz.

TOUCH LAMPS

Touch Lamps were last mentioned in 'EMC' in April 1995 and August 2001.

These are brass-effect table lamps, where touching the body of the lamp causes it to switch from off to dim, medium, bright then off again.

They can be rather EMC-unfriendly for two reasons. First, the touch sensor works by driving a continuous sawtooth waveform at around 200kHz onto the lamp body and harmonics of this may be heard in some amateur bands such as 1.8 and 3.5MHz. Secondly, touch lights can switch on and off at the slightest sign of RF from an HF amateur radio station. This can lead to complaints from neighbours about their bedside light flashing on and off in the night.

The lack of immunity to RF is a known problem which has also been reported by ARRL and is mentioned in the ARRL book Radio Frequency Interference – How to Find and Fix It.

In the August 2001 'EMC', I described a solution using a tuned trap fitted inside the body of the lamp, but this is only feasible if you own the lamp and even then it is only effective on a single amateur band.

This raises the question of EMC immunity standards for touch lamps. There is now a product-specific immunity standard for lighting equipment, EN 61547 which takes precedence over the generic immunity standard EN 50082-1.

EN 61547 uses the IEC 1000-4 series of basic standards for its test methods and includes electrostatic discharge (ESD) radiated electromagnetic fields, fast transient bursts, high energy surges, conducted radio frequency interference and power supply variations. EN 61547 also specifies performance criteria during the test, for example the light intensity should not vary by more than 15% during the tests!

It is not known whether typical touch lamps comply with this standard or whether the test method is effective in ensuring RF immunity to amateur radio transmissions using modes such as SSB and CW. There is also an emission standard, EN55014, but some touch lamps fail to meet this standard when on the dim setting due to inadequate mains filtering. It appears that the filtering is designed to meet US FCC standards which start at 500kHz. The US has no long-wave broadcasting, but European standards start at 150kHz to protect long-wave reception. ◆

The compact fluorescent lamp tested.

WEB SEARCH

RSGB EMC Committee www.qsl.net/rsgb_emc/

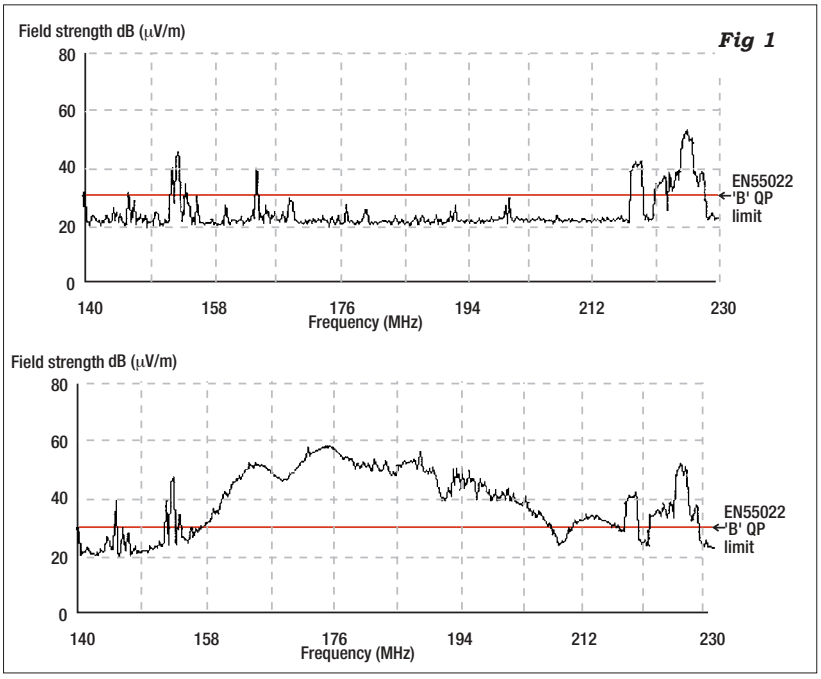


Fig 1: Results of radiated emission tests on a compact fluorescent lamp: (a) CFL off; (b) CFL on.

Members' Ads

FOR SALE

RSGB Members wishing to place an advertisement in this section should use the official form printed in ***RadCom*** each month. No acknowledgment will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged ***pro rata***. Trade or business ads, even from members, will not be accepted. Traders who wish to use this facility must send a signed declaration that the items for sale are part of, or intended for, their own personal amateur station. The RSGB reserves the right to refuse ads, and accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into. Licensed members are asked to use their callsigns and QTHR, provided their addresses in the current edition of the RSGB Yearbook are correct. RS members will have to provide their names and addresses or telephone numbers. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition. Please do not send members' advertisements to Manning Publishing Ltd (advertising agents). **The closing date for copy is the first day of the month prior to publication, eg the deadline for the May issue is 1 April.**

Warning: ***Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the cash paid. Members' Ads also appear on the members-only website:***
www.rsgb.org/membersonly/membersads

2kW HF linear, 2 x 8873, ARRL Handbook design, F deck & separate 2kV 2A PSU, £485. IC-735 with keyer, CW filter, service man, mic & leads, £395. Matching AT-150 ATU, £145. PS55 12V PSU, £145, or all three for £625. Icom AT-180, HF – 50MHz ATU, £225. Icom PS-85, 12V PSU, £145, Index Labs QRP Plus, with mic & mains PSU, £300. Also rare matching QRP Plus ATU & battery pack, £150, or £400 the pair. FL-2100 linear, £200. FRG-7, £120. Jaybeam TB3 10/15/20m trap beam, as new, used two weekends, £200, G3SEM, QTHR, 01603 618 543 till 9pm (Norwich). E-mail: paul.cort-wright@bbc.co.uk

6m/2m gear. Standard C58 2m multimode, 1W out, similar to FT-290, carry case, antenna, new NiMH batteries etc. Spectrum Communications TRC-6 2iL 6m tvtr, up to 25W (adjustable) of multimode on 6m, £170 ono. May split if you can tempt me. ADI AT-400, 70cm h/h, with batt case, spkr mic, carry case etc. Offers? Phil, G7JJZ, 01623 723 461. Email: prjpsion@microhelpuk.net

ALINCO DX-70TH, 100W, 160-6m. New cond, with sound card adapter for PSK31 & RTTY, £299. Timewave DSP9+, £50. 01527 541 502 (Redditch). Email: gskwkroger@aol.com

ANTENNA Cushcraft X7 Triband, good cond, £200. KW-1000 linear, £250. Alex, G3WBN, QTHR, 020 8654 2761, (Croydon) .

