PLT: How is it Likely to Affect the HF Spectrum?

www.rsgb.org

0 2 0 3

RadCom

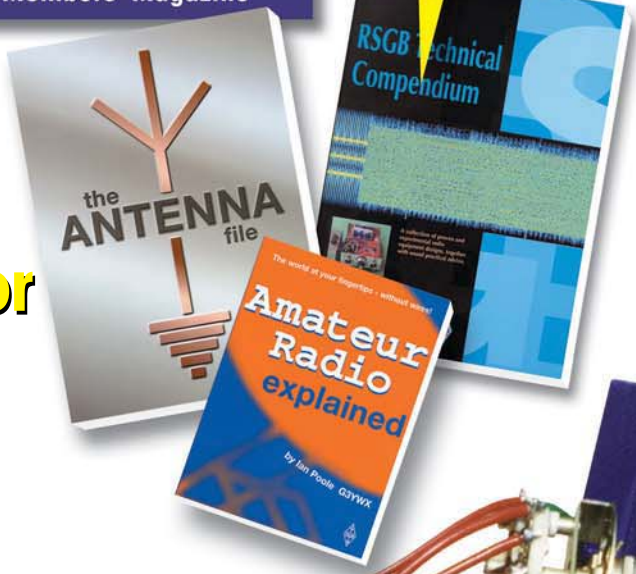
SALE! see p88 & 89

£3.95 Vol 79 No 2 ◆ February 2003 The Radio Society of Great Britain Members' Magazine

Lead Feature - A Low-Distortion Sine-Wave Generator

Combine Language Learning with a Mini-DXpedition

The 75th Anniversary of Trans-Atlantic TV



RSGB

GOMRF's Class D 136kHz Transmitter

WATERS & STANTON

FREEPHONE ORDER LINE: **08000 73 73 88**

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

WEBORDERING
www.wsplc.com

YAESU NEW FT-897

£1099 C

A 100W HF rig plus 2m and 70cms (50W/20W) with provision for running from internal optional Ni-MH pack at 20W output. Go anywhere and operate portable at realistic power levels. Put in car as self-powered radio for mobile use. Use as base station from 13.8V at full power. The possibilities and fun are endless. And it is packed full of features including Large LCD display, 200 tagged memories, DSP, IF shift, IPO, Noise blanker, VOX, Collins filter, CTCSS, and DCS, ARTS, Spectrum Scope, compatible with FC-30 auto ATU and ATAS 120/100 antennas. And all this packed into a size of 7.87" x 3.15" x 10.3". The "must have" radio for 2003.

FREE OFFER with IC-7400

£1449 C

From now until the end of February 2003 when you buy an IC-7400 you will also get a free SM-20 microphone and a free SP-21 speaker worth almost £220. Order yours now!

NEW V-868 & V-1000

V-868

Charges up to 8 Ni-MH or Ni-Cd cells

£11.95 A

Ultra-Fast Ni-MH/Ni-Cd Charger

V-1000

£10.95 A

PRICE MATCH

HF TRANSCEIVERS

ICOM

IC-756 PRO II
Flag ship of the ICOM range of transceivers.

IC-756 PRO II	160-6m 100W 12V	**£2495.00**	C
IC-7400	160-2m 100W 12V + free offer	**£1449.00**	C
IC-706 IIG DSP	160m-70cm 100W 12V	**£799.00**	C
IC-718	160-10m 100W 12V	**£599.00**	C
SP-20	Speaker with filters	**£164.99**	B
SM-8	Base microphone	**£129.99**	B
SM-20	Base microphone	**£144.99**	B
PS-125	Icom 25A PSU	**£295.99**	C

YAESU

FT-897
All New! All mode base/portable.

FT-1000 mkV	160-10m 200W 230V	**£2799.00**	E
FT-1000 Field	160-10m 100W 230V	**£2199.00**	E
FTV-1000	6m transverter List:~~£799~~	**£499.00**	B
MD-200A8X	Desk microphone	**£254.95**	B
MD-100A8X	Desk microphone	**£116.95**	B
FT-920AF	160-6m 100W 12V	**£1099.95**	C
FT-897 *NEW*	HF/6m/2m/70cm 100W	**£1099.00**	C
FT-847	160-70cm 100W 12V	**£1199.00**	C
FT-817	160-70cm 5W Batt.	**£595.00**	C
FT-840	160-10m 100W 12V	**£499.00**	C

KENWOOD

TS-2000X
Top of the range Kenwood transceiver.

TS-2000	160m-70cm<100W	**£1695.00**	C
TS-2000X	160m-23cm<100W	**£1999.00**	C
TS-B2000	Computer controlled	**£1449.00**	C
RC-2000	Remote head TS-2000	**£199.95**	B
ARCP-2000	TS-2000 software	**£44.95**	B
TS-870S DSP	160-10m 100W 12V	**£1399.00**	C
TS-570DGE	160-10m 100W 12V	**£849.00**	C
YK-88CN-1	270Hz CW filter	**£61.95**	B
YK-88SN-1	1.8kHz SSB filter	**£61.95**	B
TS-50S	160-10m 100W 12V	**£629.00**	C
PS-33	AC power supply 20.5A	**£199.95**	C
PS-52	AC power supply 22.5A	**£229.95**	C
PS-53	AC power supply 22.5A	**£229.95**	C
MC-60A	Desk microphone	**£117.95**	B
MC-80	Desk microphone	**£72.95**	B
MC-90	Desk microphone	**£187.95**	B

MFJ

QRP-CUB CW TRANSCEIVERS
MFJ-9380 CUB

**Adjustable Tx Pwr *Full QSK CW *Covers 50kHz segment *Sharp passband crystal filter *Product detector *Kit PCB's partially populated with SMD's *Easy to set up *12-15V DC*

MFJ-9380W	80m CW 2.2W QRP Tcvr Assembled	**£149.95**	B
MFJ-9380K	80m CW 2.2WQRP Tcvr Kit	**£99.95**	B
MFJ-9340W	40m CW 2.2W QRP Tcvr Assembled	**£149.95**	B
MFJ-9340K	40m CW 2.2W QRP Tcvr Kit	**£99.95**	B
MFJ-9330W	30m CW 2W QRP Tcvr Assembled	**£149.95**	B
MFJ-9330K	30m CW 2W QRP Tcvr Kit	**£99.95**	B
MFJ-9320W	20m CW 2W QRP Tcvr Assembled	**£149.95**	B
MFJ-9320K	20m CW 2W QRP Tcvr Kit	**£99.95**	B
MFJ-9315W	15m CW 1W QRP Tcvr Assembled	**£149.95**	B
MFJ-9315K	15m CW 1W QRP Tcvr Kit	**£99.95**	B

SGC

SG-2020 **1.8-30MHz *CW, USB, LSB *0-20W *11-18V*

SG-2020	HF Transceiver 0-20W	**£699.95**	C
SG-2020ADSP	HF Transceiver 0-20W with DSP	**£899.95**	C
PORTA-PAK	Portable HF Transceiver	**£1349.95**	C
SG-2000DSP	HF Transceiver 1.6-30MHz	**£2295.95**	C
SG-237	Smartuner 1.8-60MHz	**£439.95**	C
SG-237 Porta	Smartuner 1.8-60MHz needs whip	**£649.95**	C
Stealth Antenna	Kit with SG-237 + 80ft wire	**£489.95**	C
QMS-37	Mobile Smartuner needs whip	**£659.95**	C

LINEAR AMPLIFIERS

AMP UK

DISCOVERY-70
High power 700W 70cm linear amplifier

CHALLENGERIII	HF linear amp 10-160m	**£1795.00**	D
RANGER-811H	HF linear amp 10-160m	**£895.00**	D
DISCOVERY-2	2m 400-1000W out	**£1395.00**	D
DISCOVERY-6	6m 50-54MHz 400-100W out	**£1395.00**	D
DISCOVERY-70 *NEW*	430-440MHz 700W out	**£1495.00**	D

AMERITRON

AL811 XCE
HF Linear Amplifier
All versions CE approved

AL811 XCE	160-10m 600W PEP 3x811A	**£799.00**	E
AL811 HXCE	160-10m 800W PEP 4x811A	**£989.00**	E
ALS500 MXCE	160-10m 500W PEP 12V mobile	**£995.00**	C
AL800 XCE	160-10m 1250W PEP 1x3CX800A7	**£1995.00**	E
AL800 HXCE	160-10m 1.5kW PEP 2x3CX800A7	**£2795.00**	E
AL80 BXCE	160-10m 1kW PEP 1x3-500Z	**£1495.00**	E
AL82 XCE	160-10m 1.5kW PEP 2x3-500Z	**£2595.00**	E
AL1200 XCE	160-10m 1.5kW PEP 1x3CX1200	**£2695.00**	E
AL1500 XCE	160-10m 1.5kW PEP 1x3CX1500	**£2995.00**	E
Accessories			
ARB-702I	Amp to radio interface for Icom	**£48.95**	B
ARB-702I2	Amp to radio interface for IC706	**£45.95**	B
ARB-702Y	Amp to radio interface for Yaesu	**£45.95**	B
ARB-702K	Amp to radio interface for Kenwood	**£45.95**	B
ATP-100	Tuning pulser for amplifiers	**£59.95**	B

SGC

SG-500 SmartPowerCube Microprocessor controlled HF linear amplifier.

SG-500 (52-96)	160-10m 500W PEP	**£1629.95**	C
PS-50 (53-05)	50/70A PSU for SG-500	**£499.95**	C

Tokyo Hy-Power

Turn your FT-817 into a base station by adding this linear amplifier.

HL-50B	HF+50MHz 50W amplifier	**£265.95**	B

YAESU

Quadra system consists of VL-1000 linear and VP-1000 S/M PSU.

VL-1000 Quadra	HF-6m 1kW linear	**£3799.00**	C
MR-1000	Mounting rack for Quadra	**£327.95**	C
CT-56	Connecting cable	**£15.95**	A

RECEIVERS

AOR

AR-8600 II Wideband receiver for all round coverage of the bands.

AR-8600 II	100kHz-3GHz All mode	**£679.00**	C
AR-5000	10kHz-2.6GHz AM,FM,SSB,CW	**£1449.00**	B
AR-5000 +3	Enhanced version	**£1595.00**	C

AKD

HF-3S TARGET Entry level receiver with great performance.

HF-3S TARGET	30kHz-30MHz AM, SSB, CW	**£159.95**	B

FAIRHAVEN

RD-500VX Database all mode receiver including TV sound, video & stereo FM.

RD-500VX	20kHz-1.75GHz All mode	**£749.00**	B

ICOM

IC-R75E Matches the IC-718 transceiver also includes 6m.

IC-R75E	30kHz-60MHz AM,FM,SSB,CW	**£599.00**	C
IC-R8500	100kHz-2GHz AM,FM,SSB,CW	**£1299.00**	C

JRC

NRD-545G 100kHz to 30MHz DSP receiver 12-16V DC

NRD-545G	100kHz-30MHz DSP All mode	**£1395.00**	B

YAESU

VR-5000 Excellent all mode receiver with superb display.

VR-5000	100kHz-2.6GHz All mode	**£599.00**	B

HEAD OFFICE • 22 MAIN RD, HOCKLEY • ESSEX • SS5 4QS
ENQUIRIES: 01702 206835/204965 FAX: 01702 205843
MIDLANDS STORE • W&S @ LOWE • BENTLEY BRIDGE • CHESTERFIELD RD • MATLOCK
DERBYSHIRE • DE43 5LE ENQUIRIES: 01629 582380 FAX: 01629 580020
SCOTTISH STORE • W&S @ JAYCEE • 20 WOODSIDE WAY • GLENROTHES • FIFE KY7 5DF
ENQUIRIES: 01592 756962 FAX: 01592 610451-CLOSED MONDAYS

VHF/UHF TRANSCEIVERS

ICOM

IC-2725E ICOM's latest unique Dual Band FM transceiver.

IC-910X	2m/70/23cm All modes tcvr	£1249.00	C
IC-910H	2m/70cm All modes tcvr	£1149.00	C
UT-106	DSP unit	£84.99	B
UX-910	23cm unit for IC-910H	£349.00	B
PS-125	Mains PSU 25A 13.8V	£295.99	C
IC-2725E *NEW*	2m/70cm FM mobile	£309.00	C
CS-2725	Cloning software	£22.49	A
MB-84	Controller mounting bracket	£9.95	A
MB-85	Combination kit	£20.00	A
OPC-1132	DC power cable 3m	£24.99	A
OPC-1156	Separation cable 3.5m	£24.99	A
OPC-478	Cloning cable	£24.68	A
OPC-647	Mic extension cable 2.5m	£32.99	B
IC-207H	2m/70cm 50/35W mobile	£279.00	C
CS-207	Cloning software needs OPC-478	£22.49	A
OPC-589	Mic adaptor cable for 8-pin	£16.99	A
OPC-600	Separation cable 3.5m	£32.99	A
OPC-601	Separation cable 7m	£39.99	A
OPC-647	Mic extension cable 2.5m	£32.99	B
IC-2100H	2m FM mobile 55W	£229.00	C
CS-2100	Cloning software needs OPC-478	£22.49	A
OPC-478	Cloning cable	£24.68	A
OPC-589	Mic adaptor cable for 8-pin	£16.99	A
Common Accessories			
MB-17A	Quick release mount	£35.99	A
MB-65	Mounting base	£25.99	A
OPC-440	Mic extension cable 5m	£49.99	A
OPC-441	Speaker extension cable	£24.99	A
SP-10	Mobile speaker 5W 4 Ohms	£49.99	B

YAESU

FT-8900R FM Quad band transceiver

FT-8900R *NEW*	29/50/144/430MHz mobile	£399.00	C
YSK-8900	Separation lead kit	£39.95	B
FT-7100	2m/70cm FM mobile	£329.00	C
ADMS-2G	Programming software	£44.95	A
MMB-36	Mobile bracket	£6.95	A
MMB-62	Mobile controller bracket	£29.95	A
YSK-7100	Separation lead kit	£39.95	B
Common Accessories			
CT-39A	Packet interface cable	£14.95	A
MMB-60	Quick release mobile bracket	£18.95	A
MEK-2	Mic lead extension kit	£29.95	A
MLS-100	High power ext speaker	£29.95	B
MH-48A6J	Hand mic with DTMF	£39.95	B
MH-42B6J8	Speaker/mic	£44.95	B
FT-1500M	2m 50W mobile List:~~£179~~	£159.00	B
ADMS-2F	Programming software	£44.95	A
MEK-2	Mic lead extension kit	£29.95	A
MF-1A3B	Boom mic needs SB-10/CT-69	£34.00	B
SB-10	PTT switch box for MF-1A3B	£29.95	A
CT-69	Mic adaptor 8-pin to modular	£13.95	A
YH-1	Headset/boom mic needs SB-10	£26.95	A
T9022815	Spare DC lead	£17.95	A

KENWOOD

TMD-700E Dual band mobile & data communicator.

TMD-700E	2m/70cm FM mobile	£449.00	C
TM-V7E	2m/70cm FM mobile	£359.00	C
TM-G707E	2m/70cm FM mobile	£289.00	C
MC-58DM	DTMF hand mic illuminated	£44.95	B
MC-45DME	DTMF hand mic	£53.95	B
MJ-88	Mic plug adaptor	£22.95	A
MJ-89	Modular plug switch	£49.95	B
MB-201	Detachable mobile mount	£14.95	A
DFK-3C	Detachable front panel kit 3m	£34.95	B
DFK-4C	Detachable front panel kit 4m	£59.95	B
DFK-7C	Detachable front panel kit 7m	£89.95	B
PG-5A	Data cable	£11.95	A
PG-3B	DC line noise filter	£13.95	A
PG-3G	DC line noise filter	£27.95	A
PG-2N	DC cable	£9.95	A
PG-4X	Extended front panel kit	£61.95	B
VS-3	Voice synthesiser	£45.95	B

VHF/UHF HANDHELDS

ICOM

ICOM IC-E90 Handheld + Scanner 6m/2m/70cm 5W

IC-E90 *NEW*	6m/2m/70cm Handheld	£269.00	B
BC-06	UK mains PSU (BC139)	£21.15	A
BC-08	(Spare) charger	£23.50	A
BC-139	Desktop fast charger inc BC-06	£52.88	B
BP-216	Dry cell battery case 2xAA	£14.98	A
BP-217	Li-Ion battery pack 7.4V 1300mAh	£49.95	B
CT-T90A	Programming Windows software	£22.49	A
LC-152A	Leatherette carry case	£16.99	A
SP-13	Earphone	£5.87	A
IC-T3H	2m FM 5.5W Handheld	£129.00	B
BP-208	Dry cell battery case	£16.45	A
BP-209	Ni-Cad battery 1100mAh	£30.55	B
BP-210	Ni-MH battery 1650mAh	£34.99	B

YAESU

VX-7R Handie Tri-band Submersible Black or Silver.

VX-7R *NEW*	6m/2m/70cm Handheld	£329.00	B
CSC-88	Soft case	£11.95	A
FBA-23	2xAA dry cell case	£22.95	A
FNB-80LI	Li-Ion battery 7.4V 1300mAh	£54.95	B
VX-1R	2m/70cm+TV/AM audio	£149.00	B
ADMS-1E	Software	£44.95	B
CSC-71	Soft case	£11.95	A
FBA-20	1xAA battery case	£19.95	A
FEP-10	Earphone	£4.95	A
VX-150	2m + Ni-Cd & charger	£109.00	B
VX-110	2m + Ni-Cd & charger	£99.00	B
FNB-64	Ni-Cd pack 7.2V 1100mAh	£29.95	A
FNB-V57	Ni-Cd pack 7.2V 1100mAh	£45.95	B
FBA-25	Dry cell case 6xAA	£17.95	A

KENWOOD

TH-D7E Data communicator with built-in TNC

TH-D7E	2m/70cm with data	£319.00	B
PB-38	Ni-Cd pack 6V 650mAh	£29.95	B
PB-39	Ni-Cd pack 9.6V 600mAh	£32.95	B
BT-11	Dry cell case 4xAA	£12.95	A
SC-49	Real leather case	£19.95	A
SC-40 (+G71)	Soft case / strap	£15.95	A
TH-F7E	2m/70cm with wideband	£259.00	B
PB-42L	Lithium battery 7.5V 1550mAh	£59.95	B
BT-13	Dry cell case 4xAA	£18.95	A
SC-52	Real leather case	£19.95	A
TH-G71E	2m/70cm FM Handie	£199.00	B
SC-45	Soft case	£19.95	A
TH-22EUK	2m+NiCd & UK charger	£149.00	B
TH-22EE	2m+NiCd & EU charger	£139.00	B

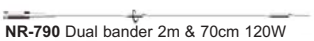
PAIR WKX-1200 10mW HANDHELDS

Crystal controlled on 143.925MHz. Not legal in UK without crystal change. Complete with rubber duck antenna. Needs PP3 batt.

£15 A per pair

VHF/UHF MOBILE ANTENNAS

DIAMOND ANTENNA



NR-790 Dual bander 2m & 70cm 120W PL-259, 1.46m with spring fold over base

AZ-504	2m/70cm 0/2.15dB 0.39m	£34.95	B
M-285S	2m 3.4dB 1.33m (non fold down)	£15.95	B
NR-2C	2m 4.1dB 1.41m long 150W	£29.95	B
NR-22L	2m 6.5dB 2.46m long 100W	£39.95	B
CR-627	6m/2m/70cm 2.15/4.5 7dB 1.5m	£67.95	B
CR-1027	10m/2m/70cms 2.15/5/7dB 1.6m	£79.95	B
NR-2000M	2m/70cm/23cm 3./6.3/9.7dB 0.99m	£59.95	B
NR-770R	2m/70cm 3/5.5dB 0.98m	£29.95	B
NR-790	2m/70cm 4.5/7dB 1.46m	£59.95	B
SG-7500	2m/70cm 3.5/6dB 1.06m 150W	£49.95	B
SG-7900	2m/70cm 5/7.6dB 1.58m 150W	£69.95	B
TRY-2E	6m/2m/70cm 3.4/2.15dB 1.32m	£29.95	B

WATSON

W-627 Triple bander 70cm/2m/6m. Length 1.6m, max pwr 120W with fold over base.

Watson Antennas (PL-259 base type)			
W-2LE	2m quarter wave 2.1dBi 0.45m	£9.95	A
W-285S	2m 3.4dB 0.48m (fold over base)	£14.95	B
W-77LS	2m/70cm 0/2.5dB 0.42m	£14.95	B
W-770HS	2m/79cm 3/5.5dB 1.1m	£24.95	B
W-7900	2m/70cm 5.6/7.6dB	£32.95	B
W-627	6m/2m/70cm 2.15/4.8/7.2dB 1.6m	£34.95	B
Watson Antennas (Magnetic base included)			
WSM-138	Adjust. 138-170MHz 0.55m max	£19.95	B
WSM-260	2m/70cm2 - 6dB 0.46m	£19.95	B
WSM-225	Airband receive VHF/UHF	£22.95	B

VHF/UHF MOBILE BASES

DIAMOND ANTENNA

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

AML	Gutter mount fold over type	£15.95	A
K-11	Universal gutter mount	£24.95	A
K-33	Adjustable hatch mount	£23.95	A
K-400	Adjustable boot mount heavy duty	£26.95	A
K-600M	Deluxe boot mount + cable	£49.95	B
DPK-TR	Stainless steel boot mount (ECH)	£18.95	A
ECH	Cable assembly above units 4m	£10.95	B
SPM-35	11.1cm di. Mag mount 4m cable	£29.95	A
K-702M	Mag mount 11.1cm di. 4m cable	£39.95	B

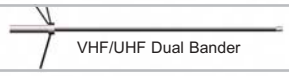
WATSON

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

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

VHF/UHF BASE STATION ANTENNAS

DIAMOND ANTENNA



VHF/UHF Dual Bander

CP-22E	2m 2x5/8th 6.5dB omni-directional	£44.95	C
F-22	2m 2x7/8th colinear 6.7dB 3.2m	£59.95	C
F-23	2m3x5/8th colinear 7.8dB 4.6m	£89.95	C
X-30	2m/70cm colinear 3/5.5db 1.3m	£49.95	C
X-50	2m/70cm colinear 4.5/7.2dB 1.7m	£54.95	C
X-50N	2m/70cm 4.5/7.2dB 1.7m 'N' type	£59.95	C
X-200	2m/70cm colinear 6/8dB 2.5m	£79.95	C
X-300	2m/70cm colinear 6.5/9dB 3.1m	£99.95	C
X-510N	2m/70cm 8.3/11.7dB 5.2m 'N' type	£124.95	C
X-700H	2m/70cm colinear 9.3/13dB 7.2m	£249.95	C
V-2000	6m/2m/70cm 2.15/6.2/8.4dB 2.5m	£89.95	C
X-5000	2m/70cm/23cm 4.5/8.3/11.7dB 1.8m	£134.95	C
X-7000	2m/70cm/23cm 8.3/11.7/13.7dB	£169.95	C
GH-62	6m 2x5/8th base vertical 6dB 6.3m	£99.95	C

WATSON

WMD-50 Mini discone 25-2200MHz Rx, 6/2m/70cm/23cmTx

WBV-70	4m half wave vertical 3.5dB 2m long	£39.95	C
W-30	2m/70cm colinear 3/6dB 1.15m long	£39.95	C
W-50	2m/70cm colinear 4.5/7.2dB 1.8m long	£49.95	C
W-300	2m/70cm colinear 6.5/9dB 3.1m long	£64.95	C
W-2000	6m/2m/70cm 2.15/6.2/8.4dBi 2.5m	£69.95	C
WBD-40	25-2000MHz discone Tx 6m/2m/70cm	£49.95	C
WMD-50	25-2200MHz discone Tx 6m/2m/23cm	£39.95	C

MASPRO UHF YAGI

High quality 70cm 15 element Yagi made in Japan and superbly engineered. Features folded dipole, balun transformer, waterproof box and SO-239.

435-WH15	70cm 15el. 16.6dB 2.19m	£41.95	B
MASPRO-259	Special PL-259 plug	£2.95	A

WATERS & STANTON

PRICE MATCH

DISCOUNT CUSTOMER SERVICE THE ONLY THING WE WON'T

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HF VERTICAL ANTENNAS

HUSTLER

6-BTV HF 6-band vertical

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

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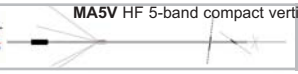

MA5V HF 5-band compact vertical.

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

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HF9V-X HF 9-band vertical

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

hy-gain

DX-88 HF 8-band vertical

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

HF HORIZONTAL BEAMS + DIPOLES

CUSHCRAFT

We offer a wide choice of guaranteed spares for most Cushcraft antennas.

X-7	20-10m 7 el. Yagi 2kW	**£699.95**	D
X-740	40m add on kit for X-7	**£299.95**	C
A4-S	10-15 & 20m 4 el. Yagi 2kW	**£599.95**	D
A-744	7/10MHz add on kit for A4S	**£159.95**	C
A3-S	20-10m 3 el. Yagi 2kW	**£499.95**	D
A-743	7/10MHz add on kit for A3S	**£159.95**	C
A3-WS	12 & 17m 3 el. Yagi 2kW	**£399.95**	D
A-103	10 MHz add on kit for A3WS	**£159.95**	C
D-3	10-20m dipole element 2kW	**£249.95**	C
D-3W	12-17-30m dipole element	**£249.95**	C
D-4	10-40m dipole element 2kW	**£339.95**	C
D-40	40m dipole element 2kW	**£299.95**	C
TEN-3	10m 3 el. Yagi 2kW	**£219.95**	C
ASL-2010	13.5-32MHz 8 el. log periodic	**£799.95**	C

RADIO WORKS

World famous Carolina Windoms used worldwide

Carolina Windoms 1kW (Inc WARC Bands)

CW-160	160-10m 76.8m long	**£139.95**	C
CWS-160	160-10m 40.5m long	**£134.95**	C
CW-80	80-10m 40.5m long	**£99.95**	C
CWS-80	80-10m 20.1m long	**£119.95**	C
CW-40	40-10m 20.1m long	**£94.95**	C
CW-20	20-10m 10.36m long	**£84.95**	C
CW-620	20-6m 9.7m (32ft) long	**£94.95**	C

Carolina Wire "Beams" (Inc WARC Bands)

CBS-160S	180-10m 30.5m (100ft) long	**£129.95**	C
CB-80	80-10m 30.5m (100ft) long	**£119.95**	C
CBS-80	80-10m 15.25m (50ft) long	**£119.95**	C
CB-40	40-10m 15.25m (50ft) long	**£115.95**	C

Other Antennas

G5RV PLUS	80-10m with balun 31m (102ft) long	**£64.95**	B

Baluns and Isolators

T-4	Line Isolator 1.8-30MHz 400W	**£37.95**	B
T-4-Plus	Line Isolator1.8 - 54MHz 400W	**£42.95**	B
T-4G	Line Isolator 1.8-30MHz + ground	**£42.95**	B
T-4G Plus	Line Isolator 1.8-30MHz + ground	**£45.95**	B
T-4500	Line Isolator (small) 500W 1.8-30MHz	**£32.95**	B
REM-BAL1	Ladder line 1:1 balun 1.8-30MHz	**£51.95**	B
REM-BAL4	Ladder line 4:1 balun 1.8-30MHz	**£52.95**	B
B1-2K Plus	1:1 current balun - for inverted V 's	**£28.95**	B
B4-2K	4:1 voltage balun loops/folded dipoles	**£42.95**	B
Y1.5K	1:1 current Yagi balun 1.8 - 30MHz	**£42.95**	B
Y1.5K Plus	1:1 current Yagi balun 1.8- 54MHz	**£42.95**	B

Sundries

KEVLAR	200ft 400lb strain guy line	**£22.95**	A
LADDER	450 Ohm ladder line - per metre	**£0.90**	A
LADDER-LOC	Dipole centre for ladder line	**£14.95**	A
RFF-213	Ferrite clamps for RG-213	**£5.95**	A
RFF-58	Ferrite clamps for RG-58	**£3.95**	A

HF MOBILE ANTENNAS

HUSTLER

RM-40S **RM-80**

Standard Resonator 400W

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

Super Resonator 1kW

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

Lower Mast Sections

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

Mobile Mount Accessories

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

WATSON

WHF - Single HF banders, budget priced fibreglass helicals with standard 3/8in stud mount. Will fit all 3/8in mountings.

WHF-160B	160m mobile whip	**£49.95**	B
WHF-80B	80m mobile whip	**£19.95**	B
WHF-40B	40m mobile whip	**£18.95**	B
WHF-30B	30m mobile whip	**£18.95**	B
WHF-20B	20m mobile whip	**£18.95**	B
WHF-17B	17m mobile whip	**£18.95**	B
WHF-15B	15m mobile whip	**£18.95**	B
WHF-12B	12m mobile whip	**£18.95**	B
WHF-11B	11m (CB) mobile whip	**£18.95**	B
WHF-10B	10m mobile whip	**£18.95**	B
WHF-6B	6m mobile whip	**£18.95**	B
WHF-4B	4m mobile whip	**£18.95**	B
WHF-2B	2m mobile whip	**£18.95**	B

HF PORTABLE ANTENNAS

WATSON

ATX Walkabouts - Multi & single telescopic whips. Covers 80m to 6m BNC. Ideal for FT817 and similar QRP radios.

ATX-DHP	Walkabout 80-6m 200W	**£89.95**	B
ATX-DLP	Walkabout 80-6m 50W	**£69.95**	B
AT-80	Single band 80m whip with BNC	**£24.95**	B
AT-40	Single band 40m whip with BNC	**£24.95**	B
AT-30	Single band 30m whip with BNC	**£19.95**	B
AT-20	Single band 20m whip with BNC	**£19.95**	B
AT-17	Single band 17m whip with BNC	**£19.95**	B
AT-15	Single band 15m whip with BNC	**£19.95**	B
AT-12	Single band 12m whip with BNC	**£19.95**	B
AT-10	Single band 10m whip with BNC	**£19.95**	B

MFJ

ANTENNA TUNER UNITS

MFJ-989C VERSA TUNER V

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

MFJ-989C 3kW Roller Inductor ATU **£379.95** C

MFJ-986 DIFFERENTIAL-T TUNER

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

MFJ-986 1.5kW Differential ATU **£349.95** C

MFJ-949E DELUXE VERSA TUNER II

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

MFJ-949E Antenna Tuner/Dummy Load 300W **£159.95** B
MFJ-948E As 949E without Dummy Load **£139.95** B

MFJ-962D VERSA TUNER III

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

MFJ-962D 1.5kW Roller Inductor ATU **£279.95** C

MFJ-921 VHF DUAL BAND TUNER

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

MFJ-921 144 & 220MHz VHF ATU 200W **£74.95** B

MFJ-906 6 METRE TUNER

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

MFJ-906 6m ATU & VSWR/Pwr Meter **£89.95** B

ARTIFICIAL GROUND

MFJ-931 ARTIFICIAL GROUND

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

MFJ-931 Artificial Ground **£94.95** B

ACTIVE ANTENNA

MFJ-1022 ACTIVE ANTENNA LF/HF/VHF

**300kHz-200MHz *Handles strong signals *Reduces Intermod *Low noise *Includes telescopic whip *SO-239 *9V batt or 9-18VDC*
Easily plugs into your general coverage Rx.

MFJ-1022 Wideband Active Rx Antenna **£55.95** B

DUMMY LOAD/WATT METER

MFJ- 267 DUMMY LOAD/WATT METER NEW

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

MFJ-267 Dummy load & VSWR meter HF+6m **£129.95** B

NOISE CANCELLER & SSB & CW AUDIO FILTER

MFJ-1025 NOISE CANCELLER

**1.8-30MHz *RF sensed/control switching *Thru Pwr handling for Tx *13.8V ext*
Eliminates locally received electrical noise.

MFJ-1025 QRM Eliminator (no active ant) **£169.95** B

MFJ-722 CW/SSB/NOTCH FILTER

**Plugs directly into Rx headphone socket *CW bandwidths 80,110,150 & 180Hz *SSB bandwidths 1.5,2 & 2.5kHz *Notch Filter *Requires 12V @ 300mA*

MFJ-722 Audio filter SSB/CW **£89.95** B

RSGB Matters

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded in 1913 incorporated 1926.
Limited by guarantee
Member society of the
International Amateur Radio Union
Patron: HRH Prince Philip, Duke of Edinburgh, KG, KT

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

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Honorary Treasurer:
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Details of the Society's volunteer officers can be found in the RSGB Yearbook 2003

HEADQUARTERS AND REGISTERED OFFICE
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Tel: 0870 904 7373
Fax: 0870 904 7374
All calls to the RSGB are charged at National Rate

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WebPlus: Members-only web site **www.rsgb.org/membersonly** Use your callsign in lower case as the user name, and your membership number (see *RadCom* address label) as the password.

