Out This Month: the NEW RSGB Yearbook 2003

RadCom

www.rsgb.org

0902

£3.95 Vol 78 No 9 ♦ September 2002 The Radio Society of Great Britain Members' Magazine

♦ GB4FUN Around the Country

♦ Leicester Show This Month

RSGB

G4PIQ & G4BWP Battle for Britain at WRTC Competition in Finland

The 'Fivemegs Experiment' Gets Under Way

WATERS & STANTON

FREEPHONE ORDER LINE:

08000 73 73

HEAD OFFICE 22 MAIN RD, HOCKLEY • ESSEX • SS5 4QS ENQUIRIES: 01702 2

MIDLANDS + NORTH SHOP BENTLEY BRIDGE • CHESTERFIELD RD • MATLOCK

SCOTLAND + BORDERS SHOP 20 • WOODSIDE WAY • GLENROTHES • FIFE KY7

CARRIAGE CHARGE CODES: A=£2.75, B=£6, C=£9 D=£12

LOWE ELECTRONICS

BENTLEY BRIDGE, CHESTERFIELD ROAD.

MIDLAND BRANCH'S OPEN DAY!

SATURDAY 7TH SEPTEMBER

10am - 4pm

WATERS & STANTON

LOWE

Free Refreshments • Free Parking

YAESU

FT-1000MP MKV FIELD £2199 C

NEW

YAESU FT-897 £TBA

NEW

100W HF 50W 2m and 20W 70cm Plus 20W on (optional) Internal Battery

Available November

YAESU

FT-1000MP Mk-V 200W HF ALL MODE

3 YEARS FREE WARRANTY

SPECIAL OFFER

FREE HEIL GOLD LINE MICROPHONE

£2899 carr.£9

FT-847 160m - 70cm ALL MODE

3 YEARS FREE WARRANTY

£1149 carr.£9

FT-100 D 160m - 70cm ALL MODE

SAVE

£899 carr.£6

FT- 920AF HF 160m-6m-100W

100 Watts from 1.8 to 54MHZ with dual VFO controls. Supplied with FREE FM unit.

£1099 carr.£9

FT-817 'SPECIAL OFFER' £595 C

The amazing FT-817 offers all-modes from 1.8MHz - 440MHz with up to 5 watts out. Buy one of our "WALKABOUTS" antennas at the same time and SAVE EVEN MORE! We will give you an extra 10% DISCOUNT on the antenna!

INCLUDES AC CHARGER AND 1 AMP Ni-cad PACK

NEW PRODUCTS

NEW

Power Tanks FD-7021

AC chargers included

From the 5W FT-817 to a 100W rig, there's a Power Tank for you!

FD-7021 £24.95 B

4 Ah supply with built-in 3/6/9V output plus 12V DC. Has built-in lantern and computer controlled battery state. Compact size: 180w x 85d x 210h mm, 3kg. Shoulder strap.

FD-1217 £59.95 B

17 Ah supply that will deliver up to 250 Amps. Includes circuit breaker and is powerful enough to start a car or power a 100W SSB/CW transceiver. 2 cigar sockets and alligator lead. Fitted circuit breaker. 250w x 140d x 350h mm, 8kg.

KENWOOD

TS-2000 160m - 70cms+23cms OPTION

3 YEARS FREE WARRANTY

+FREE HEIL HM-10 MIC

£1695 carr.£9

TS-570DG 160m - 10m All Mode

3 YEARS FREE WARRANTY

£849 carr.£9

TS-870S 160m-10m 100W Advanced DSP

£1349 carr.£9

SGC

SGC SG-2020 £699 A

Ideal for QRP, but with VOGAD and RF speech processing it can sound like 100 Watts! Very low current (4A max) makes it ideal for portable work. Variable selectivity down to 100Hz means no extra filters to purchase.

NEW SG-2020 ADSP now available £899 C

SG-237 mini auto coupler ideal for SG-2020 £439 B

ICOM

IC-756 PRO II £2495 C

NEW

IN STOCK NOW!

This is Icom's new Flagship.

IC-7400 160m - 2m ALL-MODE

NEW

IN STOCK NOW!

£1499 carr.£9

IC-706IIG 160m - 70cm ALL MODE

3 YEARS FREE WARRANTY

£849 carr.£9

IC-718 100W HF £649 C

YAESU

VL1000 £3699 D

HF + 6m Linear Amplifier + PSU 1kW

YAESU

FT-1500M 2m FM Mobile £159 C

SPECIAL OFFER SAVE £70

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

KENWOOD

TM-D700E 2m + 70cm FM £449 C

Large detached screen and APRS, make this a firm favourite. 50W on 2m and 35W on 70cms. Features 200 memos, CTCSS, Band Scope, built-in TNC, DX cluster monitor, alphanumeric etc.

TM-G707E 2m + 70cm FM £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!

TM-V7E 2m + 70cm FM £359 C

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

ICOM

IC-207H 2m + 70cm FM £279 C

A great budget class radio for VHF & UHF use.

IC-2800H 2m + 70cm FM £419 C

Large colour display with video input, and airband rx. 50W/35W and remote head unit.

IC-2100H 2m FM Mobile £229 C

Rugged design with switched receive filters 12.5/25kHz

IC-910 2m + 70cm All Mode £1299 C

Icom's new dual band all-mode base station radio with 23cms option.

YAESU

FT-7100 2m/70cm Mobile £299 C

NEW

Just arrived is this new dual band radio that has extended rx. Power is 50/35W. Features dual in-band reception and detachable display (requires YSK-7100).

One of the Best Buys in Dual Bamd Mobile!

AV-40 VSWR METER £39.95 B

- 144 - 470MHz
- Impedance 50 Ohms
- Power 0 - 30W / 0 - 300W switched
- Measures forward / reflected power + VSWR
- Sensitivity 3W for full scale deflection
- Accuracy 10% at full scale
- Sockets SO-239
- Size 85 x 87 x 95mm • Weight 280g

KENWOOD

TH-D7E 2m + 70cm £299 C

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.

TH-F7E 2m + 70cm £249 C

NEW

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.

WEST MOUNTAIN

RIGRUNNER DC DISTRIBUTION £109 B

The *RIGrunner* 12-way 13.8V DC distribution system with Over voltage, Normal and Under voltage indicators.

LINEAR AMPLIFIERS UK

CHALLENGER II	HF LINEAR AMP10-160m	£1795 D
RANGER-811H	HF LINEAR AMP10-160m	£895 D
DISCOVERY-2	2m LINEAR AMP 400-1000W OUT	£1395 D
DISCOVERY-6	6m LINEAR AMP 50-54MHz 400-1000W OUT	£1395 D
NEW DISCOVERY-70	70CMS LINEAR AMP 430-440MHz 50W IN/ 700W OUT	£1495 D

YAESU

YAESU VX5R BLACK OR SILVER £239 B

Tiny but incredibly rugged, the VX-5R provides transceiver capability on three amateur bands (50/144/430MHz) and almost continuous reception from 500kHz up to 999MHz.

YAESU VX1R 2m/70cm £149 B

Ultra-wide frequency coverage which includes VHF and UHF TV audio, AM broadcast, FM broadcast and AM airband.

W-25SM 25AMP SWITCH-MODE POWER SUPPLY

THE QUIET ONE

£79.95 Carr. £6.00

Switched 230 / 115V AC input and fixed 13.8V output at 22 Amps continuous and 25 Amps peak. Over voltage and over current protected and fan cooled. Measures 180mm (W), 75mm (H) and 190mm (D)

HL-50B NEW FT-817 AMPLIFIER 50 WATTS PEP

£299 Carr. £6.00

NEW

Made by Tokyo High Power, this amplifier covers 80m to 6m. Purpose designed for the FT-817. RF switched or can be wired to FT-817 access. socket. Measures 148 x 55 x 190mm.

HEAD OFFICE SECOND HAND LIST

HF Transceivers	
IC-706 x2	£449.00
IC-725	£399.00
TS-50S	£429.00
TS-680S	£549.00
MFJ-9020	£115.00
MX-21S	£189.00
SG-2020	£485.00
FT-920	£899.00
VHF/UHF Base/Mobile Transceiver	
2001 x4	£119.00
6001	£145.00
7003 x2	£125.00
DR-M06TH	£165.00
IC-910H	£899.00
TM-251E	£239.00
TM-702E	£199.00
MFJ-9406X	£149.00
FT-290R	£159.00
FT-290R II x3	£249.00
FT-690R II	£299.00
FT-3000M	£249.00
FT-5100	£199.00
FT-8100R	£299.00
VHF/UHF Hand Held Transceiver	
AT-400	£115.00
AT-600	£175.00
DJ-C4	£69.00
IC-2SRE	£99.00
IC-T7E	£199.00
TH-D7E	£249.00
KH-6	£75.00
FT-41R x2	£99.00
VX-5R	£199.00
Shortwave Receivers	
IC-R71E	£349.00
IC-R72	£399.00
NRD-345G	£349.00
NRD-525 x2	£529.00
NRD-535	£625.00
R-827	£99.00
Scanners Mobile/Base	
AR-5000+3	£999.00
RD-500VX	£599.00
IC-PCR1000	£199.00
IC-R7000	£499.00
IC-R8500	£949.00
AX-700E	£299.00
UBC-780XLT	£249.00

Scanners Hand Held	
AR-1500	£115.00
AR-2000	£115.00
AR-8000 x2	£199.00
AR-8200 II	£299.00
Explorer	£499.00
UBC-60XLT	£59.00
VT-150	£99.00
Station Accessories	
PK-900	£299.00
AL-800X	£1299
BY-2	£75.00
LPM144-25-180	£189.00
ASP	£95.00
D-70	£39.00
FL-3 x2	£99.00
DraeVHF	£25.00
KP-100	£59.00
AT-2000 x2	£65.00
Pro-set 5	£99.00
MK-702	£49.00
CTU-8	£35.00
AT-180	£249.00
PS-85	£179.00
RS-8500	£29.00
AMT-3	£50.00
FAX-1	£125.00
NIR-10	£199.00
NTR-1	£99.00
KAM Plus	£199.00
KPC-9612	£285.00
EK-4	£35.00
HS-5	£35.00
MFJ-422BX	£49.00
MFJ-452	£49.00
MFJ-490X	£79.00
MFJ-931	£59.00
MFJ-962C	£149.00
MFJ-989C	£215.00
MFJ-1020A	£65.00
MFJ-1278	£175.00
MFJ-1289M	£49.00
MFJ-8621	£129.00
RU-432-95	£149.00
MML-144-25	£59.00
3000A +	£289.00
Pico-2	£149.00
SP-55	£45.00
P-335	£39.00
DSP-9+	£129.00
AT-130	£79.00

VISIT US AT DONINGTON

OUR BIGGEST STAND EVER!

FRI 20TH SEPTEMBER

FRI: 9.30-5.30 SAT: 9.30-5.00

SAT 21ST SEPTEMBER

Get in Front with HUSTLER

CARRIAGE CHARGE CODES: A=£2.75, B=£6, C=£9, D: £12

5BTV

£209.95
Carr. £9.00

4BTV

£169.95
Carr. £9.00

HUSTLER®

BASE STATION ANTENNAS

Spec	5BTV	4-BTV
Bands	5	4
Coverage	80m-10m	40m-10m
Bandwidth 10-40m	Full	Full
Bandwidth 80m	100kHz	N/A
Resonance	1.15:1	1.15:1
Power	1kW CW	1kW CW
Traps	1" forms	1" forms
Tubing	1.25"	1.25"
Bracket size	1.75"	1.75"
Height	25ft 1" (7.64m)	21ft 5" (6.52m)
Weight	17lbs. (7.7kg)	15lbs (6.8kg)
Wind (112kph)	13kg	-

"I worked my first ZL while actually on the move using a Hustler whip" - Peter Waters G3OJV. Customers are also telling us how pleased they are with the base verticals. Check the prices!

HUSTLER Mobile Antennas

Model	Band	Bandwidth	Price
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

Model	Band	Bandwidth	Price
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

LDG USA

LDG AT-11MP Auto ATU £269.95 A

1.8MHz - 30MHz 150W

Requires no data leads - just 12V at 500mA . Just connect between transceiver and antenna. Handles all coax fed systems but with much wider impedance range than internal models. Should be OK for G5RVs etc.

CS-600 2-way Coax Switch £12.95 A

2-way coax switch ideal for use in antenna systems and service departments. Provides a very positive method of switching between two coax systems and offers very low loss.

B1-2K Balun £25.95 A

This balun is designed for dipoles, inverted V antennas, and similar 50 Ohm feed designs.

B4-2K Balun £34.95 B

The B4-2K 4:1 voltage balun is ideal for folded dipoles, delta loops or other medium impedance balance antennas where ATUs are not required.

REM-BAL4 Remote Balun £49.95 B

The REM-BAL4 is 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. Can be used with a transmatch.

WATSON

WEP-300B EARPIECES £2.95 A

Over-the-ear earpiece, popular for security and emergency use. Its low cost and firm mounting even in arduous conditions make this a popular item. Fitted with 3.5mm jack plug.

WSA-1 PSK-31 Adaptor £39.95 B

All you need to connect up to your sound card and run PSK-31. Includes CD software.

YS-130 ROTATORS £79.95 B

Ideal for medium sized VHF antenna systems, the YS-150 is a good quality Japanese manufactured product. It is supplied with control box with rotary direction setting, plus upper and lower in-line mast clamps.

REVEX L-20 15W DUMMY LOAD £21.95 A

- Range DC - 500MHz
- Power 15W/50W
- VSWR 1.15:1
- Connector PL-259
- 50 Ohms impedance
- Size 34 x 72mm
- Weight 70g

MASPRO VHF/UHF YAGIS

These high quality Yagis are made in Japan and superbly engineered. Features folded dipole, balun transformer, waterproof box and SO-239. You won't find anything better on the market.
Take a look at our prices!

144-WH5	2m 5 el. 6.6dBd 0.93m	£26.95 B
144-WH8	2m 8 el. 8.6dBd 1.79m	£37.95 B
144-WH10	2m 10 el 9.7dBd 2.3m	£41.95 B
435-WH8	70cms 8 el. 8.6dBd 0.8m	£29.95 B
435-WH12	70cms 12 el. 12.8dBd 1.51m	£35.95 B
435-WH15	70cms 15 el. 14.2dBd 2.19m	£41.95 B

To compare with dBi figures, add 2.4dB

WATSON

QS-112 SPEAKER MIC £16.95 A

Combined speaker-mic. with PTT switch. Models for Yaesu, Kenwood, Icom, Alinco and Motorola.

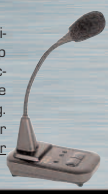
SPM-102 SPEAKER MIC £9.95 A

Incredible value!
Has 4-way 3.5mm plug for VX-1, VX-5, FT-50 and IC-Q7E Handies

Limited stocks.

WM-308 BASE MIC £59.95 B

The perfect answer for a high quality base microphone. Built-in pre-amp powered from rig or 2 x AA, electronic PTT and FM/SSB response switch. Includes lead with 8-pin plug. The plug needs to be wired for your radio. We can do this but phone for quote.



WCT-321 LAPEL TALKER £19.95 A

The elegant way of personal communications.
Earpiece with combined lapel hanging mic and PTT. Models to suit most radios.
State: Kenwood, Yaesu or Icom when ordering

AVAIR VSWR POWER METERS

Great value and great performance. There's one just right for you.

AV-200 1.8 - 200MHz 5/20/200/400W £49.95 B
AV-400 140 - 525MHz 5/20/200/400W £49.95 B
AV-600 1.8 - 525MHz 5/20/200/400W £69.95 B
All fitted with SO-239, PEP/RMS readings, 3W for FSD approx.

WATSON

CAPTURE THAT FREQUENCY!

Supplied with telescopic antenna and AC battery charger. If you are within 200 ft or so of the hand-held, you should be able to read off the frequency. Note it down and enter it in your scanner. It's that simple and it's pocket sized.

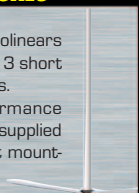
Each counter is supplied with internal Ni-Cad pack, AC charger and whip antenna.

Hunter	10MHz - 3GHz	£59.95 B
FC-130	1MHz - 3GHz	£79.95 B
S. Hunter	10Hz - 3GHz	£149.95 B
S. Searcher	10MHz - 3GHz	£99.95 B

SPY CATCHERS

Zoom into any FM transmission between 30MHz and 900MHz and monitor the audio. It takes a fraction of a second. The WR-5001 comprises a complete receiver with auto tuning, skip button, squelch adjustment and built-in speaker. The WR-5002 is similar, but adds an auto-hold control and a bargraph signal meter. It also adds a CI-V port for reaction tuning Icom and AOR receivers fitted with this feature. These monitor receivers are designed for nearfiled use and the range is from a few hundred metres to around 1km, depending on frequency and power of the transmitter.
WR-5001 £99.95 WR-5002 £159.95

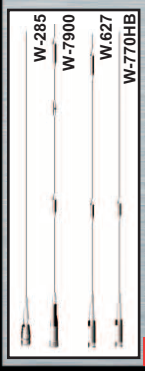
BASE VHF/UHF VERTICALS



2m / 70cm fibre glass colinears with stainless steel fittings, 3 short radials and SO-239 sockets.
These are high performance antennas, pre-tuned and supplied with all hardware for mast mounting.

Dual Band 2m/70cms		
W-30	3/6dB 1.15m long	£39.95 C
W-50	4.5/7.2dB 1.8m long	£49.95 C
W-300	6.5/9dB 3.1m long	£64.95 C
Triple band 6m/2m/70cms		
W-2000	0/6/9dB 2.5m long	£69.95 C

GREAT VALUE MOBILE WHIPS



W-285	2m 5/8th whip with PL-259 base £14.95 B
W-7900	2m/70cm 5 & 7.5dB length 1.58m £32.95 B
W-627	6m / 2m / 70cm 2 / 4.5 7.2dB length 1.6m £34.95 B
W-770HB	2m/70cm whip 3dB / 5.5dB length 1.1m £24.95 B

ALL WITH TILTOVER BASES

RSGB Matters

'MORSE CAMP' IN CHESHIRE

AN RSGB Morse Camp will be held in Frodsham, Cheshire, over the weekend of **7 / 8 September**. There is a maximum of 24 places and at the time of going to press there were still places available. For further information, or to book, please contact the amateur radio department at RSGB HQ on 0870 904 7373, or e-mail: ar.dept@rsgb.org.uk

PSC VACANCY

THE RSGB Propagation Studies Committee is looking to recruit an additional member. While the Committee has interests right across the radio spectrum, on this occasion it would especially wish to hear from RSGB members whose particular interests lie in VHF / UHF propagation. The PSC usually meets twice yearly, normally at Leicester, with business between meetings conducted by e-mail. Please contact the Chairman, Martin Harrison, G3USF (QTHR), e-mail: M.Harrison@pol.keele.ac.uk

CONTEST CORRECTION

THE ENTRY FROM Mike Farmer, G3VAO, in the Marconi Centenary Contest (see *RadCom* August 2002, page 15) should have been listed in the Single Operator All Band - Low Power (100W) section, and not under 'Multi-Operator'. Apologies for this error.

BOARD AND NATIONAL COUNCIL ELECTIONS 2002

IT IS FORMALLY announced that the following vacancies will arise to the Board and National Council for the 2002 elections:

The Board - Two Vacancies

Gordon Adams, G3LEQ, standing for re-election, having served a three-year term of office. Mr Adams currently holds the Spectrum portfolio.

Geoff Dover, G4AFJ, retires after serving six years on Council / the Board.

Members who wish to stand for election to the Board must have been a Corporate member of the RSGB for at least *two* years and need to obtain nominations and supporting signatures from *ten* or more Corporate members of the Society in good standing.

National Council - Eight Vacancies

Region 1: Scotland West & the Western Isles. Gordon Hunter, GM3ULP, currently co-opted, is formally standing for election.

Region 2: Scotland East & the Highlands. Billy Jenkins, MM0WKJ, currently co-opted, is formally standing for election.

Region 5: West Midlands. Roy Clarke, M0RLY, currently co-opted, is formally standing for election.

Region 8: Northern Ireland. Jeff Smith, MI0AEX, standing for election having served a three-year term of office.

Region 9: London and the Thames Valley. Alan Ross, G1SQB, position TBC.

Region 10: South and South-East. Vacant. Current co-optee Ivan Rosevear, G3GKC, not standing for election.

Region 11: South West & the Channel Islands. Vacant. Current co-optee Richard Atterbury, G4NQI, not standing for election.

Region 13: East Midlands. Bryn Llewellyn, G4DEZ, currently co-opted, is formally standing for election.

Candidates are welcome for all vacant positions, regardless of whether or not an incumbent is standing for election.

Members who wish to stand for election to the National Council must *reside* in the relevant Region. They must have been a Corporate member of the Society for at least *two* years and need to obtain the nominations and supporting signatures of a minimum of *five*, but not more than 10, Corporate members of the Society in good standing and residing in the Region in which the candidate is standing.

Election forms are available from the General Manager at RSGB HQ.

Prospective candidates should be aware that completed election papers must be returned to RSGB HQ not later than 1700 on Tuesday 1 October 2002.

Details of candidates standing in the election, plus voting forms, will appear in the November edition of *RadCom*.

Peter Kirby, G0TWW,
Company Secretary

RSGB President Bob Whelan, G3PJT, his wife Rosemary, Fiorina Sinapi, from the General Manager and Amateur Radio Secretariat, and her husband Bruno, were invited to the Queen's Garden Party on 23 July. They are seen here outside RSGB HQ ready to leave for Buckingham Palace.

NEW VIEW OF RAYNET

THE FIRST DECISION taken by the RSGB Board following the recent Raynet review was to move away from using the term 'Raynet', when describing the activities of Raynet groups in the provision of voluntary communications at the time of an emergency. The RSGB, when referring to Raynet activities, will in future use the title 'The Radio Communications Voluntary Service' (RCVS). The Board feels that when dealing with the press and media, this will make it easier to describe the work that Raynet groups carry out - not only the provision of emergency communications, but also taking into account the community role that Raynet plays.

To act as a focal point for RSGB support to the many groups concerned with this aspect of amateur radio, the Board has appointed Paul Gaskell, G4MWO, to the position of Radio Communications Voluntary Service - National Co-ordinator. Mr Gaskell takes up his appointment with immediate effect. Further details will be published in *RadCom* shortly.

AROS TALKS

BARRY Scarisbrick, G4ACK, the Amateur Radio Observation Service Coordinator, will be talking about AROS on **3 September** at the **Chelmsford ARS** (Marconi Social Club, Beehive Lane, Great Baddow, Chelmsford; details from David Bradley, M0BQC, tel: 01245 602838; e-mail: cars@g0mwt.org.uk; at the **Highfield ARC, Cardiff,** on **6 September** (postponed from 3 August) - details from Steve, GW6CUR, tel: 029 20634613; and on **13 September** at the Jersey ARS (details from Anne, MJ0BJU, tel: 01534 734948).

2002 LF EXPERIMENTER'S AWARD

NOMINATIONS ARE invited for the 2002 LF Experimenter's Award, the Nevada Cup. This annual RSGB Award, sponsored by Nevada, is for the most significant contribution by any RSGB member, towards scientific or engineering development of receiver and / or transmitter design, modulation technique, aerial design or propagation on the 73kHz or 136kHz UK amateur allocations. Those making a nomination must be a holder of a UK amateur licence or be a member of the RSGB. The submission nominating an individual must contain either a full description of relevant work or references to published work. The submission must state which part of the work is original.

Nominations should be sent either by post to the HF Committee at RSGB HQ or, preferably, by e-mail to John Gould, G3WKL, at g3wkl@btinternet.com to arrive by **Wednesday 18 September 2002**.

QSL BUREAU NEWS

AN RSGB QSL Bureau sub-manager has been appointed for the holders of Foundation Licences in Scotland (MM3 licensees). He is R Simpson, GM7NZI, 53 Jedworth Avenue, Glasgow G15 7QE.

The new sub-manager for the G0DAA - DZZ and G8AAA - ZZZ series of callsigns is William Sampson, M5WNS, 'Rowena', Clifford Street, Chudleigh, Devon TQ13 0LH. He takes over from John Purvess, G0FWP, who is thanked for his service as sub-manager.

There's also a new sub-manager for GB stations with callsigns ending in NAA - ZZZ: Mike Evans, MW0CNA, 322 Heol Gwyrosydd, Penlan, Swansea SA5 7BR, who takes over from Graham Ridgeway, G8UYD. Graham remains sub-manager for M5 callsigns.

Finally, there is a change of address for the G4V-series sub-manager. Bob Marley, G0VFV, has moved to 41 Scalby Road, Burniston, Scarborough YO13 0HN. He has a redirection of mail in force until January 2003 but asks that all G4Vs should note the new address when sending envelopes. Bob's phone number (01723 870299) and e-mail address (g0vfv@amsat.org) are unaltered.

BOARD HIGHLIGHTS - JULY 2002

AT ITS MEETING in July the Board covered a wide range of topics.

Financial Review. The forecast result for the financial year just ended will be most satisfactory. The Board discussed the main aspects of the budget for the next financial year. The Board approved the budget after discussion about risks and opportunities that might affect the financial results in 2003.

Membership. The last four months have seen an improving inflow of new members arising from both the Foundation Licence and better regional representation.

Foundation Licence. There continues to be a strong growth of club based courses. There are currently about 4000 M3 licences of which about 2000 are new to amateur radio. The Board was most interested in the fact that nearly a third of these were under 21. It was reported that many clubs were using the Foundation Licence to rebuild themselves. Apart from some of the more isolated parts of the UK, most regions had courses available. Several groups have reported working with Scouts, Guides, cadets and other youth organisations where the Foundation Licence fits well with their own communications courses.

Intermediate Licence. The syllabus for the Intermediate Licence is virtually complete. Drafts are being circulated for comment. It is hoped to release details at Donington. The structure of the Intermediate Course will be modelled on the Foundation course almost exactly. By these means it is hoped that the success of the Foundation approach can be continued. The nature of the pilot courses was debated and it was agreed that these would be different to the Foundation pilots in that it is now only necessary to test content rather than the principles. It was thought that these pilots would be undertaken late in 2002 and in early 2003. The course book *Intermediate Licence Now* is currently being written.

5MHz. The imminent release of a number of spot frequencies in the 5MHz frequency range was welcomed. Apart from a series of propagation experiments to investigate the use of these frequencies for short range emergency use it is hoped that on the air communication with the cadet forces, which are already heavily involved with Foundation courses, can be encouraged. Special conditions apply to these new frequencies and a NOV is required.

Emergency Review. An extensive consultation with all groups and individuals concerned with emergency services has led to the Board recommending that a Radio Communication Voluntary Service - National Coordinator be established to act as a focal point for Society support to the many groups concerned with this aspect of amateur radio. Further details will be published in *RadCom* shortly.

Changes to Mem and Arts. Changes to the procedure for election of new members of the Regional Council were approved. This should make it easier for new amateurs to become elected to the Regional Council.

Promotional programme. Various events where GB4FUN had been used were described. It is clear that we are becoming much clearer as to the ways GB4FUN can be used most effectively. Several visits are now showing the value of this vehicle in the form of recruits to Foundation courses.

WRTC 2002. The Board congratulated the UK team of Andy, G4PIQ, and Board Member, Fred Handscombe, G4BWP, on their participation in the event.

Regional Organisation. It was agreed that the next Regional Council meeting will take place in Belfast on 14 September followed by an open meeting.

AGM. The Society's AGM will take place at the University of Swansea on 7 December 2002.

RSGB YEARBOOK 2003

AVAILABLE SEPTEMBER

UK & IRELAND CALL BOOK

Your favourite annual has a ***NEW FORMAT & STYLE*** this year. There is a colour feature section, a ***NEW*** guide to propagation and RSGB propagation bulletins, and much more including:

- The Most Up To Date UK Callsign Data including the new M3 callsigns
- All pages revised and updated
- 12-year index of RadCom reviews
- Countries checklist

Plus features on:

- IOTA
- Worked All Britain
- G-QRP
- Satellites
- Internet linking
- Manchester scouts Raynet

Over 100 pages of useful information and every-thing you need at your fingertips.

All for the same price as last year

ONLY £13.59 +p&p

£15.99 (non-members)

ORDER ONLINE FROM OUR BOOKSHOP (DELIVERY SEPTEMBER)

www.rsgb.org/shop

or Tel: 0870 904 7373

RSGB Lambda House, Cranborne Road, Potters Bar, Herts, EN6 3JE

KENWOOD

ML&S

the very BEST EQUIPMENT brought to you by Martin Lynch & Sons

Kenwood TS-2000 £1695.00

Offering all bands 1.8 to 23cms (23 cms optional) Built in DX cluster monitor and auto QSY plus dual speed packet modem make this radio stand out. Excellent Kenwood build quality and reliability - a radio that is going to be around for a long time. (Requires 25 amp 13.8 volt PSU)

Kenwood TS B2000 **£1599.00**

All radios on this page are available on our

BUY NOW PAY LATER

scheme-call for details

Kenwood TS-570DGE £849.00

With the introduction of the new "M3" callsigns, (and no - it has nothing to do with BMW) the sales of this excellent Kenwood Transceiver have never been better. An easy to use DSP HF rig with a big clear display and excellent ergonomics, it is little wonder that the TS-570 sells in such huge numbers. Only £849.00

Kenwood TS-50S £629.00

The original HF mobile radio 100 Watts Top band to 10m all mode a bargain at only £629.00

Kenwood TS-870S £1399.00

The original DSP HF Radio with built in ATU (Requires 25 amp 13.8 volt PSU)

Kenwood TH-F7E

The Scanner that transmits . With a full blown all mode scanner plus 6 Watts 2m & 70 cms this handy is a real winner. £259.95

£259.95

NEW RADIO!

Kenwood TH-D7E Mk2

Dual Band Hand Held with built in TNC (Ideal for APRS and DX Cluster monitoring)

£319.00

Kenwood TM-D700E MkII £449.00

The only Dual Band mobile with a built in TNC (Ideal for APRS and DX Cluster monitoring) Remote head is standard on this model.

Kenwood TM-G707E £289.00

Twin Band mobile with large Display for at a glance reading while on the move. One of the few VHF/UHF mobile radios that can have a voice module installed for blind operators. (With optional VS3)

come and see us at the **Leicester Show** 20-21 Sept STAND W12

All these radios & much, much more!

ML&S the Kenwood Specialists

ACCESSORY LIST

PS53T	Matching PSU for TS2000 and TS570DGE	£229.95
PS52	Matching PSU for TS870S	£229.95
SP23	Matching speaker for TS570DGE and TS2000	£68.95
SP31	Matching Speaker for TS870S	£82.95
MC60A	Matching Deskmike for Kenwood HF Radios	117.95
HS5	Top Quality Headphones for HF Radios	£52.95

Have a trade in? We pay **TOP MONEY**

– call the sales desk or EMAIL your request. sales@hamradio.co.uk

ML&S martin lynch & sons

Suppliers of Communications Equipment

tel: 0208 566 1120

fax: 0208 566 1207

website: www.hamradio.co.uk

email: sales@hamradio.co.uk

128, 140-142 NORTHFIELD AVENUE • EALING • LONDON W13 9SB

Front Cover:

Andy Cook, G4PIQ, and Fred Handscombe, G4BWP, represented the UK at the World Radiosport Team Championship in Finland in July. A full report can be found on page 58. Also: the new *RSGB Yearbook 2003* is out this month. See page 40 to find out what's new this year!

Radio Communication

Editor
Steve Telenius-Lowe, G4JVG

Technical Editor
George Brown, M5ACN

Technical Illustrator
Cover Design
Bob Ryan, 2E1EKS

Advertising Design
Annie McVicar

Secretarial
Lynn Wortley

All contributions and correspondence concerning the content of *RadCom* should be posted to:

The Editor
Radio Communication
Lambda House, Cranborne Road
Potters Bar, Herts EN6 3JE

Tel: 0870 904 7373

Fax: 0870 904 7374

E-mail: radcom@rsgb.org.uk

ADVERTISING
All display and classified advertising enquiries (excepting Members' Ads) should be sent to:

Janice Forde
Advertising Sales, RSGB
Lambda House, Cranborne Road
Potters Bar, Herts EN6 3JE

Tel: 0870 904 7377
(advertising ONLY)

Fax: 0870 904 7378
(advertising ONLY)

E-mail: adsales@rsgb.org.uk

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.

All material in RadCom is subject to editing for length, clarity, style, punctuation, grammar, legality and taste.

No responsibility can be assumed for the return of unsolicited material (if in doubt, call us first!)

Printed by Southernprint (Web Offset) Ltd, Poole, Dorset.

RadCom This Month
September 2002

News and Reports

Technical Features

Down To Earth - Amateur Radio From The Ground Up

Reviews

Regulars

RadCom NEWS

Stolen Equipment

THE FOLLOWING equipment was stolen from the shack of Bernie Lyford, G0BPA, in Holbury, Southampton, on the night of 16 / 17 July: Yaesu FT-290R serial no. 2J170418; Yaesu FT-790R 2N020986; Yaesu FT-50R 6G060446; Kenwood TS-50S 60200184; Palstar KH6 97060097; SGC SG-230 SN51462685; MFJ-259 antenna analyser; DRAE 13.8V 24A PSU; Vectronics ATU. Any information should be reported to Bernie at: bernardlyford@uk2.net

Bruce Kepes, K8KSA, had his Kenwood TH-D7A, s/n 20900072, stolen on 27 July while travelling on the train and underground between Henley on Thames and Piccadilly Circus. Any information should be reported to Bruce at Bruce.Kepes@asc-yf.wpafb.af.mil

'Transmission 2002'

DON'T FORGET the British Wireless for the Blind Fund's 'Transmission 2002' event on **14 / 15 September**. See the news story on page 11 of the August *RadCom* for further details. There's still time to organise a station and take part in this very worthwhile event.

GBR Rugby Booklet

SOMETHING IN THE AIR is the title of a booklet by Pete Chambers about the GBR Rugby radio station, described as "a fond history of this remarkable place". It is available for £1.50 (send cash or cheque made out to 'Pete Chambers') to: *Something In the Air*, 110 Richmond St, Coventry CV2 4HY.

CDG2000 Correction

CDG2000 July 2002, page 22, in Fig 12, a 10k resistor (C16) should be connected from the junction of R38, R39 and C119 to the relay side of C135. The tracking on the PCB is correct.

PLT Refused Permission to Operate in Japan

THE RSGB HAS learned from its contacts in Japan who have been working on problems of interference from Powerline Telecommunications Systems that, following extensive trials, the Ministry of Public Management, Home Affairs, Posts and Telecommunications has decided not to permit the roll-out of PLT systems operating in the range 2 to 30 MHz in Japan.

Japanese studies have shown that emissions from PLT are harmful to HF communications and all requests from PLT manufacturers to operate PLT systems have been refused.

The RSGB has been told that the Japanese amateur society, JARL, has been actively working with the government, along with radio astronomers, broadcasters and others, to assess the impact of PLT systems on the radio spectrum. We understand that this decision has been given much publicity in the Japanese national press, which has highlighted concerns about interference to safety of life services.

In Europe, the RSGB continues to press for tight limits on emissions from cable telecommunications systems such as PLT, and is working with other HF users to try to ensure that the spectrum remains uncontaminated by wideband noise.

Commonwealth Games Volunteer

WE ALL WATCHED the Commonwealth Games in July and August and tended to take it for granted that all ran smoothly and to perfection. But in the background was an army of volunteers, doing their bit for the games and the athletes. One of the volunteers was Gary Bleads, G0HJQ, a committee member of the Stockport Radio Society. When asked about his role, Gary said, "I'm a volunteer for the Technology Mobile Response unit. Basically if anyone is short staffed or needs help with anything electrical, they call us. One day I was working with the radios, the next day was fixing bugs in the results website, and today I've been down at the cycling centre checking the PCs." A well deserved 'pat on the back' for Gary and all the other volunteers for making the games the success they undoubtedly were.

World Friendship Challenge

FOLLOWING THE events of 11 September 2001, the QRZ Amateur Radio Group of Sussex organised a special event station to express its appreciation of the work done by radio amateurs in providing emergency communications. The event was very successful and the group has decided to hold a 'challenge' this year, with the theme of world friendship. It takes place for 24 hours from 1100UTC on Saturday **14 September** and the rules may be obtained from qrz@jandc.demon.co.uk The group's special event station GB4WFC will be on the air during the event.

Taking part in the International Museums Weekend on 15 / 16 June from the National Wireless Museum at Puckpool Park on the Isle of Wight were (left to right): Brian, G0MWU; David, G0VZV and George, G3JLN. The museum callsign, GB3WM, is held by the curator, Douglas, G3KPO.

Annick's Pop

READERS following the continuing success story of Annick Morris, now M0HDE, will be interested to learn that her father John is now licensed as M3POP. Annick herself has been operating as GB2MCG, one of the Manchester Commonwealth Games special event stations. As Laurie Bradshaw, G0MRL, comments, "John has a bit of catching up to do - if he can get near the radio!"

Radar Memorial

ON PAGE 10 of the June 2002 *RadCom* we published a photograph of the new radar memorial at St Alban's Head in Dorset, and stated that there was a radar museum in Worth Matravers. We have since been informed that the museum consists only of a few photographs and drawings on the wall of a craft shop and restaurant in the village. While it is certainly worth visiting the Dorset coast, including the radar memorial, not to mention Swanage, Corfe Castle and the other attractions of the area, members may be disappointed if they travel from afar especially to visit the radar museum.

ARRL Receives $180,000 Grant

IN THE USA, the ARRL has received a $181,900 'homeland security' grant from the US government to train amateur radio operators in emergency communications. The League was among several dozen non-profit organisations designated to receive $10.3m of federal money to boost homeland defence volunteer programmes. The grant will provide free ARRL Amateur Radio Emergency Communications Course training to 5200 volunteers nationwide, starting in 2003.

ZB2IB SK

WILFRED Guerrero, ZB2IB, Hon Sec of the Gibraltar ARS, became a Silent Key on 26 June. He was 55. For many years Wilfred was the veritable mainstay of amateur radio in Gibraltar. Most recently he pioneered, virtually single-handedly, the introduction of the Foundation Licence there (ZB3). He was also the prime mover behind Gibraltar's contribution to the International Lighthouse and Lightship Weekend, operating ZB2LGT from Europa Point.

Twin Towns

IN THE *RadCom* News (August 2002, page 10) Tony, MW0BXJ, postulated that Mark and Gareth Studley, two students at Rydal School in Colwyn Bay, might be the first twins to have passed the Foundation Licence course together. Well, they are not! Amy, MW3VML, and Carys, MW3CAS, twin daughters of Wrexham ARS chairman Ian Wright, GW1MVL, passed the Foundation course, aged 11, in April. Coincidentally, Amy and Carys attend Rhos Primary School in the next town along the coast from Mark and Gareth!

ATC Help Required

CLIVE FORDER, G7LUC, is the squadron radio officer with a Liverpool ATC unit and has held the post for over 10 years. Due to ill health he now wishes to relinquish the role, and he is looking for a volunteer in the Merseyside area to take over. Clive says the ATC unit is very radio-orientated and also operates mobile and portable in support of its very active Duke of Edinburgh award scheme expedition programme, mostly in Snowdonia. If you wish to volunteer, or get more details, please contact Clive on 0151 525 5568 or e-mail: clive@g7luc.freeserve.co.uk

● UKIRLP HAS SET up a new website for everyone who is interested in repeater linking: www.ukirlp.co.uk

John Pink, G3OQB (left), was surprised when he started operating from the Rithymna Beach Hotel in Crete to find that SV9/PA3GYH was on the air - from the same hotel! John met John Keyzers (right) and they have kept in contact since returning to their home QTHs.

A New Band for Propagation and Antenna Experimentation

The 'Fivemegs Experiment' Gets Under Way

PERMISSION HAS been granted by the Ministry of Defence and the Radiocommunications Agency for the allocation to radio amateurs of five spot frequencies between 5260 and 5405kHz. The purpose of the experiment is to carry out propagation and antenna investigations aimed at improving the understanding of Near Zenithal Radiation or NVIS (Near Vertical-Incidence Skywave) communications via the ionosphere.

The frequencies assigned are 5260, 5280, 5290, 5400 and 5405kHz. These will be made available in the form of 3kHz bandwidth channels by way of a Notice of Variation (NoV) to the amateur radio licence.

In the first instance, NoVs will only be issued to Full Class A licence holders. It is hoped to relax this ruling as the experiment progresses. As this is a controlled experiment, applicants will be required to report their findings and results to the RSGB. The RSGB is tasked with providing both the RA and the MoD with reports on findings as the experiment progresses.

Full licence holders interested in taking part in the 'Fivemegs Experiment' can obtain an application form and further details from RSGB HQ, via the RSGB website, or by e-mail from: ar.dept@rsgb.org.uk It is anticipated that the experiment will run for a period not exceeding four years.

An article on 5MHz-band operation by Gordon Adams, G3LEQ, appears on page 44 this month.

Tim Kirby, G4VXE, in Windsor was one of the first UK amateurs to receive a 5MHz-band NoV on the morning of 5 August. Within a few minutes he was on the air using a 100-watt transceiver and an end-fed wire tuned for the 5MHz band. Tim reports working G0NBD in Wallasey, G3RXH in North Yorkshire, MW0AQD in South Wales, G3JFS in Plymouth and G3YXM in Birmingham on the first day of operation. His first impression of 5MHz propagation is that UK signals seem to be consistent throughout the day and evening. "Even at around 2045 local time, I was getting excellent reports from the Midlands - notably better than on 40m," he said. There seem to be long periods of fading and at Tim's location a lot of local noise, but he added: "It's really exciting to have the chance to unravel propagation on a 'new' band, first-hand."

How to set up an SSB transceiver for 5MHz-band operation. Note that *USB* (not LSB) should be used and that the VFO should be set 1.5kHz *below* the spot frequency, so that the *centre of the transmission* is on the nominal frequency (in this case 5260.0kHz).

● FOLLOWING THE announcement of the experimental release of five spot frequencies in the 5MHz region (60 metres), Peter Rhodes, G3XJP, writes: "Pic 'N' Mix and PicATUne will be upgraded for 60m operation over the next few weeks. Pic-A-Switch was an exercise for the student - and remains so. PIC-A-STAR will be 60m-compatible from the outset. Please e-mail me first for availability. The process will then be to send your original chips back with an SASE, and they will be re-programmed as part of the service. E-mail: g3xjp@qsl.net".

Niall Topping, aged 8 years, completed the Foundation Licence course and passed the examination at the Whitehaven ARC. He is now active as M3NWT and has operated the International Museums Weekend special event stations GB2HTM and GB2WBM. His knowledge of radio and his operating abilities owe much to his father, Steve, G0MTD, who has 'done a good job on him'. Could Niall be the youngest amateur in the UK? No doubt we will be informed if there are any younger. . .

Q u a l i t y • I n n o

ALINCO

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

~~£699.00~~ SPECIAL **£599.00**

ALINCO DX77E *HF Transceiver 'GREAT VALUE'*

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.

- 100W HF transceiver
- General coverage RX 500kHz - 30MHz
- All modes, FM, LSB, USB, CW & AM
- 100 memory channels
- Built in speech compressor
- Front mounted speaker, loud clear audio
- Optional keyer

~~£599.00~~ SPECIAL **£499.00**

EDX2

Auto Tuner

An automatic antenna tuner that matches a transceiver to a random wire antenna of over 3m in length (3.5MHz and above), or over 12m in length (1.6MHz and above). It comes installed with 5m of coaxial and control cables for instant operation with Alinco DX-70.

- Auto tuner
- 3.5MHz-30MHz (with over 3 metre element)
- 200W PEP power handling
- Power for tuning = 7-20W
- 13.8V DC ±10% operating voltage

£289.00

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

£59.95

ALINCO DR-605E *Dual Band Mobile*

The DR-605E is a no-nonsense twin-band mobile transceiver that delivers power and performance with user-friendly features. The command keys are simply laid out to enable intuitive operation.

- Ready for 9600 bps packet
- 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

£299.95

DJ-X3

Ultra modern scanning receiver

- 100kHz - 1300MHz
- AM/FM/WFM
- 700 memory channels
- Steps: 5/6.5/8.33/10/12.5/ 15/20/25/ 30/50/100kHz
- Auto descrambler
- Bug detector
- Stereo FM (with headphones)
- Attenuator
- SMA Antenna
- Battery saver cct
- Size: 56w x 102h x 23d mm
- Weight: 14.5g (without batteries)
- Supplied c/w: 3 AA dry cell battery case carrying strap

with 8.33kHz for airband

Optional extras

- Lithium ion battery pack
- Ni-Mh battery pack
- Drop in mains charger
- Earphone

£129.95

DR135E

- TX: 144 - 146MHz RX: Expandable 118 - 174MHz
- 50/10/5 Watts power settings
- 100 memory channels
- Frequency Steps: 5, 8.33, 10, 12.5, 15, 20, 25, 30, 50kHz
- Optional internal TNC operates 1200, 9600bps
- Front panel GPS input for APRS
- Rear panel DSUB9 computer connection
- Ignition key on/off feature
- CTCSS and DCS encode + decode
- Super-wide 7 character display
- Wide/narrow (25/12½kHz) FM modes
- Theft alarm feature
- AM airband receive
- Ten auto dial memories
- Size: 142 x 40 x 174mm

£235.95

NEVADA®

UK Distributors of Alinco Products

Unit 1 • Fitzherbert Spur • Farlington • Portsmouth • PO6 1TT • fax: 023 9231 3091

ORDER HOTLINE: **023 9231 3090**

v a t i o n • S t y l e

radios for 2002

DJ 193E

GREAT VALUE 2 mtr Handheld

- New design 2m (144-146MHz) handheld
- Up to 5W VHF
- Wide RX possible (typical 135-173MHz)
- CTCSS + DCS enc/dec fitted
- 40 memory channels + 1 call channel
- Alphanumeric display
- DCS, Tone burst and DTMF
- 13.8V DC direct input facility with battery charge feature
- THEFT ALARM!
  Emits a tone when disconnected from power
- S Meter with easy to read display
- Audio dialler
- Call cloning facility
- Comp. programmable 3rd party software
- Experimental insect repellent feature!
  Can the DJ-193 actually repel mosquitoes?
  Activate the special tone and decide for yourself!

£139.95

DJ-596 NEW Dual Bander

A feature packed dual bander - yet simple to use, with the capability of Digital Voice operation (where permitted - using optional digital voice board).

A nickel metal-hydride (NiMH) battery is supplied as standard, for added power and convenience.

VHF/UHF TX/RX including cross-band split operation

- 100 memory channels, any mix of VHF/UHF
- Alphanumeric channel labels
- Direct frequency input from keypad
- Large backlit display and keypad
- CTCSS, DCS encode+decode
- 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
- Wire cloning capability
- Optional digital mode *(where permitted)*

£199.95

DJ 195E

2 mtr Handheld with Keypad

Alinco has created a new 2 meter HT that sets new standards in features, convenience and easy operation. The DJ-195 sports an alphanumeric display for easy memory management. It has an ergonomic design that's "user friendly" and the 5 watt output battery is standard. You'll be ready to travel the world with CTCSS encode+decode, DCS and European tone bursts, all included at no extra cost.

- 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

£159.95

DJ-G5EY Feature Packed Dual Bander

A brilliant twin band handheld that does everything including spectrum display of 4 adjacent channels. The receiver has a superb front end that does not suffer with breakthrough like other handhelds and has CTCSS/DTMF built in as standard.

- Spectrum channel display
- RX expandable 108-173.995AM/FM 420-479.995 + 800-920MHz
- Built in CTCSS tone encoder & decoder
- DSQ encoder/decoder as standard
- Optional receive to include Airband
- Full VHF/UHF Duplex
- 100 memories
- Over air cloning
- Cross band repeater function
- Up to 5W RF output
- NiCad battery
- Charger, Rubber Duck antenna and Belt clip

Advanced Channel Scope

- Monitor 5 freq activities in VFO/Memory modes
- Simultaneous monitor of VHF/UHF bands
- Real time monitor of 11 channels during mono band operation
- VFO mode
- Memory mode
- Sweep scan

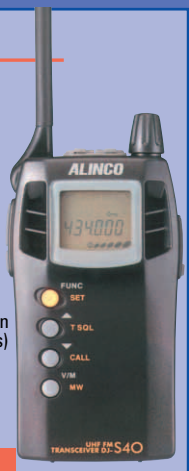
£289.95

DJ-S40 CQ

UHF Pager Sized Handheld

Alinco has created a new UHF FM Hand held Transceiver that sets new standards in features, convenience and easy operation packed in a compact pager-size package. The DJ-S40T has an ergonomic design that's "user friendly" and capable of 1 watt output with optional Ni-MH battery pack. You'll be ready to travel the world with CTCSS encode/decode and European tone bursts, all included at no extra cost.

- Up to 1 W output (with 13.8V supply)
- 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



£99.95

DJV5E

Compact Dual Bander

Alinco introduces an exciting new VHF/UHF handheld-transceiver that will change the way you think about communications. The new Alinco DJ-V5 can fill a variety of roles and it does them all well. Loaded with technical features, 5 watts of output power and a wide array of operator conveniences, the DJ-V5 is an attractive radio in a compact package.

- 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
- Automatic high temperature protection feature

£225.95

available from our dealers in the UK or direct

visit www.nevada.co.uk for more information

Send in an A4 SAE for your FREE Alinco colour brochure & leaflets

MOONRAKER

www.amateurantennas.com

TEL: (01908) 281705 - FAX: (01908) 281706

LOG PERIODIC

MLP32 TX & RX 100-1300MHz one feed, S.W.R 2:1 and below over whole frequency range professional quality (length 1420mm) **£99.95**

MLP62 same spec as MLP32 but with increased freq. range 50-1300 (Length 2000mm) ***New Low Price*** **£169.95**

MOBILE HF WHIPS
(with 3/8 base fitting)

AMPRO 6 mt **£16.95**
(Length 4.6'approx)
AMPRO 10 mt **£16.95**
(Length 7'approx)
AMPRO 12 mt **£16.95**
(Length 7'approx)
AMPRO 15 mt **£16.95**
(Length 7'approx)
AMPRO 17 mt **£16.95**
(Length 7'approx)
AMPRO 20 mt **£16.95**
(Length 7'approx)
AMPRO 30 mt **£16.95**
(Length 7'approx)
AMPRO 40 mt **£16.95**
(Length 7'approx)
AMPRO 80 mt **£19.95**
(Length 7'approx)
AMPRO 160 mt **£49.95**
(Length 7'approx)
AMPRO MB5 Multi band 10/15/20/40/80 can use 4 Bands at one time (length 100') **£69.95**

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 OdB/3.OdB 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") S0239 fitting commercial quality **£19.95**
MRQ500 2m/70cms, 1/2 wave & 2x5/8, Gain 2m 3.2dB/5.8db 70cms (Length 38") S0239 fitting commercial quality **£24.95**
MRQ750 2m/70cms, 6/8 wave & 3x5/8, Gain 2m 5.5dB/8.0dB 70cms (Length 60") S0239 fitting commercial quality **£39.95**
MRQ800 6/2/70cms 1/4 6/8 & 3x5/8, Gain 6m3,OdBi/ 2m 5.OdB/70 7.5dB (Length 60") S0239 fitting commercial quallty **£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**
MR258 2 Metre 5/8 wave 3.2 dBd Gain (3/8fitting) (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")
SO239 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**

SINGLE BAND END FED BASE ANTENNAS

70 cms 1/2 wave (Length 26") Gain 3.5dBd **£24.95**
2 Metre 1/2 wave (Length 52") Gain 3.5dBd **£24.95**
4 Metre 1/2 wave (Length 80") Gain 3.5dBd **£34.95**
6 Metre 1/2 wave (Length 120") Gain 3.5dBd **£44.95**
6 Metre 5/8 wave (Length 150") Gain 5.5dBd **£49.95**
(All above end fed antennas are without ground planes)

PROFESSIONAL MOBILE GLASS MOUNT ANTENNAS

GF151 2mtr (Length 20") **£39.95**
GF401 70cms (Length 11") **£39.95**
GF233 23cms (Length 9") **£44.95**
GF270 Dual band 2/70 (Length 31") **£59.95**

VHF/UHF VERTICAL CO-LINEAR FIBREGLASS BASE ANTENNAS

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

BM100 Dual-Bander **£29.95**
(2 mts 3dBd) (70cms 6dBd)
(Length 39")
SQBM100 Dual-Bander **£39.95**
(2 mts 3dBd@ (70oms 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)
(Length 100")
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 100/200/500/1000 are Polycoated Fibre Glass with Chrome & Stainless Steel Fittings. 2 years warranty.

2 METRE VERTICAL CO-LINEAR BASE ANTENNAS

BM60 5/8 wave, (Length 62"), 5.5dBd Gain **£49.95**
BM65 2 x 5/8 Wave, (Length 100"), 8.0 dBd Gain **£69.95**

70CMS VERTICAL CO-LINEAR BASE ANTENNAS

BM33 2 x 5/8 wave, (Length 39") 7.0 dBd Gain **£34.95**
BM45 3 x 5/8 wave, (Length 62") 8.5 dBd Gain **£49.95**
BM55 4 x 5/8 wave, (Length 100") 10 dBd Gain **£69.95**

ROTATIVE HF DIPOLE

RDP-3B 10/15/20 Mtrs Length 7.40m **£99.95**
RDP-40M 40Mtrs Lengh 11.20m **£139.95**
RDP-6B 10/12/15/17/20/30 Mtrs Boom Length 1.00m Length 10.00m **£199.95**

MINI HF DIPOLES

MDO20 20mtr version approx only 11ft **£39.95**
MDO40 40mtr version approx only 11ft **£44.95**
MDO80 80mtr version approx only 11ft **£49.95**

HAND-HELD ANTENNAS

"New Lower Price"

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 H/held antennas.

HB9CV 2 ELEMENT BEAM 3.5dBd

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**

YAGI BEAMS
All fittings Stainless Steel

2 Metre 4 Element
(Boom 48") (Gain 7dBd) **£24.95**
2 Metre 5 Element
(Boom 63") (Gain l0dBd) **£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 l0dBd) **£59.95**
6 Metre 3 Element
(Boom 72") (Gain 7.5dBd) **£54.95**
6 Metre 5 Element
(Boom 142") (Gain 9.5dBd) **£74.95**
70 cms 13 Element
(Boom 76") (Gain 12,5dBd) **£49.95**

ZL SPECIAL YAGI BEAMS
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**

YAGI COUPLERS

YC-6M For 2 x 50MHz Yagi **£29.95**
YC-2m For 2x144MHz Yagi **£24.95**
YC-7M 2x70cms Yagi **£19.95**

HALO LOOPS

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

MULTI PURPOSE ANTENNAS

MSS-1 Freq RX25-2000 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

G5RV WIRE ANTENNA

All fittings Stainless Steel

	FULL	HALF
Standard	**£22.95**	**£19.95**
Hard Drawn	**£24.95**	**£22.92**
Flex Weave	**£32.95**	**£27.95**
PVC Coated Flex Weave	**£37.95**	**£32.95**
Deluxe 450 ohm PVC Flexweave	**£49.95**	**£44.95**

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

UNIT 12, CRANFIELD ROAD UNITS, CRANFIELD ROAD, WOBURN SANDS, BUCKS MK17 8UR. sales@moonrakerukltd.com

CALLERS WELCOME
OPENING TIMES:
MON-FRI 9-6PM

SALES 01908 281705

E&OE.

G5RV INDUCTORS

"New Lower Price"

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

SHORT WAVE RECEIVING ANTENNAS

MD37 SKY WIRE £39.95
(Receives 0-40MHz)
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.
MWA-H.F. (Receives 0-30MHz) £29.95
Adjustable to any length up to 60 metres. Comes complete with 50 mts of enamelled wire, guy rope, dog bones & connecting box.

MOUNTING HARDWARE ALL GALVANISED

6" Stand off Bracket *(complete with U Bolts)* £6.00
9" Stand off Bracket *(complete with U Bolts)* £9.00
12" Stand off *(complete with U bolts)* £12.00
12" T & K Bracket *(complete with U Bolts)* £11.95
18" T & K Bracket *(complete with U Bolts)* £17.95
24" T & K Bracket *(complete with U Bolts)* £19.95
36" T & K Bracket *(complete with U Bolts)* £29.95
Chimney Lashing Kit £12.95
Double Chimney Lashing Kit £24.95
3-Way Pole Spider for Guy Rope/ wire £3.95
4-Way Pole Spider for Guy Rope/ wire £4.95
1 1/2" Mast Sleeve/Joiner £8.95
2" Mast Sleeve/Joiner £9.95
Solid copper earth rod £9.95
Pole to Pole clamp 2"-1.5" £4.95
Di-Pole Centre (for wire) £4.95
Di-Pole Centre (for aluminium rod) £4.95
Dog Bone insulator £1.00
Dog Bone Insulator (H/Duty) £2.00

POLES H/DUTY (SWAGED)

1 1/4"Single Ali Pole £7.00
1 1/4"Set of four £24.95
1 1/2"Single Ali Pole £10.00
1 1/2"Set of four £34.95
2"Single Ali Pole £15.00
2" Set of four(set of 4) £49.95

REINFORCED HARDENED FIBRE GLASS MASTS (GRP)

1 1/2" Diameter 2 metres long £16.00
1 3/4" Diameter 2 metres long £20.00
2" Diameter 2 metres long £24.00

GUY ROPE 30 METRES

MGR-3 3mm (max. load 15 kgs) £6.95
MGR-4 4mm (max. load 50 kgs) £14.95
MGR-6 6mm (max. load 140 kgs) £29.95

10/10 METRE VERTICALS

G.A.P.12 1/2 wave aluminium
(length 18' approx) £19.95
G.A.P.58 5/8 wave aluminium
(length 21' approx) £24.95

COAX

RG58 best quality standard per mt 35p
RG58 best quality military spec per mt 60p
Mini 8 best quality military spec per mt 70p
RG213 best quality military spec per mt 85p
H200 best quality military coax cable per mt £1.10

PHONE FOR 100 METRE DISCOUNT PRICE.

CONNECTORS & ADAPTORS

PL259/9 ..... £0.75
PL259/6 ..... £0.75
PL259/7 for mini 8 ..... £1.00
BNC (screw Type) £1.00
BNC (Solder Type) £1.00
BNC for 9mm (RG213) £2.50
N TYPE for RG58 ..... £2.50
N TYPE for RG213 ..... £2.50
SO239 to BNC £1.50
PL259 to BNC £2.00
N TYPE to SO239 ..... £3.00
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

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 £24.95

RIBBON LADDER USA IMPORTED

300 Ohm 20 mtr pack £15.00
450 Ohm 20 mtr pack. £15.00

(other lengths available please phone for details)

TRI/DUPLEXER & ANTENNA SWITCHES

MD-24 (2 Way Internal Duplexerl (1.3-35 MHz 500w) (50-225 MHz 300w) (350-540 MHz 300w) insert loss 0.2dBd SO239 fittings £22.95
MD-24N same spec as MD-24 'N-type' fitting £24.95
MD-25 (2 Way external/Internal Duplexer) (1.3- 35 Mhz 500w) (50-225 MHz 300w) (350-540 MHz 300w) insert loss 0.2dBd £24.95
MX2000 Tri-plexer 1.6-60MHz (800w) 110-170MHz (800w300-950MHz (500w) SO239 fitting £49.95
CS201 Two way antenna switch, frequency range 0-IGhz, 2,5 Kw Power Handling SO239 fittings £18.95
CS201-N same spec as CS201 'N-type' fitting £28.95

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

ROTATOR CABLE

3 Core ..... 0.45p per metre
7 Core ..... £1.00 per metre

(please phone for 100 metre discount price)

MOUNTS

Turbo Magnetic Mount 7inches 4 mtrs coax/PL259 3/8 or SO239 ..... £14.95
Tri-Magnetic Mount 3x5 inches 4 mtrs coax/PL259 3/8 or SO239 ..... £39.95
Hatch Back Mount (stainless steel) 4 mtrs coax/PL259 3/8 or SO239 fully adjustable with turn knob £29.95
Gutter Mount (same as above) £29.95
Rail Mount (aluminium) 4 mtrs coax/PL259 suitable for up to 1 inch roof bars or poles ..... 3/8 fitting £12.95
..... SO239 fitting £14.95
Gutter Mount (cast aluminium) 4 mtrs coax/PL259
..... 3/8 fitting £9.95
..... SO239 fitting £12.95
Hatch Back Mount 3/8 4 mtrs coax/PL259 ..... £12.95
Roof Stud Mount 4mtrs coax/PL259 3/8 or SO239 fitting £12.95

BEST QUALITY ANTENNA WIRE

The Following Supplied in 50 metre lengths

Enamelled 16 gauge copper wire £9.95
Hard Drawn 16 gauge copper wire £12.95
Multi Stranded Equipment wire £9.95
Flex Weave £27.95
Clear PVC Coated Flex Weave £37.95

TRAPS

10 Metre trap 400W £23.95
15 Metre trap 400W £23.95
20 Metre trap 400W £23.95
40 Metre trap 400W £23.95
80 Metre trap 400W £23.95

HF BALCONY ANTENNA

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

HF DELTA LOOP

DLHF-100 10/15/20 Mtrs (12/17-30M) Boom Length 4.20m Max Height 6.80m Weight 35 KG Gain 10dB £399.95

VISA SWITCH MasterCard

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: 8dBd 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: 7.5dBd BOOM: 4.27m LONGEST ELE: 10.00m POWER 2000 Watts ... £499.95
40Mtr RADIAL KIT FOR ABOVE £99.95

HF VERTICALS

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

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

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

EVX5000 5 BAND VERTICAL FREQ: 10-15-20-40-80 Mtrs GAIN: 3.5dBd HEIGHT: 7.30m POWER 2000 Watts (wihtout radials) POWER 500 Watts
(with optional radials) £139.95
OPTIONAL 10-15-20 Mtr radial kit £34.95
OPTIONAL 40 Mtr radial kit £14.95

EVX6000 6 BAND VERTICAL FREQ: 10-15-10-30-40-80 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 HF verticals require grounding if optional radials arenot purchased to obtain a good VSWR)

TRAPPED WIRE DI-POLE ANTENNAS

(Hi Grade Heavy Duty Commercial Antennas)

(picture for reference only)

UTD160 FREQ: 160 Mtrs LENGTH: 28m POWER:1000 Watts £44.95
MTD-1 (3 BAND) FREQ: 10-15-20 Mtrs LENGTH: 7.40m POWER: 1000 Watts £39.95
MTD-2 (2 BAND) FREQ: 40-80 Mtrs LENGTH: 20m POWER: 1000 Watts £44.95
MTD-3 (3BAND) FREQ: 40-80-160 Mtrs LENGTH: 21.5m POWER: 1000 Watts £79.95
MTD-4 (3BAND) FREQ: 12-17-30 Mtrs LENGTH: 10.5m POWER: 1000 Watts £44.95
MTD-5 (5 BAND) FREQ: 10-15-20-40-80 Mtrs LENGTH: 20m POWER: 1000 Watts £69.95

(MTD-5 is a crossed di-pole with 4 legs)

TELESCOPIC MASTS
(aluminium and fibreglass options)

TMA3 - 3" to 11\4" Heavy Duty Aluminium Telescopic mast set, approx 40ft when erect 6ft collapsed £149.95
TMA2 - 2\1\2" to 11\4" Heavy Duty Aluminium telescopic mast set, approx 30ft when erect 6ft collapsed £129.95
TMA1 - 2" to 11\4" Heavy Duty Aluminium telescopic mast set, approx 20ft when erect 6ft collapsed £99.95
TMAF - 2" to 11\4" Heavy Duty Fibreglass telescopic mast set, approx 20ft when erect 6ft collapsed £99.95

WINDOM WIRE DI-POLE

MWD-3 Freq: 10/20/40 Length: 20mtrs Power:500 watts Balun: 6:1 included Socket: SO329 ..... £44.95
MWD-5 Freq: 10/20/40/80 Length: 36mtrs Power: 500 watts Balun: 6:1 included Socket SO239 ..... £54.95

MISCELLANEOUS ITEMS

CDX Lightening arrestor 500 watts £19.95
MDX Lightening arrestor 1000 watts £24.95
AKD TVI Filter £9.95
Amalgamating Tape (10mtrs) £7.50
Desoldering Pump £2.99
Alignment 5pc kit £1.99

All prices plus £6.00 per order

PIC-A-STAR:

a Software Transmitter And Receiver

*Part two of our new series by Peter Rhodes, BSc, G3XJP **

SOFTWARE is this month's topic, namely an outline of what it does, how it works, how it is packaged and how you obtain it.

PIC-A-STAR DSP

ILLUSTRATED in **Fig 2** is the functionality implemented in software. You will have seen not dissimilar block diagrams implemented in analogue hardware - but not at this price and not inside a 28mm² chip!

Actually, there is an intrinsic overhead, namely that the analogue signals need converting to digital form before processing - and back to analogue after. This is the purpose of the CODEC (encoder / decoder) referenced on several inputs and outputs - and is implemented on a separate chip.

* *Danvers House, Wigmore, Herefordshire HR6 9UF.*
E-mail: G3XJP@qsl.net

The greatest appeal of the software approach, not least to the amateur, is the flexibility to change the line-up at a touch of the keyboard, so to speak. This allows easy experimentation (or overt tinkering, if you prefer), since at any time you can abandon the change and go back to the previous version. There are other subtleties.

For example, you will find five 15kHz oscillators scattered around the diagram. In fact their frequencies change depending on mode ie USB / LSB / CW. In DSP software terms the sinusoidal oscillator is simply a subroutine. To invoke it, all you need do is tell it what frequency / phase you want on any given occasion - and it is done.

Another example is the 'delay' in the receiver front-end image-cancelling I / Q mixer. In one path, there is a 90° phase shift, in the other a delay. The latter arises because it takes real elapsed *time* to produce the phase shift, so an equal amount of *time* has to be 'wasted' in the other channel to maintain that phase relationship.

TIME IS OF THE ESSENCE

The basic understanding you need in order to grasp how DSP works is to note that time is the critical commodity. Every functional box in Fig 2 takes time to execute. So does every individual instruction that goes to make up that functionality.

This would be of little concern were it not for our old friend Nyquist. He stated that, in order to process a signal faithfully, you must sample it at (at least) twice the rate of the highest frequency present.

For example, the incoming receive signal is around 15kHz, and so needs to be sampled at 30kHz or more. In fact, 48kHz is used

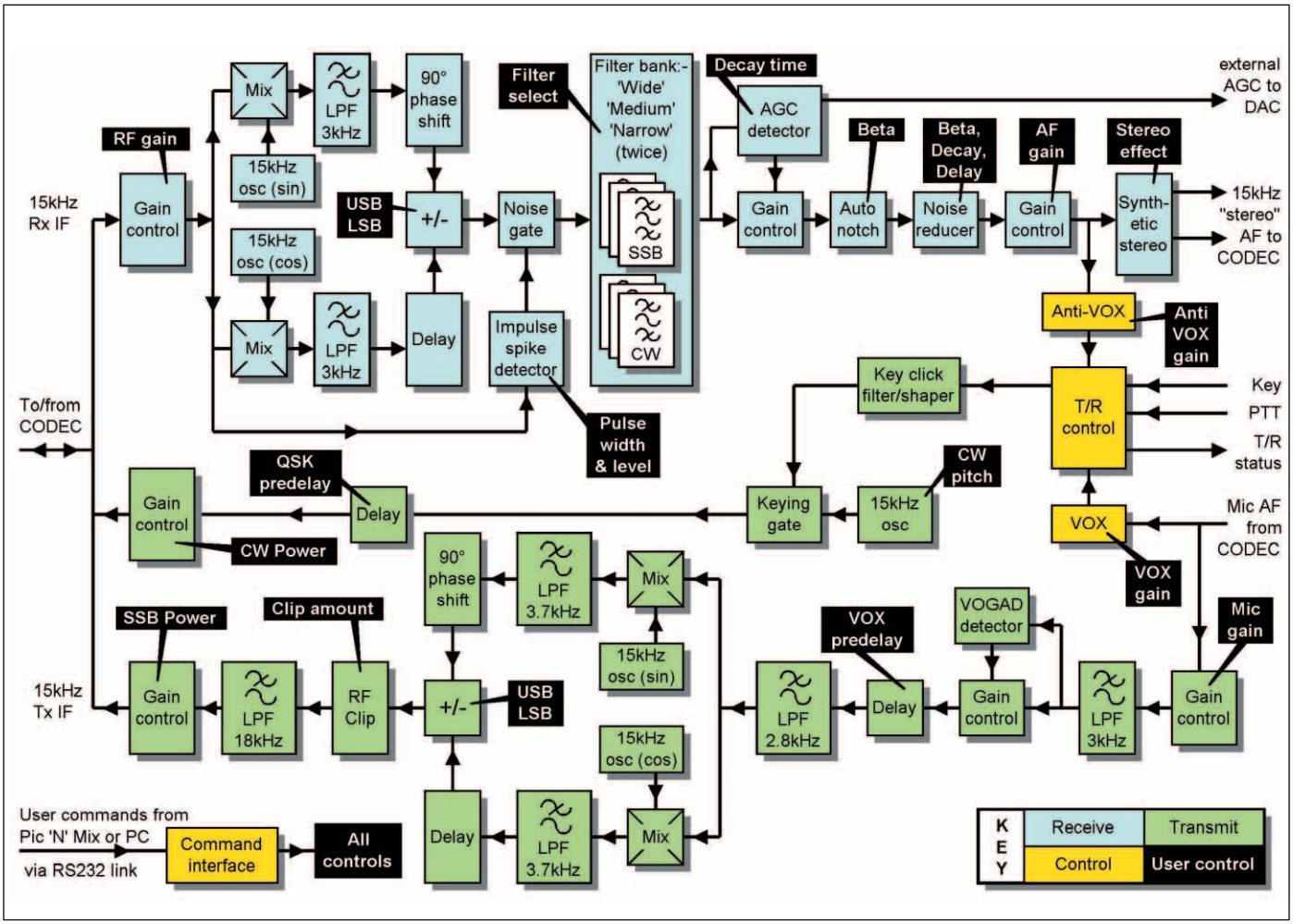


Fig 2: Software block diagram of PIC-A-STAR DSP functionality. Not shown are simple on / off switches associated with VOX, noise blanker, auto-notch, noise reducer and the RF clipper. The filter bank also has an off (ie bypass) switch to give a net maximum bandwidth of some 3kHz.

to provide a useful margin.