ANTENNA Force12 Sigma-5 vertical. 6 months old, exc cond, £250. Create 318B 4-ele HF, £150. Carriage extra. Peter, G3ZSS, 01252 783 124 (Farnham). Email: g3zss@6metres.com

ANTENNA sale – following upgrade to mono-banders! Cushcraft A3WS WARC bands antenna with A103 30m extension, as new, mans available, £245. (Cost new around £500.) Gem Quad – 4 ele, 5 bands, reinforced boom, 16 fibreglass spreaders, exc cond, most original elements unused & available together with detailed man, £395. (Cost >£1,000 ex-Canada.) Buyers to collect please, G3NUG, QTHR, 01442 262 929 (Hemel Hempstead). E-mail: g3nug@btinternet.com

ANTENNA sale, new garage forces sale. 120ft long inverted-L wire antenna with an SGC-230 Smartuner – both in new cond. Also 20ft pole with stainlesss steel pulley buyer to collect. All for, £295. GM0VCN, 01577 863 711 (Kinross). Email: wardkinross@btopenworld.com

ARGONAUT V Ten-Tec HF QRP trans, as new, boxed, etc, £495. SGC SG-2020. HF QRP trans, as new, boxed, £395. Trio TS-120V HF QRP trans, vgc, boxed, £150. Icom IC-701 HF tcvr, 100W plus matching Icom PSU, vgc, £175. Ray, G4OWY, 01305 777 691 after 6.30pm please. (Weymouth). Email: g4owy@aol.com

ATLAS 210X tcvr in console with PSU. 3.5, 7, 14, 21, 28MHz, 100W, gwo, mic, man, Shure 444, £150 ono. Price includes boxed Datong Speech Processor. Yaesu FT-107M solid-state tcvr. 3.5, 7, 14, 21, 28MHz, 100W, internal PSU, memory, mic, man, gwo, £225 ono. G3BFC, QTHR, 01425 610 611 (New Milton). Email: dabill@lineone.net

AUTO tape keyer 12 - 200WPM with tape typewriter, £100. Keys: Lionel bug, £50; RAF D, £35; Walters, £30. Chart recorder twin 1mA movements, £100. BC348Q, original with dynamotor & h/book, £40. Command tx 3 – 4MHz, £50. AR88, £45. Mullard EL37 new, boxed, £20. BC221 with PSU & charts, £20. QQV03-10 ex pwr, £50. G3TLG, QTHR, 01892 833 569 (Tonbridge).

AZ/EL KR-5400 Rotator. Bearings & potentiometers recently replaced, c/w >20m cables, £295. Hard line, ring for details. 01527 541 502 (Redditch). Email: g3kwkroger@aol.com

CUSHCRAFT R-7000 7-band trapped vertical antenna, 40m – 10m (can be ground mounted), boxed c/w man/instructions, £120 + carriage. G4ZNK, QTHR 01761 415 152 (nr Bath). E-mail: roy@g4znk.freeserve.co.uk

FOR SALE: FOUR-band mini-beam hybrid quad antenna (MQ-1) operates on 6-10-15-20m, boom length 54in, element length 11ft, ideal HF antenna for a restricted area, gwo, including instruction booklet & balun, £85 complete. Derek, G3WAG, QTHR, 01992 768 495 (Waltham Abbey). Email: derekg@freeuk.com

FT-100 HF to 70cm 100W, as new, boxed, man, £550. Offers considered, G3MQU, QTHR, 01379 642 875 (Diss).

FT-707 HF, 100W, owned from new, man, £250. No offers. Heathkit Grid Dip Meter, £30, buyer collects. G4MHQ, 023 9255 4551 (Lee-on-Solent). Email: alec@bell663.fshet.co.uk

FT-817, miracle whip, car lighter lead, all standard accessories & two small Yuasa batteries, all in fitted aluminium case, complete portable station, original boxes available, used a few times at home only, prefer collect - can't send case or batteries, £495. G0ANX, 01235 868 498 (Wantage). Email: shapwick@aol.com

HY-Gain TH3 Senior 3-ele 3-band beam ready to travel on any car with roof rack, £100. Must sell. G3BRW, 01202 747 756 (Poole, Dorset).

IC-910H – Icom's best VHF / UHF tcvr. Pristine cond, with original carton, manual, cct, mic and leads, c/w UT-106 DSP unit and CR-293 0.5ppm high-stab xtal osc, £750; non-smoking owner. Prefer buyer collects, but will despatch at cost. George, M5ACN, 01707 659 015 office hours (Potters Bar).

ICOM 756PRO plus Icom PS-60 PSU. Full warranty to March 2004, £1,000, buyer collects or postage extra, M3REX, QTHR, 01322 668 700 (Swanley).

JRC NRD 535, £300. Yaesu FRG-965, £150. Eddystone 1650/6, £300. Racal 1218, £300. Buyer inspects, collects, pays cash. Ted, G8HLJ, 0151 632 0614 (Hoylake)

KENT brass key, £22. Hi-mound key HK-107, £16. AKD wavemeter, £20. ARRL Morse practice cassettes 10–15WPM & 15 - 22WPM, four tapes, £6. Max G3BSK, 0121 744 4671 (Birmingham).