RADIO COMMUNICATIONS FOUNDATION

AT THE RSGB AGM in Swansea on 7 December 2002, the Society's President Bob Whelan, G3PJT, announced the launch of the 'Radio Communications Foundation'. The Radio Communications Foundation is the vehicle by which the RSGB will channel all its work in the field of education and training, and will support GB4FUN and the promotion of amateur radio to the wider audience. The Foundation, which is being registered as a charity, is independent of the normal commercial activities of the RSGB.

QSL BUREAU NEWS

THE RSGB QSL Bureau sub-manager for Northern Ireland, covering all GI and MI callsigns, will change on 1 February. The new sub-manager will be Harry Squance, GI4JTF, 11 Ballymenoch Road, Holywood, Co Down BT18 0HH. The retiring sub-manager, Ed Barr, GI7FFF, served in the post for 11 years and attended almost every local radio rally during that time, distributing many thousands of QSL cards directly to members attending the rallies. It is believed that this is a unique service by any QSL Bureau sub-manager. Ed is thanked by the RSGB for his excellent service over the years.

HF AWARDS MANAGER

JOHN DUNNINGTON, G3LZQ, has taken over as the RSGB HF Awards Manager from Fred Handscombe, G4BWP, with effect from 1 January. The new address is: John Dunnington, G3LZQ, PO Box 36, Brough, East Yorkshire HU15 2WX; e-mail: hf.awards@rsgb.org.uk Everything up to 31 December was dealt with by Fred and all applications already sent to him will be forwarded to John.

RSGB NATIONAL CONSTRUCTION COMPETITION

THE ORGANISERS OF THE Epsom Radio Fair, which will take place on Sunday 22 June, in conjunction with the RSGB and the Surrey Radio Contact Club (SRCC), are staging a National Construction Contest that will be open to all. It will be free to enter. Judging will be by David Bowman, G0MRF, and Robin Sykes, G3NFV.

Full consideration will be made for the age of the contestant, originality, quality of build, external appearance, novel techniques and use of homemade parts. Come along and join in the fun; it is hoped that there will be many interesting entries from both novices and the more experienced constructor.

RSGB NATIONAL CONSTRUCTION COMPETITION RULES

1. All entries must be associated with amateur radio.
2. The Construction Contest Team (CCT) at the Fair will accept entries on 22 June, from 10.00am to 11.00am.
3. Judging will take place between 1.00pm and 1.45pm and prizes will be awarded at 2.00pm.
4. The judges' decision will be final.
5. A trophy and prize will be awarded for the 1st place; the trophy to be retained for 11 months and then returned to the RSGB in its original condition.
6. Prizes and certificates will also be awarded for 2nd and 3rd places.
7. A separate first prize will also awarded for the under-16 years category.
8. Each entry should be accompanied by the contest entry form.
9. Points will be awarded for originality of design, quality of internal build, external build quality and use of homemade components / boards / modules.
10. Entries can be collected from the CCT from 3.00pm onwards.
11. Only one entry will be allowed per person.
12. Entries are brought along at the owners' risk and preferably insured under the owners' own insurance policies. The CCT will endeavour to provide security on the day but Radio Fairs cannot be made liable for damage or loss of hardware.
13. Entry forms will be available on the day or in advance on the RSGB website at www.rsgb.org.uk and the Radio Fairs Rally website at www.epsomrally.co.uk

For further information phone Paul Berkeley, M0CJX, tel: 01737 373979, or e-mail to Ray Howells, G4FFY, of the SRCC at: g4ffy@btinternet.com

PAST PRESIDENT FRED WARD, G2CVV, SILENT KEY

IT IS WITH great regret that we have to announce the passing of Fred Ward, G2CVV, of Littleover, Derby. He was 83 years of age and had not been in the best of health for some time, but was still active on the air up to the day of his death on 4 January. Fred was very well known in the field of amateur radio. He served on several committees of the RSGB and was a member of the Council of the Society from 1969 to 1975. He was elected President of the RSGB in 1971. Fred was a GB2RS newsreader on 80m from the start of the service in the 1950s up to the present day. He was the Secretary and Treasurer of the Derby and District Amateur Radio Society from 1947 for nearly four decades.

During WWII Fred was actively involved in various branches of signals intelligence. Afterwards he joined the Post Office and until his retirement was responsible for radio interference investigation in the Derby and East Midlands area.

Fred was a member of many other societies, including the RSARS and RAOTA. He was also well known in non-radio circles in the Derby area through his active membership of many of the city's other organisations. His funeral took place on 16 January in Littleover, Derby.

Fred Ward, G2CVV, when elected RSGB President in 1971.

PRESIDENT ON THE AIR

THE SPECIAL callsign GB4RS, which is used to commemorate the RSGB Presidential Inauguration, will be aired by RSGB President Bob Whelan, G3PJT, during most of 2003. A special QSL card will be sent via the bureau to confirm all contacts.

IARU REGION 1 CORRECTIONS

IN THE REPORT on the San Marino IARU Region 1 conference in the January 2003 *RadCom* (pages 18 / 19), a Region 1 medal was presented to Gaston Bertels, ON4WF (and not to Wojciech Nietyksza, SP5FM). Tafa Diop's callsign is 6W1KI (not 6W1KJ).

NEWS FROM RSGB COMMITTEES

THE RSGB **HF Committee's** website is now at **www.rsgb-hfc.org.uk**

The **RSGB HF Contests Committee** currently has a number of **vacancies** for full and corresponding members. The committee is responsible for running all facets of the RSGB HF contests programme. As a working committee its members are expected to get involved in the processes of administration and adjudication of contests as well as defining future policy. The committee conducts business through e-mail, teleconferencing and meetings which are usually held several times a year in central London. If you're interested, please contact the committee chairman, Justin Snow, G4TSH, by e-mail at hfcc.chairman@rsgb.org.uk

The RSGB **VHF Contest Committee** has a new Chairman: **Andy Cook, G4PIQ** (QTHR); e-mail: vhfcc@rsgb.org.uk

RRM & DRRM VACANCIES

THERE ARE CURRENT vacancies for RSGB Regional Managers in Region 2 - Scotland East and the Highlands, Region 7 - South Wales, Region 9 - London and the Thames Valley, and Region10 - South and South East. RSGB members resident in these regions who are interested in becoming a Regional Manager should contact the General Manager, Peter Kirby, G0TWW, at RSGB HQ on 0870 904 7373 or e-mail: gm.dept@rsgb.org.uk

Barry Scarisbrick, G4ACK, the new Regional Manager for Region 11 - the South West - is asking for volunteers for the Deputy Regional Manager vacancy in Devon (District 112). Please contact G4ACK QTHR, e-mail: barryg4ack@mbzonline.net, if you live in Devon and wish to help to keep the county's voice heard.

FROM THE AROS COORDINATOR

BARRY SCARISBRICK, G4ACK, the RSGB Amateur Radio Observation Service (AROS) Coordinator, writes: "Many thanks to all who have assisted with 20m UK monitoring following a request a few months ago. Sorry to those who volunteered, but were not tasked. It was necessary to turn down some offers of assistance just to keep the paperwork manageable. Correspondence and continued monitoring indicate that target stations are now aware of official interest. It is also obvious that there is a majority out there interested in keeping our allocated Spectrum clean - thank you all for your help and assistance. These cases are now in dormant / pending mode."

Barry will be giving a talk on the work of AROS at the **Harwich Amateur Radio Interest Group** on **12 February**. Please contact Eugene, G4FTP, tel: 01206 826633 for further details.

NEW PROPAGATION WEBSITE

GWYN WILLIAMS, G4FKH, who compiles the HF propagation predictions for *RadCom*, has a new website address: http://members.aol.com/g4fkhgwyn He posts up-to-date propagation predictions on the website, in a format similar to those in *RadCom*.

SOCIETY TROPHIES PRESENTED

SOME OF THE RSGB'S most prestigious awards were presented at the AGM in Swansea on 7 December 2002. The **Founder's Trophy**, for services to the Society and amateur radio in general, went to **David Pratt, G4DMP**, for his outstanding contribution to the RAE and Novice RAE. David was also the founder of the Amateur Radio Observation Service 25 years ago. The **Calcutta Key**, for outstanding service to international friendship, went to **Tim Hughes, G3GVV**, for his long and distinguished contribution to the work of the IARU, latterly as Secretary of Region 1. The **Raynet Trophy** was awarded to the **Manchester Scouts Raynet Group** for their outstanding services to the emergency network. A **special award** was made to **Colin Dalziel, GM8LBC**, for his services to the UK Repeater Network, while a **Certificate of Appreciation** was presented to **Bob Titterington, G3ORY**, for services to Amateur Radio Direction Finding.

David Pratt, G4DMP, receives the Founder's Trophy from RSGB President Bob Whelan, G3PJT.

A number of trophies and other awards were presented for outstanding articles published in *RadCom* during the last year. The recipients were Brian Horsfall, G3GKG; Peter Rhodes, G3XJP; Jim Moritz, M0BMU; Tony Preedy, G3LNP; and Mark Haynes, M0DXR.

VHF BAND PLANS

SEVERAL QUERIES have been received about the 6m and 2m bandplans published in the January *RadCom* (page 6). It should be pointed out that these are IARU Region1 band plans and not UK band plans, which also show UK frequency usage such as emergency communications frequencies. David Butler, G4ASR, the RSGB VHF Manager, also points out that in the UK 6m FM repeater output frequencies are 500kHz *below* the repeater input frequencies (Inputs 51.210 - 51.410MHz, Outputs 50.710 - 50.910MHz), as permitted by a footnote to the IARU band plan. The UK band plans are scheduled to be published in the April *RadCom*.

VHF AWARD NEWS

HERE IS A brief summary of VHF awards issued during November and December 2002. In November Robin Burrows-Ellis, M1DUD (IP), increased his 50MHz square tally to 100 and countries to 40 using QRP. Colin Potter, G6FQZ (OX), gained stickers for 300 and 325 Squares and for 90 Countries (2-way) on 6m.

In December, Derek, G8TOK, was rewarded with an update sticker for 70 Countries on 50MHz and stickers for 275, 300, 325 and 350 Squares. Derek also gained a 50MHz Senior Award and a second Supreme Award, this time with a 'Four Band Citation', only the fifth time this has been achieved and the first time a Class B licensee has claimed a four-band Supreme Award. Geoff Dover, G4AFJ (LE), claimed both a Standard and Senior award for 144MHz. Philip Lancaster, G0ISW (CA), gained a 'DX' certificate and sticker for 20 countries at 50MHz and a Standard Award at 144MHz endorsed for SSB.

Congratulations to all recipients. Further details at www.rsgb.org (go to 'Operating', 'VHF/UHF', then 'VHF/UHF Awards'). Details on VHF / UHF / Microwave awards can be obtained from Tony Jarvis, G6TTL QTHR (please send an A4 or A5 SASE) or e-mail: vhf.awards@rsgb.org.uk

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

FACT!

- Yaesu - the worlds number one radio manufacturer has more current models than any other ham radio manufacturer
- Only Yaesu offer this amazing range...

FT-817
RRP: £689
MLS PRICE: £595
No Deposit, then
36 x £21.63

FT-897
MLS PRICE: £1099
No Deposit, then
36 x £39.96

FT-100D
RRP: £999
MLS PRICE: £899
No Deposit, then
36 x £32.68

FT-920AF
RRP: £1299
MLS PRICE: £1199
No Deposit, then
36 x £43.59

FT-847
RRP: £1420
MLS PRICE: £1199
No Deposit, then
36 x £43.59

FT-1000MP mk5
RRP: £2899
MLS PRICE: £2799
No Deposit, then
36 x £101.76

FT-1000MP mkV Field
RRP: £2299
MLS PRICE: £2199
No Deposit, then
36 x £79.95

VL-1000
RRP: £4299
MLS PRICE: £3799
No Deposit, then
36 x £138.12

FT-840
RRP: £649
MLS PRICE: £549
No Deposit, then
36 x £19.96

FT-7100
RRP: £399
MLS PRICE: £329
No Deposit, then
36 x £11.96

FT-8900
RRP: £449
MLS PRICE: £429
No Deposit, then
36 x £15.60

VR-5000
RRP: £649
MLS PRICE: £599
No Deposit, then
36 x £21.78

FTV-1000
RRP: £799
MLS PRICE: £699
No Deposit, then
36 x £25.41

VX-7R
RRP: £359
MLS PRICE: £329
No Deposit, then
36 x £11.96

VX-1R
RRP: £219
MLS PRICE: £159
No Deposit, then
36 x £5.78

VR-500
RRP: £249
MLS PRICE: £199
No Deposit, then
36 x £7.24

VR-120D
RRP: £169
MLS PRICE: £159
No Deposit, then
36 x £5.78

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All Yaesu product carries 2 years Manufacturers warranty and ML&S can extend this to 5 years Parts and Labour Warranty with accidental dammage cover. Call for details.

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PAYMENT ILLUSTRATION: ZERO DEPOSIT: 36 payments of £11.96 TOTAL AMOUNT PAYABLE: £430.56 APR:19.9%. ML&S is a licenced credit broker.
Finance offered subject to status. Full written details on request. E&OE

FACT!

- Only ML&S employ 100% Licensed staff to deal with your calls & enquiries

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E&OE

Front Cover:

A close-up of G0MRF's Class D 136kHz transmitter is the main image on the front cover this month. See pages 65 - 67.

RadCom This Month

February 2003

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RadCom is published by the Radio Society of Great Britain as its official journal on the first day of the relevant month and is sent free and post paid to all members of the Society.

Closing date for contributions, unless otherwise notified, is five weeks prior to publication date.

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.

RSGB MEMBERSHIP - Annual Rates

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Overseas Corporate	£40.50
Corporate (Senior Citizens)	£31.50
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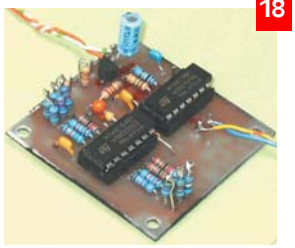
Details and membership application forms are available from RSGB HQ.

News and Reports

Reviews

Down To Earth - Amateur Radio From The Ground Up

Technical Features

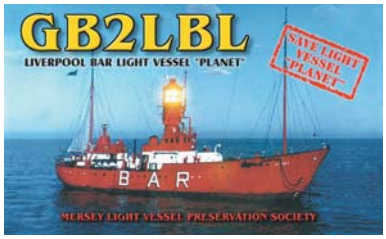


Regulars

RadCom NEWS

Save the *Planet*!

MEMBERS OF THE Mersey Lightvessel Preservation Society (MLPS), a registered charity, operated GB2LBL from the lightship *Planet* berthed in Birkenhead docks over the weekend of 18 - 20 October last year. MLPS is trying to raise money to buy the *Planet*, restore her to her original specifications and keep her on Merseyside. The special event raised over £100 to save the lightship and also marked the Queen's Golden Jubilee year. With the latter aim in mind, GB2LBL was attempting to contact other stations in the Commonwealth: the event started well with the first SSB contact to Tasmania and the first on CW to Alice Springs. Despite 'local QRM' from the maintenance crew hammering right outside the shack, the two stations went on to make contacts with the Turks and Caicos islands, Gibraltar, Cyprus, Malta, and Canada, as well as dozens of other countries. Other interesting contacts included another lightship in the harbour at Keele, Germany, and a cargo ship off Port Elizabeth, South Africa.



Members of the public were invited on board to sign the visitors' book and very generously donated to the collecting bucket. The group wishes to thank ML&S and Kenwood (UK) for their help. MLPS is looking for new members (at £5 a year) and for individual and corporate donations to help to save the *Planet*: please see the website at www.barlightvessel.org.uk Donations / membership subscriptions can be sent to Bill Harrison, Treasurer, 2 Mount House Road, Formby, Merseyside L37 3LB or for more information contact chairman Stan McNally, tel: 0151 648 2266.

M3 'QSO Party' A Big Success

THE M3 QSO Party on 40m on 1 January was a huge success with hundreds of newly-licensed M3 amateurs and their friends wanting to join in. Richard Jolliffe, G3ZGC, said: "I planned just to join in but when I switched on there were two M3s looking for a net controller. So as one of the Newbury club's Foundation Licence instructors I volunteered. Now there are 6000 licensed M3s, so even if only 1 in 10 decided to join I realised that there could be a big response. The actual pile-up was certainly the largest I have ever heard and I had to go to letters in the suffix and ask for M3 Alfa stations and work through the alphabet. In two hours I worked 112. At least half as many again were gotaways." Richard added, "What was very noticeable was that the standard of operating was fantastic by the M3s although some full licensees left a lot to be desired. It was noticeable how appreciative most of the M3s were at having passed their exams. Many messages of thanks were passed to their local clubs. An excellent event." Douglas Nixon, M3BKC, was one of the numerous Foundation Licensees joining in the fun. He said, "Richard did a splendid job as net controller during the hectic conditions that followed at times during the next two hours. Roger, G4RUW, also from Newbury, took over at 1200, followed by John, G4TSN, from Nottingham. Many thanks to all concerned."

Another Mountain to Climb

ON 1 JANUARY South Africa became the seventh country to have a 'Summits on the Air' (SOTA) scheme. SOTA is an award scheme that encourages portable operation from hilltops. It started in March 2002 with schemes in England and Wales, which were joined by the Isle of Man, Italy, Scotland and Northern Ireland. SOTA has proved very popular and already nearly 400 summit expeditions to over 180 summits have taken place in the UK. The Republic of Ireland is expected to be the next country to join - by St Patrick's Day, 17 March. Full details are at http://www.sota.org.uk

250th Success for 3 Counties Group

THE 'THREE Counties' Foundation Course Group based at Frodsham in Cheshire completed its 10th course in November last year. The course included the group's 250th successful candidate. Lead Instructor Dave Wilson, G7OBW, and his wife Kath, M1CNY, wish to thank the following for their assistance: Dave Bibby, G1PIX; Mike Isherwood, G4VSS; Graham Merrington, G1IVV; Sam Bell, G0SBI; Albert Heyes, G3ZHE; Roland Jeffery, G0GZI; Pat Glover, M0PAT; John Glover, M5HFJ; Martin Tust, G4LUQ; Steve Foulkes, MW1STE; Mark Harper, MW1MDH; Mike Jackson, M0ACK; Richie Gunning, MW3RDG; Frank Mallows, G1GYC; Ernie Holme, G4YYB; Ian Limbert, 2E1CYS; Ken Ward, G1ITV; Bob McChristie (Lead Officer, Local Authority, Civil Protection Unit) and Cheshire County Council for the use of The Beacons at Frodsham. Congratulations to them and all 250 successful candidates.

Dave Wilson, G7OBW, presenting Dereck Picton, the 250th candidate, with his paperwork, along with other candidates and helpers at the Beacons in Frodsham, Cheshire.

Thinking Day on the Air

THE ANNUAL 'Thinking Day on the Air' (TDOTA) takes place over the weekend of **15 / 16 February**. A TDOTA pack is available from RSGB HQ. Groups using a GX or similar prefix instead of a GB call are asked to inform HQ so that their details may be published in the pack. The closing date for the receipt of this information is **Wednesday 5 February**.

The Worcester Division Guides Association will be on the air for TDOTA. In 2001 there were over 400 visitors to the event and more than 350 Guides, Brownies and Rainbows passed Greetings Messages using the Avon Valley ARA's club callsign MX0RAD. The club is making a plea to all amateurs in the Worcester area for help with this year's event. If you can help please contact Pete Badham, G0WXJ, tel: 01905 726740 (evenings) or 01905 362100 (daytime) or e-mail: g0wxj@avara.co.uk

The Itchen Valley Radio Club will also be putting on a TDOTA station for the Winchester Guides. Details from Sheila, G0VNI, tel: 023 80813827; e-mail: sheila.williams@ivarc.org.uk

● WE HAVE BEEN contacted by Philip Owen, MD of Track Safe Telecom Ltd, a company which has won a contract to remove some 1200 satellite dishes nationwide. Philip is offering the roof-mounting brackets free of charge to radio amateurs who wish to pick them up from the site when the equipment is being decommissioned. Please contact Philip on 0845 1204571 or office@tracksafetelecom.co.uk

On the Road Again

DEREK HIGBEE, G0SQH, sets off to cycle the length of New Zealand on 3 February to raise funds for Polio Plus. Derek has already raised over £4000 by riding from Land's End to John O'Groats - via Snowdon, Scafell and Ben Nevis. He will be active on 2m and 70cm and hopes to make contact with the local ZLs *en route*. Those of us here can keep in touch by viewing Derek's website at www.btinternet.com/~dhig which he will be updating during his ride.

Christopher Daisley, MM3ETD, aged 9, who recently passed his Foundation Course at the Livingston DARS under the watchful eye of Billy Jenkins, MM0WKJ. Christopher is planning to take the May 2003 RAE. Christopher shares the shack with his father, Tom, MM0TLD.

RadCom NEWS

Crystal Wanted

CAN YOU HELP? Rev William Burton (Bill, G4CWA / T88BA) writes from Koror, Palau, to ask if anyone can provide a crystal on 1170kHz for a Christian radio station in the Marshall Islands. He says, "the original was in an octal holder but FT 243 or FT 241 would do with the frequency a bit LF as I could re-grind it if necessary." If you can help, please e-mail: skypilot@palaunet.com

Lucky Winner

THE WINNER of the competition in the December 2002 issue of *RadCom* is Mr P Briggs, G4BWW, of Southport, Merseyside. He wins a bhi NES-10 noise cancelling loudspeaker worth nearly £100.

May RAE

CITY & GUILDS has rescheduled the date for the May 2003 RAE. It will now take place on **Monday 19 May** and *not* on 12 May as previously notified. The December RAE remains unchanged on 1 December 2003.

● A MEETING OF broadcast listeners and DXers takes place at Wetherspoons, Piccadilly Gardens in Manchester at 4.00pm on **1 February**. Everyone with an interest in radio is invited to the meeting, organised by the British DX Club. Further information from Tom Read, M1EYP, tel: 01625 612916; or by e-mail to: tommyread@hotmail.com

Raynet Founded 50 Years Ago After Flood Devastation

Duke of Edinburgh to Open East Coast Flood Exhibition

THE EAGLE Radio Group [see *RadCom* December 2002 page 34 - *Ed*] is planning to operate GB0ERG to mark the occasion of the 50th anniversary of the East Coast Floods on 31 January 1953. The station will be part of an exhibition to be opened by the Duke of Edinburgh at the Dunes Entertainment Centre in Mablethorpe. The Duke visited Mablethorpe and Sutton-on-Sea immediately after the flood, and saw the devastation at first hand. The role played by amateur radio during this time was pivotal to the setting-up of Raynet. Humber Radio, GKZ, had to close down due to flooding. Amateurs continued to monitor the distress frequencies of 500 and 2182kHz, and Cliff Newby, G3EBH, was one of a number of amateurs who worked out-of-band to answer shipping in distress, and was then able to co-ordinate with the Coast Guard service. Amateurs also helped the emergency services ascertain the scale of the disaster.

David Hopcroft, station manager at Humber Radio, wrote the following in an article on the history of Humber Radio: "On the night of 31 January 1953 the staff on duty, though used to handling Distress traffic, suddenly found themselves to be in distress. During severe gales at a period of high tides, the sea broke through the coastal defences and flooded the station that was located just behind sandhills close to the sea. Urgency (XXX) traffic was in progress with *MV Levenwood* in difficulties in rough seas when the power failed. Very shortly after the emergency generator also failed. The last entry in the WT log reads 'GNF de GKZ, Station Flooding, Ceasing Operations'. . . The whole of the district was by now under water. The sea had broken through defences in many places, not only in this area but also other parts of the country and across in Holland. Services were resumed a few days later using the mobile station set up for just such an emergency. It was a converted bus parked on a hill some 15 miles inland. Permanent repairs took about six months before 'normal service was resumed'."

The Mablethorpe Dunes Entertainment Centre, home of GB0ERG and the east coast flood exhibition.

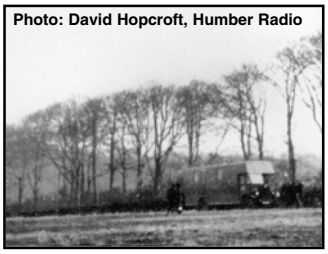


Photo: David Hopcroft, Humber Radio

The 1953 temporary Coastal Radio Station near Louth.

The Eagle Radio Group also plans to put on a display of 1950s equipment at the exhibition to demonstrate the technical changes which have taken place over the last 50 years. An article on the 50 years of amateur radio emergency service will be published in *RadCom* next month.

National Science Week, 7 - 16 March

NATIONAL SCIENCE Week takes place this year between **7 and 16 March**. This is an ideal opportunity for radio clubs or groups of individuals to put on a special event station to demonstrate amateur radio to the general public.

The RSGB has produced a whole series of posters and leaflets to help you to put on a successful event. These include press release letterheads to give your press release a professional look, A3 and A2 size posters, and even amateur radio lectures on paper, acetates or *PowerPoint*. You supply the manpower: we will help with the rest. Contact RSGB HQ by **14 February** at the latest to state your requirements.

As part of National Science Week, GB4FUN will be touring the country demonstrating amateur radio.

● GB4FUN recently visited The Priory Lincoln School of Science and Technology following a request by teacher Dave Mackinder, G4DWP. In what was seen as one of the most successful visits by GB4FUN yet, the year 7 pupils passed greetings messages to amateurs on HF and used the computer-controlled satellite tracking equipment on board the van. The demonstration was such a success that a new after-school amateur radio club is being formed and there is a waiting list for the first Foundation Course at the beginning of next term!

The visit was reported by the *Lincoln Chronicle* and generated much good publicity for amateur radio.

Photograph courtesy of *Lincoln Chronicle*

Pupils at Priory LSST on the air from GB4FUN.

Club & Regional NEWS

Region 1: Scotland West & Western Isles

PAISLEY (YMCA) ARC
5, Working the I Link. 19, The New Licence System. Jim, GM3UWX, 01505 862817.

Region 2: Scotland East & the Highlands

ABERDEEN ARS
7, Junk sale. 14, 'An Evening with OHMS', James Mackinnon, GM4EKC. 21, Video: Space Mission Part 1. 28, On air, Morse practice. Robert, 01224 896 142.

COCKENZIE & PORT SETON ARC
7, 'Normal Club Night'. 28, Radio check night, John, GM7OLQ. Bob, GM4UYZ, 01875 811723.

LOTHIANS RS
10, Switch mode power supplies, a practical approach, Brian Flynn, GM8BJF. 24, SAMC (outside visit, members only). Peter, 0131 446 0155.

Region 3: North West

CENTRAL LANCS ARC
3, AGM. Jim, G0GVA, 01772 621954.

FYLDE ARS
13, Meeting at new venue: the COMED Aviation Lounge at Blackpool Airport. Ken, G3RFH, 01253 407952.

MANCHESTER WIRELESS SOCIETY
4, SSTV for the beginner. 11, On air, social evening. 18, Quiz. 25, On air, CW practice (all levels). Kev, G0TOG, 0161 3300914.

ROSSENDALE ARS
12, East Lancashire Railways, all our yesterdays. Ken, G1RWK, 07899 084 331.

STOCKPORT RADIO SOCIETY
4, Dipole and doublet antennas, Bernard Naylor, G3SHF, and the Internet repeater, Jim, G3KAF. 18, The SWR bridge, Bernard, G3SHF, and 'The Packet Cluster', Keith Khan, G3RTU. David, M1ANT, 0161 4567832.

THORNTON CLEVELEYS ARS
3, Table top sale. 10, On air PSK31 etc. 17, Contest and rally discussion. 24, Advanced test equipment. Jack, G4BFH, jack@jduddington.fsnet.co.uk

Region 4: North East

EAST YORKS ARS
13, The new amateur radio licence structure. 20, AGM. David, G4EBT, 01482 876702.

GREAT LUMLEY AR & ES
2, 9, Foundation course. 19, Talk TBA. Nancy, 0191 4770036, nancybone2001@yahoo.co.uk

GRIMSBY ARS
6, GPS navigation, Adrian, G1BRB. 20, Quiz night. Brian, G4DXB, 01472 231383.

HALIFAX & DARS
18, QRP, Rev George Dobbs, G3RJV. 5, Talk TBA. Andy, G0VRM, 01430 801122.

HORNSEA ARS
12, Vintage machinery. 19, Activity evening. 25, Protective Multiple Earthing (PME). Andy, G0VRM, 01430 801122.

SHEFFIELD ARC
3, VHF radio, Satellite demo. 17, 'Walking with Radio', Tony Whitaker, G3RKL.24, HF radio. Nick, G4FAL, 0114 2552893.

Region 5: West Midlands

BROMSGROVE ARS
11, 'Now Like Last Year Let's Make It Work'. 25, 'Amateur DF', Geoff Foster. Angus, G8DEC, 01527 875573.

GLOUCESTER AR & ES
3, Multi-path VHF propagation. 10, Workshop, on air. 17, 'Then and Now', bring and show vintage items and modern equivalent. 24, Workshop, on air. Tony, 01452 618930 office hours.

KIDDERMINSTER & DARS
18, Vintage and military ham radio, Stuart, G0TBI, Chairman, Vintage and Military ARS. Please note new venue: the Chain Wire Club, Zortech Avenue, Kidderminster. Tony, G1OZB, 01299 400172.

MID-WARWICKSHIRE ARS
11, Meeting on air. 25, Satellite operating, Brian, G4DF. Bernard, M1AUK, 01926 420913.

STRATFORD UPON AVON & DRS
10, Build It! Team Challenge, G3MXH. 24, The Digital Future, Geoff, G8UKT. Ron, 01789 267430.

TELFORD & DARS
5, Open evening, on air. 12, Basic constructional techniques. 19, Under £5 construction competition. 26, Ten-minute topics, a fun evening of short items. Mike, G3JKX, 01952 299677.

Region 6: North Wales

No club details received.

Region 7: South Wales

ABERYSTWYTH & DARS
13, PMR demonstration, Chris, GW7HAE. 27, Club net on S20, S21, GW7OZP. Ray, GW7AGG.

Region 8: Northern Ireland

BANGOR & DARS
5, Propagation, Pete, GI4VIV. 15, 16 Foundation Licence course. Mike, GI4XSF, 028 42772383.

Region 9: London & Thames Valley

COULSDON ATS
10, Post Office Railway, Paul Pique, M3/G8KDQ. Steve, G7SYO, 01737 354271.

CRAY VALLEY RS
20, The Canadian Experience, Paul, G3SXE. Bob, BRS32525, 020 8265 7735 after 8pm & weekends.

CRYSTAL PALACE R & EC
7, Technical discussions, club projects and Morse class. 21, AGM and construction contest. Bob, G3OOU, 01737 552170 or Victor, G1PKS, 020 86532946.

DORKING & DRS
25, Fables & Myths, Walter Blanchard, G3JKV. John, G3AEZ, 01306 631236.

MAIDENHEAD & DARC
6, 'Great egg race' competition. 18, Near Vertical Incidence Skywave, Bernard, G3SMW. John, G3TWG, 01628 525275.

NEWBURY & DARS
26, 'Ask the Audience', an evening to allow Foundation Licensees to ask the more experienced amateurs any questions. Richard, G3ZGC, 01635 46241.

RS OF HARROW
7, 'Foundation Licence Training', Don, G0ACK. 14, Informal. 21, FT-747 visual basic interface, David, G0CAG. 28, Informal. Jim, G0AOT, 01895 476 933 or 020 7278 6421.

READING & DARC
13, 'The Trials & Tribulations of a GB2RS Newsreader', Roy Powers, G8CKN. Pete, G8FRC, 0118 969 5697.

SILVERTHORN RADIO CLUB
7, Construction Contest. 21, Visit by Waters & Stanton. 28, On air. David, G0KHC, 020 8504 2831.

SURREY RADIO CONTACT CLUB
3, Sid Morley Memorial. Ray, G4FFY, 020 8644 7589.

SUTTON & CHEAM RADIO SOCIETY
20, Mystery lecture. John, G0BWV, 020 8644 9945.

VERULAM ARC
10, AGM. Walter, G3PMF, 01923 262180.

Region 10: South & South East

ANDOVER RAC
4, HF / VHF activity night. 12, Slow Morse class on 145.250MHz. 18, Members review their best radio book. Terry, G8ALR, 01980 629346.

CRAWLEY RC
12, PSK and other datamodes, Phil, G4UDU and Bob, G3VXJ. 26, Construction evening. Derek, G3GRO, 01293 520424.

FARNBOROUGH & DRS
12, PCB fabrication, Alan, M5AMN. 26, Surplus equipment sale, John, G3KND. Norman, G0VYR, 01483 835320.