The consequence of this is that, having grabbed one sample, you have no more than 20.83µs (by simple arithmetic) to do all the processing required before you *have* to get back to handle the next one.

So just how much processing can be achieved in 20 millionths of a second? The ADSP-2181 processor in this design executes an instruction in 30 nanoseconds. The simplistic answer is therefore 666 instructions-worth. But this is far from the whole story. During one processor cycle it can, for example, fetch two 16-bit numbers, multiply them to give a 32-bit product and add the result to a 40-bit accumulator. This MAC (Multiply & Accumulate) instruction is the essence of filter implementation and is critical because you need to loop around it many times. Meanwhile, in the background, the processor is also organising data samples in and out of the CODEC as well as handling any serial communications port activity.

Fig 3 shows a snatch of PIC-A-STAR code, so you can visualise just how much radio you get from each line of code.

MULTI-RATE PROCESSING

There is a more structural solution to the issue of buying some time - which, equally, derives from Nyquist. Namely, once the receive signal has been mixed down to audio, you no longer need to process it at the 48kHz rate. Twice the audio frequency is fast enough.

PIC-A-STAR runs audio processing at 8kHz - by grouping the audio functions into six blocks and running one of them - but each in turn - during six successive 20.83µs time-slots. At the end of each slot the data is again processed at 48kHz because that is the sample rate used by the CODEC for outbound signals also.

So you can see that, all the way along the line, Nyquist is satisfied - and so am I because there is plenty of time for some exotic as well as the more mundane processing.

```
{ Fetch Rx sample via CODEC and place in register mx0 ...}
      mx0=dm(Rx_in_buffer);
{ ... and fetch current RF gain value and place in register my0. }
      my0 = dm(RF_gain);
{ Multiply the two together to give a gain-controlled value ...}
      mr = mx0 * my0 (SU);
{ ... and keep the gain-controlled signal in register my0. }
      my0 = mr1;
{ Fetch the phase incremented value of LO and place in register ax0 ...}
      ax0 = dm(LO_ phase);
{ Pass the phase value to sin to get instantaneous sinusoid amplitude ...}
      call sin;
{ ... and mix (ie multiply) it with the signal in register my0 }
      mr=ar*my0(SS);
```

Fig 3: Some early lines of code for the receiver. Yes, the last line truly is a mixer (otherwise known as a *product* detector).

SOFTWARE PACKAGING

THE DESIRE to provide choice and flexibility, but above all upgradability (if that is an English word), leads to some complication in describing the various modules. The context will become clearer once the hardware functionality has been covered. Suffice it to say at this stage that, from an operator's perspective, the system is totally transparent, ie you just switch it on, wait about 20 seconds (as if for the valves to warm up) and then use it. The software comes in the following modules:

DSP BOOT UTILITY

This code resides in PROM on the DSP board. At power-on time, besides running some basic hardware checks, it manages the on-board serial port to load the target DSP code. This utility was written by Bob Larkin, W7PUA, for PIC-A-STAR based on the original AD code.

DSP TRANSMIT / RECEIVE CODE

This runs on the DSP board and provides the core functionality as in Fig 2. It needs to be loaded at power-on time, a process which takes some 20 seconds. Subsequent to loading it, you also need to be able to command it.

DSP LOADER

This is a *QBASIC* utility which runs on your PC. It is written in very basic *BASIC* to enable you to adapt it or port it if you wish. It has two distinct alternative functions:

- to load and subsequently command the DSP code *directly* to the DSP board, via a COM port and a 9.6KB serial link.
- to load a new (or, of course, first) release of the DSP code to the PicAdapter board (see next) in Pic 'N' Mix. Subsequently, Pic 'N' Mix automatically loads the code at power-on time - and provides the command user interface.

These alternatives are not mutually exclusive. For early testing and use, the former gets you going quickly. The latter frees up your PC and, in my view, gives a much cleaner user interface - albeit with a little practice. The choice is yours.

(There is a further option here. You could build a dedicated controller using any programmable device with an RS232 capability. The command syntax is simple and also provided - and is in any event self-evident from the *QBASIC* code. With some loss of maintainability, you could also burn the entire transmit / receive code into the boot PROM / EPROM.)

PIC 'N' MIX PICADAPTER

Written in MicroChip Assembler, this code runs on a 16F870 (which replaces the present 16x84) to provide all the original DDS control functionality of Pic 'N' Mix and, in addition, it now integrates the ability to:

- download new release DSP code from your PC (via the web);
- subsequently upload that same code to the DSP board at power-on time;
- command the DSP using the self-same keypad, tuning knob and display as already fitted to Pic 'N' Mix.

TIMER BOARD

Also in MicroChip Assembler, this code runs on a 16F627. It provides the sequencing and timing of receive / transmit transitions - both ways - to make them as clean and fast as possible. This board is designed to be general and will find uses on other transceiver projects.

BARGRAPH S-METER

This is both optional for PIC-A-STAR and equally of general application. Also running on a 16F627, it controls a 12-LED bargraph on the Status board. It was built at all because 10 LEDs, as provided by most control chips, are not enough - and in any event, the PIC provides a lower-cost solution.

TO SUMMARISE

The programmed chips are a PROM, a 16F870 and two 16F627s. These provide the base infrastructure. The target DSP code - where most of the future enhancements will occur - is loaded from your PC using the *QBASIC* utility. No further hardware (eg a programmer) is needed.

SOFTWARE DISTRIBUTION

ALL THE SOFTWARE itemised above will be available for your personal use at no charge. However, this does not mean it comes entirely free. The 'price' is that you need to send me an e-mail note requesting the software - giving an explicit undertaking that it is for your personal use and for the purpose of self-education.

Not least, this allows me to maintain a list of 'customers' to advise when updates become available; as mentioned previously, this is, by intent, a project without end.

By software, I mean at this stage the loadable object code. Source code availability mechanisms are still under consideration but, at the least, it will not be for many months.

If, however, you want me to use my resources to program chips for you then I will supply them ready-programmed at £8 per chip - plus return postage. It is worth pointing out in this context that you could build a programmer yourself for about £10. ♦

The Leicester Amateur Radio Show Committee is proud to present

The 31st
LEICESTER AMATEUR RADIO SHOW & CONVENTION

COMPUTERS, RADIOS and ELECTRONICS at
THE CASTLE DONINGTON INTERNATIONAL EXHIBITION CENTRE DONINGTON PARK NW LEICESTERSHIRE
Less than 5 minutes from J23A & J24 M1 Motorway
on Friday 20th & Saturday 21st SEPTEMBER 2002
OPENING TIMES 9.30am to 5.30 Friday, 9.30am to 5pm Saturday

ALL MAJOR DEALERS, AOR, ICOM, KENWOOD, YAESU
FLEA MARKET, BRING and BUY, large RSGB stand, LOCAL & NATIONAL CLUBS AND SOCIETIES

Morse tests on demand, demonstration amateur radio stations, camping and caravanning on site

CONVENTION
Featuring BOB HEIL, K9EID, The Science of Audio and IAN WHITE, G3SEK In Practice Live.
(Bring your technical questions for Ian to answer.) RSGB Forum, ATV and Mobile Phone technology.
BRING YOUR CARD FOR THE QSL BOARD SO YOUR FRIENDS CAN LOOK OUT FOR YOU
TALK-IN 145.550 & 433.550MHz by GB2LS

ADMISSION PRICES
1 DAY TICKET £3, concessions (OAPs & under 16) £2.50, 2 DAY TICKET £5, concession £4
Under 12 FREE when accompanied by an adult
FOR FURTHER DETAILS AND THE MOST UP-TO-DATE INFORMATION SEE OUR INTERNET SITE
at http://www.lars.org.uk
STAND BOOKINGS contact John Theodorson, G4MTP
Tel: 01604 790966, Fax: 0701 0701 360 E-mail: g4mtp@lars.org.uk
FLEA MARKET BOOKINGS contact John Senior, G7RXS on 0116 284 1517 E-mail: SENIORJA@ aol.com
All other enquiries to Geoff Dover, G4AFJ Tel: 01455 823344 Fax: 01455 828273 E-mail: g4afj@argonet.co.uk

CQ CHRISTIAN RADIO AMATEURS!

The World Association of Christian Radio Amateurs and Listeners actively promotes Christian fellowship worldwide. Regular nets, activity days, Annual Conference, handbook, magazine etc. Call our UK Sunday "Good News" nets 3747kHz at 8am, 7047kHz at 2pm, or 144.205MHz at 3pm.

For our brochure telephone 01803 854504 or write to our Membership Secretary

WACRAL
51 Alma Road, Brixham, South Devon, TQ5 8QR
See internet Web Page http://www.wacral.org

Masts for Sale

Domestic and commercial applications
Available from Tennamast or from Waters & Stanton plc.

Prices from ***£262.00***

The demonstrator Adapt-A-Mast will be on display on the W&S stand at various shows around the country.

Quality products from quality companies.
Tennamast and Waters & Stanton are registered to **ISO 9000** quality standards.

Ordering a mast has never been easier.
CONTACT W&S ON 01702 206835 OR WRITE, FAX OR E-MAIL FOR FURTHER INFORMATION.

See the Tennamast products on www.tennamast.com

Tennamast (Scotland) Ltd,
81 Mains Road, Beith, Ayrshire KA15 2HT.
Tel/Fax: 01505 503824 - 24 hrs.
E-mail: nbrown@tennamast.com or tennamast@btinternet.com

The FT817 Store

FT817 with NiCads & mains charger	**£595**
YF122S Yaesu 2.3kHz SSB filter	**£97.50**
YF122C Yaesu 500Hz CW filter	**£85.00**
712E InRad deluxe 300Hz CW filter	**£104.95**
MP817 Mini 'Palm' twin paddle	**£49.95**
Speech Processor RF Clipper which fits inside the MH31 Yaesu microphone	**£39.95**
CSC83 Leatherette carrying case	**£19.95**
ATX Walkabout & Driveabout aerials	**£69.95**
PMX Portable ground plane aerial	**£99.95**
Miracle Whip set-top aerial/tuner	**£129.95**
LDG Z11 QRP Auto ATU	kit: **£169.95**
(requires 12V supply)	built: **£199.95**
MFJ971 ATU + Pwr/SWR meter	**£99.95**
PS817 switch mode mains PSU 2.6A	**£19.95**
1800mAH NiMH AA batteries - 8 for	**£19.95**
CT62 serial lead and interface	**£23.00**
DC power lead, fused, ferrite choke	**£9.95**
DC power plug, straight (fits thru case!)	**£0.75**
Mini DIN leads 8 or 6 pin	**£3.50**
Mini DIN plugs 8 or 6 pin	**£1.50**

Prices include VAT, carriage charged extra

G3TUX

PO Box 88 Haslemere GU27 2RF
www.g3tux.com 01428 661501
For Kits, Keys and QRP

THE CDG2000 HF TRANSCEIVER

Part four, by Colin Horrabin, G3SBI, Dave Roberts, G8KBB, and George Fare, G3OGQ *

THE ROLE of the IF unit is to accept a single, band-limited signal from the post-mixer amplifier and to amplify it to a level suitable for a 'standard' +7dBm diode product detector. It should do so in such a way that the level delivered is 'constant' for any input signal over a 120dB dynamic range. It must possess a low noise figure at its input and allow control over its operating parameters.

The IF unit presented here is not our design. Bill Carver, K6OLG (now W7AAZ), produced an excellent one in 1996 which was published in *QST* [10]. It is also described in the *RSGB VHF/UHF Handbook* [11].

If you refer to the block diagram in part one of this series, you will note that there is no AGC shown at all. This is because the AGC is local to the IF strip. With no preamplifier, there is no need for external AGC.

What made Bill's design so good was that it had a carefully-designed fast / slow AGC circuit to handle sudden signal increases, and it was based on high-quality Analog Devices XAMP family amplifiers [12].

As Bill pointed out in his *QST* article, the handling of sudden signal level changes fundamentally affects how the recovered signal sounds. The IF possesses a fast and a slow AGC loop. When a sudden increase in signal occurs, the fast loop responds to it and reduces its gain. The slow loop is on the 'other' side of a noise filter and responds slowly. The composite AGC signal is a combination of the two AGC circuits. A block diagram of the IF is shown in **Fig 19**. The effect of this dual-loop AGC is to produce an output signal that does not suffer distortion on the initial signal peaks.

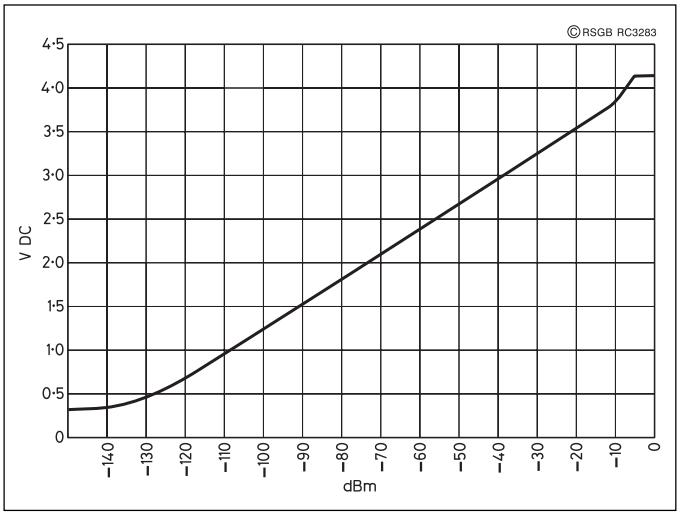


Fig 20: S-meter output range from an early version of the unit.

A full description will not be given here; the reader is referred to the *QST* or *RSGB VHF / UHF Handbook* articles. The input amplifier is a single J310 FET amplifier carefully matched to the 50Ω input impedance, providing 12dB of gain and matching the input impedance of the AD600. Each AD600 is a dual variable-gain amplifier with each stage providing 40dB of gain control range. The first device thus produces 80dB of control range.

The signal then passes through a crystal filter that is designed to remove wideband noise. Without this, there would be too much noise in the circuit to allow gain control over a 120dB range. The next AD600 is not used to provide another 80dB of control - a total of 160dB would be pointless. Instead, one half is used to give another 40dB to the AGC-controlled IF strip, giving a range of 120dB, and the final stage is used to adjust the output signal level. This is how the unit delivers a constant audio level over its whole AGC controlled range - but it can be tweaked to personal taste if you prefer.

The AGC circuits also provide an accurate logarithmic signal output - see **Fig 20**. This is used to drive the S-meter on the controller of the CDG2000, or it may be used to drive an analogue meter. In order to compensate for attenuator setting changes or band-by-band gain differences, the controller can be used to provide an offset to the AGC signal so that the S-meter always reads correctly.

There are two controls for the IF unit - 'IF gain' and 'AGC hang time'. These may either be driven by pots or by a digital-to-analogue converter. The CDG2000 controller provides for this.

* *1 Old Hall Close, Higher Walton, Warrington WA4 6SZ.*

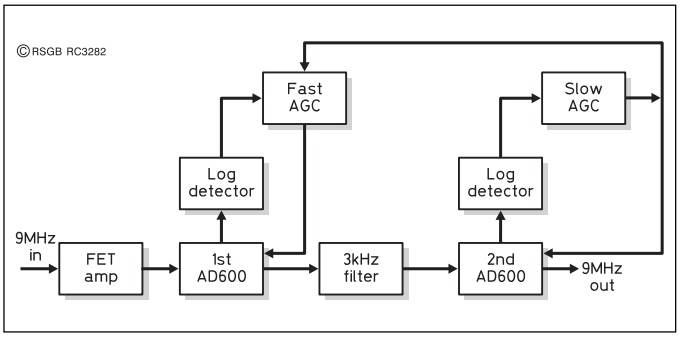


Fig 19: Block diagram of the IF unit.

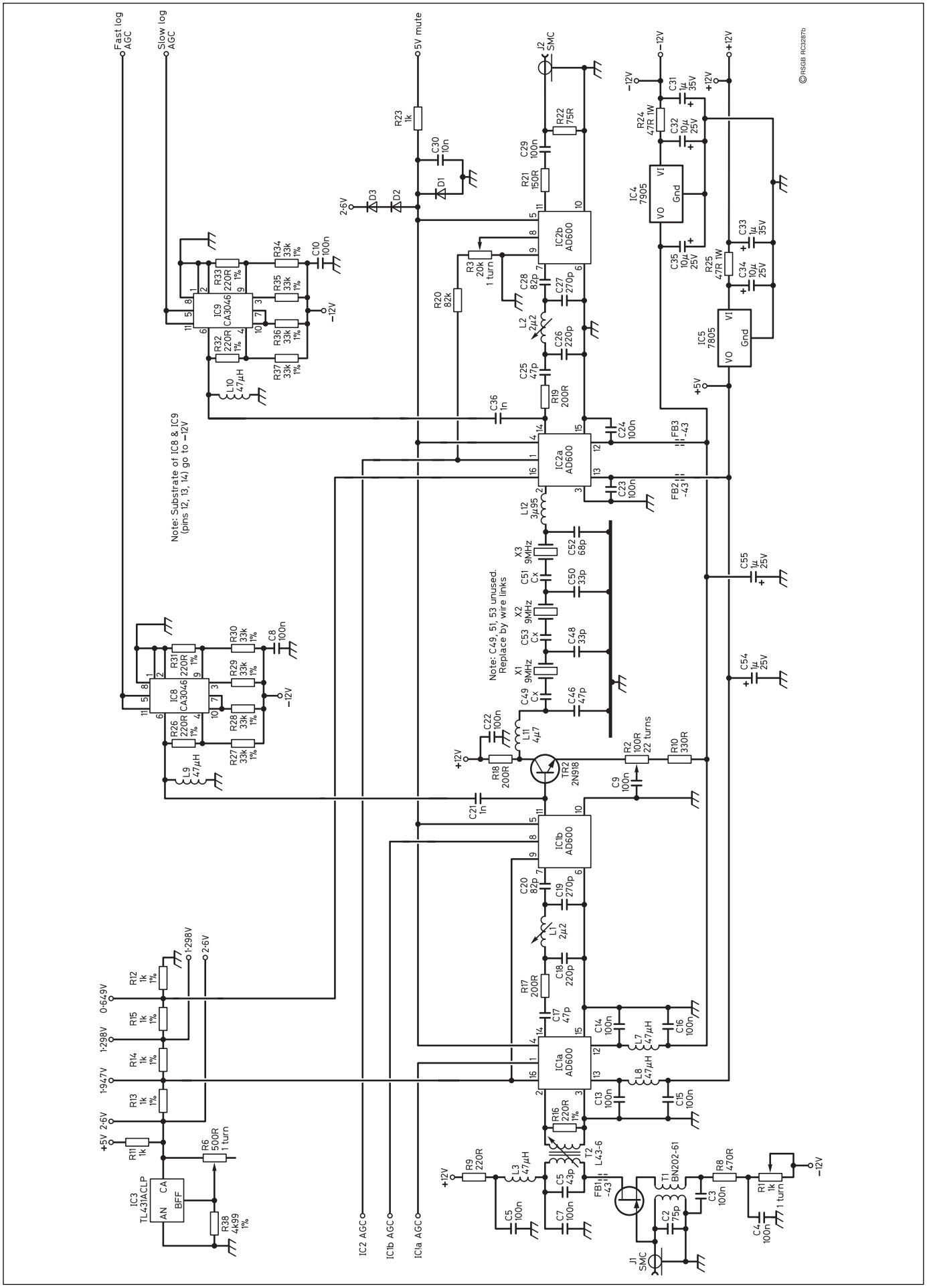


Fig 21: Circuit diagram part 1 - the signal path.

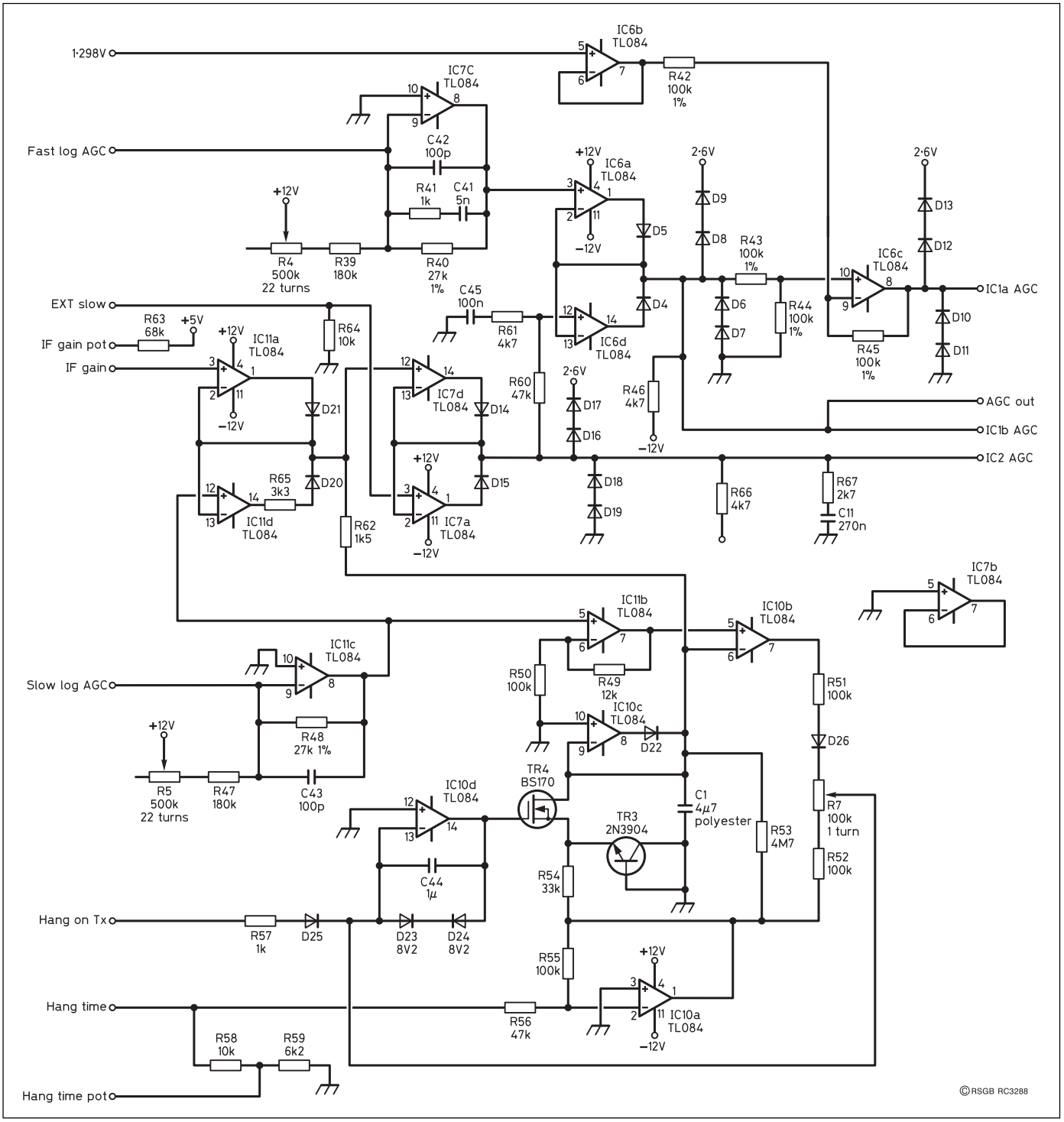


Fig 22: Circuit diagram part 2 - the AGC circuits.

IF gain rarely needs adjustment. Finally, control lines are used to hold the AGC voltage when on transmit.

A full circuit diagram of the IF unit is shown in **Fig 21** and **Fig 22**, the component layout is shown in **Fig 23**, and the PCB tracking in **Fig 24**. Note that the PCB is tracked for a simple crystal filter made of 9MHz crystals. The exact details of this filter depend on whether you have spare crystals or ready-made filters to hand. See Bill's original article for details. The diagram shows series capacitors between the crystals. These are not used, but provided for the experimenter if the filter design is changed. They should be replaced by wire links in this application. The filter is matched to the 100Ω output impedance of the buffer amplifier and the 200Ω input of the following AD600 by standard L-match networks. This is the reason for the asymmetry in the component values.

CONSTRUCTION

BASICALLY, we liked Bill's design [10] a lot, and saw no reason to change it at all. The only substantive physical change was to re-track the PCB so that it would fit on a single Eurocard. Fitting it in was a squeeze, and both layout and construction must be carried out carefully to avoid instability.

The ICs are socketed - the AD600s are not cheap - but with that much gain, the earthing is critical. The ground pins of the sockets on the AD600s are soldered directly to the top of the board (the ground plane) and, in some cases, to the tracks on the bottom as well. Turned-pin sockets

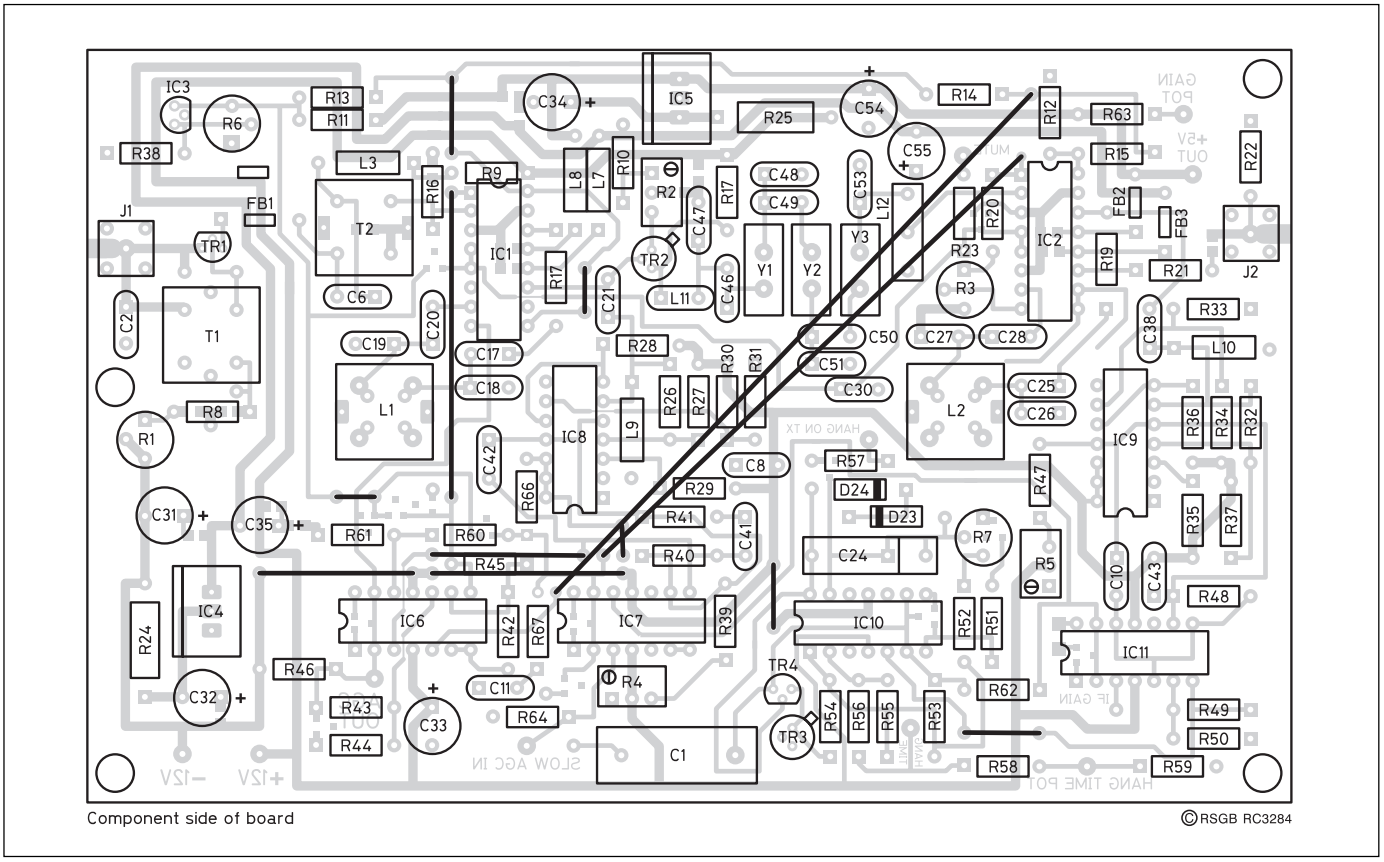


Fig 23: Component placement on the top of the board. On the underside are the SOT-23 diodes and chip decoupling capacitors.

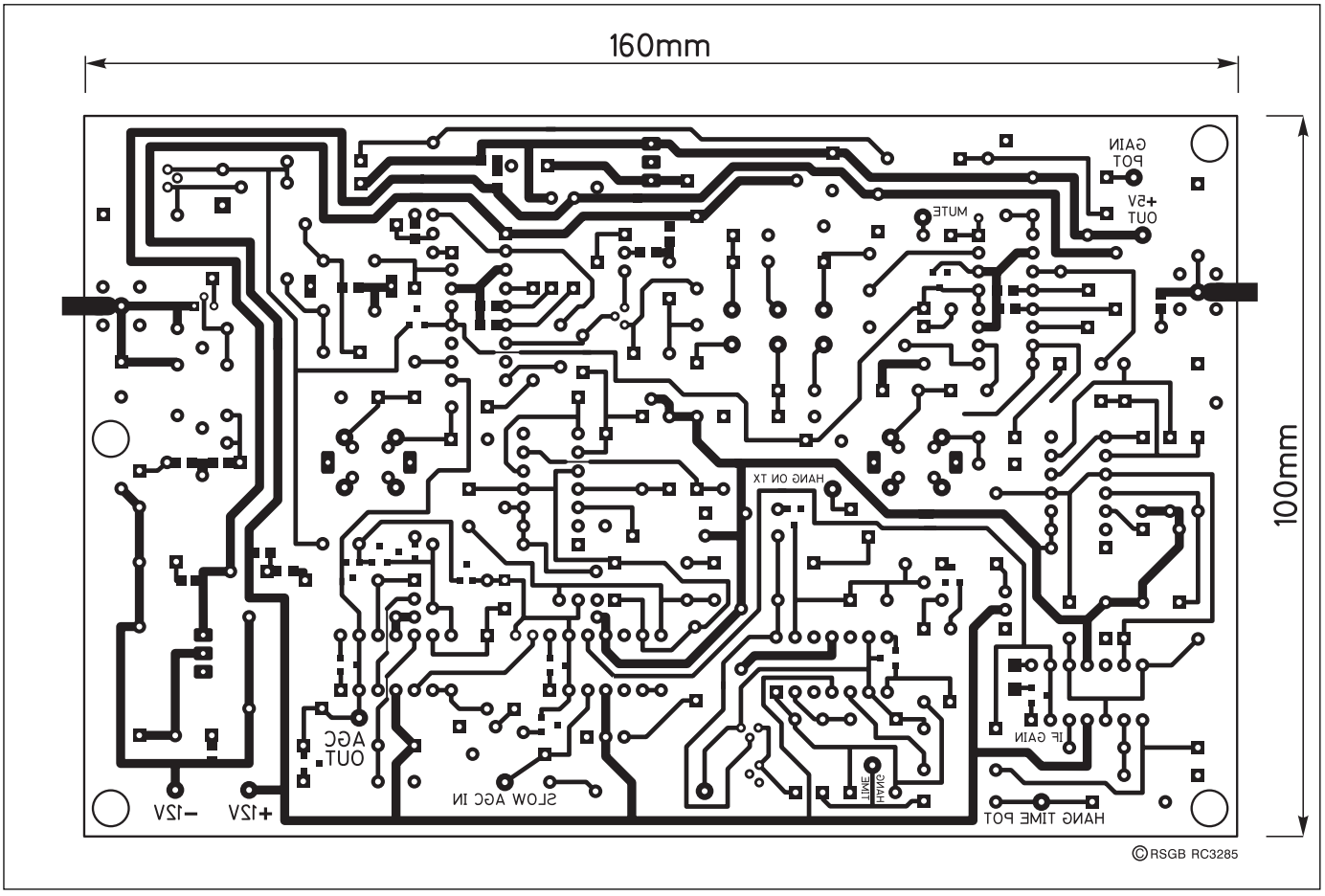


Fig 24: PCB tracking. Note the pads for the SOT-23 diodes.

COMPONENTS LIST FOR THE IF UNIT

Capacitors

33p ceramic plate	C48,50
43p ceramic plate	C6
47p ceramic plate	C17,25,47
68p ceramic plate	C52
75p ceramic plate	C2
82p ceramic plate	C20,28
100p ceramic plate	C42,43
220p ceramic plate	C18,26
270p ceramic plate	C19,27
1n multilayer ceramic	C21,36
4n7 ceramic	C41
10n multilayer ceramic	C30
100n 50V ceramic chip 0805	C3,4,5,7,9,13,14,15, C16,22,23,24,29,45
270n	C11
1µ polyester	C44
1µ 35V tantalum bead	C31,33,54,55
4µ7 polyester	C1
10µ 25V tantalum bead	C32,34,35

Semiconductors

8.2V Zener	D23,24
J310 FET	TR1
2N918 or similar	TR2
2N3904 or similar	TR3
BS170 FET	TR4
AD600JN	IC1,2
TL431 ACLP regulator	IC3
7905 regulator	IC4
7805 regulator	IC5
TL084 op-amp	IC6,7,10,11
CA3046 transistor array	IC8,9

Diodes all dual SOT-23, either series BAV99 or common-cathode BAV70. They are grouped as follows. Note final four are single diodes tracked on the PCB so that either BAV99 or BAV70 may be used.

BAV99	D2/3, 6/7, 8/9, 10/11, 12/13, D16/17, 18/19
BAV70	D4/5, 14/15, 20/21
Either BAV99 or BAV70	D1,22,25,26

Other

9MHz A164A crystal (IQD or similar) Y1,2,3

Resistors

1k 1-turn cermet preset	R1
100ohm 22-turn cermet preset	R2
20k 1-turn cermet preset	R3
500k 22-turn cermet preset	R4,5
500ohm 1-turn cermet preset	R6
100k 1-turn cermet preset	R7
47R 1W	R24,25
75R	R22
150R	R21
200R	R17,18,19
220R 1%	R16,26,31,32,33
220R	R9
330R	R10
470R	R8
1k	R11,23,41,57
1k 1%	R12,13,14,15
1k5	R62
2k7	R67
3k3 1206 ceramic chip	R65
4k7	R46,61,66
4k99 1%	R38
6k2	R59
10k	R58,64
12k	R49
27k 1%	R40,48
33k 1%	R27,28,29,30,34,35,36,37
33k	R54
47k	R56,60
68k	R63
82k	R20
100k	R50,51,52,55
100k 1%	R42,43,44,45
180k	R39,47
4M7	R53

Inductors

Type 43 ferrite beads	FB1,2,3
2.2µH Toko 7mm	L1,2
47µH RFC	L3,7,8,9,10
4.7µH RFC	L11
3.95µH (36 turns on T37-6)	L12
See notes below	T1, T2

Notes:

T1 is wound on a BN-61-202 ferrite core as shown in Fig 25. Use only the ferrite specified.

T2 is an 8-turn trifilar winding on an Amidon L43-6 coil former. The primary winding of the transformer comprises two of the windings in series. The secondary is the third winding.

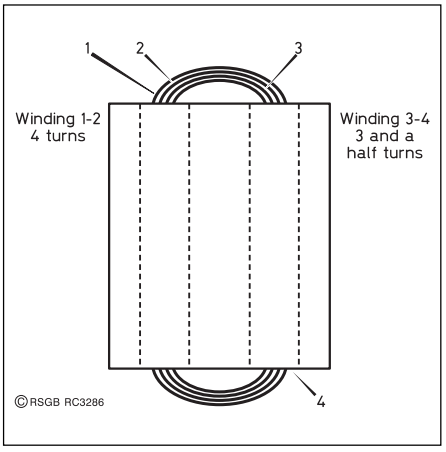


Fig 25: T1 winding details on a BN-61-202 core.

are suggested, and it is easier to attach these before any other components and certainly before you solder the board into a screening box (if that is what you choose to do). Do not miss any ground connections. George can vouch for the effect on stability if you do! There are many diodes shown in the circuit. These tend to be in pairs, so dual diodes in Surface Mount SOT23 packages were used. These are of two types and it is incredibly easy to get them mixed up, so be careful.

Before you start assembling, however, decide how you will screen the unit. Being a Eurocard, it lends itself to soldering into a standard tin-plate box (hint), but other methods are just as good. Use feedthrough capacitors for the control and power lines. Use small coaxial connectors such as SMC for the signal lines. RF input is provided via an SMC connector soldered to the surface of the tin plate box.

The coils need some comment. Transformer T1 is formed on a BN-61-202 ferrite as shown in **Fig 25**. Do not use anything else. T2 is an 8-turn trifilar winding on an Amidon L43-6 form. Coils L1 and L2 are off-the-shelf

2.2µH coils – the PCB is tracked to take 'standard' 7mm or 5mm coils such as the Toko series pre-wound devices.

Alignment is covered well in Bill's original text and will not be repeated here, but is straightforward. You will notice, however, that some of the preset potentiomaters are multi-turn devices. If these are not used, alignment will be very difficult. With 22-turn potentiometers, it is simple.

Finally, a slightly revised circuit was produced by Bill, K6OLG, after the original circuit was published. The circuit shown here follows his revised version. The changes are minor, and involved adding R65, R66, R67 and C11 and changing the value of R62 from 4k7 to 1k5. In making this change, R65 was added as a chip resistor. Note also that, not shown on the original circuit diagrams but present on the PCB layout, the substrate connections of IC8 and 9 need to be connected to -12V.

All semiconductors are available from Farnell. Toko coils are available from BEC. The crystals are the same type as those used in the front-end roofing filters.

The crystal filter is tracked out to allow the design to be altered. Specifically, the three series capacitors C49, C51, C53 are unused in our version, but tracking is included should the implementer decide to alter the design to one that requires series capacitors.

There are two wire links not shown on the layout (for the sake of clarity) for which pads are provided. IC7 pin 13 connects to IC2 pin 1 and the junction of R14 and R15 connects to IC6 pin 5.

The board layout shows signal connections as an SMB / SMC type socket, and the keen reader will notice that the corresponding tracks on the underside of the board extend right up to the edge. This is to allow for variations in build; either a socket can be soldered direct to the ground plane, a wire taken to a socket on the side of the board, or a socket soldered to the tin-plate box may be positioned so that its pin lies directly on the signal track.

PERFORMANCE

BASICALLY, "It does what it says on the box" to mis-quote the TV advert. It works well. It is sensitive enough that the post-mixer amplifier's performance governs the overall sensitivity of the rig rather than that of the IF strip.

Three words of warning, though. Screen it well.

ACKNOWLEDGEMENTS

THANKS, BILL, K6OLG, for doing a good job on the design, and thanks also to Harold Johnson, W4ZCB, for the support given.

Finally, many thanks to James Bryant, G4CLF, of Analog Devices, for sample AD600s.

NEXT MONTH

THE SYNTHESISER is the subject of the next part of this series. Its operation is critical to the performance of the transceiver, providing the local oscillator on transmit and receive.

REFERENCES

[10] 'A High Performance AGC/IF Subsystem', *QST* May 1996, p39ff

[11] *RSGB VHF/UHF Handbook* 1997, pp4.16ff

[12] AD600 data sheet, available from www.analog.com ♦

www.

Warrington ARC **www.warc.org.uk**

The Warrington ARC website carries its own version of the construction, on a month-by-month basis in parallel with *RadCom*, together with PCB layouts and up-to-date information.

3090
n a radio store

ebsite: www.nevada.co.uk • fax: 023 9231 3091

ND SEE US AT OUR RADIO SUPERSTORE...

24hr shopping
NEVADA ONLINE STORE
www.nevada.co.uk
.....the site you can TRUST.....

WorldSpace Radios

Hitachi WS1 IN STOCK!

- Receive over 40 channels of *fade free digital programs direct from satellite - from almost anywhere in the world!*
- Plus FM/MW/SW
- SW1: 2.3 - 7.3MHz, SW2: 9.5 - 26.1MHz

£149.00
3 CHEQUES OF £53.00 P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

NEW! WS2000

£129.95
3 CHEQUES OF £46.65 P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

- 10 presets and last station memory
- LC-display for station, category/features
- Headphone jack/stereo line out connectors
- External jack for multimedia & data service
- Easy-to-aim antenna detachable WorldSpace antenna
- Battery or mains operation
- AC/DC adaptor include

Sanyo WS1000

£149.00
3 CHEQUES OF £53.00 P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

A stylish satellite radio for home or portable use. listen on the internal speaker or connect it to your Hi-Fi via phono line out or digital output connectors. Removeable flip up satellite dish is supplied c/w 5 metres extension cable.

- Stereo headphone socket
- 32 memories
- Mains or battery operation *(Mains adaptor included)*
- Remote control
- Multimedia port

buy online at our secure website
www.worldspaceradios.co.uk

YAESU

YAESU FT-847
- All mode DSP Transceiver
- 70cm - Top Band

~~£1699~~ **£1149** | 3 CHEQUES OF **£386.33** | P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

PRICE MATCH

YAESU FT-817
- HF/6/2/70 cms + wide RX
- Inc Nicads, Charger, antenna & mic

~~£799~~ **£599** | 3 CHEQUES OF **£203.00** | P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

MH-FNB72

YAESU FT817
Heavy Duty Battery Pack
- Ultra high capacity 9.6V 1700 mAH
- Includes special 3 hour rapid charge cable for use with MH-C777

£59.95 | P&P £2.75

SPECIAL

YAESU FT-1500M
- 2M FM Mobile
- 50W Heavy Duty

~~£228~~ **£159.95** | 3 CHEQUES OF **£56.65** | P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

YAESU FT-7100
NEW Dual band mobile
- 2/70cms • 50/35W output
- LOTS of FEATURES!

~~£399~~ **£299** | 3 CHEQUES OF **£103.00** | P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

USED EQUIPMENT
BUY WITH CONFIDENCE!
All safety tested & guaranteed for 3 months

VHF/UHF TRANSCEIVERS		
ALBRECHT AE-550	2M FM MOBILE TRANSCEIVER	110.00
ALINCO DJ-191E	2M HANDHELD TRANSCEIVER	99.00
ALINCO DJ-580E	2M/70CM HANDHELD	129.00
ALINCO DJ-SR1	PMR 446 TRANSCEIVER	79.00
ALINCO DR-140E	2M MOBILE TRANSCEIVER	159.00
ALINCO DR-140E	2M MOBILE TRANSCEIVER	125.00
AZDEN AZ-61	6M HANDHELD TRANSCEIVER	65.00
KENWOOD TS-790E + PS31	2M/70/23CM BASE STATION	1195.00
STANDARD C156A + ACC	2M HANDHELD TRANSCEIVER	95.00
STANDARD C558 + ACC	2M/70CM HANDHELD	165.00
TRIO TR-7500	2M FM 10W TRANSCEIVER	105.00
TRIO TR-7800	2M FM 25W TRANSCEIVER	49.95
YAESU FT225RD + MUTEK	2M MULTIMODE BASE + MEMORY	399.00
YAESU FT2600M	2M 60W MOBILE	139.00
YAESU FT290RII	2M MULTIMODE PORTABLE	225.00
YAESU FT40R	70CM HANDHELD	119.00
YAESU FT4700	2M/70CM FM MOBILE W/SEP KIT	259.00
YAESU FT-90R	2M/70CM MOBILE TRANSCEIVER	285.00
HF TRANSCEIVERS		
ICOM IC-746	HF/6M/2M 100W TX	899.00
ICOM IC-775DSP	200W HF BASE TRANSCEIVER	1895.00
KENWOOD TS850SAT	100W HF TRANSCEIVER	699.00
KENWOOD TS-950S	150W HF BASE TRANSCEIVER	999.00
YAESU FT-1000	200W HF TRANSCEIVER	1199.00
YAESU FT920AF	HF/6M 100W DSP TX	899.00
RECEIVERS		
AOR AR-2000	HANDHELD SCANNER	110.00
BEARCAT UBC780XLT	TRUNK TRACKER SCANNER	375.00
ICOM IC-R2	HANDHELD SCANNER	99.00
REALISTIC PRO 26	HANDHELD SCANNER	125.00
ICOM IC-R71E	HF RECEIVER	399.00
ICOM IC-R75 + DSP	HF RECEIVER	499.00
JRC NRD345	HF RECEIVER	375.00
JRC NRD545	DSP HF RECEIVER	999.00
KENWOOD R-5000V	HF RX + VHF CONVERTER	499.00
LOWE HF225 EUROPA	HF RECEIVER	375.00
LOWE HF225 + CASE,FMdK	PAD HF RECEIVER + ACC	329.00
YAESU FRG-100	HF RECEIVER	299.00
YAESU FRG-100 + FM	HF RECEIVER + FM	325.00
ACCESSORIES		
ACTIVE CW FILTER	ACTIVE FILTER	25.00
AKD WA1	VHF/UHF WAVE METER	15.00
ALINCO EDC-91	FAST CHARGER DJ-V5	32.00
ALINCO EME-12	HEADSET/MIC	25.00
AMDAT ADC-60	FREQUENCY STANDARD CLOCK	99.00
DAIWA CL-22	ANTENNA COUPLER	25.00
DAIWA CN-101L	SWR/PWR METER	39.00
DAIWA LA-2080H	2M 80W AMPLIFIER + PREAMP	85.00
DATONG AD-270	ACTIVE ANTENNA	39.00
ICOM BC-135	BASE CHARGER UNIT	29.95
ICOM HM-75A	ICOM SPEAKER MIC	17.50
ICOM IC-AT500	AUTO ANTENNA TUNER	299.00
ICOM PS-85	20A POWER SUPPLY	159.00
ICOM SP-7	EXTERNAL SPEAKER	25.00
KENWOOD MC60A	DESK MICROPHONE	75.00
KENWOOD PS-52	20A POWER SUPPLY	139.00
KENWOOD SP31	EXTERNAL SPEAKER	59.00
KENWOOD VS-2	VOICE BOARD	40.00
KENWOOD YK88-S1	2.4KHZ SSB FILTER TS450/850	49.00
MIRAGE B3016	2M 10-160W AMPLIFIER	179.00
MML144-30LS	2M 30W LINEAR AMP	59.00
TIMEWAVE DSP599ZX	ALL MODE DSP UNIT	259.00
TOKYO HL100B/21-28	LINEAR AMP 10-100W 21-28MHZ	129.00
WATSON WAT2	RX ANTENNA TUNER	29.95
WATSON WPR2	PRECLECTOR	29.95
WATSON WR5001 + DC ADAPT	VHF/UHF RX TESTER	59.00
YAESU FIF232C VAN	COMPUTER INTERFACE (FT736)	59.00

Noise Killers from TIMEWAVE

NOW with PSK31 INTERFACE

TIMEWAVE DSP 599ZX
DSP Noise & QRM Filter, RTTY Modem, Radio/Sound Card Interface

- Eliminate heterodynes
- Filters QRM
- Brickwall PSK31 filter
- Sound card interface
- Binaural CW
- CW spotlight
- Enhanced noise reduction

£389.95 | 3 CHEQUES OF **£133.31** | P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

ANC-4
Antenna Noise Canceller & Diversity Combiner

- Cancels S-9 line noise
- Nulls strong interfering signals
- Makes two antennas into phased array
- Wipes out noise before it hits your receiver
- Works with any transceiver/receiver+LOTS MORE!

£199.95 | 3 CHEQUES OF **£69.98** | P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

COMET
High Quality Japanese Antennas

NEW LOW PROFILE 'FLEXIBLE' ANTENNAS for the YAESU FT817
CHF-412 7,21,144MHz, 0.74M long ...**£49.95**
CHF-816 3.5,28,50MHz,0.74M long ...**£49.95**
postage & packing £4.75 (UK mainland)

COMET HANDIE ANTENNAS	
SM-A3	SMA connector 144/432/900MHz £19.95
SH-95	BNC connector 144/432/1200MHz £26.95
RX-5	SMA conn 144/430MHz wide RX £26.95
p & p £3.75 all items above (UK MAINLAND)	
COMET MOBILE ANTENNA CABLES/MOUNTS	
3D-4MB	SO239 Base/4mtrs coax c/w PL259 plug .£15.50
CK-3M4B	SO239 Base w/4mtrs coax c/w PL259 .£24.50
MG-4M	Heavy duty mag mount/4m /PL259 ..... £29.95
RS-700	Gutter Mount fully adjustable £17.95
RS-730	Hatch/Trunk Mount fully adjust. £19.95
TBR	Hatch/Trunk Mount std model £14.95
COMET FILTERS	
CF-30S	32MHz low pass filter, 150W CW £19.95
CF-30MR	32MHz Low pass, 1kw PEP £37.50
CF-50S	50MHz low pass filter, 150W CW £21.50
CF-50MR	50MHz low pass, 1kw PEP £37.50
COMET BASE ANTENNAS	
GP-15N	50, 144, 430MHz, L: 2.4m 300W PEP .£89.95
GP-1	144/430MHz 3/6dB 1.25mtrs 200W £49.00
GP-3	144/430MHz 4.5/7.2 1.78mtrs 200W .. £59.95
GP-6	144/430MHz 6.5/9.0 3.07mtrs 200W .. £89.95
GP-98	144/430/1.2GHz 2.94mtrs £129.95
COMET HF MOBILE ANTENNA	
L14	Optional 14MHz coil for CA-UHV £19.95
p & p £10.00 all items above (UK MAINLAND)	
COMET VHF MOBILE ANTENNAS	
CHL-285	50/144MHz Mobile 300W, lgth 1.32mtrs £24.95
CHL-350	28/50MHz Mobile 200W, lgth 2.16 mtrs. £39.95
HR-50	50MHz centre loaded, length 2.13 mtrs £39.95
SB-15	50/144/432MHz with w/fold-over £46.95
SBB-2	Dual band mob 144/432 lgth 0.46mtrs .£19.95
SBB-4	Dual band mob 144/432 lgth 0.92mtrs .£29.95
SBB-14	Triband mob 50/144/432 lth 1.08mtrs .£39.95
p & p £10.00 all items above (UK MAINLAND)	
COMET BALUNS	
CBL-2000	5 - 60MHz 2kW 1:1 ..... £27.50
CBL-30	1.7 - 30MHz 1kW 1:1 ..... £21.95
COMET DUPLEXERS	
CF-416A	144/430MHz SO239/PL/PL £27.50
CF-416B	144/430MHz SO239/PL/'N' £28.50
CF-360A	1.3-30MHz/49-470MHz SO239/PL/PL £37.95
CF-530	1.3-90MHz/125-470MHz SO239/PL/PL .£39.95
COMET TRIPLEXERS	
Comet CFX-431A	144/430/1200MHz £46.00
Comet CFX-514N	50/144/430MHz £47.95

DAIWA
DAIWA MOBILE ANTENNAS

DAX 3300	50/144/430MHz £42.50
DAX 1500	144/430MHz (Hi Gain) £33.95
DAX 1000	144/430MHz (Standard) £29.95
DAIWA HANDHELD ANTENNAS	
HA 45	S..SMA ....TRIPLE BAND .....L 4.5CM £12.95
HA 45	B..BNC ....TRIPLE BAND .....L 4.5CM £12.95
HA 96	B..BNC ....TRIPLE BAND .....L 9.5CM £16.50

PRESIDENT LINCOLN
High class 21W 10 Mtr Multimode Transceiver
• 28-30MHz • AM/FM/SSB

~~£225~~ **£199** | 3 CHEQUES OF **£69.67** | P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

PALSTAR PS-30
- 3-15V adjustable
- 25/30A max
- Voltage + current meters
- 10mW RMS noise and ripple

£99 | 3 CHEQUES OF **£36.33** | P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

PALSTAR AT1500 CV

1.5KW HF ANTENNA TUNER

- Now with heavy duty edge-wound **silver plated roller inductor** for ***ultra high efficiency*** and ***reliability***
- Matches dipoles, centre fed doublets, G5RV's balanced feeders, Verticals, single wire, delta loops, beams, windoms, Inverted V's
- Built in 4:1 balun for balanced wire feeders
- Bypass position for quick straight-through antenna connection with SWR/POWER monitoring.
- 6 position antenna selector switching
- Average power meter reading to 3000 Watts
- Vernier dial plates for more accurate settings.

£389 | 3 CHEQUES OF **£133.00** | P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

SGC SG-230
AUTO ATU
- 1.8 - 30MHz
- 200W PEP

£359.95 | 3 CHEQUES OF **£123.31** | P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

MFJ
Antenna Tuners & Accessories

MFJ-259B	Antenna Analyser 1.8-170MHz £249.95
MFJ-269	Antenna Analyser HF/VHF/UHF £369.95
MFJ-914	Auto Tuner extender 300W £64.95
MFJ-914E	1.8-30MHz 300W Tuner..... £129.95
MFJ-945E	1.8-60MHz 300W Tuner..... £119.95
MFJ-948	1.8-30MHz 300W Tuner w/Balun .£139.95
MFJ-949E	1.8-30MHz 300W Tuner+D/load .£159.95
MFJ-962D	1.8-30MHz 800W Compact Tuner £259.95
MFJ-969	1.8-60MHz 300W Tuner..... £199.95
MFJ-971	1.8-30MHz 200W Portable Tuner ...£99.95
MFJ-986	1.8-30MHz 1500W Tuner..... £349.95
MFJ-989C	1.8-30MHz 1500W Tuner+D/load £379.95

YAESU ROTATORS

G1000C HEAVY DUTY
C/W Control Box & 25m Cable
~~£559.00~~ **£499.00** | P&P £10

G650C MEDIUM DUTY
C/W Control Box & 25m Cable
~~£459.00~~ **£399.00** | P&P £10

G450C LIGHT DUTY C/W Control Box & 25m Cable
~~£349.00~~ **£325.00** | P&P £10

G550 Elevation Rotator **£309.00** | P&P £10

GC038 LOWER MAST CLAMP **£25.00**

HEIL PRO-SET

PRO SET 4
For contesters & DX'ers who want to cut through the pile ups. Using Hc4 insert.
PRO SET 5
A fuller range insert for rag chewers who want quality with clarity. Hc5 insert.

£129.95 | P&P £7.50

DAIWA

Please add £6 p&p (UK mainland)

SWR/POWER METERS

CN801H	1.8 - 200MHZ 2KW	**£109.95**
CN801V	140 - 525MHZ 200W	**£119.95**
CN101L	1.8 - 150MHZ 1.5KW	**£59.95**
CN103LN	140 - 525MHZ 200W	**£65.95**

MINI 2000
LOW PROFILE 3 BAND MINI BEAM

£229.95 | P&P £15

ZX YAGI
LOW COST MULTIBAND VERTICALS

Two lightweight multiband verticals that really work. Each is supplied with a set of 3 wire radials. These may be laid out or bent to suit your location. Power handling approx 500W.

P&P £10

GP3.....**£69.95**
10/15/20M, 3.9 mtrs

GP3W **£69.95**
12/17/30M, 5 mtrs

k WORLDSPACE RADIOS - buy online on our secure website www.worldspaceradios.co.uk

..USE YOUR CREDIT CARD FOR SAME DAY DESPATCH...

DELTA MasterCard SWITCH VISA

WHATEVER NEXT

STEVE WHITE, G3ZVW
31 Amberley Road, London N13 4BH.
e-mail: steve.white@rsgb.org.uk

THE WORLD OF digital photography has changed enormously over the past few years. When digital cameras first appeared, the resolution was poor and the colour rendition not much better. As pixel numbers have increased from hundreds of thousands into the millions and signal processing improved, so has image quality, but 'mosaic' systems still don't capture red, blue and green light at *every* pixel location. **Fig 1** shows why. In a conventional imaging chip the light-sensitive area is a single layer that is covered with a mosaic of coloured filters. The filters allow only one wavelength of light to pass through to the light-sensitive layer below. Also, as the mosaic has twice as many green 'tiles' as red or blue, it captures 50% green light, 25% red and 25% blue. Signal processing corrects the colour balance and fills-in missing colours, but this takes time, and the greater the number of pixels on the pickup chip, the greater the effort it takes (although this has been compensated for by an increase in processing power). At the end of the process you have an image that lacks a certain amount of detail, especially to the texture of such things as skin.

Sure, you can have a 3-CCD system, as some expensive still cameras and just about all the expensive video cameras have, but that kind of thing costs serious money. You can even buy a 16 megapixel studio-quality digital camera, but that costs even more.

A SHARPER IMAGE

A NEW DIGITAL imaging chip has now been developed by Foveon, a Californian company backed by National Semiconductor. Its chip adopts a different approach, and apparently the world's digital camera makers are scrambling to get their hands on it.

Foveon's 'X3' capture chip exploits the fact that silicon absorbs different colours of light at different depths, rather like the photo-sensitive layers do in colour film. As **Fig 2** shows, stacked detectors capture red, blue and green light at every pixel location. The result of this is not just a sharper image, it is one where colour detail is better. Because less signal processing is required, it also requires less electrical power and less time for the camera's processor to compose the image. Furthermore, it offers greater resistance to unpredictable artefacts such as Moiré patterns when taking photographs of small and complex patterns such as you might find in clothing. Add to all this the ability of the chip to change its resolution electronically (ie it can switch between high-resolution for still imaging and a lower resolution 'super pixels' for video recording), and the future for this type of technology looks rosy indeed.

Cameras equipped with this new type of chip should be available as soon as National Semiconductor can start producing them – with the camera makers wanting to get models in the shops before Christmas this year. Initially, the corner of the market that is being targeted is the professional and the high-end enthusiast, so don't expect the cameras to be cheap. Even so, it seems likely that we will see digital cameras equipped with traditional mosaic pickup chips being reduced in price. Next year Foveon intends to turn its attention to pickup chips for small- and mid-sized cameras. Ultimately, we might even see its chip being used in cellphones, PDAs and fingerprint detectors.

In conclusion, I would like to mention that the delay between pressing the button and hearing the click on a digital camera has always irritated me. It is one of the main reasons I have stuck with film. Perhaps I will be converted soon.

DIGITAL MODULATION

THE D-STAR system of digital modulation, developed by Icom and Kenwood, was mentioned by Andy Talbot, G4JNT, in his 'Data' column in *RadCom*, June 2002. Transceivers which conform to this standard are not yet available to purchase, although demonstration models have been seen.

Meanwhile, Alinco has adopted an ITU open-modulation protocol and simply gone ahead and released hardware that implements digital voice. At present, the transceivers that support it are the DJ-596 handheld and the DR-135 / 235 / 435 mobiles.

DJ-596

This is a dual-band analogue FM handheld that is already being sold in the UK. The interesting thing is that, if you buy one, you will apparently see no mention in the user manual of the fact that this radio is capable of digital voice operation (although it is mentioned briefly on Alinco's

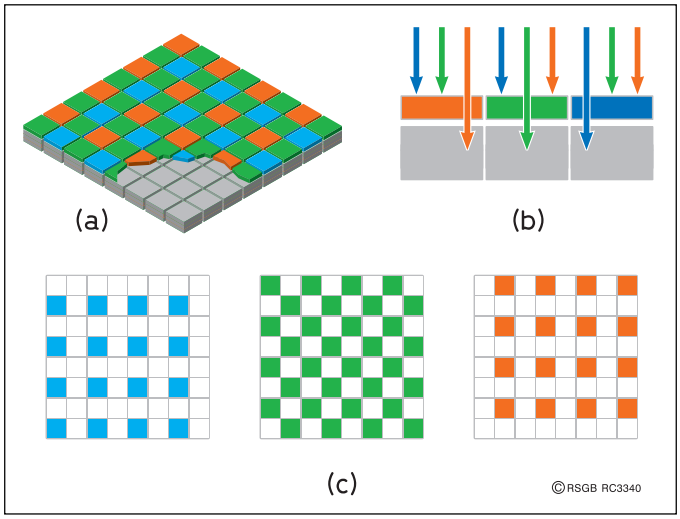


Fig 1: (a) Coloured filters are applied to a single layer of photo detectors in a mosaic pattern. (b) Each filter allows the light from only one primary colour through to the light-sensitive layer beneath. (c) Pattern of the three coloured filters, showing that 50% of green light is captured, but only 25% of red and blue.

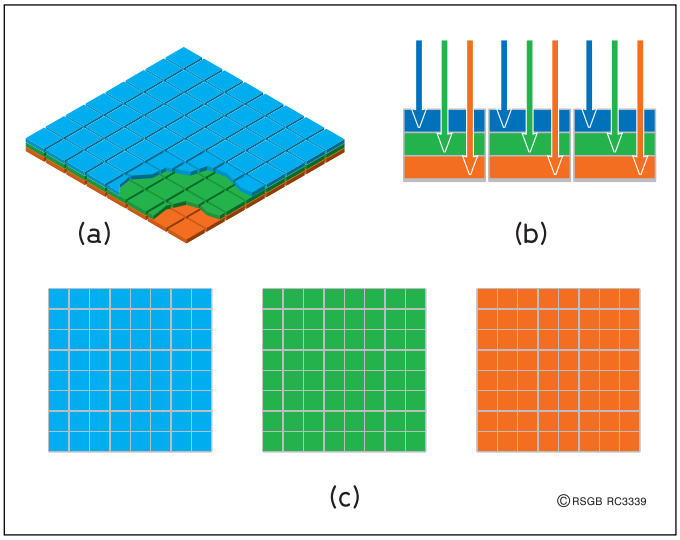


Fig 2: (a) Foveon's chip uses stacked detectors. (b) Red, blue and green light is captured at different depths. (c) Red, blue and green light is captured each pixel location.

handout for the product). The only clue on the radio itself is a button on the front panel marked "SQL DIGI". To implement digital voice operation you need the optional EJ-43U digital board, plus a special connector into which the EJ-43U is plugged. The board is accommodated under a flap that is accessed by removing the transceiver's battery pack.

DR-135 / 235 / 435

There is little mention on Alinco's web site and none in the handout that these three single-band mobile transceivers (the DR-235 is not available in Europe, as it is for the 220MHz band) also support digital voice operation - I only found out by accident. The additional module required for this series of transceiver is the EJ-40U.

OPERATION

When you speak into the microphone, the analogue audio is converted into a 14.4Kbps digital stream by a continuously-variable slope delta (CVSD) codec. The digital stream is converted by a CPU into the ITU-TV.32 protocol, which is then used to drive a GMSK (Gaussian Minimum Shift Keying) modem. On receive, the process is reversed. Incidentally, if you listen on analogue FM to a frequency on which a digital transmission is taking place, all you hear is noise.

I have not witnessed this system in operation, but those who have describe the voice quality as below that of analogue FM. How far below, I'm not quite sure. Alinco freely admits that it did not set out to create a hi-fi system, saying: "We admit that the audio from the digital modulation mode in our radio definitely sounds 'processed'. Due to simplified circuit design, the error-correction rate is not as high as more expensive 'cutting-edge' commercial rigs. However, using these boards, you can experience and experiment with the new world of digital audio communications in the amateur bands..." Apparently, in Japan, Alinco's boards have already been modified for use with Yaesu equipment. To me there seems little doubt that others will follow.

The area in which digital voice scores over analogue is that the quality of received audio does not degrade until the point is reached that the audio cannot be recovered, at which point the squelch cuts in and you receive nothing. The effect of this is that such things as a small amount of mobile flutter is eliminated, but severe flutter manifests itself by breaking-up of the signal, sometimes several times per second.

The DJ-596 and DR-135, both capable of digital voice operation.

WAFER-THIN POWER

RENEWABLE energy sources are receiving more attention these days. Research has not only led to the efficiency of cells being improved, but wafer-thin solar cells have been produced and more innovative ways have been found to mount them.

The Sustainable Village is a company devoted to renewable energy and on its website I found reference to a Solarex solar module "As thin, light and flexible as a piece of paper! … they bend, flop around and feel as light as a feather". Solarex is a brand name of BP, but BP does not make a big deal about the flexibility of the cells, indeed it seems they come mounted on a plate.

A second product I chanced upon was 'peel-and-stick' solar electric roofing panels. Said to be "lightweight and architecturally attractive", these thin-film, amorphous-silicon cells even come rolled-up for less expensive shipping.

I can well appreciate the attractiveness of solar cells in parts of the world that are beyond the reach of power lines, but there's plenty of light all around the globe and solar calls don't need to be in sunlight to produce electricity. I wonder if we will ever see house-builders in Britain incorporating photovoltaic technology as standard? ♦

HOW SOLAR CELLS WORK

PHOTOVOLTAIC (solar) cells are semiconductor devices that convert light directly into electricity. They are usually made from silicon with traces of the other elements that are used to form transistors, etc.

A semiconductor photovoltaic device (see **Fig 3**) consists of layers of semiconductor materials with different properties. In a typical cell, the bulk of the material is silicon, doped with a small quantity of boron to convert it to positive (p-type) material. A thin layer on the front of the cell is doped with phosphorus to convert it to negative (n-type) material. A barrier voltage builds-up at the junction between the two layers, in much the same way as in a diode – indeed, a photovoltaic cell is a diode with a physically large junction. When photons of light hit the cell, some of them are absorbed in the region of the junction, freeing electrons in the silicon. If the photons have enough energy, they can overcome the barrier voltage at the junction and move through the silicon and into an external circuit. The external connections usually take the form of a foil across the back of the cell and a fine grid across the front. The voltage produced by a single cell is about 0.6V (sound familiar?), but cells can be wired in series to produce higher voltages.

The photovoltaic effect was discovered in 1839 by Edmond Becquerel, but the first pn-junction solar cell was not created until 1954 at Bell Labs.

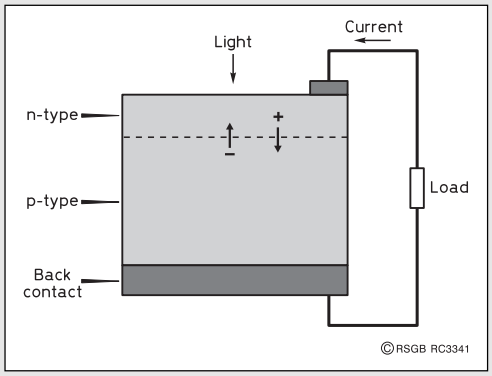


Fig 3: In a photovoltaic (solar) cell, a transparently-thin film of n-type semiconductor material is bonded to a layer of p-type material. When light strikes the cell, electrons 'hop' across the junction between the two layers and are then free to flow in an external circuit.

WWW.

Full colour image sensor	**www.foveon.com**
Alinco digital voice	**www.alinco.com/faq.html**
Wafer-thin solar cells	**www.thesustainablevillage.com/thesustainablevillage-cgi-bin/product/PV230**

If there is an item of new technology you would like to know more about - or one that you know about and think ought to be mentioned here - drop a line to the author, or e-mail him at the address at the start of the feature.

W.H Westlake

ELECTRONICS

CABLES & CONNECTORS

WESTFLEX 103, low loss Airspaced, 50 ohm	£1/m
RG213U (eq U R67), M ii spc, 50ohm	75p/m
URM43,5mm dia, 50 ohm, single conductor	35p/m
RG58CU, 5mm dia, 50 ohm stranded conductor	35p/m
RG1 74U, 2.3mm, 50 ohm Mini Coax	40p/m
RG11U,10.3mm, 75 ohm low loss Coax	£1/m
URM70,6mm, 75 ohm Tx grade Coax	35p/m
BT2002, 5mm, 75 ohm double screened Coax	35p/m
RG62AU, 6mm dia, 95 ohm Coax	50p/m
TV, 75 ohm, low loss Downlead	30p/m
MINI 8 low loss 7mm dia, 50 ohm coax	50p/m
POLYESTER (Dicrom type) 4mm GUY ROPE	30p/m
RG214U	£2/m
RG223U	£1/m
75 ohm Twin balanced Feeder, Light/Med 400w PEP	30p/m
300 ohm Ribbon standard light duty	30p/m
300 ohm Ribbon, HD USA Slotted type	65p/m
3 Core Mains/Rotator Cable, 5 amp	30p/m
6 Core Rotator Cable	50p/m
8 Core Rotator Cable	70p/m
Aerial Wire, light duty PVC coated	8p/m
Aerial Wire, medium duty PVC coated	10p/m
Aerial Wire, heavy duty PVC coated	25p/m
16swg HD copper	25p/m
16 swg stranded copper	25p/m
Single core screened, 2.3mm dia	20p/m
Two core screened, 5mm	30p/m
6 core screened, 5mm	40p/m
Red/Black DC power cable, 8 amp	30p/m
Red/Black DC power cable, 15 amp	45p/m
Red/Black DC power cable, 20 amp	£1 p/m

Postage on cables - up to 20m £3. over 20m £5.

CONNECTORS ETC

Self Amalgamating Tape	£4.50	Dipole centre boxes	£3.50
4" Dog Bone insulators	75p	Polyprop Egg insulators	60p
Mil Spec P.Sleeve N plugs 10.3mm	£3.00	Mil Spec P. Sleeve BNC plugs 5mm	£1.70
Mil Spec P.Sleeve N plugs 5mm	£3.00	Greenpar N line skt, 10.3mm	£3.00
Greenpar N Panel sq skt	£2.50	Mil Spec P.Sleeve PL259 plugs 5mm	£3.00
SMA Adaptors to BNC skt/N/skt/SO239	£3.00	Mil Spec P.Sleeve PL259 plugs 10.3mm	£3.00
SPECIAL N PLUG for W103	£5.80	Special PL959 for W103	£1.70
ADAPTORS BNC/SO239	£1.80	PL259/BNC skt	£1.80
N plug/SO239	£2.50	N PLUG/BNC skt	£3.00
BNC plug/N skt	£3.00	PL259 plug/N skt	£3.00

Postage on above connectors etc £1 per order.Lots more on our lists 30p stamp for copy.
Cheque/PO/Stamps with order, regretfully we do not take cards

W. H. Westlake, Clawton, Holsworthy, Devon EX22 6QN
Phone 01409 253758 Fax 01409 253458

Compton & Butleigh

Both ideal for Club Construction Project

Compton - 80m Ph & CW DC Receiver

Butleigh - matching 1.5 Watt phone TX

Both easy to get going - together £78

See review in June 2002 RadCom.