KENWOOD HF station complete, for £420. Kenwood TS-530SP tcvr (with built-in PSU), TS-530SP workshop man, Hansen FS-661M SWR/PWR meter, Kenwood MC-60 desk mic, Kenwood LF-30A low pass filter, SEM TranzMatch ATU with Ezitune, Hi-mound straight key. Inclusive price, £420 or will split. Also Microset PT-135 35A PSU, £60. All above are in fwo & vgc. G0EXY, QTHR, 01482 351 836 (Kingston upon Hull).

KENWOOD TL-922 2kW amplifier, new Eimac 3-500 tubes fitted, A1 cond, £895. Yaesu FT-757GX, £295. Matching FC-757AT auto ATU, £135. Yaesu FT-747GX, £225. Ten-Tec Scout 555 with three modules, £225. Kenwood TS-830S, mint, £275. Ten-Tec Argonaut 2, £350. Mirage 70cm 100W amplifier, new, unused, was £429, will take, £200. Nevada TM-1000 QRO ATU, £135. Heathkit QRO 2kW ATU, £165. Alinco DX-70 HF & 50MHz, CW & SSB filters fitted, mint, £350. Heil desk mic stand, new, unused, £15. Yaesu spkr mic, £8. Yaesu headset, new, £18. Icom SM-8 desk mic, mint, £75. Kenwood, DFK-4B remote kit, unused, £30. Yaesu FT-747GX mobile mount, £15. Alinco DX-70 remote head cable, unused, £25. Most items mint or exc cond. Possible exchange for base scanner. Watton, 01953 884 305 or 07970 214 039.

KENWOOD TM-44IE 70cm FM, £125. Yaesu 150DM 2m FM, £120. Ameritron ALS-600 solid-state no-tune HF linear amp, £750. Icom E-90 h/h, spkr mic, software, leads etc (too fiddly for me), £250. KW-109 Supermatch ATU, £125. Kenwood MC-60A mic, £60. Trio TR-2300 2m FM, £20. Yaesu GR-500A elevation rotator & controller, £150. Samsung 12V microwave oven, nearly new, £150. G0CHK, QTHR, 01243 779 479 (Chichester). Email: sleepers56@btopenworld.com

KENWOOD TS-130S, exc rig, both mans, £235. Kenwood PS-30 PSU, man, £85. MC-435 Kenwood up-down mic, £15. All vgc. 0161 477 6702 (Stockport). Email: john@mckae.freeserve.co.uk

KENWOOD TS-690SAT HF/6m tcvr, 100W/50W o/p, auto-ATU, PS-33 PSU, SP-23 spkr unit, YG-455CN-1 250Hz filter, YK-88CN-1 270Hz filter, YK-88SN-1 1.7kHz filter, £650. Yaesu FT-847 HF/VHF/UHF tcvr fitted YF-115C CW filter,YF-1155-2 SSB filter, £850. Icom IC-207H 2m/70cm mobile tcvr c/w mobile bracket,

CONGRATULATIONS to the following, whom our records show as having reached 50 or 60 years' continuous RSGB membership this month:

60 years		50 years	
G3CBW	Mr H Walker	G3CVW	Mr R F Saunders
G3GHS	Mr J G Holland	G3GFT	Mr G Oldfield
G3LIA	Mr R J Rogers	G3MCW	Mr R A E Fronius
VK5ZO	Mr D Clift	GW3LQE	Mr A M Ernest

SILENT KEYS

We regret to record the passing of the following radio amateurs:

G2TA	Mr Ray	19/06/03
G3EFR	Mr F Simpson	11/03/03
G4MGZ	Mr R E Curtis	14/06/03
G4YMS	Mr J R Russell	31/01/03
G8IQM	Mrs C Sills	08/06/03
GI3HHN	Mr R J Armstrong	20/04/03
GM4WPU	Mr F E Wright	15/05/03
M3PAD	Mr P A Davies	03/03
MI1CEG	Mr G McWilliams	10/06/03

£36, £150. All in vgc + postage. Terry G4OXD, 01462 435 248 after 6pm (Hitchin). E-mail: tm.rose@thersgb.net

KENWOOD TS-830S HF 100W tcvr, matching ATU 230, SP spkr, MC-50, mic, 100W dummy load & many extras, £400. Kenwood TS-850SAT, 100W, with internal ATU, PSU, matching spkr & mic, all Kenwood, boxed & in mint cond, many extras, £900. G4ZQL, 01706 655 287 or 07748 568 744 (Rochdale). Email: n.higgins4@ntlworld.com

MFJ-949E ATU, £80. MFJ-931 artificial ground, £50. Both boxed, mans. G3JRE, QTHR, 01933 663 517 (Wellingborough). E-mail: raythomas@lineone.net

QRT sale, IC-756PRO, £1,200. Force 12-XR-5 5-band beam (taken out of box, but never assembled), £600. Drake MN-2700 QRO tuner, £250. FL-7000 HF amp, £750. Loudenboomer HF amp, £200. Hansen FS-50 HF power meter, all in good order. All items located in Norfolk, but phone for further details 01691 831 111. E-mail: info@vinecom.co.uk.