HASTINGS E & RC
19, AGM. R C Gornall, G7DME, 01424 444466.

Region	RSGB Regional Manager
1. Scotland West & Western Isles	Gordon Hunter, GM3ULP
2. Scotland East & the Highlands	Position vacant
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	Position vacant
8. Northern Ireland	Jeff Smith, MI0AEX
9. London & Thames Valley	Position vacant
10. South & South East	Position vacant
11. South West & Channel Islands	Barry Scarisbrick, G4ACK
12. East & East Anglia	Malcolm Salmon, G3XVV
13. East Midlands	Bryn Llewellyn, G4DEZ

RSGB Regional Managers as of 8 January 2003.

HORNDEAN & DARC
4, Social Evening. 25, Auction. Stuart, G0FYX, 023 9247 2846.

ITCHEN VALLEY RADIO CLUB
14, 'My Antenna', club members. 15, 16, TDOTA with Winchester Guides. 23, Foundation Course Part 1. 28, Wire antenna construction. Sheila, G0VNI, 023 80813827 sheila.williams@ivarc.org.uk

OXFORD & DARS
13, Experiences of an M3 after 35 years as an SWL, Paul Goodhall, M3JFM. Dave, G3BLS, 01865 247311.

SOUTHDOWN ARS
3, AFS and future events, John, G3DQY. John, G3DQY, 01424 424319.

SWINDON & DARC
6, Members' equipment sale. 20, Modulation, ancient and modern, Ian Whitworth, G8JHC. Den, M0ACM, 01793 822705.

TROWBRIDGE & DARC
5, Cross Field Antennas video & talk, Bob Henley, G3IHR. Ian, G0GRI, 01225 864698 evenings / weekends.

WORTHING & DARC
5, Discussion of current topics. 12, Collectorama. 26, Junk sale. Roy, G4GPX, 01903 753893.

Region 11: South West & Channel Islands

CORNISH RADIO AMATEURS CLUB
6, Digital modes interface, G4WQL. 10, Computer section. John G4LJY, 01872 863849.

EXMOUTH AMATEUR RADIO CLUB
5, AGM. 19, Club forum. Mike, G1GZG, 01395 274172.

SOUTH BRISTOL ARC
5, Club library audit. 12, 'Using Scanners - Dos & Don'ts'. 19, On air. 26, Workshop: does SWR really matter? Len, G4RZY, 01275 834282.

SOUTH DORSET RS
4, Magnetic loop antennas, Rob Hodges, G0RYL. Jon, G2FHF, 01305 823232 or g2fhf@portlandbill.co.uk

TORBAY ARS
21, AGM. G3HTX, 01803 663200, rally@tars.org.uk

YEOVIL ARC
5, Microcontrollers, M5EVT. 13, Derek's other hobbies. 20, British Amateur Radio During the 1930s, G3GC. 27, On air. Derek, M1WOB, 01935 414452.

Region 12: East & East Anglia

BRAINTREE & DARS
3, Morse evening. 17, Oscilloscopes. John, M5AJB, 01787 460 947.

CAMBRIDGE & DARC
7, GSM Phone Technology, Mike, M0BLP. 14, Preparing for the Rally. 16, Rally at Wood Green Animal Shelter. 21, Informal. 28, Video. Ron, G3KBR, 01223 501712.

CHELMSFORD ARS
2, The Canvey Rally, The Paddocks, Long Road. 4, VHF / UHF Propagation, Les Barclay, G3HTF. David, M0BQC, 01245 602838.

COLCHESTER RAC
13, Operational evening at St Helena, M0UTH. 27, Waters & Stanton visit, Mark Francis. Andy, M1MOD, 01206 735122.

EAST KENT RS
3, VLF, Erwin, G4LQI. 17, Internet gateway, Dave, G8PUO. Paul, G3VJF, 01227 365384, EKRS@paulnic.com, www.paulnic.com/ekrs

HARWICH ARIG
12, AROS, Barry Scarisbrick, G4ACK. Eugene, G4FTP, 01206 826633.

LEISTON ARC
4, The Black Beacon, Antenna Tuning by Stealth, Andy, M3AXO. Paul, M3MIG & Diana, M3VDT, 01728 746044, m3mig@aol.com

NORFOLK ARC
5, Aircraft radio communications and visit to aircraft simulator, Tom Hughston. 12, Informal and CW instruction. 19, NARC DF project, David, G7URP. 29, Informal and CW instruction. Peter, G3ASQ.

Region 13: East Midlands

DERBY & DARS
4, Junk sale. 18, Quiz night. 25, Technical Topics. Martin, G3SZJ, martin@martinshardlow.demon.co.uk

EAGLE RADIO GROUP
11, 'Radio Restoration', Ron Oxley, G0SWS. G0SWS, 01507 478590.

LINCOLN SHORT-WAVE CLUB
5, G5FZ on air. 19, Contests discussion. John, G1TSL, 01522 793751.

LOUGHBOROUGH & DARC
4, On air. 11, 'It's not Radio! Or is it?', Peter, G7/M3PCT. 18, DF preparation. 25, Annual club dinner, venue TBA. Chris, G1ETZ, 01509 504319.

RAF WADDINGTON ARC
13, Railway signalling systems, Barry, G4DBS. Bob, G3VCA, 01522 528708.

SHEFFORD & DARS
6, Strain Gauges, Barry, G8FFM. 20, AGM. Derek, G4JLP, 01462 851722.

SOUTH NORMANTON, ALFRETON & DISTRICT AMATEUR RADIO CLUB
1, 2, Foundation Licence Course. 3, Inter-club quiz, pie & pea supper. 10, M3 operating night. 17, Junk sale. 24, On air. Mike, M0RMJ, 01949 876523.

KEEPING IT IN THE FAMILY

FIVE MEMBERS OF the McLaughlin family have recently passed the Foundation course at the North Wakefield RC. Mother and father Julie and Sean McLaughlin are now M3JML and M3TML, while 11-year old Amy is M3JSM, eight-year old Shaun M3SPR and seven-year old Laura M3LMC. Elder daughter Katrina, aged 13, was scheduled to take her exam in the next batch at NWRC in January.

The club has always been keen to train and support newcomers to the hobby, but since the Foundation Licence was introduced the club has gone from strength to strength. The whole McLaughlin family is taking an interest in the Morse classes now being held every Thursday evening at NWRC. Further details about the club's training classes can be found at www.g4nok.org

Julie, Katrina, Amy and Sean McLaughlin and (front) Shaun and Laura McLaughlin from Wakefield.

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*.

THE BRIGHT SPARKS OF 2002

Dodgy DXers team captain GM3YOR is presented with the Bright Sparks trophy by K&LARC chairman GM3OZB. L to R: GM0GAV, GM3YOR, GM3OZB and GM0RLZ.

THE KILMARNOCK & Loudoun ARC, GM0ADX, hosted its 19th annual 'Bright Sparks' quiz and social evening at the Foxbar Hotel in Kilmarnock on 10 December last year. Ten teams from local clubs competed fiercely in a pub quiz style competition for the highly coveted Bright Sparks trophy. The questions ranged from general knowledge and amateur radio to Scottish history. After seven thrilling rounds the winners, with 108 points, were The Dodgy DXers (GMDX Group); second, with 103 points, Stirling 1 (the Stirling club); and third, with 101 points, FM Group (CSFM Group).

EVEN BIGGER

IN THE DECEMBER *RadCom* the Dumfries and Galloway club thought they could claim the title of Scotland's largest Foundation class. However, Ken, MM3KMC, informs us that he was one of 16 candidates who, in May 2002, took and passed the first such course held at the Paisley ARC. He says, "so surely this is the biggest course yet, maybe even in the whole of the UK?"

'VALVE DAY' IN DORSET

THE BLACKMORE VALE ARS will be holding a 'valve day' on **Sunday 9 March** at its club HQ in Coppice Street, Shaftesbury, Dorset. The event features displays of valve transmitters and receivers and early test equipment. There will be two lectures: 'An Introduction to Valves' and 'Valve Testing'. It is also hoped to display parts of the late Dud Charman's, G6CJ, famous 'Aerial Circus', comprising a valve microwave transmitter and receiver. The Valve Day will take place between 1000 and 1630 and entry is free. For further information please contact Tony, G0GFL (QTHR).

At the Eagle Radio Group's first annual Christmas dinner the club's secretary, chairman, and training officer were presented with framed caricatures of themselves. The picture shows secretary Terry, G0SWS ('Entertainment'); chairman Nevil, G3VDV ('the big cheese') and training officer Charles, G0CBM ('Educational').

FOUNDATION COURSES IN STEVENAGE . . .

THE STEVENAGE & DARS held a second successful Foundation Course on 28 / 29 September last year, with a 100% pass rate after a couple of re-sits. 12-year old Katie Jefferson, now M3KEJ, said, "I have watched my dad Ian, M0JCC, playing with his radio and have wanted to give the Foundation course a try. On a day trip to the Bedfordshire Steam Rally [14 / 15 September 2002] we visited the special event run by SADARS with GB4FUN and GB0BSR and after talking to club members a vacancy was available for me. Everyone was put into groups and the *PowerPoint* presentation was good and helped me to understand it a little better. Everyone was friendly and willing to help. I had an excellent weekend and passed. Thank you to everyone involved."

Martin Juhe spent 35 years as an SWL but is now licensed as M3JUH, thanks to the Stevenage course.

Lead Instructor Les Jones, G7THT, thanks Robert Snary, G4OBE, for the use of his CD program on the course. Students and instructors found it very easy to use.

The club has four Foundation courses planned for 2003, commencing in February. For availability please check www.sadars.com and choose the Foundation Link, this will automatically be forwarded to the next Lead Instructor. An Intermediate Course is also planned for 2003 and priority will be given to those having completed the Foundation Course with the club.

. . . IN CHELMSFORD

THE CHELMSFORD ARS's fifth evening Foundation Course at St Mary's, Great Baddow, was a great success. On 28 November the 11 candidates took the written assessment and all passed at the first attempt. Another course is being run over six Thursday evenings in January and February. For details of this and future courses, please contact David Bradley, M0BQC, tel: 01245 602838; e-mail: cars@g0mwt.org.uk

. . . AND IN NORTHERN IRELAND

THE FOYLE & DARC near Londonderry in Northern Ireland will be holding Foundation Courses in 2003. No dates are set yet, but if you live in the area and wish to take out a Foundation Licence please contact Ray Blythe, MI0VFO, tel: 02871 841314; e-mail mi5afj@btopenworld.com or contact Trevor Campbell, MI5TCC, tel: 07710 468835: e-mail: trevsoup@aol.com

SIEMENS BECOMES TRENT VALE

THE SIEMENS Amateur Radio Club, G8ZK, in Beeston, Nottingham, has changed its name yet again. From 1 January it has become the Trent Vale Radio Club and now meets at the New Venture Social Club, Beeston Rylands, Nottingham. The club was founded in the early 70s as the Plessey Radio Club and occupied the radio shack on the company sports field. As the company name changed, first to GPT and then to Siemens, the club has also changed name. Due to falling membership and a change to funding arrangements, the decision was taken last year to vacate the shack but continue to meet on an informal basis. The club change of name reflects the fact that it is no longer associated with the Siemens company. Meetings are held on Thursdays from 8.00pm: details from Chris Archer, G4VFK, tel: 0115 917 5518 or e-mail: trentvale.radioclub@ntlworld.com

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The Digital Flagship

"Your signal's 59, lovely audio!"

Lets face it, you have to get used to hearing that every day when you own a Kenwood TS-870S – its digital technology has transformed the world of amateur communications. This HF all-mode transceiver is equipped with powerful twin 24-bit DSP (digital signal processors) at the IF stage – an innovation that leads to such benefits as high-efficiency digital filtering, powerful noise/interference reduction, equalizers and DSP detection. And the TS-870S is digital in other ways: it can be fully computer-controlled using a high-speed link. There's an antenna splitter, dual antenna connectors and an automatic antenna tuner that works on transmit and receive. All of this, plus the full range of high-performance features for which Kenwood rigs are renowned. By any measure, Kenwood's TS-870S merits true distinction.

■ IF-stage digital signal processing & digital filtering ■ SPAC noise reduction (CW/SSB) ■ Built-in K1 Logi-Keyer with full contest mode ■ Built-in Com port (to 57k bps) – standard Kenwood protocols ■ AIP and IF auto notch ■ Menu system ■ 100 memories ■ Multiple scan functions ■ Time or carrier scan-stop ■ All-mode squelch ■ Optional digital recording unit ■ Optional voice synthesizer for CQ calls, etc.

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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.

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- 100W output on HF & 6mtrs
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- SSB, CW, AM, FM and digital modes
- 100 memories
- Detachable faceplate and remote mounting kit available
- Speech processor standard
- Narrow filters fitted as standard

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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

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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

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DR620E *Dual Band Mobile/Base Radio*

- Wideband RX: 108-173.995MHz, 335-480MHz
- Receives Airband and Wide FM
- Dual Watch RX with V/U, V/V, U/U capability
- Dual Band TX: 2 Mtrs/70cm
- 200 Memory Channels
- CTCSS/DCS encode/decode
- Advanced 10F3 digital mode w/speech compression technology (EJ-47U req.)
- Four different tone bursts.
- EMS47 Mic (optional) allows remote control/direct VFO input
- Front Panel seperation (optional EDS9 kit)
- Programmable VFO and memory scan
- Direct GPS input for APRS mobile tracking (req. optional EJ-50U)
- Internal Duplexer
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- TNC (optional EJ-50U) supports digipeat mode

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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

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- 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)*

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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
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- 40 memory channels + 1 call channel
- Large range of accessories available

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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
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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.

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- Large illuminated display
- Loud clear speaker horn system
- 100 memories+1 call channel
- Multi Scan functions
- 38 CTCSS tones for selective calling
- S-meter
- Cable Cloning
- External device control feature (outputs 3Vdc 5mA signal from an accessory port when squelch opens)
- Additional features, including anti-theft alarm and experimental mosquito repelling tone!
- Huge selection of accessories available

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DJ-X3

Ultra modern scanning receiver

with 8.33kHz for airband

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- 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)
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A Low-Distortion Sine-Wave Generator

*Part one of a two-part design by David M Jones, BSc (Eng), G4FQR **

THIS ARTICLE describes a novel sine-wave generator which is easy to build, and which should be widely useful, either alone as described, or as a building block in a larger system. The wave is synthesised digitally, so purity is well-defined and reproducibility is assured. Good results have been demonstrated from below 100Hz to over 100kHz.

MY INTEREST in pure tone generators was primed by wanting one to set up the transmit function of a G3XJP 'Third Method' HF Bands SSB Transceiver [1]. The tone has to be pure so that any imperfections heard in the transmitter output can be correctly attributed. In fact, the tone generator is built into the transceiver and connected in place of the microphone when transmitting CW.

Circuits for tone generators labelled 'sine-wave' appear in the handbooks, but be aware of their limitations. In twin-T, and ladder, RC-network phase shift oscillators, the wave amplitude is limited only by the transistor alternately saturating and cutting off, so the wave is unavoidably distorted. The phase shift networks, having low selectivity, allow significant gain in the circuit at the frequencies of the distortion products. A measured spectrum of a Twin-T oscillator is given in **Fig 1**. The harmonics may add colour for a less tedious CW sidetone, but they are unacceptable in a source for test purposes or CW transmission. These circuits are essentially fixed-frequency.

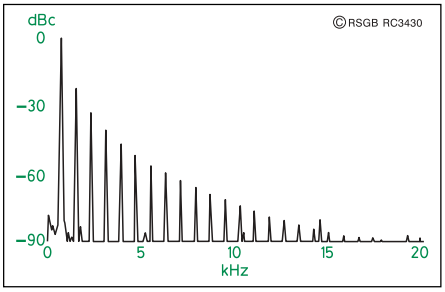


Fig 1: The spectrum of a Twin-T oscillator with a fundamental frequency of 750Hz.

* *56 Grebe Cres, Horsham RH13 6ED.*
E-mail: davidg4fqr@aol.com

Some commercial signal generators use the 8038 waveform generator IC introduced over 25 years ago and still available. Trimmer resistors have to be included to adjust for minimum distortion of the sine-wave, and inconvenient dual power supplies (eg ±9V) are recommended [2]. Projects for home constructors were described [3]. Using the cheapest version of the chip without adjustment, total harmonic distortion (THD) is typically 2% (maximum 5%) and, after adjustment, typically 1% (best 0.5%). Making such adjustments, I suggest, would have been outside the scope of the amateur until free-from-the-Internet spectrum analysis software arrived to use with PC soundcards. I still would not describe the 8038 as being 'user friendly' or the potential performance as very attractive!

Another circuit used commercially is the Wien bridge, and this has been the usual choice for high-quality amateur audio oscillators. It is a RC phase-shift circuit with special elements included to control amplitude. This reduces distortion, so that second and other even harmonics are kept very low, but the third and higher odd harmonics are rather high unless attenuated by low-pass filtering. Variable frequency control is commonly provided by a two-gang potentiometer, but the old Advance Models H and J audio signal generators used a two-gang variable capacitor instead [4].

DIGITAL SYNTHESIS FOR BETTER PERFORMANCE

WHILE PREPARING to embark on a rather complex Wien bridge project, I found in Horowitz and Hill's excellent textbook [5] the concept for a digital sine-wave generator. A shift register IC, with an inverter gate and a clock oscillator, plus a few pinches of resistors, produce a wave where the "first non-zero distortion term is the 15th harmonic, which is down by 24dB". This pointed the way to better and more certain practical results than the older ideas. Particular attractions of a digital approach are reproducibility, wave purity, ease of fixed or variable frequency control, and output level stability. The calculated shape of the wave produced by this method, is known as a 'quantised sine-wave', and is shown in **Fig 2**. Compare this with the photo of the screen of an oscilloscope connected to one of these digital generators.

Using the mathematics pioneered by

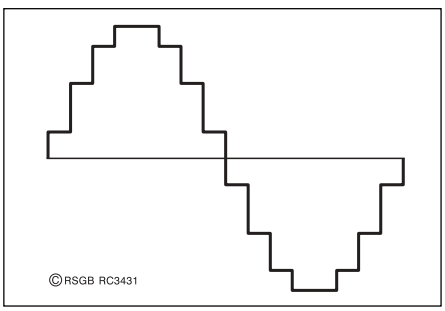


Fig 2: Calculated shape of the wave from the generator. This is also what you see on an oscilloscope - see the photograph.

Fourier, it can be shown that the only frequencies present in such a wave are the fundamental, and particular odd-order harmonics in pairs known as 'aliases'. These frequencies are simply related by the formula

$$n \times f_{clock} \pm f_{fund},$$

where n = 0, 1, 2, 3…,
f_{clock} = frequency of clock pulses applied to the shift register,
and f_{fund} = fundamental frequency of the resulting sine-wave.

Assuming an eight-stage shift register, requiring

$$f_{clock} = 16 \times f_{fund},$$

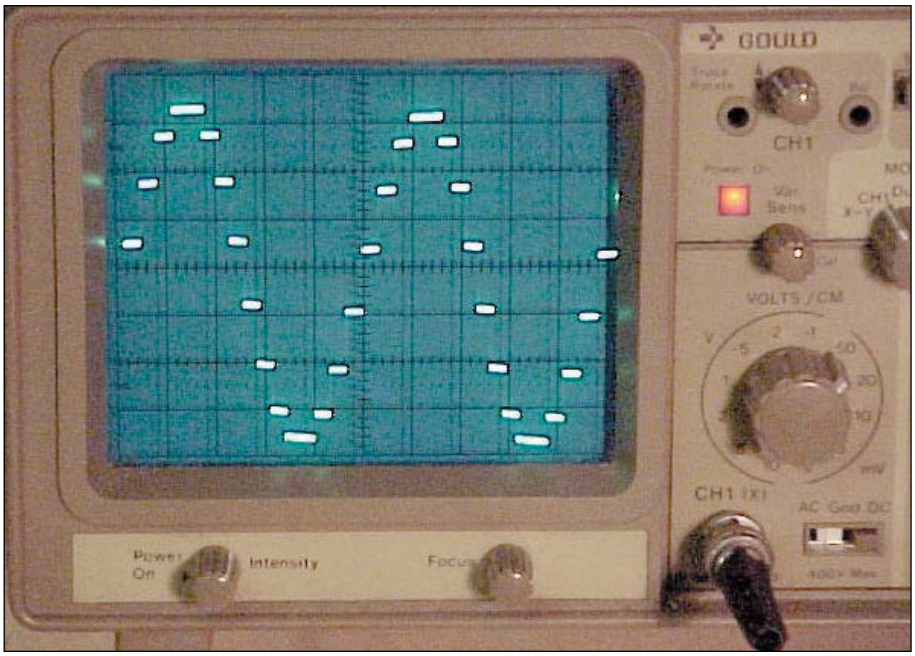
the first alias pair is f_{15}/f_{17} and the next f_{31}/f_{33}, and so on (f_{15} means the 15th harmonic). To a non-mathematician, this may seem esoteric but, using the spectrum analysis method described later, anyone can measure and verify these harmonics. Illustrations of this will appear next month.

Any other harmonics must be due to departures from perfection. Conditions for perfection include: seven 'weight' resistors conforming to the calculated sine law values (especially in regard to symmetry), equality between the eight stages of the shift register, zero delays, exact clocking, no ringing caused by the switching transitions, etc. The list looks daunting but don't be put off. Using the design to be described, only the weight resistors are significant, and the constructor can match his effort in setting up the resistors to his performance ambitions.

This modern approach promised to meet all my requirements easily, and looked like fun, so the Wien bridge project was pursued no further.

I have now built 10 of these novel generators and tested the effect of design changes on performance. Each new design was given a number, eg Mk5, and models of the same design were numbered eg Mk5.1, Mk5.2 etc. Up to Mk5, the active devices were 4000 series CMOS, but the newer and faster 74HC series was adopted from Mk6, using 74HC164 (eight-stage shift register) and a 74HC14 (hex Schmitt inverter) instead of the Mk5's 4015 and 4093. Using the B input of the 74HC164 for keying was introduced in Mk7, and this is the finalised version for which the circuit and PCB layout are given in this article.

So, are my creations perfect? Of course not, but we need something more discriminating than an oscilloscope to judge. I used a PC soundcard / spectrum analysis software combination with a usable range of 90dB (see 'Testing', next month, for the method). Even-order harmonics above the second are virtually absent. Odd-order harmonics above the third are insignificant until the 15th and 17th, the first pair of aliases, which are 24 and 26dB down.



An oscilloscope display of the quantised sine-wave output from the circuit. Compare this with Fig 2.

The all-important weight resistors (see 'Circuit Description', later) were set up for generators Mk6.1 and Mk7.1 using a Datron 1071 high-precision bench digital voltmeter (DVM), while for Mk5.3 an ordinary 3½ digit handheld DVM was used.

The test results confirm the benefit expected from precise weight resistors, so if the very best purity is important to you, try to use a high-grade meter.

The Mk6.2 is interesting, as I used it as a test bed for an idea I had to eliminate the need for a high-grade DVM. The generator's clock oscillator (Fig 3), with 'unknown' weight resistors connected in the R11 position and a frequency counter on TP1, is potentially a high precision system for measuring resistance (or capacitance). After a lot of experimenting, satisfactory results were obtained. Although they were better than those of the Mk5.3, built using an ordinary DVM, I was disappointed and the method is awkward, so a description is not offered at present. Part of the difficulty is that the two-inverter clock oscillator does not conform nicely to the simple formula connecting R, C, and period or frequency, appearing in textbooks. The measurements were also possibly disturbed by stray capacitance variations in my rough setup.

CLOCK PULSE	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	I/P A Q8 inverse
0	0	0	0	0	0	0	0	0	1
1	1	0	0	0	0	0	0	0	1
2	1	1	0	0	0	0	0	0	1
3	1	1	1	0	0	0	0	0	1
4	1	1	1	1	0	0	0	0	1
5	1	1	1	1	1	0	0	0	1
6	1	1	1	1	1	1	0	0	1
7	1	1	1	1	1	1	1	0	1
8	1	1	1	1	1	1	1	1	0
9	0	1	1	1	1	1	1	1	0
10	0	0	1	1	1	1	1	1	0
11	0	0	0	1	1	1	1	1	0
12	0	0	0	0	1	1	1	1	0
13	0	0	0	0	0	1	1	1	0
14	0	0	0	0	0	0	1	1	0
15	0	0	0	0	0	0	0	1	0
16	0	0	0	0	0	0	0	0	1

Table 1: Logic states of eight-stage shift register configured as a Johnson counter.

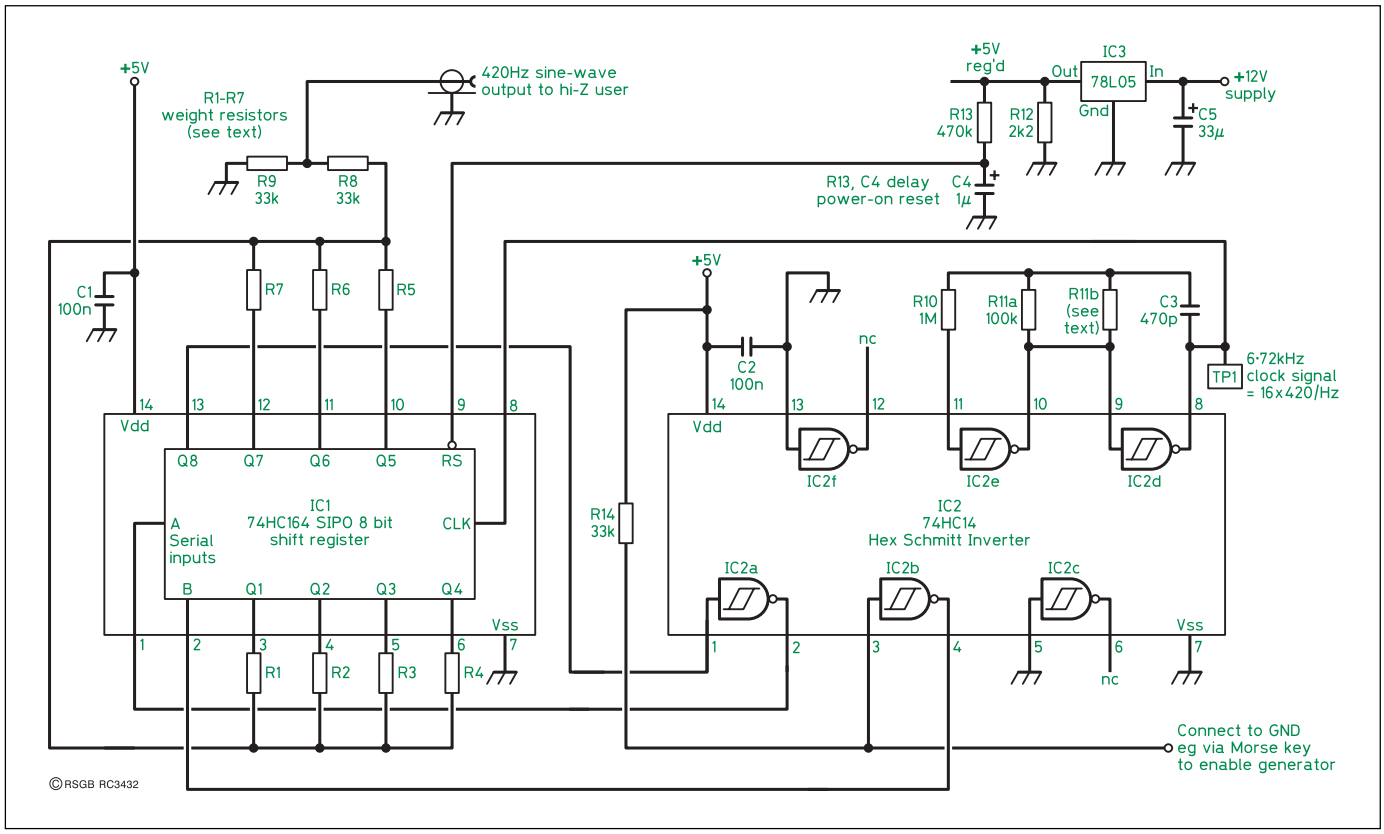


Fig 3: Circuit of the basic sine-wave generator.

CIRCUIT DESCRIPTION

FIG 3 IS MY CIRCUIT for a basic application. IC3 provides regulated 5V suitable for the 74HC series devices, ensuring stability of output frequency and level. Bleeder resistor R12 increases the load on IC3 above the otherwise very low demand of IC1 and IC2, and pulls the 5V rail rapidly to zero at power down.

About half-a-second after power on, R13-C4 place a 1 on the reset pin (RS) of IC1, a 74HC164 CMOS 8-stage serial input parallel output shift register, so that a set of all 0s appears on the Q outputs. (Without the delayed reset at power-on, there can be a random mixture of 0s and 1s in the shift register, resulting initially in a different misshapen wave and a different output level at each start-up, observable on an oscilloscope.)

Output Q8 is connected to gate (a) in IC2, a 74HC14 cmos hex Schmitt input inverter. Inverted Q8 from IC2a is presented to the data input, A, of the shift register (**Table 1** summarises the logic states of this arrangement, which is known as a Johnson counter). Outputs Q1 to Q7 are connected to a set of seven calibrated weight resistors, R1 to R7.

The result of an AND function on A and B can be used to 'enable' the generator or, in other words, for keying. To arrive at the usual sense of enabling by grounding the keying line, gate b of inverter IC2 is used with its output connected to B. Pull-up resistor R14 supplies 5V to the inverter input when the key is up.

Gates d and e of IC2 form a simple two-inverter clock oscillator the frequency of which depends on the values of C3 and R11. Using the Fig 3 values, the clock frequency is 6.72kHz, 16 times the final output frequency of 420Hz, near the bottom of the SSB audio band. Higher frequencies result from paralleling R11b in the spare holes provided in the layout (see also 'Frequency Control', later in the article). The clock can be monitored on TP1. As will be seen next month, the layout keeps spare gates IC2c and IC2f available for future use. Following CMOS practice, the unused gate inputs are grounded and the outputs are left floating.

Clock pulses are fed to the shift register clock input, CLK. On arrival of the first clock pulse, the 1 on input A appears at Q1, ie switching 5V to R1, R8 and R9. Succeeding clock pulses move 1s into the shift register until all the Q outputs are 1 except Q8, and all seven weight resistors have 5V applied. At this stage, the output voltage at R8 and R9 is a maximum and the rising half of a cosine cycle has been delivered. On the next clock pulse a 1 reaches Q8, is inverted by IC2(a), and a 0 fed into the shift register. Now, at each clock pulse, 0s appear at successive Q outputs, and 5V is removed from the weight resistors in turn to form the falling half of the cycle. When 0 appears at Q8 again, the cycle is complete, and repeats for as long as the clock runs. 16 clock pulses are required to form one cycle of the output sine-wave as shown in Fig 2 and Table 1. This relationship results from the choice of an eight-stage shift register. More or fewer stages could be used. A two-tone oscillator using the two 4-stage halves of one 4015 has been studied in a circuit simulator and looks useful but has not been built.

NEXT MONTH

IN THE CONCLUDING PART, the procedure is described for calculating the weight resistors and choosing them. Then comes the testing and choice of frequency, together with some applications.

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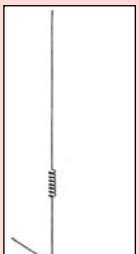

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PLT . . . . . and the Future of the HF Spectrum

by Hilary Claytonsmith, G4JKS *, RSGB EMC Committee

WE ALL KNOW the UK government's position on 'Broadband Britain'. This has been made clear in statements from the DTI in various technical meetings effectively saying that Broadband Britain is so important that the government will decide permissible interference levels after weighing up the compromises which will have to be made.

The Society formally flagged the potential radio interference problems from systems "using the existing copper infrastructure" in early 1998, and has been involved in forums, discussions and working groups ever since. The question now is, "Will the people who actually make the decision, whoever they are, be fully informed and not be led astray by short term political and commercial expediency?"

The Society's most important activities in this area have been our participation in the RA's Technical Working Group (TWG) on "Compatibility of VDSL and PLT [see box below right] with Radio Services in the Range 1.6 to 30MHz". The Society has been pleased to serve on the RA TWG itself and also on the drafting group. On completion of this Group's work it is believed that the Report was revised and amended by representatives of various governmental bodies. The final version of the report has been circulated to members of the TWG. The majority of the points raised by the Society and other radio users seem to have been addressed. However, there are still certain aspects of the report with which the Society does not wholly agree.

In the European context, the Society has been represented in the CEPT / ECC Project Team SE35 looking at "PLT, DSL, cable communications (including cable TV), LANs and their effect on radio services" and in the Joint Working Group of ETSI/CENELEC, charged with drafting the final European standard for emissions from telecommunication networks.