Send SSAE or visit: www.users.globalnet.co.uk/~walfor

WALFORD ELECTRONICS

Upton Bridge Farm, Long Sutton, Langport, Somerset TA10 9NJ

QUARTZ CRYSTALS

CUSTOM MANUFACTURED CRYSTALS AND OSCILLATORS

FUNDAMENTALS FREQUENCY RANGE	PRICE	OVERTONES MODE	FREQUENCY RANGE	PRICE
1.5 to 2.0 MHz	£9.50	3rd OVT	21.00 to 60.00 MHz	£7.50
2.0 to 4.0 MHz	£9.00	3rd OVT	60.00 to 75.00 MHz	£8.75
4.0 to 6.0 MHz	£8.75	5th OVT	60.00 to 110.0 MHz	£8.50
6.0 to 22.0 MHz	£7.50	5th OVT	110.00 to 126.0 MHz	£10.00
22 to 26.0 MHz	£9.00	7th OVT	125.00 to 175.0 MHz	£13.50
		9th OVT	170.00 to 225.0 MHz	£13.75

1.5 - 2.0MHz available in HC6/U or HC33/U only.
2.0 - 10.0MHz available in HC6/U HC33/U HC18/U or HC/25U only.
10.0 - 225.0MHz HC6/U HC33/U HC18/U HC18/T HC18/TT HC25/U HC25/T HC25/TT and HC45/U.
Where holders are not specified, crystals above 2.00MHz will be supplied in HC25/U.
For HC18/T and HC25/T (11.7mm ht.) add £1.00. For HC18/TT (9.6mm ht.) and HC45/U add £5.00.

Delivery approx 2 weeks. For 5 day EXPRESS service add 50% to above prices
Prices include P&P and VAT. **Minimum order charge £10.00. All major credit cards accepted.**
Unless otherwise requested fundamentals supplied for 30pF load & overtones for series resonant operation. Where applicable please state the make and model number of the equipment for which the crystals are to be used, this will assist us in providing the correct specifications.
Custom manufactured TTL and CMOS oscillators 3.5 - 85MHz £20.35 each 1 - 4 pcs

QuartSlab Marketing Ltd
PO Box 19, Erith, Kent DA8 1LH
Phone: 01322 330830 Fax: 01322 334904
e-mail sales@quartslab.com
web www.quartslab.com
SAE with enquiries please

WIRELESS AND ELECTRONIC SURPLUS

EX RAF WARTIME RECEIVERS. R1392 Sturdily built for thr VHF 100-150mc/s band. A 16 valve superhet. C.W./R.T. Rack mounting. 483mm x 267mm silver plated chassis. Requires 250v d.c. 6.3v power supply. Good condition **£77.50. Carriage £18.50.**

A DIGITAL HANDHELD LCR METER Measuring inductance, capacitance and resistance. 3.5 digit, 1999 count, l.c.d. display, inductance range 2Mh to 20H, capacitance range 2000pF to 200 uF, resistance range 2000W to 20 megohms. Brand new and boxed with test alligator clip leads and user manual. **£44.00. + £4.00 p&p.**

VALVE BASES Octal B7G B9A. **All 5 for £2.50.**

HIGH VOLTAGE CAPACITORS 0.1 1000v.wkg.mixed dielectric axial. .05 600v.wkg axial. 0.68 800v.wkg myler dipped axial. **All 5 for £3.00.**

HIGH VOLTAGE ELECTROLYTICS 10uf 400v.wkg axial. 22uf 250v.wkg axial. 47uf 385v.wkg radial. 68uf 450v.wkg radial. **All 5 for £2.50.**

VINTAGE CARBON ONE WATT RESISTORS Useful values. **Pack of 50 £3.00.**

VINTAGE CARBON 1/2 WATT RESISTORS Pack of 30 £2.00.

1/4 WATT METAL/CARBON FILM RESISTORS 250 for £1.50.

SILVER MICA CAPACITORS 350v.wkg. 220pf. 300pf. 560pf. 680pf. 820pf. **10 for £1.00.**

TUBE CERAMICS 350v.wkg. 50pf. 220pf. 330pf.1000pf. .002ufd. **15 for £1.00.**

TUNING CAPACITORS Solid Dielectric. .0003uf. **£3.50.**

BOOKS AND MANUALS

R1155 RECEIVER DATA 47 pages **£12.50** including p&p.

MULLARD VALVE DATA AND EQUIVALENTS HANDBOOK Over 300 pages of valve data, base connections, characteristics and operating conditions for Mullard valves and their equivalent makes. Facsimile reprint. **£16.50 + £3.50 p&p.**

EDDYSTONE COMMUNICATIONS RECEIVER DATA 1950-1970 A facsimile reprint of the circuit diagrams, general description and some service notes. 50 pages. **£11.50.**

JANES MILITARY COMMUNICATION 12th EDITION 1991-1992 Over 800 pages, contains much recently released military wireless equpment. **£25.00 p&p £8.50.**

THE COMMUNICATIONS HANDBOOK by J.D. GIBSON A vast volume of 1598 pages published 1997. A perfect balance of essential technical information. The most recent telecommunications standards from around the world. 100 chapters from 140 expert contributors, detailed information includes Telephony, Satellite Communications, Optical Communications, Radio Communications, Source compression, Data recording. Twenty background chapters on analogue and digital communications. Published at nearly £80.00. Illustrated. **Our price £35.00. Carriage £8.50 (heavy).**

P&P £2 under £12.00. Over Free unless otherwise stated.

Interested in vintage or military radio?

Why not subscribe to *The Vintage Wireless Trader,* Published approx. every four months. Contains 100s of out of print old and collectable wireless books, magazines, ephemera, vintage communication and domestic receivers, government surplus military equipment, valves and components etc., as well as **subscribers wants and sales.** Send £6 for the next four issues.

Dept (RC) CHEVET BOOK SUPPLIES
157 Dickson Road, BLACKPOOL FY1 2EU
Tel: (01253) 751858. Fax: (01253) 302979.
E-mail: chevet@globalnet.co.uk TELEPHONE ORDERS ACCEPTED.

G.W.M. RADIO LTD

40/42 PORTLAND ROAD, WORTHING, SUSSEX, BN11 1QN
Telephone: 01903 234897 / 235913 - Fax: 01903 239050
e-mail: info@gwmradio.freeserve.co.uk - website http://gwmradio.netfirms.com

GEC RC626 12v mobiles supplied aligned on 70.4MhZ just needs a speaker, ideal for 4m. club nets etc		£35
Philips M293 mobiles suplied ready to run on RAC rally frequency just needs a speaker		£35
PYE MF6am as above on RAC rally frequency		£35

SUMMER PMR CLEAROUT

Motorola MC80 hi-band fm. Multi-channel		£16
C-FONE hi-band fm. 12v mobile xtal controlled - no info	2 units for	£16
DANCOM ex-system hi-band synth 25w. 12v. - no info	3 units for	£20
TAIT 196 uhf mobile 12v mobile 1 ch xtal control	2 units for	£16
MOTOROLA MT700 uhf 10ch. H/held no batts or ants	5 units for	£25
NOLTON NOVA low band am/fm 12v. mobiles 20w. xtal	2 units for	£20
Or if you want quantities, mixes of above ring us for a deal.		
Philips PR710 Hi-band hand helds with batt but no ant or info		£12
Philips/Pye M293 lowband AM 6ch suitable for conversion to rally channels etc complete with mic an l/s etc		£25
AIRLITE 62 Head/mic sets Ex-MoD used/serviceable 600 ohm mic		£15

OPEN MON-FRI 9.30-5.30 WEDS 9.30-1 SAT 10.00-5.
Ring to check availability before making a long journey to visit.
All prices include VAT and UK mainland carriage. Send S.A.E for our current lists
Always worth giving us a ring for your particular requirements as we have many one-offs.

Skywave Analysis With a Difference

WinCAP Wizard 3
FREE to download:
www.taborsoft.com

Alert Wizard
BTWizard
BPWizard
ABW++

The Best Keeps Getting Better

TO ADVERTISE IN THE
BUSINESS CARD SECTION ON p95
PHONE JAN: 0870 904 7377

CALLING ALL AMATEUR RADIO CLUBS AND INDIVIDUALS...

WHO ON EARTH WILL YOU BE SPEAKING TO ON 14th & 15th SEPTEMBER 2002?

TRANSMISSION 2002

14th – 15th SEPTEMBER

Get **as many people as you can** to sponsor you for **every contact** you or your club makes on the air during the weekend of 14th–15th Sept. 2002.

The money YOU raise will help us to provide specially adapted audio equipment, FREE FOR LIFE, to UK-registered blind people who are in need.

WE ARE DELIGHTED TO ANNOUNCE THE FOLLOWING PRIZES AND SPONSORSHIP FOR TRANSMISSION 2002

Nevada – Alinco DX70 100w all mode HF & 6m transceiver

Roberts Radio Ltd – Model R9914 Single side band radio

Tennamast Scotland – Drive-on Wheel Mount

Wood & Douglas – "Cirrus" Radio Experimentation Board

Those Engineers – SpiceAge, Modelmaker and Spicycle computer software

RSGB – Two "100 Years" books

W H Westlake Electronics – 100m drum of RG58Cu Mil spec Coaxial cable

Hoverspeed – Two foot passenger tickets to France

Icom (UK) Ltd – 2 Sports bags

Antrex Electronics Ltd

Display Electronics

FREE QSL CARDS & SPONSORSHIP FORMS. For full details contact:
BWBF, Gabriel House, 34 New Rd, Chatham, Kent ME4 4QR.
Tel **01634 832501** or e-mail: **Fiona@blind.org.uk**

British Wireless for the Blind Fund

Reg. Charity No: 1078287

KEEPING BLIND PEOPLE IN TOUCH WITH THE WORLD

TRANSMISSION is a national fund-raising event open to all Amateur Radio Clubs and individuals to aid the work of the British Wireless for the Blind Fund.

Amateur Radio Courses - Autumn 2002

The following are details of Radio Amateurs Examination (RAE), Novice Radio Amateurs Examination (NRAE) - leading to an Intermediate Licence - Morse code and Foundation Licence courses starting this autumn that were submitted to *RadCom* by the deadline date of 7 August. See page 46 of the August 2002 *RadCom* for details of courses submitted earlier. Later updates will appear on the RSGB website at www.rsgb.org (navigate to Amateur Radio -> Get Licensed)

Region 1: Scotland West & Western Isles

No details of courses received

Region 2: Scotland East & the Highlands

The **Glenrothes** & DARC plans to start a **Novice** / **Intermediate** course in September and an **RAE** course in January 2003. The courses will be in **Kirkcaldy**. Contact Ken Horne, GM3YBQ, tel: 01592 265789.

Region 3: North West

The **East Cheshire** Radio Group will be running Foundation Licence courses from the end of August 2002. The course will be run at 1st Handforth Scout Group, The Scout Hut, Old Road, **Handforth**, Cheshire. Contact Stephen Sparkes, M1DDO, tel: 01625 528462, e-mail: M1DDO@fs2.com or Martin Hallsworth, G1GYC, tel: 0778 856 3619, e-mail: ECRG@g1gyc.demon.co.uk for further information. It is also hoped to provide Morse Assessment sessions for Class B licensees (to be confirmed).

Training for the **Foundation** Licence, the **NRAE** (**Intermediate** licence) and the full **RAE** is provided at the 123rd **Manchester** Scout HQ, on Wednesday evenings from 7.00pm. The courses are run in a modular format, so that it is possible to join a course at any stage, or to miss out weeks and catch the module later (ideal for candidates working shifts). Courses are started in rotation as candidate demand dictates, to give the highest chance of success. The Scout HQ is registered as a City & Guilds exam centre; exams can be arranged for external candidates. Contact Paul Maggs, G0OVY, tel: 0161 226 4053; e-mail: g0ovy@qsl.net

The **Oldham** ARC Club will run an **RAE** course from Thursday 26 September and a **Morse** course from the same date. **Intermediate** and **Foundation** courses start from 3 October. All are held at the Royton ATC, Park Lane, **Royton**. For further details contact Mike Crossley, M1CVL, tel: 01706 367454 (eve), 0161 249 2131 (day); or e-mail: m1cvl@thersgb.net

The **Runcorn and Widnes** ARC will be holding **RAE** / **Novice** courses starting in September at The Beacons, Simons Lane, **Frodsham** on Friday evenings at 7.00pm. The first meeting will be on 6 September for enrolment. Further details from Dave, G7OBW, tel: 01270 761608, or Dave, G1PIX, tel: 01928 591401.

Foundation courses are run by the **Stockport** Radio Society monthly at The Leewood Hall, Benja Fold, Off Ack Lane East, Bramhall, Stockport SK7 2BX. Further information from Bernard Naylor, G3SHF, tel: 01625 850088 or www.stockportradiosociety.co.uk

Region 4: North East

Sheffield ARC will again be running **Foundation** / **Intermediate** / **RAE** courses, subject to demand and instructor availability. Prospective members should come along in person on *Mondays* (*not* Bank Holidays) from 7.15pm at Club 197, 197 Brook Hill, Sheffield S3 7HG. Lead instructor will be G1TKX; contact g1tkx@thersgb.net

Region 5: West Midlands

City College Coventry, Tile Hill Centre, Tile Hill Lane, **Coventry** will be running classes from September 2002 for the **Foundation** Licence, **Intermediate** (**Novice**) Licence, Full Licence (**RAE**), **Morse** classes for 5 and 12WPM as well as **amateur radio constructional class**. Details from the course tutor, Michael, G4GHJ, e-mail: m.dixon@staff.covcollege.ac.uk or from the Course Enquiry team tel: 024 7679 1000.

R T Bowden, G3IXZ, is the course lecturer for an **RAE** course at Hereford College of Technology, Folly Lane, **Hereford** HR1 1LS commencing on 2 October 2002. Contact Chris Russell at the college on tel: 01432 352235 ext 654.

Stourbridge Amateur Radio Society's intends to hold another **Foundation** course in September at the club rooms at Old Swinford Hospital School, Stourbridge. Contact John, M1EJG, to secure a place. E-mail address: John.Clarke@ICLWAY.co.uk

Region 6: North Wales,
Region 7: South Wales,
Region 8: Northern Ireland

No details of courses received

Region 9: London & Thames Valley

Robert Snary, G4OBE, will be running courses in 2002 and 2003, subject to demand, for the **Foundation** Licence and, after January 2003, for the **Intermediate** licence at his house in **Enfield, Middx**. The courses will be run on several evenings, usually once a week. Further information from Robert Snary (Amateur Radio Training), 12 Borden Avenue, Enfield, Middx EN1 2BZ; tel: 020 8360 6555 (eves); e-mail: robert.snary@rsgb.org.uk or g4obe@arrl.net

Region 10: South & South East

Mid Sussex ARS will be running a **Foundation** Licence course on 5/6 October at **Newick** in East Sussex. Details from John Berry, G8JBJ, tel: 01825 724179, e-mail: john@jbsl-berry.demon.co.uk.

Region 11: South West & Channel Islands

The **Axe Vale** ARC offers **Foundation** Licence courses and, subject to demand, will run an **RAE** course **at Seaton, Devon**, starting in September. The club meets (1st Tue of month) in **Axminster**. Details from Ray Griffin, M1EZO, tel: 01404 44173.

Region 12: East & East Anglia

The **Hilderstone** Radio Society, **Broadstairs**, Kent, aims to run a **Foundation** course over a period of four or five club meetings. The Society meets on Friday evenings, 7.30 - 9.30pm at the Hilderstone House Adult Education Centre, St Peters, Broadstairs. The course will cost not more than £5 plus a small amount for the course book and the exam fee. Contact Ron Marchant, G3TAJ, tel: 01304 812723 or Ken Smith, G3JIX, tel: 01304 813175.

There are two separate **Foundation** Licence courses in the Chelmsford area: **1.** the Chelmsford Amateur Radio Society is running a Foundation course at **Danbury**, Essex. Contact David Bradley, M0BQC, tel: 01245 602838; e-mail: cars@g0mwt.org.uk; and **2.** Charlie Davy, 2E0PZT, is running a **Foundation** course in **Chelmsford**. Details from Charlie, tel: 01245 259951; or e-mail: charlie.davy@btopenworld.com

The **Maidstone** Amateur Radio Society, at the former YMCA centre in Cripple Street, Maidstone, will run **Intermediate** and **Full RAE** tuition and 5 and 12WPM Morse training (subject to demand). RSGB Morse tests can be carried out with 10 days notice. Courses are every Friday evening with registrations on 6 and 13 September. Tuition is free, although club membership (£2.00pa) and a weekly attendance subscription of £2.00 is a requirement. Details from Andy Holbrook, M0CST, tel: 01622 661035; e-mail: andy.holbrook@btopenworld.com) or g3trf@lineone.net or http://website.lineone.net/~g3trf

Region 13: East Midlands

No details of courses received

Correspondence Course

Pete Pennington, G4EGQ, offers a 'friendly correspondence course' for the **RAE** (postal or e-mail or mixture). This course is aimed at those who, due to disability or other reasons, cannot attend course run at their local club or college. Commences at any time of year and no time limit. Contact Pete for further details: 6 Highland Close, Folkestone CT20 3SA, tel: 01303 220010 (between 11.00am and 8.00pm), e-mail: g4egq@thersgb.net

Newcomers' News

News and Comment from and for Amateur Radio's Newcomers. Compiled by Steve Hartley, G0FUW *

ANOTHER BUSY month has passed with lots more Foundation Licences being issued. I understand the total is fast approaching 4000 new M3 callsigns! With the forthcoming changes to the Intermediate Licence training let's hope a good number will have the confidence to progress now they have had a taste of success.

A couple of things have come to light recently that have prompted me to include some gentle reminders to all Foundation and Intermediate Licence holders. Whilst the newer licences enable relatively easy and open access to the UK amateur radio service, there are some important restrictions that need to be adhered to.

OPERATING ABROAD

FIRST OF ALL, neither the M3 nor the 2E callsigns can be used outside the UK. Readers may have read elsewhere of the problems caused in Eire by MI3s operating as EI/MI3 and I have heard one or two 2Es talking about taking their radios abroad on holiday. Please note that only Full Licence holders may operate outside the UK and even they have to abide by local conditions. If you are going abroad it pays to check the arrangements well in advance.

A full list of countries that subscribe to the CEPT agreement on reciprocal licensing can be found in the licence *Terms and Conditions Booklet, BR68*, which all Full Licence holders should have. Copies can be obtained from the Radiocommunications Agency library or from their website [1].

SATELLITE ACCESS

THE SECOND POINT relates to the use of the amateur satellites. These operate quite separately from the 'standard' amateur radio service and only the internationally recognised Full Licensees have access to the Amateur Satellite Service. Again, details are in the relevant BR68 booklets.

There is currently a body of thought that thinks the satellites should be open to the newer classes of licence, but at the moment their use is seen to be one of the incentives for newcomers to progress to the higher levels. Whether that will change remains to be seen.

CONTINUOUS COURSES

THEY SAY SUCCESS breeds success and the Chelmsford Amateur Radio Society (CARS) has been running a continuous series of Foundation courses. The tutors have now settled on a format of six evening classes per course with a new course starting as soon as the previous one finishes. Phew!

The hardworking team took a three week break in August but should be hard at it again by now. For further information on the courses, or indeed the Chelmsford ARS, contact David Bradley, M0BQC, tel: 01245 602838 or e-mail: cars@g0mwt.org.uk

COURSE REPORT

IN THE JULY edition of 'Newcomers News' we heard about a Japanese radio amateur who passed the Foundation assessments in Wales in order to obtain a licence whilst working here in the UK. This month I received a report from Alan Ralph, G8XLH, who runs Foundation courses in Peterborough, which included details of a class member who apparently travelled all the way from China to attend a course!

The Chinese newcomer surfed the world wide web to see if a course was available prior to him starting work in the UK. He found details of Alan's course, flew in early, attended the course and passed the assessments! I wonder how he is getting on?

Alan also reports that several students were asking questions about repeater linking, where amateur radio communication is routed through the Internet and PSK31, the popular data mode. I don't know about other courses but we always try to find time to demonstrate PSK31 and Slow Scan Television (SSTV) here in Bath. Not only does it break up the 'chalk and talk' but it also shows some of the less well known aspects of amateur radio that Foundation Licence holders can make use of.

A NOVICE TUTOR REFLECTS

WYN Mainwaring, GW8AWT, dropped me a note looking back over his decade of Novice (now Intermediate) tutoring in the Welsh hinterland, where mains electricity is apparently still something of a hit and miss affair!

Nine successful students in 10 years doesn't sound many but in such a sparsely populated part of the country the percentage ratio is probably one of the highest. Wyn reminded me of the 'Project YEAR' banner that heralded the introduction of the Novice Licence. The project was to encourage Youth into Electronics through Amateur Radio and three of Wyn's students did indeed go into 'the trade'. Just imagine if a third of the new Foundation Licence holders went the same way!

Thanks for the recollection Wyn, I wonder if any of your former students are now readers of this column? I am always interested to hear from newcomers who have passed their exams, as well as the instructors. Come on, don't be shy!

GOOD IDEAS?

OVER THE YEARS I am sure that many amateur radio tutors have devised some great ways of demonstrating the various theoretical parts of the examination syllabus. I am currently involved in writing a new Intermediate Licence textbook and would like to hear from anyone who might have developed novel methods for illustrating the various topics. I am not too concerned with the technical merits of the demonstrations and can even live with tricks done with 'smoke and mirrors'; all new ideas will be welcomed.

So, whether you are an existing licence holder that vividly remembers a particular demonstration seen as a student, or a tutor that has a favourite 'prop' I would be very interested to hear from you. The postal and e-mail addresses can be found at the foot of this page. ♦

WWW.

[1] RA: www.radio.gov.uk

Some of the many successful candidates from the Chelmsford ARS Foundation classes (see 'Continuous Courses').

Spread The Word!

Send your news and colour photos to: Steve Hartley, G0FUW, QTHR.

E-mail: newcomers.radcom@rsgb.org.uk

* *5 Sydenham Buildings, Lower Bristol Road, Bath BA2 3BS.*

Down To Earth

The GB4FUN Roadshow

Bringing Amateur Radio to the People

The RSGB's mobile amateur radio demonstration vehicle, GB4FUN, has been 'on the road' for about a year now. During that time it has crossed the length and breadth of the country and has visited all four countries of the United Kingdom, most recently with a very successful trip to Northern Ireland. GB4FUN is intended first and foremost to demonstrate amateur radio to* the general public *- it is not provided as an additional interest for radio clubs to put on display at amateur radio rallies. The results of the GB4FUN roadshow are already beginning to bear fruit. Many individuals who knew nothing about amateur radio before seeing GB4FUN have gone on to take a Foundation Licence course and now have their own callsigns. This is what GB4FUN is all about. We have two reports from recent GB4FUN visits, from Mark Harper, MW1MDH / MW3MDH; and from Esde Tyler, G0AEC.

GB4FUN IN NORTH WALES

by Mark Harper, MW1MDH / MW3MDH

GB4FUN HAS spent a lot of time over the Welsh border recently. On 29 June it was in Wrexham town centre, parked up outside the Guild Hall, and operated by members of the Wrexham Amateur Radio Society, including Chairman Ian, GW1MVL / GW0VML; Vice Chairman Mark, MW1MDH / MW3MDH; and President John, GW3RBM, with the assistance of RSGB Regional Manager Liz Cabban, GW0ETU, and Deputy RSGB Regional Manager Dave Evans, GW4GTE.

Over the space of the day, many people came and visited us, some of whom knew what amateur radio was all about, and some who were just drawn in by a van parked in the town hall square with aerials sticking out the top of it!

All aspects of the hobby were being demonstrated, from HF through to a datamodes display, and there was plenty of literature on hand, with plenty of people asking questions. We took every opportunity to introduce the Foundation Licence, and a lot of people seemed quite amazed at how the route to getting started in amateur radio had changed for the better. It was all go for the whole day!

Ian, GW1MVL, helps to put up the GB4FUN aerials outside Wrexham Guild Hall.

The day went well, although we suffered 'audio QRM' from a live band who had set up a stage on the town hall square and proceeded to play at full volume at regular intervals - the square was also being used for other events during that day. It gave our vocal chords a good work-out!

The day went quite quickly, and there was never any shortage of people coming through. We also had a secret weapon in the form of John, GW3RBM, doing some PR work handing out leaflets and answering questions in the area around the bus. We made a few contacts on HF (VHF was a little bit hit-and-miss) which ranged from inter-G to Italy and as far afield as Connecticut.

We packed up at about 4.30pm, at which time the band had stopped playing also! We managed to pack up in record time, and then GB4FUN was off on its way to Barmouth.

Dave, GW4GTE, helps some youngsters sending their names in Morse at Rhos CP School.

On 2 July GB4FUN was at Rhos CP School, this time looked after by Dave and Liz. No sooner had GB4FUN been set up than its first visitors, formed into 'bite size chunks' by Mr Edwards, one of the teachers, were queuing up to see inside.

It was certainly a lot of fun. There were no 'mic shy' operators here, it seemed everyone wanted to have a go on the air, or on the Morse key. Dave, GW4GTE, commented, "Interestingly it seemed to be the Morse code that interested them most and everyone wanted a turn on the Morse key sending their names and decoding words. Maybe future CW operators in the making?"

They were assisted by Keith, 2E1HXT (also soon to be an M3?), who helped with the exchange of messages. Two of the Rhos CP School's pupils are already M3s: Amy, MW3VML, and Carys, MW3CAS, daughters of Wrexham ARS Chairman Ian Wright. They took to the mic under their own callsigns while being watched by Liz.

GB4FUN at Rhos CP School was deemed to be a great success. Then, if that wasn't enough, GB4FUN made an appearance at Wrexham ARS's meeting on the same night, again assisted by Liz,

Liz Cabban, GW0ETU, takes the class in GB4FUN at Rhos CP School.

GW0ETU, and Dave, GW4GTE.

We were also joined by amongst others Dennis and John who had joined us on the Saturday who were able to see GB4FUN in a somewhat quieter location than at the Guild Hall on the Saturday. There were more people in or around GB4FUN at one point than were inside. For those members who hadn't seen it before, this proved to be quite a talking point. The evening passed in what seemed like a blur, and before we knew it, GB4FUN was being packed up and readied for collection by Kath, M1CNY, and Dave, G7OBW, Wilson for its trip around the North West.

Wrexham ARS and Rhos CP School would like to thank the RSGB for GB4FUN, which in itself seems to be quite a conversation point wherever it goes. It is an amazing tool for the promotion of amateur radio. Thanks too to Liz Cabban, GW0ETU, and Dave Evans, GW4GTE, for their help and assistance with GB4FUN, everything from admin, to driving it to a location and setting it up, and feeding and watering the troops. Thanks also to Wrexham Borough Council for letting us set up GB4FUN in the town centre.

GB4FUN AT ETONBURY SCHOOL, ARLESEY

by Esde Tyler, G0AEC

A PHONE CALL from our son Ian, G0KOA, told us that his daughter's school, Etonbury Middle School at Arlesey, Beds, was planning its annual 'Fayre' and he had suggested an amateur radio station as an attraction. Would we like to go down to help him? With the possibility of over 4000 visitors, it seemed a good opportunity to show the hobby to the public. I (foolishly?) suggested that a visit by GB4FUN could add to the attraction and was given the job of arranging it.

The gathering at the school was the ideal place to advertise the hobby, as most of the former pupils turn up and they would be the ideal age to reach. The application for the vehicle was approved and all things were set to go ahead.

Putting up the GB4FUN antennas at Etonbury School.

Ian's driving licence fulfilled all the necessary qualifications and arrangements were made to pick up the vehicle from RSGB HQ. My husband Ken, G0ITI, and I travelled down the day before from Yorkshire. We took Ian to Potters Bar, where Carlos Eavis, G0AKI, was waiting with all the information that we would need. The manuals were in the van, but Carlos had made life easier by pulling out all the really relevant bits and putting them all into a single folder to make for easier reference. This made life a lot easier as we were not familiar with any of the rigs aboard. Carlos was most helpful, assuring and confident - which is more than we were by this time. He talked us through all the information we needed and gave us the chance to ask silly questions.

Then, out to the vehicle. Ian: "It's *big* - and I've never driven a Merc before!" Again, Carlos went through all the equipment and made sure we knew where everything was and how to erect aerials - all tools were provided. So, we were off. We followed Ian to Arlesey and parked the bus at Etonbury School to stay overnight as all gates are locked and the caretaker (who lives on site) was charged to keep an eye on it. Next morning a hard hat was donned when everything was set up. At last, we tried it out and made a contact, so we knew we had cracked it! I had taken the photographs that I normally use for display at rallies and we festooned the interior walls (I had even remembered the Sellotape and Bluetack!) Information sheets and leaflets from the Radiocommunications Agency were added to the RSGB literature that had been thoughtfully provided, and we were ready for the Big Day.

As Chairman of the school's governors, Ian would be busy on the field being announcer, disc jockey and general dogsbody, so it was left to Ken and me to man the station. Ken was to operate and I was to do the public relations bit and persuade visitors that amateur radio is a well worthwhile hobby for individuals and families.

Band conditions were atrocious and there were several special event stations to contend with, but Ken worked hard and contacts were made with England plus Bucharest, Milan, Ems and Bremen. Mostly, our visitors were content to listen and ask questions, rather that take the microphone themselves. We had an amateur who had been inactive for many years and a non-amateur who had spent his working life in satellite communications. There were many youngsters through the door - the FUN Bus is big enough to draw attention in crowded places! There was a very tiny element of stroppy ones who were very quickly moved on to be a nuisance elsewhere but, mostly, people were very interested and asked many questions. As I knew the story behind all the photographs on show, mainly young people of similar age to our visitors who had gained Novice licences, many of the youngsters were impressed. Families turned up with all generations showing a lively interest.

One of numerous youngsters gets his first sight and sound of amateur radio at Etonbury School.

Was it worth it? The answer is a resounding "Yes!" After being 'on show' for four hours of intensive activity, dismantling the aerials was achieved far quicker than the erection of same. Again the bus was left overnight at the school and picked up early next morning to return to Potters Bar.

Would I do it again? Again, "Yes", as I believe that a practical demonstration of the hobby is its best advertisement. We did not use a key nor headphones although listening would have been easier. Our visitors heard both sides of conversations and were impressed. Any preconceived notions of amateur radio / CB were quashed - many visitors were familiar with the latter, but had abandoned it. Perhaps they will now turn to 'the real thing', but only time will tell.

Would I advise anyone else to have a go? Another "Yes", but I would suggest that you do your homework first. You need to know exactly what you are talking about, but there is help available. Carlos will help and give you the confidence to try. The best advert for anything comes from exponents of the subject showing the very best of it. GB4FUN provides the opportunity to do just that. ♦

If your club or group would like to make use of GB4FUN for a *public* demonstration of amateur radio, please contact RSGB HQ or e-mail: gb4fun@rsgb.org.uk

Down To Earth

Measure Resistance with a Wheatstone Bridge

A simple circuit to measure resistances between 10Ω and 10MΩ, by Dick Biddulph, MOCGN *

THERE ARE THREE basic methods of measuring re-sistance:

- Connecting the unknown resistor to a voltage source and measuring the current through it. It makes indirect use of Ohm's Law by utilising the equation R = V / I, where V is known and I is measured, enabling R to be calculated. This is the method used in multi-range meters, such as the AVO.
- Using a Wheatstone bridge. which I'll describe in some detail below, with a design for a practical instrument.
- Passing a known current from a constant-current source through the unknown resistor, measuring the voltage across it and using the previous equation. This is used in direct-reading ohmmeters, particularly the digital type.

WHAT IS A BRIDGE?

IN THIS CASE, it's a network of four resistors, where, usually, three are known and from which the fourth, unknown, resistor can be calculated.

The basic bridge, shown in **Fig 1**, was actually invented in 1833 by S H Christie of the Royal Military Academy at Woolwich, but the English physicist Sir Charles Wheatstone was the first to point out its immense value to electrical engineering. Although Wheatstone always credited Christie with its invention, it became popularly known as the 'Wheatstone Bridge'.

It is considered to be 'balanced' if the voltages at A and B are equal, relative to either pole of the battery. This happens when

$$\frac{R1}{R4} = \frac{R2}{R3}.$$

At balance, no current will flow through the meter, M1, which is a centre-zero type. Remember that any component needs a voltage difference between its ends in order for current to flow through it.

If R1, R2 and R4 are known, R3 can be calculated.

A simple variation of the circuit is shown in **Fig 2**, where R1 and R4 are replaced by a potentiometer, RV1. The same criterion for balance applies, the upper and lower parts of RV1 corresponding to R1 and R4. RV1 can then be calibrated if R2 is fixed and R3 is replaced, sequentially, with a series of known resistors. Clearly, if the bridge balances at the centre point of RV1, R2 = R3.

THE BALANCE POINT

TRADITIONALLY, the Wheatstone Bridge is fitted with a sensitive meter across AB in Figs 1 and 2, and RV1 is adjusted for a null reading on the meter. However, there are other ways of indicating balance, one of which is described here.

An operational amplifier (or op-amp) is an integrated-circuit differential amplifier. This means that its output is a function of the voltage *difference* between its inputs. It has a *very* high gain (~10^5) and, when connected for our purposes, it behaves, not as an amplifier, but as a *comparator*. It tells us simply the *polarities* of the inputs, not their magnitudes. The output of the comparator can have only two states, corresponding very closely to the voltages of the two supply rails. If the inputs are connected to A and B in Figs 1 and 2, the output will (theoretically) be zero at the exact balance point. Because, in practice, the comparator output *cannot* be zero (it does not correspond to either of the two states mentioned earlier), the output is best indicated by a tricolour LED (see later) connected from it to the junction of two equal resistors between the supply lines.

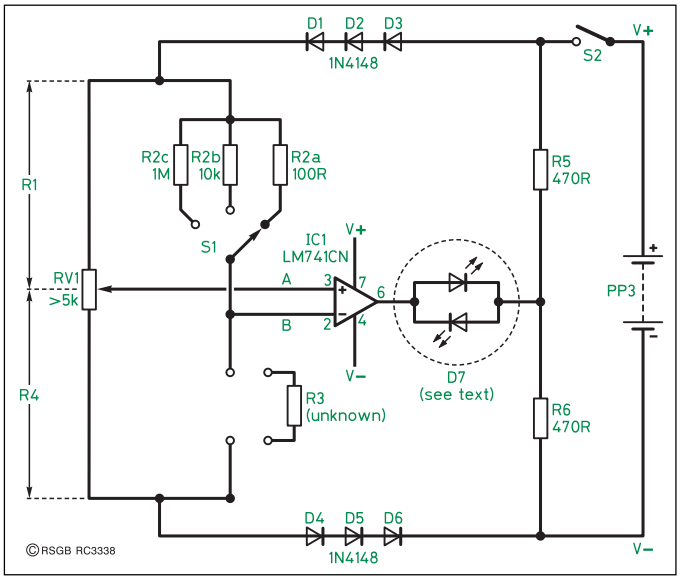


Fig 3: The final circuit for measuring resistance between 10Ω and 10mΩ.

PRACTICAL CIRCUIT

FIG 3 SHOWS the complete circuit diagram. RV1 must be a linear device, but its precise value is unimportant. A wire-wound potentiometer is probably best, but don't use a very low value because (a) it draws a lot of current from the battery and (b) the windings are rather coarsely-spaced so the resolution is poor. Anything above about 5kΩ is OK. The bridge shown in the photograph uses a cermet-based potentiometer which is linear to ±2%, though this does not affect the accuracy of the bridge.

The LED should be a tricolour device. This means that it shows red with voltage of one polarity, green with voltage of the opposite polarity, and roughly yellow (red + green) with AC excitation, Separate green and red LEDs can be used,

* *59 Ditton Road, Surbiton, Surrey KT6 6RF.*
E-mail: biddulph@intonet.co.uk

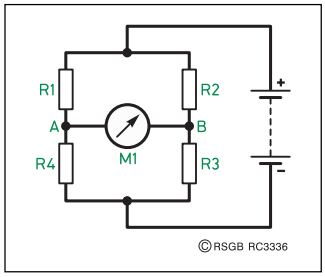


Fig 1: The basic bridge circuit.

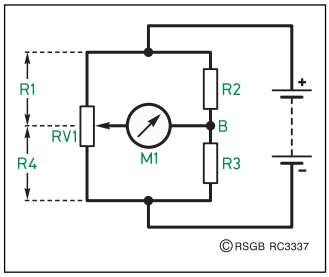


Fig 2: Fig 1 with a potentiometer fitted.

Unknown resistance R3 (kΩ)	Angle measured clockwise on RV1 from electrical zero (°)
1	23
2	42
5	84
10	126
20	168
50	210
100	229

Table 1: Calculated values of α for given values of 'unknown' resistors for the author's unit on range 'b'.

but the result is less tidy.

Construction is simple. Mount the potentiometer, RV1, on the lid of the box with a suitably-sized piece of polar coordinate graph paper centred on the shaft of the pot, as shown in the photograph. Then mount the terminals, the LED, the push switch, S2, and the range switch, S1. This selects three separate resistors which give three resistance-measuring ranges.

The op-amp can be mounted on a specially-made board or a small piece of Veroboard. The range resistors can be mounted directly on the range switch and the two sets of three diodes mounted between the op-amp board and the bridge circuit. Incidentally, these are needed to make sure that the input to the op-amp cannot get near either supply rail, because some op-amps don't like this.

The calibrated scale of the bridge. 'MZ' mark the end-stops; 0 and ∞ are the electrical ends of the potentiometer. The push-switch (S2) is mounted near the '0' mark and the LED near the '0.6' mark.

CALIBRATION

THIS CAN be done mathematically or by using a number of known resistors.

Using known resistors

After you have constructed the circuit and tested it in order to verify that a balance point can be found for a resistor connected as shown in Fig 3, you will need to calibrate the potentiometer scale.

This is quite simple. Have to hand a selection of good-quality (1%) resistors, covering, for example, the range 1kΩ to 100kΩ. Select the middle range on the range switch, and connect each resistor in turn, marking its value on the scale at its balance point, which is when the LED flips from one colour to the other. Although being far easier than the mathematical method below, the values on the scale will be a little unusual! If you are really crafty, you can borrow a four-decade resistance box from your local school's physics lab! This will overcome the unusual scale values, too.

Mathematically

Find the electrical zero by shorting the 'unknown resistor' terminals and adjust RV1 until the LED just flips from red to green. For the other end of the scale (marked '∞' on the dial), do the same with the terminals open-circuited.

When the points have been found, mark them on the scale This will give the two electrical ends of the control. Note that the 'electrical' ends will be different from the 'mechanical' ends (the end-stops, marked as MZ in the photograph). The end-stops should be marked on the scale so that, if the knob has to be removed, it can be replaced accurately.

Now, with the polar graph paper mentioned earlier, measure the angle between the electrical ends. Suppose this is θ.

The balance point, α, (in degrees from the extreme anticlockwise *electrical* zero) for any resistor, R3, in terms of the range resistor, R2, is given by

$$\alpha = \frac{R3}{R2 + R3} \times \theta$$

where R3 is the unknown (see Fig 3).

In my bridge, R2 is 10kΩ for the middle range and θ is 252°, so the equation becomes

$$\alpha = \frac{R3}{10 + R3} \times 252$$

So we can construct a table of angles for various values of the unknown resistor, R3, in kΩ, see **Table 1.** Mark these values at their appropriate angles on the scale.

Please note that this table applies *only* to my prototype with the characteristics mentioned above. When calibrating your unit, simply subsitute your value of θ into the equation. Nothing else need be changed. Then calculate the new values of α.

The other ranges are read simply by multiplying the balance reading by the appropriate factor. Only one calibration process is necessary! In my case R2 can have values of 100Ω, 10kΩ (as above) or 1MΩ, allowing readings of reasonable accuracy between 10Ω and 10MΩ.

IN USE

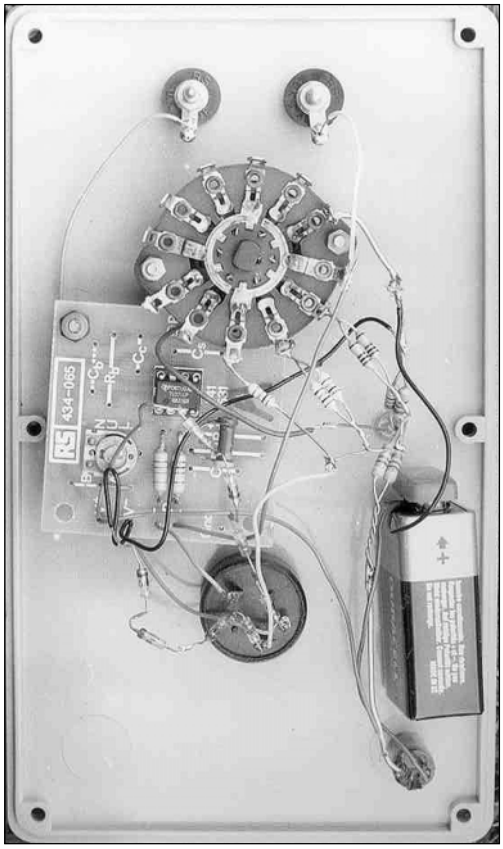
FIRST, connect your unknown resistor, R3, across the terminals. Set the range switch to position 'b' (middle). Press S2 and turn RV1 while watching the LED. If it does not change colour, R3 must lie below 1kΩ or above 100kΩ (see the box), so switch to the other ranges in turn and read the balance value from the scale. Release S2. Now scale the reading to the correct value corresponding to the position of the range switch. On position 'a', multiply the reading by 100Ω; on position 'b' by 10kΩ; on position 'c' by 1MΩ. That's all there is to it! ♦

COMPONENTS LIST

RV1 ..... linear potentiometer (see text for value)
R2a 10R 1%
R2b 10k 1%
R2c 1M 1%
(R2a, R2b, R2c: range resistors)
R5, 6 ..... 470R 10%
IC1 ..... LM741CN
D1 - D6 .. small silicon diodes, eg 1N4148
D7 ..... tricolour LED (or two different LEDs, connected back-to-back)
S1 ..... 1-pole 3-way wafer switch
S2 ..... push-to-make switch
PP3 battery and clip
Small piece of Veroboard
Polar coordinate graph paper (eg Chartwell 7506)
Plastic box

MEASURING RANGES

S1 range 'a' measures 10Ω - 1kΩ
S1 range 'b' measures 1kΩ - 100kΩ
S1 range 'c' measures 100kΩ - 10MΩ



Panel underside, showing the 'bird's nest' technique - all components wired point-to-point. The range resistors are mounted directly on the range switch.

The GB4FUN Supporters' Honour Roll

J Jordan, 2E0ASG
S Specht, DK8OL
P Martin, EI2CA
J L McHugh, EI8BR
P Lalibert, F3ET
J D Hockley, G0ANW
R H Wills, G0BDP
G Whitham, G0EPA
E R Flower, G0GCN
A E Norman, G0GGB
A H T Drye, G0GJP
Y Katoh, G0GRV
D B Ross, G0HIW
P E Boorman, G0JBA
P W E Roake, G0KDN
K W Brown, G0OMS
P W Mortimer, G0ORN
B Jones, G0PLW
M L Green, G0SGQ
M Creswick, G0SVJ
K Davidson, G0TXD
S R Adams, G0ULF
C A Myhan, G0URA
A N Marinho, G0XBG
F J Light, G1JOT
B L Underhay, G1YES
G Stanton, G3AJX
Clacton Radio Club, G3CRC
D H Maclean, G3DNQ
RS of Harrow, G3EFX
Rev H Makin, G3FDC
J R Platt, G3FEV
J Harper-Bill, G3IZM
M A Birch, G3KMO
R Roberts, G3MAK
J S E Pearce, G3MEC
A J Taylor, G3NYE
R N Graham, G3OAY
P C Taylor, G3RRG
R A Bravery, G3SKI
J E Bright, G3TJW
G F Ward, G3TUQ
G G Clark, G3UBR

£1000 RECEIVED FROM NORTH-WEST AMATEURS!

Contributions totalling nearly £1000 have been received from Dave Wilson, G7OBW, and Kath Wilson, M1CNY / M3CNY, on behalf of 'The Three Counties Foundation', a group of about a dozen amateurs from Cheshire, Lancashire and Clwyd who get together to hold a Foundation course over one weekend each month. They have agreed to donate the £5 fee for each candidate taking the Foundation course to the GB4FUN fund. The photograph shows Mike, soon to become an MW3, handing over a cheque for £70 from the 14 candidates attending the July course held in Frodsham, Cheshire, to Kath Wilson (the RSGB Regional Manager for the North West). Jeff Smith, MI0AEX, has also been conducting Foundation Courses in Northern Ireland and has recently donated over £100 from course fees to GB4FUN.

A J Matthews, G3UNM
M A Hall, G3USC
H P Shelvey, G3WPI
R A McCowatt, G3WPK
R A Ingram, G3YIY
A Pressley, G4BXQ
M E S Valente, G4EBN
K Middleton, G4EJH
K P Austen, G4GJA
Dr J M Buckley, G4HGL
L R Bower, G4HKY
P E Smith, G4JNU
B G C Thompson, G4LKF
M J Adams, G4LOF
K F Barnard, G4MMA
K H Kirby, G4VKK
Aylesbury Vale RS, G4VRS
C N Wilson, G4VVZ
A Ogden, G5OD
M Winer, G6CGB
D R Banks, G6KIE
J A Newman, G6ZQE
Dr D A Rutherford, G7KUG
Mrs J C Flower, G7MHT
C H Lucas, G7TDL
R J Dean, G7UEL
N Thompson, G7UZS
R E G Kendall, G8BNE
C C Eccles, G8NMK
W D Johnson, G8NS
D McKnee, GI0GPG
R Cunliffe, GI0HVJ
R T Sherrard, GI3VAW
J H Sander, GI4BUJ
R K Quigg, GI4CRQ
D I Mackinnon, GM0ADF
Mrs J Mackinnon, GM0EUM
D Enderby, GM0FMW
J C Carslaw, GM2ACY
K A J Younger, GM3OIB
J Carson, GM3OXK
T R Logan, GM3VBT
J Haliburton, GM4AQO
G W J Walker, GM8YUM
A G Harvey, GU7DHI
K L Williams, GW0RNK
K Robbins, GW3PFV
A I Grant, GW4KPD
J R Moritz, M0BMU
B Harrison, M0BTZ
D Clapp, M0GMT
R B Coston, M1ALF
G R H Chance, M1BUI
D B Sampson, M1DOZ
B A Sutton, M1EFF
L Shepherd, M1ETZ
J K Brown, M1JKB
F L Cooper, MI0BWK
C G Queeley, MW0COD
J C C Scott, RS170853
R M Toone, RS176044
C Matthews, RS181059
C M Boyle, RS183768
A W Tideswell, RS48462
J N Appleby, VA3JNA

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.

The RSGB is also grateful to those many generous members who have sent donations anonymously, or who have asked us not to publish their names.

RadCom Helplines FOR MEMBERS

● Alan, G3KGN, would like some information, circuit diagrams, etc of a **transistor VOX circuit** suitable for a homebrew transceiver. Any costs paid. G3KGN, QTHR. Tel 01702 477 779.

● Ted, G8HLJ, is in great need of a service manual or other information on the **FDK Multi-2700 2m multi-mode transceiver**. Costs will be reimbursed in full. G8HLJ, tel: 0151 632 0614.

● David , 2E1MUG, seeks any information, particularly circuit diagrams, on the **Marconiphone model 262AC**, manufactured in ~1936 by EMI. 2E1MUG, tel: 01388 488 456, or e-mail: david.c174@durhamlea.org.uk

● Tony, G3ICB, requires the manual or circuit diagram for the **Telequipment D61 CRO**. Also, what CRT is needed for the telex **STC3000 Perfector**, and where can he find one? He also needs a source of >20W resistors and connectors for a 1kV PSU. G3ICB, QTHR. E-mail: tony.bull@ntlworld.com

● Ken, G4CNE, is looking for a **24-hour radio-controlled clock** which can show **UTC**. G4CNE, tel: 01892 533 005.

● **KW2000B** - no RF receiver - no audio transmit. Ideas, please, in exchange for microphones. Contact Gordon, 89 Queens Drive, Sevenoaks, Kent TN14 5DB.

● Dave, G8OWN, needs an **AT-50 DC** power lead to enable him to run it as a separate unit from the TS-50S. Any information regarding a source of the lead or purchase of same will be greatly appreciated. G8OWN, tel: 07815 497 560 or e-mail: aromram@earthling.net

- IMPORTANT NOTE -

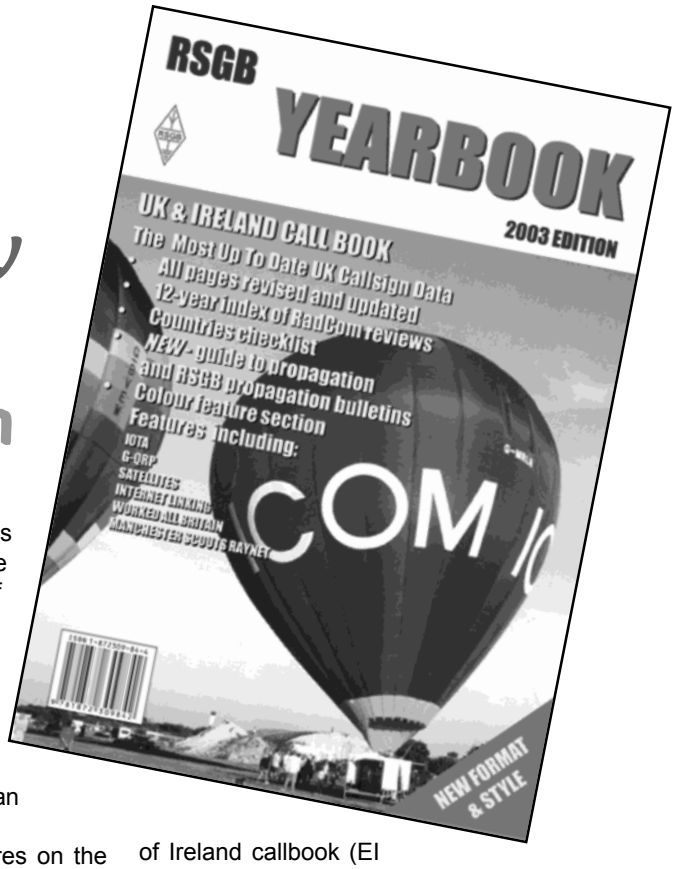
Respondents to items in the 'Helplines' column are advised not to send original documents, but to copy them and send the copies. This is to protect your (often valuable) property in those very few instances where the originals are not returned.

More 'Helplines' on page 53

'Helplines' is a free service to members. Requests for help are published in the order in which they are received. We regret it is not possible to provide an undertaking of when any submitted request will appear.

Book Review

RSGB Yearbook - 2003 Edition



IF IT'S September, it must be the new *RSGB Yearbook*; that perennial best-seller and *vade mecum* of all there is to know about amateur radio in the UK. Once upon a time known simply as the 'Call Book', for many years now the *Yearbook* has been far, far more than just a listing of callsigns and addresses. So what is new this year?

Quite a lot, actually. Indeed, of all the pages in this book, only a handful are the same as last year. Every page has been completely revised, checked and updated, and the whole book has been re-edited and redesigned. The popular colour sections have been kept, but the equipment and software reviews reprinted from *RadCom* have been replaced with a general index of *all* reviews that have appeared in *RadCom* since 1990 and several original features intended to be of general interest.

Upon picking up the new *Yearbook* it is immediately apparent that it has undergone a complete change in style. For a start, it is now printed on high-quality paper throughout, relegating the 'telephone directory' pages of the callsign listings to yesteryear.

The order of the contents has been changed into a more logical fashion, making it quicker and easier to find that one vital piece of information for which you are searching. The typeface has been updated, making the book clearer to read.

At the foot of each page there is a handy information bar intended for your own notes. To get you started, useful information such as contact names, addresses, phone numbers, websites and e-mail addresses are given on many pages, with sufficient space for your own amendments, corrections, updates and other notes.

INFORMATION SECTION

THE *YEARBOOK'S* Information Section was, as far as possible, accurate at 1 July 2002. Obviously with a publication lasting until December 2003, changes will happen during the lifetime of the edition. This particularly applies to items such as RSGB QSL Bureau sub-managers, GB2RS newsreaders, local and national clubs and societies, repeaters, beacons and the composition of the newly-formed regions and volunteer posts. Here's where that new 'strap' at the bottom of every page will come in handy!

The maps of the UK's 6m, 2m, 70cm and 23cm voice, and 23cm and 10GHz TV repeaters, have all been redrawn and now show the location of the repeaters far more accurately than hitherto.

There are new colour features on the G QRP Club, Internet linking, amateur satellites, Worked All Britain, the RSGB Islands on the Air (IOTA) programme and Manchester Scouts Raynet. By popular demand, the DXCC countries prefix list is now a 12-band check-list, allowing you to tick off each country as you work it on each band.

CALLSIGN LISTINGS

AS OF 1 JULY 2002, 59,878 UK callsigns were current and all are listed in the *Yearbook*. This figure is 2544 more than last year and represents an increase of 4.4% in the number of callsigns listed. This reverses all the falls of the last three years. Naturally enough, all the new M3 callsigns issued by the cut-off date are included.

The *Yearbook* also includes the Republic of Ireland callbook (EI callsigns), made available by the IRTS, as well as UK special short contest callsigns (eg G1A, MW2Z etc) and a listing of the most active UK SWLs.

Most active amateurs use the *Yearbook* on a daily basis. You don't want to be using out of date information, so with the sheer number of changes compared with last year's book you simply cannot afford *not* to get the latest edition! The price has been held the same as last year, and at just £13.59 (members' price) the *RSGB Yearbook 2003* continues to represent excellent value for money. ♦

RSGB Yearbook 2003
ISBN: 1-872309-84-4, ISSN: 1460-454X
464 pages, 297 x 210mm
£13.59 (members), £15.99 (non-members)

CALLSEEKER PLUS+ incorporating Eurocall

CALLSEEKER PLUS+ IS THE name given to the *RSGB Yearbook* on CD-ROM. It contains exactly the same information that is in the printed version of the book - plus lots more besides.

All the *Yearbook's* Information Section pages are on the *Callseeker* CD and can be viewed in the form of PDF pages and printed out on your printer if required.

Likewise, the entire UK callbook, updated to 1 July 2002, is included on the CD. However, *Callseeker Plus+* also incorporates *'Eurocall'*, a CD callbook with the callsigns, names and addresses of amateurs in 19 more countries: 9A, DL, EA, EI, ES, F, HA, HB, I, LX, LY, OE, OH, ON, OZ, SM, SP, SV and Z3.

The popular *Eurocall* interface, easy-to-use software with multi-language support, allows you to search for a particular callsign, surname etc.

Published jointly by the German national amateur radio society, DARC, and the RSGB, *Callseeker Plus+* is perfect for those who prefer to be able to search for callsigns or names electronically. With 19 additional countries' callbooks included, it offers superb value at £11.89 (members' price).

Callseeker Plus+
DARC / RSGB
£11.89 (members), £13.99 (non-members)

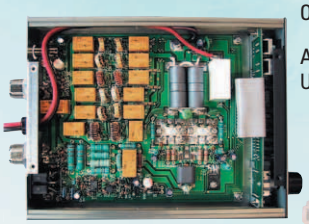
FT-817 Owner?
Fed up with QRP?

How about 50 Watts, 80m-6m!

HL-50B
6m/HF Amplifier

Ideal for ALL FT-817 owners and HF transceiver that produces 5 Watts of drive.
ONLY ***£269.95*** plus £7.00 p&p

Available from stock from your favourite UK Dealer - **ML&S Martin Lynch & Sons**



HL-50B SPECIFICATIONS

Freq. Band	3.5-29.7MHz and 50MHz
Mode	SSB/CW/FM/AM
DC Power	DC 13.8V 10A max
RF Drive Power	5W (1- 5W) Model for FT-817 10W (1- 10W) Standard model
RF Out.	50W PEP max. (25W for AM, FM)
Power Tr.	2SC1946A ?~2
In/Out Connectors	SO - 239 (M-J)
Others	Switch selected low-pass filter for each band. Carrier operated send-receive switch circuit. LED power output level indicator. External remote controller (HRC-60, optional) terminal. ALC output. Protections against antenna short, band set error, and reverse DC power polarity.
Dimensions	148 (W) ?~55 (H) ?~190 (D)mm, 5.8(W) x 2.2(H) x 7.5(D) in
Weight	Approx. 1.4kg, 3.1lbs.

HAVE YOU GOT an old 2 metre multimode hanging around?

Bring it BACK to LIFE with the HX-240 Tranverter
2 in - HF out

HX-240 SPECIFICATIONS

Frequency Band	3.5/3.8/7/14/21/28MHz Amateur Bands
Mode	FM/SSB/CW (Dependent on radio to be used)
DC Power	DC 13.8V 7A max.?@
RF Drive Power	2.5W/10W Selectable
Power out	30 - 40W pep (30W for FM)
Freq. Stability	?}10ppm max
Spurious Emission	-40dB or less
RX Pre-amp Gain	Approx 10dB (2SK125 J.FET by Sony)
In/Out Connectors	SO - 239 (M-J)
Others	Auto RF Key, Low Noise Pre-amp, Stand-by Jack (Remote TX Key Jack), Panel Meter for Power out, Protections for High SWR and Reverse DC Power Polarity, High/Low Power out Select
Dimension	146(W) x50(H) x192(D) mm, 5.7(W) x2.0(H) x7.6(D) in
Weight	approx. 1.3kg, 2.9lb

Other NEW PRODUCTS *coming soon* -

HL-700 HF Amplifier

Freq. Band	3.5 / 7 / 14 / 21 / 28mHz (also operable on 10 / 18 / 24. 5mHz bands)
Mode	SSB,CW, AM,FM RF Drive Power: 10W and 100W, manually switched
DC Input Power	13.8V, typically 70A for 500W output
RF Out (100W drive)	SSB: 600W PEP, CW/FM: 500W, AM: 300-350W
RF Out :(10W drive)	SSB: 400W PEP, CW/FM: 400W, AM: 250W
Power Transistor	THP - 120 x 8 (proprietary)
Connectors	Type M (SO-239)
Meters	Transmitted power and reflected power, power source voltage
Other	Switch type low-pass filter, sending and receiving carrier control, various protection networks, (LPF band mistake set, antenna short circuit, radiator overheating and PA imbalance, overvoltage), stand-by terminal, ALC output and RF input 2 position switch
Dimensions	300 (W) x 100 (H) x 342 (D) mm
Weight	Approximately 8kg

HL-3KDX HF 3KW Linear

Freq.Band	1.8 - 29.7MHz of all amateur bands including WARC bands.
Mode	SSB/CW/RTTY/SSTV/AM/FM
AC Power	200V/220V/240V?@20A max. single phase.
RF Drive Power	120W max.
RF Input (DC)	3.4kW peak max.
RF Out.	2kW PEP max. (1/2-1/3 for RTTY, SSTV, AM, FM)
Power tube	Eimac 3CX1200A7 x 1
Circuitry	Class AB,Q, Grounded grid
In/Out Connectors	N - R type
Built-in meters	Plate current meter (IP), Multi-function meter (IG/PO/EP)
Others	Various Protections, Peak RF Power meter., ALC out, Off-delay cooling fan for better tube life. Remote TX control.
Cooling	Forced air
Dimensions	402(W) x 205(H) x 460(D) mm, 15.8(W) x 8.1(H) x 18.1(D) ins app
Weight	50kgs, 110lbs

ML&S martin lynch & sons
Suppliers of Communications Equipment

tel: 0208 566 1120
fax: 0208 566 1207
website: www.hamradio.co.uk
email: sales@hamradio.co.uk

128, 140-142 NORTHFIELD AVENUE • EALING • LONDON W13 9SB

TELEPHONE SALES ON:
01922 414796
Ask for Dave (G1LBE)
Open Mon-Fri 9.30 - 6.00pm.
Sat 9.30 - 4.00pm.
Web Site: http://www.radioworld.co.uk
E-mail: sales@radioworld.co.uk

RADIO

42 BROOK LANE, GREAT WYRLEY,

YAESU KENWOOD ICOM ALINCO




MODEL	PRICE	MODEL	PRICE	MODEL	PRICE	MODEL	PRICE
FT-1000mkV	PHONE	TS-2000	£1,575.00	IC-756ProII	£2,400.00	DX-701	£629.00
FT-1000-FIELD	£2,299.00	TSB-2000	£1,499.00	IC-7400	£1,400.00	DX-70TH	£599.00
FT-847	£1,149.00	TS-50S	£599.00	IC-R8500	£1,199.00	DX-77	£599.00
FT-920	£1,099.00	TM-D700E	£429.00	IC-910H	£1,129.00	DR-610	£369.00
FT-100D	£849.00	TM-V7E	£375.00	IC-706mkIIG	£849.00	DR-605	£269.00
FT-817	£575.00	TH-D7E	£299.00	IC-R75	£599.00	DJ-G5E	£265.00
FRG-100	£399.00	TMG-707E	£279.00	IC-718	£549.00	DR-150	£259.00
FC-10	£299.00	THF-7E	£249.00	IC-2725E	£399.00	DJ-X2000	£449.00
FT-7100M	£299.00	THG-71E	£210.00	IC-2800H	£395.00	DJ-X10	£249.00
VX-5R	£239.00	RC-2000	£199.00	AT-180	£329.00	DJ-V5	£239.00
MD-200A8X	£225.00	MC-90	£175.00	PCR-1000	£319.00	DR-MO6	£229.00
VX-1R	£165.00	MC-85	£125.00	IC-207	£295.00	DJ-C5	£189.00
VR-120D	£159.00	MC-60A	£110.00	IC-T3H	£155.00	DJ-195	£159.00
FT-1500M	£159.00	MC-80	£69.95	SM-20	£125.00	DJ-193	£139.00
VR-120	£129.00	PS-52	£229.00	SM-8	£125.00	DJ-X3	£115.00
SP-8	£125.00	PS-53	£229.00	CT-17	£99.00	DR-135	£229.00
MD-100A8X	£100.00	PS-33	£199.00	SP-21	£69.00	DJ-496	£175.00

MFJ

MJF-16010	MFJ-989C	MFJ-986	MFJ-969	MFJ-962D	MFJ-949E	MFJ-948	MFJ-945E	MFJ-941E
£56.95	£379.95	£349.95	£199.95	£279.95	£159.95	£139.95	£119.95	£129.95
MFJ-934	**MFJ-924**	**MFJ-921**	**MFJ-914**	**MFJ-910**	**MFJ-906**	**MFJ-903**	**MFJ-901B**	**MFJ-212**
£189.95	£74.95	£74.95	£64.95	£24.95	£89.95	£54.95	£85.95	£79.95

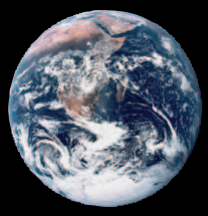
WE WON'T BE BEATEN ON PRICE

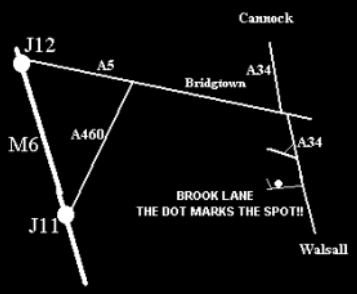
Tel Sales & Service: 01922 414796
Fax: 01922 417829