QTH move sale. Steel towers – one 95ft self-supporting tower, two guyed towers, 12.5ft sections, one 75ft, one 110ft, with all fittings, call to discuss. Cushcraft 40-2CD 2-ele 40m beam upgraded to W6QHS 100mph spec, £500. Bencher Skyhawk 10-ele HF triband beam, £600. Daiwa MR-750E very heavy-duty rotator with four motors, £350. FT-1000MP, £1,200. IC-746, £750. IC-706MkII, £450. Lots of LDF4-50 & 5-50 with connectors. Lots of control cables, heavy-duty tubing etc. Everything in good cond & working, 01691 831 111 (nr Oswestry). E-mail: info@vinecom.co.uk

SILENT key sale. All items mint, boxed & complete with instructions. Yaesu FT-1000D (200W), SP-5 spkr, 2 desk mics, 1 hand mic. Icom IC-2350H, mobile 2m/70cm, spkr, mic, mounting bracket, home use only. MFJ tuner 989C. Linear Amp Explorer 1200, minimal use. Welz 11A PSU. Watson W-10AM PSU. Offers invited for all items, best offer secures, buyer to pay carriage + insurance at cost or collect NE Essex. G0NMB, 01255 671 748 (Frinton). Email: arnold@frinton.free-online.co.uk

SILENT key sale. Yaesu FT-980 plus SEM ATU, etc. FT-290R plus PA & 12A PSU. FT-203R, h/h, plus charger & spare battery. Homebrew HF CW tcvr. 3A PSU. Morse oscillator. Vibroplex paddle key. Kent Morse key. Startek 1.5GHz counter. Maldol & TTC SWR meters. Drae 3-way antenna switch. Offers? Mike, G3BQH ,01296 641 783 (Aylesbury). Email: equimars@tesco.net

SONY ICF-SW55 portable SW rcvr & FM stereo through head phones with LSB and USB, mint cond, £130. AOR AR8200 MkI, h/h scanner, mint cond, boxed, no mains adaptor, hence £180. Global AT-2000 ATU 0-32MHz, mint, £50. Martin, M3CUS, 020 8290 1520 (Bromley). Email: mwal@lineone.net

TENNAMAST wall-mount Adapt-a-Mast, c/w winches, Yaesu GR-600RC rotator in cage, extends to 40ft with stub mast, transport length 20ft. Buyer collects, £350 ono. Microset 45W VHF linear, £25. Timewave DSP9 Digital Noise Reduction Filter, £75. Postage at cost. 01692 671 972 after 5pm (Gt. Yarmouth).

TEN-TEC RX-350, exc radio, powerful to dig out any weak signal, best radio for money, genuine reason for sale, save over £300. Sale at £800, 020 8813 9193 (Middx).

TL-222 linear, soft start, two new, boxed, Eimac 3-500Z tubes, 1kW dummy load, LPF, user & service mans, recommend buyer collects, £800 the package. Two 100W Celestion Ditton 44 speakers at £50. Toshiba 48in projection TV with LS & stand, plus surround sound speakers, cost £3,500, now £850 ono. G3ACB, 01279 731 070 (nr Harlow).

TS-830S, exc cond, CW filter £300 ono. Buyer collects. 01502 715 419 (Beccles).

TS-850SAT, £525. SP-31, £45. CW filters YG-455CN-1, £60. YG-88CN-1, £40. FT-8000R 2m/70cm with mobile bracket, only used as base station, £195. All above purchased new 1996/7, mint cond, mans & boxes. TM-255E 2m multi-mode, vgc, man, box, £275. TS-440SAT with auto-ATU, vgc, man, £325. Prefer inspect & collect, or pay carriage. G2FXS, QTHR, 0191 257 2852 (Tyneside).

VHF & UHF SWR & power meter model Diamond SX-400, £50. Yaesu FT-221 2m base station only works on FM, £30. Cliff, G3THX, 01754 761 306 (Skegness).

YAESU FRG-7 comms rcvr, 500kHz - 30MHz, AM, CW, SSB, h/book, very nice, non-smoker, mains or battery, £80. 01634 253 056 (Medway).

YAESU FT-650 12/10/6m multi-mode, £500. FRG-9600 VHF / UHF receiver, £170. Datong Morse Tutor, £40. Datong FL-1 audio filter, £40. Realistic DX394 receiver, £50. Alinco DRM-06T 6m FM, £80. Eddystone 740 receiver, £75. All with manuals, prefer inspect, collect. G7BZD,QTHR 0121 682 0962 (Solihull).

YAESU FT-8100R, £400, Kenwood TS-680S, £350. Navico AMR-1000S, £150. Datong FL1,£50. Freq Counter FC-841, offers. Valves 572B, TY2-125, 4CX250, U19, 6146B, offers? All gwo, 07940 556 826 or 01865 371 670 (Oxford). Email: bob.limehouse@t-mobile.co.uk

YAESU FT-840, vgc, c/w mic, h/book, boxed, £350. Yaesu FT-290 MkI, good cond, mic, book, £200. Also: PK-232 multi-mode decoder / TNC, £100 ono, vgc. Timewave DSP9+ filter, mint, £100 ono. All kept in clean, non smoky atmosphere. Mark, 01458 273 943 (Somerton) to arrange sale / viewing. Email: mark@dental.demon.co.uk.

YAESU items for sale: FT-840 HF tcvr, £350, Matching auto-tuner FC-10 like new, £150. SP-6 speaker fully tunable, also like new, £50. MFJ-969 roller coaster ATU, HF + 6m, hardy used, £140. All with man & boxes. Carriage at cost, prefer buyer of FT-840 to have first chance of FC-10. Don, M3VAT, 01225 309 018 (Bradford on Avon).

WANTED

432MHz >100W linear amp (for 20W drive). 1296MHz >100W linear amp (for 10W drive). GM3WKZ, QTHR, 01847 802 033 (W), 01847 811 244 (H). Email: crbayliss@aol.com

9600 baud modem & software for Atari STE computer, G8WCQ. E-mail: poisonpen@poisonpen.freeserve.co.uk

AIR Ministry R1224A receiver. Wavemeter W1191A. Steel case for Canadian WS52 rcvr. Canvas cover for WS128. Peter, G0DRT, 01795 876 277 (Kent). E-mail: peter.g0drt@virgin.net

COLLINS S-Line equipment. Anything considered. Peter, G3ZSS, 01252 783 124 (Farnham). Email: g3zss@6metres.com

COPY of Eddystone short wave man circa 1940, or details of Eddystone 'Short-Wave Two' rcvr. Derrick, G3LYU, QTHR, 0116 287 6459 (Leicester).

HF auto-ATU for long wire, poor outside cond no problem, as long as it works. Ron, G0NXC, Tel: 01915 866 383 (Peterlee).