Looking at the general run of papers, discussion documents and web pages on the use of "the existing copper infrastructure" for transmitting data signals, a few are excellent, presenting good engineering information in a professional manner. Others are quite the opposite, claiming unbelievable data throughputs and completely ignoring EMC - or more often passing it off as simply a question of getting the EMC standards sorted out to accommodate their system - as if their right to the spectrum was a foregone conclusion.

The Society's involvement over the years has led to the sad conclusion that although the impact of systems such as ADSL and perhaps VDSL on the electromagnetic environment has been reasonably well thought out, the potential problems of the more controversial proposals, such as various forms of PLT, are much less well understood even by some of their proponents.

MISUNDERSTANDINGS

HERE ARE A few of the misunderstandings and half-truths put forward in various guises. In some cases these may have been due simply to a lack of knowledge of the electromagnetic environment. In other cases the misinformation appears deliberate.

1. "*There is no need for interference control more stringent than that of the existing EU Product Standards*". This is simply not true. The product standards (such as EN55022) are a practical compromise. Most interference to amateur radio comes from sources which themselves are compliant with the standards. The only reason that small signal services like amateur radio can exist is because most products are much better than the standards require and in many cases are operating for only a limited time. Broadband emissions 24 hours a day at the maximum level permitted by the current product standards would be a disaster.

2. "*The ambient noise level on HF is so high that high levels of emission on the HF band are justified*". Again this is simply not true. In residential areas, the HF ambient noise is relatively low for most of the time, with bursts of noise which are a nuisance but which do not prevent radio communication. Again, broadband noise present all the time would be a totally different problem.

3, "*Measurements made on high grade calibrated instruments can be relied on to give a true picture*". Plots have been published where the presenter has "forgotten" to note that the lowest level of the plot is the noise floor of the measuring antenna not the ambient noise floor, which

TECHNOLOGIES FOR SYSTEMS USING EXISTING CABLING

ADSL (ASYMMETRIC DIGITAL SUBSCRIBER LINE):

Frequencies used - up to 1.1MHz. Generally launched into the phone line at the local exchange.
Deployment: ADSL is being deployed in the UK and there are many thousands of customers.
Interference potential: The standard laying down permissible emission limits on ADSL is not as tight as we would like, but in practice systems seem to be better than the standard requires, and there does not seem to be a significant problem. So far the EMCC has not received any reports of interference from, or breakthrough to, an ADSL installation.

VDSL (VERY HIGH BIT RATE DIGITAL SUBSCRIBER LINE):

Frequencies used: up to 12MHz. Generally launched into the telephone lines at the street cabinet.
Deployment: Not deployed (except perhaps on an experimental basis) in the UK.
Interference potential: The launch powers are tightly controlled by international regulations to avoid mutual interference in the multicore cables. The regulation includes optional 'notches' for the amateur bands. The intention is that these would be invoked should there be an interference problem. It is not possible at the moment to say whether VDSL - if it is ever deployed in the UK - will be a problem to amateur radio.

PLT (POWER LINE TELECOMMUNICATIONS):

Frequencies used: For Internet access (generally known as 'access PLT') up to about 10MHz. Broadband signals are injected at the electricity sub-station and enter the domestic wiring of each house on the circuit. Proposed 'in house' systems could go up to 30MHz.
Deployment: Access PLT is not deployed in the UK (except for some very limited experiments). Trials so far have confirmed high levels of emission from access PLT systems.
Interference potential: There is no imperative system requirement to limit launch power, so ultimately the only limit on radio interference will be the emission regulations which are presently under discussion. The available bandwidth is shared by all the householders on the circuit, encouraging the use of the highest possible launch power to achieve a high data throughput to an economic number of customers. The question is, how will amateur radio be affected if access PLT is deployed on a commercial basis? On present showing it would be disastrous.

* Hares Cottage, Woolston, Church Stretton, Shropshire SY6 6QD.

RADIO SMOG

A commentary by David Sumner, K1ZZ, and published in the 'It Seems to Us . . .' column in the ARRL members' magazine, QST, *October 2002.*

Much in the news in mid-August were reports of a major scientific study of an 'Asian brown cloud' of toxic haze hovering over the most densely populated portion of that continent and threatening other parts of the world. The harmful effects of the haze on health and weather appear to be substantial: respiratory disease, drought in some areas and flooding in others, acid rain, and reductions in crop yields to name but a few. On a more encouraging note, scientists also know how to reduce the pollution and its effects: the use of cleaner energy sources and better stoves, and reduced burning to clear fields and forests.

The issue, which is really one of economics, is how to get hundreds of millions of individuals, families, and businesses to make these changes in how they live when the cost is far more immediate and tangible than the benefit. For an impoverished family, cooking its meal as cheaply as possible is a matter of survival. If cow dung is available as a 'free' fuel it's a rational decision for the family to use it - but when multiplied by one hundred million, one family's tiny stove becomes an environmental calamity.

There is an obvious parallel between pollution of the Earth's atmosphere and pollution of the radio spectrum. Like the atmosphere, the radio spectrum is a precious natural resource shared by all. Like pollution, radio waves respect no political boundaries. Like the smog that fouls the air in many cities, electronic smog fouls the radio spectrum as a consequence of human activity - and like toxic haze, radio smog is an economic rather than a technical issue. We know how to control it; the debate is over whether it's worth the price to do so, and who should pay.

We're used to hearing public policy debates about air and water pollution. While people may disagree on costs vs benefits in some instances, no one can possibly dispute that, for example, the quality of life in London improved dramatically after Parliament curtailed coal-burning in 1956. If someone were to suggest today that Londoners could save money by switching back, they would not be taken seriously - to put it mildly. The same would be true if someone were to suggest that their community could save money by dumping its raw sewage into the river. Such thoughts might have been acceptable 100 years ago, but not today. We've made too much progress, at too great a cost, to go back.

Unfortunately, the same cannot be said of spectrum policy. In some ways we do indeed seem to be going backwards, or having to fight against pressures in that direction.

Many sources of radio smog are unintentional. Switch-mode power supplies are not designed to generate radio interference. Unfortunately, in some cases they are not designed not to. They could be, and if either consumers or governments insist on it they will be.

Line noise is a big problem for many amateurs and other radio users. Power lines are not supposed to emit RF energy, and if they do it's a sign something's wrong. Some power companies care, and know what to do. Others either don't know or don't care (executive bonuses being more important than overtime pay for linemen, perhaps). The FCC can make them care, and in several recent cases has done exactly that by threatening enforcement action.

Radio smog also results from putting RF where it doesn't belong. RF has this wonderful property: it wants to radiate. And it will radiate from any conductor you introduce it to, unless the conductor is either shielded or balanced. So, why would anyone deliberately put RF on a conductor that is neither shielded nor balanced if they didn't want it to radiate? For the same reason that the destitute Asian family uses cow dung to heat its dinner: economies.

What we're talking about here are plans to use power lines to distribute broadband digital signals to homes and offices. The wires are already there, the reasoning goes, so why not use them? Utilising existing infrastructure in new and creative ways is good for business and good for society. Offering competitive choices to consumers lowers prices and improves service. How can anyone be opposed to that?

Here's how. A broadband signal is RF. Sent down an unshielded or imperfectly balanced line, it will radiate. Putting security concerns aside as someone else's problem, this creates a new and pervasive source of interference to radio reception. In other words, this competitive choice would transfer to all of society a cost - in the form of reduced utility of the radio spectrum - that is not imposed by other, more environmentally friendly ways of providing broadband service. Our poor Asian family may not have any choice but to pollute. We do.

Is it possible to do power line communications without causing interference to over-the-air communications? Count us among the sceptics. What may be a fine transmission line at 60Hz looks more like an antenna at HF. And that's a matter of physics, not economics.

Writing in the Summer 1994 issue of *EPA Journal* about London's historic 'pea-soup' fogs that gave rise to the term 'smog' in 1905, David Urbinato said: "At the turn of the century, cries to reduce the smoke faced a tough opponent. Coal was fuelling the industrial revolution. To be against coal burning was to be against progress. 'Progress' won out. Not until the 1950s, when a four-day fog in 1952 killed roughly 4000 Londoners was any real reform passed."

New sources of radio smog are no more acceptable than are new sources of the visible kind. At the turn of the new century our policymakers should - no, must - be able to distinguish real progress from cow dung.

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can be up to 30dB lower than the plot indicates. This is then used to justify claims that existing ambient noise is high. Similarly unsuitable measuring bandwidths have been used giving the impression that the ambient noise is much higher than it actually is.

4. "*Security and safety of life services could be protected from interference by having exclusion zones around receiving sites".* This may or may not be true. Some studies indicate that the exclusion zones might be impractical. In any event the Society has made it quite clear that such a concept is totally unacceptable. If emissions are so bad that such measures are required then there can be no justification for inflicting the interference on the private citizen.

5. "*HF communication is out of date and the HF band would be more profitably used for low cost Internet access".* This is so ridiculous it hardly needs an answer, though believe it or not, it has been made at more than one "professional" meeting. It is worth pointing out that it is not necessary to have high HF emissions to provide low cost high speed Internet access over the existing copper infrastructure. Satisfactory xDSL systems are being widely deployed in the UK and abroad and do not seem to cause any insoluble problems. The question is presumably whether to raise permissible emissions on HF to give greater competition, however great the cost to the environment. Could anyone seriously call this a level playing field?

6. "*Trials of our system have been held and there were no complaints of radio interference".* This is one of the most dangerous claims because it sounds so convincing to non-technical people. A few trials organisers have acknowledged that radio interference is a crucial issue and have cooperated in attempts to determine the extent of the problem. Other have kept their trials 'under wraps' and then claimed that no interference has been reported. In the case of PLT, where the frequencies of operation are in the HF band, away from the domestic broadcast bands, it might be some time before the interference is identified and reported. Even without this problem it is hopeless to rely on complaints from members of the general public - most people have no idea how to identify and report radio interference. Members can listen to sound-clips on the RSGB EMC website which show the nature of PLT interference.

Whilst the Society has been concerned for some time about these systems, the general level of concern elsewhere,

PLT WARNING!

The proposed use of power lines for broadband Internet access is raising very serious concerns for the low power radio industry, as Brian Back (MD of Radio-Tech and LPRA vice-chairman) explains.

The technology behind power generation and distribution has changed very little over the past 80 to 100 years. In fact the largest step change the industry saw was the introduction of AC and the subsequent construction of the National Grid between the 1920s and 1950s. Fundamentally, the system is much the same as it was in those early days: the insulating materials may have changed, but the network still comprises of unshielded conductors passing down every street across the land, both above and below ground.

Then came the telecommunications revolution. Again distribution networks were rapidly established, but this time using shielded / balanced conductors, optical fibres and regulated radio channels. So why the different approach? Simply to optimise propagation and to minimise interference!

WHERE DOES PLT FIT IN?

So, then, if power distribution uses unshielded cables and telecommunication uses controlled / shielded media, what is PLT and where does it fit in?

Power Line Telecommunication, sometimes referred to as Power Line Communication, is simply the superimposing of data on top of the mains. However, the network is not intended for that purpose, the cables are not shielded, and the noise generated by the data can potentially radiate everywhere.

In its defence, small-scale narrowband PLT has been around for a number of decades and is strictly regulated to minimise emissions and to reduce the risk of interference. So why, then, if PLT is so easy and can follow the path of the mains supply down every valley, every street, up every lighting column, into every home, up every tower block and into every workplace, don't we find it everywhere? Simply, experience has shown that it doesn't work very well under the emission constraints currently in place. Modifications are also often required to street furniture and, in spite of this, many of the systems in service struggle even with simple tasks such as switching on and off street lighting.

So what are the UK and other European and international governments planning, and why the concern of bodies such as the LPRA? In summary, they believe that PLT can be used to provide broadband Internet access, bypassing the monopoly of the existing cable providers, to deliver an Internet service 24 hours a day, seven days a week. Like it or not, every home, office, factory and building connected to the mains will in theory get the service.

So what is the problem with this? *Interference!*

In practice, to deliver that data rate required for broadband Internet access will require expanding the occupied bandwidth of PLT up to at least 30MHz, moving the goal posts on emission levels and introducing aggressive modulation schemes.

Apparently, signal levels of up to 20V are already used with the existing narrowband PLT systems and these do not always work! So what will be required for broadband PLT? What will be the effect of these modulation schemes and the increased bandwidth? We simply do not know and are unable to find out! We have not been invited to observe any trials and have not been able to obtain copies of any reports! We have met with a wall of secrecy.

RAISING THE NOISE FLOOR

The consequence of introducing broadband PLT will no doubt result in raising the 'radio spectrum noise floor'. How far we do not know, but is doesn't need to move very far: the spectrum is already polluted with noise from computing, commercial and domestic appliances. Just imagine damage from a broadband PLT network spanning an entire country! The consequential noise could be high enough to mask the monitoring of distant transmissions for national security purposes; the BBC SW broadcast bands will without doubt be hit with the quality of service reduced or blocked; the various international radio societies, including the UK's RSGB, will no doubt have major concerns over interference to their members' protected spectrum; radio astronomers will be effectively blindfolded; and finally LPRA members' equipment operating in the low frequency region could be seriously affected.

In summary, broadband PLT is like pollution: you receive it without choice, it is not biodegradable and it is impossible to clean up! It is alarming to think that not all the implications of PLT have been considered and the public and industry alike have been kept *totally* in the dark.

This article was first published in LPRA News, *the magazine of the Low Power Radio Association, and is reproduced here with its permission.*

particularly about PLT systems, is now rising. With the agreement of the authors, we reproduce here two examples of recent articles expressing concerns about the threat from any widespread deployment of PLT.

We also asked the RA for a statement to include in this article, setting out their position, and this is reproduced here (see 'Compatibility of Wired Telecommunication Networks with Radio Services').

The Society will continue to work in the UK and European standards forums to argue for common sense in setting emission limits to ensure that the HF spectrum remains a usable resource for radio communication. Whether technical arguments alone will be adequate now seems very doubtful. ♦

WWW.

RSGB EMC Committee: www.qsl.net/rsgb_emc

COMPATIBILITY OF WIRED TELECOMMUNICATION NETWORKS WITH RADIO SERVICES

- a statement from the RA

"RECENT DEVELOPMENTS in broadband telecommunication technologies, such as Digital Subscriber Line (DSL) and Power Line Telecommunication (PLT), have raised concerns amongst some radio users about the potential for emissions from these wired networks to cause radio interference. The Agency is therefore shortly to introduce Regulations to control emissions from cables and wires associated with specific broadband technologies operating below 1.6MHz. Studies have also been conducted to assist in determining what future measures might be needed to limit emissions from emerging technologies that operate above 1.6MHz.

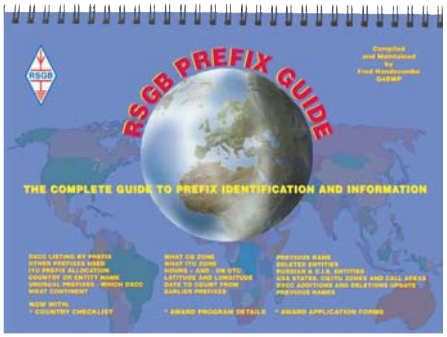
"In March 2001, the Agency formed a Technical Working Group on Compatibility of VDSL and PLT with Radio Services in the Range 1.6 to 30MHz. All interested parties were welcome to attend and membership included radio users; telecommunication operators and manufacturers. Around 70% of the radio frequency spectrum in the range considered by the group is used for Government sponsored radio services and officials from all the relevant departments also participated. The Agency was particularly pleased that representatives of the RSGB were fully involved in the group, providing a detailed input on behalf of radio amateurs and more general technical advice concerning this important area of spectrum. The group has now completed its work and a Final Report has been agreed for publication. It is anticipated that the report will be published in December 2002 alongside a National Consultation, which will be seeking views on appropriate emission limits needed to control radio interference from wired networks to ensure the successful coexistence of radio services and broadband telecommunications.

"The consultation will last three months. The results will inform the Government's position before responding to any request by the Joint Working Group of ETSI [the European Telecommunications Standards Institute - *Ed*] and CENELEC, which is currently in the process of developing a harmonised European EMC Standard for wired networks. Any UK Government position will take account of both the need to adequately protect radio services from undue interference and the need to encourage widespread deployment of broadband using competing technologies."

Radiocommunications Agency, Department of Trade & Industry, December 2002

Book Review

RSGB PREFIX GUIDE
Edited by Fred Handscombe, G4BWP
Reviewed by RSGB HQ Staff



THE *RSGB Prefix Guide* has been a favourite with HF operators and DXers for many years. Originally produced and published by the late Geoff Watts, production was taken over by the RSGB after Geoff Watts died and for many years John Forward, G3HTA, has diligently kept the publication up to date and accurate. Our thanks to John for his many years of service to the Society. Now, with the new 6th edition, John has deservedly retired and top DXer Fred Handscombe, G4BWP, takes over the role of editing the *Guide*.

For those who have not seen the *Prefix Guide* before, why is it such a useful publication? Its subtitle, *The Complete Guide to Prefix Identification and Information*, gives a clue. All HF operators, and in particular those interested in DXing or contesting, need a prefix list to provide information on the callsigns of stations being heard or worked. But most prefix lists give the briefest of information, eg F = France. The *RSGB Prefix Guide*, by contrast, for each prefix provides a vast amount of detail. A typical line listing might be as follows:

F France EU 14 27 +1 49N 2E FA-FF #36

The information that can be gleaned from just this one line is that the 'usual prefix' is F, France is a DXCC entity in Europe, in CQ Zone 14, ITU Zone 27, its local time is 1 hour ahead of UTC, it is located at 49ºN 2ºE (in the case of large entities, it is the approximate location of the capital city that is listed), 'earlier prefixes' used were FA to FF, and, finally, note 36 informs the reader that "all FC - FF prefixes have changed to Fn. FA FB prefixes will change to Fn in the near future."

France is well enough known, but what about unusual prefixes? Here, the *Prefix Guide* provides useful cross references. Take 6O as an example. Here, the prefix - 6O - is not listed in the first column, which immediately alerts you to the fact that 6O is not the 'usual prefix' used by this country (instead 6O appears in the second column). In the third column is the ITU prefix allocation, 6OA-6OZ, and the fourth column tells you that the country is Somalia. Column 5 says "Counts as Prefix T5". If you then cross-refer to T5 you are rewarded with all the detail you need for Somalia.

Previous names are given for many countries, eg 7P Lesotho, previous name Basutoland, and earlier prefixes are given for many more, eg 5Z Kenya, earlier prefix VQ4. When an entity has become accepted for DXCC from a specific date this information is also given, eg 9A Croatia counts from 26-06-91. Fascinating details are given for some 'odd' prefixes or callsigns, eg SI8MI - the Swedish part of Market Reef, counts as SM (for DXCC) [and not OJ0]; or SV0 "non-nationals in Greece or on Greek Is", counts as SV SV5 or SV9. And so on and so on.

But the prefix listing itself takes up only 18 pages of the 64 page guide. The rest comprises a series of 12 useful appendices, some new to this edition. These include a list of DXCC deleted entities, prefixes for the CIS and Russian Federation, USA States, zones and call areas, DXCC additions and deletions and so on.

So, what is new in the 6th edition? It goes without saying that the content has been completely updated since the last revision. But, with the new editor, the RSGB has also taken the opportunity to improve the whole quality of the publication. Hitherto, in order to keep production costs low, the *Prefix Guide* was photocopied on to coloured paper, whereas now it is a properly printed booklet. It is wire bound for ease of use, allowing it to lie flat on the operating desk, open to whichever page is desired. Details of a number of award programmes are now included, including application forms and there is also a useful DXCC band check list, an unlikely omission from previous editions, so you can tick off each entity as you work it on each band.

In short, the *RSGB Prefix Guide* is an essential aid for all HF (or 6m!) operators and SWLs. This new 6th edition is the biggest and best yet and is as up to date as it can possibly be.

RSGB Prefix Guide
ISBN 1 872309 85 2
64 pages + covers, A4 (landscape)
£7.64 + p&p (members), available from the RSGB Shop.

INTERMEDIATE LICENCE
by Steve Hartley, G0FUW
Reviewed by RSGB HQ Staff

SUBTITLED 'Building on the Foundation', this new book dovetails exactly with the new Intermediate Licence Syllabus, and guides you through it in a series of 38 carefully-prepared worksheets.

Written by a seasoned Novice tutor and author of *RadCom*'s regular 'Newcomers' News' column, the style is simple and non-menacing, presenting each subject as if it were 'pretty obvious, really', thus creating immediate confidence in the reader.

The book opens with the subject of soldering, giving practical advice on how to produce a good job.

We then proceed through conductors, insulators, components and symbols, before being confronted with our first circuit. The construction of this is described in a fashion resembling the old Heathkit manuals. Information is given about the tools you will need and how to use them safely.

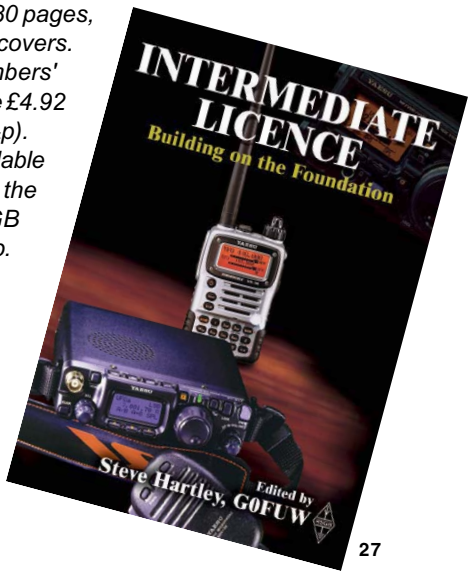
Although the section on wiring the 13A mains plug will be in danger of being thumbed past rapidly, just bear in mind that a lot more energy than you radiate will pass through one or more of these; isn't it therefore logical that it should be wired correctly, firmly and safely, without stray strands, insufficient insulation and a loose cord grip?

Multimeters and their uses are spread over several worksheets, so that you know what they are and how to use them.

The only inconsistency in the book is the sandwiching of the measurement of input power between 'Licence Conditions 1' and 'Operating Practices and Procedures'.

Then, the technical details come thick and fast, and the course becomes interesting but challenging, with two short diversions in the form of revision questions, enabling you to direct your revision.

The Intermediate Licence (RSGB).
ISBN 1-872309-81-X
A4, 80 pages, soft covers. Members' price £4.92 (+p&p). Available from the RSGB Shop.



Trans-Atlantic TV: The 75th Anniversary of Baird's 1928 Success

JUST OVER A year ago, the centenary of Marconi's feat in getting radio signals across the Atlantic was celebrated in style, there were special transmissions on the amateur bands, also a commemorative £2 coin. When this event took place in 1901, very few records were kept, there were no independent witnesses and even the wavelength used is still open to doubt. In contrast, John Logie Baird's equally important and technically more difficult achievement in sending live television pictures across the Atlantic 75 years ago this month, in February 1928, is very well documented. Every facet of this important event is recorded in detail in the radio station log books, diaries and correspondence. Surprisingly, few people are aware of these early television successes.

RADIO AMATEUR TECHNICIANS

AN INTERESTING AND UNUSUAL aspect of this important milestone in the progress of television is that radio amateurs in this country and the USA were solely responsible for the transmitting and reception arrangements. These covered a period of four months and involved a total of 58 test transmissions.

In 1924 - 5 Ben Clapp, G2KZ, was assisting the Wanamaker Corporation in the USA by sending reception reports relating to their special concerts broadcast through WGY on 107 metres. They were anxious to promote similar events from London, but could not appreciate that the BBC had an absolute monopoly on entertainment broadcasting. Believing that permission could be obtained for isolated presentations from London, they asked Ben Clapp to design and build a 1kW transmitting station at his home at 40 Warwick Road, Coulsdon. Wanamaker covered the entire cost and it is interesting to note from the insurance document that the transmitter and power supply alone amounted to £1027, about £26,000 in today's money.

The Wanamaker Corporation had heard about television and they asked Clapp to contact Baird to find out some details. During the visit he mentioned that on Christmas Eve 1924, he had become the first radio amateur to achieve two-way speech communication with the USA, when contacting Sheldon Heap, who held the callsign W1BDT. Baird quickly realised that he was speaking to someone with the necessary expertise and equipment to make possible his next important demonstration, trans-Atlantic television. Ben Clapp was engaged on the spot as Baird's first technical assistant and started work at the Motograph House laboratory in November 1926.

J L Baird (sitting) and Ben Clapp, G2KZ, at the trans-Atlantic transmitter.

For some time he had maintained regular contact with a fellow radio amateur, Robert Hart, W2CVJ, in Hartsdale, New York. On 4 January 1927, vision signals from Motograph House were sent by land line to Coulsdon for transmission to Hartsdale. The distinctive, pulsating audio note of the 30-line vision signals was received by Hart but an image could not be obtained due to the lack of suitable equipment.

Propagation conditions for trans-Atlantic transmissions on the short waves would not have been favourable during the summer months and Ben Clapp eventually arrived in New York on 5 October with a television receiver consisting of a 24-inch scanning disc driven by a 100 volt DC motor. He stayed with Robert Hart who had offered the use of his premises for the experiments.

ALL THROUGH THE NIGHT

THE RESIDENTS OF Warwick Road, Coulsdon, were used to the sound of the generators late at night at number 40, but when Ben Clapp left for the USA leaving his wife alone in the house, they viewed with suspicion the arrival of two young men, three times each week shortly before midnight and staying until the small hours. Their mission was entirely innocent, of course, for they were there to operate the transmitter.

The true nature of these activities had to be concealed from the British Post Office and the USA authorities, in case the latter should be spurred into launching a competitive venture. No mention could be made over the air of television, Baird or images and a simple substitution code disguised these words. Baird's name appeared throughout as 'IJKDR'.

Due to the high voltages in use at the Coulsdon transmitter, two operators were always on duty for safety reasons. This arrangement left one of them free to record verbatim all incoming and outgoing messages. The 315 pages of the station log book provides a detailed and unique account of the 16 weeks of tests each Monday, Wednesday and Friday.

Vision signals sent by land line from the Baird Long Acre laboratory

Robert Hart, W2CVJ. 'U' was the earlier, unofficial, prefix.

24 Norfolk Avenue, South Croydon, Surrey CR2 8BN.

If asked, most people would say the first live trans-Atlantic television was via the Telstar satellite in 1962. But Baird and radio amateurs in the UK and USA had already achieved this milestone in 1928, as Ray Herbert, G2KU, describes*

were transmitted when conditions were suitable, at other times gramophone records were used. An attempt was made to receive a video recording of Stooky Bill (a ventriloquist's dummy), made by Baird on 20 September 1927, but this proved to be unsuccessful due to the incompatibility of the synchronising arrangements. An entry in the station log book at 0001 GMT on 7 October 1927 reads "R OK. Pse stand bi for TV record", possibly the first time that this now universal abbreviation had been used.

The licence conditions prohibited transmissions until after midnight and close-down rarely occurred before 0230. It was a gruelling time for the team at Coulsdon who then had to put in a full day's work after a brief sleep. The operators were Harold Smith (best man at the Clapp's wedding), Len Luger from the Croydon aerodrome wireless station, and Frank Barford. Gwen Clapp, instead of distancing herself from the nocturnal disturbances in her home, as many wives would have done, took an active part in the tests. She brewed endless cups of tea during the long nights, maintained a telephone link with the studio, sorted out the paperwork and collected spare parts from London.

Week after week the tests continued on a wavelength of 45 metres (see **Fig 1** below). It was a frustrating business. On some evenings propagation conditions were so bad that nothing could be heard, while at other times jamming, atmospherics and fading all contributed to difficulties with reception. On 16 November 1927, there is an entry in the Hartsdale station log book "Saw outline hand and face momentarily". Progress was being made and in a letter to Baird from Ben Clapp on 29 November he reported "Tonight's test

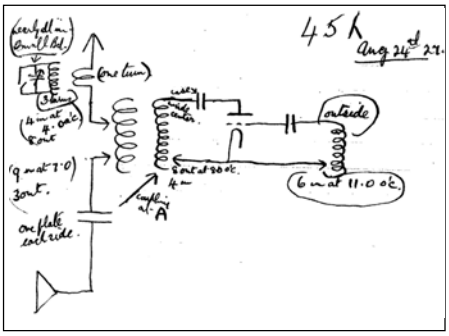


Fig 1: Extract from G2KZ's log book: setting up notes for operation on 45 metres, 24 August 1927.

was most encouraging and the face at times being remarkably clear".

By December the Baird Company felt that a successful demonstration could not be far off and Baird sent a message to Hartsdale, "Get the New York paper people to see their London man on television". Time was running out and Ben Clapp felt he could no longer impose upon the hospitable Harts much longer.

FACES ACROSS THE SEA

IN FEBRUARY 1928, Baird judged that the results were suitable for a demonstration and on the 7th of that month arrangements were made to televise various visitors to the Long Acre studio. William Fox of the Press Association and a wireless enthusiast since 1924, sat before the scanner at 0212 GMT and John Baird followed him at 0238. Mia Howe, the wife of the London representative of Associated Press in New York, took her place under the floodlights at 0301 and Arthur Dinsdale, the editor of the magazine *Television*, filled the remaining slot at 0326. The Coulsdon transmitter closed down at 0415, having completed a successful dress rehearsal, but without the benefit of any independent witnesses at the New York end. Two days later, on 9 February (the 8th in New York), at 44 minutes past midnight, Robert Hart announced over the radio link to Coulsdon that the 'vision sound', the unmistakable audio note of 30-line transmissions, was coming over. In the cellar, O G Hutchinson, Joint Managing Director of the Baird Company, Ben Clapp and a reporter from Associated Press, sat before the television receiver and watched the flickering orange-pink screen resolve into a smudgy picture. The vacant grin of Stooky Bill, was the first image to appear. John Baird came over next at 0135 GMT after a delay caused by jamming. William Fox was televised at 0252 for a period of 30 minutes but propagation conditions were deteriorating rapidly and the link to London through W2CVJ could not be maintained. Mia Howe put in a brief appearance before the transmission terminated. History having been made that night, Harold Smith wrote in the log book "Station closed 0438".

The viewers at Hartsdale felt that it would not have been possible to identify the sitters. Ben Clapp in a later interview

William Fox of the Press Association being televised across the Atlantic from the Baird Studios in Long Acre, February 1928. To keep the sitter in focus, a very thin wire was stretched between the two projecting arms.

stated "You could see a face, you could see movement, it was very crude, it was only 30-lines. But it was a picture and we had headlines in American papers". The results were admittedly crude but little better could be expected bearing in mind the equipment available, and the inevitable degradation of the signal due to fading, phase distortion and interference. They were certainly no cruder than Marconi's three scratchy dots comprising the letter 'S', which had traversed a similar path 27 years earlier.

So after months of painstaking effort, television had bridged the Atlantic, less than six years after the first BBC broadcast and 34 years *before* the *Telstar* satellite. The USA newspapers did full justice to the occasion describing the events of the previous evening with front page headlines. In contrast, the British press coverage was meagre and even *Wireless World* could manage no more than three sentences.

RECEPTION IN MID-ATLANTIC

O G HUTCHINSON and the Clapps left for the UK on 2 March 1928, travelling on the SS *Berengaria*. Shortly before sailing, arrangements had been made to attempt the reception of television signals during the voyage. The ship's officers responded

The television receiver on the *Berengaria*. Gwen Clapp (sitting); Ben Clapp (behind); Sir Arthur Rostron (Captain) third from right.

with enthusiasm and on the evening of 6 March (0112 GMT on 7 March in London), Stooky Bill was seen for about an hour while technical adjustments were made.

John Baird had asked Dora Selvey, the fiancée of chief radio officer Stanley Brown, to visit the Long Acre studio, and he was able to recognise her instantly when she appeared on the small screen. The pictures on the *Berengaria* were of better quality than those received at Hartsdale.

Two radio amateurs in the Jamaica district of New York, Boyd Phelps, W2EB, and Werne Olpe, W2BUO, successfully received a picture and recorded the vision signals on an ordinary phonograph disc which they sent to the Baird Company as proof of reception.

EQUIPMENT

BAIRD always had a fear that other people would copy his ideas. The scanning equipment was invariably enclosed and only the lenses in the disc could be seen through a small aperture. For the trans-Atlantic experiments he used the floodlight system. The subject was brilliantly illuminated by a bank of lamps and a scanning disc with a single spiral of lenses around the periphery cast narrow strips of the scene in quick succession across a light-sensitive cell. From the sparse description available it seems that John Baird used the same equipment that he employed to make his video recordings on gramophone discs in September 1927 and March 1928. The 5ft diameter scanning disc rotated at 300 - 350RPM, providing a definition of 30 lines with a repetition rate of 5 - 8 pictures per second.