MasterCard Access SWITCH VISA

There is NO CHARGE for using credit cards

WORLD





WALSALL, WEST MIDLANDS WS6 6BQ

SECOND HAND EQUIPMENT LIST

RADIOWORLD SECOND HAND EQUIPMENT

Make	Model	Description	Price
ADI	AR-146	2m FM 50W MOBILE	£130.00
AKD	6001	6m FM TRANSCEIVER	£135.00
ALINCO	DJ-580E	2/70CM HANDY TRANSCEIVER	£140.00
ALINCO	DJ-G5EY	DUAL BAND HANDY	£199.00
ALINCO	DJ-X10	WIDE BAND RECEIVER	£275.00
ALINCO	DR-140	2M MOBILE TRANSCEIVER	£120.00
ALINCO	DR-605E	2M / 70CMS MOBILE	£200.00
ALINCO	DX-70	HF MOBILE + 6M	£399.00
ALINCO	DX-70TH	HF MOBILE + 6M	£475.00
AMERITRON	QSK-5	AMPLIFIER SWITCH / PRE HEAT	£200.00
AOR	AR-3000A	WIDE RECEIVER	£475.00
AOR	AR-3030	HF / VHF RECEIVER Inc converter VHF	£450.00
AOR	AR-3030	HF RECEIVER	£399.00
AOR	AR-7030	TOP RECEIVER	£550.00
AOR	AR-8000	WIDE BAND RECEIVER	£199.00
AOR	AR-8200II	WIDE BAND SCANNER	£275.00
AOR	AR-8200 mk1	WIDE BAND RECEIVER	£230.00
AOR	AR5000	TOP CLASS RECEIVER	£999.00
AZDEN	PCS-4000	2M TRANSCEIVER	£99.00
BNOS	AMPLIFIER	432-10-50 70CM 50Watt	£99.00
CAPLO	SPL-3000	ANTENNA TUNING UNIT	£199.00
DAIWA	CNW-419	ATU	£190.00
DATONG	FL-2	FILTER	£60.00
DIAMOND	SX-1000	POWER METER - HF TO 23CMS	£110.00
DRAKE	SW-2	RECEIVER	£275.00
FAIRHAVEN	RD-500	WIDE BAND RECEIVER	£575.00
GRUNDIG	SAT800	SATELITE 800 MILLENIUM	£400.00
ICOM	AT-150	AUTO ATU	£175.00
ICOM	IC-2100H	2M MOBILE TRANSCEIVER	£150.00
ICOM	IC-251	2m MULTIMODE TRANSCEIVER	£295.00
ICOM	IC-275E	25W TRANSCEIVER	£525.00
ICOM	IC-471E	70CM BASE MULITMODE TRANSCEIVER	£299.00
ICOM	IC-706MK1	HF / 6M / 2M (10w) TRANSCEIVER	£450.00
ICOM	IC-706MK11	HF / 6M/ 2M TRANSCEIVER	£550.00
ICOM	IC-728	HF TRANSCEIVER	£399.00
ICOM	IC-737	HF inc ATU BASE STATION TRANSCEIVER	£575.00
ICOM	IC-756	HF / 6m All Band Transceiver	£999.00
ICOM	IC-756PRO	ICOM TRANSCEIVER	£1,600.00
ICOM	IC-775DSP	HF 200W BASE STATION TRANSCEIVER	£1,499.00
ICOM	IC-8500	WIDE BAND RECEIVER	£899.00
ICOM	IC-910	2/70 CM BASE TRANSCEIVER	£999.00
ICOM	IC-R2	HANDY SCANNER	£99.00
ICOM	IC-R3	HANDHELD RECEIVER	£299.00
ICOM	IC-R7000	RECEIVER MINT! CONDITION	£550.00
ICOM	IC-R72	RECEIVER	£399.00
ICOM	IC-R75	HF / 6m RECEIVER	£475.00
ICOM	IC-T81E	QUAD BAND HANDY 2m/6m/23cm/70cm	£250.00
ICOM	IC-T8E	HANDY TRANSCEIVER	£175.00
ICOM	PCR-1000	COMPUTER SCANNER	£200.00
ICOM	PS-15	20A POWER SUPPLY FITS ALL ICOM	£110.00
ICOM	RC-7000	REMOTE CONTROL	£40.00
ICOM	ICT-7E	2/70CM HANDY TRANSCEIVER	£170.00
ICOM	UT-84	TONE SQUELCH UNIT	£25.00
ICOM	1C-R9000	TOP CLASS COMMUNICATIOS RECEIVER	£2,995.00
ICOM	IC-756ProII	HF / 6M DSP BUILT IN ATU	£2,000.00
ICOM	IC-706mkIIG	HF / 6M/ 70CMS / 2M TRANSCEIVER	£750.00
ICOM	AT180	MATCHING ATU FOR THE IC706	£250.00
ICOM	IC-271E	2m MULTIMODE TRANSCEIVER	£325.00
ICOM	AT-100	AUTO TUNER SUITE IC-751 etc	£225.00
ICOM	IC-271E	ALL MODE TRANSCEIVER	£299.00
ICOM	IC-706MKII	GHF / VHF / UHF TRANSCEIVER	£699.00
ICOM	AT-180	ATU	£250.00
ICOM	IC-R71E	RECEIVER	£399.00
JRC	JST-245	HF 50MHz 1500w AC BASE TRANSCEIVER	£1,295.00
JRC	NRD-345	RECEIVER	£299.00
JRC	NRD-535	HF RECEIVER	£600.00
KENWOOD	AT-230	ANTENNA TUNER	£120.00
KENWOOD	DFC-230	FREQUENCY CONTROLLER	£70.00
KENWOOD	PS-430	POWER SUPPLY	£100.00
KENWOOD	PS-50	POWER SUPPLY	£145.00
KENWOOD	PS-52	POWER SUPPLY	£175.00
KENWOOD	R-2000	RECEIVER	£225.00
KENWOOD	R-5000	RECEIVER	£499.00
KENWOOD	R-5000	RECEIVER + CONVERTER	£600.00
KENWOOD	SM-220	SCOPE - TS-940 etc.	£200.00
KENWOOD	SP-31	SPEAKER	£60.00
KENWOOD	SW-100E	SWR METER	£25.00
KENWOOD	TH-22E	2M HANDY TRANSCEIVER	£99.00
KENWOOD	TH-251E	HANDHELD 2M	£140.00
KENWOOD	TH-77E	DUALBAND 2M/70CMS HANDHELD	£130.00
KENWOOD	TH-79E	HANDY TRANSCEIVER	£189.00
KENWOOD	TL-120	LINEAR LOW DRIVE AMPLIFIER 100W HF	£150.00
KENWOOD	TM-231E	2M MOBILE TRANSCEIVER	£120.00
KENWOOD	TM-241E	2M MOBILE TRANSCEIVER	£120.00
KENWOOD	TM-251E	MOBILE TRANSCEIVER	£140.00
KENWOOD	TM-255E	TRANSCEIVER 2M MULTIMODE	£395.00
KENWOOD	TM-455E	70CM MULTIMODE MOBILE TRANSCEIVER	£450.00
KENWOOD	TM-741E	DUALBAND TRANSCEIVER WITH DETATCHABLE FRONT	£275.00
KENWOOD	TM-751E	TRANSCEIVER 2M MULTIMODE	£325.00
KENWOOD	TR-751E	2M MULTIMODE TRANSCEIVER	£350.00
KENWOOD	TR-851E	70CM MULTIMODE MOBILE TRANSCEIVER	£395.00
KENWOOD	TS-440SAT	TRANSCEIVER WITH BUILT IN ATU	£499.00
KENWOOD	TS-570D	TRANSCEIVER HF DSP ATU MOBILE/BASE	£650.00
KENWOOD	TS-680	HF 6M MOBILE/BASE TRANSCEIVER	£400.00
KENWOOD	TS-690	HF 6M Inc ATU	£550.00
KENWOOD	TS-711E	SM BASE STATION TRANSCEIVER	£399.00
KENWOOD	TS-790E	2/70CM BASE STATION TRANSCEIVER	£699.00
KENWOOD	TS-790E	2m / 70cm/23cm BASE TRANSCEIVER	£999.00
KENWOOD	TS-850SAT	HF TRANSCEIVER MINT!	£800.00
KENWOOD	TS-950SD	HF/ 150W DSP BASE TRANSCEIVER	£1,100.00
KENWOOD	TS-950SDX	HF 150W DSP FULLY LOADED LATE S.NUMBER	£1,700.00
KENWOOD	VFO-120	TS120 VFO	£50.00
KENWOOD	VS-1	VOICE SYTHESISER	£30.00
KENWOOD	VS-2	VOICE SYTHESISER	£30.00
KENWOOD	YG-455CN-1	270Hz CW CRYSTAL FILTER	£100.00
KENWOOD	YK-88A-1	AM FILTER	£40.00
KENWOOD	YK-88C-1	500Hz CW NARROW FILTER	£40.00
KENWOOD	YK-88CN1	270Hz CW FILTER 8.83MHz IF	£40.00
KENWOOD	YK-88S-1	2.4KHz SSB NARROW FILTER 8.83MHz IF	£40.00
KENWOOD	YK-88SN	1.8K SSB FILTER (TS-440 /R5000)	£40.00
KENWOOD	YK-88SN-1	1.8KHz SSB NARROW FILTER 8.83MHz IF	£40.00
KENWOOD	TS-2000	HF / VHF / UHF ALL MODE MULTIBANDER	£1,350.00
KENWOOD	AT-120	ANTENNA TUNER	£75.00
KENWOOD	TS-50	HF TRANSCEIVER	£425.00
MAGNUM	DELTA FORCE	10M MOBILE AM/FM/USB /LSB/CW	£149.00
MICROSET	RU-20	70 CMS AMP	£60.00
MICROWAVE MODULES	28/144	TRANSVERTER 28/144	£125.00
MIDLAND	MIDLAND 48	80 CHANNEL CB	£55.00
PACCOM	TINY 11	TNC	£99.00
PACCOM	TNC-320	TNC	£90.00
PLESSEY	PR-2250	HF RECEIVER BEST QUALITY CLASSIC!	£1,200.00
REALISTIC	PRO-394	HF RECIEVER	£99.00
REALISTIC	PRO-2006	400 CHANNEL SCANNER	£110.00
SGC	SGC-2020	HF TRANSCEIVER	£450.00
SOMMERKAMP	FT290R	2m MULTI-MODE TRANSCEIVER	£180.00
SONY	ICF-SW77	FM/SW/MW/LW PORTABLE AS NEW!	£250.00
SONY	SW-100E	FM/SW/MW/LW PORTABLE	£90.00
SYNCRON TOKYO	PS-1220VU	20 AMP POWER SUPPLY	£60.00
HY-POWER TOKYO	HL-30V	2M and 25W AMPLIFIER	£75.00
HY-POWER	HL-37V	LINEAR AMPLIFIER	£60.00
TONNA	7000E	TERMINAL	£130.00
TRANSVERTER	QM 70	28/144 TRANSVERTER	£100.00
TRIO	R-2000	RECEIVER + CONVERTER	£300.00
TRIO	TR-2300	TRANSCEIVER PLUS AMPLIFIER 2M	£99.00
TRIO	TR-9000	2M MULTI MODE	£199.00
TRIO	TR-9130	2M ALL MODE TRANSCEIVER	£250.00
TRIO	TS-780	DUAL BAND BASE TRANSCEIVER	£275.00
WELZ	AC-38M	200W MOBILE MATCHING NETWORK	£50.00
YAESU	FP700	POWER SUPPLY	£100.00
YAESU	FP-757HD	HEAVY DUTY POWER SUPPLY	£120.00
YAESU	FRG-100	HF RECEIVER	£300.00
YAESU	FRG-7700	HF RECEIVER	£220.00
YAESU	FRG-8800	RECEIVER INCLUDES CONVERTER	£399.00
YAESU	FRG-9600	RECEIVER	£200.00
YAESU	FT-1000MK5 £2,000.00	200W DSP HF TRANSCEIVER	
YAESU	FT-1000MP	BASE TRANSCEIVER	£1,300.00
YAESU	FT-1000MP AC	HF BASE DSP TRANSCEIVER (Late serial no)	£1,550.00
YAESU	FT-1000MP V	200W DSP HF TRANSCEIVER	£1,900.00
YAESU	FT-101Z	MINT CONDITION!!	£250.00
YAESU	FT-101ZD mkIII	HF TRANSCEIVER inc FM	£375.00
YAESU	FT-225RD	2M BASE MULTIMODE CLASSIC!	£399.00
YAESU	FT-23R	HANDY TRANSCEIVER	£180.00
YAESU	FT-2500M	MOBILE TRANSCEIVER	£190.00
YAESU	FT-290RMKII	2M ALL MODE TRANSCEIVER	£180.00
YAESU	FT-290RMKII	MOBILE 2M MULTIMODE TRANSCEIVER	£275.00
YAESU	FT-41R	HANDY TRANSCEIVER	£120.00
YAESU	FT-470	2/70CM HANDY TRANSCEIVER	£140.00
YAESU	FT-650AC	26-50MHz 100w BASE SAATION TRANSCEIVER	£599.00
YAESU	FT-690RMKI	6M MULTIMODE MOBILE TRANSCEIVER	£250.00
YAESU	FT-690RMKII	6M PORTABLE	£375.00
YAESU	FT-726R	2 / 70 / HF TRANSCEIVER	£400.00
YAESU	FT-726R	2 / 70 / 6m TRANSCEIVER	£575.00
YAESU	FT-730R	70CM MOBILE TRANSCEIVER	£120.00
YAESU	FT-736R	2m / 70cm TRANSCEIVER	£650.00
YAESU	FT-736R	2m / 70cm / 6m TRANSCEIVER	£750.00
YAESU	FT-747GX	TRANSCEIVER	£299.00
YAESU	FT-757GX MKII	TRANSCEIVER	£395.00
YAESU	FT-757MK1 GX	HF TRANSCEIVER	£375.00
YAESU	FT-767GX	HF BASE 100watt built-in ATU	£599.00
YAESU	FT-77	INCLUDES FM MINT!	£275.00
YAESU	FT-790R	70CM MULTIMODE MOBILE TRANSCEIVER	£225.00
YAESU	FT-80C	0-30MHz COMMERCIAL RANSCEIVER	£375.00
YAESU	FT-847	HF / 2 / 6 / 70cm BASE TRANSCEIVER	£900.00
YAESU	FT-920AF	HF/6M BASE WITH DSP	£899.00
YAESU	FT-ONE	HF BASE TRANSCEIVER	£450.00
YAESU	FTV-901	TRANSVERTER Inc 2m Mod	£165.00
YAESU	FV-707	VFO UNIT	£99.00
YAESU	MD-100A8X	DESK MICROPHONE	£80.00
YAESU	MH-34B4B	SPEAKER MICROPHONE For VX5R VX-1R	£15.00
YAESU	MH-35	SPEAKER MICROPHONE	£10.00
YAESU	MMB-16	MOUNTING BRACKET	£20.00
YAESU	NT-29	CHARGER	£30.00
YAESU	PA11U	PSU FOR FRG-100	£20.00
YAESU	VR-120	RECEIVER FM /WFM/AM	£99.00
YAESU	VR-5000	TOP RANGE SCANNER RECEIVER	£450.00
YAESU	VX-1R	HANDHELD TRANSCEIVER	£120.00
YAESU	VX-5R	2 / 70 / 6 HANDIE 5W	£220.00
YAESU	XF-114SN	2KHz SSB FILTER	£60.00
YAESU	YO-100	SCOPE VERY RARE!	£150.00
YAESU	FT-7100	2M / 70CMS DUALBAND TRANSCEIVER	£249.00
YAESU	FT-480R	2M TRANSCEIVER	£199.00
YAESU	FT-100	HF / VHF / UHF ALL MODE TRANSCEIVER	£599.00
YAESU	FT-840	HF TRANSCEIVER	£425.00
YUPITERU	MVT-225	AIRBAND SCANNER	£150.00
YUPITERU	MVT-7300	MULTIBAND HANDHELD SCANNER	£199.00
YUPITERU	OP-90	CASE	£10.00
YUPITERU	VT-125	AIRBAND SCANNER	£120.00

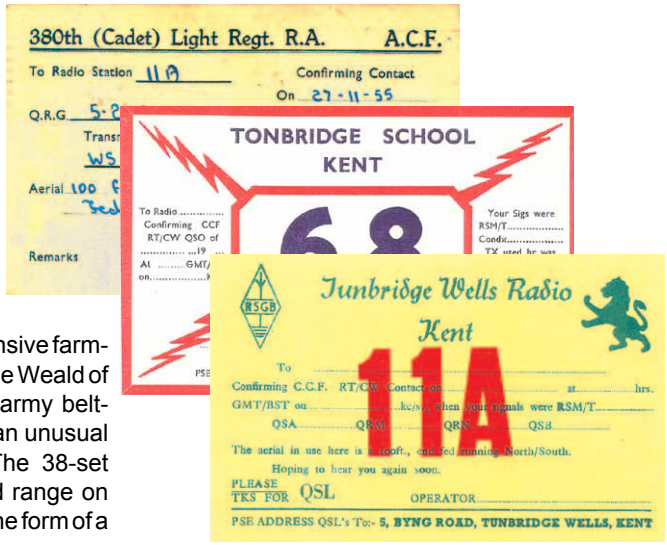
Please note, the equipment listed may have been sold / updated, please ring 01922-414796 to check availabilty

THE 'FIVEMEGS EXPERIMENT'

THE FIVEMEGS EXPERIMENT - WORTH KNOWING

YOU WILL HAVE READ in the *RadCom* news pages this month about the 'Fivemegs Experiment'. It is open initially to applicants who hold a Full UK Amateur Class 'A' Licence. The spot frequencies assigned by the Ministry of Defence and the Radiocommunications Agency are 5260, 5280, 5290, 5400 and 5405kHz. These have been made available as 3-kHz wide channels centred on each frequency listed. *Therefore, these are* not *tuning dial frequencies!* USB [note: *not* LSB - *Ed*] is the voice mode recommended. *Thus, to call on the 5400kHz channel, the operator must tune his transceiver to 5398.5kHz USB*. Careful consideration must be given as to where the nominal carrier frequency must be placed for other modes of working, and the RSGB has produced a set of 'Operating Guidelines' and 'Procedural Notes' for operators. An Application Form for a Notice of Variation (NoV), allowing 5MHz operation on these five frequencies, can be obtained from RSGB HQ. Approved applicants will be issued with their NoVs, direct by the Radiocommunications Agency, for a period not exceeding four years. All participants will be required to take part in the propagation and antenna experiments, and 5MHz 'Activity Log' sheets, together with experimental 'Time Clock' schedules can be downloaded from the RSGB's website. Steve Richards, G4HPE, is looking after this aspect, and may be contacted via steve@g4hpe.freeserve.co.uk Paul Gaskell, G4MWO, the RSGB's Radio Communications Voluntary Services (RCVS) National Co-ordinator, will be arranging emergency communications trials, which will dovetail with the propagation and antenna experiments. Contact Paul, G4MWO, via pauldgaskell@btinternet.com Yours truly, Gordon Adams, G3LEQ, as RSGB Spectrum Director, has overall responsibility for the conduct of the experiment. I may be contacted via fivemegs@boltblue.net or by telephone on 01565 652 652. If anyone wishes to conduct a scientific experiment, they should contact the RSGB HF Committee Chairman Colin Thomas, G3PSM, via hf.chairman@rsgb.org.uk

Gordon L Adams, G3LEQ,* the RSGB Spectrum Director with overall responsibility for the 'Fivemegs Experiment', has some personal reminiscences of 5MHz operation in the past - and some thoughts for the future



T IS EXACTLY 50 years ago that I first became intrigued by short-wave radio communications. At the age of 14, I was required to join one of the arms of my school's Combined Cadet Force (CCF). Initially I was assigned to act as one of the marshals for the senior boys' cross-country run, which passed through extensive farmland and the hop fields around the Weald of Kent. I was entrusted with an army belt-slung 38-set, which employed an unusual pair of throat microphones. The 38-set proved to have a rather limited range on 6MHz, and the larger 18-set, in the form of a back-pack was quickly set up.

Having shown enough enthusiasm to learn Morse code at 12WPM, I was introduced to the school's HF station on the Army Cadet Force (ACF) and CCF National Network. This comprised of a massive type 12 transmitter weighing some 9 stones, and three type R107 communications receivers of similar size to the transmitter. Both pieces of equipment tuned from 1.2 to 17.5MHz, and had a very impressive appearance. Needless to say, I became hooked by short-wave radio, and the magnificent 12-set with its very technical-looking R107 short-wave receivers. Furthermore, across the playing fields in the Air Training Corps (ATC) hut was another interesting HF station comprising of a T1154 transmitter, two R1155 HF receivers, a 1200 volt mains power supply weighing nearly 12 stones, and a large direction finding installation. I therefore decided to become a part-time member of the ATC as well!

SELF TRAINING IN RADIO COMMUNICATIONS

WHAT HAS THIS got to do with 'The Fivemegs Experiment' you may be wondering? Well, the ACF / CCF National Network proved to be a fascinating experience. We had available to us spot frequencies in the 2, 3, 4, 5, and 6MHz ranges. It was not long before the cadet signallers discovered that the best results for inter-school contacts across the UK during daylight hours were achieved on the channels that we had around 5.2 and 5.7MHz. At the time I was not really clear why this was so, but it was quite obvious that when we dropped down to 3 or 2MHz, our signals became very weak over more than a few miles, and drowned in high noise levels.

Communication with schools as far away as Belfast and Edinburgh was easily achieved on 5MHz from Kent during daylight hours, with the 25 to 30 watts DC input available from the 12-set on AM. Indeed, the signal was even better with 60 watts on CW, and there seemed to be no black holes, or 'skip zone' within the 400 miles range. However, what I did notice was that all signals on the 5MHz net would suddenly disappear around dusk, and we had to change down to a lower frequency just above 4MHz to re-establish communication. In 1955 we were at the bottom of a sunspot cycle, and as soon as the sun set in Southern England, the critical frequency dropped rapidly below 5MHz. After dark, we had to call ACF stations operating from their drill halls during weekday evenings on frequencies between 2.2 and 3.4MHz.

During my time in the cadet signals unit, extensive flooding of the East Coast of England occurred overnight on 31 January-1 February 1953. The floods were even more extensive in the Netherlands and parts of Belgium, and Dutch radio amateurs were active for several weeks providing emergency radio links. In the North East of England, radio amateurs took it upon themselves to assist stricken ships when Humber Radio, GKN, was put completely off the air by the gale force storms and an accompanying massive North Sea surge. Within a few weeks the RSGB had formed the Radio Amateurs' Emergency Network, and volun-

Russian army radio communications vehicle, with two NVIS magnetic loop antennas mounted on the roof.

* *c/o RSGB HQ; e-mail: fivemegs@boltblue.net*

teers joined thick and fast, in the hope that radio amateurs might be better prepared the next time such a disaster occurred.

RADIO COMMUNICATIONS OBSESSION?

I DECIDED TO apply for one of the first cadet network callsigns that was to be issued for home use, and became the proud possessor of the callsign 11A - see the QSL cards pictured opposite. Within a couple of years I had taken the Radio Amateurs' Examination, and obtained my amateur callsign G3LEQ as well.

By 1957 I was doing my National Service, and even operated on the amateur 7MHz band from a Centurion tank using a 19-set with various intercom attachments, and a long vertical whip antenna mounted on the hull. At the completion of my National Service I decided to join No 1 Special Communications Signal Regiment. They had a very interesting role and operated the Army's Commonwealth Communications Network or COMCAN, using Marconi SWB11 point-to-point transmitters. At a later date I found myself working for the Diplomatic Wireless Service of the Foreign Office, where I became involved in operating transmitters all over the HF spectrum.

NVIS TAKES A BOW

BESIDES MY LIFELONG interest in amateur radio, I have always maintained an interest in military communications as well. One still sees all kinds of military vehicles sprouting HF whip antennas, indeed some of the British Army Land Rovers could be seen with what was obviously a small aerial tuning unit mounted on one of the front wheel guards. In more recent times these vertical aerials have been seen tied down until they are almost horizontal. Has the army become worried about striking overhead hazards, or have they re-discovered Near Zenithal Radiation (NZR), also known as NVIS (Near Vertical Incidence Skywave)? (see **Fig 1**)

The Russians have certainly never given up on the ionosphere for land mobile operations. The photograph at the bottom of page 44 shows a Russian Army radio communications vehicle, of 1990 vintage, which has been purchased by a member of the Surplus Radio Society in the Netherlands. The picture has been received from Rob Vijfschaft, PA3EQB, and shows two HF magnetic loop antennas mounted on the vehicle roof. As to the performance of the system, he claims that he was bending S-meters all over Holland using just 30 watts of CW on 3.5MHz via NZR propagation.

In 1996 Lt Col David M Fiedler (Retired), Chief of the New Jersey Army National Guard, and Maj Edward J Farmer, AA6ZM, of the California Army National Guard published a handbook with the title *Near Vertical Incidence Skywave Communication (NVIS) - Theory, Techniques and Validation*. This describes in considerable detail how to achieve near saturation coverage of distances up to 400 miles using HF at frequencies between 2 and 8MHz with aerials having a near zenithal polar diagram. Zenith by the way, means a point immediately above you, through which a vertically projected line will pass. The beamwidth of the RF energy emitted from an antenna is usually measured between the -3dB points (half of the peak power). If an elevation angle of, say, 60º to 80º can be achieved, the 'umbrella' coverage over a radius of 200 to 400 miles will be maximised. Obviously, radio amateur DXers look for very low elevation angle (near horizon) radiation to achieve long haul communications. An elevation angle of 80º, for a ray projected via the night time F-layer would cause the ray to be returned at a radius of about 90 miles from the transmitter. From Birmingham, this represents a circle passing through London and Leeds.

IS PROPAGATION A BLACK ART?

REFLECTION OF A near vertically radiated ray can only be achieved effectively - with low power - at a frequency which is close to the *critical frequency* for the ionospheric layer in question. It is normal to consider the critical frequency for the F-layer, since any ray that just passes through the lower E-layer may still be reflected by the F-layer above. It is worth mentioning that the maximum usable frequency (MUF) is determined by the critical frequency (CF) divided by the cosine of the angle of incidence at the ionosphere. Thus, for an incident angle of 0º, ie an elevation angle of 90º, the CF becomes the MUF for the paths of less than 400 miles. If the transmission frequency is increased significantly, a skip zone occurs between the limit of the ground wave range and the first reflection down to earth of the skywave.

Why not just drop the frequency to be used to well below the critical frequency? The answer to this is quite simple - the absorption in the ionospheric D-region, and to some extent the E-layer as well, increases as the transmission moves down to about 1.5MHz. At this frequency the attenuation reaches a peak during the daylight hours around midday. Radio amateurs use comparatively low power transmitters, and to overcome the absorption effect, it follows that for good short haul coverage of inter-UK ranges, one must operate as close to the critical frequency as possible. At the time of writing this article (August 2002) sunspot cycle 23 is falling, with the minimum being expected some time in 2006. The 'Fivemegs Experiment' has therefore been timed to take place over a period of four years, and terminating in August 2006.

You might wonder what there is left to discover about the ionosphere, if ionosondes were plotting its behaviour in the 1930s. The answer to this is that radio amateurs have always concentrated their interest in working long haul DX, whilst professional communicators have employed directional antenna arrays for working reliable point-to-point links. Earth satellite links have been developed over the last 30 years, but these are fallible, and in time of emergency some simple HF NVIS links could prove of value.

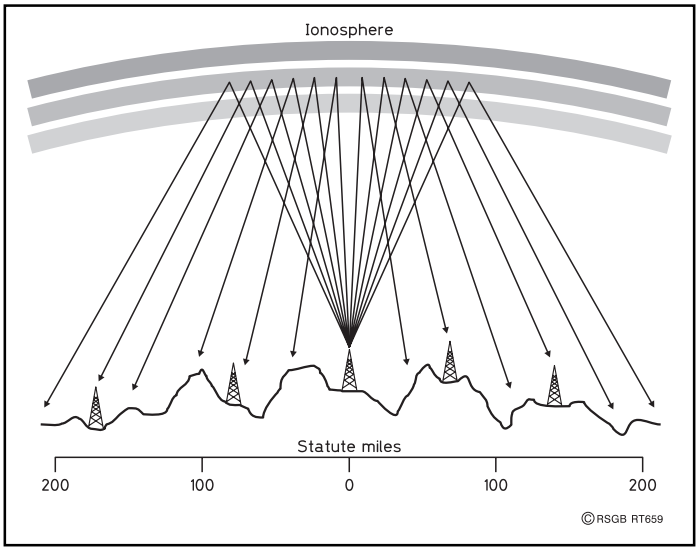


Fig 1: Near Zenithal Radiation (NZR) or NVIS (Near Vertical Incidence Skywave) propagation. High-angle skywaves of a suitable frequency are reflected back to saturate an area of the earth. They provide continuous short-range coverage with no gaps: the 'dead zone' no longer exists.

YOUR COUNTRY NEEDS YOU!

YOU MAY THINK that the Thames Barrier is a protection for London against any further major North Sea storms, but what about our East coast defences? After the 1953 disaster, the rebuilt North Sea defences were claimed to have a design life of 30 to 50 years. During the last 300 years major high tides, whipped up by storm force gales, have occurred in 1703, 1717, 1736, 1825, 1856, 1870, 1879, 1881, 1897, 1907, 1928, 1938, 1949 and 1953. Are we due for another and will global warming make it any worse? Shall we have large numbers of National Servicemen to give assistance, as we did in 1953? ♦

THE 31st LEICESTER AMATEUR RADIO SHOW - 20 & 21 SEPTEMBER 2002

The Show Also Features:

- Convention
- Raffles
- Licensed bar
- Demonstration HF station
- Free camping and caravanning immediately adjacent to the Exhibition Hall
- Disabled parking adjacent to the main building
- Meeting room for club and societies (*must* be pre-booked: contact G4MTP QTHR)
- Better catering cafeteria, restaurant and snack bar
- Easy access from M1 J23a - less than 5 minutes
- Easy access from East Midlands Airport - less than 3 minutes
- Direct bus service from Loughborough station to East Midlands Airport
- Free shuttle from East Midlands Airport to exhibition
- Concessionary prices on other attractions at Donington Park
- The Motor Racing Museum contains 130 racing cars ranging from the 20s to 1997. The latest additions are the McLaren-Mercedes from 1997 driven by Mikka Hakinen and Damon Hill. Discount price of £5 (instead of £7) on presentation of LARS ticket
- Clubland: large area for local and national clubs and societies.
- QSL Corner: bring your QSL card for display on the boards in the entrance foyer so your friends can see you have arrived.
- 'Drop and Swap Table': 'Professional Amateurs' please bring any recent component catalogues and CD-ROMs home from work and leave them on the Drop and Swap table in Clubland, where they will be available to pass on to 'Amateur Amateur' constructors. 'Amateur Amateur' constructors come to the Drop and Swap Table for free component catalogues and data CD-ROMs.

THE 31ST LEICESTER Amateur Radio Show takes place at the Castle Donington International Exhibition Centre near junction 23A of the M1 motorway on 20 / 21 September.

OPENING TIMES: 9.30am to 5.30pm Friday and till 5.00pm on Saturday.

ADMISSION PRICES: 1-day ticket £3, concessions (OAPs and under 16) £2.50. 2- day ticket £5 (concession price £4). Advance party bookings £2.00 each (12 minimum), two-day £3.50 (12 minimum). Under 12s *free* when accompanied by an adult.

For much more information, please see www.lars.org.uk

Getting to the Leicester Show. *If your road map is not up to date, care is required. Some road renumbering took place following the opening of the Derby southern bypass last year. This is now the A50; the old A50 was renumbered and the A6 is now in a different place and doesn't come to Jct 24. Take care - you've been warned!*

From the south via M1: Leave the M1 at junction 23A, follow signs for East Midlands Airport (A453) and brown tourist signs for Donington Park. Go past main entrance to the airport (traffic lights), after approx 2 miles turn right signposted Donington Park and Castle Donington on B5460. 200m along this road brings you to the main entrance of Donington Park.

From the north via M1: Leave M1 at junction 24 and follow signs for East Midlands Airport (A453) and brown tourist signs for Donington Park. After airport follow directions as above.

From the south-west: From the M5 or M40 join the M42 northbound. Continue on M42/A42 until junction 14. Follow signs for East Midlands Airport (A453) and brown tourist signs to Donington Park. Go past Paddock Entrance and turn left after 800m on B5460 signposted Donington Park and Castle Donington. After 200 metres turn left into main entrance of Donington Park.

From the north & north-west: Leave M6 at jct 15 heading for Trentham Gardens and Uttoxeter A50. Follow A50 dual carriageway to M1 jct 24. *Do not join M1.* Follow signs for East Midlands Airport (A453) and brown tourist signs for Donington Park. Go past airport entrance (traffic lights) and after about 2 miles turn right signposted Donington Park and Castle Donington on B5460. After 200 metres is the main entrance of Donington Park.

Don't forget the talk-in stations on 145.55MHz and 433.550MHz.

Car and coach parking is vast and free. Disabled car parking is immediately outside the Exhibition Hall on right hand side. Car and coach parking is in front of the Exhibition Hall on the right hand side of the road. Please follow the one-way system and the directions of car park attendants.

LEICESTER SHOW CONVENTION PROGRAMME

FRIDAY 20 SEPTEMBER

1200 - 1300 RSGB Forum
Come and hear the latest on licensing and any other hot topics in amateur radio. RSGB President, General Manager and Board members. www.rsgb.org.uk

1300 - 1400 The Science of Audio Workshop. Bob Heil, K9EID, Heil Sound
This session will explore the human ear's response curve and how we can use this information to communicate more effectively by tailoring the audio response of typical amateur transceivers. This will be very much a practical demonstration showing how you can get the best audio on the band. www.heilsound.com

1400 - 1500 GSM Basics. Edwin, PA3GVQ, Radio Engineer with VF-NL
This popular presentation has been given to 25 Dutch radio clubs. Firstly the GSM network will be outlined and details of the working of the base stations and antennas used in a network. If you want to get a global idea about how your mobile is working this presentation is not to be missed!

SATURDAY 21 SEPTEMBER

1200 - 1300 Amateur TV. Giles Read, G1MFG
We bring you live pictures! Fast scan amateur television is different from other aspects of our hobby because you can see the chap at the other end. Giles Read (of www.G1MFG.com fame) describes, discusses and demonstrates ATV from UHF to microwaves.

1300 - 1400 The Science of Audio Workshop. Bob Heil, K9EID, Heil Sound
(for details see above)

1400 - 1500 *In Practice* Live! Ian White, G3SEK
This is a completely unscripted question and answer session along the lines of the popular RadCom *column.* Don't be shy - *come and ask Ian all those technical radio-related questions that you want answers to. www.ifwtech.co.uk/g3sek*

Staying Overnight for the Leicester Show? The following is a list of nearby hotels:

The Paddock Hotel Tel: (01332) 86 2566
Hilton National Tel: (01509) 674000 Fax: (01509) 672412
The Priest House Tel: (01332) 810649 Fax: (01332) 811141
Yew Tree Lodge Tel: (01509) 672518 Fax: (01509) 674730
Novotel Tel: (01159) 465111 Fax: (01159) 465900
Forte Posthouse Tel: (01159) 397800 Fax: (01159) 490469
The Kegworth Hotel Tel: (01509) 672427 Fax: (01509) 674664
Melbourne View Hotel Tel/Fax: (01332) 865353
Donington Park Farmhouse Hotel Tel: 01332 862409 Fax: 01332 862364
Moto Travel Lodge at Donington Services (jn 23A on M1), Tel: 08700 850950
Express By Holiday Inn Tel: 01509 678000 Fax: 01509 670954.

Call Donington Hotel Hotline 01904 471944, which is a booking service for 2 to 4 Star hotel accommodation. Guest House and Bed & Breakfast Information Line 01530 411767 or 01530 813608 (Ashby Tourist Information Centre).

product news

Tokyo Hi-Power HL-50B

SPECIFICALLY DESIGNED to work with the Yaesu FT-817, the new HL-50B is a small HF / 6m linear amplifier producing 50W output from only 5W of drive. For simple operation, the unit is RF switched and its operational modes are SSB / CW / FM and AM. Employing a pair of 2SC1946A by Mitsubishi, both transistors are operating in push pull. Individual low pass filters are used for all bands, 80 - 6m.

The Tokyo Hi-Power HL-50B is reviewed on pages 52 / 53 of this issue of *RadCom*. It is available from dealers including **Waters & Stanton plc** and **Martin Lynch & Sons Ltd.**

New Joyear WorldSpace Radio Released

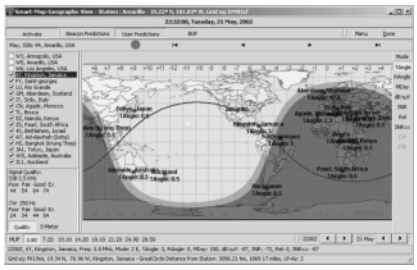
KOREAN RADIO MANUFACTURER Joyear visited the UK recently to show off its new WorldSpace WS2000 portable radio. It also took the opportunity to confirm the appointment of Nevada as UK distributors for the Joyear WorldSpace products. The Joyear WS2000 is an exciting new WorldSpace receiver that won the Grand Prize at the Korean Industrial Design award for 2001. It's small, stylish and light enough to travel the world. An easy-to-aim removable antenna is provided with a 2.5m extension cable to enable clear reception of the satellite programming. The radio has 10 presets, last station memory recall and a comprehensive LC-Display. It costs £129 and further details are available at www.worldspaceradios.co.uk or from:

Left to right: Dale Bradley, Dipak Naran (Worldpsace UK), Helen Choi (Joyear), Mike Devereux and Phil Jeffery (Nevada) with the new Joyear WS2000.

Nevada, Unit 1, Fitzherbert Spur, Farlington, Portsmouth, Hants PO6 1TT; tel: 023 9231 3093; fax: 023 9231 3091; e-mail: sales@nevada.co.uk

WinCAP Wizard 3 Propagation Prediction

WinCAP Wizard 3 is a third generation HF propagation prediction engine interface from Kangaroo Tabor Software of Farwell, Texas. It combines enhanced versions of the best features from CAPMan and previous versions of WinCAP Wizard. WinCAP Wizard 3 is a specialised interface for the VOACAP prediction engine, unquestionably the most powerful HF propagation prediction engine ever created.



We hope to publish a full user review of WinCAP Wizard 3 in *RadCom* in the next couple of months. Meanwhile, a fully-functioning trial version is available for download from the website at **www.taborsoft.com/wwizard3**

Kangaroo Tabor Software, 1203 County Road 5, Farwell, Texas 79325-9430, USA.

Ten-Tec DIRECT

THE US AMATEUR radio manufacturer Ten-Tec has set up a new business alliance with AOR UK Ltd. With the formation of a UK sales office called Ten-Tec DIRECT UK, Ten-Tec is providing a renewed commitment to the UK market. Ten-Tec DIRECT in the UK is fully backed by pre-sales and after-sales support stretching back to the US factory. Two new short-wave radios have recently been released here: the RX-320 and the RX-350 (pictured above), a table-top DSP receiver.

The Ten-Tec range of short wave receivers start at around £250 and go up to £4000. For further information, contact:

Ten-Tec DIRECT UK, 4E East Mill, Bridgefoot, Belper, Derbyshire DE56 2UA; tel: 01773 880788; fax: 01773 880780; e-mail: tentec@aoruk.com; website: www.aoruk.com/tentec

New Hokushin Maldol Base Antenna from ML&S

HOKUSHIN INDUSTRIES of Japan has released a new HF / VHF / UHF base station antenna, the HVU-8. At just 2.6 metres high, this new compact design has been specially created to work with any of the modern HF to 70cm transceivers, such as the FT-817, FT-100, FT-847, TS-2000 etc. Capable of handling 200W, it is also ideal for use with the FT-1000MP MkV. Supplied with a complete set of loaded radials, the new HVU-8 is the smallest all-band antenna available in the UK ham market. The HVU-8 is available from stock at £199.95 from the UK distributor, ML&S Martin Lynch & Sons. An entire range of HF, VHF and UHF mobile and base station antennas is also available.

ML&S Group, 128 & 140-142 Northfield Avenue, Ealing, London W13 9SB. Tel: 020 8566 1120 or 020 8566 0000; website: www.HamRadio.co.uk

New Version of Kenwood TM-D700E

THE LATEST VERSION of the Kenwood TM-D700E is the TM-D700E (G2.0). The transceiver has a new *DXCluster* feature which will be of interest. If a special COM port cable is connected between the D700E and a TS-870S, TS-570D/DG or a TS-2000E, the DX spot's operating frequency can be transferred to the HF rig, allowing for an instant 'QSY' (change of frequency). This facility is already built into the TS-2000 when it is running in 'PCT' mode. The TM-D700E (G2.0) also has upgraded TNC features connected with APRS GPS handling and introduced as a result of customer requests for it to be brought in line with the American versions.

Kenwood (UK) says that the interconnectivity of VHF and HF radios is a first for any manufacturer and will be of great interest to all who enjoy *DXCluster* operation.

Kenwood Electronics UK Ltd, Kenwood House, Dwight Road, Watford, Herts WD1 8EB; tel: 01923 655284; fax: 01923 655297; e-mail: david.wilkins@kenwood-electronics.co.uk

GB4FUN at Leicester

COME AND SEE the RSGB's mobile amateur radio demonstration vehicle, GB4FUN, at Leicester - and find out how you and your club can promote amateur radio to the general public by using GB4FUN.

Note: Product News is compiled from press releases sent in by the manufacturers and distributors concerned. Details are published in good faith, but RadCom *cannot be held responsible for false or exaggerated claims made in the source material.*

Licensing in a State of Flux

by Ed Taylor, G3SQX, Chairman, Amateur Radio Development Committee

MANY RADIO AMATEURS in the UK are (understandably) confused about the licensing system that we have at the moment. There seem to be announcements every week; callsigns are bewildering, and it's difficult to work out what is going on. Here are a few clues to help us cope with the next year or two, and an update as to progress so far.

Didn't it used to be straightforward?

Until a couple of years ago, there were two types of licence: Novice and Full. Each came in two varieties: with Morse test and without. Novices had a limited selection of bands and power; Full Licensees could use all amateur radio facilities on offer in the UK. If you passed the Morse test, you could operate under 30MHz, otherwise you were restricted to VHF and UHF.

Why were they called Novices?

Good question! The Novice Licence actually required people to have practical knowledge of operating and construction, which was not the case with the Full Radio Amateurs Examination (RAE). It became clear that Novice operators were generally very accomplished amateurs, lacking only the theoretical base which the RAE provided.

So anyone could get a Full Licence without becoming a Novice first?

There were two separate routes into the hobby, and this was widely seen as anomalous. It was also clear that the power levels and bands allowed to a Novice ought to be raised, because they were not commensurate with the skills that had been learnt.

Didn't the Foundation Licence make things more complicated?

Yes, it was decided that a new entry-level licence should be created, again to operate independently of the other two types of licence (Novice and Full). At the same time, the Novice Licence was renamed 'Intermediate', and so a three-level system was created, consisting of Foundation, Intermediate and Full Licences.

So there are currently three separate licensing systems in the UK?

We are in transition. At the moment there are three separate and independent licences. In 18 months the system will be integrated. At that time, an amateur will have to have passed at the lower level before proceeding to the next level up. Everything is complicated at the moment because we are moving from the three 'independent' licences to an integrated system in a series of stages, over a period of two to three years.

And it will all make more sense two years from now?

It will be very clear and understandable. There will be three licences: Foundation, Intermediate and Full. Everyone will have to achieve Foundation level before going on to Intermediate. Everyone will have to achieve Intermediate level before going on to Full. Full Licensees will have all the facilities available. Intermediate Licensees will have reduced privileges, in line with the knowledge they have. The Foundation Licence is an entry-level qualification, and (as now) there will be appropriate restrictions to reflect this.

What about Morse?

For a while the Morse test will cause more complications (just when you thought you were beginning to understand things!) There was a period during which the Morse test was being reduced from 12 words per minute (WPM) to 5WPM, and the A/B licence was issued. This has now been absorbed into the Full Class A Licence, so we needn't dwell on it.

As far as Intermediate and Full Licences are concerned, the position for the next year or so is that the 5WPM Morse test will be required for HF access, and the 'A' and 'B' distinction will be retained. In the case of Foundation Licensees, they can use HF if they wish, since they have all passed a Morse Assessment.

Isn't the Morse test going to be abolished?

There is an international requirement for Morse testing, and it is widely expected that this will be removed by decision of next year's World Radio Conference. At that point, administrations will be free to set their own Morse testing regime. In the UK, the Radiocommunications Agency (RA) determines licensing conditions. It seems likely that the RA will say that the Morse Assessment of the Foundation Licence is adequate at all licence levels, and that no other Morse testing is required.

Then there will only be three licences in total?

When the dust has settled, the three licences mentioned above (Full, Intermediate and Foundation) will comprise the whole of the UK system. There will be no 'A' or 'B', and each level will lead on logically to the next. It's thought that this state of affairs will be reached in the spring of 2004.

So, until 2004, the system will stay quite complicated?

It will get simpler by stages. At the moment, there are still three independent licences with their own assessments and examinations. At the beginning of 2003, the Foundation and Intermediate licences will become integrated. A year later, the Full licence will join the system. The Morse test is a separate issue, but it is likely to disappear during 2003.

What about callsigns?

If we go forward to 2004, there will be three callsign allocations, corresponding to the three categories of licence. Foundation licensees receive callsigns in the M3 series; Intermediates receive calls in the 2E series, and Full Licensees receive calls in the M0 series, each with a 'Secondary Locator' as appropriate (to form MW3, 2M, and so on). The series beginning with 'G' have always been allocated to Full Licensees.

What happens to Class B Licensees after the Morse test is abolished?

The RA has said that Class B licensees will probably get all HF privileges without further testing. Thus they will be 'grandfathered' in, becoming Intermediate or Full Licensees in the three level system (with no 'A' or 'B' distinction). It's likely that they will also retain their existing callsigns.

Where are we now in creating the new system?

We are currently getting towards the end of creating the new Intermediate Licence syllabus. This is based on the old Novice syllabus, but is being virtually rewritten. Most of the material which is already in the Foundation syllabus can be removed, except where it is needed to emphasise new subject matter.

The practical elements of the Novice licence have been retained and enhanced for the new Intermediate syllabus; these were considered to be the highlights of the old syllabus. The rest is being considered and discussed line by line, taking into account experience from Novice instructors over the years. Some new material is being added, to take account of the higher power levels available to Intermediates, and to include reference to recent advances in technology.

What is the time scale for introducing the new Intermediate Licence?

As with the Foundation Licence, there will be a pilot scheme to make sure the new system is functioning correctly. This will take place towards the end of 2002. The first assessments and examinations proper will be early in 2003. A text book for students will be available in time for Christmas.

It is expected that many current Foundation and Intermediate tutors will wish to teach the new Intermediate course, and there will be notes and briefings as appropriate.

How will the new Intermediate training and exams be administered?

Much of the administration will be similar to that of the Foundation licence. We expect to come close to an 'on demand' service, where a candidate can be reasonably sure of being able to find an assessment and examination not too far away within two to three weeks.

Neither the Foundation nor Intermediate licences will require students to attend a training course unless they want to. However, it's likely that the thoroughness of the practical requirements of the Intermediate syllabus will mean that virtually all candidates will need some help in getting through the work needed.

Who is working on the new Intermediate system?

A Working Party has been created from members of the RSGB's Amateur Radio Development Committee, together with representatives from the RA. They meet every two to three weeks to discuss the syllabus and other issues. In addition, thousands of words have been exchanged by e-mail and telephone to work on this project. The new Intermediate licence will be ready and tested by the beginning of 2003, and we think it will be a big success.

Questions? Comments?

Contact Ed Taylor, G3SQX, c/o RSGB HQ, or e-mail: Ed@g3sqx.net

The BEST RADIO EQUIPMENT at the B

REVEX SWR/Power Meters

REVEX W570N
HF/VHF/UHF SWR/PWR Meter
Measures 3 power levels and SWR across an extremely wide range of HF/VHF/UHF frequencies. Uses two separate sensors to provide greater accuracy.
ML&S £119.95

REVEX MODEL W540
VHF/UHF Power/SWR Meter
An SWR/power meter to suit Amateur, UHF CB and Commercial applications. Japanese construction with an all-metal case, large meter display, 140-525MHz coverage with less than 0.3dB insertion loss, 4W, 20W &200W power scales.
ML&S £64.95

Other models available - please call for details

MALDOL Vertex Range of Base Antennas

GHX-250D 144/430MHz £79.95
• TYPE 5/8λ x 2 CP 144MHz, 5/8λ x 4 CP 430MHz • GAIN 6.0dBi 144MHz 8.5dBi 430MHz • MAX POWER INPUT 200W (F3) • CONN. M-J • LENGTH 2640mm • WEIGHT 1300g • SUITABLE MAST Φ25~Φ60

GHX-160D 144/430MHz £64.95
• TYPE 6/8λ CP 144MHz, 5/8λ x 2 CP 430MHz • GAIN 4.5dBi 144MHz 7.2dBi 430MHz • MAX POWER INPUT 100W (F3) • CONN. M-J • LENGTH 1750mm • WEIGHT 900g • SUITABLE MAST Φ25~Φ60

GHX-510 50/144/430MHz £99.95
• TYPE 1/2λ CP 50MHz, 5/8λ x 2 CP 144MHz, 5/8λ x 4 CP 430MHz • GAIN 2.15dBi 50MHz 6.2dBi 144MHz 8.4dBi 430MHz • MAX POWER INPUT 150W (F3) • CONN. M-J • LENGTH 2640mm • WEIGHT 1300g • SUITABLE MAST Φ25~Φ60

MALDOL Apex Range

AX-40 144/430MHz £24.95
• TYPE 1/4λ 144MHz, 1/2λ 430MHz • GAIN 3.0dBi 430MHz • MAX POWER INPUT 60W • CONN. M-P • LENGTH 425mm • WEIGHT 110g

AX-75 144/430MHz £33.95
• TYPE 1/2λ 144MHz, 5/8λ 430MHz • GAIN 3.2dBi 144MHz, 5.7dBi 430MHz, • MAX POWER INPUT 60W • CONN. M-P • LENGTH 760mm • WEIGHT 140g

AX-95 144/430MHz £32.95
• TYPE 1/2λ 144MHz, 5/8λ 430MHz • GAIN 3.3dBi 144MHz, 5.8dBi 430MHz, • MAX POWER INPUT 60W • CONN. M-P • LENGTH 950mm • WEIGHT 150g

AX-110 144/430MHz £34.95
• TYPE 1/2λ 144MHz, 5/8λ 430MHz • GAIN 3.5dBi 144MHz, 6.0dBi 430MHz, • MAX POWER INPUT 70W • CONN. M-P • LENGTH 1100mm • WEIGHT 150g

MALDOL Range

HMC-6S 7/21/28/50/144/430MHz £79.95
• TYPE 1/4λ 7/21/28/50MHz, 1/2λ 144MHz, 5/8λ 430MHz • GAIN 3.5dBi 144MHz, 6.0dBi 430MHz, • MAX POWER INPUT 120W 7/21/28, 150W 50/144/430MHz • CONN. M-P • LENGTH 1800mm • WEIGHT 800g

HFC-80L 3.5MHz £44.95
• TYPE 1/4λ • MAX POWER INPUT 120W SSB • CONN. M-P • LENGTH 2110mm • WEIGHT 530g

HFC-80 3.5MHz £38.95
• TYPE 1/4λ • MAX POWER INPUT 120W SSB • CONN. M-P • LENGTH 1540mm • WEIGHT 360g

YAESU FT1000MP MK5

This radio combines excellent DSP with top grade IF filters to give you the best DX performance available.

ML&S £2799
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £121.52

YAESU QUADRA VL1000

The ultimate add on for your station. Offering 1000 Watts of effortless RF on HF and six metres this amplifier is a delight to use.

ML&S £3799
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £164.94

YAESU FT847

This is a well established radio and was the original multi band base station. With Yaesu's constant upgrade policy the current batches are far better than early versions and it is still the only radio to offer 4 metres all mode operation. A shack in a box for only £1199.00

RRP £1699 **ML&S £1199**
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £52.06

YAESU FT920AFC

With HF and six metres this radio is the most simple to operate DSP radio we stock. The large display is easy to read and the controls are large and well spaced for those who do not like the smaller radios. Now includes 500Hz CW filter

ML&S £1149
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £49.88

YAESU FTV1000

Yaesu's new 200 Watt six metre transverter for the FT1000MP Mk5 at only -

ML&S £799
CALL FOR A DEAL

YAESU FT840 FM

now with FM!

This is an excellent starter radio is sadly discontinued so we are offering the TS-50S from Kenwood at the same price or we have a few used units available.

RRP £799 **ML&S £599**
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £26.01

YAESU FT817

new low price

This is a radio that every radio ham should own. As well as being an excellent portable radio this makes an ideal second receiver for the shack. Supplied ready to go at a new low price of £599

ML&S £599
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £26.01

YAESU FT100D

Following on from the FT100 the D version offers a few extras and improved HF performance. HYAuto repeater shift on VHF & UHF plus an easy menu system make this the most popular HF mobile radio.

ML&S £899
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £39.03

YAESU VX5RS

Our best selling hand held ever! Giving 5 Watts on 2/70 & 6 metres. With built in wide band receiver We have purchased our last batch from Yaesu in black for only £259

RRP £339
ML&S £269

YAESU VX1R

Still the smallest handheld around with built in scanner offering up to 1 Watt on 2 & 70 and Lithium ion battery that last for ages this is the ultimate pocket radio at only:

RRP £229
ML&S
CALL FOR BEST PRICE

YAESU VR-5000

The new desktop scanner from Yaesu all bands and all mode with a host of features.

ML&S £599
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £26.01

YAESU FT-7100

The latest dual band mobile from the Yaesu stable with all the usual features including detachable head.

ML&S £299
SUPER LOW PRICE!

KENWOOD TS2000E

ALSO AVAILABLE: 23cm version CALL FOR DEAL!

This radio has set a new bench mark for all in one radios. Offering all bands,built in TNC,built in ATU this is a real communications station. You can chat on your local 2 meter repeater while tuning around HF for that elusive DX station on HF. You can also monitor the DX cluster and see the DX popping up on the main receiver. The features just go on and on. Call for a leaflet or email TS2000@hamradio.co.uk and we we email the brochure back to you. *Prices start at £1599 for the B2000 and £1649 for the TS2000.*

ML&S £1649 STD UNIT
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £71.59
If you require the B2000 or 23cms CALL FOR A PRICE PACKAGE

KENWOOD TS50S

This is the original HF mobile radio still selling at only £599.00 *- an absolute BARGAIN An ideal M3 HF rig*

ML&S £619
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £26.87

KENWOOD TS570DGE

This is an excellent entry level DSP radio offering excellent features for newcomers and hardened DX'ers! 100 Watts HF with a built in ATU. Excellent value at only £849.00

ML&S £849
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £36.86

KENWOOD TMG707

A simple twin band VHF radio with a large display and speech option make this an ideal choice for people with eyesight problems.

ML&S £299

KENWOOD B2000

All the features of the TS2000 but no knobs. This radio is controlled via your PC or the Head of a TMD700E *(Upgrade will be required on early versions of the TMD700E)*

ML&S £1599
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £69.42

KENWOOD TMD700E

With packet cluster monitor and APRS built in this is fast becoming THE mobile radio for VHF/UHF in-car operation.

ML&S £449
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £19.49

KENWOOD TS870S

The original DSP radio still selling very well. A bargain DSP machine at only *£1399.00*

ML&S £1379
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £59.87

KENWOOD THD7E

The Packet handheld that every one wants. Ideal for APRS on the move.

ML&S £319

ICOM IC910H

The LATEST VHF/UHF multimode. Features include 100W on VHF, 75W on UHF and true dual receive.
Options include: DSP and 23cms

ML&S £1299 STD UNIT
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £56.40

ICOM IC-7400

NEW ICOM RADIO!

With 32 bit DSP offering HF/6 & 2 at 100 watts on all bands this radio is an amazing radio at an bargain price! Features over 51 filter bandwidths, RTTY Decoder, Memory Keyer plus many more enhanced features this is much more than a replacement for the IC-746

ML&S £1499
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £65.08

CALL for a MALDOL catalogue

INTEREST FREE credit IS BACK! NOTHING to PAY for 6 MONTHS!

FINANCE EXAMPLE TS870s AT £1379
PAYMENT ILLUSTRATION:
ZERO DEPOSIT: 36 payments of £41.25
TOTAL AMOUNT PAYABLE: £2155.32 APR:126.9%
if paid in 6 months 0% APR
ML&S is a licenced credit broker. *Finance offered subject to status. Full written details on request.* E&OE

E&OE

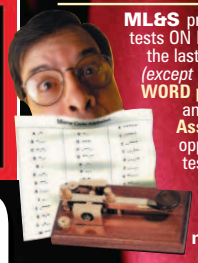
EST PRICES at ML&S - *where else!*

Have a trade in? We PAY TOP MONEY call the sales desk or EMAIL your request to sales@hamradio.co.uk

ML&S martin lynch & sons
Suppliers of Communications Equipment

0208 566 1120

MORSE TESTS at Martin Lynch & Sons



ML&S provide the facility for Morse tests ON DEMAND on the morning of the last Saturday of every month *(except December)*. We offer the **5 WORD per MINUTE MORSE TEST** and the **Foundation Morse Assessment**. This is a unique opportunity to take your morse test in a relaxed environment. *Any questions call* ***CHRIS TAYLOR*** *on* **0208 566 1120** *or email:* **morse@hamradio.co.uk**

NEW!

YAESU FT-897

New 100W version of the famous FT-817 with a host of options - call for a brochure

IC-756 Pro Mk2

True DSP has arrived! - with a full feature HF & 50MHz Dual Receive transceiver!

ML&S £2495
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £108.32

- *Improved receiver*
- *Selectable filter shape*
- *Digital Voice record/playback*
- *Enhanced SSB data mode performance*
- *SSB & CW synchronous shift*
- *and LOTS MORE!*

FT1000 Mark V Field

A 100W all-in-one HF Transceiver with built-in power supply and auto antenna tuner.

- *High Efficiency Cooling system*
- *Conservative 100 Watt Low Distortion Final Amplifier Design*
- *High Speed Automatic Antenna Tuning System*
- *Dual Receive With Independent AGC Systems*
- *Enhanced Digital Signal Processing*
- *Selectable SSB Pattern Contour Filters*
- *Industry-Leading RF Front End Design*
- *3 RF Preamp Modes+ IPO (Direct Mixer Feed)*
- *Outstanding IF Filter Chain*
- *Full Breaking CW and Electronic Keyer*
- *Multifunction Display with Improved Contrast*
- *Enhanced Shuttle Jog Tuning Dial*
- *Direct Keypad Frequency Entry*
- *Twin Stacked VFO Registers*
- *Easy Digital Mode Interfacing*
- *And MORE.....*

ML&S £2295
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £99.64

NEW!

YAESU VX-7R

New waterproof triple band handheld with dual receive only **£329**

come and see us at the STAND W12

Leicester Show

ML&S *the Ham Radio Specialists*

20-21 Sept

All these radios and much, much MORE!

ICOM IC706 MK2G

The original mobile multiband radio. Now the 3rd variant offering HF/6/2&70 with DSP and detachable head. Icom certainly got this radio spot on with features and performance.

zero DEPOSIT

ML&S £849
ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or
36 * £36.86

IC-7400

With 32 bit DSP and 100W on HF/50MHz and 144MHz plus a built in ATU this radio offers performance at a value for money price.
Only **£1499**

YAESU FT-8900

NEW Quad band mobile radio 2679 & 10m FM
Only **£499**

NEW!

LOOK!

New Miracle Antenna has arrived!

MIRACLE WHIP

This antenna has been designed with the FT-817 in mind and is a 55 inch whip with a tuning box at the base. The performance is staggering and it will work with any radio from 3.5-460MHz (5W max). It even works without a counter poise. Call for full details!

ML&S £129.95
IN STOCK!

- 128, 140-142 Northfield Ave
- Ealing
- London
- W13 9SB

website:
www.hamradio.co.uk
email:
sales@hamradio.co.uk
fax: **0208 566 1207**

Tokyo High Power HL-50B

Reviewed by Steve White, G3ZVW*

WITH THE Foundation Licence now firmly established and nearly 4000 M3 licences issued, many M3s - and others - have equipped themselves with the Yaesu FT-817 [1]. Foundation Licensees who go on to achieve an Intermediate Licence - and there have already been some - and Full licensees who would like more power from this or any other low power HF transceiver, now have a convenient means of getting it. Extra power can be very useful in overcoming QRM on the low bands (160, 80 and 40 metres) at night, and on all bands when operating mobile. In a couple of years' time, when sunspot activity drops, the extra power will be highly desirable for long distance communication at HF.

The Tokyo High Power HL-50B is a companion amplifier for 5W or 10W HF transceivers, and is rated at 50W output on all bands from 3.5 to 50MHz.

Front view of the HL-50B. The front panel does not detach, but a remote front panel is available.

CONSTRUCTION

WEIGHING-IN at 1.4kg, the HL-50B is solidly constructed in a cast aluminium and pressed steel case. It comes complete with a 12V power cable, a PL259 patch cable, a mounting bracket, an accessory plug and spare fuses.

Inside the case there are two double-sided PCBs, a small one that the front panel switches and indicators are mounted on, and a larger one for everything else. An optional remote head (not reviewed) permits it to be controlled . . . well . . . remotely!

HOW IT WORKS

THE SIGNAL PATH starts with an RF attenuator. Attenuation can be set to the correct level to match the amplifier to 5W or 10W output transceivers. The model supplied for this review was set for 5W input. The correct values of resistor to match the amplifier to a 10W output transceiver were given in the instruction book, but changing the resistors would involve dismantling the amplifier and a certain amount of soldering. Consequently, I would advise anyone inexperienced in the practical aspects of electronics to seek help or advice in this respect.

The single-stage amplifier employs a pair of 2SC1946A bipolar transistors in a conventional broadband Class-AB push-pull circuit. According to Mitsubishi's data sheet, these devices are rated up to 175MHz and at 30W output (per transistor).

Following the amplifier, six low pass filters are manually selected via a front panel switch. The amplifier is specified for nine bands, so three of these filters are active on two bands, namely 10/14MHz, 18/21MHz and 24.5/28MHz; and the other three filters on one band, namely 3.5MHz, 7MHz and 50MHz. The filters are relay selected via a front panel rotary switch.

Finally, in the transmit path at least, the signal is sampled and fed to (a) a BA6104 5-LED meter chip, which gives an approximate indication of RF output, and (b) an ALC output. In each case there is an adjustment, and in each case it is via a miniature potentiometer inside the case.

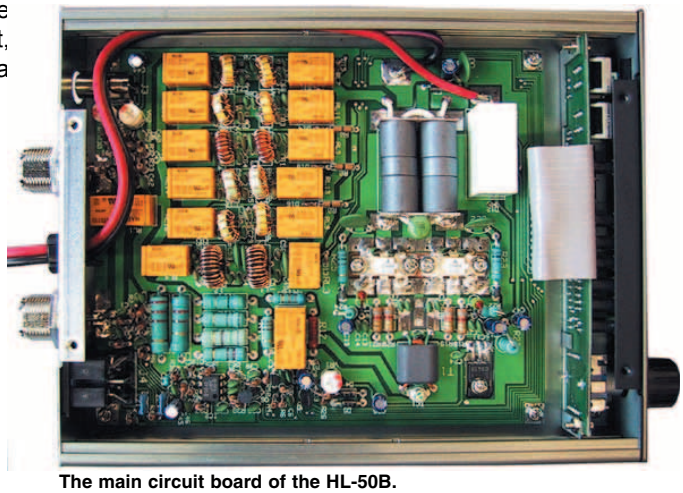
Transmit / receive switching is via RF VOX, which activates a changeover relay. Hang times are selectable for AM / FM (short) and CW / SSB (long). A rear panel socket contains a connection that enables the amplifier to be 'hard' switched.

The amplifier is also equipped with a shutdown feature and associated Warning LED, should incorrect operation occur (eg if you transmit on 28MHz when the amplifier is switched to 7MHz, or there is a short on the antenna).

LINEARITY

THE ACID TEST for an amplifier that is described as 'linear' is just how linear it is, eg does twice as much input result in twice as much output? Linearity is a *very* important and highly underrated issue for modes that vary continuously in amplitude, ie AM and SSB. To show an example, firstly see **Fig 1**. The solid diagonal line is that of a theoretical linear amplifier. Note that it is a straight line up to the point that the amplifier reaches its full output, at which point it suddenly flattens out. In reality this never occurs, because amplifiers start to lose linearity gradually. **Fig 2** shows what is likely to be observed. In this case the output is a straight line (ie 'linear') up to a point, but then starts to tail off. The point at which the actual output is 20% less than it would have been if the gain initially achieved continued to be achieved, is the so-called '1dB point'. Extending this dotted line down to the X axis shows the maximum drive that should be applied to the amplifier before it is considered to be no longer linear. Amplifiers vary from band to band, from sample to sample, with changes

All sockets are mounted on the rear panel.



The main circuit board of the HL-50B.

* 31 Amberley Road, London N13 4BH; e-mail: steve.white@rsgb.org.uk

Linear Amplifier Reviewed

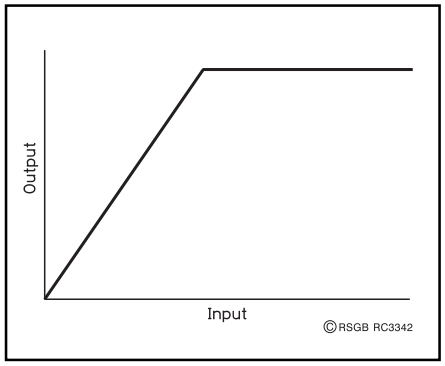


Fig 1: Gain of a theoretical linear amplifier. The steeper the diagonal line, the greater the gain.

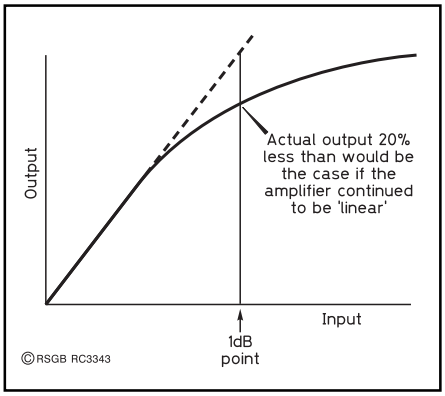


Fig 2: Gain of a practical linear amplifier, which is straight up to a point but then gradually decreases.

in power supply voltage, and different bias settings also producing different results, so it is a complex situation.

The important thing to remember is that poor linearity results in signals that sound rough and occupy more bandwidth than they should. In the extreme, a signal can become so wide that some of it is radiated outside of the band - a real no-no!

	BAND (MHz)								
Input	**3.5**	**7**	**10**	**14**	**18**	**21**	**24**	**28**	**50**
1W	14.2W	12.7W	12.7W	13.7W	18.3W	16.1W	13.3W	14.4W	30W
2W	27.4W	27.5W	27.5W	28.5W	34W	29.3W	25.5W	27.7W	42W
3W	38W	39W	39W	40W	42W	37W	34W	37W	48W
4W	45W	47W	47W	48W	46W	42W	39W	42W	53W
5W	52W	54W	54W	52W	49W	45W	43W	46W	57W
6W	57W	58W	58W	56W	52W	48W	46W	49W	60W
1dB point:	4.5W	5W	5W	4.3W	3W	2.8W	3.4W	3.6W	1.4W

Table 1: Power output on each band, plus 1dB compression point.

TEST RESULTS

ON THE HF bands the amplifier was tested with a Marconi 2955 test set. On 50MHz a URM-120 wattmeter was used. The results are shown in **Table 1**.

The figures show that the amplifier performed very well on the lower bands (up to 14MHz), not quite as well on the upper HF bands (18 - 28MHz), and exhibited too much gain on 50MHz. On three bands the quoted output was not quite achieved, but the shortfall was minimal and could easily not have been so if the power supply used for the tests had delivered even 0.1V more (not that it was low, but small differences in supply voltage can make big differences in performance).

CONCLUSIONS

THE HL-50B would make a useful addition to the station of someone whose transceiver is limited to 5W or 10W output. Many commercial transceivers, however, produce a little more output than they are quoted as doing, and over-driving exacerbates linearity problems, so attention needs to be paid to drive power, especially when using the HL-50B on 50MHz.

The construction quality of the HL-50B seemed solid enough. The only thing I would change is the mounting of the 12 inductors in the low pass filters, which would benefit from being fixed to the PCB, rather than just being supported by their wires. If used mobile the amplifier would inevitably be subject to vibration, and eventually stress fractures might occur.

I would like to thank Waters & Stanton for the loan of the review model. The Tokyo High Power HL-50B Linear Amplifier is available from Waters & Stanton (tel: 01702 206835) and ML&S (tel: 020 8566 1120) at about £299.

REFERENCE

[1] Reviewed by Peter Hart, G3SJX, in *RadCom* June 2001. ♦

RadCom Helplines FOR MEMBERS

● Barrie, G1ABW, is seeking a Mutek front end (preferably new) with fitting instructions for a **Yaesu FT-290R MkI**. G1ABW, QTHR. Tel: 01442 864 711.

● Denzil, G3KXF, would like to hear from anyone with knowledge of **special Q-codes** used by the German and Russian military during WWII and, especially, from anyone who worked at 'Enigma' intercept stations. G3KXF, QTHR. Tel: 01903 764 599 or e-mail: denzil-roden@lineone.net

● G3BSK would welcome comments on the efficiency and performance of **magnetic loops**. Confidential information respected and appreciated. G3BSK, QTHR. Tel: 0121 744 4671.

● Ray, G3EVT, would like any information (including where it was used) on the **BC306A antenna tuning unit** (Stock No 2C516A-1). It was manufactured by the Aircraft Accessory Corporation of Kansas City. G3EVT, QTHR. Tel: 01789 762 041.

● Peter, RS185319, would appreciate copies of instruction books for: **Marconi TF801A** - book number EB801A; **Philips capacitance / resistance meter, model GM4144 / 01**. RS185319, tel: 01622 890 244.

● Charles, M0DED, needs help with the 200kHz mechanical filters for the **Telefunken E-1500** series receiver. He is also interested in an e-mail technical design chat relevant to HF transceivers, synthesisers, etc. M0DED, not QTHR, 6 Hillcrest Road, Littlebourne, Canterbury, Kent CT3 1TJ.

● Ron, G4MNB, needs service information and a circuit diagram for the **Sony Cassette-Corder TC-95A**. All costs will be met. G4MNB, QTHR. Tel: 01793 331 585.

● Douglas, G3KPO, is searching for an ex-RAF **R1082 receiver** and **T1083 transmitter** for working exhibits in the National Wireless Museum at Seaview on the Isle of Wight. G3KPO, QTHR. Tel: 01983 567 665.

● Steve, G6AQC, would like a circuit diagram and / or manual for a Telequipment D32 oscilloscope. G6AQC, QTHR.

'Helplines' is a free service to members. Requests for help are published in the order in which they are received. We regret it is not possible to provide an undertaking of when any submitted request will appear.

in practice

IAN WHITE, G3SEK

52, Abingdon Road, Drayton, Abingdon, OX14 4HP
Website: www.ifwtech.co.uk/g3sek
E-mail: g3sek@ifwtech.co.uk

INSIDE A DIRECTIONAL WATTMETER

HOW DOES an SWR meter or directional wattmeter work? How does it separate forward and reflected power?

'SWR' IS SHORTHAND for 'Standing Wave Ratio'... but what does that mean? When a transmission line is terminated in a matched load - in other words, a load equal to the characteristic impedance of the line - the RF voltage and current are constant along the line. Losses in a real-life line will mean that the voltage and current will decrease slightly but steadily as you travel away from the transmitter, but let's ignore that for the rest of this discussion. When the line is terminated in a mismatched load, standing waves will appear - the voltage and current vary up and down, going through a complete cycle in each electrical wavelength along the line. By probing along a transmission line at a series of points, you can actually measure the RMS values of voltage and current, and plot out the standing waves as in **Fig 1** [1]. Note that the standing waves are not travelling along the line - they really do stand there, pinned at either end by the conditions at the transmitter and the load.

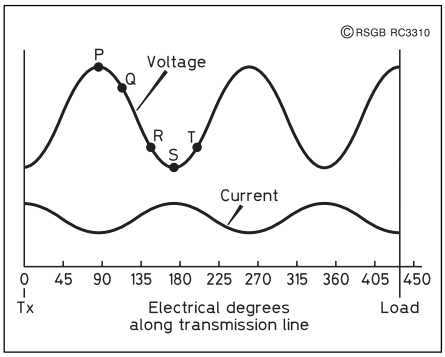


Fig 1: Standing waves of voltage and current on a transmission line.

Yet something moves. Power (or more correctly, energy) flows from the transmitter to the load. To understand what is happening, we can visualise the standing wave as the result of two separate waves travelling in opposite directions. Concentrating for the moment on the voltages, we can visualise a forward-travelling voltage wave E_F from the transmitter, and a reverse-travelling voltage wave E_R reflected from the mismatched load. A reactive load determines the initial phase relationship between E_F and E_R at the load itself, but it is the addition and cancellation between E_F and E_R in progressively-changing phase that creates the standing wave along the line. **Fig 2** shows what is happening at points P, Q, R, S and T marked in Fig 1. When E_F and E_R are in phase (point P), a voltage maximum occurs; when they are 180° out of phase (point S), a voltage minimum; and so on for the intermediate points.

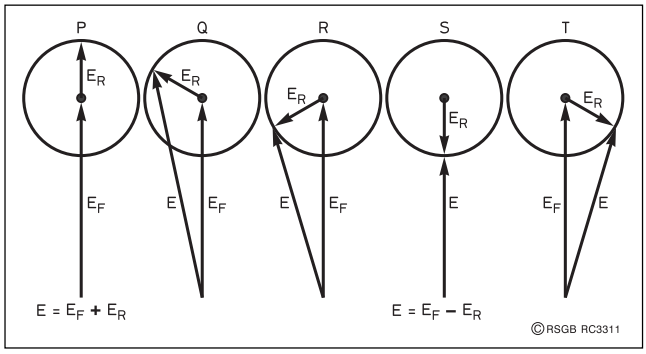


Fig 2: How the forward and reverse voltage waves (E_F and E_R) interact at various points along the transmission line to create the standing wave in Fig 1.

The power flowing forward along the transmission line is:

$$P_F = E_F^2/Z_0 = I_F^2 Z_0$$

where Z_0 is the line impedance. Likewise the reverse power is given by:

$$P_R = E_R^2/Z_0 = I_R^2 Z_0$$

The power delivered to the load is simply:

$$P_L = P_F - P_R$$

What the directional wattmeter does is to sense the forward and reflected waves, and indicate the corresponding power levels. It does this by using the important fact that forward voltage and current (E_F and I_F) are always in phase, everywhere along the line, while E_R and I_R are always 180° out of phase [2].

For example, **Fig 3** shows a very simple version of the Bruene bridge directional wattmeter. If the instantaneous voltage on the line is V, and the instantaneous current is I, the capacitive voltage divider C1 and C2 takes a sample of the voltage (E_V) and the current transformer T1 takes a sample of the current, developing a voltage E_I across the load resistor R1. The reversing switch S1 allows us either to add the two instantaneous RF voltages E_I and E_V or to subtract them. A diode detector detects the amplitude of the resultant RF waveform.