JUNKERS Morse key & Collins S-Line mechanical filters F455FA-05 and -08. Peter, G3UKH, QTHR, 0191 274 4115 (Newcastle upon Tyne).

KENWOOD DG-5 digital readout wanted for Kenwood TS-520SE. GW4SPL, QTHR, 01792 844 622 (Swansea).

KENWOOD TS-520 tcvr man. Mans for Weir PSU type 423D & Farnell PSU type 15/28, output of 11VDC. G0PQB QTHR, (Borehamwood).

KENWOOD TS-570DGE or Yaesu FT-920, will consider anything similar with built-in auto ATU. Tom, M3TFH, 01206 854 217 (Colchester). Email: thomasharrison@supanet.com

LOOKING for mains transformers for a KW108 Monitorscope & Heathkit IO-18U oscilloscope. Can anyone help? John, G3EGC, QTHR, 01204 301 502 (Bolton).

MODULATION transformer, Woden UM-2 or UM-3 or similar, ie ex-DX-100 etc, very much wanted to put an LG-300 back into operation. Gerald, G3LEO, 01845 567 519 (N Yorks).

SERVICE man and/or circuit diagram for Tandberg TP41 portable radio. Dave, G4LQT, 01785 662 884 (Stafford). Email: dfm@supanet.com

WANTED post-mounted tilt-over tower with rotator. Ken, G4VSJ, 01455 209 382 (Leics). Email: ken-d@g4vsj.fsnet.co.uk

YAESU 736R optinal tone squelch unit FTS-8, G0WKL QTHR, 01730 825630, (Petersfield).

YAESU 736R optional tone squelch unit FTS-8. G0WKL, QTHR, 01730 825 630 (Petersfield).

RALLIES & EVENTS

3 AUGUST 2003

KING'S LYNN ARC 14th Great Easter Rally Car Boot Sale - Foster's Sports & Social Club sports field, Clenchwarton. OT 10am, £1. CBS, C, LB, TI by G3XYZ on 145.550MHz. Sorry, no dogs on field. George, G6AKC, 07719 874 128 (eves) or george@g6akc.freeserve.co.uk [www.klarc.org.uk]

LORN ARS Rally – Tyndrum Village Hall (new venue), 40 miles east of Oban, Argyll, at the junction of the A85 and A82. OT 10.30am. TI, CP, C, TS. Shirley, GM0ERV, 01631 566 518, or smclennan@freeuk.com or John, MM3MLH, 01838 200 304.

5 AUGUST 2003

CHELMSFORD ARS Radio & Electronic Table-Top Sale - Marconi Social Club, Beehive Lane, Great Baddow. OT 7.15pm, entrance / CP free. LB. David, M0BQC, 01245 602 838 or cars@g0mwt.org.uk [www.g0mwt.org.uk]

8 AUGUST 2003

COCKENZIE & PORT SETON ARC 10th Annual Radio Junk Night - Cockenzie & Port Seton Community Centre, South Seton Park, Port Seton, E Lothian. OT 6.30pm, £1, proceeds to British Heart Foundation. WIN, DF, C. Bob, GM4UYZ, 01875 811 723 or bob.gm4uyz@btinternet.com

9 AUGUST 2003

RUGBY ATS Rally - New venue: Stanford Hall, Lutterworth, Leics. Follow brown signs to Stanford Hall from M1 jn 20. OT 10am, £1. TI on 145.550MHz. Tony, G0OLS, 01455 552 519, or thumph3426@aol.com [www.rugby-ats.co.uk]

10 AUGUST 2003

FLIGHT REFUELLING ARS Hamfest - Cobham Sports and Social Sportsground, Merley, Wimborne, off the A31 (signposted). OT 10am, £3 - correct money, please. TS, CBS, MT (5WPM), MA, LB, C, FAM, TI on 144.550MHz from 8am. Overnight camping on Saturday. Mike, M0MJS, 01202 883 479 or hamfest@frars.org.uk

16 AUGUST 2003

NATIONAL WIRELESS MUSEUM Annual Wireless Rally - Puckpool Park, Ryde, Isle of Wight. OT 10am. Douglas, G3KPO / GB3WM, 01983 567 665.

24 AUGUST 2003

COLERAINE & DARS Annual Radio Rally - Bohill Hotel, Bushmills Road, Coleraine. OT 11.30 / 12 noon. Peter, MI0CIB, 028 7035 1335, or James, GI4ORI, 028 7035 2393.

MILTON KEYNES ARS 17th Annual Rally & Car Boot Sale - St Paul's School, Phoenix Drive, Leaden Hall (behind Woughton Campus). David, G3ZPA, 01908 501 310.

TORBAY ARS Communications Fair - rally@tars.org.uk

25 AUGUST 2003

HUNTINGDONSHIRE ARS Annual Bank Holiday Monday Rally - Ernulf School, St Neots, Cambridgeshire (nr Tesco Superstore on A428). OT 10am, £1.50. C, CBS on hard standing, TI on 144.550MHz. Peter, M5ABN, 01480 457 347, or peteherbert@aol.com

30 / 31 AUGUST 2003

WEINHEIM VHF Meeting - same venue as last year.