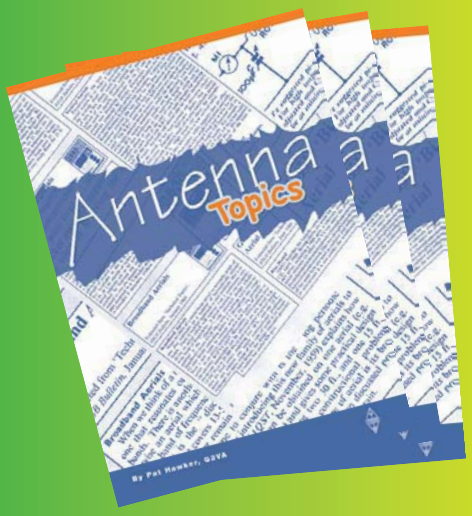
G2KZ had received permission from the licensing authority to use 1kW for the trans-Atlantic tests, but the power had been increased to 2kW for the television transmissions by adding a second Mortley Sprague rotary transformer to provide a total of 6000 volts. (George Mortley was G2PQ).

Two Mullard M5C valves were connected in parallel for modulation and the power amplifier stage used a fan-cooled silica valve. A pair of 18m high masts supported the single wire antenna system.

POSTSCRIPT

JUST SIX STAFF constituted the Baird Television Development Company and only two were technically competent. They received no government grants and very little support from industry for this important enterprise which put this country firmly in the forefront of television progress. ♦

RSGB BOOKS - BEST OF 2002



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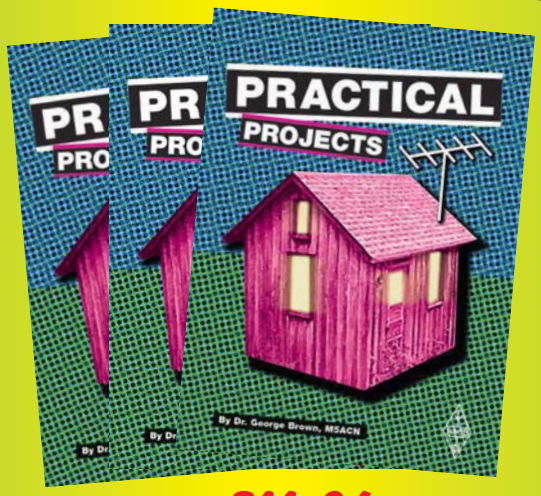

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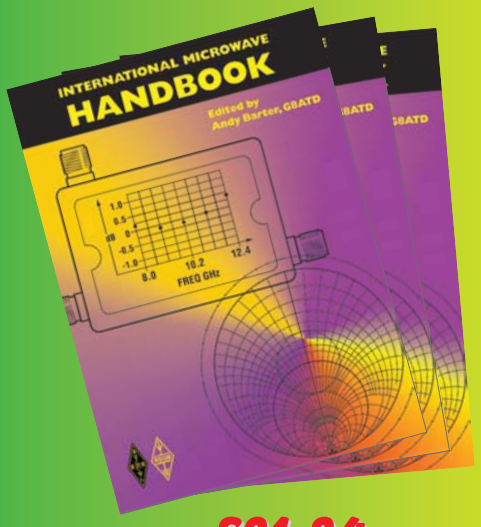

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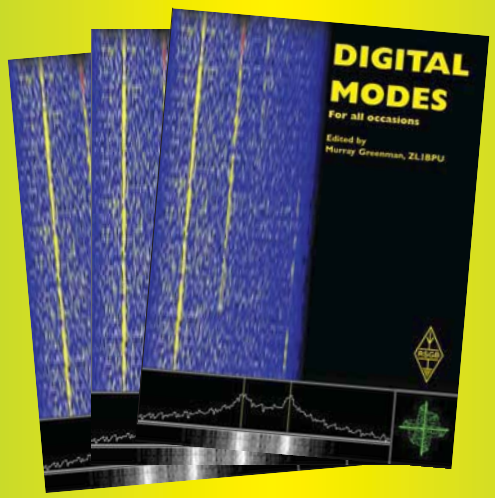

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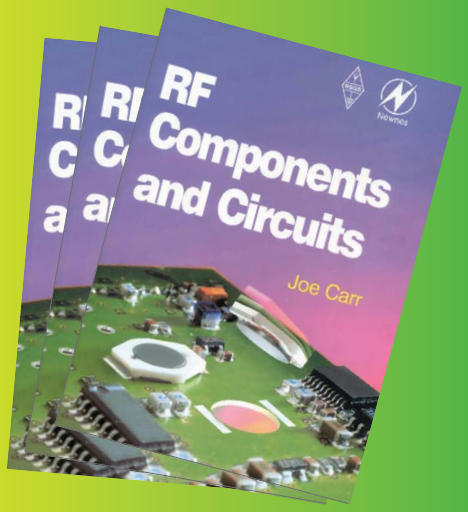

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GW3JBH Mr J S Hammond
G2AFV Mr P Carbutt
G2DZF Mr J H English
G2MJ Mr R T Hunt
G3AQF Mr H F Weston
G3BHK Mr L R Mitchell
G3EBP Mr P E R Courcoux
G3FNM Mr W R Parkinson
G3GAW Mr D J Redshaw
RS14170 Mr D H Clements
VK6PZ Mr P Zeid OBE

55 YEARS
G2FYY Mr M B Rowles
G3AVE Mr F C P Flanner
G3EDS Mr K G Perkins
G5MS Manchester & DARS
VK6RV Mr R G B Vaughan
G3BDH Mr R R Flaum
G3EFP Mr J C Pennell
G3GIQ Mr H F Lewis
GW3ITT Mr J Cairns
G3BRQ Mr K B Tackley
G3EZZ Mr J Eaton
G3HCT Mr J Bazley
G3IJE Mr M J Powell
GM3EDZ Mr T P Hughes
G2CYN Dr M Hely
G2DUS Mr I B Howard
G3BFP Mr J N Headland
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RS17044 Mr M Woodfield
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G3BZS Mr C J Whistlecroft
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RS15448 Mr A S Kitching
VK2BPN Mr P J Naish
G3BDQ Mr J D Heys
G3DSV Mr R W P Wilson
G3EVT Mr R J Mutton
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G3BRT Mr G O J Parfitt
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G3EFK Mr W T Clegg
G3IIY Mr E C Clayson
G3MUI Mr D J Durrant
GW3FPH Mr J W Hayes

54 YEARS
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G3FHL Mr G C Bagley
G3FIA Mr A D Lowden
G3FKI Mr E C Lambert
GM3HAT Mr M C Hately
ZL1HV Mr A G Godfrey
G2HBA Mr C H Spencer
G3BON Mr W J Rawlings
GM3COQ Mr D Oswald
G3CXT Mr G H Clarke
G3DCZ Mr R G McDonald
G3DEB Mr T A Bennett
G3EFY Mr T W A Smith
G3FIJ Mr F R Howe
G3FVC Mr E C Palmer
G3GUD Mr A Bosworth
G3HBN Mr J R Bolton

G3ISD	Mr E J Hatch
G3IWT	J P Hewitt
G3YLJ	Mr J Boraston
GD3FXN	Mr A D Radcliffe
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G3DDA	Mr K W Dyson
G3HRP	Mr T J Wright
RS17032	Mr B M Collings
RS4190	Mr F J W Trollope
G3DIC	Mr C H Bullivant
G3FYP	Mr P S Robson
G3KXE	Mr E W Bettles
GD3FLH	Isle of Man ARS
GM3DEE	Mr R P Russell
RS17058	A M C Macklow-Smith
VK6HD	Mr M E Bazley
G2ACN	Mr B J Bale
G3BSU	Mr A F Cleall
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G3NOX	Mr J R T Royle
G4LU	Mr S F Brown
G3BYG	Mr N L H Williams
G3DVQ	Mr R H Pounder
G3ELF	Mr F W Malpass
G3NWR	Wirral ARS
G6IPU	Mr G A Edwards
G3GBU	Stoke on Trent ARS
G4RD	Mr F Briggs
G3FFY	Mr M H Stedman
GM3GVD	Mr J A Dunlop
GW3EJR	Mr J B Armstrong
G3HPM	Mr P J Mullock
G3JXG	Mr F T Hodgson
GW3EMI	Mr M P Hopkins
RS17624	Mr F J Shepherd
7Q7RM	Mr R Macfarlane BEM
G3DQY	Mr J Vaughan
G3DSK	Mr R A Lord
G3EDD	Mr B A Armstrong
G3EHZ	Mr A H Wreford
G3FWB	Mr P L Hunt
G3FZL	Mr G M C Stone
G3JHI	Mr R L S Hathaway
G3ORC	Mr R R J Caines
GM3HOQ	Mr D D Stobie
VK3XX	Mr G S Bracewell
G3FZW	Mr E A Matthews
G3HVH	Mr E Basilio
G3HZJ	Mr W J Walsh
G3HZW	Mr D C Mainhood
G3NEO	Mr P Bagshaw
G3WUZ	Mr P H Brown
GM3ENJ	Mr K Street
GM3HOM	Mr J Reilly
VE3EAB	Mr W A Cheek
G3DGW	Mr D Early
G3EGV	Mr R Staniforth
G3EOQ	Mr M Flinn
G3HTA	Mr J D Forward
G3IGI	Mr L E R Hall
G3KKD	Mr I M Waters

53 YEARS

DJ0OS	Mr F C Hartles
G3EPV	Mr R D Emes
G3ERR	Mr J A W Edwards
G3HTC	Mr G E Storey
G4CDB	Mr G Lindsay
G3GZJ	Mr F J Crisp
GM3OBC	Mr R Thomson
G3FFH	Mr J Frings
G3ETH	Mr J L Goldberg
G3GVV	Mr R J Hughes
G3HZT	Mr P S Fraser
G3LMR	Mr J K Eley
GI3FJX	Mr J Davidson
GM3EWC	Mr R B Irvine
G3FOP	Mr R G Barrell
G3JNW	Mr H L Fleming
GM3JIJ	Mr J D Hague
G3FPK	Mr N A S Fitch
G3BVW	Mr C P Townley
G3FRX	Mr J A Wilkes
G3SOL	Mr J B G Parker
G3SVC	Spen Valley ARS
G3FVL	Mr H J Hudson
G8CDW	Mr E H Double
GW3GEN	Mr C F Cole
G3GXW	Mr J G A Lamb
G3KQF	Mr J Anthony
GU3HKV	Mr E H Page
RS18567	Mr A H Turner

52 YEARS

G1KEP	Mr J G Houghton
G3GEJ	Mr L M Airey
G3GGS	Mr W E Waring
G3YJJ	Mr R T Palmer
VK6PG	Mr AJ Gibbs
G3GJW	Mr T I Lundegard
G3GKI	Mr F V Kershaw
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GD3HDL	Dr S E Kelly

51 YEARS

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G3IGW	Mr M G Whitaker
G3JLH	Mr I L Hampton
G3GGO	Mr C N Wridgway
G3IJA	Mr J Allan
G3VRB	Mr J D Nias
G3HIA	Mr H C Young
G2HLL	Mr F H Pickard
G3FJE	Shefford & DARS
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50 YEARS

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G3JHL	Mr J H Lepper
G6UQ	Stockport RS
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G3HWW	York ARS
G3IGP	Mr J G H Pearce
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G3JYG	Mr J Kirby
G3KPJ	Mr A W Butcher
G3LUY	Mr E W Brett
RS19615	Mr M Addicott
G3HRN	Mr D L Wright
G3IGV	Mr J W Birkbeck
G3IKL	Mr R T Craxton
G3INA	Mr R G Robinson
G3ITH	Mr R D Franklin
G3KTN	Mr J F Brown
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G3VDL	J A St Leger
G3HRD	Mr J Ellis
G3HUL	Mr D M Mallett
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G3IOI	Mr N R Pascoe
G3JLN	Mr F G Blain
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G3HBW	Mr A L Mynett
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RS20537	Mr R A Townsend

The GB4FUN Supporters' Honour Roll

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

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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.

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(Length 62")
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10 dBd Gain **£69.95**
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All of the above are suitable to any transceiver or scanner.
Please add £2.00 p&p for H/held antennas.

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..... SO239 fitting £12.95
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Clear PVC Coated Flex Weave 50 mtrs £37.95
300 Ohm Ladder Ribbon USA imported 20 mtrs £15.00
450 Ohm LadderRibbon USA imported 20 mtrs £15.00

(Other lengths available please phone for details)

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

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

VISA SWITCH MasterCard

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: 32.5m POWER: 1000 Watts £89.95
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 £79.95

(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
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: SO239 ..... £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

PATCH LEADS

Standard Leads
1 mtr RG58 PL259 to PL259 Lead £3.95
10mtr RG58 PL259 to PL259 Lead £7.95
30mtr RG58 PL259 to PL259 Lead £14.95
Mil Spec Leads
1 mtr RG58 Mil Spec PL259 to PL259 Lead £4.95
10mtr RG58 Mil Spec PL259 to PL259 Lead £10.95
30mtr RG58 Mil Spec PL259 to PL259 Lead £24.95
1mtr RG213 Mil Spec PL259 to PL259 Lead £4.95
10mtr RG213 Mil Spec PL259 to PL259 Lead £14.95
30mtr RG213 Mil Spec PL259 to PL259 Lead £29.95
(All other leads and lengths available ie BNC to 'N' Type etc. Please phone for details)

All prices plus £6.00 per order

VHF NFD 2002

by Andy Cook, G4PIQ *, RSGB VHF Contest Committee

GW6YB's 6m / 4m stations.

IT WAS GOOD to welcome back an old friend to the contest calendar in 2002. After a year off due to the foot and mouth outbreak, the biggest portable VHF contest of the year was back.

VHF NFD is much more than just a contest. Sure - the big groups go all out to win their sections and bands, but this contest also offers a great opportunity for club members to get together for a social event in, hopefully, good weather at the height of the UK summer, and fit in some operating as well. As the Edgware & District ARS said, "Lousy conditions, but a great location for a BBQ". In 2000 the rules were changed to make two sections more attractive to smaller radio clubs by reducing the power levels in the Restricted section and the number of bands and operating time required in the Low Power section. We hope that this makes it easier for clubs to come on and make a competitive entry.

The groups who went out varied in size from around 15 people down to one-man band entries, with many of the smaller teams actually being very successful. Clive O'Hennessy, GM4VVX once again went portable from the North of Scotland to make only 30 QSOs, but used the event to introduce 13-year old Matthew, MM3MMB, to contesting. As Clive said: "Entered in the true spirit of amateur radio".

Photo: www.frars.org.uk website

Members of the Flight Refuelling ARS putting together their monster 6m and 4m antennas.

ENVIRONMENTAL HAZARDS

AT LEAST THIS YEAR the weather was generally co-operative, with few complaints of trouble from the elements, other than a high population of mosquitoes biting at contest sites. Conditions were less co-operative however, with almost universal complaints of poor conditions on all bands. There was some tropo in evidence to the south of France and Spain on the higher bands, but except for this, conditions were generally 'flat'.

Cows appeared to cause a problem for some groups, with two teams having the animals attempt to knock over masts and tents and eat cables. One even had an antenna trampled before the start of the contest - it's worth making sure that your site is well protected against anyone or anything you may be sharing the field with!

CONDITIONS

THE CARSCOG Gearboxers used what little sunshine there was to help power their station from solar cells, but more importantly, harnessed the wind to provide additional power, with the wind generator only stopping for five minutes over the whole weekend - much more typical of a contest weekend. Unusually, they also used turnstile antennas on all four bands.

6m was re-introduced to VHF NFD in 2000 and is a very popular band amongst entrants. However, this year, conditions did not live up to hopes with almost no Sporadic E - this was an almost universal complaint from entrants. The Blacksheep Contest Group, M0BAA/P, said, "The master plan failed totally! After doing so well in the 50MHz Trophy from the Lizard we decided to do a primarily 6m single-band entry with the other bands just taken along 'for fun'. Alas, the way of 6m prevailed - virtually no conditions other than a little meteor scatter and a short Sporadic E opening towards CT."

Conditions were average on 4m, with only G5UM/P managing to work S51DI this year.

As usual, 2m was the most productive of the bands, with the tropo down to Northern Spain and Southern France giving most stations some excellent best DX. G0VHF/P was very happy with seven QSOs over 1000km. As ever, propagation was interesting from GM4ZUK/P's excellent site near Dundee. They heard the HB9HB beacon and worked some good tropo in the small hours of the morning, and also caught a small aurora on the Saturday evening.

Propagation on 70cm was similar in nature to 2m, with a good number of groups making it down to the South of France or Northern Spain.

Support for 23cm seems to have been eroded by groups having the choice of what bands they want to enter in NFD but, nevertheless, the top stations made a good number of QSOs and caught some good DX.

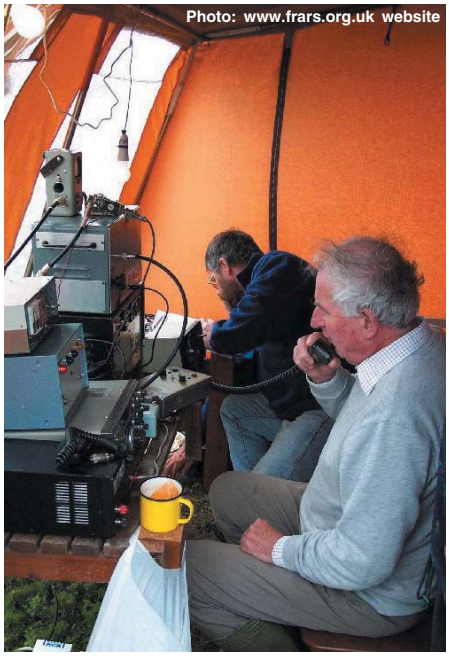


Photo: www.frars.org.uk website

The Flight Refuelling ARS operating on 4m.

The Northern Lights 6m station.

* Knaves Acre, Brantham Hill, Brantham, Manningtree CO11 1TA.

The South Birmingham RS 70cm and 23cm stations being set up.

GD0TEP of the Northern Lights group operating on 6m.

WINNING TEAMS

THE OPEN SECTION was easily won by the Parallel Lines Contest Group from its site in Kent and giving it the Surrey Trophy. A small four man team from the Northern Lights at Ravenscar in North Yorkshire took second place with a three-band entry. The Lothians Radio Society take the Tartan Trophy as the leading resident Scottish group.

The Bristol Contest Group put together a hasty entry to win the Martlesham Trophy in the Restricted section, leaving the 2000 Low Power winners, the South Birmingham RS, in second place. The Birmingham group hadn't had the opportunity to check all the equipment working together beforehand and encountered a bunch of problems, but nonetheless put in a very impressive score. The Cockenzie & Port Seton ARC was the leading Scottish group and wins the Cockenzie Quaich.

The Low Power section was dominated by a pair of two man teams. The Warrington Contest Group, in the shape of Erik Gedvilas, G8XVJ, and Mike Ryder, G0CDA, won the section, taking the Arthur Watts Trophy and forcing Jim Martin, MM0BQI, and David Dodds, GM4WLL, into second place. Jim and David won the Scottish Trophy and also staged an entry to the Restricted section on the two bands which they didn't enter in the Low Power section.

The Mix and Match section was the most closely fought, with the Telford & DARS narrowly beating the Chesham & District RS into second place and winning the G5BY Trophy. ♦

VHF National Field Day 2002 Results

Open Section

Pos	Group Name	Locator	50	70	144	432	1296	Total
1	Parallel Lines CG	JO01QD	0	788	1000	1000	1000	3788
2	The Northern Lights	IO94RJ	1000	1000	600	0	0	2600
3	De Montfort University ARS	JO02TG	793	0	492	373	597	2254
4	Colchester CG	JO01PU	460	0	603	463	592	2118
5	Windmill CG	JO01LD	428	0	402	845	253	1928
6	Crawley & Reigate ARCs	JO01OC	0	387	662	542	284	1875
7	The Blacksheep Contest & DX G	IN79JX	462	503	547	125	0	1636
8	Flight Refuelling ARS	IO80UU	311	516	453	266	0	1546
9	Lothians RS	IO74WV	255	736	302	156	0	1448
10	Guildford & DRS	IO91TF	427	528	40	0	0	995
11	Stevenage & DARS	IO91TW	328	374	123	0	56	881
12	Harlow & DARS	JO01BS	270	327	206	0	0	803
13	MIDCARS	IO83PF	201	362	93	0	0	656
14	Aberdeen VHF Group	IO86RW	0	0	494	0	90	584
15	Clifton ARS	JO01DH	181	224	105	0	0	510
16	Swindon & DARC	IO91CL	43	0	286	46	94	469
17	Edgware & DARS	IO91VO	55	237	91	0	0	383
18	Newquay & DARS	IO70LK	102	0	71	0	0	173
19	GM4VVX	IO78RE	0	0	24	0	0	24

Restricted Section

Pos	Group Name	Locator	50	70	144	432	1296	Total
1	Bristol CG	IO81KW	1000	663	1000	1000	0	3663
2	South Birmingham RS	IO82XJ	585	566	0	919	1000	3071
3	Lagan Valley ARS CG	IO74AI	286	1000	603	243	0	2132
4	Cockenzie & Port Seton ARC	IO85RU	271	724	405	207	0	1607
5	Basingstoke ARC	IO91KG	150	0	534	866	0	1550
6	Salop ARS	IO82LN	476	517	532	0	0	1525
7	CARSCOG Gearboxers	IO92HE	457	363	137	210	0	1167
8	Goole R&ES	IO93PW	0	432	338	305	0	1076
9	GM3TAL & G3SHK	IO75IU	0	431	95	0	0	527
10	West Bromwich Central RC	IO93XF	0	167	203	55	0	425
11	Mexborough & DARS + S Yorkshire ARS	IO93HO	0	0	160	149	0	309
12	MM0BQI/GM4WLL	IO85NR	0	0	64	0	207	271
13	John Baxter	IO93XF	0	167	0	55	0	222
14	South West Herts UHF Group	IO91QT	0	0	0	219	0	219
15	North Bristol ARG	IO81TL	0	0	180	0	0	180

Low Power Section

Pos	Group Name	Locator	50	70	144	432	1296	Total
1	Warrington Contest Group	IO93AD	0	0	1000	1000	1000	3000
2	GM4WLL/MM0BQI	IO85NR	1000	1000	0	75	0	2075
3	Hitchin Contest Group	IO92XA	850	528	0	0	0	1377
4	Shefford & DARS	IO92XA	0	0	327	370	678	1376
5	Leicester RS	IO92IO	488	568	180	0	0	1235
6	Mid Sussex ARC	IO90WV	438	0	366	319	0	1122
7	Cambridge & DARC	JO02CE	0	351	430	0	165	946
8	Andover RAC	IO91FH	0	268	343	147	0	757
9	Sutton Coldfield RS	IO92FM	331	0	319	0	0	650
10	South Bristol ARC	IO81QJ	0	0	312	0	0	312
11	Newbury & DARS	IO91GI	0	0	243	0	0	243
12	Sierra Yankee ARCG	IO81PU	0	0	77	0	0	77
13	Thomas Cannon	IO91NK	0	0	67	0	0	67

Mix & Match Section

Pos	Group Name	Locator	50	70	144	432	1296	Total
1	Telford & DARS	IO82NN	434	643	272	0	896	2244
2	Chesham & DARS	IO91QS	433	517	572	690	0	2212
3	North Beds Gentlemen CG	IO92TI	0	440	282	676	511	1910
4	Bracknell ARC	IO80ST	395	820	415	214	0	1844
5	Darenth Valley & Cray Valley RSs	JO01BI	871	336	343	0	0	1549
6	Surrey Radio Contact Club	IO91XH	212	0	695	121	410	1439
7	Two Counties CG	IO92LJ	136	287	341	640	0	1405
8	Rochdale & DARS	IO83VP	232	738	275	0	0	1246
9	Wythall Radio Club	IO92BJ	151	344	347	256	0	1097

6m Open Section

Pos	Callsign	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G0EMG/P	IO94RJ	58596	196	400	2x6Y + 2x5Y	EH10J	1368
2	G3SDC/P	JO02TG	46447	169	400	6Y	UX7UN	2019
3	M0BAA/P	IN79JX	27076	64	400	6Y	SQ9HQ	1826
4	G0VHF/P	JO01PU	26953	129	250	7Y	GM0FRG/P	601
5	G4XRV/P	IO91QS	25348	150	400	2x5Y	DK3EE	630
6	G3GRS/P	JO01LD	25084	126	400	2x5Y + 2 x dip	GM0FRG/P	641
7	G5RS/P	IO91TF	25048	161	400	2x6Y	PA2TAB	490
8	G4BRA/P	IO80ST	23167	110	400	8Y	MM0CPS/P	561
9	G8SAD/P	IO91TW	19196	97	400	7Y	DK3EE	611
10	G4RFR/P	IO80UU	18198	91	100	11Y	SP6MLK/P	1346
11	G6BUT/P	JO01BS	15800	106	400	5Y	GM0FRG/P	551
12	GM3HAM/P	IO74WV	14922	53	100	9Y	ON4ANT	718
13	G8ZTT/P	IO83PF	11759	84	100	2x3Y	GM8OEG	362
14	M0BPQ/P	JO01DH	10577	67	100	5Y	GM0FRG/P	597
15	G4ADV/P	IO70LK	5999	16	100	5Y	SM7FJE	1330
16	G4IUZ/P	IO91VO	3207	32	100	6Y	PA6M	345

6m Restricted Section

Pos	Callsign	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	GW6YB/P	IO81KW	51672	239	80	8Y	CT1HZE	1688
2	G4OHM/P	IO82XJ	30239	175	100	6Y	PA2TAB	583
3	GC3SRT/P	IO82LN	24596	134	100	5Y	CS0RCL/P	1793
4	G4GEE/P	IO92HE	23600	174	100	Turnstile	GM8OEG	489
5	G3ZME/P	IO82NN	22424	130	100	5Y	CS0RCL/P	1797
6	GI4SRQ/P	IO74AI	14762	55	100	5Y	ON4ANT	786
7	MM0CPS/P	IO85RU	13996	49	100	6Y	ON4ANT	718
9	G0ROC/P	IO83VP	12008	83	100	6Y	EI7TRG/P	373
8	G3SRC/P	IO91XH	11020	85	100	6Y	MM0BQI/P	526
10	G0WRC/P	IO92BJ	7793	70	100	5Y	PA6M	464
11	G3TCR/P	IO91KG	7733	65	100	5Y	GI4SRQ/P	469
12	G4APD/P	IO92LJ	7052	64	100	2Y	MM0CPS/P	396

6m Low Power Section

Pos	Callsign	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	MM0BQI/P	IO85NR	15178	54	25	6Y	ON4ANT	721
2	G3RCV/P	JO01BI	13221	90	25	5Y	GM0FRG/P	586
3	G2DPQ/P	IO92XA	12897	87	20	7Y	GM0FRG/P	523
4	G5UM/P	IO92IO	7408	53	25	6Y	PA6M	429
5	G4VTQ/P	IO90WV	6648	47	25	3Y	EI7M/P	476
6	G3RSC/P	IO92FM	5021	49	20	3Y	MM0CPS/P	376
7	G3YBY/P	IO91CL	2522	18	5	5Y	G0EMG/P	335

More results over the page!


Photo: www.frars.org.uk website

Moving the Flight Refuelling ARS tent into position.

4m Open Section

Pos	Callsign	Loc	QSO	Score	Pwr	Ant	Best DX	km
1	G0EMG/P	IO94RJ	86	23558	160	2 x 7Y+7Y	EI7GL	594
2	G4LIP/P	JO01QD	70	18574	160	12Y	GM3TAL/P	684
3	GM3HAM/P	IO74WV	62	17341	100	11Y	G4LIP/P	556
4	G6GS/P	IO91TF	67	12431	70	8Y	GM3TAL/P	608
5	G4XRV/P	IO91QS	84	12188	100	2 x 5Y	GM3TAL/P	548
6	G4RFR/P	IO80UU	68	12158	50	15Y	GM3TAL/P	590
7	M0VHF/P	IN79JX	37	11838	100	8Y	G0EMG/P	585
8	G6RC/P	JO01OC	46	9110	100	7Y	GI3PDN/P	602
9	G8SAD/P	IO91TW	61	8816	150	8Y	GM3TAL/P	541
10	G4ZTT/P	IO83PF	50	8535	20	6Y	EI7GL	412
11	G6BUT/P	JO01BS	48	7702	150	6Y	GM3TAL/P	576
12	G4IUZ/P	IO91VO	41	5594	40	8Y	MM0CPS/P	497
13	M0BPQ/P	JO01DH	30	5282	80	8Y	GI3PDN/P	539

4m Restricted Section

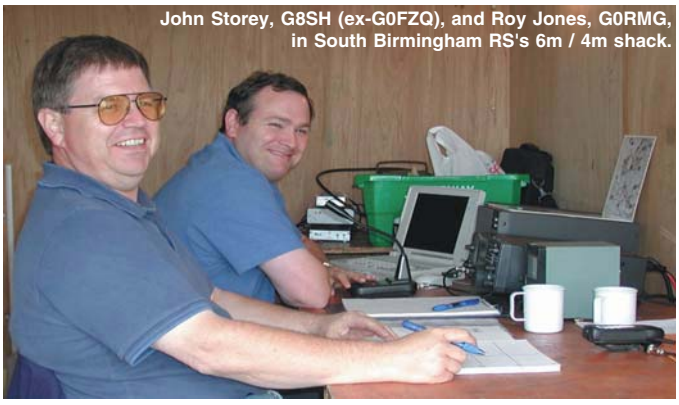
Pos	Callsign	Loc	QSO	Score	Pwr	Ant	Best DX	km
1	GI3PDN/P	IO74AI	65	20854	100	6Y	G6RC/P	602
2	MM0CPS/P	IO85RU	44	15089	50	8Y	G4LIP/P	584
3	GW6YB/P	IO81KW	76	13832	70	8Y	MM1CXE	473
4	G3UKV/P	IO82NN	72	13405	90	8Y	MM1CXE	403
5	G4OHM/P	IO82XJ	73	11799	70	6Y	GM3TAL/P	439
6	GC3SRT/P	IO82LN	64	10786	80	5Y	EI7GL	372
7	G0SWL/P	IO93PW	46	9018	20	6Y	GM3TAL/P	362
8	GM3TAL/P	IO75IU	24	8995	80	9Y	G4LIP/P	684
9	G4GEE/P	IO92HE	64	7578	10	Turnstile	MM0CPS/P	415
10	G8VIQ/P	IO93XF	23	3480	80	5Y	M0VHF/P	508

4m Low Power Section

Pos	Callsign	Loc	QSO	Score	Pwr	Ant	Best DX	km
1	MM0BQI/P	IO85NR	47	14222	25	6Y	G4LIP/P	582
2	G4BRA/P	IO80ST	51	11658	25	6Y	MM0CPS/P	561
3	G0ROC/P	IO83VP	58	10501	20	5Y	M0VHF/P	457
4	G5UM/P	IO92IO	48	8076	25	5Y	S51DI	1403
5	G2DPQ/P	IO92XA	46	7503	20	10Y	GM3TAL/P	547
6	G4FOH/P	IO92TI	46	6255	25	6Y	GM3TAL/P	504
7	G8EVY/P	JO02CE	30	4994	10	5Y	GI3PDN/P	475
8	G4WAC/P	IO92BJ	36	4887	25	7Y	MM0CPS/P	387
9	G4CW/P	JO01BI	38	4775	20	6Y	GI3PDN/P	527
10	G4APD/P	IO92LJ	33	4083	15	5Y	MM0CPS/P	397
11	G0ARC/P	IO91FH	26	3805	20	4Y	GM3HAM/P	434

2m Open Section

Pos	Callsign	Loc	QSO	Score	Pwr	Ant	Best DX	km
1	G4LIP/P	JO01QD	700	251019	400	4 x 17Y	EA1FDI/P	1208
2	G3WSC/P	JO01OC	522	166110	400	4 x 10Y	EA1FDI/P	1197
3	G0VHF/P	JO01PU	474	151478	400	4 x 9Y	EA1BFZ/P	1132
4	G0EMG/P	IO94RJ	410	150729	400	2 x 15Y	HB9STY/P	975
5	G8TIC/P	IN79JX	325	137194	400	2 x 10Y	EA2AFF/P	1028
6	GM4ZUK/P	IO86RW	292	124091	400	4 x 13Y	SM3BEI	1216
7	G3SDC/P	JO02TG	403	123475	400	4 x 9Y + 2 x 17Y	OL1C	854
8	G4RFR/P	IO80UU	396	113736	400	19Y	F6KCI/P	1334
9	G4BRA/P	IO80ST	343	104083	400	17Y	EA1FDI/P	1012
10	G0FBB/P	JO01LD	349	100981	400	18Y	EA1FDI/P	1188
11	G1WAC/P	IO92BJ	383	86997	400	2 x 17Y	F6FZS/P	1046
12	GM3HAM/P	IO74WV	279	75700	400	17Y	EA2URE	1336
13	G8SRC/P	IO91CL	308	71728	400	2 X 17Y	EA1BFZ/P	1057
14	G3ZME/P	IO82NN	320	68290	400	2 x 10Y	F6KBR/P	1190
15	G6BUT/P	JO01BS	241	51819	250	2 x 13Y	F1USF/P	851
16	G8SAD/P	IO91TW	193	30923	250	4 x 6Y	EA2URE	994
17	G3GHN/P	JO01DH	163	26326	200	19Y	F5KMQ/P	719
18	G3ZTT/P	IO83PF	168	23314	400	2 X 17Y	GM0EWX	524
19	G3ASR/P	IO91VO	122	22923	100	19Y	F1USF/P	842
20	M0BFB/P	IO70LK	84	17723	400	8/8Y	EA1FDI/P	892
21	G5RS/P	IO91TF	106	10109	100	2 x 17Y	DK0BN	593
22	GM4VVX/P	IO78RE	30	6042	300	17Y	GW6YB/P	701


John Storey, G8SH (ex-G0FZQ), and Roy Jones, G0RMG, in South Birmingham RS's 6m / 4m shack.