When E_I and E_V are added in phase, we are sensing the forward wave in the transmission line. When E_I and E_V are added in antiphase we are sensing the reflected wave. To satisfy the condition that there is no reflected wave from a matched load, the circuit needs to be proportioned to make $E_I = E_V$ under these conditions, so that they subtract to zero. That is how a directional wattmeter is made, initially by designing the capacitor ratio and transformer turns ratio to make E_I and E_V approximately equal, and finally by adjusting C1 or C2 to equalise them exactly. Fig 3 is not a very practical form of Bruene bridge, because it's not good design practice to have a reversing switch floating at RF potential - certainly not in something that's intended to be a measuring instrument. **Fig 4** shows the alternatives, which are simply different ways of extracting the instantaneous sum and difference of E_I and E_V, and presenting them to a pair of matched diode detectors. You can find these and other variants in a variety of handbooks and other circuits.

Another important type of directional coupler is based on a parallel section of transmission line (**Fig 5**). This looks different from the Bruene bridges in Figs 3 and 4, but the principle is exactly the same. The pickup line samples the main-line current by magnetic coupling (mutual inductance) and simultaneously samples the main-line voltage by capacitive coupling. The capacitively-coupled voltage E_V appears across the resistor R1, and the inductively-coupled voltage E_I is in series with E_V. By suitably proportioning the line dimensions and R1, you can again make E_V and E_I exactly equal with a matched

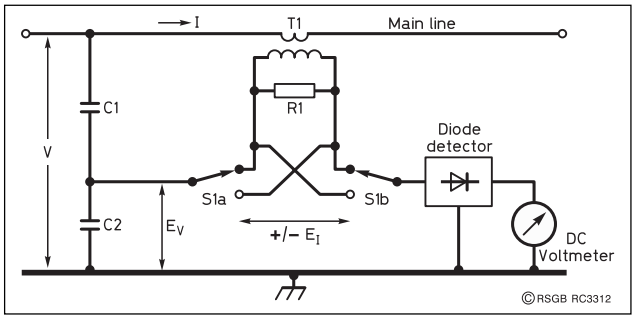


Fig 3: Simplified version of the Bruene bridge directional sensor. Sampled RF voltages proportional to the main-line voltage and main-line current (E_v and E_i) can be either added or subtracted. The diode detector displays the resultant.

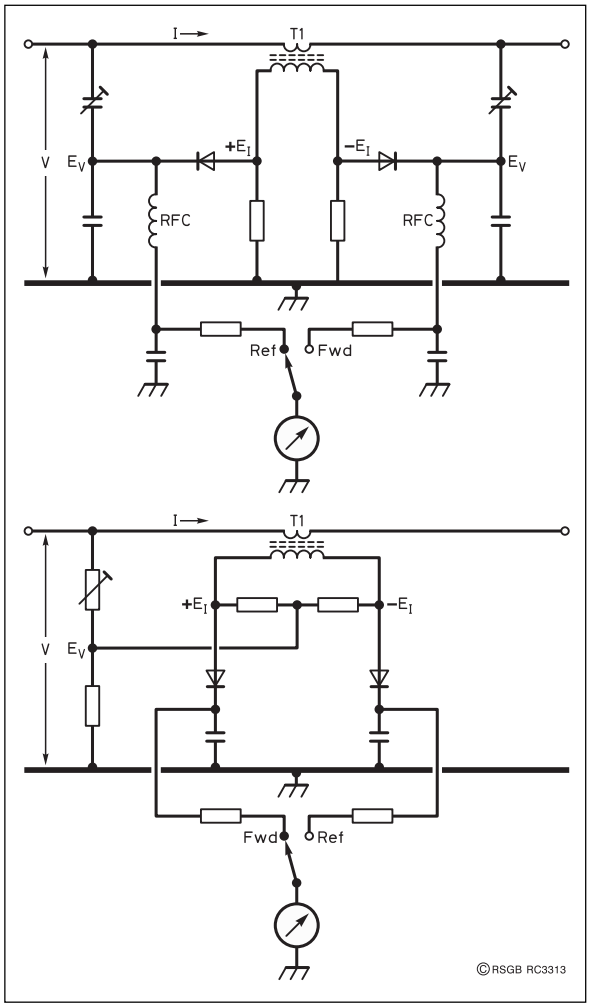


Fig 4: Some more practical versions of the Bruene bridge.

load. If you physically rotate the whole sensor by 180°, E_I will reverse in phase but E_V will stay the same, so once again we have made a directional sensor. This is the basic principle of the well-known Bird directional wattmeters, where the sensor is a short section of pickup line contained inside a rotatable 'slug'. Unlike the Bruene bridge, the sensitivity of this type of directional coupler increases with frequency, so for use as a wattmeter it needs to be frequency-compensated.

You may have noticed that none of these so-called 'wattmeters' is truly measuring power. What the meter displays is the rectified RF voltage that is the sum or the difference of E_V and E_I. The conversion to power occurs on the meter scale itself, which is calibrated in terms of power delivered into a matched load. The RF power is ideally proportional to the square of the rectified voltage, but the meter calibration also compensates for the loss of sensitivity at low levels due to the threshold voltage of the rectifier diode.

With a matched load, the reflected power is zero and the power P_L delivered to the load is simply the forward power P_F. If the load is mismatched, you have lost your power calibration and the indication of P_F is meaningless. But if you also calibrate the reverse sensor using a matched load, so that it can read the reflected power P_R, a very curious property emerges. The total power, P_L, into a mismatched load is still the simple difference (P_F - P_R), even though the readings of P_F and P_R are meaningless individually [3].

The SWR calibration of a directional wattmeter is very simple. Turning back to Fig 1, Standing Wave Ratio is fundamentally defined as the ratio between the maximum and minimum voltages anywhere along the line. It used to be measured by direct probing along the transmission line to find these two voltages, and the waveguide slotted line still uses this principle. Recalling from Fig 2 that the voltage variation comes from the interaction between the forward and reflected voltages E_F and E_R, it follows that:

$$SWR = \frac{E_{MAX}}{E_{MIN}} = \frac{E_F + E_R}{E_F - E_R}$$

If the sampled voltages E_V and E_I have been adjusted to be equal (and opposite) with a matched load, then SWR is simply $|E_V / E_I|$. It's also quite easy to show mathematically that if you insert the directional meter anywhere along the line, you will measure the same value of SWR [4]. As I've remarked in previous columns, an 'SWR meter' can also be considered as measuring the reflection coefficient $|\rho|$, where:

$$|\rho| = \frac{E_V - E_I}{E_V + E_I}$$

$$SWR = \frac{1+|\rho|}{1-|\rho|}$$

When we go through the ritual of adjusting the 'forward' reading to full-scale, and then switching to read 'reverse', we are actually reading (E_V - E_I) as a fraction of (E_V + E_I). In other words the instrument is displaying $|\rho|$ on a *linear* scale. The familiar *non-linear* SWR calibration on the meter face is simply converting from $|\rho|$ to SWR using the equation above. I hope this bit of simple maths has tied together all the related quantities, and explained how they are measured by a so-called 'directional wattmeter' or 'SWR meter'.

But what if there isn't a transmission line at all - what if the directional wattmeter is connected directly between the output of the transmitter and a load consisting of lumped components? Can you still have a 'Standing Wave Ratio' when there's no transmission line for the waves to stand on? In strict literal terms the answer has to be 'no', but in everyday engineering practice it's definitely 'yes'. SWR is regarded as just another mathematical way of expressing the quality of an impedance match, one of the set of related quantities including ρ, return loss and Y-, Z- and S-parameters. RF engineers simply use whichever one is most helpful for the problem at hand, and convert freely between them.

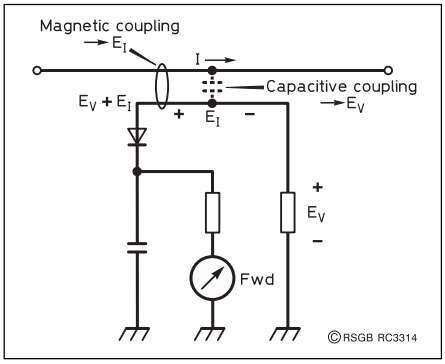


Fig 5: Transmission line directional sensor, again sampling both the main-line voltage and the current. In this orientation the sensor samples the forward wave - reverse for reflected.

NOTES AND REFERENCES

1. This explanation is abridged from 'An Inside Picture of Directional Wattmeters', by Warren Bruene, W5OLY, *QST*, April 1959 - the clearest description ever published, by the man who invented the ubiquitous 'Bruene bridge' SWR meter shown in Figs 3 and 4.
2. The fixed phase relationships between E_F and I_F (0°), and between E_R and I_R (180°), are independent of the load impedance. The load impedance only affects the phase relationship between E_F and E_R (and likewise between I_F and I_R).
3. This property falls out of the mathematics of these instruments, as described in *Reflections*, by Walter Maxwell, W2DU (**http://home.iag.net/~w2du** and available from **www.arrl.org**). Its validity is limited only by the directivity of the directional bridge under mismatched conditions, and the accuracy of the forward and reflected power scales.
4. If your SWR appears to vary according to the position of the meter along the line, there's a problem with the measurement. ♦

If you have new questions, or any comments to add to this month's column, I'd be very pleased to hear from you by post or e-mail.

Please remember that I can answer questions through this column only, so they need to be on topics of general interest.

PROFESSIONAL
Amateur Products
FROM THE **USA**

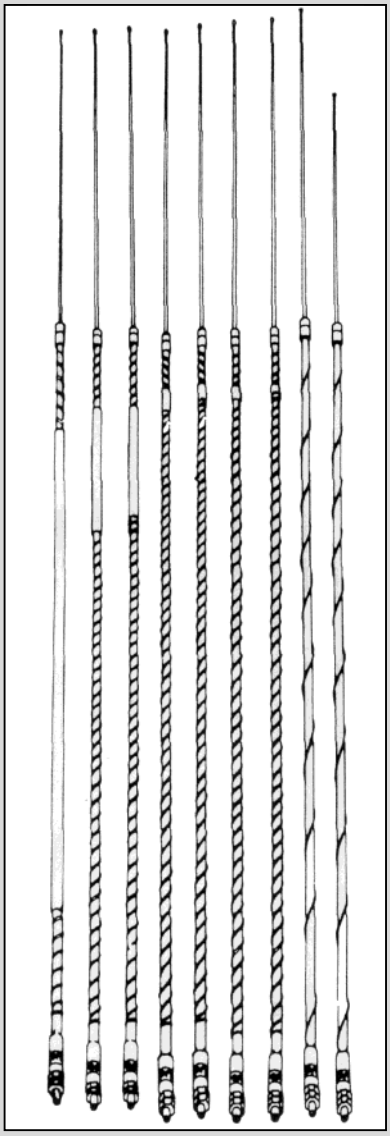
IronHorse

The Spirit of Communications

PROFESSIONAL
Amateur Products
FROM THE **USA**

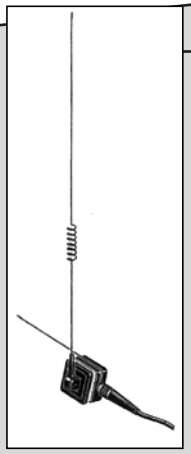
HF Mobile Antennas

For great HF DXing on the open road. Rated at 500W PEP specially designed for maximum effieciency, low SWR and broad bandwidth. Uses 3/8 thread mount.



IHF80E	80 mtrs	36kHz	***£24.95***
IHF40E	40 mtrs	60kHz	***£19.95***
IHF20	20 mtrs	150kHz	***£19.95***
IHF17	17 mtrs	175kHz	***£19.95***
IHF15	15 mtrs	200kHz	***£19.95***
IHF10	10 mtrs	500kHz	***£19.95***
IHF6	6 mtrs	1000kHz	***£19.95***

ADD £8.00 P&P FOR ABOVE ANTENNAS

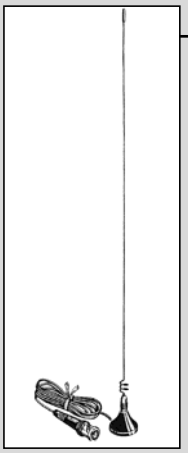


Model ATA270

Dual band glass mounted antenna

- **FREQ:** 144-148/440-450MHz
- **GAIN:** 2.6dB over 1/4 λ at 2m
  4dB over 1/4 λ at 70cm
- **TYPICAL VSWR:** Less than 2.0:1 through the bands
- **MAX POWER:** 50 Watts
- Field tuneable
- 14ft RG58 cable with PL259
- 26in copper plated whip with black finish
- Instructions and mounting package included
- Replacement whip, base and remount kit available

£29.95 ***£4.00 P&P***

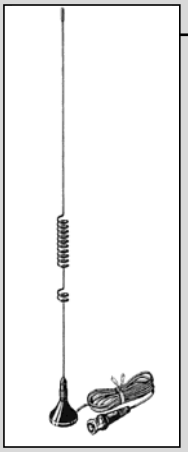


Model IHMM270

Dual band Mini Mag Mount

- **FREQ:** 144-148/440-450MHz
- 1⅛in diameter black ABS base
- Rare earth magnet
- 9ft of RG174 cable with BNC
- **HEIGHT:** Less than 20in
- **WEIGHT:** Less than 2oz
- 1/4 λ length at 2m and 5/8 λ length at 70cm
- **TYPICAL VSWR:** Less than 1.5:1 through the band
- **MAX POWER:** 25 Watts @ 70cm
  50 Watts @ 2m
- Black/chrome finished brass ferrule
- Replacement whip available

£19.95 ***£4.00 P&P***



Model IHMM3

Dual Band & Scanner Mini Mag Mount

This Dual band TX antenna for 2/70cms also receives from 100 - 1200 MHz. It weighs less than 2 ozs and is only 13.5" tall. It features a super strong rare earth magnetic base pre-wired with 9 ft of RG174 cable c/w BNC connector.

- **FREQ TX** 144 - 148 MHz
  440 - 450 MHz
  820 - 896 MHz
- **FREQ RX** 100 - 1,200 MHz
- **POWER** 40W on 2 mtr
  24W on 70 cms
  15W on UHF
- Black powder coated for durable performance

£19.95 ***£4.00 P&P***

Antenna Mounts

Model IHCU-114

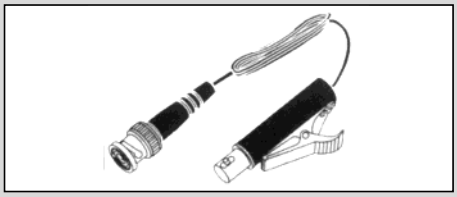
Heavy duty trunk lip mount with swivel feature. 3/8 x 24 beehive top mount hardwired connection required for installation.

£28.95 ***£4.00 P&P***

Model IHCU-114C

Heavy duty trunk lip mount with swivel feature. 3/8 x 24 beehive top mount, SO-239 connection for quick cable installation and 18ft RG-58U low loss hardwired cable with mini - UHF's in-line connectors for easy installation PL-259 connector to radio.

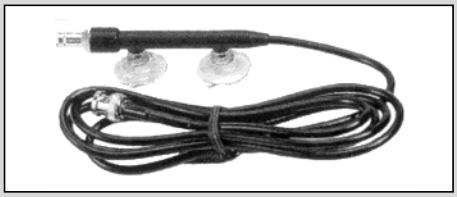
£39.95 ***£4.00 P&P***



Model IHC-18 *Hat Clip Mount*

BNC female clip mount and 4ft RG-174 and BNC male

£14.95 ***£2.50 P&P***



Model IHC-20 *Suction Mount*

Easy to install with 2 strong suction cups and 6ft RG-58U cable, BNC male connector at end.

£14.95 ***£2.50 P&P***

Model IHDL

60W Dummy Load with Heat Sink

- SWR: 1.10 (250MHz), 1.20 (450MHz)
- POWER: 20W (cont), 60W (max)
- IMPEDANCE: 50 Ohm
- CONNECTOR: PL-259

£29.95 ***£2.50 P&P***

NEVADA®

ORDER HOTLINE: ***023 9231 3090***

WEBSITE: ***www.nevada.co.uk***

Unit 1 • Fitzherbert Spur • Farlington • Portsmouth • PO6 1TT • website: www.nevada.co.uk

NEVADA - UK Distributors of IRON HORSE Products

WATERS & STANTON

INSIDE-OUT!

WHETHER OPERATING INSIDE OR OUT, THERE'S AN ICOM RADIO FOR YOU. AND IF YOU ARE LOOKING FOR A DEALER WHO KNOWS ICOM'S GEAR INSIDE OUT, GIVE US A CALL AT WATERS & STANTON.

IC-718 HF TRANSCEIVER

ICOM

PRICE MATCH

REGULAR BASE

INSIDE USE

The IC-718 although budget priced is high on features. An adjustable microphone compressor for increasing or decreasing audio levels. VOX for quick-fire QSO's or for handsfree operation. For the CW enthusiast, a built-in electronic keyer with variable dot/dash ratio, adjustable pitch 300 to 900Hz and key speeds of 6 to 60 WPM. Full break-in CW is available as well as CW reverse mode for reducing interference.

IC-756PRO II HF/50MHz ALL MODE TRANSCEIVER

ICOM

ADVANCED BASE

INSIDE USE

This flag-ship design gives you 5W - 100W on all bands from 160m - 6m. With advanced DSP there are no extra filters to purchase and the built-in ATU gives you the perfect match. Everything has been designed to make operating this radio a pleasure. Whether just getting started or an experienced operator, the latest IC-756 gives you all you need to span the globe.

IC-706MkIIG DSP HF/VHF/UHF ALL MODE DSP TRANSCEIVER

ICOM

MOBILE & PORTABLE

OUTSIDE USE

The IC-706MkIIG is the latest enhanced version of this popular HF/VHF/UHF mobile rig. It has more features but in the same physical size. Frequency coverage is expanded to the 70cm band with a usable 20W and power has been increased to 50W on 2m. Narrow FM cabability with FM deviation set for 2.5kHz, ideal for the new 12.5kHz channel spacings. Not forgetting that it also covers 6m all modes with the appropriate channel spacing selected from the menu. A long list of enhance-ments, both to usability and performance, as well as added features and functions have been added.

WATERS & STANTON: 22 MAIN RD, HOCKLEY, ESSEX, SS5 4QS. TEL: 01702 206835 • E-MAIL: sales@wsplc.com

MIDLANDS: BENTLEY BRIDGE, CHESTERFIELD RD, MATLOCK, DERBYSHIRE, DE4 5LE. 01629 582380

SCOTLAND: 20 WOODSIDE WAY, GLENROTHES, FIFE, KY7 5DF. 01592 756962

The World Radiosport Team

by RadCom Editor, Steve Telenius-Lowe, G4JVG *

THE WORLD Radiosport Team Championship (WRTC) 2002 took place in Finland between 9 and 15 July. The event featured 52 two-man teams of the best HF contest operators in the world getting together for a week of preparation, socialising - and serious competitive contest activity.

The team representing the UK was Andy Cook, G4PIQ, and Fred Handscombe, G4BWP; highly-experienced contest operators on both CW and SSB. The culmination of the event was each of the teams competing against each other in the 24-hour IARU HF Championship contest, which took place over the weekend of 13 / 14 July. 52 more experienced contesters were to act as referees at each of the team's stations, monitoring every QSO made, to ensure fair play throughout.

Many amateurs say they cannot possibly compete against stations using 10 times their amount of power, or those using pairs of six-element monoband Yagis on each band, or those fortunate enough to live on a Caribbean island with its own unique prefix that everyone will want to work. Even the callsign used can have an effect on the final score: GX0XYZ/P is obviously a lot more cumbersome than, say, M5E.

The whole idea of the WRTC events is as far as possible to eliminate all these factors and thus emphasise the one variable that remains - operator skill. Therefore all the teams used two 100-watt transceivers to identical triband Yagis and Fritzel FD-4 Windom antennas for 40 and 80 metres. All the antennas were supported on identical 12-metre high masts, made in Finland especially for WRTC2002. All the stations were located in as geographically compact an area as possible, subject to being far enough from each other so as not to cause mutual interference, and with the necessity of locating the stations at existing amateur host stations. In the event, the 52 teams were spread out over an area about 100km wide by 60km from north to south, with Helsinki roughly in the middle and at the bottom of this rectangle. The Finnish PTT made available 52 special event callsigns in the series OJ1 - OJ8, with single letter suffixes, so that no-one had an unfair advantage of using a 'better', or simply better-known, callsign.

The choice of transceivers, computers, software and ancillary equipment (bandpass filters, antenna switching etc) was left to the individual teams. The UK team's equipment is given in **Table 1**.

MESSAGE FROM THE PRESIDENT OF FINLAND, TARJA HALONEN, PATRON OF WRTC2002

AMATEUR RADIO has a long and rich history in Finland. Wireless telecommunications also play a strong part in the infrastructure of modern Finland. Therefore, the Ministry of Education has supported the aspirations of the Finnish youth in this field for many years now. It is indeed a great pleasure to see so many highly skilled people from all over the world taking part in the World Radiosport Team Championships 2002 here in Finland. I extend my best greetings and wishes for success to the WRTC2002, to all participants and spectators as well as to the organisers of the Championships.

Tarja Halonen, President of Finland.

The Himos summer camp.

GETTING TOGETHER

AMATEURS FROM all over the world began arriving in Helsinki on 9 July. The following morning the first meeting took place of all competitors, referees, judges, and spectators. The organising committee explained briefly the rules and introduced a couple of new developments. Each team was given a GSM mobile phone so that they could contact any of the other team captains or any of the organising committee before the contest started. The team-captain's callsigns had been programmed in Morse as the ring tone for each phone - important in a bus-load of 50 amateurs, half with phones! SMS text messaging was quite a novelty for some of the Americans, many of whom had not seen this feature before.

The phones were to be handed over to the team referees for use during the contest. This is where the second new development came in: each hour the referee would send a text message with his team's current score (as indicated by the logging software in use) to a central number which would automatically display all the teams' scores on the Internet. In this way, the thousands of amateurs around the world following the contest could keep up to date with how 'their' team was getting on.

The following day, several coaches drove everyone to Himos, some 275km north of

Photo: Lee Volante, G0MTN

The WRTC2002 beam: a 6-element tribander with two elements on each of 10, 15 and 20m, made in Finland especially for the event.

Radio A: FT-1000MP with INRAD filters, Heil Proset, Bencher paddle, Keyer in *TR*, Auto-switched ICE bandpass filters with homebrew decoder driving homebrew antenna transfer switch, Toshiba Portege 3480CT running Win 98SE with PCMCIA serial card.

Radio B: FT-1000MP, Heil Proset 2, Manual switched homebrew filters, Lightbulb protector, Older Toshiba laptop running DOS 6.22.

***TR* Log 6.69.**

Table 1: The OJ2Z (Team UK) station configuration.

* c/o RSGB HQ

Championship 2002

The packed 'big tent' during the opening ceremony.

Helsinki. Himos is a Finnish amateur radio institution: an annual summer camp which brings together a high proportion of Finland's amateur radio population for a week of car boot sales and some serious socialising. Himos is a camp site spread out over hundreds of acres around a large lake and offering accommodation from tents to luxury log cabins each with its own sauna. It was estimated that some 1500 Finnish amateurs and their families were visiting Himos, to which were added the several hundred WRTC delegates.

Finland was having a heatwave during the WRTC week and at Himos the temperature rose to over 30 °C. This came as a surprise to visitors from more southerly latitudes, who had brought many layers of clothing to combat the expected arctic conditions! As it was less than three weeks after the summer solstice and because Himos is only four and a half degrees south of the arctic circle, it never really became dark, with a red glow in the sky between midnight and 1.00am, when the sun rose again. The temperature did not drop more than a few degrees at night, making for really hot, sticky, nights without air conditioning or ceiling fans in the log cabins.

OLYMPIC SPIRIT

HIMOS WAS A time for renewing old friendships and getting to meet new friends. With the sun still blazing down from a cloudless sky at 11.00pm it felt much earlier than it was and the open-air bar did a roaring trade until 2.00am each night.

But Himos was also the place for the official opening ceremony of WRTC2002, at which the teams paraded into the 50m x 50m marquee (the 'big tent'), Olympic-style. As each team entered and stood below the national flags of the 36 countries being represented at WRTC2002, the tent becoming more and more packed, it gradually became apparent what a huge event this was.

Two Finnish competitors, dressed in the official uniform of the 1952 Helsinki Olympics, read out the Olympic oath, the wording modified slightly for the amateur radio context. The ideals of fair play in WRTC2002 were identical to those of the Olympic games: indeed, with the commercialisation of many mainstream sports these days it could be argued that amateur radio contesting more closely represents the original Olympic ideal of amateurism than the majority of sports. It was particularly appropriate that at the time of WRTC2002, Finland was celebrating the 50th anniversary of the Helsinki Olympics.

Before returning to Helsinki from Himos one more important event had to take place. This was when each team captain drew the location and callsign they would be using in the contest. Because all the normal contesting variables of power, antenna type, gain and height, had been nullified, much

Dave Sumner, K1ZZ, co-chairman of the WRTC2002 Judging Committee, addresses the delegates at Himos. In the background, Pekka Länsman, OH2NCS, of the Finnish Communications Regulatory Authority and Dave's co-chairman on the Judging Committee; and Jouko Hayrynen, OH1RX, the chairman of the Organising Committee.

good-humoured play was made of drawing the 'best' locations, eg those close to the sea or on the shore of a large lake.

Andy, G4PIQ, drew the location of well-known DXer and contester Martti Laine, OH2BH, and pronounced himself pleased with his choice. The UK team's referee was to be Mark, 4Z4KX.

The callsigns, in sealed envelopes, were handed over by the team captain to their referee, who would open them only 10 minutes before the start of the contest. In this way, no-one knew which team would be using which callsign - another possible gamesmanship variable overcome!

THE CONTEST

THE LONG DRIVE back from Himos to Helsinki was noticeably quieter than the one north from the capital. This was serious now. It was nearly time for the event for which everyone had been planning for the last couple of years.

The competitors and the referees were taken to their host stations on the Friday evening. Most then opted for a good night's sleep before the contest, as they would be operating for 24 hours non-stop. All teams had sufficient time to set up their stations properly and to try to get acquainted with the

The teams file in and stand beneath the national flags during the opening ceremony.

Left to right: The UK team's referee, Mark, 4Z4KX; station host Martti, OH2BH; and team captain Andy, G4PIQ, at the draw for locations and callsigns.

The entire UK delegation at WRTC2002: Lee Volante, G0MTN (referee); Fred Handscombe, G4BWP (Team UK); Dave Lawley, G4BUO (referee); John Dunnington, G3LZQ (spectator); Andy Cook, G4PIQ (Team UK Captain); Tim Kirby, G4VXE (spectator); Roger Western, G3SXW (co-chairman, Referee Management); Steve Telenius-Lowe, G4JVG (spectator).

northerly propagation before the contest started at 3.00pm Finnish summer time on the Saturday. Many stations were heard signing OH/own calls during this period.

Several spectators, myself included, who otherwise would have had nothing to do during the contest, were invited to operate as OI2HQ as part of the SRAL (Finnish national society) HQ contest entry. Thanks to Jukka, OH6LI, for organising this effort. OI2HQ was not restricted to 100 watts and triband beams; indeed the cream of Finland's 'mega-stations' with massive 200ft rotating towers were used to produce a total of over 13,000 QSOs for the HQ station.

The WRTC competitors were restricted to using one of their two transceivers at any one time, the second one being used only as a receiver to 'spot' multipliers. For the WRTC teams the multipliers in this contest were DXCC entities, as in the *CQ* World Wide DX contests.

The envelopes containing the callsigns were opened at 1150UTC and Andy and Fred learned that their callsign for the next 24 hours would be OJ2Z. At 1200UTC the contest was on!

The top-scoring teams made over 2500 QSOs, with around 400 country multipliers across the five bands used (80, 40, 20, 15 and 10m). This figure of over 100 QSOs per hour for 24 consecutive hours is a remarkable achievement, especially considering that this was genuinely a single-transmitter event, at a maximum of 100 watts output to relatively simple triband beam and wire antennas.

Amateurs taking part in the contest from around the world were encouraged to e-mail their logs to the WRTC judges immediately after the contest, in order to assist with the adjudication process. Nearly 950 logs were received, leading to a log-jam at the WRTC judging centre, but allowing for probably the most accurately adjudicated amateur radio contest ever.

Of course, as soon as the contest ended most people had some inkling of who had been successful and who had not fared so well, thanks to the near-real-time scoring on the Internet. However, these were very much 'raw' scores, before any form of adjudication had taken place. Also, rumours spread that the logging software used by some teams had failed to identify some multipliers correctly, meaning that some teams' scores would go *up*, whilst others went down as logging errors were identified. In some cases the claimed scores were so close to each other that a few QSOs or a multiplier or two would make all the difference between the placings. Logging accuracy would play a major part in determining the final winner's table.

Pos	Callsign	Team members	Mults/QSOs	Score
1.	OJ3A	N5TJ/K1TO	438/2782	1.629.798
2.	OJ8E	RA3AUU/RV1AW	426/2627	1.619.226
3.	OJ2V	DL2CC/DL6FBL	473/2468	1.608.673
4.	OJ3R	N6MJ/N2NL	436/2705	1.560.008
5.	OJ8K	KQ2M/W7WA	394/2816	1.479.470
6.	OJ5A	VE3EJ/VE7ZO	437/2635	1.473.127
7.	OJ1M	K5ZD/K1KI	457/2519	1.469.255
8.	OJ6E	UT4UZ/UT3UA	416/2637	1.468.064
9.	OJ5W	LY1DS/LY2TA	416/2638	1.459.744
10	OJ5M	DK3GI/DL1IAO	440/2534	1.456.840
11	OJ6W	OE2VEL/OE9MON	416/2560	1.436.448
12	OJ6C	RW1AC/RW3QC	395/2776	1.414.100
13	OJ5U	N6RT/N2NT	432/2435	1.412.640
14	OJ8W	9A9A/9A5E	373/2778	1.405.837
15	OJ7M	SP3RBR/SP8NR	403/2650	1.402.440
16	OJ2F	N6TJ/N6AA	397/2428	1.391.088
17	OJ3T	RZ9UA/UA9MA	395/2708	1.390.795
18	OJ2H	N5RZ/K2UA	410/2559	1.388.670
19	OJ8A	K1AR/K1DG	432/2382	1.382.400
20	OJ2J	HA1AG/HA3OV	408/2602	1.368.432
21	OJ3N	N2IC/K6LL	405/2513	1.355.940
22	OJ4M	K3LR/N9RV	366/2642	1.347.612
23	OJ3D	W4AN/K4BAI	389/2530	1.347.107
24	OJ2Y	UA2FZ/RW4WR	421/2389	1.331.623
25	OJ4N	ON6TT/ON4WW	416/2260	1.301.248
26	OJ2Q	YU7BW/YU1ZZ	381/2743	1.300.734
27	OJ6X	OH1MDR/OH1MM	438/2267	1.293.414
28	OJ7C	ES5MC/ES2RR	393/2505	1.288.254
29	OJ2Z	G4PIQ/G4BWP	419/2342	1.277.950
30	OJ6N	OK2FD/OK2ZU	379/2446	1.274.577
31	OJ1S	SP7GIQ/SP2FAX	371/2498	1.234.317
32	OJ5T	SM5IMO/SM3SGP	386/2381	1.214.742
33	OJ7X	S50A/S59AA	379/2542	1.210.147
34	OJ4S	JM1CAX/JE1JKL	392/2289	1.205.008
35	OJ7N	YL2KL/YL3DW	382/2392	1.196.424
36	OJ3X	5B4ADA/5B4WN	386/2310	1.186.950
37	OJ7S	N5KO/N1YC	389/2177	1.142.882
38	OJ1X	K1ZM/N6ZZ	370/2354	1.139.230
39	OJ5E	OH6EI/OH2XX	402/2059	1.131.630
40	OJ1F	NT1N/AG9A	397/2101	1.105.645
41	OJ5Z	F6FGZ/F5NLY	375/2016	1.086.750
42	OJ8N	YT1AD/YU7NU	359/2335	1.069.820
43	OJ7W	UA9BA/RN9AO	368/2168	1.052.480
44	OJ6K	VE7SV/VE7AHA	351/2257	1.045.980
45	OJ4A	DJ6QT/DL2OBF	347/2166	1.005.259
46	OJ1C	LU7DW/LU1FAM	322/2335	986.930
47	OJ7A	PP5JR/PY1KN	333/2263	978.021
48	OJ1N	EA3AIR/EA3KU	340/2140	954.380
49	OJ8L	S56M/S57AL	345/1920	883.545
50	OJ1W	ZS6EZ/ZS4TX	369/1723	880.065
51	OJ6Y	IK2QEI/I4UFH	339/1921	878.349
52	OJ4W	UN9LW/UN7LAN	297/1893	699.732

Table 2: The final results of WRTC2002.

"AND THE GOLD GOES TO . . ."

THE WINNERS WERE to be announced at a gala dinner on the Monday evening, the day after the contest. By now, it was known that the adjudicators had worked throughout the night analysing the logs and running software programs especially written for the event, in an attempt to separate the highest-scoring teams.

The final scores are shown in **Table 2**. The UK team came 29th, about half-way down the listing. Andy and Fred said they were disappointed by this showing, but agreed that it was very close indeed - another 100 more USA QSOs would have made all the difference to the placings. Their 2342 QSO total was higher than some stations placed higher, as was the multiplier total of 419. There were also many excellent contesters who appeared below Andy and Fred in the final table!

N5TJ and K1TO (centre) on the winners' rostrum, with (left) RV1AW and RA3AUU in second place and (right) DL2CC and DL6FBL, with their station host OH1XX.

The winners of the Gold Medals were Jeff Steinman, N5TJ, and Dan Street, K1TO, with Silver going to RA3AUU and RV1AW and the Bronze to DL2CC and DL6FBL. Jeff and Dan also won at WRTC1996 in San Francisco *and* at WRTC2000 in Slovenia. With Helsinki making it a hat-trick, there can be little doubt that these two gentlemen are the absolute best HF contesters in the world at present. ♦

W W W .
WRTC2002 http://www.wrtc2002.org
(The site includes numerous photographs sent in by participants and spectators.)

AFTER THE DUST HAD SETTLED

ANDY COOK, G4PIQ, sent the following message to UK contesters after arriving home: "Fred and I had a fabulous time competing in WRTC this year, and it was a great honour to have represented the UK. We'd have liked to have finished higher than 29th from 52, but we didn't. I could spout a whole bunch of excuses, but I'll just say that, in part, we made some tactically bad choices, but equally, the competition was of a very high standard - no room for any slacking, and the tables are actually very tight. . . As to the winners - well they are clearly outstanding at what they do and much more practice is required here! We were lucky enough to pull Martti's, OH2BH, location from the draw. He and his wife Leena were fabulous hosts for the contest and we had a very pleasant location to operate from. Thanks for all the support in the contest - activity from the UK seemed pretty good and it was great to work so many of you on a variety of band / mode slots."

But what did contesters at home make of it all? Here are a couple of comments from the UK Contesting Reflector on the Internet: "All 52 OJ stations were worked on CW, but not on SSB. The operating by the OJs was a marvel to observe: slick QSOs, full calls first time and no time-wasting. Great stuff. Even with the various odd 'bits of intelligence' that were to be gleaned from the *DXCluster*, we still had no real idea of who was who by the end of the event (apart from the odd team that was immediately discernible by their 'accent' on SSB, eg the G team, the JA team and the ZS team!)" - Nigel Cawthorne, G3TXF.

"Great fun chasing the OJ stations. Most were excellent operators and some were just unbelievably superb. Quite humbling really. . . I worked every OJ station on at least two band slots and made a total of 190 OJ QSOs. . . The Finns can certainly congratulate themselves on a well run and fun event." - Ian Pritchard, G3WVG.

Technical Topics

PAT HAWKER, G3VA
37 Dovercourt Road, London SE22 8SS

BALANCE-FED LARGE LOOP ANTENNAS

THERE APPEARS to be a marked revival of interest in the use of open-wire, ladder-line and ribbon transmission lines, both as matched and as tuned lines. Twin balanced feeders have always offered several useful advantages, not only lower attenuation than coaxial cables, but also the elimination of the need for a (possibly lossy) balun at the feed-point to a dipole-type element. Provided the line, the ATU output and the antenna structure itself are all well-balanced to earth, there will be little feeder radiation such as is commonly experienced from the outer-braid of coaxial cables - often advantageous in overcoming RFI problems. When used with an appropriate 'ASMU' (antenna system matching unit) and appropriate length of transmission line, virtually any length of element (preferably at least an electrical quarter-wave long on the lowest band) can provide an effective multi-band antenna, particularly important for the use of the non-harmonically related WARC bands.

For some years, I have used a balanced-fed irregular 'horizontal loop' of indeterminate length (roughly 150ft or so) running down my narrow 70ft back garden to tree supports and then back again to the house at a height that varies from about 18 to 30ft: see 'TT' July 2000, p56, Fig 6. While I would certainly not claim this as a particularly good system, it does function between 3.5 and 30MHz (and occasionally 1.8MHz). With horizontal polarisation it is too low to be suitable for DX on the lower bands. Because of its marked directivity towards the east, I have put up a crude '21MHz' dipole, (no attempt made to check resonance) in the roof-space fed from ladder-line. With the tuner used on 14/21/28 MHz for the 'loop', this works reasonably well on all three bands for working North American stations. The ability to switch quickly between two simple wire antennas with different horizontal radiation patterns is a dodge that I first used in the 1950s. I was then operating from a first floor flat in Central London, using one antenna stretched across a front balcony and a second (sloping) at the rear of the solid four-storey building.

The use of large horizontal loops (circular, square, rectangular, triangular (delta)) with balanced feed is proving increasingly popular; whether like mine, it is just a long indeterminate length of wire, or a more ambitious design such as that described by Kirk A Kleinschmidt, NT0Z, in 'A Balanced, Everyday Approach to All-Band Bliss' (*QST*, April 2002, pp47-50). This is sub-titled 'Feed lines, antenna tuners, baluns, RFI, computer noise and all-band antennas – now there's a snake pit of potential conflict. After years of experimentation, the author has found the path to multiband nirvana.'

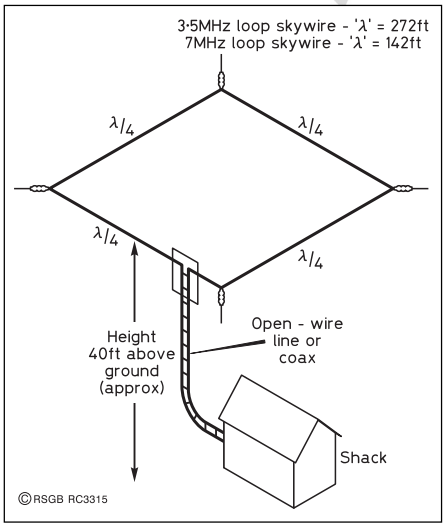


Fig 1: NT0Z advises: Put up the largest horizontal loop your site can support while keeping the 'loop' as square as possible. Don't worry about perfect symmetry [or resonance but try to preserve balance to earth –*G3VA*]. Loop could be scaled down for 14MHz and above.

NT0Z's opening remarks will be endorsed by many: "For most of us, the Holy Grail of ham radio is antenna performance. It's often the key element in determining ham radio success and operating enjoyment. You can get by with a second-rate transceiver, a deep gravelly voice… but if you have an underperforming antenna, ham radio isn't nearly the fun it could be.

"After imagining an antenna system that qualifies as a navigation hazard, most of us will scale things down to the real matter at hand – how to put up an affordable, easy-to-build multiband antenna that works great and fits on an average-size lot… Although dipole antennas in all of their various shapes and configurations perform well, in my experience the *best* all-around multiband antenna is the horizontal loop. It's efficient, omnidirectional over most 'real ground', it's quiet, it operates well on *all* HF frequencies [including 50MHz] above its design frequency (and even those below…). [It can] be an *outstanding* antenna for domestic *and* DX contacts alike."

NT0Z endorses 'Fisher's First Rule of Horizontal Loop Construction". (Dave Fischer, W7FB, formerly W0MHS, in 'The Loop Skywire' (*QST*, November 1985) gave this as "enclose as much area as possible within the confines of the loop". That is to say a circular loop is ideal, but a square loop is much more practical and performance doesn't suffer.) NT0Z adds: "My lot could only accommodate a triangular 'loop' which is pretty much the geometric limit of what you can get away with. If you make the loop any more elongated or constricted, it loses it 'loop-like' qualities". [Mainly, I would suggest, its omni-directional pattern, as found in my very irregular elongated shape – *G3VA*].

Fig 1, taken from the NT0Z article, but clearly not his triangularly-shaped antenna, is captioned: "Put up the largest horizontal loop your site can support while keeping the 'loop' as square as possible [as high as possible, but don't fret overmuch if you can't exceed say 25 - 30ft – *G3VA*]. Don't worry about perfect symmetry. For size reference, values are shown for 3.5MHz and 7MHz." Although NT0Z originally used coax feeder, he shows the significant improvement possible with open-wire or 450Ω ladder-line, particularly when there is a high SWR on the feeder. For twin-wire balanced feeders, he provides (**Fig 2**) a simplified schematic of the balanced tuner originally presented by Rich Measures, AG6K (*QST*, February 1990, which gives full constructional details). AG6K's article was noted in 'TT' May 1990 (*Technical Topics Scrapbook 1990-94,* pp23 - 24). NT0X recognises that the use of two similar, high-power roller-coaster inductors is expensive and notes that some constructors use fixed, tapped coils to save money. In 'TT' May 1990 (also 'TT' July 2000) I included a diagram showing the low-cost balanced π-network tuner that I use on 14/21/28MHz with a fixed coil (using a π-network rather than fixed 50Ω output on the transmitter), repeated here as **Fig 3.**

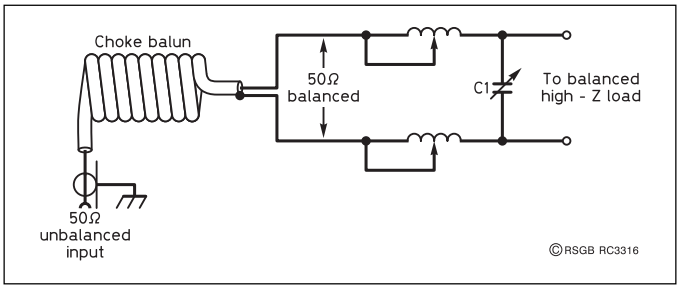


Fig 2: Simplified schematic of the balanced tuner, as originally presented by AG6K in 1990. The two roller inductors should be adjusted in sync. This design uses only a single (high-voltage) variable capacitor and is not suitable for balanced low-Z loads, unless the capacitor is moved to the input side of the inductors. To reduce costs, tapped inductors can be used instead of rollers.

ECONOMISING DRIVE TO AB1 LINEARS

JORGE Dorvier, EA4EO, notes that the present practice of driv-

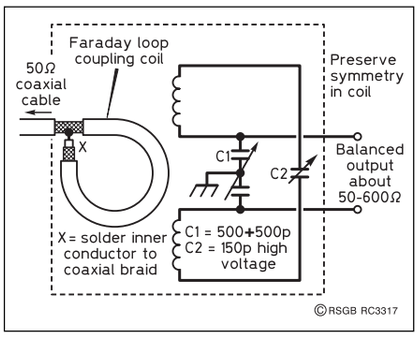


Fig 3: Relatively low-cost unit with π-network providing balanced output, as used by G3VA for 14/21/28MHz. C2 2 x 500pF broadcast-type gang permits matching to very low impedance loads in conjunction with the π-network in the transmitter.

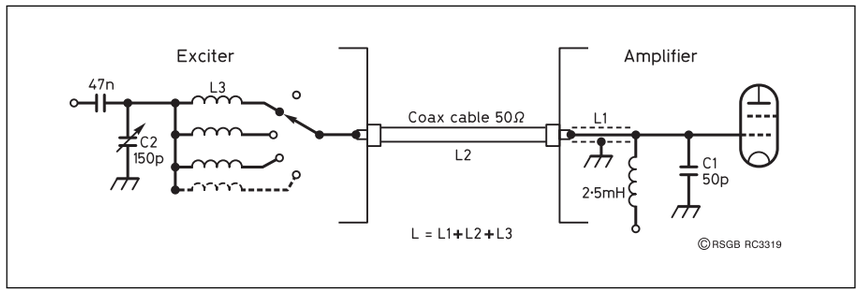


Fig 5: Practical implementation of the arrangement of Fig 4 as suggested by EA4EO.

ing AB1 linear amplifiers is to connect a 50Ω non-inductive resistor between grid and earth in order to avoid the need for neutralisation. This is reasonably convenient when driving a high-power linear from a typical 50- or 100-watt transceiver. But it is extremely wasteful of drive power, eliminating the fundamental advantage of a grid-controlled high-gain amplifier that, if self-oscillation can be avoided, it is capable of being driven by just a few watts, for example from a QRP rig or low-power exciter.

To reduce the loss of drive power in the 50Ω resistor, one solution is to use a toroidal wideband transformer with a ratio of 1:4 or 1:9. This permits the value of the non-inductive resistor to be increased, in the first case, to 200Ω, or 450Ω in the second case; this is shown in the EA4EO linear outlined in 'TT'. August 2000, p54, Fig 2. This significantly reduces the drive-power requirement, but still requires more drive than is available from say a 1 - 2W QRP rig to drive a pair of 6146 valves.

To solve the problem, EA4EO rolls back the years to provide the 'Heathkit Solution'. He revisits a circuit technique used by Heathkit in the heyday of its existence as a amateur radio kit supplier, but now usually forgotten by old-timers and unknown to the vast majority of enthusiasts.

The basic arrangement, **Fig 4,** was used by Heathkit for their early SB-10 phasing-type SSB adapter in the 1950s. Instead of a non-inductive resistor, a 50pF capacitor is used to eliminate the need for neutralisation. This capacitor, in conjunction with an inverted-L arrangement in the exciter, forms a π-network that transforms the output of a low-power transceiver to the input impedance of an AB1 linear amplifier. **Fig 5** shows a practical implementation. In this case the inductor, L, of Fig 4 is formed by the sum of L1 + L2 + L3. With this arrangement, it is necessary to have the connecting co-axial cable (forming L2) between transceiver and amplifier always the same length, so as not to change the total inductance of the circuit. For multiband operation, C1 remains the same value (always 50pF or the standard preferred-value 47pF), but L1 and C2 should be appropriate to the band in use and changed with a multipole switch. Switching can be much simpler by making C2 variable as shown in Fig 5.

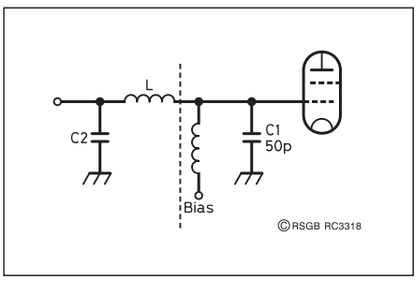


Fig 4: Basic arrangement using a capacitor rather than a resistor to prevent self-oscillation without neutralisation. The capacitor with an inverted-L circuit in the exciter forms a π-network that adapts the impedance of the output of a transceiver to the input of an AB1 linear amplifier.

IONOSPHERE – THE LODGE CENTENNIAL

FOLLOWING THE Marconi experiments in December 1901 and, more especially, the undisputed reception of Poldlhu signals on the *Philadelphia* in February 1902 that for the first time underlined the longer range that could be covered on LF/MF at night, there was a rush by scientists to explain how radio signals could be received far beyond the horizon and why this range might be increased at night. Heaviside and Kennelly deduced that the radio waves must be reflected from a conductive region in the upper atmosphere, but failed to explain correctly how this might be formed.

The first to provide the correct explanation was none other than Oliver Lodge [a past president of the RSGB - *Ed*], who had undoubtedly been the first to demonstrate publicly (14 August 1894) that Hertzian waves could be used for telegraphic signalling in the Morse code: see 'TT' August 1994 and in far greater detail in the book *Oliver Lodge and the Invention of Radio*, edited by Peter Rowlands and J Patrick Wilson (PD Publications, 1994).

Curiously, there is no reference in the book to a letter, dated 27 June 1902, which Lodge wrote to *Nature* (published in the 3 July issue). This provided the first physical explanation of how an elevated conductive / reflective layer could be formed. The background to this letter is not without interest. Marconi published details of the results of his long-distance experiments in the *The Times* of 16 June 1902, suggesting that the explanation of the greater distance at which night signals were received was that, during the day, signalling was affected by dis-electrification of the transmitting elevated conductor.

This report resulted in Professor J Joly of Trinity College, Dublin penning a letter to *Nature* (published 26 June). He tentatively suggested: "If - as I gather - Signor Marconi is referring to the observations made at positions in the Atlantic, west of England, the waves travelling westward, may not aether drift in the earth's orbital path be concerned in producing the effects observed?". He likened this to the way that the range of sound varies with or against a high wind. The idea of an aether (ether) as the transmitting medium persisted for years.

Oliver Lodge in reply wrote: "I can assure Prof Joly that his explanation will not do. The observed effect which, if confirmed, is very interesting, seems to me to be due to the conductivity, and consequential partial opacity, of air, under the influence of ultra-violet solar radiation. No doubt electrons must be given off from matter (dust as well as other matter) in the solar beams; and the presence of these will convert the atmosphere into a feeble conductor. Conducting power in the seawater surface assists and guides the waves, retaining them in two dimensions after the same fashion as a telegraph wire retains them in one; but the conductivity in the dielectric itself will tend to dissipate and enfeeble the waves, by a process of reflection resulting in some amount of distortion."

To mark the centennial of this landmark letter, Henry Rishbeth, Emeritus Professor in the Department of Physics and Astronomy at the University of Southampton (who since the death of J A Ratcliffe has been the UK's leading figure in ionospheric physics) contributes a short but salient article 'High above the Earth' (*Nature,* 4 July 2002, p23). To quote: "Using the new knowledge of electrons and ionisation, Lodge realised that

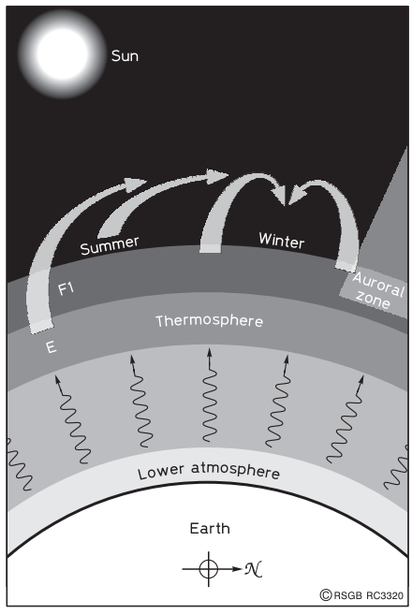


Fig 6: Interactions between Earth and Ionosphere. (Source *Nature*)

solar ultraviolet radiation produces a conducting layer that reflects radio waves. We call this the ionosphere, a term coined by Robert Watson-Watt in 1926 to replace its previous name, the Heaviside layer (after the physicist Oliver Heaviside). In modern terms, the ionosphere is a weakly ionised plasma or electron-ion gas embedded in the thermosphere, the hot, tenuous region above 80km that comprises the top few millionths of the atmosphere's mass…

"For a century, the ionosphere has been used for communications, but it is by no means a constant 'mirror in the sky'. Although its E layer (100-120km above the ground) and F1 layer (170-200km) usually behave in a regular, solar-controlled way, the F2 layer (250-350km) does not. It is this F2 layer, with the greatest density of free electrons, that is potentially the most effective reflector of radio waves [**Fig 6**]. But its variability in height and density, its strange day / night and seasonal behaviour, and its complex response to geomagnetic disturbances have long puzzled scientists and infuriated users of radio communications. This matters because the ionosphere is still widely used for radio communications; furthermore, the ionosphere can severely affect satellite transmissions that pass through it, causing errors in the Global Positioning System, for example. Ionospheric disturbances can also create strong electric currents in the E layer that can disrupt cable communications and terrestrial electric-power systems."

Rishbeth shows how modern research techniques are resulting in ideas that help to solve such long-standing puzzles as why electron density in the F2 layer peaks in winter over Europe, North America and Australasia, but at the equinoxes at low latitudes and in the South Atlantic. He writes: "Another tricky question is why electron density is usually drastically reduced (but is sometimes increased) during geomagnetic storms. Investigating these problems helps to validate the models and to make sense of the vagaries of radio propagation."

He notes that not all ionospheric variability can be blamed on solar or geomagnetic disturbances. "Some may originate from below, caused by waves and tides transmitted up to the ionosphere." He poses the question whether the lower-atmosphere 'weather' may affect the ionosphere, or vice versa?

He believes that the ultimate prize would be a complete top-to-bottom, predictive model of the Earth's atmosphere incorporating the rapidly-advancing knowledge of Sun-Earth relations. Such a model might provide better forecasts of the 'space weather' that affects spacecraft and communications, and give a better understanding of solar and upper-atmospheric influences on climate and global change. "There are still many questions whether and how the ionosphere is affected by tropical storms, volcanic activity or earthquakes." He concludes "All this may sound visionary, but Lodge, a visionary of his day, would surely have approved."

An earlier, six-page article by Prof Henry Rishbeth and Dr Christopher J Davis (Rutherford Appleton Laboratory) 'The 70th Anniversary of Ionospheric Sounding' in the IEE's *Engineering Science and Education Journal* (August 2001, pp139-144) traces the history of ionospheric sounding in the UK since hourly soundings at the Radio Research Station at Slough, Buckinghamshire started at noon on 11 January 1931. It shows how the sounding data, now from Chilton and elsewhere, are accessible in real time to communications companies and scientists, providing rapid information on 'space weather' – the monitoring and forecasting of conditions in the space environment, especially the effects of solar storms and changes in the solar wind and interplanetary magnetic field.

It also shows that recent studies have used the Slough data sequence to show that the observed increase in geomagnetic activity during the last century has been caused by an increase in the solar magnetic field rather than by changes in the Earth's ionosphere. Similarly historical ionospheric data recorded during solar eclipses since 1932 have been used to estimate the changing brightness of the solar corona. "Such changes are important to quantify if their effects are to be accounted for in current investigations into climate change on Earth."

The IEE paper includes a list of 58 papers of significance and / or used in connection with this paper. These provide a useful guide to the progress made in the study of the ionosphere over the past century, including the original Kennelly, Heaviside and Lodge letters and notes, the classic Appleton papers, several by J A Ratcliffe, as well as more recent papers by Dr J S Belrose, VE2CV, and the late G R M Garratt, G5CS. Among those who assisted the authors was Leslie Barclay, G3HTF.

Another valuable review of ionospheric physics by Henry Rishbeth 'Reflections in Appleton's Mirror: a Century of Ionospheric Science' appeared in IEE's *Engineering Science and Education Journal*, August 1995, pp167-175. This carried the editorial note: "From its beginnings in the nineteenth and early twentieth centuries, ionospheric physics evolved into a major branch of the wider discipline of solar-terrestrial physics. This paper traces progress from the earliest days, through Appleton's era and the International Geophysical Year, up to the present. Several lines of research are foreseen along which ionospheric physics will advance into the next century."

A section on 'the new understanding of the ionosphere' includes a diagram (**Fig 7**) showing in simplified form the quiet-day global temperature distribution in the thermosphere. Prof Rishbeth explains: "Solar heating, strongest in the summer hemisphere, drives a huge convection cell, Heating in the auroral zone causes 'upwelling' and drives equatorward winds at heights above 300km… The horizontal winds impose drifts on the F layer plasma causing the well-known day / night changes in F2 layer height".

The diagram gives only a highly simplified picture of the complex patterns of winds and waves. It is clear that the ionosphere is vastly more complex in structure and dynamics than the usual picture presented to HF radio operators. Propagation forecasting is still largely based on 'informed hit-and-miss'. Space weather seems even more difficult to forecast

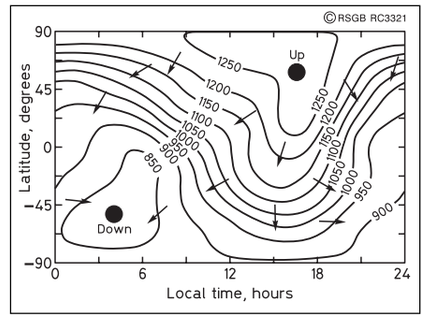


Fig 7: Map of neutral air temperature (K) in the thermosphere at heights above 300km for June at a moderate level of solar activity (flux index about 150) and quiet geomagnetic conditions. The arrows show approximate directions of the thermospheric winds. The centres of the regions of upward and downward air motions are also shown. (Source: Rishbeth and RAL)

accurately than terrestrial weather.

The rather poor HF propagation conditions in recent months are reflected in the steady decline of the average daily solar flux average from the 237 high of December 2001: April, 2002 (190), May (175) and June (149) as calculated from the German DK0WCY beacon transmissions. The 237 average of December 2001 appears to have represented the second peak of a double-hump Solar Cycle 23.

VALUE-FOR-MONEY CB LINEARS

WHATEVER YOU may think of the open sale in this country of high-power CB linear amplifiers, there seems no reason why licensed amateurs (other than those restricted to low-power) should not take advantage of the value-for-money that some of these relatively low-cost products offer.

D A Bunday, G3JQQ, writes: "For some time, I have been looking to replace my modest home-brew linear (two 4CX250B valves) with a more compact system that could be used /P if required.

"The CB world contains a wide variety of solid-state and some valve linears of various power outputs. A few now available are broad-band HF designs rather than 10-11-metre only, following the usual ferrite transformer and conventional circuitry design with good quality construction. In my view the value-for-money of some of these amplifiers is excellent: for example, well under £200 for the Italian RM Model L-500, rated at 12V 35A maximum input (420W), and available from Truck King of Watford (with whom I have no connection!).

"From two purchased recently, I have measured in excess of 200W CW output for 10W input, 1.8 to 28MHz when driven by an Alinco DX70TH on low power. A switched attenuator is provided to prevent over-drive, always a risk with solid state.

"For amateur-band usage, switched output filtering is essential and reflectometer feedback for high VSWR desirable. Well within the capabilities of a little technical DIY and not too costly. Filter data can be found, for example, in *ARRL Handbook*s. For the more ambitious, combining two of these amplifiers for higher power could be considered for which the specialist books on balun transformers such as the J Sevick Transmission Line Transformer is recommended."

EW AND A 5W INVERTER

FOR SOME 90 YEARS, the changing world of wireless and electronics has been reflected in the columns of the UK's oldest radio journal that began life as *The Marconiphone* but became *Wireless World* in 1913 before the first World War. During the war it continued to appear despite the clamp-down on any possession of radio components or constructional articles. Afterwards it campaigned for the start of broadcasting and encouraged wireless transmission by amateurs; it was the 'official journal' of the Wireless Society of London and then the RSGB in the first half of the 1920s, before the launch of the *T & R Bulletin* in 1925. If you will forgive a personal note, I published the first of many articles in *WW* over 60 years ago (1941) and contributed regular columns from 1969 to 1992, during a period when the title changed from *Wireless World* to *Electronics World*.

A few months ago, *EW* (and *Television*) were acquired by Highbury Business Communications and the August 2002 issue has announced that Martin Eccles, the former editor, has been succeeded by Phil Read, a broadcast engineer and former editor of *International Broadcast Engineer*. His first issue contains, as usual, several articles of interest to radio amateurs including one by two Italian LF enthusiasts on calibrating LF [loop] antennas using, as a marker, DCF39 on 138.83kHz. There is also an article on RF power amplifier design, although this carries the ominous sub-heading "Although radio and amateur radio are a bit old-fashioned (*sic*) today, a lot of engineers have to deal with RF…" The new editor reports that a reader-survey has shown that over 70% of its subscribers are professional electronics engineers. Let us hope that *EW* will not abandon entirely its long support of electronic hobbies, including high-fidelity as well as amateur radio.

Among the 'Circuit Ideas' in the August issue are details of a 5W inverter (**Fig 8**) providing an output of 5W at 220VAC, from an input of 12V at 0.8A. Contributed by D di Mario of Milan, it has been designed to use readily-available components including a standard 10VA mains transformer with two 6V windings. Its prime purpose is to provide a suitable voltage "for all those mains battery chargers that surround us: mobile phones, electric razors, generic battery chargers or even a 5W electronic neon lamp". The frequency varies between 70 and 190Hz depending on the load; the output is far from a sine-wave, making it unsuitable for some critical applications.

It is claimed "The circuit will withstand temporary shorts and battery reversals. Some switching chargers require an initial peak current that might look like a short to the inverter. In this case, it is necessary to disconnect and reconnect the load until it works. A fuse rated at 2.5A is a useful addition. Reverse one of the windings, if the circuit does not oscillate."

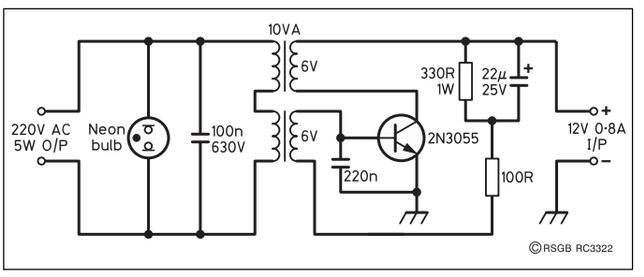


Fig 8: 5W inverter suitable for supplying the commonly used switched chargers for mobile phones etc. (Source *Electronics World*)

HERE & THERE

THE CLANS OF Bonnie Scotland must be in tumult following the recognition of the US Congress of an impoverished Florentine immigrant, Antonio Meucci, as the original inventor of the telephone rather than Alexander Graham Bell. In the 1830s Meuccci discovered, while working in Cuba on treating illnesses with electric shocks, that sounds could travel by electrical impulses through copper wire. He moved to New York in 1850 to develop the technology and in 1860 held a public demonstration reported in New York's Italian-language press. He could not afford to patent his improved designs in which an inductor was wound round an iron core, although in 1871 he filed a one-year renewable notice of an impending patent for his 'talking telegraph'. He sent a model to Western Union but they lost it.

In 1876 Graham Bell, who shared a laboratory with Meucci, filed a patent for a telephone and made a lucrative deal with Western Union. Meucci sued but, before the Supreme Court could give its verdict, he died in 1889 and his legal action died with him.

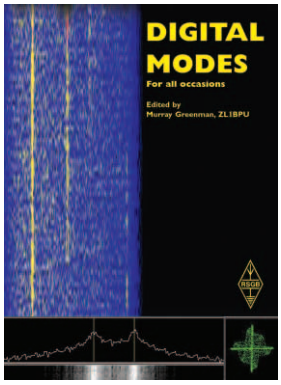
Bell (Telephone) Laboratories, for decades the dominant industrial research laboratory in telecommunications, now owned by Lucent Technologies, has other worries. Along with many other telecommunications companies, it is flirting with bankruptcy. To add salt to the wounds, an investigation has been launched into possible data fabrication. Several recent papers on organic superconductors by Bell Laboratories' scientists have come under suspicion.

'SLIDING DOORS' FILTER INFORMATION

WITH REFERENCE to PA0SE's 'sliding doors' filter, reported in the July 'TT', Dick, PA0SE, has now advised us that he is willing to send his text by e-mail to any interested reader. Dick can be contacted at pa0se@amsat.org ♦

DIGITAL MODES

FOR ALL OCCASIONS



This is the book for every person who is interested in digital modes, as it is simply the most complete book yet written on this subject. The book describes serial transmission and various data and error correction techniques. It explains the differences between a bit, a byte and a symbol, the baud and BPS, Baudot and ITA2 and much more.

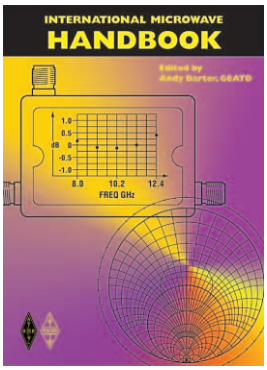
With this book you will be able to:

- Set up your computer effortlessly, using hints to avoiding all the pitfalls
- Learn how to connect the computer and radio together safely and simply
- Learn where to find all the software you need, at no cost
- Operate exciting real-time QSOs, working across town or around the world
- Learn which modes to use, which are best for certain conditions
- Operate visual modes, such as Hellschreiber, FAX and SSTV

Written for the average radio amateur through to the seasoned digital mode expert, this book is a must for everyone!

ONLY £14.44 +p&p (£16.99 non-members)

INTERNATIONAL MICROWAVE HANDBOOK



The microwave bands are an excellent area for radio amateurs who want to experiment and construct their own equipment. The RSGB in partnership with the ARRL has produced this invaluable source of reference information for those interested in this area, along with excellent designs from around the world to fire the imagination. Material has been drawn from many sources including the RSGB journal RadCom and the ARRL publications QST & QEX. Alongside this material a truly international range of sources have been used including items from Germany, Denmark, New Zealand, Slovenia and many more.

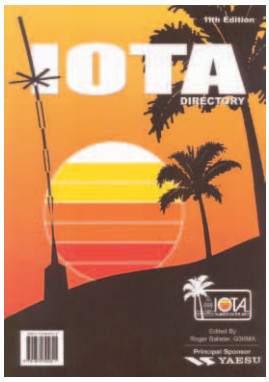
Techniques and devices are covered in depth, leading the reader to understand better the wide range of equipment and techniques now available to the microwave experimenter. This book contains a wide selection of designs using the latest technology that can reasonably be used by radio amateurs and ranges from ones that can be reproduced by most radio amateurs to those that require a high degree of skill to make.

This book is simply the best guide to the area of microwave radio

ONLY £21.24 + p&p (£24.99 non-members)

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

IOTA DIRECTORY - 11th Edition



This book is an essential guide to participating in the IOTA (Islands on the Air) programme. It contains everything a newcomer needs to know to enjoy collecting or operating from islands for this popular world-wide programme.

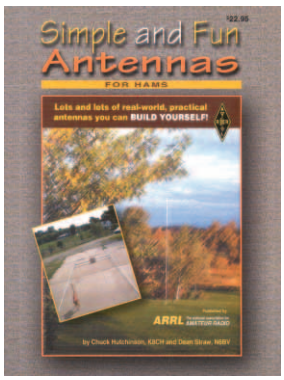
Fully updated, it provides the only complete, official listing of IOTA islands available, with the many recent changes. The Directory lists all islands that qualify for IOTA, grouped by continent, and indexed by prefix. It also details the award rules, and includes application forms and masses of information and advice for island hunters and intending award applicants and DXpeditioners alike. This edition also contains for the first time for several years some "Yearbook material" and is a must have book for every island chaser.

New For This Edition

* 32 more pages at the same price! * A listing of accepted operations from the 500+ rarest IOTAs * 1018 of the 1200 IOTAs now numbered * Hundreds more islands added * Illustrated in colour * Articles on major DXpedition activity in Russia, China and Indonesia. * A report on one of the most ambitious IOTA operations ever mounted. * A fully updated list of Most Wanted IOTA groups (with notes of operations in the last 2 years).

ONLY £8.49 + p&p (£9.99 non-members)

SIMPLE AND FUN ANTENNAS FOR HAMS



FROM THE ARRL

Finally a no-nonsense, hands-on practical book about antennas

Simple and Fun Antennas for Hams is designed not only for newcomers to Amateur Radio, but also for anyone overwhelmed with the theory and technical details in most antenna "textbooks."

Retired ARRL technical editor Chuck Hutchinson, K8CH and the ARRL Antenna Book editor, Dean Straw, N6BV bring you more than 70 well-tested fun and entirely useful projects.

These antennas work! Hundreds of photos and illustrations make sure you can actually build working antennas yourself. The range of designs include dipoles, verticals & wire antennas across both VHF and HF bands.

Simple and Fun Antenna for Hams presents the antenna know-how you need to make things clear, with a minimum of mind-numbing detail or maths.

ONLY £14.44 + p&p (£16.99 non-members)

SHARMAN
multiCOM Ltd

A FULL RANGE OF PRODUCTS AVAILABLE:

CB RADIOS
PMR RADIOS
SCANNERS
ANTENNAE
MICROPHONES
ACCESSORIES

MAYCOM EM-27

80 Channel CB Radio
40 UK+ 40EU

Also available
MAYCOM AH-27
hand-held CB Radio

multiCOM *pro* PMR446 RADIO

multiCOM *jnr* PMR446 RADIO

All the favourite brand names available Sadelta • Wilson Albrecht • Sirio • Maas.
Not forgetting our *own* brand of products!

Your benefits from Sharmans:
- Extensive range of products
- Speedy delivery
- Loyalty discounts
- 24 hour order line
- Product catalogue on-line

Full range of **GRE** and **UNIDEN** scanners available. Please ask for full details.

SCAN-UBC120 SCAN-UBC220 SCAN-UBC3000

Tel: 0161 834 9571

(24 hour orderline available - **TRADE ONLY**)

We offer all our customers, big or small, the best service possible.

Sharman multiCOM Limited 3 Bury New Road, Manchester M8 8FW
Fax: 0161 835 3679 email: sales@sharmans.com or visit our website: www.sharmans.com

SGC
NO COMPROMISE COMMUNICATIONS

SG-237 PORTA

HF + 6m AUTOMATIC ANTENNA TUNER

CANCELLED EXPORT ORDER

Due to a cancelled commercial export order we have a quantity of this top grade Smartuner available to clear at a bargain price.

We can offer £200 off the list price of £649 to the first 20 customers

The SG-237PORTA Smartuner is designed for quick portable set-up or base operation. It is designed to match end fed antennas, whips or ladder feedline. The power handling capability is 100W (PEP) and 40W maximum on CW. Its rugged internal construction is ideal for tough operation. Only four connections are required. The DC input requirement is 13.8V DC (nominal) 300mA, its DC operating range is 10.5 to 18V DC. Any 2.7m (9ft) whip will provide good operations above 3.5MHz. For operation down to 1.8MHz it is recommended that at least a 8.5m (28ft) wire antenna or 6 x 6m (20 x 20ft) loop antenna be used. When using a whip antenna in a fixed location it is important that a ground system of radials be used.

£449

carr. £9

WATERS & STANTON

AVAILABLE ONLY FROM HOCKLEY STORE.