31 AUGUST 2003

ANDOVER RAC Middle Wallop Boot Sale

- Museum of Army Aviation, A343 south of Andover. OT 09.30 / 10am, £1. C, picnic area, TI on 145.550MHz, CP, TS, FAM. Terry, G8ALR, 01980 629 346 or g8alr@ukgateway.net [www.arac.co.uk]

TELFORD ARRG 2003 Telford Rally - RAF Cosford Aerospace Museum, on A41, one mile south of jn 3, M54. OT 10am. Entrance & CP free. RSGB regional stand / bookstall / EMC Clinic, WIN, BATC AGM, TS, CBS, B&B, Eddie Murphy, G0VVT, with QSL cards for the G6AAA - ZZZ series. Bob, M0RJS, bob@somrob.u-net.com [www.telfordrally.org.uk]

14 SEPTEMBER 2003

FENLAND RG Horncastle Summer Amateur Radio Rally - Horncastle Youth Centre, The Old School, Cagthorpe, Horncastle, Lincs (nr Horncastle Police Station). OT 10.30am, £1. C, TI on 144.550MHz. Chris, G0PXB, 01526 860 320 or Tony, G3ZPU, 07778 274 535. [www.fenlandrepeater.org.uk]

SUFFOLK DATA GROUP Five Esses Rally – Raceway Centre Green, Foxhall Stadium, nr Ipswich, Suffolk. Amateur radio, computers, electronics. OT 9.30am, £1. Peter, G8HUE, 01473 631 313. [www.sufolkdatagroup.freeserve.co.uk]

19/20 SEPTEMBER 2003

LEICESTER Amateur Radio Show – Donington International Centre, Castle Donington, Leics. Geoff, G4AFJ, 01455 823 344, fax 01455 828 273 or g4afj@argonet.co.uk

19–28 SEPTEMBER 2003

HORNSEA ARC Antenna Workshop & Farm – Usual attractions, inc full-size rhombic, demonstrations from Linear Amp UK. Richard, G4YTV, 01964 562 498 or g4ytv@aol.com

20/21 SEPTEMBER 2003

TRANSMISSION 2003 - 11th annual event to raise money for the British Wireless for the Blind Fund.

28 SEPTEMBER 2003

NATIONAL VINTAGE Communications Fair - Hall 11, National Exhibition Centre, Birmingham. OT 10.30am, £5, under-14s free. 300 stalls, vintage wireless, valve amplifiers, classic hi-fi, gramophones, records (shellac 78, vinyl and CD), early TV, etc. Terry Martini, 07947 460 161, info@nvcf.org.uk [www.bvws.org.uk]

5 OCTOBER 2003

BELGIUM Amateur Radio & Computer Rally – Hall 'La Louvière Expo', La Louvière, access direct from motorway 50km S of Brussels. OT 9am. TI on FM repeaters: 145.600MHz & 430.325MHz. FM, TS from UK, Holland, Germany & France. Michel, ON7FI, 0032 64 849 596, or dewyngaert@skynet.be [www.qsl.net /on6ll/]

12 OCTOBER 2003

GREAT LUMLEY AR & ES Rally - Great Lumley Community Centre, Front Street, Great Lumley, nr Chester le Street. OT 10.30am, £2 (accompanied under-14s free). CP free, C, B&B, radio, hobbies, satellite, component stalls, model aircraft flying display, TI. Nancy, 0191 477 0036 or 07990 760 920 or nancybone2001@yahoo.co.uk

14/15 OCTOBER 2003

LOW-POWER RADIO ASSOCIATION Radio Solutions 2003 - ETSI, Sophia Antipolis, nr Nice. Diane Green, 020 8658 3511, diane@instrotec.demon.co.uk

19 OCTOBER 2003

BLACKWOOD & DARS Rally - Newport Centre, Newport, 1 mile from jn 25A of the M4, (jn 26 travelling west to east). OT 10.30 / 10.45, £1.50. CP free, B&B, TI, TS, SIG, LB, C, DF, WIN, LB. George, 2W1JLK, 01495 724 942, or Dave, GW4HBK, 01495 228 516.

HORNSEA ARC Rally - The Floral Hall, Hornsea. OT 10.30am. TI, CP, B&B, LB, C. Richard, G4YTV, 01964 562 498 or g4ytv@aol.com

26 OCTOBER 2003

GALASHIELS & DARS Annual Rally - The Volunteer Hall, St John's Street, Galashiels. OT 11am. TS, B&B, C. Jim, GM7LUN, 01896 850 245.

WEST LONDON Radio & Electronics Rally - Kempton Park racecourse, Sunbury-on-Thames, Middx. £3.50 (£3 after midday), under 16s free. TS, MT (plus free entry), CP for 2000, DF, C, LB, TI on 144.550MHz, B&B, external seating & picnic areas. Paul, M0CJX, 01737 279 108, m0cjx@lineone.net

2 NOVEMBER 2003

SOUTH YORKSHIRE RG 13th Great Northern Hamfest - Ernie, G4LUE, 01226 716 339 or 07787 546 515.

8/9 NOVEMBER 2003

NORTH WALES Radio & Electronics Show - Jenny, MW0BET, 01492 549 413.

9 NOVEMBER 2003

BISHOP AUCKLAND RAC Rally - Mark, G0GFG, 01388 745 353, or Brian, G7OCK, 01388 762 678.

16 NOVEMBER 2003

MIDLAND ARS 15th Radio & Computer Rally - Peter, G6DRN, 0121 443 1189 or 07808 078 003, or nlgutteridge@aol.com

23 NOVEMBER 2003

RADIOSPORT Communication & Computer Show - *** CANCELLED*** - RadioSport 01923 893 929. [www.radiosport.co.uk]

30 NOVEMBER 2003

PENCOED ARC Radio & Computer Show - MW5MWR, QTHR.

7 DECEMBER 2003

WEST MANCHESTER RC Red Rose Winter Rally - Steve, 01942 895 198. [www.wmrc.org.uk]

WORCESTER Radio & Computer Rally - [www.qsl.net/gb2tcr]

1 FEBRUARY 2004

SOUTH ESSEX ARS Mobile Radio Rally - Brian, G7IIO, 01268 756 331 or briang7iio@yahoo.com [www.southessex.ars.btinternet.co.uk]

29 FEBRUARY 2004

CAMBRIDGE & DARC Rally - [www.cdarc.org.uk]

16 MAY 2004

MIDLAND ARS Drayton Manor Radio & Computer Rally - Norman, G8BHE, 0121 422 9787 or 07808 078 003.