2m Restricted Section

Pos	Callsign	Loc	QSO	Score	Pwr	Ant	Best DX	km
1	GW6YB/P	IO81KW	329	84824	100	17Y	F6KBR/P	1133
2	G3WIM/P	IO91XH	313	58948	100	18Y	EA1FDI/P	1156
3	GI4GTY/P	IO74AI	205	51166	100	18Y	OS4PRA/P	783
4	G3MDG/P	IO91QS	224	48512	100	17Y	EA2URE	974
5	G3TCR/P	IO91KG	239	45298	100	17Y	EA2URE	917
6	MC1AXW/P	IO82LN	245	45137	100	10Y	EA1CFX/P	1188
7	MM0CPS/P	IO85RU	122	34386	100	17Y	PE1GUR	662
8	G0OLE/P	IO93PW	142	28685	70	12Y	F5KMQ/P	1018
9	G0ROC/P	IO83VP	154	23331	50	12Y	EA2URE	1183
10	G4WBC/P	IO93XF	86	17239	50	9Y	F6KIM/P	671
11	G6PNB/P	IO81TL	95	15302	98	17Y	EE2MAF	982
12	G4BTS/P	IO93HO	117	13548	100	Yagi	F6KPQ/P	642
13	G2ASF/P	IO92HE	128	11594	25	Turnstile	EA2URE	1019
14	GM3SHK/P	IO75IU	30	8093	10	10Y	G4LIP/P	684
15	GM4WLL/P	IO85NR	40	5419	25	8/8Y	G3YVR	541

2m Low Power Section

Pos	Callsign	Loc	QSO	Score	Pwr	Ant	Best DX	km
1	G3CKR/P	IO93AD	253	61147	25	18Y	EA1EF/P	1145
2	G2XV/P	JO02CE	121	26280	25	17Y	EA1FDI/P	1243
3	G3ZMS/P	IO90WV	146	22363	25	9Y	EE2DJB	895
4	G0ARC/P	IO91FH	132	20959	25	9Y	F6KBR/P	1027
5	G0KDV/P	JO01BI	144	20943	25	10Y	DL0PWD	1045
6	G7APD/P	IO92LJ	160	20852	25	16Y	GM4VVX/P	681
7	G4ARL/P	IO92XA	106	20016	25	10Y	F6KBR/P	1075
8	G3RSC/P	IO92FM	106	19520	25	10Y	F5KMQ/P	888
9	G4WAW/P	IO81QJ	112	19066	25	17Y	EA2URE	937
10	G4VMX/P	IO92TI	119	17263	25	8Y	GM4ZUK/P	528
11	G5XV/P	IO91GI	96	14867	25	9Y	EA1FDI/P	1100
12	G3LRS/P	IO92IO	63	10977	25	17Y	GM4ZUK/P	488
13	M1DQG/P	IO81PU	49	4717	10	8Q	EI7M/P	272
14	G3ULT/P	IO91NK	32	4069	5	7Y	GM4ZUK/P	621

70cm Open Section

Pos	Callsign	Loc	QSO	Score	Pwr	Ant	Best DX	km
1	G4LIP/P	JO01QD	286	106498	400	4 x 21Y + 38Y	EA1FDI/P	1208
2	G0HSS/P	JO01LD	274	89968	400	4 x 21Y	EA1FDI/P	1188
3	G5LK/P	JO01OC	180	57725	400	4 x 21Y	OK1KIM	861
4	M1CRO/P	JO01PU	155	49271	100	4 x 21Y	F6FZS/P	995
5	G3SDC/P	JO02TG	147	39685	250	4 x 20Y	F5KMQ/P	806
6	G4RFR/P	IO80UU	109	28338	400	QLY	EA1FDI/P	1022
7	G4BRA/P	IO80ST	100	22782	400	2 x 21Y	EA1FDI/P	1012
8	GM3HAM/P	IO74WV	58	16630	200	2 x 27QLY	PI4FRG	679
9	G0XDI/P	IN79JX	37	13324	75	21Y	EA1BFZ/P	916
10	G3ZPB/P	IO91XH	87	12848	100	4 x 21Y	DF0OL	576

70cm Restricted Section

Pos	Callsign	Loc	QSO	Score	Pwr	Ant	Best DX	km
1	GW6YB/P	IO81KW	69	15254	20	38Y	EA2CN/P	976
2	G8OHM/P	IO82XJ	81	14026	100	24Y	DF2VJ	716
3	G3TCR/P	IO91KG	85	13213	50	21Y	EA1FDI/P	1106
4	G1MDG/P	IO91QS	68	10520	70	23Y	DL6NAQ/P	755
5	G4FEV/P	IO92TI	65	10318	50	21Y	DF2VJ	613
6	G8VHL/P	IO93PW	29	4651	70	12Y	PA6NL	390
7	G7WAC/P	IO92BJ	25	3898	75	23Y	PA6NL	412
8	MI0BOT/P	IO74AI	31	3704	100	23Y	PA6NL	721
9	G8ADM/P	IO91QT	29	3348	50	21Y	EI7M/P	414
10	G7ASF/P	IO92HE	26	3204	10	Turnstile	PA6NL	376
11	MM0CPS/P	IO85RU	21	3155	50	19Y	G0HSS/P	572
12	M0CKY/P	IO93HO	30	2277	25	XY	G5LK/P	329
13	G4WBC/P	IO93XF	8	839	25	19Y	PA6NL	314

70cm Low Power Section

Pos	Callsign	Loc	QSO	Score	Pwr	Ant	Best DX	km
1	G3CKR/P	IO93AD	74	14236	20	32Y	DL0GL/P	622
2	G8LED/P	IO92LJ	67	9111	10	18Y	DJ6JJ	563
3	G3FJE/P	IO92XA	34	5268	25	28Y	DK0HN	505
4	G3FEC/P	IO91CL	37	4917	25	23Y	EI5FK	467
5	G1ZMS/P	IO90WV	40	4535	25	13Y	F6KPQ/P	394
6	G0ARC/P	IO91FH	17	2087	10		PA6NL	398
7	GM4WLL/P	IO85NR	10	1063	25	21Y	G8OHM/P	375

23cm Open Section

Pos	Callsign	Loc	QSO	Score	Pwr	Ant	Best DX	km
1	G4LIP/P	JO01QD	115	35321	300	16 x 23Y	F6FZS/P	918
2	G3SDC/P	JO02TG	79	21074	350	8 x 23Y + 40Y	DK2GR	725
3	M1CRO/P	JO01PU	86	20896	200	8 x 23Y + 35Y	DF0YY	770
4	G3GRO/P	JO01OC	42	10043	50	16'x6' + 4 x 15/15	DL0GTH	674
5	G0FDZ/P	JO01LD	46	8935	300	5' + 2 x 55Y	F5KMQ/P	690
6	G3FEC/P	IO91CL	16	3305	10	4 x 23Y	DF0HS/P	547
7	GM6MGS/P	IO86RW	9	3178	10	4 x 55Y	G0RRJ	643
8	G8SAD/P	IO91TW	21	1985	25	55Y	DF0HS/P	456

23cm Restricted Section

Pos	Callsign	Loc	QSO	Score	Pwr	Ant	Best DX	km
1	G3OHM/P	IO82XJ	46	9976	100	70Y	DL0GTH	908
2	G3ZME/P	IO82NN	42	8934	100	66QLY	DF0HS/P	636
3	G8MNY/P	IO91XH	36	4088	25	55Y	DF0HS/P	425
4	GM4WLL/P	IO85NR	11	2068	15	67Y	G4NBS	433

23cm Low Power Section

Pos	Callsign	Loc	QSO	Score	Pwr	Ant	Best DX	km
1	G3CKR/P	IO93AD	37	7714	25	1m	DF0HS/P	595
2	G8ATD/P	IO92XA	31	5233	25	56Y	DL5DAW/P	525
3	G4JTJ/P	IO92TI	30	3944	20	6'	DF0HS/P	466
4	G6KWA/P	JO02CE	12	1270	16	56Y	PI4ZLD	262


CARSCOG Gearboxers site, complete with solar power. They also had a wind generator (not shown).

HF HF HF HF

DON FIELD, G3XTT
105 Shiplake Bottom, Peppard Common, Henley on Thames, RG9 5HJ.
e-mail: hf.radcom@rsgb.org.uk

DECEMBER SAW SOME good conditions on the bands. I had a play in the ARRL 10m contest, just on the Sunday, and worked 75 countries and all areas of the USA while running just 150 watts. I found conditions good to the west but less so to the east, and I gather that even the serious UK entrants only worked a handful of Japanese, Australian and New Zealand contacts. At the other end of the spectrum, a friend who entered the Stew Perry 160m contest tells me that, with his 75 watts and an inverted-L off his 60ft tower, he worked to the mid-West of the USA, as well as Alaska (a very nice one on topband) and a smattering of Caribbean stations.

I'm occasionally taken to task by readers for devoting too much space to contests and expeditions, and not enough to 'normal' HF operating. This is a tricky one. But, as in the preceding paragraph, a contest is an excellent indicator of band conditions, because you know that there will be high activity from all areas for a specified period. If you fail to hear Australasia, for example, it won't be because none are active, but because propagation isn't there. There is relatively little to say in a monthly column about normal day-to-day HF operating. The behaviour of our existing HF bands is well established and documented (see the *RSGB Operating Manual*, for example), although some interesting work has been done in recent years on the LF bands (73 and 136kHz) and the newly-available 5MHz allocation. There are many slants to HF operating. You may enjoy meeting local friends on regular nets (many such nets exist during daylight hours on 80m, for example), or simply dropping in on the bands and seeing who there is to talk to. You may enjoy chasing particular types of station (some operators make a point, for example, of working GB or overseas special event stations, or of chasing Maritime Mobile stations). In some cases this will be related to one of the popular award programmes, but there are many who do so for the simple enjoyment of it, without ever applying for the awards in question. You may use the HF bands primarily as a way of checking out your latest construction project, whether it's a new antenna, or a complex transceiver, or you may use the HF bands for regular schedules across the world.

Then again, one of the great growth areas on HF has been the emergence in recent years of many new datamodes. I alluded to this last month. The trend started when multimode terminal units such as the AEA PK232 became readily available but since then the route to HF data has become even easier and cheaper, at least if you have a sound-card equipped PC in the shack. Now it is as easy to operate PSK31, MFSK or even SSTV (Slow Scan Television) as it is RTTY. Indeed, for most of these modes the user interface tends to be identical: select the mode you want, and the software does the rest. While at HC8N recently, I was introduced to SSTV for the first time. Zoli, HA1AG, had brought the software on a floppy disc. He borrowed my elderly P133 laptop, took the easy way out and connected the soundcard directly to the microphone and headphone connectors on one of the transceivers, and within minutes we were making history with the first SSTV operation from the Galapagos.

Which prompts me to mention one of the other benefits of PCs. The pictures from those HC8N SSTV contacts are still on my laptop, as a permanent record of the contacts. You can also, of course, use the soundcard to record your QSOs, so that you can always relive that chat with Tom Christian on Pitcairn Island (or whatever) on some future occasion, perhaps at a club meeting.

One from the archives: top DXpeditioner Don Miller, ex-W9WNV and now back on the air as AE6IY (see *RadCom* 'HF' December 2002 and January 2003) visiting London ca 1966 and seen here with Laurie Margolis, G3UML, and his mother, the late Sylvia Margolis.

As I say, though, very little of the above constitutes 'news' in that it is commonplace on the bands. That's not to say it isn't fun, because it is. I'm sure many of you who have recently started on HF, perhaps with an M3 call, will gradually explore the different facets of HF that I have mentioned, and get considerable pleasure from doing so. Your main resources will be the various manuals and handbooks, but if there is an aspect that you really *do* think I should be covering in more detail here, do please drop me a line.

P5/4L4FN QRT

ONE DISAPPOINTING PIECE of news in December was that Ed, P5/4L4FN, had been closed down by the North Korean authorities. During his time on the air Ed had made 16,194 QSOs, 3160 of which were on RTTY. The continental breakdown was Europe 36.7%, North America 28.9% and Asia 28.4%. Further details on the website. It appears, perhaps not surprisingly if you have been reading the papers recently, that the decision to close Ed down had more to do with politics than amateur radio.

DX NEWS

TWELVE SPECIAL CALLSIGNS are active from **Poland** until 15 March, marking the 70th anniversary of breaking of the Enigma machine code by Polish cryptographers. The callsigns are (QSL route in brackets): HF70A (SP9PRO), HF70E (SQ9AOJ), HF70G (SP2DNI), HF70I (SP6IHE), HF70M (SP2PI), HF70N (SP7CVW), SN70A (SP9EVP), SN70E (SP6CDP), SN70G (SP1PBT), SN70I (SP5PPK), SN70M (SP5ZCC), SN70N (SP6JKH). There is a website and a special award for working these callsigns.

Mike, OM2DX, is now in **Iraq** and has been signing YI9OM for a few weeks, while waiting for his own call to be issued (hopefully YI9DX). Please note that the new QSL route for contacts made with YI9OM from 28 November 2002 is via OM3JW. Mike will remain at the Slovak Embassy in Baghdad for two to four years and plans to operate on all bands CW, SSB, RTTY and PSK31. Topbanders should look for him after 2030UTC on 1832 - 1833kHz.

Glenn, W0GJ, will be back in **Bhutan** from 3 to 26 February, and expects to be active as A51B, with special emphasis on 80m (3505kHz ±QRM). His activities will also include the *CQ/RJ* WW RTTY Contest (8 - 9 February) and the ARRL CW DX Contest (15 - 16 February). QSL to home call.

DL1CW and DL3GA plan to be active

The view from the window of Bill, T88BA (G4CWA), in Koror, Palau. A dipole is strung between the building and the coconut tree.

from Cape Coast, **Ghana**, from 5 to 18 February. The requested callsigns are 9G5AP (DL1CW) and 9G5GA (DL3GA). They will operate 80 - 10m, all modes, and will be active in the WPX RTTY and ARRL DX CW contests.

Marco, ST1MN, will be a new station active from **Sudan** from 28 February until sometime in June. *425 DX News* says he is not used to pile-ups, so take it easy on him. Claudio, IV3OWC, will join him in mid-March for a month of operating. Claudio previously operated as 9E1C. While in Sudan, Claudio will use the callsign ST1C and he will be in the CQ WPX SSB Contest. QSL both of these via IV3OWC.

Lee, DS4CNB, is now operating from King Se-Jong station on the **South Shetlands** as D88S. This callsign has already caused some confusion on the bands, as D8 is allocated to Korea. It is worth remembering that the Antarctic region is shared between many nations, through the Antarctic Treaty, so there is no single prefix allocation. Most operators are allocated callsigns by their home country, but usually from a reserved callsign block. So, for example, the ZS7 and CE9 prefixes are from the South African and Chilean ITU allocations respectively, but these specific prefixes are only used from Antarctica. Even then, the actual DXCC entity may be ambiguous as there are several DXCC entities in the area encompassed by the Antarctic Treaty including not only Antarctica itself, but South Shetland, South Sandwich, etc. Most readers will also be aware that some UK interests in Antarctica are run out of the Falklands, so UK bases in the Antarctic area, in addition to those in South Georgia and the Falklands which are outside the Treaty zone, all use the VP8 prefix. It all adds up to ambiguity and possible confusion! [Which makes the *RSGB Prefix Guide* such a useful aid: see page 27 - *Ed.*] While on this subject, Felix, DL5XL, will be at the Neumayer Station, **Antarctica** from March to November. When he is not working as the radio operator and electronics engineer at the German research base he'll be active as DP1POL mainly on CW, but also on SSB, RTTY, PSK31 and Hell. QSL via DL1ZBO, either direct or via the bureau.

Andy, G3AB, writes that, during his 26 days of activity as 9L1AB from **Sierra Leone**, he made 40,362 QSOs on CW / SSB / RTTY on all bands 6 - 160m, with 959 QSOs on 6m and 1265 QSOs on 160m. Only dipole and inverted-L antennas were used. A full report with statistics and photos will appear on the website. Direct QSL cards are already being mailed out.

Chris, ZS6RI (ex-ZD9IR), has now left Gough Island and reports that by the time this appears he will be working in **Tanzania** and on the air as 5H9IR.

Luc Glarey, I1YRL, writes that he has been a radio amateur for more than 30 years and is offering his services as a QSL manager for anyone who may need one. Please contact him at: i1yrl_luc@libero.it

Gwyn, GW4KYN, writes that, in the December column, where I mentioned that UK amateurs resident in Thailand have now received their own HS calls, I referred to him incorrectly as GW3KYN. I did get his Thai call correct: HS0ZEB.

Looking forward to March, cancel any travel plans now! Two significant expedition operations have already been announced. Firstly, a German group will be in the **Sudan** for around three weeks (exact dates not yet available), using the callsign ST0RY. Their activity will include the *CQ* WPX SSB Contest, but otherwise their focus will be on the low bands, the WARC bands (30, 17 and 12m) and on RTTY, with three complete high-power stations and a wide selection of antennas. The group has also announced its intention of providing support (including books and equipment) to the national amateur radio club in Sudan. Don't be confused by the ST0 prefix, which used to be associated with Southern Sudan (now a deleted DXCC entity). It now seems to be used, along with ST1, for visiting amateurs.

Secondly, look out for a second DXpedition to **Ducie Island**, the newest DXCC entity (the first operation, as VP6DI, took place in March 2002). Ducie lies 350km east of Henderson Island in the Pitcairn Island group. Activity by what promises to be a large multinational group is likely to start around 8 March and hopefully by next month I will have further details.

CONTESTS

THE POPULAR *CQ* WW 160m contests (CW last full weekend in January, SSB last full weekend in February) move this year to a 48-hour format, 0000 Saturday to 2359 Sunday, but single operators are restricted to a maximum of 30 hours' operation. Also, VY0 has been added as a new Canadian multiplier and the DX window has been dropped for both modes. Further information from the *CQ* Magazine website.

The GACW (Argentinean CW Group) Key Day, not a competition or contest but an event to encourage all amateurs to bring out their old manual keys and make as many QSOs as they can with other participants, is from 1800 23 February until 0600 the following day. Operate around 30kHz up on each band. Call CQ KD, and exchange RST plus any greetings. If you make more than 10 QSOs you are also invited to vote for those stations with the best CW, and awards will be made to those who receive the most votes!

CORRESPONDENCE

MY COMMENTS LAST month on the continuing pleasure to be gained from the HF bands struck a chord with at least one reader. Brian, G3RJX, writes that he had read with interest in an earlier column that Ron, G3SGQ, would be active from South Africa. Brian had met Ron through a mutual acquaintance back in the 70s, but had not run across him in recent years. However, despite tuning the bands diligently, no ZS/G3SGQ was heard, to the point that Brian was beginning to think he had imagined the reference in this column. "You can imagine my surprise and pleasure, therefore" says Brian, when I heard ZS/G3SGQ completing a QSO on 12m last evening, and raised him for a contact before the band closed". Brian makes the point that his is a typical station, not one of

COUNTRIES WORKED, 2002

(sorted this month by CW totals. Final 2002 table next month)

CALL	CW	SSB	DATA	MIXED
G3TXF	266	11	0	266
G0NXX	257	0	0	257
G3SXW	253	0	0	253
G3YVH	230	209	0	263
G4PTJ	226	224	0	271
G4IRN	217	0	0	217
G3LHJ	215	117	145	231
G3JFS	199	179	149	233
G4WFQ	196	98	111	221
G3SED	192	140	3	222
G4UCJ	187	0	47	187
ZC4BS	186	221	84	239
G4WXZ	185	204	0	242
G4OBK	170	79	88	203
G4DJX	168	0	0	168
MU0FAL	166	136	0	185
ZC4VG	166	14	36	169
ZC4DW	165	110	115	189
G4KIV	154	132	0	179
G3YMC QRP	150	0	0	150
GU4YOX	149	162	0	205
G3XTT	140	124	94	182
MM0BQI	133	106	124	173
G4IDL	128	41	0	140
G3WP	117	0	0	117
M0BVE	110	0	0	110
G3ING	102	0	0	102
MW5VZW	81	150	0	168
G4FVK	77	142	0	154
GM4ELV QRP	72	69	0	93
G4DDL	72	26	13	74
MU3DHI	55	129	0	129
M5AEF QRP	50	61	0	71
M0BZK	37	142	68	151
G0GFQ	16	210	26	210
M0CNP	8	169	46	169
M0CAL	3	85	0	85
M0AWX	0	245	0	245
M5PLY	0	220	0	220
M3RDX	0	197	82	203
G0ARF	0	0	200	200
GU0SUP	0	0	150	150
G0LGJ/M	0	143	0	143
M5GUS	0	134	0	134
G4YWY/M	0	112	0	112
M3CLY	0	92	0	92
M3FSI	0	85	0	85
G0URR	0	0	81	81
G3URA	0	0	75	75
M3VAM	0	65	0	65
M5AFA QRP	0	0	39	39

QTH CORNER

3C5XA	Alan Ibbetson, G3XAQ, Katallin, Town Lane, Chartham Hatch, Canterbury, CT4 7NN.
5H9IR	Chris Burger, ZS6EZ, Box 4485, Pretoria 0001, Republic of South Africa.
D88S	Captain Lee, DS4CNB, PO Box 30, Tong Yung 650-600, South Korea.
DL1ZBO	Rainer Hilgardt, Hans-Sachs-Weg 38, D-64291 Darmstadt, Germany.
KU9C	Steve Wheatley, PO Box 31, Morristown, NJ 07963-0031, USA.
ON5NT	Ghis Penny, PO Box 93, B-9700 Oudenaarde, Belgium.
ZC4DW	Dez Watson, 7 Darwin Close, Lichfield, Staffordshire WS13 7ET.
ZL3CW/F2CW	(new) Jacky Calvo, 31 Raurenga Ave, Epsom - Auckland, New Zealand.

the 'big guns' that he often reads about here and elsewhere, or one of the newly-licensed M3 stations struggling with modest power. But for him the pleasure of contacts such as that he describes is what keeps his interest in the hobby alive and well. Brian notes, incidentally, that he became interested in the hobby at the tender age of 13, and was a boy telegraphist with the RN by the time he was 15.

My table regulars also keep me up to date with lots of news of their activities, of course. David, G4FVK, is just one who comments that the CQWW contests gave him some new DX for the year and, indeed, some all-time new slots. Paul, MW5VZW, writes that he is now running a TS-870S to his 3m whip antenna, which has brought him recent QSOs with, for example, C56R (Gambia, worked on four bands), 9S1X (Zaire), TT8DX (Chad), XV9DT (Vietnam) and 8R1USA/P (Guyana). All these (and plenty of others) were on 10, 12, 15 or 17m. Mark, G0LGJ, has collected some more nice ones during his mobile operations. His list this month includes YI9OM (Iraq), CY0MM (Sable Island) and 5N6EAM (Nigeria). Not bad! Al, MU3DHI, comments about the high-speed CW in the CQWW CW Contest at the end of November, but nevertheless managed to increase his CW score considerably. Keep at it Al, and your code speed will soon increase.

Finally, Don, G0SOV, writes that he had a QSL returned from EA4AHK (QSL manager for TT8FC) for a CW QSO, with a note that TT8FC is SSB only, and that this was a pirate operation. From time to time I hear of such problems on the bands, and it is always irritating, indeed upsetting, to all concerned. Fortunately, it doesn't seem to be too common. Most people we hear and work on the bands are perfectly legitimate. And, of course (though not in this case), it's occasionally a case of a misread callsign. On several occasions I have been asked for QSL information for a callsign I don't recognise, and then it dawns on me that the call is just one dot removed from a well-known DX station!

THANKS

SPECIAL THANKS GO to the authors of the following for information extracted: *OPDX Bulletin* (KB8NW), *The Daily DX* (W3UR) and *425 DX News* (I1JQJ). Please send items for the **April** issue by **22 February.** ♦

WWW.

9L1AB:	www.g3ab.net/9l1ab.htm
BARTG:	bartg.demon.co.uk
Chiltern DX Club (correction):	www.cdxc.org.uk
CQ WW 160 Contests:	www.cq-amateur-radio.com/infoc.html
Enigma History:	www.enigmahistory.org/enigma.html
Enigma Awards:	www.sp5zcc.waw.pl/en/enigma.html
KU9C: (including a list of stations for which he is QSL manager)	www.ku9c.com
Neumayer Station DP1POL:	www.awi-bremerhaven.de/Polar/neumayer1.html
P5/4L4FN:	www.amsatnet.com/p5stats.html

HF F-Layer **Propagation Predictions** for **February 2003**

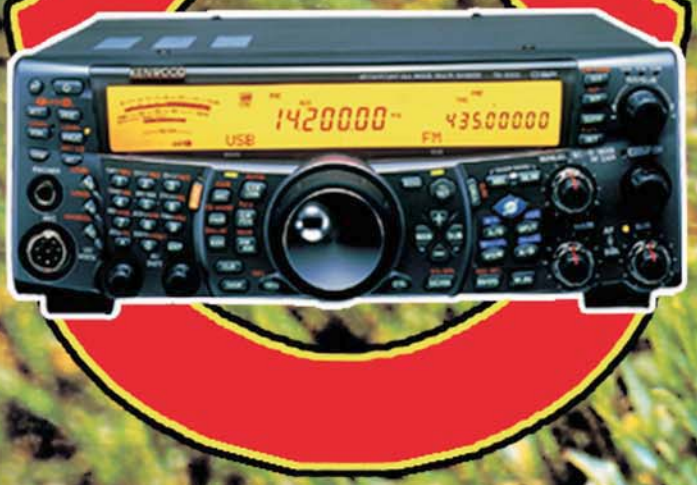
	3.5MHz	7.0MHz	10.1MHz	14.0MHz	21.0MHz	24.9MHz	28.0MHz
Time	0000111112220	0000111112220	0000111112220	0000111112220	0000111112220	0000111112220	0000111112220
(UTC)	2468024680220	2468024680220	2468024680220	2468024680220	2468024680220	2468024680220	2468024680220
*** Europe							
Moscow	88.....47888	866...289888	1.7545688322	..3878896...	..2999995...	...48884....	...26762....
*** Asia							
Yakutsk	.........232.	2.....36664	3.5235788876	..1788556322	...672.....	...46.....	...34.....
Tokyo	.........11..	.......3544.	.....15521.	....1..22...	...1.....	...3.....	.....
Singapore	.....	56432	277321	.....686...	.....467....	...12566....	....2333....
Hyderabad	.....	2222	3.....67662	.....3772..	...6679944...	...8899933...	...88998....
Tel Aviv	77.....17777	886....79888	9683.1599699	522877898255	...67786....	...57776....	...46664....
*** Oceania							
Wellington	.....12...	.....388...	...267898...	...588886...	....6652....	....665.....	....442.....
Perth	.....	.....1323.	.....5621.	.....375...	.....5772...	...45777....	...55655....
Sydney	.....	.....332..	.....5741..	.....3771...	...16787....	...57887....	...57674....
Honolulu	.....	...3.....	...73212....	...3.2.12...	.....	.....	.....
W. Samoa	.....	...1...1....	...44356....	...277852...	....366.....	.....55.....	.....32.....
*** Africa							
Mauritius	.....	4.....212	2.....13212	.....452..	.....162...	.....24....	.....22....
Johannesburg	67.....54	99.....2899	87.....7998	532....39977	...3224772..	...7788982..	...7788887...
Ibadan	.1.....	664.....4566	887.....7878	42361.158743	...99999952.	...9999985..	...9999973..
Nairobi	.....	32.....2222	55.....14444	712....46777	..36556873..	...7677786...	...7777783...
Canary Isles	666.....5666	8882....8888	88761.128888	552864568885	...98987972.	...4788882..	...2788886...
*** S. America							
Buenos Aires	122.....1	7766.....57	4517.....33	11.7.....121	...6532355..	...3564552..	....46555...
Rio de Janeiro	.....	222.....12	2211.....122	...3.....21.	...5753576..	....764673..	....76466...
Lima	.....	11.3.....1	11.5.....1	...4.....	...3.64452..	.....6655...	.....6553...
Caracas	.....	3331.....23	45.4.....33	...22....11.	.....32341..	.....87872..	.....8776...
*** N. America							
Guatemala	.....	3214.....1	11.5.....1	...2.....	.....	.....442...	.....43....
New Orleans	.....	3221.....3	41.5.....23	...2.....1..	.....28883..	.....8883..	.....887...
Washington	212.....2	7775.....67	76173....387	21.2.3113752	.....68885..	.....27882..	.....886...
Quebec	677.....76	7836.....587	1..52...1551	.....32247..	.....89996..	.....79996..	.....69984..
Anchorage	.55.....	7773....1124	2.....12311	.....51..	.....	.....	.....
Vancouver	.....	321.....	2.....	.....	...27...	.....26...	.....4...
San Francisco	.....	2212.....	1..1.....	.....	...44...	.....44...	.....22...

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 December 2002 issued by the Sunspot Data Centre, Brussels, was 81.6. The maximum daily sunspot number was 140 on 17 December and the minimum was 25 on 30 December. The predicted smoothed sunspot numbers for February, March and April are respectively: (SIDC classical method – Waldmeier's standard) 88, 86, 83 (combined method) 75, 71, 67.

KENWOOD

HOME OR AWAY



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Scottish Store: 20 Woodside Way, Glenrothes, Fife, KY7 5DF. Tel: 01592 756962, Fax: 01592 610451, E-mail:jayceecoms@aol.com, Web: www.jayceecoms.com

CONTEST

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Windsor SL4 5BZ
E-mail:tim@g4vxe.com

STEVE RAWLINGS, GW4ALG, decided to have a go at using his QRP station during the CQWW CW contest in November. He writes, "Operating single-operator in the CQWW CW contest on10, 15, 20, 40, 80 and 160m, I made 830 QSOs using my Elecraft K2 at 5 watts RF output to a single G5RV antenna." Steve put together an excellent score of around 340k points, which is great going for a simple station (see the photo below). It shows that when an excellent operator is behind a simple station, good results can be obtained. I hope Steve's experience may encourage others with simple stations to have a go in other contests and see what they can do.

SLOW SPEED CUMULATIVES 2001 - A CORRECTION

UNFORTUNATELY, THE ENTRY to this contest from Ron Bee, G3SZS, was misfiled and was not included in the final results table. Ron would have been placed joint 20th. Please accept the apologies of the adjudicator and the HF Contests Committee, Ron, and we hope to receive more logs from you in the future.

CONTESTS THIS MONTH

THERE'S A VARIETY OF contests to choose from this month. Always a favourite of mine has been the ARRL DX CW contest (15 / 16 February). For us in the UK, the object is simple: to work as many US and Canadian stations and multipliers as you can on each of the bands. It can be a great way of helping your Worked All States (WAS) totals along, as many hard-to-work states will be available over the contest weekend. On the higher bands, 14, 21 and 28MHz, a simple station will be able to make plenty of contacts, so it's ideal for the newcomer or QRP enthusiast who fancies a dabble. For the more experienced operator, though, the challenge of working some of the harder states on the low bands can be demanding - and, of course, fascinating! It's surprising, even with a simple station, what you can work on 40 and 80m during the contest. It would be wonderful to hear some good Foundation Licence participation in this contest. If you have a go, do drop me an e-mail so that I can let people know how you got on.