WATERS & STANTON PLC: 22 MAIN RD, HOCKLEY, ESSEX, SS5 4QS. TEL: 01702 206835 • email: sales@wsplc.com

MEMBERS ONLY SPECIAL OFFERS

One of the most important coins of 2002, is the Golden Jubilee commemorative crown. Both the equestrian portrait on the obverse and the fine new portrait of the Queen on the reverse have been created by sculptor Ian Rank-Broadley. The coin is supplied in a luxury gloss printed presentation folder.

ONLY £9.45 + p&p

The Golden Jubilee commemorative medal struck in nickel-brass and measuring over 38mm in diameter is nestled in a luxurious red presentation case.

ONLY £4.95 + p&p

www.rgb.org/shop **Tel: 0870 904 7373**

SPECIAL OFFER

RACAL H.F. Communications Receiver RA1792

* Fully synthesized solid state receiver as used by government departments
* 150kHz - 30MHz
* Modes LSB, USB, AM, CW & FM
* Digital AGC scan facility
* 100 channel memory

Price: £550.00
(incl. VAT @ 17.5%)
P&P £15.00 (mainland U.K.)
Callers welcome strictly by appointment

Racal RA1772 HF Communications Receiver
15kHz to 30MHz
Complete with operator/ user manual
Price: £352.50

Raven Research
8 way HF Multicoupler
Price: £352.50

Bird 8201 RF Load 500W DC-2GHz
Price: £235.00

Bird 4314 Peak Power Meter
Price: £176.25

A selection of Bird Elements in stock
Prices from: £35.25

Sealed Lead Acid Rechargeable Battery
Sonnenschein - Dryfit A500
12V 6.5Ah - Brand New & Boxed
List Price: £44.64 each
Our Price: £11.75 each

SHOP OPENING TO THE PUBLIC ON SATURDAY 7th SEPTEMBER 2002
9am till 2pm

TELFORD ELECTRONICS
Old Officers Mess, Hoo Farm, Humbers Lane,
Horton, Telford, Shropshire TF6 6DJ, UK
Phone: (0044) 01952 605451 / 670178
- Fax: (0044) 01952 677978

E-mail: telfordelectronics@btinternet.com
Web site: http://www.telford-electronics.com

WE NOW ACCEPT ALL MAJOR CREDIT CARDS. OVERSEAS ORDERS WELCOME. PLEASE SEND LARGE SAE FOR DETAILS

VISA SWITCH MasterCard

J.BIRKETT

25, The Strait, Lincoln LN2 1JF
(Partners: J.H Birkett, J.L. Birkett) Tel: (01522) 520767

TUBULAR CERAMIC CAPACITORS 12 Kv.w. 135pf, 160pf, 210pf @ 10 for £1.00.
PLESSEY RELAY 10 Amp Contacts 4 Pole Change Over Coil 16 - 28 Volt DC @ £1.00.
LARGE WIRE WOUND VARIABLE RESISTOR 10 ohm 3.2 Amps @ £2.50.
MINI CIRCUITS FILTER SHP 200 SME Sockets @ £3.00.
EX-MOD SEMICONDUCTORS Germanium Diodes CG91 @ 20 for £1., OA10 @ 10 for £1, Transistors 2N916 @ 10 for £1, 2N1304 @ 10 for £1, 2N2223 @ 10 for £1, OAZ206 @ 15 for £1, CV Types CV7413 @ 15 for £1, CV7203 @ 5 for £1.00.
SUB-MINIATURE RELAY 24 Volt 2 Pole Change Over @ 75p each.
HANDHELD STORNO PA R.F. AMPLIFIERS Type PA831-S @ £3.00, Type AF PA AA801E @ £2.00, Storno Tone Module @ £1.50.
TUBULAR CERAMIC CAPACITORS 500v.w. 0.01uf @ 30 for £1.00.
LOUDSPEAKERS 4" Square 4 ohm @ 4 for £5.00.
MAINS DROPPER RESISTOR Tapped At 37-31-97-26-163 ohms @ £1.50.
PYE SHAVER MICROPHONES @ £5.00.
RACAL POWER SUPPLY V1-2044 240VAC Input With Lead and 13 Amp Plug, Output + 12 Volt 200mA, -12 Volt 200mA, 5 Volt 1 Amp @ £6.50 Post Paid.
TEXAS FETS TIS 14 @ 6 for £1.00.
GROUND POWER SUPPLY For ARC52, PTR175, 240 VAC Input, 28 Volt DC Out 15 To 17 Amp Out @ £35 (P&P £10).
WINGROVE AND ROGERS Silver Plated Miniature Air Spaced Trimmer 10pf @ 5 for £1.00.
TUBULAR TRIMMER Gold Plated Centre 20pf @ 50p.
SILVER MICA CAPACITOR 0.25uf 200v.w. 1% @ 50p.
Access, Switch, Barclay Card and American Express Cards accepted.
P&P £2 under £10, Over Free, Unless otherwise stated.

Free Entry

Boot Sale
Flea Market
Bring and Buy
Win an 817 in the raffle

Telford Amateur Radio Rally
Sunday 1st September

Aerospace Museum at RAF Cosford, M54 Junction 3 and A41.
Access from 08:00, entry from 10:00.

Exhibitors Contact:
Bob M0RJS, 01782 516504
bob@somrob.u-net.com
Jim M0UGL, 01952 684173
jim_g8ugl@onetel.net.uk

General Enquiries:
Les M5LMG, 01743 353288
les@griffiths51.worldonline.co.uk
Martyn G3UKV, 01952 255416
ukv@globalnet.co.uk

Morse tests available on request, no booking required

www.telfordrally.org.uk

Free Parking

Members' Advertisements

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 of *RadCom*. Please do not send members' advertisements to Janice Forde in the Advertising Sales Department.

The closing date for copy is the first day of the month prior to publication, eg the deadline for the March issue is 1 February.

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

FOR SALE

ACER 133MHz colour laptop Win95 fully loaded. Modem, CD plus A-drive, nice cond, £150 plus postage. For further details phone 01503 240 432 (Liskeard).
E-mail: g4mpq@diver34.freeserve.co.uk

AERIAL items (at low prices to cover collection from Bradford/Halifax area). 1 unused Cushcraft Skywalker 15m 3-ele beam, as new, with assembly and installation leaflets, £125. 1 telescopic pole (WD style) 30-40ft with accessories, suitable for an AR group, only £25. Harold, G4YRH, 01274 679 597 (Halifax).
E-mail: harold@g4yrh.demon.co.uk

CAPCO Magloop 80-40m, £150. Icom AH2a smartuner, brand new, £250. G-600 heavy duty rotator, £175. Kenwood DRU-1 recording unit, new, £20. Kenwood LF-30A LPF, £30. Yaesu FC-20 remote ATU, new, £75. Capco balun, £15. TS-950SDX front panel, £30. S/manuals DRG-7700, TS-180S, £15, Various speaker mics and headsets, £8 to £15. FT-101ZD fan, £10. Wanted high power ATU, dummy load, SWR, HF amp. 01953 884 305 or 07970 214 039 (Norfolk).

CHELCOM CL-80 vertical DX antennas, £100 each. Four available. Build a 4-square. Discounted £300. Dismantles into 2-metre lengths for easy transport. 01636 830 005.
E-mail: gzeromdz@thersgb.net

CLARK pneumatic pump-up mast 40ft extended. Pump and legs. Buyer collects, £195 ono. G3KWY, QTHR, 01509 829 323 (Loughborough).
E-mail: swain@ntlworld.com

COLLECTION of ex-PMR single and multi-channel radios, some ruggedised, one base station controller for remote landline use (keytone), one 60ft tower, triangular lattice, 3-section, no base mounting/support post. Buyer collects, offers, WHY? Andy Digby, G0JLX, QTHR, 07768 282 880 (Bishops Waltham).
E-mail: andy.digby@mail.com

COLLINS 30L1 linear amp, £500, vgc with man, Collins large and small trims fan motor for 30L1 linear. Call for details, G3GBB, 01379 783 657 (Nr Diss).

CUSHCRAFT MA5B beam with rotor, £220**.** Also Cushcraft R-6000 vertical, brand new, unopened, £220. G0VFX, 01527 837 296 (Bromsgrove)

DISPOSAL of Silent Key equipment, carriage extra at cost but will deliver free within 50 miles of Moffat items over £100. Most items c/w mans, in gwo & appearance. Photographs available (by e-mail) for all items. All sensible offers considered. No time wasters please. Yaesu FT-980 10/160m & gen cov, c/w all filters, £290.Yaesu SP-980 matching spkr & AF filter unit, £55.Yaesu 757AT auto tuner (for FT-980) c/w cables, £95. Yaesu MD-1 desk mic for FT-980, £40, or complete HF station as above, £430. Yaesu FL2100Z linear amp 10/160m 1.2kW PEP, £325, or complete station including linear amp, £750. Yaesu G-600RC rotator c/w ~50m H/D coax, plus 6-way control cable and shack controller, £160. Jaybeam 3-ele trap Yagi 10/15/20m, partially dismantled into car roof-rack-sized components, £90 or complete assembly, rotator plus beam, £225. Kenwood HS-5 headset (8 ohm), £15. Amstrad PCW 8256 computer / word processor c/w VDU, printer & keyboard (buyer must collect), £15. Advance Voltstat const voltage transformer 230V/250W on base c/w 13A skts (heavy - must be collected), £20. Twin PSU 0-10V/30V/0.5A twice, fully metered, £30.
E-mail: gm3oft@care4free.net

FAIRHAVEN RD-500VX wideband rcvr. 0-1750MHz. USB/LSB, AM, sync AM, stereo CW, NBFM/WBFM, stereo FM, TV sound/video. 54,000 memories, remote control, PC software/lead, very good HF/VHF/UHF performer, 3 months old, mint, boxed. See recent full page *RadCom* adverts, £650 ovno. 07764 356 240 (Salisbury).

FREE to collector, quantity of radio and electrical junk. All or nothing, no pick and mix! Terry, GW3NJG, QTHR, 01600 716 470 (Monmouth).
E-mail: telex@consultant.com

FT-100 HF/VHF/UHF. MH-42B hand mic. MD-100 A8X desk mic. 25A power supply. Mint condition mans and boxed, £675. Alan, G4YYD, QTHR, 0161 797 7893 (Bury).

FT-101ZD WARC bands, man, mic and cables. FV-101DM external VFO inc cables and man. MMT-1296 23cm tvtr. FT-790R 70cm multimode tcvr. FL-7010 10W linear for FT-790R. Sensible offers only please. 01207 580 360 (Durham).
E-mail: g3uts@tiscali.co.uk

FT-736R, fitted 2/70/6, good cond, buy for £500 and get BNOS LPM50 10-100 6m linear free (no split). G1INK, 01298 72628 (Buxton).
E-mail: g1ink@aol.com

FT-840 HF tcvr with 20A power supply, FM fitted, mic, h/book, £370. CFA 9-band HF loop, 15m feeder, vgc £130. Collector pay carriage. 17m very low-loss coax, 2m glass fibre mast, £17.50. Collect. 01455 449 602 (Barwell).

HATELY Crossed-Field Antenna type EMDR1B, covers 160-10 including WARC bands, as new, only few months old, cost £275, now £175. 01823 442 477.
E-mail: eddie.hayden@clara.co.uk

HI-MOUND paddle key with WPOCOM iambic keyer. All cables and PSU, ready to go, £50 ono. Still have the ZS HF antenna as *RadCom* July. 10m to 80m. No more time wasters please, £80. Trio SP5D speaker, £20. G4PFR, 01296 623 802 (Wendover).

HYGAIN TH-11, original packing, used for 6 months, stored for 3 years, £800 + p&p. 01473 311 665.

ICOM 735, boxed, £295. Ameriton 811 amp, £375. New spare valves £15 each. MFJ-962C, 1.5kW ATU, £135. DRAE 24A power supply, £50. Datong, auto RF speech processor, £50. Morse keys & dummy load. 01253 865 553 (Blackpool).
E-mail: dave@tiscali.co.uk

ICOM, IC-2KL 500W HF linear, solid-state, AT-500 matching auto tuner, cables for Kenwood, Yaesu, £800 for both units. 0114 255 2893 (Sheffield).
E-mail: g4fal@riverauto.co.uk

KENWOOD TS-440S with intermittent fault, £350 ono. Buyer collect please. G3VN, QTHR, 01883 348 337 (Caterham).

KENWOOD TS-450S HF all-bands tcvr, matching speaker SP-23, hand mic, Kenwood desk mic MC-60, 35A PSU. All good condition with mans. No split, £500, no offers. Ken, G3RFH, 01253 407 952 (Blackpool).
E-mail: g3rfh@fsmail.net

KENWOOD TS-811 70cm all-mode, £500. Icom IC-202 2m SSB/CW, £150. G4FDX, 01590 623 926 (Brockenhurst).
E-mail: g4fdx@insightbb.com

KENWOOD TS-950SD, extra filter, mint cond, £950. Heil headset Proset-4, £75 inc ADI-K. Watson tri-band colinear 6-2-70, new, £45. Icom SP-21, £20. Kenwood SP-950, £40. Kenwood MC-90 desk mic, £65. Yaesu G10005 rotator H/D, £150. KR-400 rotator, £60. Versatower 60ft 3-section, complete with head unit, £400. Tennamast 40ft wall-mounted, £95. Versatower 60ft , 3 sections & ground post, £275. TR-10, TS120V, & VFO, £100. 01771 644 729 (Aberdeenshire).
E-mail: gm4vhu@aol.com

MFJ 422B-X electronic keyer, h/book, new, to fit on BY-1 bencher paddle, £50. Suitable BY-1 paddle, £50. ZX GP3 vertical 20-15-10m, new, £50. 100dB LPF 50ohm, £15. Linear amplifier, mains, 250W output 160-80-40-20-15-10, passive grid, heavy, £45. Hansen SWR bridge two meters 50 or 75 ohm switchable, £15. Six metre 3-ele beam, £15. Six metre end-fed half wave, £10. Vibroplex presentation set, 3 different weights, carrying case, offers? G3JFC, QTHR, 01529 413 547 (Sleaford).

MFJ-269 antenna analyser used once, absolute bargain, no offers, £300. Call Alan, G7CDK, 01763 262 443 (Royston).
E-mail: alan.florence@tinyonline.co.uk

MFJ-931 artificial earth, £50. Kenwood MC-60A cardioid dynamic desk mic, £50. All vgc. Buyer collects or pays carriage. Barry, GM4GIF, 01436 678 646 (Helensburgh).

NEW Alinco DX70-TH HF + 50MHz 100W. New Palstar PS 30M PSU available if required, both unwanted gifts. Sensible offers to Charlie, 01938 552 059 (Welshpool).

PORTABLE mast, three 12ft aluminium poles, two joining sleeves, baseplate, rotating ring with guys and steel stakes, £40. 01453 833 008 (Nailsworth).
E-mail: mike@g3wmq.freeserve.co.uk

QRP Outfit, Lake DTR3-5 and matching/SWR, fitted additional CW filter, £100 and £70 respectively, both vgc. Keith, G4ZTZ, QTHR, 07855 647 150 (Cambridge).
E-mail: taylor_k_m@hotmail.com

R206, drum dial, PSU, LF adapter, £60. 3 command rcvr, £10 each. Marconi Electra rcvr, £40. CR100/B28, £20. R216 vgc AC PSU, £100. Collect only. PRC 316/A16, £65. G4FUY, QTHR, 0118 973 3633 (Reading).
E-mail: fredab61@hotmail.com

SHACK clearance FT-480 tcvr 2m all-mode, mic, £100. Icom U-101 UHF 12 ch fxg brackets, box, man, mic, £80. HF ATU 1.5K H/B steel case, works well, looks good, £65. Audio notch filter, £18. NiCad charger, 7.2V (h/h), drains/charges automatically, £15. WD 2m tx Xtals for 5 freq (used for packet), £15. Signal source, 8MHz, £5. *RadCom* and *PW* complete 1994-99, £10. Xpelair extractor, new, boxed, unused, £40. Callers only, Derek, G0OEW, 01270 668 111 (Nantwich).

SILENT key disposal. Kenwood dynamic mic MC-30S (MC-35S), £15. Kenwood h/phones HS-5, £15. Kenwood HF SSB tcvr TS-830S, £323. Kenwood comms rcvr R-600, £300. Yaesu comms rcvr FRG-9600, £220. Kenwood antenna tuner AT-230, £75. Kenwood dip meter DM-81, £20. Total £970, but would accept £850 ono for the complete lot. Enquiries to R Herman, Gable Cottage, 47 Shaw Hill, Melksham, Wilts SN12 8EY.

SILENT key sale (G3EDW). Kenwood R-1000 rcvr, £165. Eddystone EC10 rcvr, £85. Heathkit SB-300 rcvr minus AM filter, £20. MFJ-269 SWR analyser, £110. MFJ-949 ATU, £75. Heathkit HO-13 Ham-Scan, £20. Katsumi EK-9X keyer, £20. Vibroplex

CONGRATULATIONS

to the following whom our records show as having reached 50 or 60 years' continuous RSGB membership this month:

50 years		*60 years*	
G3EHP	Mr J Wilmot	G3ALK	Mr E J Holmes
G3HBW	Mr A L Mynett		
G3HHD	Mr T J Hayward		
G3IGU	Mr K H Coates		
G4DMP	Mr D M Pratt		
GM3NYG	Miss J G Fish		

key, £50. Standard key, £5. Microwave Modules 6-digit counter, £10. Akigawa LP-30 LPFs (2), £5 each. Alpha Delta 'Delta C' dipole centre insulator, £5. Marconi TF-2600 VVM, £15. Elektor capacitance meter, £10. Following need attention: Scopex 4D-10A scope, £5. Racal 9822 counters (2), £5 each, Icon Design programmable counter, £5. G3USC, QTHR, 01458 241 584 (Langport).
E-mail: m_a_hall@talk21.com

SILENT key sale (G3FNJ). Tower, beam, main cable, motor and guys. Heathkit 102, linear amps, 2m h/held, Collins, mics, Morse keys, many valves and meters and other small items. Too many items to price, phone for details. House callers welcome. Phone Richard Joly on 020 8866 4680 eves.

SILENT key sale. FT-747GX, new, boxed, unused, £395. TS-440S, mic, man, £370. FT-7B boxed, man, £90. FT-221R, mic, man with 40W Sentinel PA, £265. T599, R599, S599 matching speaker, £145. Class D wavemeter, £20. AR300XL rotator, boxed, unused, £45. Phihong PP1205GS 13.8V PSU, £15. Freemark Electronics 13.8V, 10A PSU, £20. Telequipment Serviscope S51B, £15. BC221-AC, charts, PSU, man, £22. HFC 600MHz frequency counter instructions, £15. FX1 Mizuho absorption wavemeter, boxed, instructions, £25. Tandy Micronta transistor tester 22-024, £15. Datong FL3 multimode audio and notch filter, £45. Welz 300W dummy load, boxed, £45. IC-22A mic bracket, 18 channels, £55. Drae 24A, 13.8V PSU, £60. Amtech 200 ATU with SMC T3-170L twin meter SWR bridge, £25. 4 boxed 6146 valves, 2 boxed 12BY7A valves, cond unknown, £20 the lot. Many other items inc speakers, cables, connectors, components from shack clearance. For details contact Colin, G4IER, QTHR, 01993 832 135 (Chipping Norton).
E-mail: colbeck@ukgateway.net

SILENT key sale. Yaesu boxed FT-847, £695. FT-707, £150. FT-290R with mobile mount and case, £50. Rexon RL-501 dual-band h/held, £75. MFJ-864 HF/VHF/UHF wattmeter, £50. SEM Transmatch, £50. AR1002 rotator, £20. Sharman Lab PSU 5 to 15V @ 10A with V/I meters, £50. PK88 TNC, offers? SOTA 2m linear amplifier, £50. All items ono and believed to be gwo, but without guarantee. Carriage extra. André, GM3VLB, QTHR, 01573 224664. E-mail 5z4kl@ukonline.co.uk

SPACIOUS detached 2-bedroom luxury house, Cromer, Norfolk. Set almost in the town centre of this delightful seaside town, only 100 yards to train and bus stations, 200 yards to town centre and 100 yards to sea front, yet totally private without close neighbours. With my G5RV and 400W on any band, there is no TV interference with adjacent properties. Comprising porch, freezer room, hallway, kitchen, laundry room, cloakroom, dining room, lounge and conservatory on the ground floor and 2 large double bedrooms, bathroom, landing, glory hole and small loft with foldaway ladder access. Set in a large plot, 105ft x 80ft approx, with garage (currently workshop) and car port. Extensive gardens laid to lawn, well stocked borders, 3 patios, fruit and vegetable garden and greenhouse and garden shed with power. Offers over £225,000. 01263 511 000 (Cromer).
E-mail: david@m0cnp.fsnet.co.uk

STABILOCK 4031 radiocomms test set, £1100. HP8903B audio analyser, £250. HP339A distortion meter, £300. HP4815A vector impedance meter, £150. 07973 502 741 (Ely).
E-mail: john@g4fit.com

STABILOCK 4040 radiocomms test set, vgc with man, £380. HP-339A distortion meter, vgc, £250. HP8901A modulation analyser, the ultimate mod meter, £400. Marconi 2305 mod meter, £200. Marconi Q-meter with oscillators, £100. 110MHz network analyser system (HP-8407A etc), £250. W&G SPM-3 measuring rcvr, 2kHz-612kHz, ideal LF rcvr, £40. 20V/10A variable bench PSU, £40. 07973 502 741 (Ely).
E-mail: john@g4fit.com

STRUMECH Versatower BP-40 model in excellent condition, dismantled and ready for inspection and collection. Also Yaesu G-800 SDX rotator, F6GFL mini-beam & Cushcraft 5-ele 6m beam. Everything with instruction mans. Offers? M0AGI, 01395 267 957 (Exmouth).
E-mail: geoff@m0agi.fsnet.co.uk

TONO θ-9000 in excellent working order. Receives and transmits CW, ASCII, RTTY, several speeds, many memories, even teaches you CW. Includes monitor + man, £120. Chris, G4ILR, QTHR, 01603 736 147 (Norwich).
E-mail: chris.judi@virgin.net

TOWER, 40ft, 2-section, c/w base post, wind-up, tiltover, no rust, rotator + controller, head unit, winches etc, vgc, £200. 01438 232 482.

TRIO TS-180S 160-10m, VFO-180, SGC-230 Smartuner, Lowe power pack EP925, exc performer. Buyer inspects & collects. Job lot, £550. 01952 251 478 (Wellington).

TRIO TS-940S tcvr, gwo, narrow CW filter, man, auto ATU, £400 ono. G3EDS, QTHR, 01386 47457 (Evesham).
E-mail: ken.sarnen@talk21.com

YAESU FT-1000MP boxed with man, £1350. Ameritron AL-811 amplifier 750W with box, £250. MFJ Versatuner tuner III 1.5kW model 962D, £180. MFJ HF-VHF SWR analyser model 259B, £190. Welz SP 1-5m SWR meter, £45. Nissei RS-101 SWR meter, £45. SWR pwr meter with loading coils and impedance and Optoeletronics handi-counter 9VDC, £150. Communications SRX100, £40. Loadstar freq counter FC-5250C, £40. Oscilloscope OS502RD 20MHz x 2. MFJ low pass filter 704. Universal AVO meters x 2, plus much more. There is a rotator, antennas, Morse keys & lots of components. Please feel free to call me. Keith, 01543 466 746

YAESU FT-1000MP Mk-V with FH1 remote keypad, less than two hours' use, brand new, £2200. Colin, G3TA, QTHR. 01285 821 571 (Cirencester).

YAESU FT-290R MkII, immaculate cond, charger, new NiCads, h/book and leather case, boxed, £230. Kenwood MC-60 desk mic, exc cond, £70. George, 01443 437 345 (Mid Glamorgan).

YAESU FT-757GX, gwo, fair condition with only minor scratches on facia panel, £200. 01563 534 383 (Kilmarnock).
E-mail: len_paget@hotmail.com

YAESU FT-840 with CW filter. Yaesu FT-2500M mobile 2m FM tcvr, both very little used. 0191 290 1757 (Tyne & Wear).
E-mail: t.lambert@virgin.net

YAESU HF line-up FT-77, FC-700, FP-700, desk mic, YM38, £300. Tokyo HL-30V 70cm linear, £15. Kenwood TH-75E dual-band h/held spkr mic, NiCads, £80. Altron tiltover slimline mast soil-post mounted, 15ft retracted head cage, rotator, top bearing, £200. All plus postage etc. 0121 603 2735 (West Midlands).
E-mail: dmb.31@virgin.net

YAESU VXR-RS USA model, 115V charger, includes spkr mic and ant adapter. As new, boxed, £200. G3IZD, 01229 828 572 (Barrow).
E-mail: g3izd@davies.net1.co.uk

YAESU YO-801multiscope in gwo. This is a now very rare item to go with FT-101ZD. Best sensible offer within 10 days of this advert appearing will secure. Regret buyer must collect by appointment as heavy item and I am unable to pack. MFJ-931 artificial earth, £30 plus carriage. G3ADZ, QTHR, 01394 275 820 (Suffolk).
E-mail: g3adz@dhaylock.fsnet.co.uk

SILENT KEYS

WE REGRET to record the passing of the following radio amateurs:

3DA0AB	Mr R H Bird	12/01
G0FBU	Mr W B Hedley	09/01
G0FOR	Mr J A Dodds	
G0KCJ	Mr A L R Johnson	09/01
G0KJW	Mr E Brown	07/02
G0LZR	Mr D G Griffiths	
G0SCD	Mr V G Clarke	
G0TYV	Mr W E Jones	29/06/02
G0UZQ	Mr P A V Saunders	14/06/02
G1XJH	Mr P Cox	
G2JL	Mr R V Allbright	23/06/02
G3AOV	Mr R T Foster	18/07/02
G3AYS	Mr R A Watson	24/06/02
G3KSH	Mr A Gilding	16/07/02
G3NBR	Mr R Ashby	18/06/02
G3NZU	Mr B Gilbert	22/06/02
G3RIS	Mr F W Nash	04/02
G3UUS	Mr G Packer	17/01/02
G3YIU	Mr K R Bassett	14/07/02
G3ZDO	Mr G P Walker	18/02/02
G4BNH	Mr F Hogg	07/07/02
G4IKD	Mr C F Pinder	
G5VQ	Mr E W Taylor	15/01/02
G7AOW	Mr U Siebert	23/03/02
G8BYH	Mr N Berry	
G8ZLG	Mr R E Green	10/05/02
GD4IHB	Mr J Whitmore	23/05/02
GM0LYM	Mr A G Donaldson	20/05/02
GM3OJC	Mr W Whyte	10/01/02
GM7IZO	Mr D Meek	
GW3LFC	Mr R Copestake	24/07/02
RS18588	Mr E Pringle	10/07/02
RS33128	Mr G H Tallis	11/07/02
RS176038	Mr A J Spayne	
ZB2IB	Mr W Guerrero	26/06/02

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.

RSGB MEMBERS' ADS ORDER FORM

Application form for one For Sale, Exchange or Wanted advertisement. Do not mix classifications on this form; separate applications must be made.

Please ensure you read and understand the conditions of acceptance of these subsidised Members' Advertisements, printed at the top of the Members' Ads page of the current *RadCom*.

FOR SALE ☐
EXCHANGE ☐
WANTED ☐
Tick one box

I enclose a cheque/PO for £ ..... or please charge to my credit account below

CARD No EXPIRY DATE

Issue No (Switch only) . . . . . .

Signed: . . . . . *Date:* . . . . . .

FREE ENTRIES TOWN PHONE E-MAIL

RATES: UP TO 20 WORDS £5.50; 21-40, £6.50; 41-60, £7.50

WANTED

EARLY crystal and valve wireless wanted; anything to do with early wireless is of great interest, especially Marconi items. Also looking for top-end valve comms rcvrs and early AM transmitters by Johnson, Hallicrafters and other US makers. G4ERU, QTHR, 01202 510 400 (Bournemouth).

ADVANCE valve audio signal generator. Also man (or copy) for Solartron oscilloscope type CD-814. GM4LPJ, QTHR, 01387 376 253.

DISABLED fan of old days seeks QSL cards, log books etc of that era. Also British magazines pre-1970, *CQ* pre-1975 & *QST* pre-1951. Mike, 8 Windsor Road, Reydon, Southwold, Suffolk IP18 6PQ.

ICOM 756 PRO or PROII. CW filter & 2.4kHz SSB filter for TS-120. Colin, G3TA, QTHR, 01285 821 571 (Cirencester).

LATTICE tiltover sectional tower required with short sections and hand winch rising to 40/50ft. Required for trailer mounting. 01206 240 452 (Colchester).

RACAL items wanted: TA-944 HF linear amplifier (any suffix), 12V input PSU for Syncal, Comcal manpack, Syncal 2000. Also Yaesu FT-70G accessories. John, 01963 240 319 (Castle Cary).

SILENT key clearout or just not needed, I collect QSL cards for their historic interest and a research project, especially from periods before 1970. Can collect or arrange collection. 0113 269 3892 (Leeds). E-mail: g4uzn@qsl.net

SPY radio sets from any period or origin wanted by private collector. WWII suitcase sets are of special interest. 020 8505 0838 (London).

TENNAMAST or similar free standing, 30 to 40ft. Nigel, M0NIG, 01832 732 846 (Northants).

YAESU CPU 2500 2m FM tcvr, Heathkit HW-101 HF tcvr. Ten-Tec Argosy HF tcvr. G4OWY, 01305 777 691 after 6.30pm please (Weymouth).
E-mail: g4owy@aol.com

YAESU G-600RC controller (or similar) for G-600 rotator. G3JAU, QTHR, 01202 514 078 (Bournemouth).

YAESU MD-1 mic from non-smoker, in reasonable condition, must be in fully working condition. Andy Digby, G0JLX, QTHR, 07768 282 880 (Bishops Waltham).
E-mail: andy.digby@mail.com

Rallies & Events

1 SEPTEMBER 2002

ANDOVER ARC Radio & Computer Boot Sale - Middle Wallop airfield, on A343 between Andover and Salisbury. Access via 'Museum of Army Flying'. OT 10am, TI on S22. E-mail aracnews@ntlworld.com [www.arac.co.uk]

MID-SUSSEX ARS Amateur Radio & Computer Car Boot Sale - Marle Place, Burgess Hill. OT 10am. [www.msars.co.uk]

TELFORD & DARS Rally - Aerospace Museum, RAF Cosford, nr Wolverhampton, on A41 1 mile south of jn3 of M54. Admission free. TS, CBS, FM, DF, C, MT, FAM, CP free. TI on 2m and 70cm. 01952 299 677 or e-mail mstreet@g3jkx.freeserve.co.uk [www.telfordrally.org.uk]

7 SEPTEMBER 2002

WATERS & STANTON @ LOWE Open Day - Bentley Bridge, Chesterfield Road, Matlock. 01629 582 380.

8 SEPTEMBER 2002

LINCOLN SWC Hamfest - Lincolnshire Showground on A15, 5 miles north of Lincoln. OT 10.30am, £2, under-14s free. CP free, TI on 2m, CS by arrangement, C, TS, B&B, FM. Dave, 01522 878 481 or 07961 961 494.

SUFFOLK DATA GROUP Rally & Surplus Sale (Five Ss Rally) - Raceway Centre Green, Foxhall Stadium, nr Ipswich. OT 9.30am, £1. CBS, CP free, C, TI on S22. Peter, G8HUE, 01473 631 313. [www.antrina.net/hamradio/sdg-rally-2002-info.htm]

14 / 15 SEPTEMBER 2002

TRANSMISSION 2002 - 10th annual event to raise money for British Wireless for the Blind Fund. John 01634 832 501.

15 SEPTEMBER 2002

BARRY ARS Welsh Amateur Radio Show - Memorial Hall, Barry. George, GW0PUP, 029 2083 2253.

CRAWLEY ARC Microwave Round Table - details TBA.

WATERSIDE (New Forest) ARS Radio & Computer Rally - Applemore College, nr Hythe, Hants. OT 10am, £2. CP free, TI on 2m, TS, C, SIG. Bill, G0XAZ, 023 8078 3170, or bill.simmons@southernwater.co.uk

20 / 21 SEPTEMBER 2002

LEICESTER Amateur Radio Show – Donington International Centre, Castle Donington, Leics. Geoff, G4AFJ, 01455 823 344, fax 01455 828 273 or g4afj@argonet.co.uk

29 SEPTEMBER 2002

BELGIUM Amateur Radio & Computer Rally - Hall 'la Louvière Expo', direct from motorway, 50km south of Brussels. OT 9am. TI on 145.600 and 430.325MHz, TS, FM. Michel, ON7FI, 0032 64 849 596.

4 - 6 OCTOBER 2002

WACRAL CONFERENCE and AGM 2002 - Torquay. Christian and radio activities are planned. Construction competition, TS, MT. Non-members welcome to attend by arrangement with the organiser Geoff, G4YJW, 01323 721 352 or geoff@g4yjw.freeserve.co.uk who can supply all the details.

6 OCTOBER 2002

GREAT LUMLEY AR & ES Rally - Great Lumley Community Centre, Front Street, Great Lumley, nr Chester-le-Street, just off the A1(M). OT 10.30am, £1 (accompanied under-14s free). TI on S22, TS, B&B, SIG, C, DF, CP free, model aircraft, satellite & component stalls. Nancy, 0191 477 0036 (H) or 07990 760 920 or e-mail nancybone2001@yahoo.co.uk

HORNSEA ARC Annual Rally - Floral Hall, Hornsea, E Yorkshire. OT 10.30am. G4YTV, QTHR, 01964 562 498 or g4ytv@aol.com

MANSFIELD ARS Radio, Computer & Electronics Rally - Intake Leisure Club, Kirkland Avenue, Mansfield. OT 10am, TI on S22. David, G0RDP, 01623 631 931 or mail@davidg0rdp.vispa.com

11 - 13 OCTOBER 2002

RSGB International HF & IOTA Convention HFC 2002 - Savill Court Hotel, Egham, Surrey. RSGB 0870 904 7373. [www.rsgb.org/hfc/]

13 OCTOBER 2002

NORTH WAKEFIELD RC Radio Rally & Computer Fair - Outwood Grange Secondary School, Potovens Lane, Outwood, Wakefield, W Yorkshire. Follow signs from M1 jn 41. CP free, TS, SIG, B&B, C. 01924 824 451. [www.nwrc.org]

19 OCTOBER 2002

WATERS & STANTON @ JAYCEE Open Day - 20 Woodside Way, Glenrothes, Fife. 01592 756 962.

20 OCTOBER 2002

BLACKWOOD & DARS Radio, Computer & Electronics Rally - Newport Centre, Newport, 1 mile from jn 25A of M4. OT 10.30/10.45am, £1.50. CP free, B&B, TI, TS, SIG, LB, C, DF, WIN, LEC. George, 01495 724 942 or Dave, GW4HBK, 01495 228 516.

26 OCTOBER 2002

CARRICKFERGUS ARG Rally - Downshire School, Downshire Road, Co Antrim. OT 12 noon. C. Billy, MI0CZF.

27 OCTOBER 2002

GALASHIELS & DARS Annual Rally - The Volunteer Hall, St John's Street, Galashiels. OT 10.45/11am. TS, B&B C. Jim, GM7LUN, 01896 850 245 or gm7lun@qsl.net

2 NOVEMBER 2002

RAEN Annual General Meeting - National Space Centre, Leicester. Details from g_griffiths@compuserve.com

2 / 3 NOVEMBER 2002

16th NORTH WALES RADIO & ELECTRONICS SHOW - North Wales Conference Centre, Llandudno. OT 10am, £2, accompanied under-14s free. Clubroom, B&B. Muriel, GW7NFY, tel/fax: 01745 591 704.

3 NOVEMBER 2002

NORTH DEVON RADIO RALLY - Holsworthy Memorial Hall. OT 10am. B&B, etc. G8MXI, QTHR, 01409 241 202.

10 NOVEMBER 2002

12th GREAT NORTHERN HAMFEST - Metrodome Leisure Centre, Queen's Road, Barnsley, less than 2 miles from M1 jn 37, and 5 minutes' walk from train and bus stations. Follow the brown 'Metrodome' signs from all directions. OT 10am, £2.50. DF, TS, SIG, B&B, TI via GB3NA on 145.675MHz. Ernie, G4LUE, 01226 716 339 or 07787 546 515 (6pm - 8pm) or e-mail ernest.bailey1@virgin.net

17 NOVEMBER 2002

COULSDON ATS CATS Bazaar - 4th Purley Scout HQ, Lion Green Road, Coulsdon. OT 10am. Andy, G0KZT, 01737 552 139 or andyg0kzt@hotmail.com

MIDLAND AMATEUR RADIO SOCIETY Radio & Computer Rally - King Edward's Grammar Camp Hill School, Vicarage Road, King's Heath, jn A4040 & B4122. OT 10am, £1. TS, Clubs, SIG, CP free, C, B&B. Peter, G6DRN, 0121 443 1189.

23 / 24 NOVEMBER 2002

LONDON COMMUNICATION & COMPUTER SHOW - New venue - Wodson Park, Ware, Herts. RadioSport 01923 893 929. [www.radiosport.co.uk]

30 NOVEMBER 2002

ROCHDALE & DARS Traditional Radio Rally - St Vincent de Paul Catholic Church Hall, Caldershaw Road, off the A680 Edenfield Road, about 2 miles west of Rochdale. This is a **Saturday** rally! Follow orange arrows from M62 jn 20. OT 10.15/10.30am, £1. TI on S22, CP free, TS, B&B, C. John, G7OAI, 01706 376 204 (eve) or radars@mbc.co.uk

1 DECEMBER 2002

BISHOP AUCKLAND RAC Rally - Mark, G0GFG, 01388 745 353 or Brian, G7OCK, 01388 762 678.

8 DECEMBER 2002

WEST MANCHESTER RADIO CLUB Red Rose Radio Rally - Stephen, G6BVN, 01942 888 900.

26 JANUARY 2003

OLDHAM ARC Rally - Steve or Hazel, 01706 848 092 or m5aeg@btinternet.com [www.oarc.zen.co.uk]

8 JUNE 2003

SPALDING & DARS Annual Rally - Ray, M0CTM, 01775 711 953, or John, G4NBR, 07946 302 815. [www.sdars.org.uk]

15 JUNE 2003

NEWBURY & DARS Amateur Radio Boot Sale - [www.nadars.org.uk]

22 JUNE 2003

EPSOM RADIO & ELECTRONICS FAIR - Paul, M0CJX, m0cjx@lineone.net [www.epsomrally.co.uk]

KEY ***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.

Will organisers of special event stations please ensure that they lodge plenty of envelopes with their sub-managers?

1 Sep	GB2SC: Sea Cadets. Taplow, Bucks. LH27 (G0FFL)
2 Sep	GB2BOB: Battle of Britain. Rochester, Kent. TLH2 (G4EVY)
6 Sep	GB0RAF: Royal Air Force. South Carlton, Lincolnshire. LH (M0CBN) GB4DET: Detling Show. Detling, Kent. TL (G0NEE)
7 Sep	GB0WMF: Winscombe Michaelmas Fair. Winscombe, North Somerset. LH27 (G3YOL) GB2BPM: Big Pit Mine. Blaenavon, Gwent. LH2 (G4KJV) GB2LL: Langford Lodge. Crumlin, Co.Antrim. LHV2 (GI0OUM)
8 Sep	GB0RID: Ridgewell War Time call sign. Ridgewell, Essex. L (G3MMA)
13 Sep	GB4HRC: Highfields Radio Club. Heath, Cardiff. LH27 (GW0WHT)
14 Sep	GB0BSR: Bedfordshire Steam Rally. Biggleswade, Beds. TLHV27P (M0AZZ) GB2CCC: Christ Church Cathedral. Oxford. L27 (G3NGX) GB4WFC: World Friendship Challenge. E. Sussex. LHP (M0CHW) GB5SH: St. Hilda. Hartlepool. LH2 (G3NUA)
15 Sep	GB2MRL: Museum of Rural Life. Milton Keynes, MK12 5EL. LH (M0BUP)
19 Sep	GB0RAF: Royal Air Force. Donnington Park, Leics. LH2 (M0CBN)
20 Sep	GB4ATC: Air Training Corps. Donningotn Park, Derby. LHV27P (M5EHG) GB4ROC: Royal Observer Corps. Abingdon, Oxon. LV2 (M0BRE)
28 Sep	GB2SOB: Sirloin of Beef. Preston, Lancs. TLH27 (G3UCA)

Club & Regional NEWS

Region 1: Scotland West & the Western Isles

No club details received.

Region 2: Scotland East & the Highlands

COCKENZIE & PORT SETON ARC
27, 144MHz DF hunt. Bob, GM4UYZ, 01875 811723.

Region 3: North West

FYLDE ARS
26, Visit and talk by Peter Kirby, G0TWW, General Manager RSGB. Ken, G3RFH, 01253 407952.

RUNCORN & WIDNES ARC
6, Enrolment for RAE / Novice Courses. Dave, G7OBW, 01270 761608.

SOUTHPORT & DARS
16, Changes in amateur radio over past 30 years, Mike Nolan. Don, M1BUL, 01704 227726.

THORNTON CLEVELEYS ARS
2, Contests, G8KBH. 9, Talk by G4FXG. 16, Construction contest hosted by G4EZM. 23, Auction / bring & buy. 30, Computer night. Jack, G4BFH, e-mail: jack@jduddington.fsnet.co.uk

Region 4: North East

GOOLE R & ES
6, Fund raising at Black Swan. 29, AGM at Courtyard Centre. Richard, G0GLZ, 07867 862169.

GRIMSBY ARS
5, HF night. Brian, G4DXB, 01472 231383.

HALIFAX & DARS
17, AGM. R E Nolson, G0PMU, 01274 600297.

HORNSEA ARS
4, Antenna workshop at Bweholme. 11, Slide show. 18, Vintage farm machinery. 25, 'Foxhunt'. Andy, G0VRM, 01482 643660.

KEIGHLEY ARS
1, On air, G0KRS. Ian, M1BGY, 01274 723951.

YORK RADIO CLUB
5, Kit construction evening. 12, Technical questions for newcomers. 19, Junk sale. Gareth Foster, G1DRG, g1drg@arrl.net

Region 5: West Midlands

GLOUCESTER AR & ES
2, AGM. 9, Workshop, on air. 16, Antenna experiment. 23, Workshop, on air. Tony, 01452 618930 office hours.

KIDDERMINSTER & DARS
3, AGM. Tony, G1OZB, 01299 400172.

MID-WARWICKSHIRE ARS
10, 'DRM' (digital radio), Ken, G7RYO. 24, History of Coventry's machine tool industry, Arthur Astrop. Bernard, M1AUK, 01926 420913.

STRATFORD UPON AVON & DRS
9, Open evening. 23, Raynet, Bill, G3TZM. Ron, 01789 267430

TELFORD & DARS
4, Open evening, on air. Mike, G3JKX, 01952 299677.

Region 6: North Wales

DRAGON ARC
2, Model radio control, John Richards, GW0AQR. 16, Caernarfon sailors, Meirion Hughes. Stewart, GW0ETF, 01248 362229.

Region 7: South Wales

BARRY ARS
3, Quiz, Glyn, GW0ANA. 10, Planning for club rally. 15, Welsh Amateur Radio Show. 17, Annual dinner. 24, Open forum. Richard, GW4BVJ, 01656 658830.

HIGHFIELD ARC
6, Amateur Radio Observation Service, Barry Scarisbrick, G4ACK. Steve, GW6CUR, tel: 029 20634613.

Region 8: Northern Ireland

BANGOR & DARS
4, AGM - visitors and new members most welcome. Mike, GI4XSF, 028 42772383.

Region 9: London & Thames Valley

AYLESBURY VALE RS
11, On air, discussion evening. Roger, G3MEH, 01442 826651 or g3meh@supanet.com

CHESHAM & DARS
4, General Meeting. 11, On air. Terry,terence.thirlwell@eds.com

CHESHUNT & DARC
4, Members' forum. 18, 'Auntie & The Pop Pirates', John, G3WFM. Jim, G0JXN, 01992 468204.

COULSDON ATS
9, Weather Station Construction, part 2. Steve, G7SYO, 01737 354271.

CRYSTAL PALACE R & EC
6, Morse instruction. 20 *I-Link*, G4CDY. Bob, G3OOU, 01737 552170 or Victor, 020 86532946.

EDGWARE & DARS
21, Demo at Gayton Library, Harrow. 26, Stereo Lithography, John, G3SJE. David, G5HY, 01923 655284 (days) / 020 89549180 (eve).

MAIDENHEAD & DARC
5, Tribulations of an RSGB newsreader. 17, Tuned loops and other small antennas, Mike, G3LHZ. John, G3TWG, 01628 525275.

NEWBURY & DARS
18, Committee Meeting. Mark, M0CUK, 01635 36444.

READING & DARC
12, 'Nikola Tesla, Forgotten Father of Radio', Nick Field. Pete, G8FRC, 01189 695697.

RS OF HARROW
1, GB2DHH operating day. Jim, G0AOT, 01895 476 933 or 020 7278 6421.

SILVERTHORN RC
6, First meeting of autumn. 20, Junk sale. 27, On air. David, G0KHC, 020 8504 2831.

SURREY RCC
2, History of the airship, G3KQR. Ray, G4FFY, 020 8644 7589.

VERULAM ARC
23, Great ERG Race. Walter, G3PMF, 01923 262180.

Region 10: South & South East

BASINGSTOKE ARC
2, TBA. 21 / 22, 'Foxhunt' New Forest weekend, Janet, G6JDP; Clive, G4ODM; Paul, G0VVM, Peter, M1DGQ, 0118 983 6545.

CRAWLEY RC
25, Trans-Atlantic on LF, by Peter Dodd, G3LDO. Derek Atter G3GRO 01293 520 424.

CROWBOROUGH & DARS
2, Open forum: the future. Eric, G3TXZ, 01892 654633.

FAREHAM & DISTRICT ARS
4, On air. 11, Junk sale. 18, Baluns, Andrew, G0AMS. 25, PSK demo, the latest techniques using DSP, Mick G4ITF. Steve, G7HEP, 01329 663673.

FARNBOROUGH & DRS
11, The German amateur radio system, Bernd, M0COH. 25, The Microwave Group, Lehane, G8KMH. Norman, G0VYR, 01483 835320.

HASTINGS ELECTRONICS & RADIO CLUB
18, Bring your thing. R C Gornall, G7DME, 01424 444466.

HORNDEAN & DARC
5, Club social. 26, Club members' 10-minute talks. Stuart, G0FYX, 023 92472846.

HORSHAM ARC
5, HARC CARC challenge. David, G4JHI, 01403 252221.

ITCHEN VALLEY RC
13, Digital TV, Vic Hemmings. 28, Foundation Licence Course Part 1. Mike, G6AIQ, mamjh@yahoo.com

MID SUSSEX ARS
1, Car boot sale. 6, Wire antennas, Chris, G0GMC. 13, DX, Chris, G4ZCS. 27, Shack ops and table top sale. Geoff, G6MJW, 01273 845103.

OXFORD & DARS
12, 'Global Positioning Systems', Mike Stevens, G8CUL. 26, History of the Oxford & DARS, Paul Goodhall, M3JFM. Dave, G3BLS, 01865 247311.

SOUTHDOWN ARS
2, Magnetic loop aerials and antennas, Prof Mike Underhill, G3LHZ. John, G3DQY, 01424 414319.

SWINDON & DARC
5, 144MHz Trophy contest preparation. 12, 'Power Line Data Transmission', Peter Chadwick, G3RZP. 26, 'Radio Astronomy, A Beginner's View', Brian Coleman, G4NNS. Den, M0ACM, 01793 822705.

TROWBRIDGE & DARC
4, 'The Ubiquitous PIC', Des, G8FIF, of Microchip. Ian, G0GRI, 01225 864698 eves/w/ends.

WORTHING & DARC
4, Talk by M0DTB. 11, Current topics discussion. 18, Construction contest. 25, On air. Roy, G4GPX, 01903 753893.

Region	RSGB Regional Manager
1. Scotland West & Western Isles	Gordon Hunter, GM3ULP
2. Scotland East & the Highlands	Billy Jenkins, MM0WKJ
3. North West	Kath Wilson, M1CNY / M3CNY
4. North East	Geoff Darby, G7GJU / M3GJU
5. West Midlands	Roy Clarke, G8AYD / M0RLY
6. North Wales	Liz Cabban, GW0ETU
7. South Wales	Simon Lloyd Hughes, GW0NVN
8. Northern Ireland	Jeff Smith, MI0AEX
9. London & Thames Valley	Alan Ross, G1SQB
10. South & South East	Ivan Rosevear, G3GKC
11. South West & Channel Islands	Dick Atterbury, G4NQI
12. East & East Anglia	Malcolm Salmon, G3XVV
13. East Midlands	Bryn Llewellyn, G4DEZ

RSGB Regional Managers as of 8 August 2002.

Region 11: South West & Channel Islands

APPLEDORE & DARC

16, Club quiz, set by Dave. Brian, M0BRB, 01237 473251.

BRISTOL RSGB GROUP

30, 'Backyard Antennas', Peter Dodd, G3LDO. Martyn, G3RFX, 0117 9736419.

CORNISH RAC

5, General meeting. 9, Computer section, pathology, John. John G4LJY, 01872 863849.

EXMOUTH ARC

11, Members' forum. Mike, G1GZG, 01395 274172.

JERSEY ARS

13, Amateur Radio Observation Service, Barry Scarisbrick, G4ACK. Anne, MJ0BJU, 01534 734948.

SOUTH BRISTOL ARC

4, How to construct a wavemeter. 11, Satellite radio explained. 18, Annual 'foxhunt'. 25, Soldering iron evening. Len, G4RZY, 01275 834282.

TORBAY ARS

20, Talk by George Williams, his walk around Britain. Walt, G3HTX, 01803 663200.

WEST SOMERSET ARC

3, Junk sale. Jean, G0SZO, 01984 633060.

YEOVIL ARC

5, 'A Backyard Foundry', G1PZK. 12, 'The Collapse of the 1500ft Emley Moor TV Mast', G3GC. 19, Quiz. 26, On air. Derek, M1WOB, 01935 414452.

Region 12: East & East Anglia

BRAINTREE & DARS

1, Frequency measurement. John, M5AJB, 01787 460 947.

BROMLEY & DARS

17, *I-Link*. Alan, G0TLK, alangm4@clara.net

CHELMSFORD ARS

3, Amateur Radio Observation Service, Barry Scarisbrick, G4ACK. David Bradley, M0BQC, 01245 602838.

HARWICH ARIG

11, 'A Journey to the Roof of the World', Alan Hardy. Eugene, G4FTP, 01206 826633.

IPSWICH RADIO CLUB

4, Intra-club quiz vs Leiston Radio Club. 18, Club net and activity from Otley. Keith, G7CIY, 01394 420226.

LEISTON ARC

3, 'The Science of Secrecy', Jonathan, G0DVJ. Paul, M3MIG & Diana, M3VDT, 01728 746044, m3mig@aol.com

NORFOLK ARC

4, Back to basics: mini talks by members. 11, Club dinner. 18, DIY aerials, Arnold, G3PTB. 25, Informal Morse practice and instruction. Peter, G3ASQ.

SUDBURY & DRS

3, AGM plus guest speaker. Bryan, G1TWY, 01787 247893

Region 13: East Midlands

DERBY & DARS

3, Junk sale. Martin, G3SZJ, martin@martinshardlow.demon.co.uk

EAGLE RG

10, Digital TV, G4KCU. G0SWS, 01507 478590.

LINCOLN SW CLUB

4, Hamfest Preparation. 8, Lincoln Hamfest. 14, ATV contest, Bob, G7AVU / Transmission 2000. John, G1TSL, 01522 793751

LOTTERY GRANT FOR WELLAND VALLEY FOUNDATION COURSE

WELLAND VALLEY Amateur Radio Society is celebrating after receiving a grant of £835 to run the amateur radio training course. The money is from the National Lottery's 'Awards for All' programme. The club's chief instructor, Andy Thomas, said "it's wonderful news for the students and the club".

The award paid for 12 candidates to take the Foundation Licence examination on 6 July. Radio transmitters will also be purchased with the support of the National Lottery, making it possible for the youngsters on the course to get on the air, as soon as licences are issued by the RA. Ten candidates, ranging in age from 13 to over 60, successfully passed the Foundation exam, a 100% pass rate. For more information contact Simon Day, Secretary Welland Valley Amateur Radio Society, e-mail: wvars@phasor-design.uk.com

From left to right: Hannah, Jack, Tom, James and Alec.

At a recent club meeting of the Southgate Amateur Radio Club in North London: a talk on lighthouses and lightships.

LOUGHBOROUGH & DARC

3, 6th and final DF of 2002 on 160m. 10, Mini talks 1. Early Transistors, Don, G8AYG 2. Early Values, Ian, G8SNF. 17, Vintage radio: bring a vintage set. 24, On air, try your radio on club aerial. Chris, G1ETZ, tel: 01509 504319.

SHEFFORD & DARS

5, Welcome back, invitation to Stevenage club for Steam Rally arrangements. 14 / 15 Bedfordshire Steam Rally special event station. 19, Hints and kinks, bring along your favourite ideas or short cuts. Derek, G4JLP, 01462 851722.

SOUTH NOTTS ARC

4, SSB Field Day preparation. 7 / 8 RSGB HF SSB Field Day. Tel: 01509 569679.

OPEN MEETING

ROY CLARKE, M0RLY, the RSGB Regional Manager for Region 5, the West Midlands, has asked the Association of Mercian Affiliated Amateur Radio Societies to hold an open meeting for him to meet radio amateurs in the region. The meeting will take place on **Thursday 5 September**, at 7.30pm for 8.00pm, at Aldridge Central Hall Community Centre, Middlemore Lane, Aldridge, Walsall WS9 8AN (the meeting-place of Aldridge and Great Barr ARC). Everyone is welcome, whether or not members of any club or of the RSGB. Further details from Arnold Matthews, G3FZW, tel: 01543 262495; e-mail: g3fzw@mail.com

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.

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*.

LOWESTOFT CLUB HONOURS G3OEP

A RECENT EVENT held at the Lowestoft radio club was held to honour one of the club's most respected radio amateurs who has been providing training to new radio enthusiasts for a great many years. David Buddery, G3OEP, is close to 80 years of age and still teaching the RAE. It was decided to arrange a summer BBQ, at which the presentation of a gift and plaque and the honour of becoming the club's president was bestowed on David. He was presented with a Walford QRP rig supplied by Tim Walford and assembled by club members. The presentation was performed by Bill, G3IWC, the club chairman.

Bill, G3IWC, left, and David Buddery, G3OEP, right, holding the packaged rig.

The club has grown in strength as a result of offering training courses in all areas: the Foundation, Novice and RAE. Many who have sat the Foundation course are already moving on to the more advanced levels.

ART OF HOME CONSTRUCTION ALIVE AND WELL

THE CHELMSFORD Amateur Radio Society had a record number of entries for its recent construction competition, proving that home construction isn't dead. The winner was Geoff Lovegrove, G7KLV, with his 'LC Bridge'. The Chelmsford ARS meets on the 1st Tuesday of each month at 7.15pm in the Marconi Social Club, Beehive Lane, Great Baddow, Chelmsford.

Geoff Lovegrove, G7KLV, being presented with his certificate by CARS President Harry Heap, G5HF.

Malcolm Day, a member of the Scarborough ARS, about to take the 5WPM Morse code test at Scarborough in July. Malcolm, who is registered blind, passed the May RAE after attending a course at the club over the winter. He passed the Morse test too and has now applied for an M0 callsign.

ANDOVER CLUB SCORES EIGHT OUT OF EIGHT

Back row: Matthew Adams; Dominic Adams; Andres Mejía-Butterfield; Boyde Galloway; Mike, G0AMO; Colin Rickman. Front row: Terry, G8ALR; Joseph Killian; Steve Cox; Peter McClurg; Keith, G0HKC.

IN A TWO-DAY teaching marathon at Larkhill the Andover Radio Amateur Club (ARAC) took eight candidates through the intricacies of the Foundation Licence and late on Sunday evening discovered that all eight had obtained a pass mark. This was a remarkable tribute to the hard work of the candidates and the presenters, not forgetting their respective families. It is all the more impressive because this was the first course for the Foundation Licence that ARAC had organised.

The candidates ranged in age from nine years old (Joseph) to 58 (Colin), which was a challenge in itself. Club members involved were: Keith Chambers, G0HKC (Lead Instructor); Andy Cuthbertson, M3JRS; Terry Cull, G8ALR; Stan Noke, G4MOE; Mike Adams, G0AMO; plus Ann Chambers (independent invigilator).

At the Barford Rally, organised by the Norfolk ARC: Chairman David Catchpole, G0PFN, and President Peter Ives, G3ASQ, by the club's central display stand. The club meets every Wednesday at 7.30pm at the Norwich Aviation Centre, Norwich Airport, Gambling Close, Norwich NR6 6EG.

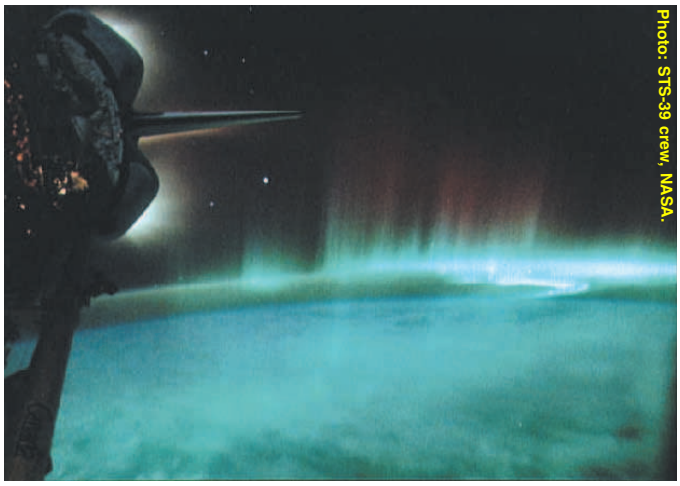
The Mablethorpe Town Show was the first public event attended by the Eagle Radio Group. Here, Mablethorpe Councillors Audry Thomas and Rita Dudley, with Sue Powell, G8JGC, visit special event station GB0ERG. Over 3000 members of the public attended the show and the station attracted several candidates for the club's next Foundation course.

VHF/UHF

NORMAN FITCH, G3FPK
40 Eskdale Gardens, Purley, Surrey CR8 1EZ.
E-mail: g3fpk@compuserve.com

THE FIRST legal VHF operation under the new government in Afghanistan is sanctioned. Sporadic E (Es) openings continued on 50, 70 and 144MHz but no major tropospheric or auroral events were reported.

All times are in UTC, ODX indicates best DX and QTHR signifies that the operator's address is in the current *RSGB Yearbook*. An asterisk (*) after a callsign denotes a CW contact, (DT), (TS) etc refers to the postcode area and (KO00), for example, is the Maidenhead grid.



The space shuttle recently flew *through* a geomagnetic storm with colourful auroras all around them. This picture was taken during an earlier shuttle flight which experienced the same phenomenon. It shows the 'southern lights' and glow from the Space Shuttle.

PUBLICATIONS

THE SUMMER EDITION, issue 2002-Q2, of the quarterly publication *VHF Communications* starts with an article by Michael Kuhne, DB6NT, describing 'A simple speed control for rotators' to enable precise positioning of parabolic dishes. Wolfgang Schneider, DJ8ES, writes about his 'Speech store with integrated sequencer' in which he uses an ISD 2560 speech memory IC and an AT90S2313-10PC micro controller.

There are other articles on the 'Sensitivity of radio equipment' with lots of formulae and a 'Simple noise figure meter'. Gunthard Kraus, DG8GB, presents his 'Internet treasure trove' piece in which he mentions WB6TPU's NEC archive site - see the list - from which can be downloaded the YGO3.ZIP Yagi design program. Andy Barter, G8ATD, edits *VHF Communications* which is published by K M Publications, 63 Ringwood Road, Luton LU2 7BG and there is a website - see the list.

The *144MHz & Above Newsletter* is a new weekly, non-profit publication compiled by Derek Gilbert, G0NFA (QTHR). Issue No. 1 was dated 24 June 2002 and includes 10 pages of topical data on Es events, beacon news, activity from rare grids, a few adverts, etc. It is available free as a .pdf file by e-mail or by post for a small fee to cover postage and stationery costs. See the website for full details. Derek's e-mail address is g0nfa@aol.com

BEACON NOTES

TED COLLINS, G4UPS (IO80), reports reception of a new Swiss 6m beacon on 3 June. HB9SIX (JN47KM) is on 50.0585MHz and transmits on CW. A new Polish 6m beacon was copied on 29 June: SR3SIX (JN92DF) is on 50.015MHz. Jose Guerreiro, CT1EPS, has restored the trans-Atlantic beacon CT1ART (IM67AH) on 144.406MHz. He asks for the donation of some equipment to establish a 6m beacon in the same area. Jose's E-mail address is ct1eps@netc.pt and thanks to G0NFA's *Newsletter* for this item.

GEOMAGNETIC AND SOLAR ACTIVITY

THE AVERAGE 10.7cm radio flux continues to decline. In the 30 days to 16 July the minimum value was 129 on 10 July and the maximum reached 172 on the 16th to give an average of 142.9 units. That is over 21% down on last month's value. 32 new sunspot regions were recorded. On 16 July the Space Weather News site reported a remarkable large active region on the Sun stretching 15 Earth diameters from end-to-end. On the previous day, twisted magnetic fields above the spot erupted sparking an X-class solar flare, which hurled a coronal mass ejection (CME) into space.

There were 23 geomagnetic 'quiet' days in this period, the rest being 'unsettled' with a maximum middle latitude A-index at Fredericksburg of 18 on 6 July. The 3-hourly K-index only reached 4 on six occasions, consequently little or no auroral activity was observed. I acknowledge with thanks receipt of the March *Six and Ten Report* and the June issue of *SunMag,* the source details of each as given in recent 'VHF/UHF' columns.

AFGHANISTAN

NICK Peckett, G4KUX, e-mailed to confirm that he now has the first *official* permit from the new government in Afghanistan to operate an amateur radio station under the call sign YA4F. He already has a rotator and was awaiting delivery of a 4-ele Yagi for 6m and a multiband vertical for the HF bands. He has IC-706 Mk2G and IC-730 transceivers. He is based in Kabul (MM44ON) at 6000ft ASL but with much higher mountains all around. He will be there for a couple of years at least but will travel around the country from time to time. Operation from some provincial capitals is possible. There are other YA stations around with verbal permission to operate. His e-mail address is nick@fourwinds.demon.co.uk

WSJT NOTE

UDO Langenohl, DK5YA, advises that there is a European 'mirror' of Joe Taylor's, K1JT, WSJT site which includes the latest 2.2.0 version of his software. Udo also runs a VHF page - see the list.

CHAT ROOMS

ALAIN Stievenart, ON4KST (JO20), informs that he is running a 50MHz European chat room with DX spots and that there are more than 175 users already registered. He can be e-mailed at on4kst@qsl.net and the website is in the list. Gordon Wyatt, GW8ASA, advises that Alain has now started a 144MHz version and Daniel Lee, MW1MFY, also refers to these sites. DK5YA mentions a WSJT/JT44 Forum and BBS - see the list for all details.

BAND REPORTS

50MHz

THE Es SEASON started on 22 May for Philip Lancaster, G0ISW (IO84), when he worked two new grids, LY3AX (KO25) and LY3MR (KO24). In June he contacted 8S6FRO (JO78) in Sweden, SP8AWL (KO11) and OE3MWS (JN88) on the 24th but couldn't get through to JX7DFA ((IQ50) in the evening

of the 27th. On the 29th he had QSOs with DL5WG (JO52) and OK1FRG (JN79) at 2251, the latest time he has made an Es contact.

Ken Punshon, G4APJ (IO83), checked the band on 5 July and was pleased to work LA1NG, who's just inside the Arctic Circle, and LA1IE. At the beginning of VHF NFD on the 6th he worked G8TIC/P in the rare IN79 grid. Roger Greengrass, G4NRG (JO02), uses an FT-847 with 100W to a collinear antenna which brought him FP/NA1CW (GN17) on 17 June. Mike Kerry, GW1SXT (IO81), was QRV on 21 June and contacted S50O and 9A0C (JN76), SP8FHK, SQ9IAU (KO00), OE1PLW and OK2YT (JN88).

Clive O'Hennessy, GM4VVX (IO78), reports Es on 16 days in June, most openings being short-lived. On the 27th the JX7SIX beacon was S9+ from 0700 for over an hour but there was no activity. The best day was the 29th when Es propagation started around lunchtime, continuing till gone midnight. He thought it had all finished by 2130 but on the way to bed he checked the band and found LA5TFA/P (KP09) calling CQ. He was the only signal on the band so they had a good 'ragchew' from 0000 on the 30th.

The band was very quiet on 8 July until 2220 when he heard JX7DFA working German and Spanish stations on CW and SSB. At 2240 Pen answered Clive's CW call. The OX3SIX beacon was S9 and after putting out many CQs on SSB and CW he worked OX3HX (GP44), who only QSLs direct, and TF3A* (HP94).

Finally to Ted Collins's, G4UPS (IO80), daily report for the period from 18 June which runs to five A4 sheets. Of the 29 days covered, only eight were poor; 21-23, 25, 26 and 28 June, and 11 and 14 July. On the other 21 days he reports plenty of activity from all over Europe and the Eastern Mediterranean with 31 beacons heard from CT0SIX in the west to OD5SIX and 5B4CY in the east and OY6SMC in the north to 9H1SIX in the south. Here are a few highlights from Ted's June log: 19th 1259 T77GO (JN63), 1631 UT5JAJ* (KN64), 24th 1756 LA8LA* (JP43), 27th 1141 JY4NE (KM71), 1851 JX7DFA and 30th 0947 LC6OBT/M (JO49). From the July list: 2nd 1545 FS/W6JKV* for DXCC 182, 3rd 2038 HB0/DM2AYO (JN47), 2124 IA5/HB9AOB (JN52 and EU-028 for IOTA fans), 5th 1025 JX7DFA*, 1940 T96Q* (JN49), 6th 0945 OY9JD (IP62), 8th 1101 OH0JFH* (KP00) and 12th 1350 3Z0AJC* (KN19) in Poland.

From Ted's information notes, he reports that I3LLH, the QSL manager for D2EB in Angola, is having difficulty in getting his logs. Henry has received over 1000 QSLs but only has the logs up till September 2000. NA1CW is the new callsign of N1RZ. Tim gave many 6m operators a new country as FP/NA1CW in GN17VA.

ANNUAL VHF/UHF TABLE - JAN TO DEC 2002

	50MHz		70MHz		144MHz		430MHz		1.3GHz		Total
Callsign	Dist	Ctr	Dist	Ctr	Dist	Ctr	Dist	Ctr	Dist	Ctr	Points
G4DEZ	69	72	22	5	81	19	20	7	13	6	314
G3FIJ	34	26	15	3	38	8	27	3	5	1	160
G4APJ	12	9	-	-	44	7	38	4	-	-	114
G6TTL	15	43	-	-	-	-	10	5	-	-	73
G7CLY	3	8	-	-	6	7	4	3	-	-	31
G8RWG	-	-	-	-	16	12	-	-	-	-	28

The District Codes are the 124 listed on page 52 in the January 2002 *RadCom*. Up to six different GI stations and up to three different GM stations in each Scottish district may be counted. Countries are the current DXCC ones plus IT9. The deadline for the next issue is 10 September.

70MHz

On 29 June at 1943 G0ISW worked S51DI (JN76) for his third grid and second country on 4m. Philip, who runs an FT-847, 50W to a log periodic antenna at 150m ASL, says that the S5 must have been calling CQ without response for at least an hour even after he placed the call on the *DXCluster*.

Also running an FT-847, but with 10W to a vertical antenna, G4NRG worked S52AU, S59MA, S57UUD, S53X and S53M on 1 June, then S53J and S57A on the 20th. Bryn Llewellyn, G4DEZ (JO03), says that conditions on 4m during VHF NFD were superb. There was no Es but tropo brought QSOs with GI, GM and GW stations, ". . . plus loads of Gs."

144MHz

Alec Trusler, G0FIG (IO90), is QRV again after a 16 months absence. On 2 June he made Es QSOs with IK8XSY and IK7UXY (JN70), SV3CYM (KM08 and a new grid), IW0GPN (JN62) and IW0BET (JN61). On the 8th he contacted CN2DX (IM83) for a new country and grid and EA8BPX (IL18) at 2837km for another new country and grid in a one minute opening - possibly tropo assisted Es? - bringing his grid tally to 393.

Dave Edwards, G7RAU (IO90), caught an Es opening in the early evening of 20 June. Starting at 1710 he worked YU7EW, YU7OP, YU7ZZ, YU7MS, YU7RF and YZ7PEK (KN05), YZ7MON, YZ1BUL, YU1LA and YU7ON (KN04), HA3HV (JN86) and 9A2SB (JN95) in a 28min period.

He makes the perennial complaint about G stations congregating on 144.300MHz arguing that, if they spread out, they would work more stations. But Steve Eldridge, G8IZY (IO91), says he gave up calling CQ on 144.312MHz, called on 144.300 and immediately worked YU1TT. Running 50W to a collinear antenna, G8NRG made Es QSOs with IK0SOI, IW0GPN, I8PMO and IC8CQF on 2 June.

MOONBOUNCE

HOWARD LING, G4CCH (IO93), continues his EME activity on 23cm and on 7 July he completed with N2UO*, IK2MMB*, OH2DG*, KU4F* for initial (station worked for the first time) no. 171 and K5JL*. On the 12th he worked DJ9YW*, IK3COJ* and OZ6OL*. It was quiet on the Saturday of the 13/14 July activity weekend when he completed with JA6AHB*, JA2CZD*, F6ETI*, DL8OBU*, N2UO*, F6KHM and F2TU.