RALLIES & EVENTS

TI – Talk-In; **CP** – Car Park; **£** – admission; **OT** – Opening Time – time for disabled visitors appears first, eg (10.30/11am); **TS** – Trade Stands; **FM** – Flea Market; **CBS** – Car Boot Sale; **B&B** – Bring and Buy; **A** – Auction; **SIG** – Special Interest Groups; **MT** – Morse Tests; **MA** – Foundation Morse Assessments; **LB** – Licensed Bar; **C** – Catering; **DF** – Disabled Facilities; **WIN** – prize draw, raffle; **LEC** – LECtures/ seminars; **FAM** – FAMily attractions; **CS** – Camp Site.

GB CALLS

These callsigns are valid for use from the date given, but the period of operation may vary from 1 – 28 days before or after the event date. Operating details are provided in an abbreviated form as follows: T = 160m; L = 80 or 40m; H = HF bands (30 - 10m); V = 6 and / or 4m; 2 = 2m; 7 = 70cm; S = satellite and P = packet. Please send operational details of your special event station to the RadCom office at least five weeks before publication. The only QSL Bureau sub-manager for special event station callsigns is as follows: GBxAAA-MZZ – Mike Evans, 322 Heol Gwyrosydd, Penlan, Swansea SA5 7BR, e-mail mw0cna@ntlworld.com. Will organisers of special event stations please ensure that they lodge plenty of envelopes with their sub-manager?

1 Aug	GB2CLH: Cromer Light House. Norfolk. LH2 (G3YOA)
	GB4CEB: Comms & Electronics Branch. Norfolk. LH2 (G4OHX)
	GB4YOU: Youlbury Scout & Guide Radio. Oxford. TLH27P (G0REL)
	GB4YOU: Youlbury Scout & Guide Radio. Oxford. TLH27P (G0RJX)
2 Aug	GB0FMF: Finn McCool Festival. Co. Antrim. LH2 (MI0CRQ)
	GB2CGC: Chippenham Gateway Club. Chippenham. LH (G4KJV)
	GB6RH: Robin Hood. Newark, Nottinghamshire. LH (G0GDU)
10 Aug	GB5RO: Radio Orkney. Orkney. LHV2 (GM0HTH)
15 Aug	GB0MFD: Marconi Festival Day. Ballycastle. LH2 (MI0CRQ)
	GB0SUN: Steam Up Now. Truro. H27 (G0FIC)
	GB2APL: Anvil Point Lighthouse. Dorset. TLH (G0PSE)
	GB2PSL: Plovers Scar Lighthouse. Lancs. LH (G3UCA)
	GB5RO: Radio Orkney. Orkney. LH (GM0HTH)
16 Aug	GB0MLH: Methil Lighthouse. Fife, Scotland. TLHV27 (GM0UZM)
	GB0NHL: Noss Head Lighthouse. Caithness. LHV (GM4EFR)
	GB0PBL: Portland Breakwater Lighthouse. Weymouth. LH27P (M5MKW)
	GB0PL: Paull Lighthouse. East Yorkshire. LH2 (G4VHM)
	GB0RF: Romaldkirk Fair. Romaldkirk, Co Durham. LH (M0SSF)
	GB2BL: Bamburgh Lighthouse. Northumberland. HV2 (M0BMJ)
	GB2ELH: Eshaness Light house. Shetland. LHV (MM5PSL)
	GB2HE: Hobbies Extravaganza. Southampton. LH27 (G0VNI)
	GB2LBN: Lighthouse Barns Ness. E.Lothian. LH (GM4UYZ)
	GB2LCP: Lighthouse Corsewall Point. Stranraer. LHV27 (GM4LQS)
	GB2PF: Peter Fidler. Bolsover, Derbys. LH2 (G0THF)
	GB2RFS: Ruthin Flower Show. Denbighshire. LH27P (GW4WSU)
	GB2RL: Roker Lighthouse. Sunderland. LHV27 (M0AYI)
	GB2SCA: Scarborough Lighthouse. Scarborough. LH2 (G4SSH)
	GB2SL: Spurn lightship. East Yorkshire. LH2 (G4ASA)
	GB4FPL: Farley Park Lodge. Sandwell, West Midlands. LH2 (M0BPT)
	GB4KAY: K Kendal Memorial. Withernsea. LH2 (M5EXY)
	GB4LL: Leasowe Lighthouse. Leasowe,Wirral. (G4OAR)
	GB4WL: Whitgift Lighthouse. East Yorkshire. LH (G0SGB)
	GB5HL: Hartland Lighthouse. Bideford, N.Devon. LHV2P (G0KLX)
	GB5PW: Pendeen Watch. Penzance. LH (G0CAM)
17 Aug	GB0REL: Rathlin East Lighthouse. Rathlin Island, N.I. TLHV27 (GI0PGC)
18 Aug	GB0MR: Marhamchurch Revel. Cornwall. LH (G4NCJ)
20 Aug	GB2GSS: Gillingham & Shaftesbury Show. Dorset, Shaftesbury. LH2 (G0ENW)
23 Aug	GB2CNC: Crene & Nantwich Carnival. Crewe. TLH2 (G0MMH)
	GB4TCF: Town & Country Festival. Warwickshire. TLHV27 (G4GHJ)
	GB4WFC: World Friendship Challenge. Herstmonceux, E.Sussex. TLHV2P (M0CHW)
24 Aug	GB2LGD: Leiston Gala Day. Leiston, Suffolk. LHV27 (G4XVE)
	GB2PPS: Papplewick Pumping Station. Nottinghamshire. L2 (G0UYQ)
	GB4RFC: Rosliston Forestry Centre. Derbyshire. LH2 (G4CRT)
25 Aug	GB300WES: Wesley. N Lincs. LH2 (M0RHI)
27 Aug	GB0PC: Peterlee Carnival. Co Durham. TLHV27PS (G0NSK)
29 Aug	GB4XF: Four by Four. Trentham, Staffordshire. LV2 (G4PMY)
	GB4YOU: Youlbury Scout & Guide Radio. Oxford. TLH27P (G0REL)
	GB4YOU: Youlbury Scout & Guide Radio. Oxford. TLH27P (G0RJX)
30 Aug	GB2GCE: Greystoke Castle Estate. Cumbria. LH2 (G0OMB)

The Members' Ads order form is now published here. If members do not wish to cut the form out of the magazine, photocopies will be accepted, as will recent copies of the form from previous months, or recent copies of the 'carrier' sheet. *As a last resort*, members may also send in their advertisements on separate sheets of paper, but if you choose to do this, you *must* supply an accurate word count - and, of course, the correct fee in the normal manner.