The RSGB 1.8MHz contest on 8 / 9 February sees good support from stations all around the UK and beyond. It's a good opportunity to get on and make a few contacts with the usual suspects! If you're out late on the Saturday night, it's well worth trying to get on for a few minutes towards the end of the contest, because very often the last hour or so of the contest is quiet, so the serious participants will *really* value your contact.

On 432MHz, there is the Affiliated Societies Contest on 2 February. Up to three stations form a team for each society and there is usually a good amount of activity. This is an ideal time to test our your 432MHz station - the band can sometimes be quiet at this time of year and it's good to get some concentrated activity to see how things are working out.

For the RTTY enthusiast, the CQWW RTTY WPX event takes place on 8 / 9 February which sees lots of RTTY activity from around the world. If your club has one of the Special Contest Calls, why not think about airing it on RTTY? As you will be a fairly unique multiplier, you will undoubtedly be very popular. Strategy for the WPX events is usually fairly straightforward - at least if you have a decent prefix. Just run, run, run - and the multipliers will come to you. And because a lot of the multipliers are in Europe and the USA, you don't need a massive station to make a good entry.

Effective contest stations come in all shapes and sizes! Steve Rawlings, GW4ALG, used his Elecraft K2 QRP rig to great effect during CQWW CW 2002.

144MHz LOW POWER CONTEST, 2001

FOOT AND MOUTH took a great toll on the entry to this contest during 2001, and, combined with poor conditions, made for a very quiet event, but it was good to welcome a few new faces or returnees to the VHF contesting scene. The only other upside seemed to be the French portables who were out in their own QRP contest on this weekend.

Roger Piper, G3MEH, walks away with the single operator section leaving Michael Wright, G0GCI, in second place. Things were closer in the multi-op section with the Colchester Contest Group, hiding as G3ZES, this time getting the better of the Five Bells, G4SIV.

The VHF Contests Committee apologises for the enormous delay in preparing these results.

Andy Cook, G4PIQ

144MHz Low Power Contest, 2001

Single Operator Fixed Station

Pos	Callsign	Loc	QSOs	Mult	Points	Pwr	Ant	Best DX	km
1*	G3MEH	IO91QS	100	73	1182819	25	2 x 10Y	DF0WD	623
2*	G0GCI	JO01ED	68	60	676740	25	2 x 9Y	DF2VJ	509
3	G8ZRE	IO83NE	45	50	374550	25	8Y	F6KPL	413
4	M0BPQ	IO93HD	39	38	208278	18	9Y	ON7CL	493
5	G1KHX	IO81MI	32	36	172368	25	9Y	G4DEZ	288
6*	PE1EWR	JO11SL	20	26	141336	3	10Y	F6KPL	400
7	M0COP	IO92BK	25	33	83358	25	8Y	GI6ATZ	347
8	G0EYX	IO82WT	21	30	66540	25	16Y	GM0BRS/P	338

All Others Section

Pos	Callsign	Loc	QSOs	Mult	Points	Pwr	Ant	Best DX	km
1*	G3ZES	JO01JP	117	87	2085651	25	2 x 15Y	DK7FC	589
2*	G4SIV	IO92WS	94	87	1708245	25	6 x 12Y	DF2VJ	624
3	G3PIA	IO91IN	93	78	1067196	25	17Y	DF2VJ	633
4	G0DLR	JO01EI	73	58	565790	25	15Y	GM0BRS/P	530
5	G3YNN	JO00EU	45	41	265147	25	14Y	DF2VJ	498

*Certificate Winner. Checklog gratefully received from G8LED/P.

432MHz Low Power Contest, 2001

THE 432MHZ LOW POWER EVENT was hit even more badly by Foot and Mouth than the 2m session with a measly two entrants in the Open section, and conditions and activity were no better than for the 2m session. Nevertheless, with their big eight Yagi system, the Five Bells Group, G4SIV, made some good DX to reverse the tables on the Colchester Contest Group, G3ZES, compared with the 2m event.

In the single operator section, Reg Woolley, G8VHI, made only a few more QSOs than Roger Piper, G3MEH, but found more DX and more multipliers to eek out a large lead.

The VHF Contests Committee apologises for the enormous delay in preparing these results.

Andy Cook, G4PIQ

VHF CHAMPIONSHIP, 2001

THE VHF CHAMPIONSHIP of 2001 fell victim to the Foot and Mouth break out, with the number of stations able to compete in three or more contests reduced when compared with previous year's entries.

The winner of the Open section was the Five Bells Contest Group, which managed to compete in all nine contests. The Northern Lights Contest Group was the runner-up in the Open section.

The winner of the Single Operator section was Roger Piper, G3MEH, who competed in eight of the nine events. Michael Wright, G0GCI, filled the runner-up slot in this section.

The winner of the Single Operator QRP section was Frank Howe, G3FIJ, who just managed to beat Dave Hewitt, G8ZRE, into second place.

Congratulations to all of the winners and runners-up.

The VHF Contests Committee apologises for the long delay in preparing these results.

Ian Pawson, G0FCT

Open Section

Pos	Name	Points	No of Contests
1*	Five Bells CG	6157	9
2*	Northern Lights CG	3678	5
3	Colchester CG	3232	7
4	Harwich ARS	575	3
5	South Birmingham Radio Society	568	3
6	Culverstone CG	443	3
7	Herstmonceux Megacycles CG	278	3
8	Dacorum AR&TS	110	3
9	Newquay & DARS	11	3

Single Operator, Fixed Section

Pos	Callsign	Points	No of Contests
1*	G3MEH	5610	8
2*	G0GCI	1200	3
3	G8ZRE	455	3
4	G1KHX	378	4
5*	2E1GUA	322	4
6	G3YJR	252	4
7	M1DUD	251	4
8	G3FIJ	199	4
9	G4APJ	111	4

Single Operator, Fixed, 25W / Single Antenna

Pos	Callsign	Points	No of Contests
1*	G3FIJ	2840	4
2*	G8ZRE	2319	3
3	G4APJ	2004	5
4	2E1GUA	1992	4
5*	M1DUD	1229	4
6	G3YJR	803	3

*Certificate Winner

2nd 50MHz CONTEST, 2001

THIS CONTEST produced periods of good Sporadic E propagation mixed with only average conditions within the UK. The weather was also kind to most entrants with sunny periods and calm winds.

Congratulations to G6FFB/P for winning the Single Operator (others) section, to G4ZTR for winning the Single Operator (fixed) section and finally to GD0EMG for winning the Multi-operator section. Thank you to IW5EFM for his very useful check log.

Ian Pawson, G0FCT

2nd 50MHz Contest, 2001

Single Operator (Others)

Pos	Group	Callsign	Loc	QTH	QSO	Mult	Points	Total	Best DX	km	Power	Ant	Rig
1*	Yate Contest Group	G6FFB/P	IO81TL	BA	85	71	32971	2340941	YU1EXY	1839	100	7el	FT847
2*		G4HLX/P	IO91FN	OX	60	60	19757	1185420	YU1EXY	1786	100	5el	FT847
3		GW8ZRE/P	IO83JA	LL	37	40	13869	554760	EH9IB	1974	10	HB9CV	FT690R
4		G0WJR/P	IO81QJ	BS	12	17	882	14994	G3MEH	144	5	Dipole	FT817

Single Operator (Fixed)

Pos	Group	Callsign	Loc	QTH	QSO	Mult	Points	Total	Best DX	km	Power	Ant	Rig
1*		G4ZTR	JO01KW	CO	62	67	44592	2987664	TR8CA	5777	200	4el	FT847
2*		G3MEH	IO91QS	HP	84	80	32941	2635280	TR8CA	5780	300	5el	IC736
3		GW6TYO	IO81AO	SA	49	54	31491	1700514	YU1EXY	1949	400	5el	FT847
4		G6FQZ	IO91JR	OX	56	60	21914	1314840	YO2II	1746	150	5el	FT736R
5		M0COP	IO92BK	BM	34	35	11453	400855	EH9IB	1911	100	5el	IC746
6		G4BRK	IO91DP	SN	13	18	7289	131202	YZ1AU	1791	100	Loop	FT100
7		M1DUD	JO02QC	IP	8	12	1805	21660	IK4FMT	1166	2	5el	FT690R

Multi-operator

Pos	Group	Callsign	Loc	QTH	QSO	Mult	Points	Total	Best DX	km	Power	Ant	Rig
1*	Northern Lights CG	GD0EMG	IO74QD	IM	182	115	142970	16441550	TR8CA	6104	400	2x7el	FT650
2*	Herstmonceux Megacycles	G3YNN	JO00EU	BN	57	58	29158	1691164	LZ1KG	2211	400	5el	IC736
3	G4TSW Radio Club	G4TSW	IO80FV	EX	49	54	30835	1665090	YU1EXY	1904	100	5el	IC746
4	Flight Refuelling ARS	G4RFR	IO90AS	BH	49	59	27979	1650761	TR8CA	5694	100	11el	IC746
5	Newquay & DARS	G4ADV	IO70LK	TR	24	26	15852	412152	YU1EXY	1999	100	4el	DX70

Checklog: IW5EFM

432MHz Low Power Contest, 2001

Single Operator Fixed Station

Pos	Callsign	Loc	QSOs	Mult	Points	Pwr	Ant	Best DX	km
1*	G8VHI	IO92FM	44	45	323415	25	2 x 19Y	DF2VJ	691
2*	G3MEH	IO91QS	38	38	155420	20	2 x 23Y	PA0ME	401
3	G0GCI	JO01ED	22	29	102805	25	2 x 21Y	DF2VJ	509
4*	PE1EWR	JO11SL	17	21	68733	13	2 x 21Y	DF4UE	521
5	G3JJZ	JO01AJ	23	28	52220	25	19Y	G4APJ	296
6	G4APJ	IO83UP	11	19	51794	25	19Y	F6KPL	455
7	G1KHX	IO81MI	13	16	27344	25	19Y	G3FIJ	271
8	M0COP	IO92BK	3	4	160	15	17Y	G8VHI	24

All Others Section

Pos	Callsign	Loc	QSOs	Mult	Points	Pwr	Ant	Best DX	km
1*	G4SIV	IO92WS	56	46	569710	25	8 x 28Y	DF4UE	809
2*	G3ZES	JO01JP	51	40	414560	25	2 x 21Y	DL3YEE	535

*Certificate Winner. Checklog gratefully received from G8LED/P.

CONTEST CALENDAR

HF Contests

Date	Time	Mode	Contest	Bands	Exchange
8-9 Feb	*0000-2400*	*RTTY*	*CQ WW WPX RTTY*	*3.5-28*	*RST+SN*
8-9 Feb	*1200-1200*	*CW/SSB*	*PACC*	*1.8-28*	*RST+SN*
8-9 Feb	2100-0100	CW	RSGB 1.8MHz	1.8	RST+SN+District
15-16 Feb	*0000-2400*	*CW*	*ARRL DX*	*1.8-28*	*RST+Power*
21-23 Feb	*2200-1600*	*SSB*	*CQ WW 160m*	*1.8*	*RS+Country/Prefix*

VHF Contests

Date	Time	Mode	Contest	Bands	Exchange
2 February	0900-1500	ALL	RSGB 432MHz AFS	432	RST+SN+Locator
4 February	2000-2230	ALL	RSGB 144MHz Activity	144	RST+SN+Locator
9 February	1000-1200	ALL	RSGB 70MHz Cumulative #3	70	RST+SN+Locator
11 February	2000-2230	ALL	RSGB 432MHz Activity	432	RST+SN+Locator
18 February	2000-2230	ALL	RSGB 1.3-24GHz Activity	1.3-24G	RST+SN+Locator
23 February	1000-1200	ALL	RSGB 70MHz Cumulative #4	70	RST+SN+Locator
25 February	2000-2230	ALL	RSGB 50MHz Activity	50	RST+SN+Locator

Microwave Contests

Date	Time	Mode	Contest	Bands	Exchange
23 February	0900-2100	ALL	RSGB All-Band Activity Day	All	Non-competitive

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

SWL

BOB TREACHER, BRS32525
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E-Mail: brs32525@compuserve.com

SO, HOW HAS the LF DX season been for you? By the time you read this, the days will be getting longer and the best of the low band DX season will be behind you. How many W6s did you hear over the long path and how many JAs did you hear at our sunrise on 80m? I hope that the low band enthusiasts amongst you will have heard at least one west coast W and one JA this season. The short path openings to both W6 (our morning) and JA (our evening) would probably have provided your best opportunities, but several of the west coast and JA boys have impressive set-ups, so there would have been almost daily opportunities. It will be good to hear of your experiences, together with details of any other interesting DX heard on the low bands over the Christmas and New Year periods.

OPPORTUNITY

I'VE TALKED ABOUT opportunity already, and SWLing is very much about being in the right place at the right time. How many times do you pick up a 'new one' just because you paid a chance visit to the shack? Well, I took 'opportunity' a little further a couple of months ago when a friend of mine had a holiday in Egypt and arranged to visit Ezzat, SU1ER. Needing a QSL card from him on 50MHz, the opportunity was taken for my friend to bring one back for me. I'm glad to say that Ezzat's card provided my 134th DXCC confirmation on 50MHz. I hope to tell you of another such 'opportunity' next month but, as I write, I still do not yet have the missing QSL card!

QSLing

A TOPIC OFTEN visited in this column, but it seems that the 'Do's' and 'Don'ts' are not always complied with! I heard from a British amateur who operated from a European DXCC entity with an IOTA reference, made a few hundred QSOs and is now getting many QSL cards from SWLs seeking confirmation of either the DXCC entity or the IOTA reference. However, with so many DXpedition-type QSOs handed out, this G wondered why just about all the listeners only reported on one QSO. Perhaps it is the fault of the QSL card designers who do not leave sufficient space for more than one callsign to be entered? Perhaps it is the fault of the SWL who considers that he only needs to report on one QSO? Whichever it is, listeners should always try to report on more than one QSO. Not only does it show that you were interested in listening to the DX station's pile-up, but logging two (or more QSOs) ensures that you have a better 'opportunity' (there's that word again!) of obtaining a QSL card, especially if one of the callsigns reported on is incorrect.

I have also been asked what "QSL via CBA" means. It simply means that the station wants you to QSL to his Call Book Address.

DX NEWS

DAVID WHITAKER, BRS25429, updated the 50MHz situation. He really had to persevere with the two C56s before they got up to IO93 square, but he finally heard C56R and C56JHF, as well as D44TD. That took David to 142 DXCC entities heard on 50MHz. Not content with that, he heard XT2DX the next day. On HF David heard YK1AO for entity number 273 in 2002 and also HC8N on 24MHz for a new one.

Robert Small, BRS8841, took part in the CW section of the CQWW Challenge. Conditions were not too good, although overall the bands had been quite good. Thanks to HC8N and CY0MM, Robert bagged two new ones on 3.5MHz. 40m had opened up well at times and the pick of Robert's log were YN9HAU, HI8MAL and 9L1BTB. 30MHz provided CY0MM and 9L1AB. On 14MHz, a couple of new IOTA references were logged - FO5RK (OC-051) and VK4WWI (OC-187), while 21MHz gave YE8XM/P, KH2TX, T88SP, VP5/K5CM and VR2DS. As 28MHz will not be too good for much longer, Robert had been spending much of his listening time there. He was rewarded with XY1M, 5R8HA, PJ7/VA3RA/M, YA1CQ, S9WU, C56R and XT2ATI.

The 'sparkle' had deserted the bands in early December, although the ARRL 10m contest was quite a lively affair with lots of activity. However, in several hours of listening nothing of great note was logged. In those two hours, 87 DXCC entities were logged.

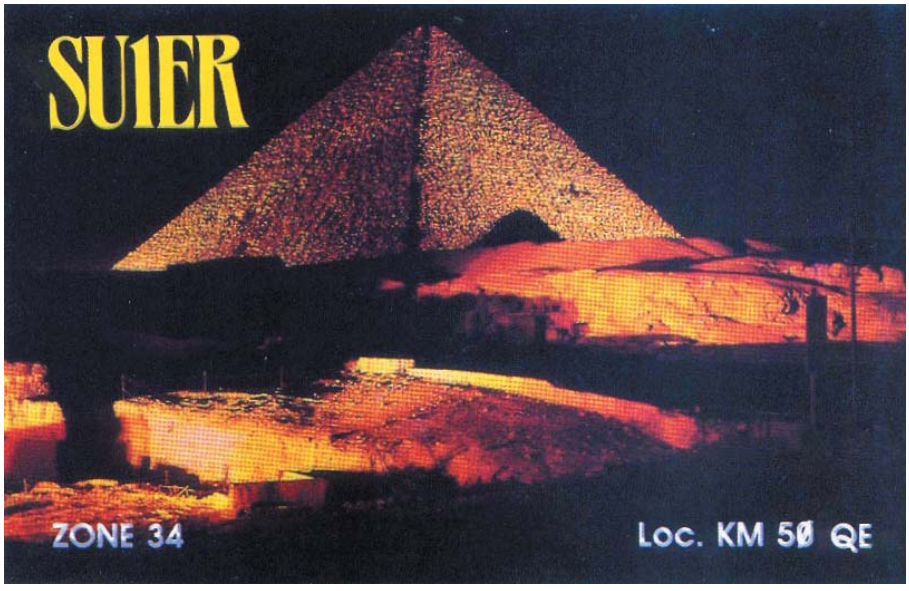
SWL CONTESTS

DUE TO POOR SUPPORT in recent years, there will be no CQ160m or CQWPX SWL contests this year.

QSL MANAGERS

MANY SWLs tell me that they still have difficulty obtaining QSL cards from some of the former Soviet Republics. Many such stations now have European QSL managers, so make use of the various QSL manager sites on the Internet and you may find that it's easier than you think to obtain QSLs. One such manager is DK6CW, who handles cards for 4K6CD, 4K8DX, 4K8DM, 4K3MA, 4J3DGF, EK3AA, EK3AW, EK3KA, EK3SA, EK3GM, EK1700A, EK6DM, 4L3Y, DL2BC, RA3SD, UK8FC, and ZA/UT7DW. QSL direct to Alexander Poliakov, PO Box 3552, D-49025 Osnabrück, Germany.

Closer to home, Dave, G3NKC, is handling cards for special contest callsigns MD4K and MD6V. Finally, Mike, G3TEV, acts as QSL manager for 9J2BO, who can often be heard on 28MHz. ♦



Bob's 'opportunistic' QSL card from SU.

VHF/UHF

NORMAN FITCH, G3FPK
40 Eskdale Gardens,
Purley, Surrey CR8 1EZ.
E-mail: g3fpk@compuserve.com

THE LACK OF any decent tropospheric propagation was more than made up for by some excellent meteor scatter (MS) activity during the Leonids shower, some auroral events and openings to Africa on 50MHz.

ACTIVITY

THE SUBJECT FOR this month's topic was triggered off by an e-mail from David Perry, G4YVM, so I'll quote from parts of his comments. He writes, "Don't you get really fed up at the low levels of UK activity on 2m? I try quite hard to use the SSB mode, but what's out there? Zilch. Even when we have contests, which do increase activity, we often find contests within contests; why?"

He continues, "I wish there was some way to encourage all the new M3 licensees on to 2m SSB. It's an interesting and challenging band and well suited to the M3s as they could use quite high gain antennas." One of David's suggestions was to have a contest every month but in fact this already happens, as can be seen in the RSGB VHF / UHF 2003 Contest Calendar on page 54 in the January *RadCom* and in the monthly 'Contest Calendar' lists in Tim Kirby's, G4VXE, column.

There is no doubt that nowadays far fewer operators come on to the VHF bands and put out a CQ call just for a chat with anyone, friend or stranger, who answers. Many reasons have been suggested for this change, including much more time being spent on the Internet and the much greater diversity in operating modes that has evolved in the past two or three decades.

The more clued-up operators are aware of the likelihood of an aurora happening and subscribing to the NASA's 'Space Weather News' website proves very useful - see the list. They are also aware when possible Sporadic E (Es) propagation may occur or of an extended tropospheric opening by monitoring the DX cluster frequencies on the packet radio network. Meteor scatter (MS) activity periods are well documented and do not rely on fortuitous ionospheric or tropospheric conditions.

A time-honoured method of monitoring bands for signs of openings is to listen for distant beacons. These are listed annually in the *RSGB Yearbook* and, since most modern all-mode transceivers have memory capability, it makes sense to program some of their frequencies into the memory bank. So, when a distant beacon is well above its usual strength, it is certainly worth persevering with CQ calls on the appropriate frequency for the mode.

It is often possible to stir up some activity on an apparently dead band by calling CQ. This is illustrated by the success that regular contributor Bryn Llewellyn, G4DEZ (JO03), has on VHF / UHF, although it has to be realised that he has a good VHF location for working across the North Sea from a fairly rare grid.

The aforementioned DX cluster is a very useful system and all you need is a modest PC, a simple VHF / UHF transceiver, a TNC and appropriate software to enable you to have an excellent way of ascertaining what is happening on the bands in real time. A popular suitable transceiver is the Kenwood TM-D700E which covers 2m and 70cm and has the advantage of a built-in TNC, making it that much simpler to access the cluster. Furthermore some computer logging systems, such as *TurboLog*, can be hooked up to your system to enhance further the efficiency of your station.

DUBUS NOTE

OH DEAR! I have to confess to a 'senior moment' for an error in the 'Publications' section in the December column. Roger Blackwell, G4PMK, is the UK agent for the excellent quarterly *DUBUS* magazine and not Andy Talbot, G4JNT. My apologies to both for this clanger, but the e-mail address dubus@marsport.demon.co.uk was correct. On an historic note, Roger mentioned that I was his first ever QSO on 2m on AM mode on 21 August 1974 when he was G8IZV. As he remarked, "Those were the days; tuning the band high to low!"

BAND PLANS

TO ACCOMMODATE THE huge rise in popularity of Internet Voice Gateways, RSGB VHF Manager David Butler, G4ASR, has agreed to Iain Philipps's, G0RDI, (Chairman of the Data Communications Committee), proposal for additional frequencies in the 2m band for Internet Voice Gateways. These are 145.2125 and 145.2375MHz. In the 4m band, two existing data channels have been re-allocated to IVGs, 70.3875 and 70.4125MHz.

A reminder that at the IARU Region 1 Conference in San Marino last November, alterations were made to the 50 and 144MHz band plans with immediate effect. These were published in the January *RadCom*, see page 6.

The UK Six Metre Group has proposed, "That the global 6m community adopts the term 'Inter-regional' in place of the now outmoded terms 'Inter-continental' and 'International' when referring to the 50.110MHz calling frequency." In his editorial in the November 2002 issue of the UKSMG's quarterly journal *Six News*, Chris Deacon, G4IFX, explains the reasons for this. The modified Operating Code of Practice can be seen on a website - see the list - so have a look at it and let them know if you have any points of support or disagreement by e-mail to vicechairman@uksmg.org. If the response is generally positive, the UKSMG would recommend that this term be adopted from 1 March 2003.

The aurora of 1 - 2 October 2002, photographed by Clive O'Hennessy, GM4VVX, at his QTH in IO78TA, near Lairg. Clive sent a series of photographs taken between 2300 and 0130UTC, when the aurora moved from NW to N and overhead. He used 20 - 30sec exposures at f/2 using 200ASA film.

BEACON NEWS

DUE TO the demands of a new job, John Wilson, G3UUT, has resigned as IARU Region 1 VHF beacon co-ordinator, as reported in 'RSGB Matters', *RadCom* January 2003, page 6. Iain Philipps, G0RDI, (g0rdi@77hz.com) has taken over John's job as UK VHF beacon co-ordinator.

GEOMAGNETIC AND SOLAR ACTIVITY

IN THE 29 days up to 10 December the middle latitude A-index at Fredericksburg just reached into the sub-storm range at 22 once, on 21 November. It was unsettled on eight days, the rest being quiet. Further north at College in Alaska it was much livelier, with the A-index reaching a storm value of 64 on 21 November and with 10 days in the sub-storm category.

The 10.7cm radio flux averaged 159.0 in the 30 days to 10 December, down 8% on last month's value. The maximum value was 199 on 16 November and the minimum was 137 on the 25th. 30 new sunspot regions were reported and their areas in millionths of the Sun's visible disc varied between 2360 on 17 November and 490 on 7 December. The highest SESC sunspot number was 197 on 11 November with a minimum count of 97 on 1 December.

MOONBOUNCE

THE NOVEMBER ISSUE of *The 432 and Above EME Newsletter* carries the news that Joe Taylor, K1JT, has now released the new version of his *JT44* software that he announced at the Prague Conference last August. It incorporates an echo mode that allows you to evaluate the EME capabilities of your system even when you have too small a station to hear your own echoes.

Peter Blair, G3LTF (IO91), was QRV in the first leg of the ARRL EME Contest last October but the gigantic wind storm really messed things up, including a six-hour power loss. In two short spells of operation on 23cm he made 19 QSOs with 14 multipliers and two more initials (#). He started at 0730 on the 26th and completed on CW with N7AM, VE6TA, WA6PY, K5GW, K0YW, G4CCH, W5LUA, DL4MUP, KU4F (#190), K2UYH, HB9Q, F2TU and IK2MMB. On SSB he worked OE9XXI. After 0930 he went QRT due to the gale, which continued for 36 hours, but did get on for the final window on the 27th at 2140 when he added on CW IK3COJ, F6ETI, OE9ERC and JH0YSI (#191).

Dave Dibley, G4RGK (IO91), was forced to go QRT after only 20min but got back for a couple of hours on the Saturday morning to work a few stations on 70cm. He was QRV for another two hours on the Sunday and ended up with eight contacts. He notes problems with green algae on his antenna elements and his Moon window in limited to over 30° above the horizon.

In his editorial Al Katz, K2UYH, reports that the first leg of the contest produced some of the lowest activity he had ever observed. He rightly suspected that this was due to the very bad weather in Europe. Turn-out seemed better on 23cm than on 70cm but QSO counts suggested that there are still considerably more stations on 70cm than on 23cm.

Howard Ling, G4CCH (IO93), carried out some final checks on his 23cm set-up on 16 November in the run-up to the second leg of the ARRL EME Contest. He completed with EA8/LA8LF, DL8OBU, G3LQR and ZS6AXT on CW. Conditions were good on the 23rd and many stations had exceptional signals. His own echoes were S8 at times and were audible with just 5W in a 2.5kHz bandwidth. But activity was low and he only made 18 CW contacts, KA0Y being a duplicate. The others were EA8/LA8LF, DF4PV, ZS6AXT, DL8OBU, HA5SHF, N2UO, DL1YMK, W7SZ, OE5EYM, HB9BHU, F5HRY, ON5RR, OE5JFL, G3LQR, JH5LUZ, GW3XYW and DF3RU.

There was even lower activity on the 24th, so much so that he went to bed at 0130. At 0500 there were a few more stations QRV but from 0730 signal levels were down. All he worked were VE4MA, WA4NJP, PA3CSG and DL4MUP another duplicate QSO. His final score for the overall event is 50 QSOs and 20 multipliers.

The next activity weekend will be on 15/16 February, when London latitude stations will have 30.5 hours of Moon time. The declination varies from +24.14° to +16.60°. The signal degradation referred to perigee ranges from -0.94dB to -0.51dB and the 144/432MHz sky temperature varies from 253/19K to 200/15K.

METEOR SCATTER: THE LEONIDS

ACTIVITY WAS HIGH in the November 2002 Leonids meteor shower. G4ASR (IO81) was outdoors looking for meteors for a couple of hours from 0100 on the 19th. David was operational (QRV) in the 0300-1200 period on 6m and 2m and sensed a good peak in activity 0350-0500 and 0600-0730 was also good. He lists 56 completed QSOs on 2m SSB with stations in 17 DXCC countries; DL, EA6, ES, HA, I, LA, LY, OE, OH, OH0, OK, RX, SM, SP, S5, TK and 9A. ODX were RX1AS (KO59/2234km), OH7HDU (KP32/2133), IK7UXY (JN90/2092), OH6MAZ (KP21/1964), ES2NA (KO29/1908) and LY2BIL (KO24/1887). Best of all was hearing OH8K (KP55) three times at a distance (QRB) of 2396km but nothing was heard from YM3XC at 2600km.

On 2m Guy Juenkersfeld, DL8EBW, completed with OH8K at 2070km on the 17th using FSK441 mode but it took 141min. Next day they repeated it on HSCW (high-speed CW) in 92min. He completed another nine QSOs on FSK441 that day. His main activity was on the 19th, 0135-1116, during which period he completed another 30 QSOs on SSB, the first being with YM3XC (KN30/1936), and just one on HSCW with UR3EE (KN88/2112). The best reflections were in the 0300-0500 period but he did not notice a predicted second peak in JO31.

Gabriel Sampol Duran, EA6VQ, lists 47 completed 2m QSOs on SSB and four on FSK441 on the 19th in the 0342-0851 period with stations in 38 grids. ODX was LZ1KWT (KN32/1985). He has placed recordings of the SSB signals during the peak on his websites - see the list for the Spanish one.

On 2m Clive O'Hennessy, GM4VVX (IO78), reports that the shower was not good for skeds, with only one out of 14 completed, although random SSB brought 13 QSOs. There were good reflections for over six hours from 2200 on the 18th but by 0430 nearly all pings had disappeared. Reflections were good again for 45min from 1100 on the 19th when he had big pile-ups replying to his CQ MS calls, some lasting over 20s.

Robin Burrows-Ellis, M1DUD (JO02), was QRV on 6m with just 2W QRP and a 5-ele Yagi at 6m AGL. Between 0221 and 0900 on the 19th he completed SSB QSOs with SP2MPO (JO94), OK1FRG (JN79), S59A and S51IV (JN76), SP9UOP (JO90), DK1MAX (JN58), IZ2AAJ (JN45), DL5RBW (JN68), OK1KT (JO70), SP6GZZ (JO81), SP2BDR (JO83) and SM6CMU (JO57), a truly remarkable performance.

From 0752 on 6m on the 19th Ted Collins, G4UPS (IO81), completed with OK1FRG (JO70), ON1DDG (JO21), SM3BIU (JP71), I2WSG* (JN45), OK1KT* (JO70), OZ1DPR (JO45), SM7AED and OZ1BTE (JO65) until fade-out at 1145.

LOCATOR SQUARES TABLE

Starting date: 1-1-1979

Call	50MHz	70MHz	144MHz	430MHz	1296MHz	Total
G4YTL	-	53	529	122	-	704
G1SWH	350	42	240	81	30	743
G8TOK	406	34	140	56	29	665
G3XDY	-	34	251	175	123	583
G3FIJ	278	29	108	51	23	489
G4TIF	509	28	235	112	-	884
G0JHC	1000	26	48	4	-	1078
G4DEZ	606	23	141	62	27	859
G4OUT	-	23	107	-	-	130
G4OBK	425	25	60	4	-	514
G3IMV	835	20	616	125	53	1649
G4FUJ	96	20	25	6	5	152
M5BXB	335	15	160	56	-	566
G0EVT	506	14	309	77	16	922
GU6AJE	338	13	32	-	-	383
G4ZHI	101	10	259	33	-	403
GM4VVX	324	5	132	-	-	461
G0ISW	224	5	88	22	-	339
GM4JJJ	206	3	430	46	-	685
GJ4ICD	780	1	267	121	79	1248
G0FYD	676	1	285	20	-	982
M1DUD	241	1	32	1	-	275
GW7SMV	664	-	211	-	-	875
G8BCG	661	-	-	-	-	661
G0XDI	228	-	254	67	-	549
G8HGN	310	-	168	67	-	545
G7CLY	244	-	248	16	-	508
G7KHF	487	-	18	-	-	505
G6TTL	220	-	133	90	27	470
G1UGH	280	-	130	18	-	428
G1EFL	231	-	67	2	-	300
GW3EJR	289	-	-	-	-	289
G3FPK	30	-	246	-	-	276
G4APJ	176	-	57	24	-	257
GM6MEN	186	-	-	-	-	186
M5PLY	120	-	-	-	-	120
M1DRK	113	-	-	-	-	113
EA7IT	-	-	103	-	-	103
M3VAM	17	-	18	6	-	41
G8RWG	-	-	30	-	-	30

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Band of the month 70MHz. Next deadline is 18 February.

BAND REPORTS

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, (LS), (TW) etc refers to the postcode area and (JO70), for example, is the Maidenhead grid.

50MHz

The RSGB contest on 30 October was a real struggle for M1DUD and Robin only made 10 QSOs. There was deep QSB, signal strengths were low and ODX was ON7TL (JO21). At 2318 on 12 November he heard TF8GX (HP84) calling CQ and worked him at RS57 each way: it was Gudlauger's first QSO on 6m and Robin's 52nd DXCC country.