It was busier on the Sunday when he made 12 QSOs with DL1YMK*, HB9BHU*, F1ANH*, ON/PA3DZL* at ON5RR's QTH, ON5RR*, IK2MMB*, N2IQ*, SM6CKU*, W2UHI*, OZ4MM*, LX1DB and W7SZ*. Howard is now up to 32 countries, six continents, 24 US states, 27 fields and 129 grids on the band.

Niels Montanana, G8RWG (IO91), began his EME activity on 2m on 20 May when he completed with S52LM using JT44 mode. There followed successes with WA8CLT on the 24th, W5UN on 14 June and I2FAK on the 20th.

The following is extracted from the July *432 and Above Newsletter*. In common with many other contributors, Peter Blair, G3LTF (IO91) was sorry that the W2WD/0 expedition to Nebraska didn't work out well considering all the effort the team put into the project. Peter was QRV (ie operational) on 23cm on 15 June and completed with JA6AHB*, F6ETI*, DL8OBU* for initial 188 and F1ANH*.

On 70cm he worked KO7N* for initial 359 and next day VK3UM* and JH4JLV* in excellent conditions with sharp polarisation. He ran his new PA for the skeds with W2WD/0 and it worked fine. He writes, "It has a lot more in hand than the K2RIW and uses fewer fuses!"

Stuart Jones, GW3XYW (IO71), also reports high activity on 23cm on 16 June when he completed with OZ6OL*, G4CCH* also on SSB, IK2MMB*, IK3COJ*, OH2DG*, OE5EYM*, K0YW*, W4OP*, VE1ALQ* and W2UHI*. On the previous day he had a partial QSO with F6ETI* and completions with F1ANH* and DL8OBU*.

On the software front, David Anderson, GM4JJJ (IO86), confirms that his *MoonSked* program is not available for the Linux operating system (OS). However, it does run under MS Windows and Macintosh OSs and can be run under a Windows emulator in Linux. Check his superb website for details - see the list.

The best weekends for September EME activity are 31 August/1 September and 28/29 September. For the former there will be 31.5 hours of Moon time for London latitude stations, the declination varying from +20.65° to +24.93°. The 144/432MHz sky temperature range is 435/31K to 575/44K and the signal degradation, referred to perigee, varies from -1.48dB to -1.09dB. The Sun offset at Saturday midnight is -80°. On the latter weekend the data are 32.2 hours, +22.92° to +25.52°, 463/35K to 575/44K, -1.40dB to -0.99dB and -98°.

Warren Butler, W2WD, has issued his latest 'E-mail Address List' as of 3 July 2002 on behalf of the 432 and Above EME Group. He thanks JA9BOH for his help in updating the Japanese listings. Moon-Net postings and subscription instructions are on the website - see the list.

G8RWG has been running tropo tests every Tuesday evening over a 900km path with OZ1PIF (JO65) using JT44 mode. Best signals were on 26 June but up till 11 July they hadn't managed a complete QSO. Niels's recent tropo successes included EA1FDI/P (IN52) on 1 June and F/PA2CHR (IN77) on the 3rd. He did not find very high activity in VHF NFD but there were good signals from Spain in the morning of 7 July when he worked EA2CN/P and EA2URE (IN93).

GM4VVX found conditions very quiet in IO78 with no trace of any auroras. He was QRV for NFD and his ODX was GW6YB/P (IO81). MW1MFY mentions some excellent Es to CN, EA, EA8, IS0, 9H, etc in the month to 12 July.

430MHz UP

G0FIG added five new grids to reach the magic 100 on 70cm. These were PA6FI/MM (J013) on 15 June and over the NFD weekend EA1FDI/P, EA1EF/P (IN72), EA2AP/P (IN83) and GW8IZR (IO73). Alec remarks that it was nice to get some decent tropo propagation during a contest period.

John Tye, G4BYV, in Dereham, Norfolk, started a series of skeds over a 104-mile path with Denis Bosworth, G8BAV, in Derby, on 20 September 1968 and they have now completed over 6000 QSOs. At the start of this marathon, Denis was using a G2DD converter with AF239 preamp and an HRO Rx. His Tx was a QQV03-20 tripler from 2m with a QQV03-20 30W PA feeding an 18-ele Parabeam. The mode was AM. His current station comprises an FT-790R, 25W SSB to a 21-ele Yagi 40ft AGL. John's station, when he was G8BYV, then consisted of a 2m Tx from a *RadCom* design, known as a 2N4, into a varactor tripler giving about 5W output to an 8-over-8 Jaybeam antenna. His receive set-up was a modified PMR converter with AF239 preamp stage into an AR88 Rx. His present station comprises an SSB Electronic transverter made from a kit feeding a 2C39 PA producing 50W, the antenna being a home made 13-ele K2RIW design at 50ft AGL. Their skeds now take place at 0815 local time on 432.340MHz. He says that, "At one time someone would call in, but not now."

G4DEZ writes, "To those who may have tried to call me on 70cm I do have a problem caused by using water-cooled LDF4-50 cable. Perfect DC conductor but not very good for RF!" By now he should have changed to LDF5-50 from the shack to the masthead amplifier. He thought he had a problem on 23cm but that appeared not to be as he worked F6DKW* (JN18) on 16 July, his first French station this year.

SIGN OFF

VHF NFD FEATURED in very few reports, so it will be interesting to see if activity was down compared with 2000, last year being thwarted by the foot and mouth disaster. We are always keen to receive photographs of contributors and their stations. While antenna pictures are interesting, they often don't reproduce well.

Copy deadline for the November issue is **10 September** and for December the date is **11 October** and please note that that is a Friday instead of the usual Tuesday. My telephone answering and fax machine is on 020 8763 9457 and my CompuServe ID is g3fpk ♦

WWW.

WB6TPU (NEC archive)	**http://www.qsl.net/wb6tpu/swindex.html**
VHF Communications	**http://www.vhfcomm.co.uk**
G0NFA *Newsletter*	**http://www.144mhz.co.uk**
ON4KST 6m chat room	**http://www.on4kst.com/chat**
ON4KST 2m chat room	**http://www.on4kst.be/chat144/**
GM4JJJ MoonSked	**http://www.gm4jjj.co.uk/MoonSked/moonsked.htm**
EME E-mail list (W2WD)	**http://www.nlsa.com/nets/moon-net-help.html**
European WSJT Mirror	**http://www.vhfdx.de/wsjt/**
DK5YA VHF Page	**http://www.vhfdx.de/**
WSJT/JT44 Forum	**http://www.vhfdx.de/cgi-bin/yabb/YABB.pl**

CONTEST

TIM KIRBY, G4VXE
11a Vansittart Road,
Windsor SL4 5BZ
E-mail: tim@g4vxe.com

I'M WRITING THIS just after getting back from Finland, having attended the World Radiosport Team Championship (WRTC) as a spectator. You'll see a full write-up of the event elsewhere in this month's *RadCom*. However, I'd like to add my congratulations to all the participants, but particularly to the UK team of Andy Cook, G4PIQ, and Fred Handscombe, G4BWP, who did a magnificent job representing us. All the teams were extremely skilful and it only takes a quick look at the final results listings to see just how competitive things were. Of course, the whole event provided a wonderful opportunity to meet some of the very best contesters in the world and swap stories and ideas. If you have the chance to attend a future WRTC event in whatever capacity, be it as a competitor, a referee or a guest, I heartily recommend it to you.

SSB FIELD DAY

THE FIRST weekend in September brings SSB Field Day. This is one of the major contests for UK clubs in the RSGB contest calendar. It provides a very real opportunity for the seasoned DXers and contesters amongst us to introduce newcomers, perhaps Foundation Licensees to the excitement of HF contesting. Even if you are a dedicated CW operator and don't normally support the event, please consider doing so. There's been a wonderful influx of new blood into the hobby over the last few months and if you're part of a club you'll want to capitalise on that and 'hook' the new recruits on HF DXing and contesting! Unlike CW field day, SSB field day is orientated around working DX stations, so it pays to work all the different countries and multipliers that you hear - rather than concentrating on the portable stations, as you do in the CW event. Finally, we are hoping to make more of a feature of the results of this year's SSB Field Day, so if you are at an event and can take some photographs, I'll be very pleased to receive them.

OTHER CONTESTS THIS MONTH

THE FIRST weekend in the month also brings the 144MHz Trophy, which is a major event for VHF contest enthusiasts. Some clubs have traditionally run a 2m station from their SSB Field Day site and this is a great way to show the HF guys what fun VHF is, and, of course, *vice versa*! The 144MHz trophy is co-ordinated around Europe, which is to say that there will be lots of well-sited portable stations located all over Europe, so if there is the slightest hint of good conditions, you will be in for some fun. We saw a great example of this on 2m during VHF Field Day, when low-power stations in the south-west of the UK were able to work into Northern Spain, Southern France and Switzerland on tropo.

Those of you who know me know of my enthusiasm for RTTY contests, as being something rather different in the contest program. I've mentioned before how relaxing these events are, but the required skills in working the bands and multipliers to best effect are still considerable. The final weekend in September brings the CQWW RTTY contest which is, as you might imagine, one of the major events of the year. We usually see plenty of DXpeditions active on RTTY around this time, so even if you're not an avid data modes enthusiast, this is a great time to get one of the programs such as MMTTY on your computer and a simple interface built between your soundcard and your rig. If you do not fancy building one yourself, interface cables are available and G3LIV (www.g3liv.co.uk) has been extremely helpful in trying to resolve some interfacing issues at G4VXE.

If you're a phone operator, you'll probably enjoy the Worked All Europe SSB event on 14 / 15 September, with the fun and games of passing QTCs as described last month.

During the 50MHz Backpackers Contest over the Jubilee weekend, Dave, GW8ZRE/P, operated with this patriotic set-up!

SUCCESSES IN THE SPRINTS

REGULAR READERS of the column will know all about the EU Sprints, organised twice a year in April and October. The results of the Spring contest have just come out and make very happy reading for UK contesters. In first place is Dave, G4BUO, second is Steve, G0CKP, and third is Andy, G4PIQ/P. Eleven out of the 51 entrants are from the UK. Congratulations to the leaders and to everyone who showed the rest of Europe what the UK can do! The SSB event had slightly less UK participation, with nine out of 68 entrants from the UK. Look out for the autumn events next month and let's go for even more UK entries!

432MHz Contest, August 2001

PROPAGATION ACROSS the North Sea seems to have been quite favourable for this event. This helped our stalwart overseas entrant Frank, PE1EWR, take the second place behind Reg, G8VHI, who amassed a fine leading score from his Midlands location. Although the event was open to multi operator entrants, this time there were no entries outside the SF category. Overall support for this event was again reduced this year, and as a consequence it will be discontinued as part of a rationalisation of the calendar for 2002. Many thanks to this and previous years' entrants for their support.

Steve Redfern, G4AEQ

432MHz Contest August 2001

Single Operator Fixed Section

Pos	Call	QSOs	Points	Mults	Total	Loc	Best DX	km	Power	Ant
1	G8VHI*	41	6495	38	246810	IO92FM	ON1BIV	479	100	2x23Y
2	PE1EWR*	24	5815	29	168635	JO11SL	GW8ASA	496	130	2x21Y
3	G6FQZ	25	4151	34	141134	IO91JR	ON1BIV	439	100	17Y
4	G3MEH	29	3771	31	116901	IO91QS	ON1BIV	398	10	2x23Y
5	G1KHX	18	3427	27	92529	IO81MI	PE1EWR	451	120	19Y
6	G0GCI	23	3077	26	80002	JO01ED	G4APJ	332	100	2x21Y
7	G0ODQ	19	2507	29	72703	IO91NQ	G6LEU	329	100	2x21Y
8	G3YDY	17	2510	21	52710	JO01FQ	ON1BIV	323	50	19Y
9	G0DVJ	13	1806	19	34314	JO01MX	ON1BIV	293	50	5Y
10	G4APJ*	12	1688	18	30384	IO83UP	G0GCI	331	25	19Y
11	2E1GUA*	5	611	10	6110	JO01FS	ON1ALJ	242	10	13Y(2M)

*Certificate winners

1.3 / 2.3GHz Cumulatives, 2001

AS USUAL on these bands the standard of logging was very high with very few points being lost. However, more care could be taken with the logging of cross band QSOs.

Congratulations to Robert Ferguson, GD4GNH, for winning the 23cm Single Fixed section, to the South Birmingham Radio Society, G8OHM/P, for winning the 23cm 'All Others' section, and to David Dodds, GM4WLL, for going portable from Scotland, winning the 23cm 'Single Other' section.

On 13cm, congratulations to Roger Piper, G3MEH, for winning the Single Operator section and again the South Birmingham Radio Society, G8OHM/P, for winning the 'All Others' section.

Frank Laanen, PE1EWR, receives the Overseas entrant certificate for both 23cm and 13cm. Finally, J T Joyce, G4JTJ, wins the 25W Single Antenna certificate for his entry on 23cm.

Mike Goodey, G0GJV

1.3/2.3GHz Cumulatives, 2001

1296 MHz Multi-Operator

		11/10		26/10		05/11		20/11		05/12								
Pos	Callsign	Norm	Score	Norm	Score	Norm	Score	Norm	Score	Norm	Score	Total	QSOs	ODX	Loc	Pwr	Ant	Equip
*1	G8OHM/P	1000	4308	1000	4307	1000	3025	1000	2365	1000	2535	3000	105	601	IO82QL	130	8x23Y	IC970H+tverter

1296MHz Single Operator Fixed

		11/10		26/10		05/11		20/11		05/12								
Pos	Callsign	Norm	Score	Norm	Score	Norm	Score	Norm	Score	Norm	Score	Total	QSOs	ODX	Loc	Pwr	Ant	Equip
*1	GD4GNH	919	3868	1000	2936	891	2842	1000	2158	1000	3569	3000	52	399	IO74QD	200	8x23Y	FT736R
*2	G4BRK	0	0	808	2373	1000	3189	847	1829	0	0	2655	51	461	IO91DP	40	67Y	FT290+tverter
3	G4NBS	435	1834	738	2167	796	2541	996	2151	506	1806	2530	86	377	JO02AF			
4	M0GHZ	1000	4208	749	2200	582	1857	590	1275	0	0	2339	56	582	IO81VK			
5	G3MEH	748	3151	701	2061	704	2247	878	1895	580	2072	2330	86	481	IO91QS	50	4x35	IC275E+tverter
6	G8ZQB	359	1514	556	1634	660	2106	803	1734	379	1355	2019	74	287	IO92JN	100	40 LY	FT225R+tverter
7	G0ODQ	732	3083	600	1763	616	1967	0	0	448	1599	1948	69	468	IO91NQ	60	35Y	FT736
8	G4THI	266	1123	500	1468	531	1696	577	1246	0	0	1608	48	270	IO93HD	100	35Y	FT736
*9	G4JTJ	204	860	374	1099	0	0	292	632	270	965	936	42	356	IO92SD	20	35Y	?+tverter
*10	PE1EWR	359	1512	247	726	152	487	329	711	129	462	935	16	437	JO11SL	10	2*25LY	TS790E

1296MHz Single Operator Other

		11/10		26/10		05/11		20/11		05/12								
Pos	Callsign	Norm	Score	Norm	Score	Norm	Score	Norm	Score	Norm	Score	Total	QSOs	ODX	Loc	Pwr	Ant	Equip
*1	GM4WLL/P	1000	830	1000	1945	0	0	1000	51	0	0	3000	12	468	IO85NR	18	67Y	FT290R2+tverter

2320MHz Multi-Operator

		11/10		26/10		05/11		20/11		05/12								
Pos	Callsign	Norm	Score	Norm	Score	Norm	Score	Norm	Score	Norm	Score	Total	QSOs	ODX	Loc	Pwr	Ant	Equip
*1	G8OHM/P	0	0	1000	825	1000	1510	1000	748	1000	638	3000	29	265	IO82QL	30	67Y	IC970E+tverter

2320MHz Single Operator Fixed

		11/10		26/10		05/11		20/11		05/12								
Pos	Callsign	Norm	Score	Norm	Score	Norm	Score	Norm	Score	Norm	Score	Total	QSOs	ODX	Loc	Pwr	Ant	Equip
*1	G3MEH	1000	1622	1000	1177	1000	1431	989	865	469	288	3000	32	481	IO91QS	10	67Y	IC275E+tverter
*2	G8ZQB	342	555	735	866	612	876	933	816	1000	614	2668	30	287	IO92JN	20	60Y	FT480+tverter
3	G4BRK	0	0	792	933	763	1093	1000	874	0	0	2555	23	427	IO91DP	30	80cm Dish	FT290+tverter
4	GD4GNH	146	238	728	857	325	466	589	515	838	515	2155	11	342	IO74QD	40	84LY	FT225RD+tverter
5	M0GHZ	725	1177	693	816	560	802	688	602	0	0	2106	23	582	IO81VK			
6	G4THI	88	144	293	346	539	772	395	346	0	0	1227	13	228	IO93HD	4	25Y	FT290+tverter
*7	PE1EWR	423	687	0	0	0	0	0	0	0	0	423	3	398	JO11SL	7	25Y	IC260E+tverter

2nd 2.3GHz Contest, 2001

A FLAT BAND produced little activity during this contest. Even so, the eventual winner managed to work five stations (four out of the five did not enter the contest).

Congratulations to Roger Piper, G3MEH, for winning the contest and to Robert Ferguson, GD4GNH, for coming second.

Ian Pawson, G0FCT

2nd 2.3GHz Contest, 2001

Single Operator Fixed Station (SF)

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km	Power	Ant	Equipment
1*	G3MEH	IO91QS	5	426	G3XDY	130	10	67EL	IC275E+DB6NT+DL2AM
2*	GD4GNH	IO74QD	1	287	G8ZQB	287	10	84Q	FT225+TVTR+AMP
3	G4BRK	IO91DP	1	76	G3MEH	76	30	90cm	FT290+DB6NT+AMP

*Certificate Winner

2nd 1296MHz Contest, September 2001

ONLY FIVE STATIONS out of the 38 stations active for this contest put in an entry. GD4GNH reported "flat band conditions with poor propagation east - west". However, GM4WLL/P was "surprised to work so many stations" from his portable location.

Congratulations to Robert Ferguson, GD4GNH, for winning the fixed station section of the contest and to Neil Whiting, G4BRK, for coming second. Also congratulations to David Dodds, GM4WLL/P, for winning the 'others' section of this contest.

Ian Pawson, G0FCT

2nd 1296 MHz Contest, September 2001

Single Operator Fixed Station (SF)

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km	Power	Ant	Equipment
1*	GD4GNH	IO74QD	13	3517	G4ZFJ	463	150	8x23EL	FT736R
2*	G4BRK	IO91DP	15	2301	GM4WLL/P	461	40	67EL	FT290+DB6NT+DL2AM
3	G3MEH	IO91QS	21	1527	G4DEZ	164	50	4x35EL	IC275E+DB6NT+DL2AM
4*	G4JTJ	IO92SD	12	1161	GD4GNH	356	20	35EL	MMTVTR

Single Operator, Others (SO)

Pos	Callsign	Locator	QSOs	Score	ODX Call	ODX km	Power	Ant	Equipment
1*	GM4WLL/P	IO85NR	7	1134	G4BRK	461	18	67EL	TR9130+DEMTVTR+AMP

*Certificate Winner

CONTEST CALENDAR

HF Contests

Date	Time	Mode	Contest	Bands	Exchange
2Sept	1900-2030	CW	RSGB Slow Speed Cumulative	3.5	RST + Name
7/8Sept	1300-1300	SSB	RSGB SSB Field Day	3.5-28	RST + S/N
7/8Sept	*0000-2359*	*SSB*	*All Asia DX*	*3.5-28*	*RST + Age (YLs send XX!)*
10Sept	1900-2030	CW	RSGB Slow Speed Cumulative	3.5	RST + Name
14/15Sept	*0000-2359*	*SSB*	*WAE SSB*	*3.5-28*	*RST + S/N*
18Sept	1900-2030	CW	RSGB Slow Speed Cumulative	3.5	RST + Name
21/22Sept	*1200-1200*	*CW*	*Scandinavian Activity*	*3.5-28*	*RST + S/N*
28/29Sept	*0000-2359*	*DIGI*	*CQ/RJ WW RTTY*	*3.5-28*	*RST + CQ Zone*
28/29Sept	*1200-1200*	*SSB*	*Scandinavian Activity*	*3.5-28*	*RST + S/N*
26Sept	1900-2030	CW	RSGB Slow Speed Cumulative	3.5	RST + Name

VHF Contests

Date	Time	Mode	Contest	Bands	Exchange
3Sept	1900-2130	ALL	RSGB 144MHz Activity	144	RST+SN+Locator
7/8Sept	1400-1400	ALL	RSGB 144MHz trophy	144	RST+SN+Locator
8Sept	1100-1500	ALL	RSGB 144MHz Backpackers	144	RST+SN+Locator
10Sept	1900-2130	ALL	RSGB 432MHz Activity	432	RST+SN+Locator
17Sept	1900-2130	ALL	RSGB 1.3/2.3Ghz Activity	1.3/2.3	RST+SN+Locator
22Sept	0900-1300	ALL	RSGB 2nd 70MHz	70	RST+SN+Locator+QTH
24Sept	1900-2130	ALL	RSGB 50MHz Activity	50	RST+SN+Locator

Microwave Contests

Date	Time	Mode	Contest	Bands	Exchange
8Sept	0900-2000	ALL	RSGB 24GHz up	24Gup	RST+SN+Locator
22Sept	0900-2000	ALL	RSGB 10GHz Cumulative	10G	RST+SN+Locator

The full rules of RSGB HF, VHF/UHF and Microwave contests were published in the RSGB Contesting Guide in January 2002 *RadCom*. Brief rules for non-RSGB contests, which are listed in italics above, can often be found in the 'HF' and 'VHF/UHF' columns. The HF and VHF Contest Committees both have websites from which comprehensive details are available. These are www.rsgbhfcc.org and www.blacksheep.org/vhfcc RSGB Microwave Contest rules can be found on the Internet at: http://www.g3pho.free-online.co.uk/microwaves/calendar2002.html

HF HF HF HF

DON FIELD, G3XTT
105 Shiplake Bottom, Peppard Common, Henley on Thames, RG9 5HJ.
e-mail: hf.radcom@rsgb.org.uk

SEPTEMBER IS generally regarded as the start of the 'DX Season', as propagation begins to pick up in the northern hemisphere. Low band propagation is often especially good around the time of the solstice (21 September). I well remember one year around that time, putting up a new 160m antenna, finishing late afternoon and promptly working ZL3GQ exactly on our sunset. A couple of days later I worked him the 'other way round' at our sunrise, his sunset.

This brings to mind the letter from G4TLY in last month's 'The Last Word' regarding the validity (or otherwise) of the *RadCom* propagation predictions. Most propagation software looks only at traditional ionospheric propagation, along a great circle path with control points at either end and, if the software is any good, at intermediate control points too. It factors in absorption and, with most programs, will also allow some specification of the power and antenna gain at either end (the *RadCom* predictions obviously have to be based on a 'typical' station but if you have your own software you can set these parameters to suit). However, any serious HF operator will quickly discover that there is more to the story. On the low bands, for example, there is the well-known phenomenon of ionospheric tilting at dawn and dusk, giving considerable signal enhancement (which, especially on 160m, can be very fleeting, but also very pronounced). Additionally, you may encounter 'chordal hop' propagation, where signals bounce within the ionosphere without intermediate reflections off the earth (or sea), with the result that path losses are considerably less than predicted by the standard models. I might also mention long-path propagation, which was raised in G4FKH's reply to G4TLY's letter. Many UK amateurs use long-path daily to work VK on 20m, but it also exists at certain times of the sunspot cycle on the higher bands. A couple of friends of mine, both with excellent HF locations and high-gain 10m antennas (typically six element monoband Yagis) were working VK/ZL regularly on 10m during our evening time earlier this year, when the path appeared closed to most users. The benefit of a good antenna, of course, is that, unlike simply upping the power, its gain is beneficial on receive as well as transmit.

The moral is that there is much more to HF propagation, at both the high- and low-frequency end of the spectrum, than many of us realise. It is these 'bonus' openings that make our operating fun. In contrast, most propagation software is, of course, designed primarily for professional users of HF who are much more interested in 'reliable' openings which they can use for their regular scheduled operations.

9 BAND TABLE No 43

MIXED MODE

CALL	1.8	3.5	7	10	14	18	21	24	28	TOTAL
G3KMA	253	301	327	321	334	329	335	322	332	2854
G4BWP	247	305	333	320	334	329	335	314	325	2842
G3XTT	233	278	316	284	332	314	332	297	312	2698
GW3JXN	183	257	294	285	328	318	320	296	304	2585
G3GIQ	152	246	303	264	333	317	333	306	328	2582
G3SED	233	261	293	277	314	293	296	263	287	2517
G4OBK	171	227	277	283	327	307	318	300	299	2509
G3TXF	129	234	294	283	329	291	323	267	301	2451
G3TBK	119	231	275	247	327	292	314	277	287	2369
G3LAS	106	201	246	253	316	301	315	295	298	2331
G3YVH	125	154	254	276	318	310	304	272	278	2291
G3IFB	62	222	288	237	326	248	305	244	287	2219
GM3PPE	148	210	254	264	319	257	276	231	226	2185
G3VJP	107	182	256	190	326	276	313	245	286	2181
G3KMQ	60	212	266	213	325	247	281	255	247	2106
G4PTJ	40	176	218	169	322	263	316	251	299	2054
G3IGW	129	198	316	240	289	246	258	131	235	2042
G0TSM	67	153	229	184	301	261	294	231	295	2015
G5LP	67	224	283	218	310	210	282	144	242	1980
G3VKW	48	163	229	122	326	214	322	229	306	1959
G0JHC	1	29	164	260	272	300	313	294	308	1941
M5ACC	34	112	207	184	279	238	271	225	263	1813
G3NOF	5	126	131	0	332	298	330	263	305	1790
G4XRX	8	77	172	154	294	233	300	205	262	1705
M0AWX	45	115	138	0	277	219	263	204	225	1486
G4NXG/M	25	58	137	0	290	213	284	192	251	1450
G4OWT	2	44	151	77	302	55	288	59	257	1235
GM4OBK	43	97	134	77	163	117	157	127	188	1103
G0LRX	1	95	124	0	233	53	251	52	227	1036
G4FVK	40	79	103	58	188	105	187	74	168	1002
MM0BQI	39	62	122	49	188	76	168	61	160	925
M0CNP	10	67	119	9	208	73	163	51	126	826
AVERAGE	92	169	227	181	296	238	286	218	266	1971

CW ONLY

G3KMA	247	281	324	321	333	322	331	308	323	2790
G3XTT	222	248	304	284	304	291	303	271	282	2509
G4BWP	216	221	290	319	296	302	287	280	249	2460
GW3JXN	180	225	280	285	313	305	307	271	275	2441
G3TXF	129	227	292	283	324	289	318	266	288	2416
G0NXX	172	235	282	293	300	292	278	267	268	2387
G4OBK	162	207	270	283	309	293	293	279	278	2374
G3SED	232	244	287	277	286	261	257	217	226	2287
G3SXW	96	204	261	260	317	279	302	253	280	2252
G3YVH	124	150	250	276	309	297	288	256	258	2208
G3LAS	105	123	220	253	272	274	280	253	256	2036
G3NOH	49	124	208	257	301	283	294	248	261	2025
G3VJP	106	147	245	190	298	253	285	221	251	1996
G5LP	67	223	283	218	299	209	271	144	241	1955
G4PTJ	37	113	188	169	246	229	269	224	252	1727
G0TSM	63	106	203	184	216	177	225	180	253	1607
G3VKW	41	90	175	120	231	161	256	177	201	1452
G4OWT	0	43	116	77	221	38	222	44	188	949
MM0BQI	26	31	81	49	95	32	84	28	88	514
GM4OBK	36	79	117	77	138	99	137	109	138	930
AVERAGE	**116**	**166**	**234**	**224**	**270**	**234**	**264**	**215**	**243**	**1966**

Next deadline 8 October 2002. Prepared by G3GIQ, henry@topdx.com

Incidentally, contests are often an excellent time to explore the more unusual band openings, as some may occur when the DX station would, if it were not for the contest, be fast asleep in bed!

DX NEWS

THE 'QLF DX Team' will be active from **Market Reef** from 31 August to 7 September. They have applied for the call OJ0LA. Operations are expected on 10-160m with special attention to the high and low bands. Look for activity on CW, SSB and possibly RTTY. QSL via LA9VDA.

John, G4IRN, will be in the **Gambia** from 6 to 13 September and active as C5/G4IRN, mainly on CW, 80 - 10m with 100 watts plus wire antennas. QSL to his home call. Ely, IN3VZE, will be in **Malawi** from 22 September to 8 October, signing 7Q7CE. QSL to IN3VZE.

Largely due to the efforts of Nicole, TU5NC / 5N0YL, amateur radio in the **Democratic Republic of Congo** continues to make progress. The PTT has given verbal permission to five licensees as of 1 July. Those are ARAC (national society), 9Q0AR; Nicole, 9Q1TL; Jean Philippe, 9Q1MM; Cyprien, 9Q1KS, and Pat, 9Q1A. To promote amateur radio and keep it in the spotlight in the DRC, the 9Q0AR callsign may be used by visitors in any of the nine call areas. Written applications can be made to ARAC by providing a valid foreign licence, joining ARAC and guaranteeing 100% QSLing. Guest operators should take care of their own QSLing arrangements but must supply ARAC with a copy of their logs. For more details contact ARAC via e-mail to gckin@ic.cd or phone Nicole, 9Q1YL, tel: (00 243) 99 43 838.

Ken, K4ZW, is due back in **Mongolia** some time this month. Karl, K4YT, will also be with him. They plan to concentrate on 80 and 160m, and will put up some

Beverage receiving antennas as well as improving the ground system under the Titanex vertical installed last November at JT1CO's QTH.

Raymond Upchurch, W4GXT, of North Carolina, who is well known for working numerous UK stations around 14243kHz, had a stroke in February. He is recovering slowly, but has not yet been able to return to the air. Raymond's cousin, Jack Emerson, W4TJE, thanks all Raymond's UK friends for their messages of support and passes on greetings from W4GXT.

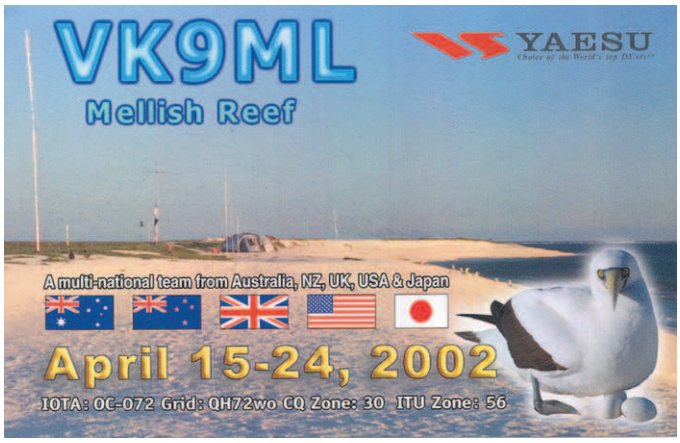
IOTA ACTIVITY

PETER, OZ/DL6LZM, will operate first from **Fyn Island** (EU-172) from 3 to 6 September, then from **Lolland Island** (EU-029) from 7 to 13 September. He plans to be on SSB on 10 - 80m. QSL via DARC.

A team of six, led by YB2MTA, will active from **Karimunjawa Island** (OC-186) from 28 August to 3 September, probably as YE2R. They will be active mainly on 10 and 15m, both CW and SSB. QSL via YB2MTA.

COUNTRIES WORKED, 2002
(sorted this month by CW totals)

CALL	CW	SSB	DATA	MIXED
G0NXX	238	0	0	238
G3SXW	232	0	0	232
G4PTJ	197	213	0	259
G4IRN	190	0	0	190
G4UCJ	187	0	47	187
ZC4BS	186	221	84	239
G3YVH	177	125	0	217
G3SED	176	131	0	209
G3LHJ	171	69	106	188
G3JFS	158	135	125	203
G4WXZ	147	140	0	194
ZC4VG	140	14	4	142
ZC4DW	138	80	91	157
MU0FAL	135	103	0	152
G4DJX	110	0	0	110
G3XTT	106	85	50	133
M0BVE	105	0	0	105
G3ING	102	0	0	102
G4OBK	97	38	56	119
GM4ELV QRP	72	69	0	93
G4DDL	59	19	10	63
G4FVK	52	115	0	117
M5AEF QRP	50	61	0	71
G4IDL	46	34	0	67
MW5VZW	42	131	0	140
MM0BQI	33	84	101	130
M0CNP	6	158	46	158
M0CAL	2	83	0	83
M0AWX	0	226	0	226
M5PLY	0	202	0	202
G0GFQ	0	153	21	155
G0ARF	0	0	150	150
M5GUS	0	128	0	128
M0BZK	0	110	59	120
G0LGJ/M	0	97	0	97
GU0SUP	0	0	96	96
G4YWY/M	0	94	0	94
G0URR	0	0	81	81
G3URA	0	0	42	42
M5AFA QRP	0	0	38	38
MU3DHI	-	-	-	100



QSLs for the April VK9ML Mellish Reef DXpedition have now been sent out.

Ken, G3OCA, will activate some Philippine islands in September, including the **Calamian group** (OC-090), the **Cuyo Islands** (OC-120) and the **Sarangani islands** (OC-175). He will be on CW and SSB with 100 watts to a Yagi or vertical.

Spike, W7AVA, will be active as V63VB from **Pohnpei** (OC-010), from 14 to 23 September. QSL via his home call.

TABLES

WELCOME THIS month to Gus, M5GUS. Most participants have found the pickings a bit thin over the summer, though the IARU and IOTA contests helped to boost totals. Nevertheless, it's nice to see some friendly competition in the table with, for example, Keith, G0GFQ, and Dave, M0CNP, battling it out with each other! Paul, MW5VZW, mentions some nice ones worked, especially on 15, 17 and 20m, including YA5T (fast QSL), 9L1BTB, ZD7VC, TY7Z etc, as well as plenty of IOTA counters, all worked with 100 watts to a modified CB whip. Steve, ZC4BS, writes that he will have left Cyprus by the time this appears. During his tour of duty, using only wire antennas (coaxial dipole / Moxon rectangle and a 600ft delta loop for contesting at the club), he worked 279 countries in all, from just short of 35,000 contacts. He thanks his wife Carol for allowing him time for amateur radio.

The 9-band table appears once again this month, thanks to Henry, G3GIQ. Henry apologises that he is unable to respond to all the letters accompanying the table updates, but he does appreciate them all. Please note Henry's latest e-mail address (by the table) and that next 9-band updates are due by 8 October.

CONTESTS

THE RESULTS OF last year's **CQWW Phone contest** appear in the table. These include the following high scorers: M6T 3rd EU, 10th World, SOAB; GW4BLE 4th EU, SOAB; G3TXF 5th EU 28MHz; GI0KOW 1st EU, 4th World 21MHz; MJ0C 4th EU 21MHz; G4BUO 4th EU SOAB LP; GI4SNA 1st EU 28MHz LP; G0AEV 5th EU 28MHz LP; M5ACC 4th EU 14MHz LP; G0KDS 3rd World 28MHz QRP; GM0IIO 2nd World 21MHz QRP. Quite a set of achievements! The CW results will appear next month.

The **All Asia SSB Contest** is on 7/8 September. The **Worked All Europe SSB Contest** takes place on 14/15 September. 2001 results appeared in last month's column. I owe an apology to the M5X team (operators G0IVZ, G4EDG and G4TSH) who took 6th place in the CW multi-operator category with a score of 1,220,058 points, and whom I missed out of the results. There were no UK multi-op entrants in the SSB section. In the RTTY leg of last year's contest, UK scores included (asterisk indicates Low Power): G4WFQ* 299,460; GW4KHQ 169,320; GI4KSH 99,320; GU0SUP* 99,197; G0URR* 87,451; MM0BQI* 493.

The **Scandinavian Activity Contests** take place this month; the CW leg on 21 / 22, and the SSB leg on 28 / 29. The *CQ/RJ* WW RTTY DX Contest is also on 28 / 29 September, and is

CQWW Phone 2001
(An asterisk beside the callsign indicates 'Low Power'.)

Single Operator		
M6T (op G4PIQ)	A	7,506,840
GW4BLE	A	6,713,616
GM0F (op GM4AFF)	A	3,615,147
G0AZH	A	514,332
G3LUW	A	92,584
G3UFY	A	21,917
GW3YVC	A	1,462
G3TXF	28	1,179,900
G0RAH	28	11,421
GI0KOW	21	1,698,840
MJ0C (op G3XTT)	21	1,078,350
G3NLY	21	700,964
G4WTD	21	414,120
G4HTD	21	50,232
G3ZXD	14	104,920
G4Z (op G4DEZ)	14	81,198
G3TVU	14	46,354
M5ACR	14	210
GM3POI	7	96,360
*G4BUO	A	2,918,466
*GM0FET	A	1,147,928
*GI0KVQ	A	1,031,990
*G0MTN	A	882,973
*M0CSU	A	611,200
*MU0FAL	A	369,572
*GM3BCL	A	227,205
*M4T (op G0VQR)	A	195,250
*G4DDX	A	192,325
*G4NXG	A	180,532
*GD4GWQ	A	172,557
*M0BEX	A	151,840
*G0WJN	A	143,654
*GW3NJW	A	136,652
*MM0BQI	A	123,900
*M0BWY	A	114,660
*M0BZK	A	97,152
*M5FUN	A	95,496
*G3RSD	A	83,065
*G4GOY	A	80,465
*M5TEM	A	78,020
*GI0VTS	A	58,216
*M0ZAK	A	48,927
*G4AXX	A	4,920
*GI4SNA	28	887,124
*G0AEV	28	529,223
*G3KWK	28	176,468
*G3PJV	28	108,944
*G3ZRJ	28	31,416
*GM3YOG (op G3YOG)	28	28,201
*G0KXL	28	17,819
*M5BGR	28	7,682
*MW0CRI	21	71,400
*GW0AJI	21	54,243
*MI5AFL	21	2,196
*M5ACC	14	436,076
*GI0OUM	14	5,640
*MW5HOC	7	8,692
QRP		
G3FNM	A	77,328
GM4HQF	A	71,995
G4JZO	A	32,680
GM4ELV	A	20,995
G0KDS	28	143,716
GM0IIO	21	47,718
Assisted		
GI4XSF	A	159,929
GI4VIV	A	66,051
G4IIY	A	20,394
G5X (op G4RCG)	28	676,035
Multi-Single		
GD6IA		6,334,180
G4UJS		5,728,970
G5W		4,280,598
G6PZ		4,211,636
G9Q		3,141,548
G3B		2,210,274
GW7X		967,270
M4U		895,026
M0RCA		663,432
Multi-Multi		
GZ7V		8,492,334
GM2T		4,276,044
GM0B		3,405,285

probably the biggest RTTY event of the year. 2001 results appeared last month.

In the 2001 OK/OM Contest, UK results were: EU/SO/HP/160 G4VQO 1716; EU/SO/HP/40 G5LP 5850; EU/SO/HP/20 M0CYB/P 4392; EU/SO/LP/ALL G4OGB 128,856; GM3CFS 93,411; G4KFT 72,216; G3RSD 24,716; G3ZRJ 9964; M0AJT 7917.

AWARDS

THE ANTONIO Navatta, LU5AQ, Memorial Award is issued by the CW Group of Argentina (GACW) to radio amateurs and SWLs who have worked (heard) a total of six different stations as follows: Bronze - two of them will be GACW world-wide members; Silver - four of them will be GACW world-wide members; Gold - six GACW world-wide members. All contacts should be on CW. The fee is four IRCs. Send a photocopy of QSLs / eQSLs to Grupo Argentino de CW, PO Box 9, (B1875ZAA) Wilde, Buenos Aires, Argentina. GACW also reports the following nominations for its 'Diploma al Merito 2002', for their contribution to their use of Morse code and to amateur radio in general: Diploma number 15 Jean Marc Idee, F5SGI; 16 Union Française des Telegraphistes; 17 Martin Hengemuehle, DL5QE; 18 Deustcher Telegrafie Club.

The **10 Years of 9A Award** is to mark the 10th anniversary of the allocation of the 9A prefix to Croatia. This award will be issued to anyone for QSOs made with 9A stations between 5 July 2002 and 31 December 2002. SWLs are also encouraged to work for the award. Each contact with 9A station counts 1 point. A station may be worked only once. On HF, European stations need to achieve 10 points. All modes on all bands are accepted, and contest QSOs can be counted. Cross-mode or cross-band contacts are excluded. There are mode (CW) and QRP endorsements. QSLs are not required; only a certified log extract (with callsign, date UTC, mode). The fee is $5 or 5 Euros. Applications must be received by 31 March 2003. Apply to: '10 Years of 9A Award' Manager, Denis Vincek, 9A3Z, Josipa Karla Tuskana 8, HR-49218 Pregrada, Croatia.

QSLING

TOM, GM4FDM, TELLS me he has had his arm well and truly twisted to take on QSLing duties for Ray HS0/G3NOM. With immediate effect, Tom has logs for: HS0/G3NOM, 9M2/G3NOM, XU1NOM, S21ZF, 5B4/G3NOM, G3NOM/ZC6, A52OM, XW1OM, JT4/G3NOM, S2/G3NOM, E22DX, E28DX and XY1HT. Apart from these, Tom was already QSL manager for V26VG, V2/GM4FDM, 9H3RT, GM6X, GM7X, GM8X, 5V7A, 9G5AA, 2S4FDM and VP8SDX. Must be a glutton for punishment!

WWW.

GACW: http://gacw.no-ip.org
OJ0LA: http://home.c2i.net/la6yea/

GMDX CONVENTION

THE GMDX Convention takes place on Saturday **28 September** at the King Robert Hotel, Whins of Milton, Stirling, starting at 12.30pm, with a wide range of HF-related presentations, followed by an evening dinner. Details from Rob, GM3YTS QTHR; gm3yts@btinternet.com

THANKS

THANKS GO to the following for information extracted: *OPDX Bulletin* (KB8NW), *The Daily DX* (W3UR) and *425 DX News* (I1JQJ). Thanks also to G4OGB for contest results. Please send items for the **November** issue by **21 September.** ♦

HF F-Layer **Propagation Predictions** for **September2002**

	3.5MHz	7.0MHz	10.1MHz	14.0MHz	21.0MHz	24.9MHz	28.0MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** Europe							
Moscow	84.....2678	882....27888	484222358888	.276667788 22	.1689999862.	....2332....	.....
*** Asia							
Yakutsk	.....	1531	642...257887	2276667787 74	..27773.....	...4652.....	...343.....
Tokyo	.....2..	.....47..	.....3671.	.....12335..	....21.....	...242.....	....2.....
Singapore	.....	.....454.	47761	.....17873.	.....16762..	....13564...	.....233....
Hyderabad	.....	1233	3.....17777	1.....168876	..655688862.	..58888984..	..367788 72..
Tel Aviv	67.....3445	882....18888	9581..168887	7.8755688798	...333333.3.	.....	.....
*** Oceania							
Wellington	.....	.....47...	.....1278...	...256667...	....22.....	....22.....	.....
Perth	.....	.....345.	.....3654.	.....4421.	.....344....	..224643....	...345.....
Sydney	.....	.....46..	.....466..	.....2544..	....3665....	..236773....	...3555.....
Honolulu	.....2.....	.2.....	.2651.....	..2542.....	.....	.....	.....
W. Samoa	.....	.....	..4311.....	..256541....	....343.....	.....22.....	.....
*** Africa							
Mauritius	1.....	5.....1555	4.....5666	2.....37764	.....662..	.....43...	.....21...
Johannesburg	78.....155	99.....7999	89.....9999	371....29998	..665468987.	..677778984.	..477778 96..
Ibadan	.....	24.....112	777.....1567	5393...14666	2.9887778632	2.8888888632	..777777762.
Nairobi	.....	1.....	22.....1.11	55.....2134	.264211467 53	..666556752.	..377777 73..
Canary Isles	665.....665	8881....3888	8886...26888	8687534678 88	2.3888889953	...6878885..	...4555563..
*** S. America							
Buenos Aires	111.....	878.....37	657.....35	4252.....143	...3521 1474.	....532356..	....432354..
Rio de Janeiro	.....	324.....23	436.....244	214.....432	..2363236851	....654577..	....554466..
Lima	.....	211.....1	1111.....1	...3.....	...6.311232.	...3.42233..	.....32232..
Caracas	.....	111.....1	223.....12	3134.....22	....521113..	....476676..	....254464..
*** N. America							
Guatemala	.....	222.....1	2122.....1	...2.....	.....	.....2..2...	.....
New Orleans	.....	211.....1	3341.....2	1.11.....12	.....677772.	.....47786..	.....35564..
Washington	11.....	666.....6	8785.....47	634251..1378	.....777773.	.....36674..	.....23342..
Quebec	66.....26	887.....88	6231.....265	...52..1253.	...2566675..	....455554..	....333442..
Anchorage	.....	231.....	232.....1	..1....1223.	.....34..	.....2..	.....
Vancouver	.....	.21.....	122.....	.....	.....244..	.....233..	.....
San Francisco	.....	122.....	111.....	.....	.....232..	.....342..	.....2...

Key: Each number in the table represents the expected *circuit reliability*, eg '1' represents reliability between 1 and 19% of days, '2' between 20 and 29% 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 the signal is expected to be strong.

The RSGB Propagation Studies Committee provides propagation predictions on the Internet at www.g4fkh.demon.co.uk The page is updated monthly. The provisional mean sunspot number for July 2002 issued by the Sunspot Data Centre, Brussels, was 99.9. The maximum daily sunspot number was 192 on 28 July and the minimum was 52 on 12 July. The predicted smoothed sunspot numbers for September, October and November are respectively: (SIDC classical method – Waldmeier's standard) 98, 96, 94 (combined method) 88. 85, 81.

BOB TREACHER, BRS32525
93 Elibank Road, Eltham, SE9 1QJ.
E-Mail: brs32525@compuserve.com

SWL

PROPAGATION really does seem to be in the doldrums as I write this. The amateur bands do not seem to have produced much in the way of startling DX of late - we can only look forward to the autumn when conditions should improve from the rather 'flat' conditions encountered at present. This autumn may see the last of the good conditions, so make the most of them.

Having said that, in the last month, CY9DH made a welcome appearance on 24MHz as a new DXCC entity for me on that band, the first since the TN DXpedition in mid-May.

The poor band conditions and summer holidays seem to have had an effect on SWL news this month. However, it is good to welcome back Martyn, RS184847, who used to hold the SWL callsign of RS96149. He now has a relatively decent computer and is keen to find a good logging program. The G0MDO logging software is in use here, but for contests we use EI5DI's *SDL*. Alan Jubb's, G3PMR, *SHACKLOG* is a good program, too. All three have good websites (see www. below) so take a look and download the software.If there are other SWL logging programs out there, please let me know and I can feature details in a later column. Martyn has been an SWL for around 30 years and is keen on prefix hunting and contesting. He was a member of the International Listeners Association as RS88763.

WANTED

NO, NOT A new DXCC entity, but an antenna tuner. The column does not usually feature 'wants', but this month I heard from C6ANI who would like to be able to acquire a high quality antenna tuner to cover 1.8 to 30MHz or 1.8 to 54MHz. He is not looking for a preselector as such, as his receivers have adequate gain. However, it is felt that they suffer from more of a mismatch than anything else. Does any reader have an unwanted ATU, or ideas on where a good ATU can be purchased? Ideas and suggestions to C6ANI at c6anirumcay@hotmail.com

QSLING

I HAVE DEALT with many bureau requests for D68C QSL cards in the last few weeks. The number of reports replied to is fast heading towards the 1000 mark. A big batch of cards went to the RSGB bureau at the end of June. Most had been received via Phil, G3SWH. There are about 100 cards that still need replying to. They should be in the bureau by the time you read this.

I have been quite surprised at how many SWL reports are *not* from the UK. There have been hordes of cards from German SWLs, and quite a few from SWLs in UA, OK and ON. It begs the question of how many G SWLs are active and actually send reports to stations? Activity from D6 in the past few years has been quite scarce on the bands, and there had not been any real WARC band activity, so I would envisage reports for loggings on the WARC bands if nothing else.

It does, of course depend on each listener's QSLing habits - perhaps you only collect one card from each country and you do not collect cards by band or mode? There are a number of permutations. As the D68 team did a fantastic job handing out so many contacts, especially to British amateurs, it does seem somewhat strange that I have seen so few British SWL reports. If any SWL did hear the DXpedition and needs a card, I still have a good supply of blank cards and will be pleased to confirm D6 for you - providing the details correspond with the D68C log.

QSL used by Korean stations to celebrate the 2002 FIFA World Cup.

The shack of German SWL Peter Sinke.

WEATHER SATELLITES

HOW MANY LISTENERS follow weather satellites? Keith Holland, G3MCD, has provided this information with the aim of getting more people involved in the monitoring of weather satellites. They have been around for about 40 years and can be divided into two groups - polar orbiting and geo-stationary. Let us look at the polar-orbiting variety. They are called polar-orbiting as they pass over the north and south poles and take between 100 and 110 minutes per orbit. They are at a height of approximately 500 miles, and because the earth rotates 25 degrees in the time for one orbit they pass every point on the earth twice every 24 hours. They transmit between 137 and 138MHz and can be received on a simple indoor antenna. The American National Oceanic and Atmospheric Administration (NOAA) series travel at about 17,000MPH and send back a line-by-line picture of what is below the satellite. In the simple APT (automatic picture transmission) mode they send back an infrared picture beside a visual picture, so you can still get pictures at night. A typical satellite takes about seven minutes to cross Europe and builds up a picture that is 1000 miles wide. The resolution of the APT system is 4km. They also transmit high-resolution digital images on the 1700MHz band. This is called HRPT and needs much more expensive equipment and a tracking dish.

An RX2 weather satellite receiver kit for 137MHz polar-orbiting satellites will cost in the order of only £55. Suitable software, such as *WXSat* v2.59 by Christian Bock, can be downloaded from the web free of charge. Some other useful websites are given in WWW. below.

Currently you can hear the following (if they are switched on):

NOAA12 and 15 on 137.5MHz
NOAA14 on 137.62MHz
Meteor 3-05 on 137.3MHz
Meteor 2-21, Okean and Sich on 137.4MHz
Resurs 01 4 on 137.85MHz. ♦

WWW.

G0MDO SWL logging software www.rafars.freeserve.co.uk/easiswl.htm
EI5DI *SDL* logging software www.ei5di.com
***SHACKLOG* (Alan Jubb, G3PMR)** www.shacklog.co.uk
WXSat software download www.hffax.de/WX_Satellite/WXSa/wxsat.html
The Remote Imaging Group www.rig.org.uk
Heavens Above www.heavens-above.com
(gives current position and pass times of all satellites and the International Space Station)
NOAA www.noaa.gov
CNN weather forecasts www.cnn.com/weather
Dundee University Satellite Receiving Station www.sat.dundee.ac.uk
(high resolution pictures within a few minutes of the NOAA pass, plus picture library)

Antennas

PETER DODD, G3LDO
37 The Ridings, East Preston,
West Sussex, BN16 2TW
E-mail: g3ldo@ukonline.co.uk

I HAVE received various comments about the '50/50 Jubilee' competition [see 'Antennas' July 2002 - Ed]. While in general it is regarded as a good idea, at least one writer was unhappy about the 'competitive' nature of the project. I guess it might have been a better idea to call it an experiment. The operating aspect is really the only measure of antenna effectiveness. Most contest operators spend a lot of time honing their antenna systems for maximum performance and this can only be done with experimental operation. If you have any interest in the project at all then you should participate. Some suitable ways of using your 50ft wire are described below. I would be interested in hearing of your solution.

TYPES OF 50/50 ANTENNA

THE SIMPLEST way of using your 50ft length of wire would be to make an inverted-L with a 10 to 30 ft vertical section (depending on where the shack is located) and the balance of the length being used for the top section. This antenna is fed using an ATU located close to the transmitter. A good RF earth is also required. If you have an upstairs shack, an artificial earth may be necessary and methods of feeding this antenna are described in [1]. The disadvantage of this antenna is that the vertical section is located close to the house wiring and electrical gadgets and there is a high probability of electrical interference. For some reason this type of antenna is a total failure at my QTH; the house seems to be a RF black hole that only generates electrical interference. On the other hand, Dave Sergeant, G3YMC, finds this type of antenna (65ft) at 30ft high very good and over a period of 50 days worked 311 stations in 79 DXCC countries using an Elecraft K2 running 5W. This would be a good achievement using a multiband beam!

The other method is to feed the inverted-L antenna remotely at a point located as far from the house as practicable to reduce electrical interference. To avoid high transmission line losses the ATU should be located at the feedpoint. With modern automatic ATUs the system can be quite simple. If you can't afford an automatic ATU, there are cheaper solutions, also described in [1]. Again a good RF earth should be used and a set of radials buried in the ground are effective. This method of end feeding an antenna works at my QTH so it would appear that the performance of the inverted-L is very much affected by its environment.

The 50ft length of wire centre fed with home made twin-line feeder. In the foreground is a PA0SE coax balun. This arrangement was replaced with 450Ω ladder line all the way back to the outside of the shack, with a short length of coax through the wall to the ATU.

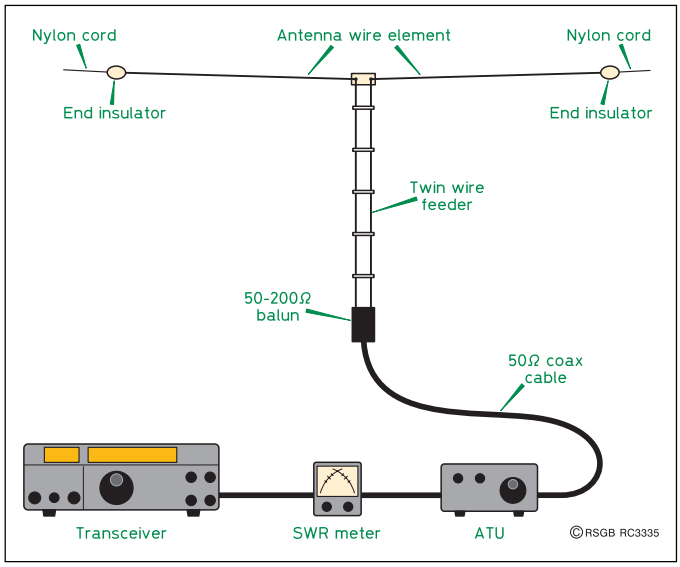


Fig 1: The 'Comudipole' arrangement. This allows the use of low-loss twin feeder to be used in conjunction with coax cable. The coax cable section is used in order to negotiate areas where the use of twin feeder is not practical, such as in a conduit with other cables or in metal ducting in apartments. The coax section should be kept as short as possible to minimise losses.

Because most electrical interference appears to be vertically polarised it might be better to use a horizontal antenna if you have the space.

Multiband dipoles do not have to be any specific length - after all if you want to operate on several bands a wire antenna cannot be resonant on all of them. Furthermore, the choice of a non-resonant length of wire avoids wild impedance values on some bands. My choice is to feed the 50ft of wire in the centre using balanced twin wire feeder. I decided to try the 'Comudipole' feed system [1] [2], which is shown in **Fig 1**. This method locates the balun unit, normally located inside the ATU, at some remote point so that coax can be used for the problem area of entry into the shack. Because a length of coax (24m) running from my shack to the garden already existed it seemed a good idea to use this. The 50ft dipole was fed with open wire feeder, using a PA0SE coax cable balun [1] to couple it to the existing coax feeder.

The antenna loaded on all bands using an MFJ Versa-Tuner V in the shack. On the 7MHz and 10MHz bands the performance was reasonable, but on the higher frequencies it was rather disappointing. I should have known better. With a multiband antenna like this high SWRs are common. With a 25m length of coax these high SWRs can cause losses of around 6 to 10dB at the higher frequencies. The graphs shown in G3SEK's *In Practice* column [3] illustrate this. Replacing the existing coax cable with 450Ω ladder line made a significant predictable improvement to the higher HF band performance of my 50ft centre-fed antenna. It does make you wonder about those G5RVs that you hear about that are fed with long lengths of RG58 and with reports of low SWRs on all bands!

There is rather a nice transmission line Windows software package that comes with *The ARRL Antenna Book* [4]. All you have to do is enter the transmission line type and length, together with measured impedance values, and up it pops with the calculated line loss plus a lot of other interesting information.

REFERENCES

[1] *Backyard Antennas*, Peter Dodd, G3LDO.
[2] *Electron*, December 1992. Reported in 'Technical Topics' *RadCom* July 1984.
[3] Losses from High SWR, G3SEK, 'In Practice' *RadCom*, March 2002.
[4] TLW Transmission Line Program for Windows, by N6BV, *The ARRL Antenna Book*, 19th edition. ♦

ATV

TREVOR BROWN, G8CJS
E-mail: chairman@batc.org.uk

MAY I START by thanking all the people who wrote and e-mailed me with regard to the July column, and in particular Telstar and the cross-polarisation with Goonhilly Down? I cannot reply to you all, or I will not have time to write this column. Every communication confirmed that Goonhilly was cross-polarised, and they all raise speculation on how this happened - from poor communications to political intrigue. It was interesting to see how many readers worked on this project.

DINNER ON A WING AND A PRAYER

MOVING ON, 16 June was the BATC annual get-together at Shuttleworth. It started with a dinner on the Saturday evening, in what can only be described as palatial surroundings. This was only surpassed by the stream of vintage aeroplanes flying past the mullioned window, including Tiger Moths and a Fairey Gannet. The dinner ended with the President (Mike Cox) proposing a toast to the continued success of the club.

BATC DVD PROJECT

THE following day, the lecture room was converted into a TV studio for the day as part of the BATC DVD production project. The guest speakers were Ian Waters on 70cm TV, Mike Ferriday on digital signal processing, and Mike Cox on the design of an SDI vision mixer. Mike's lecture was augmented by a practical demonstration of the progress so far, running on what can only be described as the world's largest breadboard.

ATV FLY-BY

ELSEWHERE in the building, a gallery of broadcast TV cameras was set up by member Paul Read. The refurbished Southern OB truck was powered up and ready for visitors, courtesy of Paul Marshall. The trade stands were populated by the usual goodies and the smallest ATV-equipped helicopter yet seen made a fly-by.

ITV DIGITAL?

THE DAY CLOSED with the BGM. I was able to report that we had outperformed ITV Digital in that we were still on the air and in the black. This was confirmed by the Hon Treasurer, Brian Summers. The prestigious Grant Dixon award was presented to Mike Cox for the most outstanding article in *CQ-TV*, and a special award was presented to retiring Committee member Bob Robson.

GERMAN DATV

IT WAS HOPED to show a demonstration of the German digital ATV system at Shuttleworth, but at the moment the encoders have not been released as there are problems with the modulator board. Tests are currently being carried out in Cologne via the 23cm ATV repeater, DB0KO. For a standard FM TV input, the repeater output can be switched via DTMF tones to either FM ATV or DATV.

Reports over a 50km path compare a rather noisy FM signal with a noise-free DATV output using less power. The DATV signal occupies some 6MHz of band space and it said to be more friendly to other band users where it appears as a raised background noise level. This digital signal can be received by a standard satellite set-top box, ie DVB-S.

Concerns have been raised regarding multi-path, as this is not a problem with Satellite TV communications for which the system was designed. The alternative is a COFDM (Coded Orthogonal Frequency-Division Multiplex) system, which is designed for terrestrial transmission, and could be received by an ITV digital box. The problems here are numerous, as the UK boxes revolve around a system of 2000 carriers. The continental systems use an 8000-carrier system. The 8000-carrier boxes will receive the 2000-carrier system, but not the other way around, so we could have a compatibility problem in the UK if we went down this road.

NO MORE MONKEY BUSINESS

THE GOVERNMENT has just announced new plans for this UK system and has promised a better technical performance, but has not said how this will be achieved. If it increases the number of carriers, the existing set-top boxes will not work, and it has already announced that these boxes will receive the new service. It must be pinning its hopes on an increase in transmitter power as a solution. If this system is to replace analogue TV in 2011, I hope the new service performs better than the last one, which sold around one million boxes, compared with B-Sky-B with eight million dishes. ♦

WWW.

DATV	www.datv-agaf.de
BATC	www.batc.org.uk

Left: a Link 110 camera; right, a selection of cameras, including a Philips LDK90 and LDK14, and a Link 130 and 120, all courtesy of Paul Read.

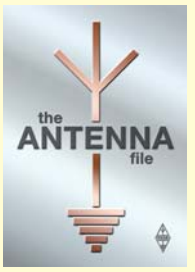
RSGB

ANTENNA BOOKS

VUAN	VHF/UHF Antennas - NEW	£13.99	**£11.89**
ATK2	Antenna Toolkit II	£24.99	**£21.24**
TAFE	The Antenna File	£18.99	**£16.14**
BKYA	Backyard Antennas	£18.99	**£16.14**
NACO	HF Antenna Collection	£9.99	**£8.49**
HFAL	HF Antennas for all Locations	£7.99	**£6.79**
PAFN	Practical Antennas for Novices	£7.99	**£6.79**
TAEG	The Antenna Experimenters Guide	£17.99	**£15.29**

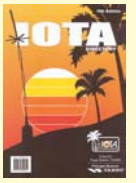
OTHER PUBLISHERS

SAFA	ARRL Simple and Fun Antennas -*NEW*	£16.99	**£14.44**
YAAC	ARRL Yagi Antenna Classics	£14.99	**£12.74**
ACV2	ARRL Antenna Compendium Volume 2	£12.99	**£11.04**
ACV3	ARRL Antenna Compendium Volume 3	£12.99	**£11.04**
ACV5	ARRL Antenna Compendium Volume 5	£17.99	**£15.29**
ACV6	ARRL Antenna Compendium Volume 6	£19.99	**£16.99**
ANTB	ARRL Antenna Book 19th Edition	£27.99	**£23.79**
STAR	ARRL Stealth Amateur Radio	£12.99	**£11.04**
VACS	ARRL Vertical Antenna Classics	£12.99	**£11.04**
MWAC	ARRL More Wire Antenna Classics	£12.99	**£11.04**
WACS	ARRL Wire Antenna Classics	£12.99	**£11.04**
YAGI	ARRL Physical Design of Yagi Antennas	£12.99	**£11.04**



IOTA

ID11	IOTA Directory 11th Ed.	£9.99	**£8.49**
MUG		£4.99	



T SHIRTS

ITSHM	M	£9.99
ITSHL	L	£9.99
ITSHXL	XL	£9.99
ITSHXXL	XXL	£9.99

POLO SHIRTS

ITPL	L	£9.99
ITPXL	XL	£9.99
ITPXXL	XXL	£9.99

(There is no members discount on IOTA goods)

MAPS

LOCE	Locator Map of Europe Wall (folded)	£1.99	**£1.69**
LOCD	Locator of Europe (A4 card for desk)	£2.99	**£2.54**
RAMW	Radio Amateur World Map	£4.99	**£4.24**

RADCOM

RC5363	RadCom 1953-63 Set CD-ROMs	£29.99	**£25.49**
RC6469	RadCom 1964-69 Set CD-ROMs	£29.99	**£25.49**
RC7075	RadCom 1970-75 Set CD-ROMs	£29.99	**£25.49**
RC7680	RadCom 1976-80 Set CD-ROMs	£29.99	**£25.49**
RC8185	RadCom 1981-85 Set CD-ROMs	£29.99	**£25.49**
RC8690	RadCom 1986-90 Set CD-ROMs	£29.99	**£25.49**
RC9195	RadCom 1991-95 Set CD-ROMs	£29.99	**£25.49**
RC96	RadCom 1996 CD-ROM	£19.99	**£16.99**
RC97	RadCom 1997 CD-ROM	£19.99	**£16.99**
RC98	RadCom 1998 CD-ROM	£19.99	**£16.99**
RC99	RadCom 1999 CD-ROM	£19.99	**£16.99**
RC00	RadCom 2000 CD-ROM	£19.99	**£16.99**
RC01	RadCom 2001 CD-ROM - NEW	£19.99	**£16.99**
EAZI	RadCom Easibinder		**£7.99**

VHF/UHF

YGVU	Guide to VHF/UHF	£8.99	**£7.64**
VHFH	VHF Contesting Handbook		**£4.25**
VHFM	VHF/UHF Handbook	£19.99	**£16.99**

OTHER PUBLISHERS

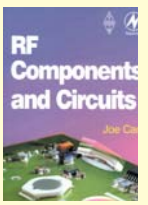
VHDX	DIR VHF/UHF DX Book	£19.99	**£16.99**

EMC

RFCC	RF Components and Circuits - NEW	£22.50	**£19.12**
RAGE	Guide to EMC	£19.99	**£16.99**

OTHER PUBLISHERS

RFIB	ARRL Radio Frequency Interference Book	£17.99	**£15.29**

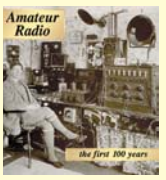


GENERAL TECHNICAL

DMFO	Digital Modes for all occasions - NEW	£16.99	**£14.44**
RHPB	Radio Communication Handbook	£29.99	**£25.49**
PMRC	PMR Conversion Handbook	£16.99	**£14.44**
TEC1	RSGB Technical Compendium	£17.99	**£15.29**
RECB	Radio & Electronics Cookbook	£16.99	**£14.44**
RDRB	Radio Data Reference Book	£14.99	**£12.74**
TTSB	Technical Topics Scrapbook 1985-89	£9.99	**£8.49**
TTSB2	Technical Topics Scrapbook 1990-94	£13.99	**£11.89**
TTSB3	Technical Topics Scrapbook 1995-99	£14.99	**£12.74**
SET	Technical Topics Set	£34.99	**£29.99**

OTHER PUBLISHERS

DSPT	ARRL Digital Signal Processing Technology	£34.99	**£29.74**
PSCB	Power Supply Cookbook -NEW	£24.99	**£21.24**
AH02	ARRL 2002 Handbook - NEW	£27.99	**£23.99**
HFDH2	ARRL HF Digital Handbook. 2nd Ed.NEW	£12.99	**£11.04**
LPCM	ARRL Low Power Communications	£12.99	**£11.04**
SSDD	ARRL Solid State Design	£12.99	**£11.04**
DENK	ARRL W1FB's Design Notebook	£18.99	**£16.14**



HISTORY

SPAR	Even when the Sparrows are Walking	£14.99	**£12.74**
TCRC	Perera's Morse Key Collectors CD	£12.99	**£11.04**
FOHY	Amateur Radio - First 100 years	£49.99	**£42.49**

OTHER PUBLISHERS

RIRB	RW Reflections in a rose bowl	£15.99	**£13.59**

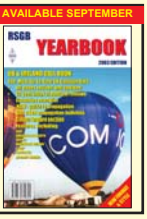
CALL BOOKS

CB03	RSGB Yearbook 2003	£15.99	**£13.59**

OTHER PUBLISHERS

BHCD	Buckmaster Ham Call CD-ROM	£41.99	**£35.69**

AVAILABLE SEPTEMBER



MEMBERS PRICES SHOWN IN RED

www.rsgb.org/shop

Radio Society of Great Britain, Lambda House,

All items are subject to Post & Packing - £1.50 for 1 item - £2.95 for 2 or more

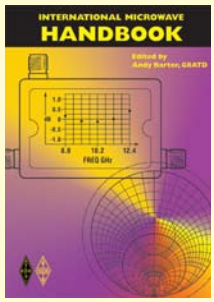
SHOP

MICROWAVES

IMHB	International Microwave Handbook - NEW	£24.99	**£21.24**
MHB3	Microwave Handbook - Bands & Equipment (Members Only - special price 40% off)	£18.99	**£11.39**
MLOP	Microwave Lectures & Other Papers	£13.99	**£11.89**
	Microwave Newsletter - inc postage	£11.15	**£9.50**

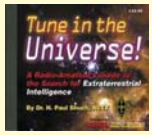
OTHER PUBLISHERS

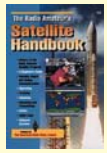
UMEM	UHF/Microwave Experimenter's Manual	£17.99	**£15.29**
MWPM	UHF/Microwave Project Manual Vol. 1	£17.99	**£15.29**
MWP2	UHF/Microwave Project Manual Vol. 2	£12.99	**£11.04**



SATELLITE - ARRL

TUNI	Tune in the Universe	£22.99	**£19.54**
SRHB	Space Radio Hand	£2.99	**£2.54**
ANTH5	Satellite Anthology	£10.99	**£9.34**
SATH	Satellite Handbook	£18.99	**£16.14**
WSHB	The Weather Satellite Handbook	£17.99	**£15.29**





QRP (LOW POWER)

LPSB	Low Power Scrapbook	£12.99	**£11.04**
GQRP	G-QRP Club Circuit Handbook	£9.99	**£8.49**
LEHB	The LF Experimenters Handbook	£18.99	**£16.14**

OTHER PUBLISHERS

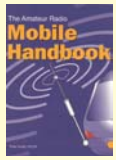
QRPP	ARRL QRP Power	£12.99	**£11.04**
QRPN	ARRL W1FB's QRP Notebook	£8.99	**£7.64**

OPERATING AIDS

MOHB	Mobile Handbook	£13.99	**£11.89**
AROM	Amateur Radio Operating Manual	£24.99	**£21.24**
PREG	Prefix Guide	£8.99	**£7.64**
YFAS	Your First Amateur Station	£7.99	**£6.79**
YGTP	Your Guide to Propagation	£9.99	**£8.49**
HFAR	HF Amateur Radio	£13.99	**£11.89**

OTHER PUBLISHERS

DXCC	ARRL DXCC Countries List	£3.99	**£3.39**
DOTE	ARRL DXing on the Edge	£27.99	**£23.79**
HIKI	ARRL Hints & Kinks - New 15th Ed	£10.99	**£9.34**
LDXG	ARRL ON4UN's Low Band Dx-ing	£26.99	**£22.94**



SUNDRIES

BCAP	Luxury Baseball Cap RSGB	**£4.99**
DLLB	Callsign Lapel Badge - Deluxe	**£4.50**
CSLB	Callsign Lapel Badge - Standard	**£4.00**
RSGB	RSGB Lapel Badge - Standard	**£2.99**
TBLU	RSGB Tie - Dk. Blue / RedDiamond	**£7.99**
TCRE	RSGB Tie - Single Diamond	**£7.99**
TRED	RSGB Silk Tie - Burgundy / Stripe	**£12.99**
PORDL	POLO SHIRT Poly/Cotton Red L	**£9.99**
PORDXL	POLO SHIRT Poly/Cotton Red XL	**£9.99**
PORDXXL	POLO SHIRT Poly/Cotton Red XXL	**£9.99**
PONYL	POLO SHIRT Poly/Cotton Blue L	**£9.99**
PONYXL	POLO SHIRT Poly/Cotton Blue XL	**£9.99**
PONYXXL	POLO SHIRT Poly/Cotton XXL	**£9.99**

(The above items are only available to members)

MORSE CODE

IMCD	Instant Morse CD-ROM	£14.99	**£12.74**
MCRA	Morse Code for Radio Amateurs	£4.99	**£4.24**

ARRL

MCEL	Morse Code The Essential Language	£8.99	**£7.64**
IMTC	Your Introduction to Morse Code (2 tapes)	£9.99	**£8.49**
INMC	Your introduction to Morse Code (CD)	£9.99	**£8.49**

SPECIAL MODES

PRPR	Packet Radio Primer	£9.99	**£8.49**

OTHER PUBLISHERS

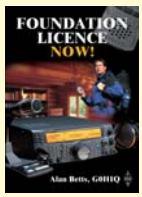
ATMM	APRS Tracks, Maps & Mobiles	£12.99	**£11.04**
PSMS	ARRL Packet, Speed & More Speed	£11.99	**£10.19**

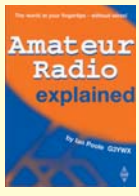
TRAINING

FNOW	Foundation Licence Now! - NEW	£3.99	**£3.39**
AREX	Amateur Radio Explained	£9.99	**£8.49**
STN3	Novice Licence Student's Notebook	£4.99	**£4.24**
RAE2	Radio Amateurs' Examination Manual	£14.99	**£12.74**
REVN	RAE Revision Notes	£5.00	**£4.25**
NOVQ	Revision Questions for the Novice RAE	£5.99	**£5.09**
TFNL	Training for the Novice Licence Instructor's Manual	£9.99	**£8.49**

OTHER PUBLISHERS

BNHC	ARRL Best of New Ham Companion	£9.99	**£8.49**
WKSH	RS Novice RAE - Additional Worksheets	£6.00	**£5.10**
QARM	RP Radio Amateurs' Question & Answers	£14.00	**£11.90**
ECTP	RP RAE End of Course Test Papers	£13.99	**£11.89**





LOG BOOKS & LOG SHEETS

LBRX	Value Log Book Receiving	£4.99	**£4.24**
LBAR	Value Log Book Transmitting	£4.99	**£4.24**

QST MAGAZINE - ARRL

PE01	QST, NCJ, QEX CD - NEW	£16.99	**£14.44**
PE00	QST, NCJ, QEX CD	£16.99	**£14.44**
QST1	QST 1 Year Sub - Air Mail		**£44.00**
QST2	QST 2 Yrs. Sub - Air Mail		**£84.00**
QST3	QST 3 Yrs. Sub - Air Mail		**£118.50**
QSTC	QST 1 Year CD		**£28.00**
QSTC2	QST 2 Year CD		**£52.50**
QST3	QST 3 Year CD		**£74.50**

or Tel: 0870 904 7373

Cranborne Road, Potters Bar, Herts EN6 3JE

All major credit cards accepted.