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The Last Word

Foundation Licence Too Difficult?

Are some of the questions in the Foundation Licence examination set too high? I know there are some who think that the Foundation Licence is 'giving away' licences and dumbing down amateur radio, but these people have obviously not seen any recent papers. I have seen one question about "what effect would a badly designed frequency generator stage in a transmitter have... "I thought that the conditions of the Foundation Licence stopped you getting anywhere near that sort of understanding.

As an instructor I am having to teach to a much higher level than stated in the syllabus and in the book Foundation Licence Now! in order to have my students a chance of passing, especially if they have no radio background. Some of the questions are not only worded badly but ask about topics well beyond the level required, supposedly, for the course. The book covers briefly subjects which are well covered in questions and vice versa.

Having to explain subjects in much more depth than the syllabus requires blurs the line between the Foundation, Intermediate and Full licence exams. If these are going to be the standard of questions in the Foundation Licence exam, what on earth are the questions going to be like for the Full licence when the RSGB takes over? Will we have to cover topics at post-degree level? How is the aim of self-training going to be achieved if the examination standard is well over the top?

Andrew Ripley, M0DCD

[Having had some experience in teaching it is not unusual to teach above the required syllabus level. In fact it is pretty normal. The Foundation course we believe is set at the right level and the questions are constantly being reviewed to ensure they meet the criteria set. I think the results to date speak for themselves. The youngest candidate to pass is 6 years old. 87 candidates over the age of 75 have been successful and the average candidate pass rate is 83%. - General Manager Peter Kirby, G0TWW.]

Radio Badges

I am currently researching radio badges. On the cover of the July 'Bulletin' (RadCom) the original RSGB badge is shown, also a modified one on page 5 of said issue, illustrating the union flag.

My interest is in your current badge, comprising symbols for the aerial, capacitor and earth, all surrounded by a diamond. I will be obliged if you can reliably inform me as follows: a) The person who invented the design. b) The exact date that this badge was used in the magazine. c) The exact date when it was manufactured as a badge and sold to members.

Christopher Jones, G3RCU

[The original RSGB badge was a combination of two designs submitted by H W Taylor and H H Towney in response to a competition in 1924. The diamond badge was introduced for the T&R section of the Society (only) at a slightly later date. Both badges were then current for many years. The current RSGB badge is a variation of the T&R badge but the point at which the original badge was dropped and replaced with the current logo is unclear. If any reader can shed light on this matter Mr Jones and the Society would be interested to hear from them. – Commercial Manager Mark Allgar, M1MPA.]

Morse Test Anniversary

10/11 May was the 17th anniversary of the RSGB Morse Test Service (MTS). Over the two days I worked 15 of the 25 or so special MTS stations and recently received my superb certificate. I thought it was a marvellous event, and as a new boy to the transmitting side of amateur radio, a thrill and pleasure to work all these MTS stations.

Can't wait for next year when I will try to work them all, but sadly probably not under my M3 call, which just flows in CW. I took the RAE in May so I suppose I will end up with one of those dreadfully long-winded M0 callsigns!

Ken Duggan, M3NPB

Freedom of Bletchley Park

With reference to the letter from Henry Balen, G4MHB ('The Last Word', June), it should be pointed out that the 'Freedom of Bletchley Park' certificates were originally suggested by G4MM several years ago. After years of pressure by David White, G3ZPA, they were granted to those (mainly radio amateurs) who served in the Radio Security Service. These amateurs certainly have now received recognition: after a long struggle their efforts are recorded in various histories and publications (see RadCom November 1996, the video tape The Secret Wireless War and a forthcoming book by Geoffrey Pidgeon). Many lectures have been given on this subject and I gave one last September to the 300 attending the Oxford Christ Church Conference, which included 160 visitors from the States. Lord Dacre, among others, also referred to the RSS in his talk at the same conference.

Wartime interceptors should write to Bletchley Park and ask for an application form for 'Freedom of the Park' and contact me (QTHR) for details of RSS Newsletters and our annual reunion at the Park.

Bob King, G3ASE (ex-RSS)

[See also part 2 of the article by Pat Hawker, G3VA, on pages 20 - 25 this month for more on the work of the radio amateurs who were 'Secret Listeners' in WWII – Ed.]

'Spectrum Ownership'

Reading Colin Dollery's 'Guide to HF Operating' ('Down to Earth', RadCom June 2003) reminded me of a recent experience on 80m during International Marconi Day. What was witnessed was a blatant case of 'Spectrum Ownership' and by a UK operator who by description of himself as of long standing ought to have appreciated that propagation changes and so should have known better. I listened for a while and then closed down following several heated comments about "Getting off our frequency" directed at the DX. The UK station was running about 100W and the distant station probably was running much more, which is yet another factor to consider - the DX probably didn't even hear the UK station at all!

This of course is not an isolated incident and served to remind me of one of the reasons why it has taken me 22 years as a Class B licensee to take the step of attaining a transmitting licence on HF. Now, the world of 23cm and up is much more gentlemanly!

Andrew Hutley, M0SPS

[Such instances of ignorant operating highlight the need for articles like Colin's! – Ed.]

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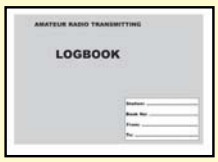

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