JEREMY BOOT, G4NJH
E-mail: jp.boot@ntlworld.com

INTERNET LINKING SYSTEM PAGES

SOME OF YOU will remember *Ham Radio Today* magazine (which became *Radio Today*) in which I wrote a monthly column. At that time, Andy Gayne looked after *RadCom*'s 'WWW' interest, which I followed with great interest, and I am delighted to be taking over this column from him.

A lot has happened in the last few years. Internet once seemed to some a threat to the hobby; some still think it is, but others saw it as a new tool to promote what we have to offer. It certainly is, and has proved to be a wonderful means of almost limitless publicity for us. A few years ago, Internet amateur pages were patchy to say the least, but now there are many thousands of them on every conceivable subject of the hobby. Never before have we been able so widely to air and share all manner of amateur radio subjects so easily. In the forthcoming articles, I hope to explore some of the most interesting of them.

ONE OF the practical uses of the Internet, especially to people unable to plant antenna farms, run complex and expensive equipment etc, has been the licensed Internet gateways. These let any amateur with modest equipment – even a low power handheld – access a node which connects through the Internet to another point, perhaps the USA or Australia, or even just another G station. You can have a contact, admittedly without using the 'black art' of propagation, its study and control, but at least with the pleasure of a QSO with a fellow amateur. At first most Internet links used the *IPhone* system, but this is no longer supported by its masters and other systems have developed.

Ian Abel, G3ZHI, the guru of Internet linking, and whose pages are well worth a visit, has written in various publications about linking and *IRLP*. From his pages you can follow links to the different linking systems which, briefly, are: *IRLP*, *iLINK*, *eQSO* and *eCHOLINK*. If this is mysterious to you, be sure to visit GJ7JHF's pages, which explain the difference between them and who uses what. I found the explanations very good. They all seem to have their advantages. More to the point, you will learn how to access these gateways either by radio or computer. It is good to see that all of these systems have proper safeguards to see that only amateurs can transmit through them. In some systems, 'computer SWLing' is possible. You can follow what is being said without participating yourself. Obviously, it is possible to listen to the gateway by radio in any case.

Of the different systems, look at the eQSO site page. 14 UK gateways are cited with links, and five gateways abroad from Mexico to Holland to the States. The pages include plenty of detail of the system, how to set it up and many help files, together with a WAP page (should we be doing more ham pages for WAP users?).

WWW.

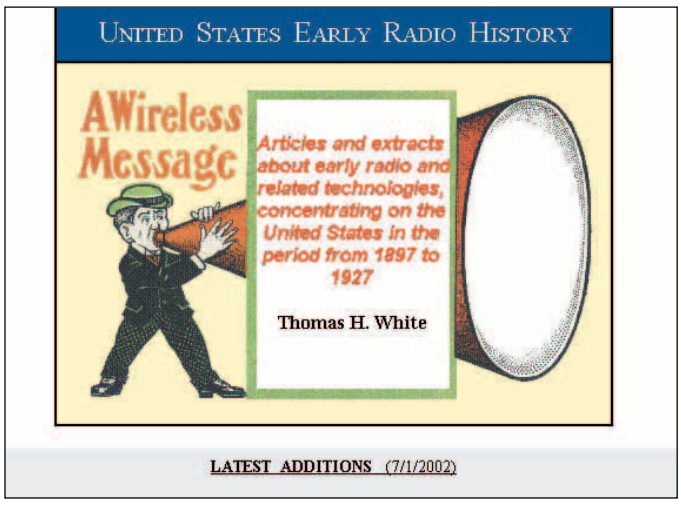
eQSO	www.eqso.org/
G3ZHI pages	www.qsl.net/g3zhi/
GJ7JHF	www.geocities.com/gj7jhf/ilinking.html
Boatanchors	www.boatanchors.com/page2.html
US Early Radio History	www.ipass.net/~whitetho/
Amateur Radio after WWI	www.ipass.net/~whitetho/part2.htm#postWWIamateurs
G4NJH site	http://go.to/g4njh

EARLY / HISTORIC RADIO

I HAVE ALWAYS enjoyed revisiting historic radio and the early pioneers, so no apologies for commending to *RadCom* readers as I did in times past elsewhere, the Boatanchors site, which seems to have branched out somewhat since I last saw it. Dave Ellison, WB7AWK, its webmaster, writes: "Originally, all radio communication was by hams. The early radio amateurs were the innovators, developers, and producers of many of the new devices and techniques in the field of radio. But, like all popular fields of pursuit, commercial interests evolved to fill the need for the 'tools of the trade' and it doesn't take long for a market to evolve." This is a good reminder to us of the essential role of the amateur in early radio days. The BBC and other national broadcasting systems relied heavily on the expertise of amateurs, many of whom filled important jobs and made their careers in radio.

As to the amateur equipment in Boatanchors, all former life is there: Hallicrafters, Heathkit, Globe, Scout, Collins, Ten-Tec and Hammarlund, all in copious detail with links. There are many photos of early commercial radios too (1920s onwards) - glorious polished beasts with glowing valves – a joy to behold. Most of the amateur radio equipment on the site is of the 1950s onwards.

Be sure to read 'US Early Radio History', another fascinating site. It is really a series of articles on early radio. If this sounds rather dull, it isn't, and it is exceptionally well written with excellent and plentiful links. Look up the article on 'The Reinstatement of Amateur Radio' after WWI by Thomas White – so interesting. "With the restoration of their hobby, amateur radio operators worked to re-establish themselves. A meeting of the NE Wireless Association, from the July 1919 *Radio Amateur News*, told how a government District Radio Inspector spelled out the standards to be followed in order to get back on the airwaves. However, some amateurs were guilty of bending these rules... Pierre H Boucheron warned about the need for amateurs to adhere to government requirements, and in particular to 'Keep your transmitter on the lawful side of 200 metres'."



Visit the US Early Radio History site for interesting, well-written information.

PLUS ÇA CHANGE

I COULDN'T HELP noticing the reference on that same site to 'News and Entertainment by Telephone in the Late 19th Century', where there were news and music services and even theatre plays relayed by telephone. So, even in those dim days, there had been plans to use the new telephone device for more than simply basic voice communication.

Now, that's funny, it sounds a remarkably familiar concept 120 years later – oh yes, the Internet. I think that's where we came in. More next month. ♦

QRP QRP QRP QRP QRP

REV GEORGE DOBBS, G3RJV
St Aidan's Vicarage,
498 Manchester Road,
Rochdale OL11 3HE.
E-mail: g3rjv@gqrp.com

DOUG DEMAW, W1FB, was one of the founding fathers of QRP radio construction. His series of articles, written for *QST* in the 1970s, launched a whole genre of amateur radio magazine articles on building simple QRP amateur radio equipment which has lasted until the present day. Although later articles using more up-to-date devices and techniques have superseded them, some of the 30-year-old projects are still being built. In honour of his contribution to the hobby, the Northern California QRP Club (NORCAL) has produced updates of two of his classic articles, complete with kits of parts. These articles are the Tuna Tin 2 transmitter and the Herring Aid receiver.

The Tuna Tin 2 transmitter first appeared as the cover feature article for *QST* in May 1976. The cover picture was a cat looking longingly at a tin of tuna, but the lid (and contents!) had been removed and replaced with a printed circuit board bearing a QRP transmitter. The Herring Aid receiver was a similar concept. In this case, a direct-conversion receiver built on a printed circuit board replaced the lid of a tin of herrings. The novelty and efficacy of the designs appealed to many radio amateurs and hundreds of them were built.

There is a nice twist to the Tuna Tin 2 story. It was thought that the original Tuna Tin 2 transmitter built by Doug DeMaw had been lost but, in the late 1990s, ARRL laboratory superviser, Ed Hare, W1RFI, found it in a flea market in Massachusetts, returned it to ARRL Headquarters, and it was used on the air. To mark Doug DeMaw's contribution to *QST*, the ARRL was granted permission to revive the W1FB callsign and use the little transmitter as part of a 'Tuna Tin Revival'. As I reported at the time in this column, Doug's son, Dave DeMaw, using his father's callsign, made the first QSO with the original Tuna Tin 2 in February 2000.

THE ARKIECON QRP CONVENTION

I HAD THE PLEASURE of knowing W1FB before he died in September 1997, both by visits to his home in Michigan and sharing a speaking platform with him twice at the Dayton Hamvention. Early this year, I had reason to be thankful to W1FB and the Tuna Tin 2 design. I received an invitation from Jay Bromley, W5JAY, to be a guest speaker at the ArkieCon QRP Convention in Fort Smith, Arkansas. Although the timing of the event was inconvenient for me, I succumbed for two reasons; they offered to pay all my expenses and had invited me to speak alongside an old friend, Roy Lewallen, W7EL. The expenses paid to Roy and myself came through sales of Tuna Tin 2 kits by the Arkansas QRP group.

The ArkieCon QRP Convention is a large QRP event; about 150 people attended the QRP presentations, grafted on to a modest-sized local 'amateur radio rally', as we would call it. Sandwiched between two social events, a dinner in a local steakhouse on the evening before the event and a free dinner after the presentations, the convention offered a whole day of QRP talks. I gave two talks on the general theme of QRP construction and W7EL gave two talks on antenna design and we were joined by Graham Firth, G3MFJ, who spoke on QRP PSK31.

A LESSON FOR OTHER GROUPS?

THIS CONVENTION could provide a model for other special interest groups. The formula is simple. Choose an existing amateur radio event and add a special-interest convention. Many events are held at venues where there is space to offer a series of lectures or presentations. Plan a mix of social interaction and specialist talks and offer to pay the speakers adequate expenses. Most organisers of amateur radio events would be pleased to have an influx of extra people drawn by a special interest. This formula has been used, with great success, by W5JAY and his helpers, making the ArkieCon Convention a popular QRP event in the USA.

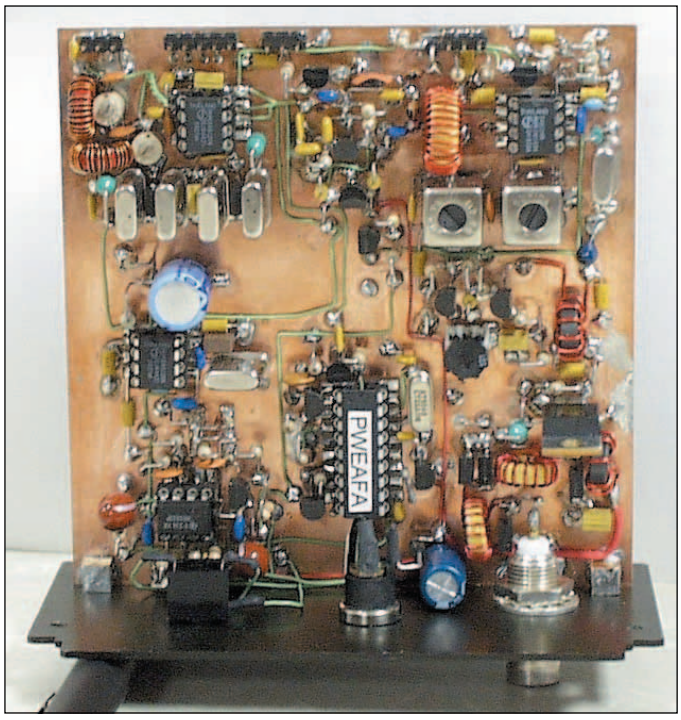
THE G QRP CLUB WINTER SPORTS

I KNOW THAT I mention it each year, but the G QRP Club Winter Sports is one of the most popular QRP operating events. Every year between Boxing Day (26 December) and New Year's Day (1 January) the G QRP Club invites all operators, including those new to QRP operation, to join in a QRP 'QSO Party' using 5W of RF output or less. The operating takes place on and around the international QRP calling frequencies. These are: CW: 1843, 3560, 7030, 10,106, 14,060, 21,060, and 28,060kHz; SSB: 3690, 7090, 14,285, 21,285, 28,360 kHz.

The Winter Sports is not a contest, although the G4DQP Trophy is awarded to the operator thought to have made the best overall contribution to the event. So "5NN BK" exchanges are not heard and participants often linger over interesting QSOs. It is usual for operators to exchange their G QRP Club membership numbers.

The event provides an opportunity for operators who do not usually use low power to turn down their power to 5W or less and see what can be done. Those taking part are invited to submit logs and comments to the G QRP Club Communications Manager, Peter Barville, G3XJS, QTHR (g3xjs@gqrp.com). The G4DQP Trophy is awarded to the station making the best overall contribution, which may not be the station with the most QSOs or working the most DX. So turn down the power and have a try at this popular event. It is one of the few times I have heard QRO stations complaining about QRM from QRP stations!

Enquiries about membership of the G QRP Club can be made to John Leak, G0BXO, Flat 7, 56 Heath Crescent, Halifax, W Yorks, HX1 2PW, (g0bxo@gqrp.com). ♦



A fine 40m transceiver, displayed at Arkiecon 2002, built using copper islands and direct wiring techniques.

DAVE PICK, G3YXM
178 Alcester Road South,
Kings Heath,
Birmingham B14 6DE.
E-mail: lf.radcom@rsgb.org.uk

SEPTEMBER WAS the month that all the fun started in 2000, so it may be worth keeping an eye on the LF news pages to find out what trans-Atlantic activity is taking place. I should think a few US hams will be eager to test their receiving systems at least!

VINTAGE TECHNOLOGY

DICK ROLLEMA, PA0SE, has a genuine 1944 Hellschreiber machine on loan from Arthur Bauer, PA0AOB. Recently, he decided to put it on the air on the 136kHz band. His first transmission was answered using Hell by Markus, DF6NM, and Wolf, DF0WD. Unfortunately the signal/noise ratio was too poor for readable print on the paper tape. Using CW they reported good copy of the Hell signals. The next day, DF0WD tried using a large font (a useful feature of the IZ8BLY software) and Dick saw readable text on his paper tape.

So a two-way Hellschreiber QSO was made with 1944 technology at one end and some high-tech PC software at the other!

The operation of the machine is interesting. It produces two lines of text, one above the other, to remove the need for perfect synchronisation of the transmit and receive machines. Should one machine drift the text will slant up or down but there should always be one line of readable text on the receive tape. The receiver operator adjusts the speed control to make the text horizontal.

A centrifugal speed regulator controls the motor speed. When the speed exceeds the wanted value a spinning weight is forced against the pressure of a spring thus closing a contact. This causes a change in current through the motor field coils and the speed decreases until the contact opens again. The speed settles at a value at which the contact periodically closes and opens. The tension of the spring can be varied with the speed control knob, keeping the speed within very tight limits.

The current through the field coils is actually controlled by a thermionic valve so that the current in the contacts is small and they do not arc.

The motor also incorporates a dynamotor which produces 130V HT for the valves from the 12VDC supply.

MORE VINTAGE TECHNOLOGY

THE GRIMETON radio station in Sweden was active again on 17.2kHz in June, the Alexanderson alternator producing its distinctive CW note. An amateur station, SA6Q, operating on HF and 136kHz was also set up. The LF signals from SA6Q got out quite well, but it seemed to have receiving problems, presumably due to local noise. Despite this, it worked into Germany, Holland and the UK on CW.

As for the big VLF station, signals were good as usual but, at the time of writing, no reports from across the pond have been received.

CIRCUIT IDEAS

THERE HASN'T BEEN very much activity to report over the summer months, so here's another loop aerial idea from Jan-Martin Noeding, LA8AK. Jan-Martin's single-ended preamplifier uses a J310 FET biased to 20mA to give good intermodulation performance. The square loop has sides of 1.5m and consists of 28 turns of insulated wire with the turns separated by spreaders in the corners. The Q is about 50.

I would be interested to see how this performs in areas of high local noise. Perhaps it could be adapted into a balanced version, coupling two FETs into the output transformer. Food for thought!

He also reminded me of his TT item in April 1998, a 136kHz converter using a 4066 as a switching mixer, cheaper than a diode ring and easier to drive. It would be ideal for a low consumption portable receiver.

USA PREPARES FOR 136kHz

AS YOU MAY have seen elsewhere, the FCC is proposing to allow US hams to use the 135.7 to 137.8kHz band with a 1W EIRP limit and 100W maximum transmitter power. This 100W limit will make it difficult for the average amateur to get anywhere near 1W EIRP, so some pretty good aerials will be required if we are to have a trans-Atlantic two-way contact.

The FCC has been seeking comments from interested parties on their website (proposal RM-9404) so they may yet relent and allow a more practical power limit. The other factor to consider is the fact that they quote EIRP as opposed to ERP, a 2dB reduction.

In the meantime, some are already at work preparing to meet the challenge and one suggestion has been a large vertical loop 100ft high and 450ft long, made from copper tubing. I wish I had the space for one of those!

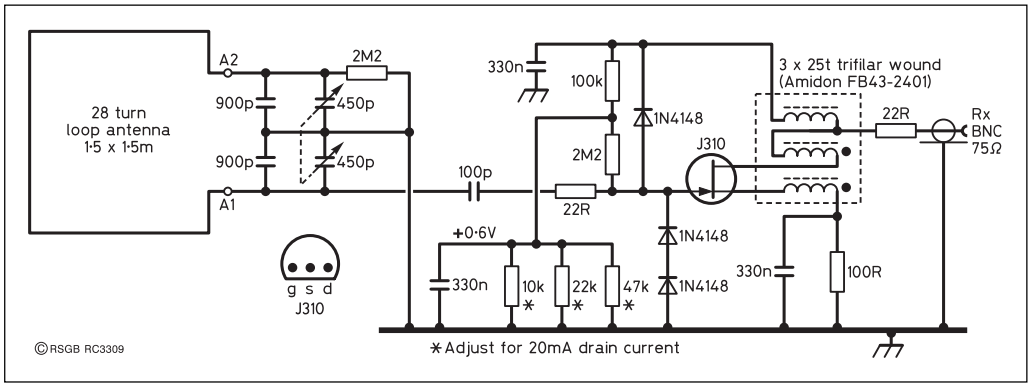
There is no date set for the introduction of the new allocation, but I'm told that these things can drag on for some considerable time. There may not be any US presence on the band this winter but there's still hope.

FIRST QSO FROM YUGOSLAVIA

AT 0730 ON SUNDAY 23 June Teo, YU7AR, worked Szigy, YO2IS, on 136.5kHz CW. Teo has a 50W transmitter using IRF630 FETs and his 80m aerial was suspended from a 35m tower. The reports were 449/559. Teo's locator is KN05BW.

If he can use that transmitting site again with QRS we may be able to make a QSO from the UK. ♦

The 1944 Hellschreiber machine.



LA8AK's loop aerial and preamplifier.

WWW.
FCC
www.fcc.gov/e-file/ecfs.html
LF news page
www.wireless.org.uk

ROGER BALISTER, G3KMA
La Quinta, Mimbridge, Chobham, Surrey, GU24 8AR.
E-mail: g3kma@dial.pipex.com

Members of the Italian-Tunisian 3V8KO team landing on Kuriat I, AF-092.

PEREJIL BRIEFLY hit the news headlines in mid-July when in quick succession the Moroccans and then the Spanish landed armed soldiers on this rocky island, 300 metres off the north coast of Morocco. This was not the first time there had been trouble, but the earlier incident, on 1 May 1994, escaped the attention of the world's media. This occurred when some Spanish amateurs landed on Perejil and set up station EA9LZ/P for a brand new IOTA, AF-069. No sooner had they got a pile-up going on 40m and were rattling along in fine style when gunfire from the mainland brought the operation to an abrupt end. Not wishing to argue the toss they quickly embarked back to Ceuta.

World-wide there are many islands where sovereignty is disputed between two or more countries. More often than not classification in the *Directory* is not difficult, since our reference atlases are quite conclusive. However, not all cases are clear-cut and, of course, time doesn't stand still and the political situation can change. Where a country has achieved *'de facto'* control through an official presence on an island or in the region, it is the normal practice (but there are exceptions) to list the island under that country in the *Directory*. When reviewing the island listings, we thought long and hard about Perejil. Although the few maps we had detailing it showed it was Spanish, the 1994 incident indicated a live dispute with Morocco over sovereignty. In the absence of a Spanish presence on the island, it was difficult to say that Spain had *de facto* control and this magnified the potential danger for any visiting amateurs. With the two other small islands making up the group not easy to activate, AF-069 was a very rare IOTA, all too likely to attract attention from someone prepared to take a risk. In the circumstances we decided in the *Directory* that an operation from Perejil would not be accepted for IOTA without evidence of written permission and a licence to operate from the island. This would at least guarantee the involvement of the 'authorities' who, it was hoped, would be guided not only by the political situation but also by personal safety considerations. In the event perhaps a wise move.

RSGB IOTA Programme, PO Box 9, Potters Bar, Herts EN6 3RH; e-mail: iota.hq@rsgb.org.uk

IOTA ON 6 METRES

THE REAPPEARANCE of Sporadic E conditions on 6 metres has brought back the possibility of IOTA contacts. For your columnist, one year on the band has produced 65 different IOTAs in six continents, making obtaining the IOTA-100 award a realistic first target (thank goodness, Antarctica is not a required continent for the VHF category award!) Recent island contacts were with EH8QL (AF-004), CT3HF and CT3FT (AF-014), IG9SIX (AF-019), ZC40DW (AS-004), SV5AZP (EU-001), GM4ENK (EU-012), 9A6R (EU-016), OY6FRA (EU-018), TF3FK (EU-021), JX7DFA (EU-022), IA5/HB9OAB (EU-028), IB0A & IB0/IK2DUW (EU-045), OJ0VR (EU-053), IF9/I2ADN & IK1RGM/IF9 (EU-054), LC9PBT (EU-056), J48ALO (EU-072), IZ8EEI/P (EU-144), OZ1MAX (EU-171) and FP/NA1CW (NA-032).

MEASUREMENT DIFFICULTY!

"... On BBC News, on teletext and in your paper today, Wolf Rock at Lord Howe Island has been variously described as being 200, 300, 400 and 500 miles from Sydney. Clearly the wretched thing is mobile and its position unpredictable." (From the letters to the editor column in *The Times*, July.)

ACTIVITY ON THE BANDS

THE TWO MONTHS under review saw three new IOTAs on the air. First, in early June, Johan, PA3EXX, mounted a single-handed operation from remote Papegaaien Island on the Guyana / Suriname border. Owing to difficulties of access and transport constraints, his stay on the island was shorter than intended. Nevertheless, in 10 hours' operation he managed over 1000 QSOs using the call PZ5PI to secure SA-092 for IOTA's Suriname group. From Johan's description this island is not for the squeamish. Boa constrictors were just one of the more scary types of wildlife that had colonised Papegaaien.

One week later Giovanni, I5JHW, led a joint Tunisian / Italian team to Kuriat Island to put 3V8KO on the bands and secure AF-092 for the last unnumbered Tunisian IOTA. In three days' operation they notched up an impressive 13,600 QSOs! This team has now aired three of the four Tunisian IOTA groups, mounting each operation as a cooperative venture between the two countries. This has promoted IOTA but, more than that, it has helped the development of amateur radio in Tunisia. Congratulations to all concerned. Then, at the start of July YB8VM/P, YE8XM/P and YC9BU/8 made their way to Wamar Island in the remote Aru Islands in the East Molucca Sea. With modest equipment they gave out OC-249 to more than 2500 contacts in five days' operation.

Yaesu, Principal Sponsor of the IOTA Programme

PERSONAL NOTE

I WAS VERY SAD to learn of Eric Brown's, G0KJW, death in July. Eric will be remembered for his many portable operations from the Farne Islands and a long list of Scottish islands. In his quiet and unassuming way, based on conviction and understanding of what was right, he earned the deep respect and friendship of amateurs not only within the UK but well beyond. He will be greatly missed.

Finally, apologies for the omission of the Club Stations Listing from the IOTA Annual Listings 2002 report in the July *RadCom*. The table below should have been included. ♦

IOTA CLUB STATIONS LISTING - 2002

Pos	Callsign	Score
1	UT7WZA	830
2	SK6PJ	732
3	YL1XZ	712
4	DL0BMW	700
5	HA3KNA	449
6	DL0IOA	404
7	YU7JDE	400
8	DL0TU	393
9	9A1BHI	254
10	HL0C	226
11	G3CSR	168
12	SK7DX	152
13	HA2KNP	135
14	DL0AKR	130
15	RZ3AZO	118

NEW REFERENCES

AF-092	3V	Sousse/Monastir/Mahdia Region group
OC-249/Pr	YB8	Aru Islands
SA-092	PZ	Suriname group

Pr = provisional

WWW.

RSGB IOTA Programme: http://www.rsgbiota.org
IOTA Manager's website: http://www.eo19.dial.pipex.com/index.shtml
IOTA Contest rules: http://www.rsgbhfcc.org/

MICROWAVE

SIMON LEWIS, GM4PLM
Creoch Farm, Ochiltree, Ayrshire KA18 2QH.
E-mail: uwave.radcom@rsgb.org.uk

IT'S BEEN a particularly quiet period for radio at Creoch over the last month or so, due mainly to a very busy period at work. However, the poor weather has not given any encouragement to outside activities and it looks like summer 2002 will go down as one of the wettest on record in Scotland. We can only hope things will improve before the year end. At least the rainscatter operators will have had plenty of propagation (see news below)! The bands in general seem very quiet and the 6m band, another interest of mine, has been almost devoid of Sporadic-E. With that wet and dreary theme, I'll pass on to the news for this month.

WORLD RAINSCATTER RECORD AT 10GHz?

SPEAKING OF rainscatter, Jonathon, HB9DRD / G4KLX reports "On 20 June, DB6NI and DL6NCI (JO50VI) worked IW4CJM / P in JN72MA, a distance of 961km. There is some belief that the QSO was a mixture of sea ducting and rainscatter, although QSOs of over 700km were being worked over land at the same time. DB6NI is DL6NCI's daughter and had been licensed for three days at this point. What an introduction to amateur radio!

G3KEU SILENT KEY

THE UK LOST one of its most active 10GHz enthusiasts recently when G3KEU passed away on Tuesday, 14 May. Tim Leighfield, G3KEU, died of cancer in a hospice near his home in Swindon. He had entered the hospice just a few days before his death at the age of 71 years. He is survived by his wife Ena and his sons and daughters. His funeral took place at Swindon on 22 May and several microwavers were in attendance. Many of you already knew that Tim had been very ill with cancer over the past few months. He struggled on bravely, but the last few weeks unfortunately saw a rapid deterioration. Our thoughts are with his wife and family. Plans are afoot to set up a lasting memorial to Tim, possibly in the form of a beacon (GB3KEU?) and / or a contest trophy. Peter Day, G3PHO, would be interested to hear of any suggestions. His address is correct in the current *RSGB Yearbook*.

PRODUCT NEWS

OUR FRIENDS at Eisch Electronics report that its 24GHz waveguide switch is again available. It has a new Italian fabricator supplying the switches again.

The specifications say the switch has an insertion loss of <1dB and an isolation of >45dB. The construction is given in the advert in the catalogue. The price is 190 Euros. You can order a catalogue or view its stock online on its web pages.

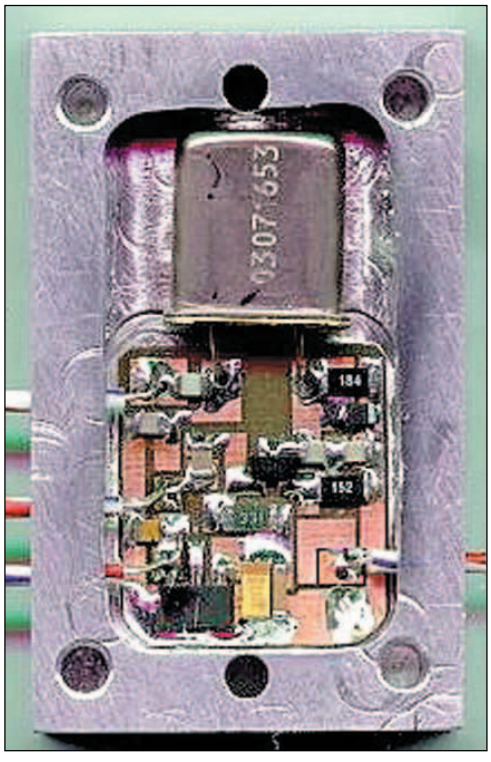
Wimo Electronics send news that it has produced a new RHCP 2.4GHz satellite feed for OSCAR use. The feed comes terminated in an N socket (SMA on request), and is totally waterproofed. The specifications are 9.5dB gain, 63° beam width using right-hand circular polarisation. Power handling is 100W. More information can be found on its web pages.

NEW 10MHz OCXO DESIGN

NEWS OF A new 10MHz ovened oscillator from Germany popped into my e-mail this week. Walter, DC9UP, writes "For a long time, I have been talking about the availability of surplus OCXOs over here in Germany and Europe to achieve the required stability for my DSP-10 transceiver project. There are few on the surplus market over here, and they are very expensive. This situation obliged us to start the development of an new, affordable OCXO in the low-price range, but with all the possibilities and specifications of the 'high-society' high-priced units.

"For more than six weeks, Walter and I have been working hard (outside our normal daytime work) to find a solution which is able to compete with the specs of the OCXOs found on the market. Now we have finished the design and have been building the first units. Lots of problems needed to be solved. One of the biggest problems was the design of the heater. It was a nightmare but, finally, we are able to keep the temperature variation of the oscillator cavity below 0.06°C during an day-night cycle, due to a special oven-cavity and regulation circuit. The unit is also voltage-controllable to be steered by a GPS receiver and its interface-board, like the one from Brooks Shera, W5OJM.

"Everything is finished and final tests have begun. The results so far satisfy our goals. For those who would like to see more, take a look on our website. For even more information please contact me by e-mail to DC9UPgermany@aol.com"



The 10MHz DC9UP ovened crystal oscillator.

BEACON NEWS

THE GM4ISM PERSONAL 9cm beacon in IO86 on 3400.067MHz has been switched off due to concerns over RF exposure levels, reports Mark, GM4ISM. "Until I can borrow a hazard meter that covers the appropriate range, it must remain off. I have to demonstrate (by measurement) that no-one can be cooked! (even though people do not generally go within 20m of the antenna) Calculation shows that the RF level is 50% of the ICNIRP (International Commission for Non-Ionising Radiation Protection) public exposure limit within 1m of the antenna at the maximum power excluding losses! There is no possibility of exceeding exposure limits other than by climbing up and hugging the antenna, and then it is doubtful that SAR limits would be exceeded. Still someone may do that I guess! Still, such is the way of the world. I will let it be known when the beacon is QRV again." ♦

WWW.

Wimo Electronics	www.wimo.com
Eisch Electronics	www.eisch-electronic.com
DC9UP 10MHz OXCO	www.walter-schroeer.de/id24.htm

JOHN HEATH, G7HIA
Chestnuts, Desford Lane, Kirkby Mallory, Leicester LE9 7QF.
E-mail: g7hia@amsat.org

SPACE

RUSSIAN 'Progress' rockets make regular supply trips to the ISS, but the one in March was a little different. On leaving the ISS, Progress ejected a mini-satellite called Kolibri-2000, a 1220 x 510mm cylinder, packed with science experiments, including a flux-gate magnetometer and particle analyser. This joint project, involving students in Russia and Australia, produced some valuable scientific data, as well as providing an interesting opportunity to monitor a short-life satellite on its way to re-entry.

At 380km altitude, the atmosphere is extremely thin, but at Kolibri's speed of 7680m/s, it's enough to produce significant drag. As the satellite fell towards the earth, it speeded up. This was easily confirmed on the ground, as Kolibri's radio signals appeared a little earlier each day. If this speeding-up seems curious, think of the ice skaters in a pirouette who fold their arms in to their bodies to spin faster. A good demonstration of the conservation of angular momentum.

As well as noting the earlier arrival of signals, we could also track the changes in the orbital height by collecting the sets of orbital elements from NORAD and making a few simple calculations. We need only two sets of numbers from the Keplerian Elements, the satellite's Mean Motion, (the number of orbits per 24 hours), and the Eccentricity (0 = circular; values greater than 0 but less than 1 indicate an increasingly 'long' ellipse).

The first set of elements I had was for day 78, which was shortly after launch. The Mean Motion was 15.60369213 orbits per day, and the Eccentricity 0.0011613, very close to a circular orbit.

Epoch Day	Mean Motion	Perigee altitude (km)	Change (km/day)
110.05623	15.8385	312.70	-
113.58384	15.8897	297.65	-4.27
116.15836	15.9392	282.17	-6.01
120.15828	16.0547	248.99	-8.30
122.20623	16.1596	218.87	-14.71

Table 1: Showing the last few days of flight of Kolibri.

Feeding those numbers into the *BASIC* program in the panel gave me the Orbital Period in minutes, indicating that Kolibri was completing an orbit every 92.2 minutes.

The calculated heights were 394.5km for Apogee, the point on the orbit furthest away from the Earth, and 378.8km for Perigee, the point on the orbit nearest to the Earth.

These indicated a slightly elliptical orbit (remember the Eccentricity is not quite zero), since both heights were not the same.

Collecting element sets over several days, I was provided with a few extra sets to fill in the gaps by Graham James Hughes, whose students were part of the project to build Kolibri (thanks, Graham). Visit the students' Kolibri website for more information. Running the calculations produced the table. During day 122, the perigee fell below 200km, leading to re-entry shortly after (**see Table 1**).

Orbital decay can provide valuable data on the upper atmosphere, and NASA is running a research programme using satellites in low orbits. Starshine 3 is currently still in orbit and Starshine 4 will be launched later this year. These spherical 'disco-ball' satellites have 1000 tiny mirrors attached to the surface to reflect sunlight. They will be highly visible in the same conditions needed for good visual observations of the ISS - a clear evening, about two hours after sunset with a darkening sky, and a satellite pass which rises in the west and reaches at least 45° elevation. The higher the better, to get well out of the light scatter and murky atmosphere lower down. Although the sun has set for us at ground level, the satellite at 300km altitude is still in sunlight and bright against the night sky. The flashes of reflected sunlight enables high-accuracy optical tracking.

Schools groups and radio amateurs worldwide took part in polishing the 1000 metal mirrors needed for Starshine 4. The National space Centre Amateur Radio Society joined the project and received its set of three machined aluminium discs.

Together with an instruction CD, grinding and polishing compounds and an optically flat glass test piece, the polishing and testing was carried out as a public participation event in the 'Space Now' area of the Centre. It generated a huge amount of interest, with over 100 people taking part, each giving the mirrors a few passes on the polishing pads. Cliff Shuttlewood, founding member of Leicester Astronomical Society, joined us and we benefited greatly from his experience of polishing telescope mirrors. We polished and tested all three, and sent our best two for integration into the satellite. Starshine was a unique opportunity for Radio Society members and Space Centre visitors to handle a component of a real spacecraft, and take a tiny part in a real space science project. ♦

Polishing Starshine mirrors, under the watchful eye of Ted Coleman, G1LGO, (left) and Cliff Shuttlewood (right).

A Simple *BASIC* Program to calculate orbital period in minutes. Apogee and perigee are in kilometres

```
10 INPUT "MEAN MOTION"; MM
20 INPUT "ECCENTRICITY"; ECC
30 T=1440/MM
40 A=331.25*T^(2/3)
50 APOGEE=A*(1+ECC)- 6378
60 PERIGEE=A*(1- ECC)- 6378
70 PRINT "Period= "; T; " Apogee= "; APOGEE;
75 PRINT " Perigee= "; PERIGEE
80 PRINT "Semi-Major Axis = "; A
```

Using Mean Motion = 15.60369213 and Eccentricity =0.0011613,

gives **Period 92.286 minutes,**
Apogee 394.52 km,
Perigee 378.80 km.

WWW.

Keplerian elements www.celestrak.com
Kolibri http://kolibri.ozweb.nu
Starshine www.azinet.com/starshine

CLASSIFIED ADVERTISEMENTS

Classified advertisements 58p per word (VAT inc.) minimum 14 words £8.12. All classified advertisements must be prepaid. Please write clearly. No responsibility accepted for errors. Latest date for acceptance is 1st month prior to publication.
Cheques should be made payable to RSGB. Copy and payment to:
Jan Forde, Lambda House, Cranborne Rd, Potters Bar, Herts EN6 3JE.
Tel: 0870 904 7377 Fax: 0870 904 7378
E-mail: adsales@rsgb.org.uk

FOR SALE

AR8200 SCANNER, AS NEW. With Discone aerial, Scanner Directory, PC interface. £260 ono. Barrie Kissack 0127 181 6539
E-mail: barrie@kissack.org.uk

AERIAL POLES 6.7m TELESCOPIC. These fibreglass poles make ideal supports for lightweight HF longwires or verticals. £17 inc. p&p. Details at http://www.qsl.net/g3cwi Cheques payable to Richard Newstead, 89 Victoria Road, Macclesfield, Cheshire SK10 3JA.

ALUMINIUM TUBE. Heavy-duty (scaffold) tube approx. dimensions 20' long 2" dia. $^{11}/_{64}$" (4.5mm) wall thickness, 20' and 10' lengths available @ £1.80 + VAT per ft. C.W.O. Rusper Hire (Crawley)
01293 87 1621 office hours only.

CONSIDERABLE QUANTITY immediate Post War components, valves. eg. 807, EF50 etc. Buyer collects (Bath) best offers. McClune (ex GI2BGM) Tel: 01 225 311748.

FIBREGLASS TUBE High strength tube, square box, rod and other sections all from stock in 6m lengths. Engineered Composites, Chester. Tel: 01244 676000
www.engineered-composites.co.uk

GAREX ELECTRONICS VHF/UHF accesories and aerials, PMR equipmnt and spares. www.garex.co.uk PO Box 52 Exeter EX4 5FD.

ISOLATED INTERFACES for PSK31-SSTV-RTTY-WSJT. Suitable for SOUNDBOARD PROGRAMS. NEW INTERCHANGEABLE LEAD model available. see www.g3liv.co.uk johnny@melvin.com Phone 0191 2843028.

MONEY BACK GUARANTEED if G2DYM anti-tvi, anti interference aerials don't outperform any other commercial wire aerial. For information & testimonials send Large S.A.S.A.E:- G2DYM, Uplowman, Devon, EX16 7PH. 01398 361215 Anytime.

PEGASUS BOOK OF Q-CODES QAA -QZZ third edition out May. £10.50 inclusive p&p. Cheques: R. Benham Holman, Uplowman, Devon EX16 7PH.

FERRITE BEADS for current baluns/chokes/line isolators. Qty 50 £18.95 inc. Ferromagnetics P.O. Box 577, Mold, Flints CH7 1AH

PROGRAMMED PROMS, PMR & MORE Details: www.atlantacomms.co.uk or SAE: Atlanta Communications (RC), PO Box 5, Chatteris, PE16 6JT

THE RF KIT CATALOGUE. Send 2 x 2nd class stamps or browse www.rf-kits.demon.co.uk. Hands Electronics, Tegryn, Llanfyrnach, Dyfed SA35 0BL
Tel: 01239 698427.

BRING & BUY

ADVERTISE OR AUCTION your surplus equipment at http://www.bringandbuy.cjb.net

COMPUTER SOFTWARE & HARDWARE

SD - EI5DI's CONTEST LOGGERS. HF £25.00, VHF £25.00, both £39.00. Paul O'Kane, 36 Coolkill, Dublin 18. (00353 1295 3668) www.ei5di.com

SHACKLOG 5.5 - Probably the most popular UK written and UK supported logging software. £32.00. With IOTA add-ons £42.50. SASE + disk for demo copy. Alan Jubb, G3PMR, 30 West St., Gt Gransden, Sandy SG19 3AU. 01767 677913. www.shacklog.co.uk

HOLIDAY ACCOMMODATION

NORTH WALES, CARAVAN, BUNK HOUSE, CAMPING. Elevated site. Use of shack and beam antenna. Open all year. Rural setting. "Tynrhos", Mynytho, Pwllheli LL53 7PS (01758 740712).
tynrhosdiving@btinternet.com

PEMBROKESHIRE SEASIDE holiday home sleeps four from only £150 per week. See www.pembrokeshire.thersgb.net, or send for brochure to G3XDV, 10 Cornmead, Welwyn Garden City, AL8 7QR.

MISCELLANEOUS

CALL IN ON THE 'GOOD NEWS' CHRISTIAN NETS! Every Sunday at 8am on 3747kHz and around 7047kHz and 144.205 at 3pm sharing Christian fellowship over the air. Info from WACRAL, 51 Alma Road, Brixham, South Devon TQ5 8QR
Tel: 01803 854504

FOR INFORMATION, tutorials and books about all aspects of radio and electronics, visit: www.radio-electronics.com

KINGS PATENT AGENCY LTD Patents - Trade Marks - Designs. Literature and fees on request. Tel: 020 7248 6161. www.kingspatent.co.uk

VIDEO TAPE CONVERSIONS to and from all modes NTSC : SECAM : PALN : PALM Digital processing. Fast and economic service. Also 'cine' conversions. g4wmp@qsl.net
Phone 01932 846139.

QSL CARDS

FULL COLOUR BOTH SIDES QSL CARDS for under £70 per 1000 QSL cards. For info send SAE to Qslers P.O. Box 184 Northampton NN3 9JH or E-mail: Qslers@aol.com

FULL COLOUR QSL CARDS , plus our low cost, conventional cards. Personal designs our speciality. LSAE for samples:- The Standfast Press, South Drive, Inskip, Preston PR4 0UT.

G4TJB QSL CARDS printed to your specification, send large SAE for samples and full product list. Unit 6, Worle Industrial Centre, Coker Road, Worle, Weston-Super-Mare BS22 6BX. Tel/Fax: (01934) 512757.

QSL CARDS OF QUALITY Specialising in personalised designs incorporating photographs. Large S.A.E. for samples to: Admiral Printers, 12 Faraday Court, Park Farm North, Wellingborough, Northants NN8 6XY.
Tel 01933 400883.

UX5UO QSL PRINT SERVICE. Quality QSL cards. From £20 for 1000. For samples and prices please send SAE to: Vlad, M0UNF, 43 Nine Acres Road, Cuxton, ME2 1EN.

CLASSIFIED continued

UNIQUE QSLs produce more responses! (specially drawn for you £15) GW3COI, Penrynbach, Abersoch. 01758 712675.

WANTED

VALVES WANTED - NEW AND BOXED. KT66 GEC £35. KT88 GEC £60. EL34 Mullard £27. EL84 Mullard £4. EL37 Mullard £27, DA30, DO30, PX25, all at £120 each. PX4 Globe Shape £70, DA100 GEC £150. ECC83 Mullard £5. GZ32 and GZ34 Mullard £10, ECC32 and ECC33 Mullard £15, B65 Metal Base £8. 53KU Bulbous £8. Other types wanted. Please send a SAE for free list. Old valved radio and test equipment also wanted. COLOMOR (ELECTRONICS) LIMITED, Unit 5, Huffwood Trading Estate, Brookers Road, Billingshurst, West Sussex RH14 9RZ. Tel: +44 (0) 1403 786 559 Fax: +44 (0) 1403 786 560

STILL AVAILABLE.
Special investment terms for RSGB members.

Argent

* WITH PROFIT BONDS
Standard Life (uplift 3%) minimum investment £10,000

Clerical Medical Investment Group (uplift 2%) minimum investment £5000

* INDIVIDUAL SAVINGS ACCOUNTS (ISAs)
Framlington Absolute Growth. (5% initial charge reduced to 3.5%) maximum investment £7000.

We are required to give a warning that past performance is not a guide to future performance. The value of your investment and the income from it can fall as well as rise and you may not get back the amount you originally invested. Tax assumptions may change if the law changes and the value of tax relief will depend upon your individual circumstances. Regulated by the Financial Services Authority.

ARGENT BROKING GROUP LTD. (RSGB/GAL) , 8-9 Lovat Lane, London EC3R 8DW. Tel 020 7621 1133. Fax 020 7621 0203.

BUSINESS CARD SECTION

CB & Amateur Radio P&D

MIØCIB
PETER BELL
1 KNOCKBRACKEN DRIVE
COLERAINE CO LONDONDERRY
N IRELAND BT52 1WN
PHONE: 028 7035 1335
FAX: 028 7034 2378
MOBILE: 07798 731460
EMAIL: peter@amateur-radio-ni.co.uk

LAR COMMUNICATIONS
THE COMPLETE RADIO SUPPLIERS
STEVE POUNDER
BRADFORD ROAD EAST ARDSLEY
NR. WAKEFIELD WF3 2DN
TEL:0113 252 4586
FAX: 0113 253 6621

WATERS & STANTON PLC
ISO 9002 REGISTERED FIRM CERTIFICATE NO: A4942
SPA HOUSE
22 MAIN ROAD, HOCKLEY
ESSEX SS5 4QS. U.K.
E-mail: sales@wsplc.com
Web: www.wsplc.com
TEL: 44 (01702) 206835
OR: 44 (01702) 204965
FAX: 44 (01702) 205843

ML&S martin lynch & sons
Suppliers of Communications Equipment
128 & 140-142 NORTHFIELD AVE., EALING, LONDON W13 9SB
TEL: 0208 566 1120
FAX: 0208 566 1207
Web: www.hamradio.co.uk E-mail: sales@mlands.co.uk

MODE COMPONENTS
23/24 WARSTONE LANE, HOCKLEY, BIRMINGHAM B18 6JQ
Tel/Fax: 0121 233 3661 Mobile: 07929 912724
E-Mail: ctredwell@webleicester.co.uk
Electronic component mail order only
For full details of services and rally details see:-
Web: http://modemidlands.tripod.com/modemidlands

QSLfactory.com
You need never run out of cards again

JVM RF & EMC Solutions Ltd
VARGARDA RADIO's ANTENNAS
High Swedish performance & quality.
Park View, Chapel St. Telford TF4 3DD
Fax: 01952 275167 - Tel: 01952 502550

Robin C Worsley G0 MYR
COMMUNICATIONS SPECIALIST
'OMARU', PENNANCE ROAD, LANNER, REDRUTH, CORNWALL TR16 5TQ
www.hamradiosales.btinternet.co.uk
TEL: 01209 820118

Adur Communications
Radio Communication Sales & Servicing
Tel: 01903 879526
E-mail: pgodbold@adurcomms.com
www.sales@adurcomms.com

www.twoway-radio.co.uk

Castle Electronics
REPAIR AND SERVICING TO ALL TWO WAY RADIO COMMUNICATIONS AND CCTV SYSTEMS
UNIT 20, WOLVERHAMPTON BUSINESS AIRPORT
NR. STOURBRIDGE, WEST MIDLANDS DY7 5DY
Tel: 01384 221036 Fax: 01384 221037

KENT ENGINEERS
KENT MORSE KEYS
www.kent-engineers.com
243 CARR LANE, TARLETON, PRESTON, LANCS. PR4 6BY
Tel: (44) (0) 1772 814998
Fax: (44) (0) 1772 815437
E-mail: kent.engineers@cwcom.net

TO ADVERTISE IN THIS SECTION PHONE JAN: 0870 904 7377

Sycom
P.O. Box 148, Leatherhead
Surrey KT229YW
Resistors - Capacitors - Switches - Semiconductors
Cable Connectors etc.
Tel: 01372 372587 Fax: 01372 361421
E-mail: robin@sycomcomp.co.uk
Web: www.sycomcomp.co.uk
COMPONENTS AND AMATEUR RADIO EQUIPMENT PURCHASED

Curtis Communications Ltd.
CB RADIO, AMATEUR RADIO, PMR446
SCANNERS & ACCESSORIES
BOUGHT AND SOLD P/X NO PROBLEM
TEL: 01633 866488
Unit 119 Springvale Ind. Est., Cwmbran NP44 5BG

Advertisement Index

Next Advertisement Copy Date:
Display advertisement copy date for
OCTOBER 2002 is 20th AUGUST 2002

the last WORD

The CFA Again

Some readers may have guessed that I knew all along what would be the result of my hypothetical two-tone-test on the Crossed Field antenna ('The Last Word', July). There is of course no intermodulation between the two carriers fed to the magnetic and electric elements of the antenna. Thankfully both the antenna structure and the rest of the known universe are quite linear and the two carriers are independent and additive. I fully agree with Messrs Hateley and Kimber on this point. ('Technical Feedback', August).

But we can deduce from this that if one of my carriers radiates X watts and the other radiates Y watts, then the combined radiation is always X+Y watts, and that this will be true regardless of the relationship between the two carriers. In particular it's true if they are the same frequency.

We can therefore also deduce that the antenna would still radiate X+Y watts if I put all my power into one element and discard the other. There is thus no advantage in generating both fields, crossed or otherwise. The same result can be obtained by generating either alone.

Peter Martinez, G3PLX

"CQ on 20 Marconis"?

Reading about D, E and F layers in the July *RadCom* led me to wondering whatever has happened to dear old Appleton and Heaviside? Now that we have lost kc/s (easy to say) to kilohertz (gobbledegook), shouldn't we resurrect Messrs Appleton and Heaviside? For that matter, how come we don't measure something or other in Marconis? Should the D, E and F layers become the Appleton, Heaviside and Marconi layers?

John Allison, G0LYY

Share Your Skills

I would like to express my appreciation to the RSGB and the RA for the creation of the Foundation Licence Training Scheme and the whole ethos behind the M3 licences, and to all local amateurs who have lent the scheme their support.

My three grandsons are now M3AUH, M3LWM and M3NKA, and took the excellent course organised by Colchester Radio Amateurs under the watchful eye and participation of Frank, G3FIJ.

Yes, I know we had to take a written exam; yes, I know we had to send and receive Morse at 12WPM, but as the song says, "the times they are a-changing".

Of course they will make mistakes, didn't you? I hope that all radio amateurs will be faithful to the true spirit of amateur radio and wherever possible help and assist any new M3 who is taking his or her fist solo experience on the bands.

If you have any doubts, go along to a local radio club and sit in on a Foundation Licence course. Better still, offer your services and share your own skills. I can assure you that you will be pleasantly surprised.

Jeff Harris, G3LWM

A Change of Heart

I have been a keen SWL for over 25 years and thoroughly enjoy the time I spend with my receivers, from prefix hunting to contesting or just generally listening to all around the world, it's always been my way of relaxing after a hard day's work. However, I have been hesitant in the past to go for the RAE. There are a few reasons for this, but it's mostly due to some of the derogatory comments I've heard on the bands regarding new licensees from people who, in my opinion, should really know better.

Having said that, I was tuning around the 40m band on Thursday 18 July, around 1400, and some of the strongest signals I found were coming from the RAFARS net so I stopped to listen for a while. Well I can only say that my opinion on operating was totally changed, thanks largely to the guys who were on the net that day.

One of the operators who'd joined in was very new to the net and was quite obviously extremely nervous, as he himself stated on a few occasions, about operating in the company of the 'old timers'. Well he needn't have worried; the patience of the more experienced operators and the genuine welcome he received was a pleasure to listen to. All operators joining the net were informed by the net control of a new member and each in turn took their time to call Dennis and have a brief chat with him, everyone welcoming him to the frequency. You all deserve a massive pat on the back for putting a very nervous new operator at ease.

In conclusion I've now decided, in no small part due to these guys, to bite the bullet and get myself through the RAE. Well done, I take my hat off to all of you, it's operators such as yourselves that will encourage people like me to take up the mic and join you. In the meantime, shifts permitting, I will be on the side, listening. My best regards to you all.

Martyn Whyte, RS184847

Thanks from New MM3

I would like to take this opportunity to thank the guys from the Paisley YMCA ARC for their assistance in helping me obtain my MM3 call. It was very kind of the guys to take so much time out to help the 16 of us who all passed in May. Thanks Jim S, John M, Brian, Robert, John Q and also to anyone whom I have missed - it was greatly appreciated .

Ken McCormick, MM3KMC

Service Manuals

I required a service manual for a Trio R-1000 receiver and after a long period of searching I found that it was available on CD from a small company in Oxfordshire. They have a large number of service manuals for amateur equipment as well as other electronic equipment, including computer monitors, which are available on CD for £15 inc postage or in printed form for an extra charge. Available manuals are listed on their website. Will you publish this so that other members may take advantage of this information? The address is: Mauritron Technical Services, 8 Cherry Tree Road, Chinnor OX39 4QY; tel: 01844 351694; fax: 01844 352554; e-mail: enquiries@mauritron.co.uk; Internet: mauritron.co.uk

Alan Croft, G8CJM

Environmentally Friendly Mobile

On 5 July, I was called by Bob, GM4DLG/P, from North Uist in the Outer Hebrides. His signals were mainly 57, but with QSB. The reason was that he was operating from a recumbent three-wheeler tricycle using a kite to fly his 70ft long-wire aerial, and with an FT-817 running 5W from a solar panel fixed to the bike. He told me that using his 81 (!) gears his fully-laden slowest speed up a steep hill was 1.5MPH, and down the same hill 50MPH.

For sheer dedication to the hobby and respect for the environment, this must surely qualify for an award, or at least a special mention in 'The Last Word'!

T J 'Taff' Hynes, G4DUV

Help from HQ

Recently I had cause to seek the help of the RSGB in regard to licensing in the Philippines. After speaking to [General Manager] Mr Kirby his response was immediate, and letters to the Philippine association arrived in seven days (amazing in itself!)

I thank you Mr Kirby and your very efficient secretary for assistance, and this is a good example of why every amateur in Great Britain should be a member of the RSGB.

Roy Charlesworth, DU9/G4UNL

80m QRN

Thanks to the many public spirited amateurs who responded to my letter ('The Last Word' July). The noise is recorded as causing severe problems from the South Coast right up the country to Edinburgh. I would now like to know whether amateurs or SWLs in the very remote parts of Scotland, say John o'Groats, the Orkneys and Scottish Islands, the Isle of Man and the Channel Islands, experience this noise. This would help to complete the picture, if they would be kind enough to communicate with me.

Enver Chaudri, G3DCS
enver_chaudri@talk21.com

CARRIAGE CHARGE CODES: A=£2.75, B=£6, C=£9, D: £12

HYGAIN

HYGAIN ROTATORS BACK IN THE UK

CD45IIX	£425	C
HAMIVX	£599	C
T2XX	£699	C
FULL DETAILS AVAILABLE		

"FULL DETAILS AVAILABLE"

NOW IN STOCK

HYGAIN ANTENNAS		
TH7DX	£799	D
THIIDX	£995	D
12AVQ	£139	D

HEIL MICS + HEADSETS

APPOINTED BY HEIL AS UK DISTRIBUTOR

Proset-4	H'phone/boom mic	£129.95 B
Proset-5	H'phone/boom mic	£129.95 B
Pro-5-4	Single H'phone/mic	£119.95 B
Pro-5-5	Single H'phone/mic	£119.95 B
AD-1	Cables Y. K. or I	£16.95 A
HM-10-4	Stick mic	£76.95 B
HM-10-5	Stick mic	£76.96 B
CC-1	Cables Y. K. or I.	£29.95 A
HC-4	Spare insert	£32.95 A
HC-5	Spare insert	£32.95 A

You can convert your mic to Heil by simply purchasing HC-4 or HC-5 insert.

POWER SUPPLIES

Watson power supplies guarantee the very best performance and value for money. Tried and tested, they have been submitted for independent laboratory testing for safety and electrical performance.

W-3A	3 Amp fixed supply.	£22.95	B
W-5A	5 Amp fixed supply	£29.95	B
W-10AM	10 Amp variable supply	£59.95	C
W-25AM	25 Amp variable supply	£89.95	C
W-30AM	30 Amp variable supply	£119.95	C

W-25SM 25 Amp £79.95 B

Switched 230 / 115V AC input and fixed 13.8V output at 22 Amps continuous and 25 Amps peak. Over voltage and over current protected and fan cooled. Measures 180mm (W), 75mm (H) and 190mm (D) excluding terminals. Provided with detachable 13 Amp plug and cable.

CREATE JAPANESE ROTATORS

These are tough rotators that weigh almost twice as much as similar priced units and have great turning capacity. Made by Create of Japan, they will handle 4 element HF yagis with ease. Our own Create model has been on our roof for 12 years turning a 4-element HF beam. (We wouldn't use anything else!)

RC5-1	Standard control box, OK for 4-el Yagis - needs 7-core cable	£349.95C
RC5-3	Control box features pre-set or manual control. Otherwise the same as RC5-1 above	£449.95C
MC-2	Lower mast clamps	£59.95 B

WATSON ATX WALKABOUTS

WALKABOUT PORTABLES

Multi & single telescopic whips. Covers 80m to 6m BNC. Ideal for FT-817 and similar QRP radios.

ATX Walkabout 80 - 6m	£69.95B
AT-80 Single band	£24.95B
AT-40 Single band	£24.95B
AT-20 Single band	£19.95A
AT-17 Single band	£19.95A
AT-15 Single band	£19.95A
AT-12 Single band	£19.95A
AT-10 Single band	£19.95A

CAROLINA WINDOMS

CW-80 Special

Just 66ft long yet covers 80m - 10m. It will out perform a G5RV and give lower angle of radiation because of the 10ft vertical section which is forced to radiate. It will handle 1.5kW

£119 C

Other Models (all with low angle radiator stub)

CW-160	160 - 10m 171ft long	£139.95 C
CWS-160	160 - 10m 133ft long	£134.95 C
CW-80	80 - 10m 133ft long	£99.95 C
CW-40	40 - 10m 66ft long	£94.95 C
CW-20	20 - 10m 34ft long	£84.95 C

80-40-20m Mini Dipole

The "80 plus 2" Mini - Dipole was designed by our Director, Peter Waters, G3OJV. Just 52ft long, it uses linear loading - no tuned traps. It can be directly fed without ATU and also operates at 2.5:1 VSWR on 15m. Amazingly efficient, it handles 400 Watts and is balun fed. Erect it as an inverted V and it takes up less than 40ft of space. If you have a small garden, don't miss out on the LF bands anymore.

£79.95 B

MFJ-986 ATU £349.95 C

3kW Differential 1.8 - 30MHz

One less knob to twiddle, but all the facilities of the MFJ-989C

MFJ-969 ATU £199.95 C

HF + 6m! 300W "T" Match ATU

It has a very accurate PEP meter built-in, (PP3 battery needed) Includes VSWR cross needle meter, dummy load and lovely roller coaster for critical adjustment. Handles coax, balanced an wire. Size 268 x 242 x 95mm.

MFJ-949E ATU £159.95 C

1.8 - 30MHz 300W "T" Match ATU

Our most popular ATU because it covers all HF bands and matches anything from coax to long wire to balanced feed. Take a look at the price and then consider that it even includes a dummy load plus power and VSWR meter. Measuring 260 x 190 x 83mm, it really is great value.

MFJ-914 Auto ATU Extender £64.95 C

Match into that G5RV or similar

If your internal auto ATU is having trouble matching your G5RV or similar antenna. this should solve the problem. Just place it in series with the coax feed to the rear of your transceiver. Magic!

MFJ-418 £79.95 C

The easy way to learn CW

Unlike other tutors, this one sends true text and full length QSOs, just like the real test. The massive database avoids frequent repeats too! Will also send groups and displays the text.

MFJ-269 AND MFJ-259B

THE MOST ADVANCED ANTENNA ANALYSERS

MFJ-259B £269.95 B
MFJ-269 £349.95 B

Connect it to your antenna and get all the information you need to optimise it for best performance including resonance, VSWR and impedance. Totally portable (using AA cells), you can work right up by the antenna. The MFJ-259 is the basic design covering 1.8 - 170MHz. The MFJ-269 has extended coverage up to 470MHz and gives an extremely wide range of measurements, even indicating where a break is in a coax cable.

MFJ DUMMY LOADS

MFJ-264 or MFJ-264N
1.5-150MHz 1.5kW £74.95
"N" version of above £79.95
MFJ-260C or MFJ-260CN
1.5 - 150MHz 300W£37.95
"N" version of above £44.95

Carr. £9.00

MFJ-962D ATU £279.95 C

1.8 - 30MHz 1.5kW "T" Match

For use with medium linears. Using the famous "T" Match design, this ATU will cope with any antenna whether it be coax, end fed wire or balanced feed. You can monitor your power (average or PEP 200W or 2kW max) and VSWR. Antenna switch selector is included for two antennas. Size 270 x 375 x 115mm.

MFJ-989C ATU £379.95 C

3kW 1.8- 30MHz "T" Match

This design has a roller coaster coil and a 4:1 balun to match balanced line. Ideal for coax, end fed wires and open wire feeder. Features PEP or RMS power measurement VSWR, antenna switch, bypass, built-in dummy load etc. Size 270 x 375 x 115mm.

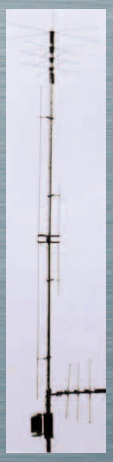
MFJ-1025 Local Noise Canceller £159.95 C

Kills local noise, but lets signals through. Handles electrical noise, TV time-base etc. Short length of wire picks only local interference and cancels it out.

MFJ-1026 As MFJ-1025, but has active whip antenna for picking up noise signals (as illustrated above). £159.95 C

MFJ COMPACT VERTICALS

MFJ verticals are compact, yet offer a large number of bands. Being vertical dipoles, they offer exceptionally low angle of radiation for DX. They are rated up to 1kW on the HF bands.



MFJ-1796 (40, 20, 15, 10, 6 & 2m)
Just 3.65m long, it is the ideal antenna for really small spaces.VSWR typically 1.2:1
£219.95 C

MFJ-1798 (80, 40, 30, 20, 17, 15, 12, 10, 6 & 2m!)
Only 6.7m long, it covers every popular band. No radials and no ground needed. £299.95 C

MFJ-616 SPEECH INTELLIGIBILITY ENHANCER £179.95 C

HEAR SIGNALS BETTER

Designed to enhance the audio of your transceiver. MFJ President, Martin Jue suffers with deafness and said that this has put the enjoyment back into radio for him!

MFJ-461 MORSE CODE READER £84.95 B

BEST SELLER

The MFJ-461 is a stand-alone pocket sized Morse code reader. Similar in size to the MFJ Morse tutors, all you do is hold it close to your receiver and it instantly displays CW on the 32 character high contrast LCD. It has automatic speed tracking, a serial port - if you wish to connect to a computer to display the text on a bigger screen. It can also be connected to your receivers audio if required. Truly pocket sized at 57 x 82.5 x 25.5mm and 156g.

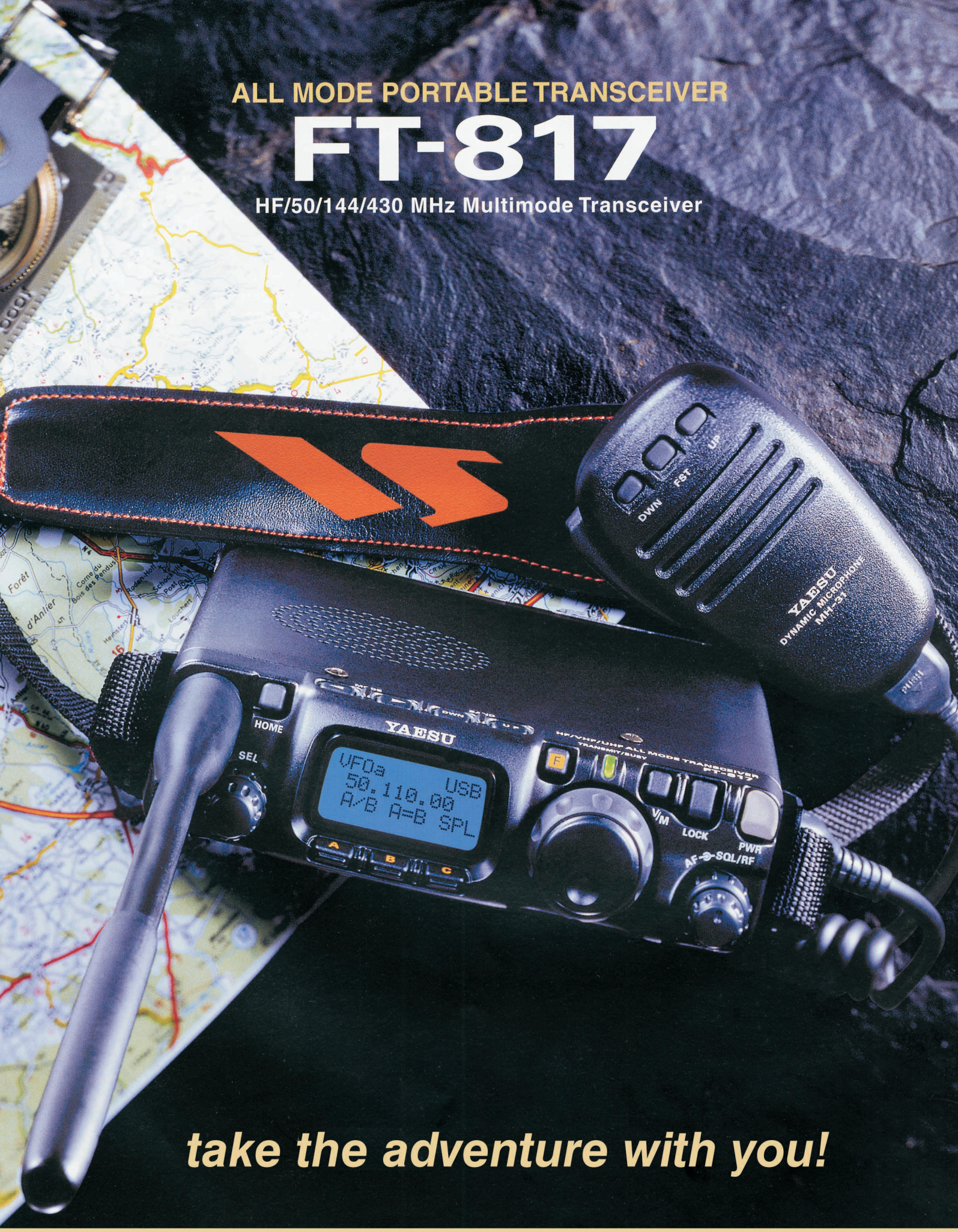
MFJ-1704 4-way switch £69.95 B

DC - 500MHz 2.5kW

This is a heavy duty die-cast 4-way switch with SO-239 sockets, central earth position and built-in static discharge protector. Makes changing antennas a breeze!

MFJ-392 Mono Padded Communications Earphones £24.95 A

These are purpose designed communications padded headphones that are ideal for all the modern transceivers and receivers. Suits 3.5mm and 1/4" jacks - adaptor provided.



YAESU