On 9 November G4UPS worked 3XY7C (IJ39) who faded out at 1628. The 20th brought contacts with XT2WP* (QSL via G4BWP) and XT2DX* (QSL via G3SXW) both in IK92 and C56R* (IK13) QSL via OH3RM. The evening brought an aurora during which Ted worked G4UZN (IO93) but nil heard after 2010. He worked C56R again on SSB and CW on the 26th. On 9 December he contacted SM6CRM* (JO78), G3IMV* (IO91), SP9EVP* (JO90) and OZ5AGJ* (JO56). Beacons heard were SK7SIX, OZ7IGY and OH1SIX in this first winter Es event? He advises that C56JHF does *not* collect QSL cards so don't send any by any route. If you need a card send Henryk an e-mail request to sm0jhf@qsl.net

M1DUD and G7OEC have operated from the East Anglian DX Group's club station GX7VHF (JO01) for two years. It comprises an FT-690, 400W PA with a 6-ele Yagi 17m AGL. During the 4-hour Nordic Activity Contest on 22 October they made 45 QSOs into 19 grids and to seven DXCC countries. ODX were IG9/I0AND (JM65) at 2038km and ZS6WB (KG44) 9039km). At 2138 ZD8MY (IH74/7539) was worked.

From 0922 on 19 November Jim Rabbitts, GM8LFB (IO88), worked SM3BIU (JP73), ES4EQ (KO39), then ES2s JL, QN, NA and CM (KO29), listing these as Es mode. In an aurora next day he contacted GM4UPL, OZ1JXY, OZ1BNN, PE2ENG and M0DDT in the 1832-1934 period, then at 2026 he had an auroral-E QSO with LA5QFA (JQ90). On the 24th at 2028 LA8CGA (JP78) and on the 26th at 2300 TF8GX were two more Au-E contacts. The aurora returned from 2331 and LA6MV (JO59) and LA4LN (JP50) were worked.

70MHz

Derek, G8TOK (JO01), reports loads more stations on FM using ex-PMR Ascom gear. If you want to read about this log on to the website - see the list - and follow the 'Mail' link.

144MHz

On 3 November GM4VVX operated portable for the 6-hour section of the Marconi Memorial CW Contest but tropo conditions were appalling following the previous day's gale. An aurora was detected at 1300 resulting in 16 QSOs with stations in DL, G, LA, and SM but Clive didn't hear a single CQ Contest call. Auroras occurred on the 20th to the 25th and on the 29th, the first resulting in 33 CW QSOs with DL, EI, G, GM, GW, OZ, PA, SM and YL stations: the second brought 14 contacts.

G4ASR was QRV in the 20 November aurora and on CW David worked DL/UT8AL (JO43), SM0KAK (J089) and EI2TAA (IO42) a rather rare grid. He heard LA3BO and YL3AG.

THANKS & DEADLINES

SPECIAL THANKS TO KM Publications for the copy of the Winter edition of *VHF Communications*, to Neil Clarke, G0CAS, for the copy of the October issue of *SunMag* and to Dr Steve Reed, G0AEV, for the September issue of *The Six and Ten Report*.

The deadline for April is **11 February** (a week *earlier* than stated in the January issue) and for May it's **18 March**, when I'll publish the first entries in the 2003 Annual Table, so *please* send in your scores, however modest. My telephone answering and fax machine (though I never get any faxes now!) is on 020 8763 9457 and my CompuServe ID is g3fpk ♦

WWW.

Space Weather News: http://www.spaceweather.com
UKSMG (50.110): http://www.uksmg.org/code.htm
EA6VQ (MS recordings): http://www.vhfdx.net/leonids2002.html
70MHz (Ascom gear): http://www.70mhz.org

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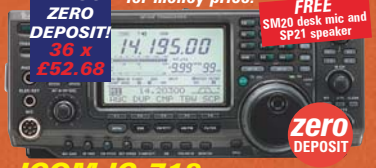

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A REPORT OF the San Marino IARU Region 1 Conference appeared in last month's *RadCom*, summarising many of the decisions taken. One of these decisions has resulted in my appointment as the new Secretary of IARU Region 1, and in writing my first IARU Column for *RadCom*, I want to start by acknowledging the contribution of my predecessor, Tim Hughes, G3GVV. Tim took over as the Secretary of Region 1 after the untimely death of Dr John Allaway, G3FKM, and has held the Secretary role for some five years. Prior to that, Tim had extensive involvement on behalf of the RSGB in IARU matters for many years. The Region owes a debt of gratitude to Tim for his work over this period. It is now my role to carry on that work with the new Executive Committee, elected at San Marino. Also retiring at San Marino were the Chairman of Region 1, Lou van de Nadort, PA0LOU, who had been on the Executive Committee for nearly 30 years, and Wojciech Nietyksza, SP5FM, who has worked tirelessly in many international bodies to represent amateur radio's interests over many years. We all wish Tim, Lou and Wojciech well in their new-found 'retirement'.

In the next few paragraphs I want to provide a little more background to a couple of issues that were the subject of considerable discussion at San Marino.

EMC

IN THE JANUARY *RadCom* report of the Conference, readers will see that PLT was discussed extensively, and that one decision was for IARU Region 1 to become a member of ETSI (The European Telecommunications Standards Institute). This is costly, but is an important step for amateur radio. ETSI currently, in conjunction with CENELEC, is responsible for developing a standard for emission levels from PLT and other cable-borne telecommunications systems. The committee concerned includes cable operators, national administrations and a very few HF radio users (mainly the major broadcasters). Although there have been representatives from amateur radio organisations (including RSGB) in the meetings, none, with the exception of the German society (DARC), has had a voice when it comes to voting. IARU Region 1 membership of ETSI will raise the profile of amateur radio input and give amateur radio a further voice in the proceedings.

Also reviewed at San Marino was the enormous amount of work done over the past year by the Region's EUROCOM Committee, under its Chairman Gaston Bertels, ON4WF. The main items of concern to the EUROCOM WG in the last three years have been in the areas of standardisation. Gaston has kept a watchful eye on the various telecommunications packages coming out of Brussels and through his contacts with relevant MEPs has managed to effect some changes and modifications to the various Directives, which work in favour of the Amateur Service.

The EUROCOM WG has also been involved in the EMF debate, which is set to rumble on for some time. There appears to be a great deal of difference between member states on what limits should be adopted. The majority use the ICNIRP limits as guidance but some countries such as Belgium have adopted much more severe limits. The European Commission, however, considers that if equipment complies with the harmonised standards under the R&TTE Directive then it should be considered safe, with no need for further legislation. Guidelines for the evaluation of amateur radio stations with respect to conformity with RF exposure limits have been produced by IARU Region 1 following the 1999 Lillehammer Conference and these were formally adopted at San Marino.

WRC-03

AT WRC 2003, three items of interest to amateurs will be discussed, and immediately after the San Marino Conference the ITU Conference Preparatory Meeting (CPM) for WRC-03 brought to Geneva for two weeks approximately 1000 participants representing administrations, telecommunications companies and organisations throughout the world. The objective of the CPM was to complete work on an extensive technical report, called the CPM Report, outlining methods of addressing the more than three dozen items that are on the WRC-03 agenda. Among the agenda items of significance to radio amateurs are 1.23, possible realignment of the 7MHz amateur and broadcasting allocations, and 1.7, possible revision of the specific rules for the Amateur and Amateur Satellite Services, including how callsigns are formed.

Agenda item 1.7 is not very controversial. The 7MHz realignment issue, on the other hand, is one of the most difficult issues facing WRC-03. There are three major interests: amateurs, shortwave broadcasters, and users (principally military) of the fixed and mobile services. Amateurs seek a return to the 300kHz allocation that existed world-wide prior to WWII but that now exists only in the Americas. Achieving this would require the fixed and mobile services to make room for broadcasters and the broadcasters to change their operating frequencies.

The draft CPM Report prepared over a period of more than a year identified three methods of realigning the 7MHz amateur and broadcasting bands. The CPM itself added two more, plus a 'no change' option that would simply preserve the status quo. The five options for change all represent improvements in the amateur band, although two fall short of fulfilling the 300kHz world-wide requirement.

Radio amateurs were well represented at the CPM. A three-member IARU team was headed by President Larry Price, W4RA, and included Wojciech Nietyksza, SP5FM, and David Sumner, K1ZZ. Paul Rinaldo, W4RI, of the ARRL staff was a member of the US delegation and was named chairman of the *ad hoc* group that dealt with the substance of the 7MHz text. Several other amateurs were on their national delegations, some of them specifically to represent amateur radio and others in professional capacities.

How WRC-03 will finally decide on the various options for resolving the 7MHz issue is not clear. What is certain is that there will be a great deal of talking between now and June, when WRC-03 gets into full swing. ♦

The new officers of IARU Region 1. Left to right: Andreas Thiemann, HB9JOE, (Treasurer); Ole Garpestad, LA2RR (Chairman); Tafa Diop, 6W1KJ (Vice Chairman); Don Beattie, G3BJ (Secretary).

REPEATERS

MARK LEWIS, GW7KDU
14 Hornbeam Close, St Mellons, Cardiff CF3 0JA. E-mail: rmcwales@ntlworld.com

CONGRATULATIONS to Repeater Management Committee member Colin Dalziel, GM8LBC, who has received an RSGB Special Award. The award was made for Colin's services to the UK Repeater Network over many years. The announcement of the award was made at the Society's AGM in Swansea on 7 December.

GB3HH

RECENTLY THE Buxton 2m repeater, GB3HH, and the two GB3BUX beacons have suffered frequent power disruptions due to building work taking place on the site where the equipment is located. Derek, G4IHO, keeper for the repeater and beacons e-mailed to report that a team of four amateurs installed larger batteries in mid-October 2002. Hopefully this will reduce the down time caused by power disruptions considerably.

GB3NB

MARK, G0LGJ, secretary of the GB3NB repeater group (Norfolk) e-mailed to say that the group hoped to have GB3NB back on the air before Christmas after a site change. Access details are: 145.625MHz with CTCSS 94.8Hz and 1750Hz tone burst. More details can be found on the group's website [1].

PROBLEM SOLVED

THE THAMES Valley Repeater Group (TVRG) has cured a difficult interference problem on GB3BK. Two very strong commercial transmitters located on and near GB3BK's site, are separated by 1.6MHz, at about 10MHz above the 70cm band. When both of these were keyed up at the same time as the repeater, intermodulation produced a weak but steady signal on the repeater input, modulated by all three. This gave a mixture of non-amateur speech, data, and feedback from the repeater's own output signal. It was cured using half a PMR 10MHz split duplexer, set up to pass 70cm and to notch the commercial signals by 60dB+.

LATEST CLEARED REPEATERS

Call	Type	Channel/Frequency	Keeper
GB3AS	Wigton, Cumbria	RV48 145.600 MHz	G4KFN
GB3DN	New 2m Gt Torrington, Devon	RV51 145.6375 MHz	G1BHM
GB3FJ	Site change 70cm Winceby, Lincs	RU76 In: 438.550MHz Out: 430.950MHz	G8LXI
GB3HT	70cm Site change Hinckley	RB11 433.275 MHz	G4ALB
GB3KR	70cm Site change, Kidderminster	RB3 433.075MHz	G8NTU
GB3NB	2m Site change Wymondham, Norfolk	RV50 145.6250 MHz	G8VLL
GB3PL	New 2m East Cornwall	RV61 145.7625 MHz	M5DAP
GB3SH	2m Site change Southampton	RV53 145.6625 MHz	M1AFM
GB3SM	70cm Site change Leek, Staffs	RB13 433.325 MHz	G8DZJ
GB3WD	New 2m Plymouth	RV56 145.700 MHz	G7LUL

Outstanding voice repeater proposals submitted for licensing are:

Callsign	Type	Process Stage	Proposed Keeper
GB3AA	New 23cm Alveston, North of Bristol	RA	G4CJZ
GB3BY	6m Site change Kidderminster	NFAP	G8EPR
GB3DM	New 70cm Dumbarton	RA	MM1APC
GB3DX	New 2m Birmingham	RA	G4KQU
GB3ET	New 70cm Winchester	RA	G8GTZ
GB3IB	New 70cm Wide split Weston-super-Mare	PU	G4SZM
GB3IT	New 70cm Wide split Tamworth	PU	G6NHG
GB3MX	2m Site change Mansfield	RA	G6CUK
GB3RB	New 70cm Wide split Bolsover	RIS	G1SLE
GB3WW	Site change 2m Nant-y-Caws, Nr Carmarthen	RA	GW4FOI

Repeater proposal status as of 15 December 2002. The latest clearance status can be obtained from the RMC website [2]. Please note that even though an application may have cleared, it is beyond the control of the RMC as to when the keeper will bring the repeater into service.

CTCSS ACCESS?

ONE MEMBER OF the Repeater Management Committee recently received a comment from a repeater user concerned about the introduction of CTCSS. He said that while he could manage to whistle 1750Hz at the start of a transmission, he doubted if he could hum 118.8Hz all the way through each over!

ATV REPEATER NEWS

THERE ARE NOW 25 23cm ATV repeaters now licensed or in process of clearing around the UK. Although there is some way to go before 'nation-wide' coverage is achieved, there is a lot of the country that already has access to an ATV repeater. A map of these can be found on the RMC website [2] and also in the 2003 *RSGB Yearbook*. Graham Shirville, G3VZV, RMC ATV Specialist, reports that he hopes to have some Scottish applications as well in the not-too-distant future.

Other bands that have ATV repeaters include 13cm and 3cm. Currently there are three repeaters in the 13cm band with a further three applications currently in the process of clearing. The 3cm band has seven repeaters in operation. The equipment required to operate on these bands can readily be adapted from old analogue satellite dishes with a simple helix feed replacing the original LNB.

The RMC website carries lots of information about these repeaters and you can also listen on 144.750MHz FM, which is the talk-back channel for many of the repeater groups.

Photograph by G4IHO

Left to right: G7EKY, M0AVK, G4MRQ and 2E1AZQ prepare for their trek up the hill with the heavy batteries (see 'GB3HH' above).

CRG NEWSLETTER

TERRY BICKELL, G0UIO, has sent me a copy of the latest Cambridge Repeater Group newsletter. At 44 pages it is certainly much larger than the usual newsletters produced by other groups. Inside there are the minutes of the group's last two AGMs and also details of a design for a 23cm antenna for ATV use. Terry also includes a request to repeater users to be considerate to new Foundation Licensees and asks that more experienced users observe good operating practice so that the newcomers to the hobby can learn. More information on the group can be found on its website [3], together with previous editions of their newsletter.

RMC QUESTIONS / QUERIES

THE RSGB Repeater Management Committee (RMC) meets four times a year (in January, April, July and October). If you wish to have anything discussed in committee regarding amateur repeater use / operation in the UK, please contact your local RMC regional manger. Details are available from RSGB HQ or RMCWeb.

A REQUEST

PLEASE NOTE THAT I am always happy to accept items for publication including news, details of new projects etc. Please e-mail them to the address at the top of the column. ♦

WWW.

[1] GB3NB: www.gb3nb.freeserve.co.uk
[2] RMCWeb: www.coldal.org.uk/rmc
[3] CRG: www.qsl.net/crg

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MARCH 16th 2003

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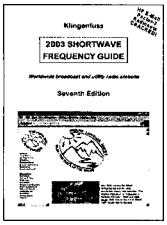

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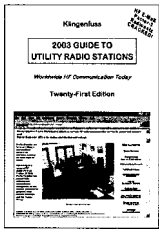

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Newcomers' News

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

A GOOD MIXED BAG of news this month with lots of photos. Please keep your news rolling in, the contributions are always welcome.

YOUNGSTERS STEAL THE SHOW

EVERY YEAR the Trowbridge & District Amateur Radio Club runs a construction challenge for its members. This year the club stalwarts were swept aside by three newcomers who took the top three prizes! The prize-winners are three of four very keen young amateurs.

I am told that Freya Shirley, M3FES, aged 13, is the tidy one. Her other interests include playing the piano and horse riding. Camilla Shirley, M3CGS, aged 11 is the talkative one and, like her older sister, also enjoys horse riding and the piano. Ethan Shirley, M3BVK, is the 'baby' of the gang at 8 years of age. Ethan had only just turned 8 when he did the Foundation exam and, after causing all the others a lot of stress, he walked away with a score of 19 out of 20. Well done Ethan! Last, but not least, comes Peter Robertson, M3BPG, aged 11, who was the first of the group to take the exam. Peter is a *Star Wars* nut and enjoys playing computer games.

Camilla takes up the story: "On our first visit to the local amateur radio club we all entered into the Constructor's Cup. Peter won with his amplifier project, Freya came second with a short-wave receiver and Ethan was placed third with his crystal radio set. Now we are all licensed amateur radio operators and are on the air. Currently we are only on the 2m (144MHz) band until we all get a more substantial radio station".

If you would like to read more about their achievements you can access the full newsletter at www.gb3wr.co.uk/foundation/ I think all readers will join in the congratulations to this very keen band of newcomers.

MORE ON SMALL LOOPS

DAVID BERRY, G4DDW, is no newcomer to amateur radio or to this column but he continues to chip in ideas for those who are just finding their way in the hobby. His latest idea is for a really small loop antenna. David reports that during some experimentation he made a mistake but ended up with an antenna that works well on all bands from 7 to 21MHz.

He now regularly works SM5AEA in Stockholm on 14MHz and has contacted many UK stations on 7MHz using the new antenna. Signal reports are much the same as with his 60m long wire and generally better than his previous attempts at magnetic loops. Quite remarkable for a loop only 40cm in diameter!

David Berry, G4DDW, with his very small loop (see 'More on Small Loops').

The antenna comprises two loops of 20SWG insulated copper wire in parallel and it is fed via a 'roller coaster' inductor with a high voltage 15pF variable capacitor between the other end of the loop and ground. David is in the *RSGB Yearbook* (QTHR) should any readers be interested in learning more.

RAE SOFTWARE UPDATED

THE *QRAE* programme has been around for a while now and my RAE students always find it an excellent aid for their studies. Murray Ward, G3KZB, the author of the software tells us that the latest version is now available from the Internet, www.g3kzb.org or directly from Murray (QTHR) in exchange for a couple of floppy disks.

The changes are mainly presentational, but the interactive features and the links to the *RAE Manual* remain in place and some 25 new questions have been added. Keep up the good work Murray!

FIRST MI3 CALLS FOR ATC

JOHN BRANAGH, GI3YRL, sent in details of the first Foundation course to be held at the 1919 ATC Squadron in Newtownabbey. Five young ladies and nine boys attended the course run by the Carrick Amateur Radio Group and all 14 were successful.

Not only was this the first course at 1919 Squadron but the first at any ATC Squadron in Northern Ireland. It seems that the successes at Newtownabbey have stirred up more interest with requests for courses now coming in from other ATC units. Looks like the instructors Eddie, MI0ALS; John, GI0USX; and John, GI3YRL, are going to have their hands full in 2003! Please keep in touch, if you can find the time. ♦

* *5 Sydenham Buildings, Lower Bristol Road, Bath BA2 3BS; e-mail: newcomers.radcom@rsgb.org.uk*

The podium at the T&DARC (see 'Youngsters Steal the Show').

The first Foundation course at Newtownabbey (see 'First MI3 calls for ATC').

Down To Earth

Improving Language Skills Using Amateur Radio

by Norman Shackley, G0OSX *

Amateur radio is an absolutely ideal medium for improving your school French or German, or for brushing up on your Spanish before your next holiday to the Costas or the Canaries. Yet very few UK amateurs, at least, take advantage of the wonderful opportunities provided by our hobby, relying instead on the overseas amateurs' ability to speak English. Norman Shackley, G0OSX, says "Try something *new* in amateur radio!" and provides a number of ideas based around using your foreign language skills.

THE PAGES of *RadCom* regularly draw readers' attention to both new and different aspects of our multi-faceted hobby. One aspect which has not featured prominently for some time, however, is the use of amateur radio for developing foreign language skills. Recent changes in the licensing rules and the welcome influx of younger M3 Foundation Licensees, many of whom are still pursuing academic studies, make this a good time to reflect on how we might give greater emphasis to this important aspect of the hobby.

As someone who has been a long-standing student of the French language - for more years than I care to remember - I have to say that whenever conventional language students outside amateur radio see the facilities we have for live, on-air language practice, the reaction is often one of disbelief. The opportunity for voice and text contact with foreign nationals who share similar interests to our own is something we frequently undervalue.

Like many other UK Francophile operators, I use 80 and 40m and the lower portion of the 20m SSB segment to make contact with French radio amateurs. The contacts can be mutually advantageous in the sense that the language used can easily be switched according to need. English is used if French amateurs wish to practice their hard-learned vocabulary, and French is used if British operators wish to test their language skills. In practice, the operator with the weaker vocabulary tends to defer quickly and lapse into his or her own language, but this need not always be so. Experience has shown that the simple request to be allowed to continue in the other language will almost certainly be met with patience, courtesy and a genuine willingness to assist.

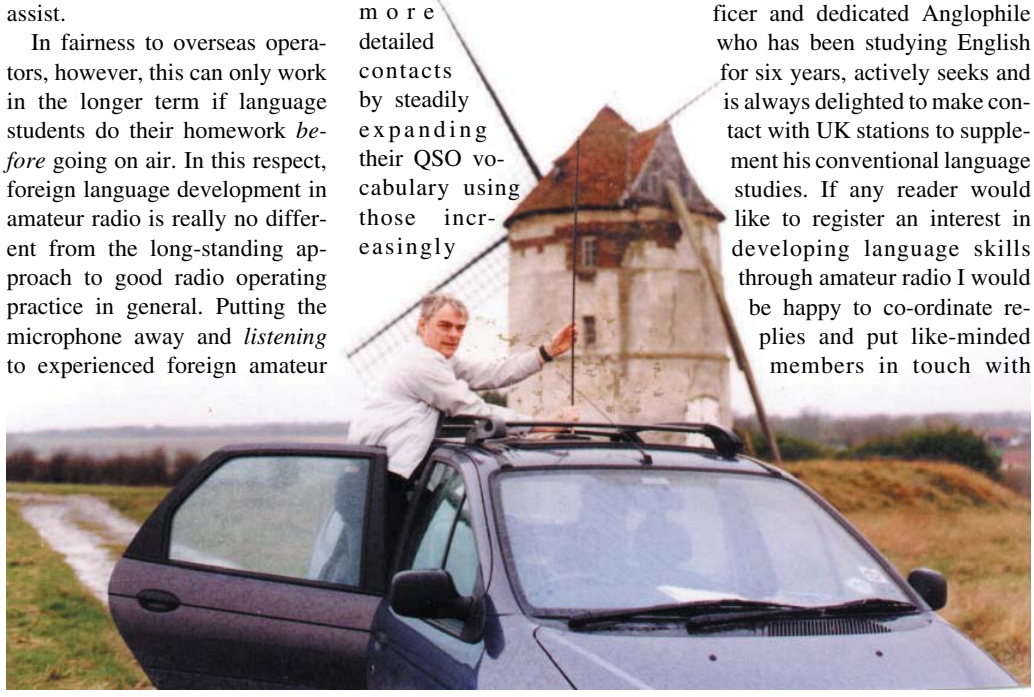
Saint-Jean - a watermill in the hamlet of Polincove in the Pas de Calais, the first mill activated on the day described in the text.

In fairness to overseas operators, however, this can only work in the longer term if language students do their homework *before* going on air. In this respect, foreign language development in amateur radio is really no different from the long-standing approach to good radio operating practice in general. Putting the microphone away and *listening* to experienced foreign amateur operators will frequently ensure better progress than bulldozing one's way into a QSO, ill-prepared and inadequately equipped linguistically for a meaningful two-way exchange of information.

Perhaps a closer parallel to good learning practice is the building-block approach to learning the Morse code - which is itself a language, after all. Many of the good linguists in amateur radio first started foreign language QSOs using the simple, rubber-stamp exchanges. Typically, they then progressed to more detailed contacts by steadily expanding their QSO vocabulary using those increasingly common expressions 'lifted' from the valuable listening sessions mentioned above. If the commitment is there, before too long a facility is developed for dealing with standard radio exchanges and the operator begins to cope with increasing confidence when pushed to the limits of a restricted vocabulary.

Speak to any radio amateur who has scaled the language barrier at whatever level and in whatever language and all will agree on one thing. The satisfaction and pleasure they now gain from the hobby makes all the months and years of effort worthwhile.

At the present time several UK operators are regularly active working stations across the channel. Harry, G0CSS, from Nottingham can be heard most days, as can Ray, G0RKQ, in Scunthorpe. Ray has for many years enjoyed regular QSOs with Patrick, F5RXE, from Castillon-la-Bataille in the Bordeaux region of south west France. On the French side, Henri Lohier, F5MDM, a retired air force officer and dedicated Anglophile who has been studying English for six years, actively seeks and is always delighted to make contact with UK stations to supplement his conventional language studies. If any reader would like to register an interest in developing language skills through amateur radio I would be happy to co-ordinate replies and put like-minded members in touch with



Les Allwood, G3VQO, setting up the 40m mobile antenna on the 4 x 4 by the windmill in the village of Watten.

* *20A Pear Tree Road, Ashford, Middlesex TW15 1PW; e-mail: nshackley@btinternet.com*

WHERE TO LOOK

WHERE CAN YOU FIND foreign-speaking radio amateurs to practise your language skills? The answer is, of course, all over all of the HF bands. But certain nationalities tend to congregate around specific frequencies so specific languages can often be heard in particular parts of the bands, particularly on 20m. Here are a few - if you have details of others, please send them in to *RadCom*.

Français	French	80m (all), 40m (all), 20m 14120 - 14130kHz
Deutsch	German	80m (all), 40m (all), 20m (all)
Ελληνικα	Greek	20m 14285kHz±
Svenska	Swedish	20m 14300 - 14310kHz

each other under the various language groupings.

FRENCH AWARDS PROGRAMMES

FOR ANY English-speaking operator wishing to develop language skills and radio links with French operators directly, the awards programme organised by REF-Union (the French equivalent of the RSGB) offers real opportunities for regular contacts. Awards such as the regional departments award (DDFM - *Le Diplôme des Départements Français de la Metropole*); the French castles award (DFCF - *Le Diplôme des Forts et Chateaux de France*) and the French windmill and watermill award (DMF - *Le Diplôme des Moulins de France*) all provide real operating challenges, combined with the opportunity to improve language skills for those wishing to do so.

In all of these award programmes, the level of French language required for a successful contact can be as simple or as complex as desired. They therefore make an ideal starter-pack for the aspiring linguist.

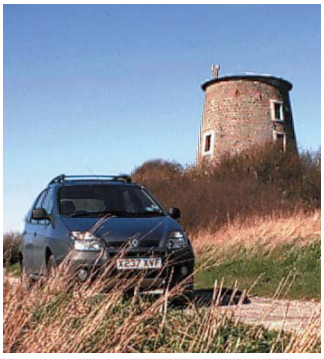
TILTING AT WINDMILLS

MY OWN INTEREST in the DMF award was triggered by Les Allwood, G3VQO, following a 40m contact in May 2002, when he was operating as F/G3VQO/P from a windmill in the Pas de Calais region of northern France. The ensuing QSL and e-mail correspondence spoke of the detailed preparations involved in identifying and locating mills suitable for activation by invading Brits from this side of the channel. I expressed an interest in learning more about the DMF and was quickly invited to join the next trip planned for November 2002. And so it was that I found myself one dark, Saturday morning in Horsham, Sussex, at 0420, shaking hands with G3VQO.

After brief introductions we climbed into a 4 x 4 and set off for Folkestone and the 0630 cross-channel tunnel departure for Calais. We quickly cleared Calais port controls by 0830 French time, and were rolling through the French countryside just 15 minutes later.

The day's activities called for a number of skills, all of which were amply demonstrated by G3VQO: map reading, antenna assembly and adjustment, language skills for operating as well as for seeking route directions as a last resort (some mills were so remote that not even all local residents were aware of their existence). Even natural history knowledge was tested on occasions as we tried to identify the wealth of wildlife observed during the course of the day.

Under the rules of the DMF award programme, the portable station can be located up to 500 metres from the mill. In practice, we were able to set up the station immediately adjacent to the mill in most cases. Les was adept at springing into action and converting the 4 x 4 into a working station within minutes. The equipment used for the project was a Yaesu FT-847, powered by a 110Ah 12V Leisure battery with a variety of HF whip antennas available for connection to a mag-mount on the roof of the vehicle.



Haute Escalles - a rural windmill in the Pas de Calais countryside.

Only five of the planned six mills were activated due to time constraints. In the course of the day we operated mainly on 40m SSB, providing award contacts for predominantly French and Belgian DMF enthusiasts, but with a respectable smattering of UK stations coming in strongly, together with other European callsigns. During the inevitable quiet spells, Les quickly switched to CW and gained a number of rapid Morse contacts including one of particular interest with Sergei Rebrov, M0SDX, the Tottenham Hotspur premier league footballer. Sergei was enjoying a break from premiership football by spending a day on the rig to participate in the Ukraine National CW Contest. The last QSO was logged at 1610, after which we closed down the station and headed back to Calais for the 1730 tunnel departure. We arrived back in Folkestone at 1615 UK time, a return which enabled me to be back home in Ashford, Middlesex, by 1830.

ONE THING LEADS TO ANOTHER . . .

WOULD I CONSIDER doing it again? I certainly would. The benefits of overseas operating in this unusual but very popular award programme are many and varied. I particularly enjoyed the strengthening of links with French operators on their home soil in the true spirit of amateur radio. Being able to operate in the French countryside was most enjoyable, as our surroundings were always pleasant. Perhaps most of all I enjoyed the getting up and about and trying something *different* in amateur radio for a change, a step I had not taken for many years.

Les Allwood, G3VQO, at the mill at Inglinghem.

The reward here was being able to watch a skilled CW operator at close quarters. Les Allwood, G3VQO, belongs to the French UFT (*L'Union Française des Télégraphistes)*, membership of which requires a set number of successful French-language CW contacts with, and nomination by, other UFT operators.

Not unexpectedly, the experience has fired my ambition to follow suit and since my return I have been busy brushing up my CW French-language vocabulary.

Would I want to change anything the next time I go over? I would certainly want to reward myself just a little more for all of those many DMF award contacts issued. I would also like to benefit from the location, once the radios have been safely stowed away, by tucking in to a large meal with lots of good wine, ideally in the company of a few French operators to do our bit for *L'Entente Cordiale*, followed by an overnight stay in a comfortable hotel! ♦

WWW.

DMF (*Diplôme des Moulins de France*): http://f5pez.free.fr/Diplome.htm
DDFM (*Diplôme des Départements Français de la Metropole*): http://www.dxawards.com/DXAwardDir/france-ref.htm
DFCF (*Diplôme des Forts et Chateaux de France*): http://perso.club-internet.fr/f6fna/dfcfa.html
REF-Union (*Réseau des Emetteurs Français*): http://www.ref-union.org
UFT (*Union Française des Télégraphistes*): http://www.uft.net

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VX-1R	£149.00
VX-150	£129.00
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VR-120	£139.00
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TM-V7E	£375.00
TMG-707E	£279.00
TH-D7E	£299.00
THF-7E	£249.00
TH-G71E	£210.00
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PS-53	£229.00
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MC-80	£69.95

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IC-R10	£279.00
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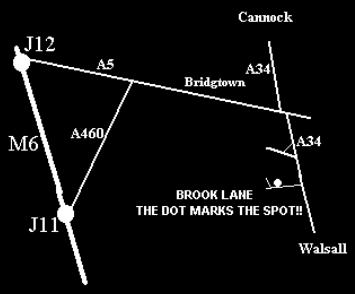

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PIC-A-STAR:

a Software Transmitter And Receiver

*Part seven of the regular series by Peter Rhodes, BSc, G3XJP **

MAKING THE DSP board PCBs and assembling them is this month's specific topic. Before we get to that, and because this series is approaching the half-way point, it is an opportune moment to take some time out for a factual summary - as well as to share a speculative prediction of where this 'project without end' may be going.

SUMMARY

ONE OF THE DELIGHTS of software control is that once you have all the hardware elements, integrating them into a working transceiver is very quick, given the lack of system cabling. See WWW for some websites where you can see pictures of other STAR implementations.

The less-good news is that you do still need hardware to run all this software on; but from now on the constructional pace picks up and you will be lucky to keep up!

A few words on Beta testing, since many have asked. All the engineering diagrams for this project (eg circuit diagrams, PCB artwork etc) as published in *RadCom* are the actual master drawings which several people have used to verify the build. In other words they were neither produced retrospectively, nor were they redrawn for publication.

These drawings are therefore extremely valuable, especially if you are building hardware you may not completely understand (and therefore can't instinctively spot any errors).

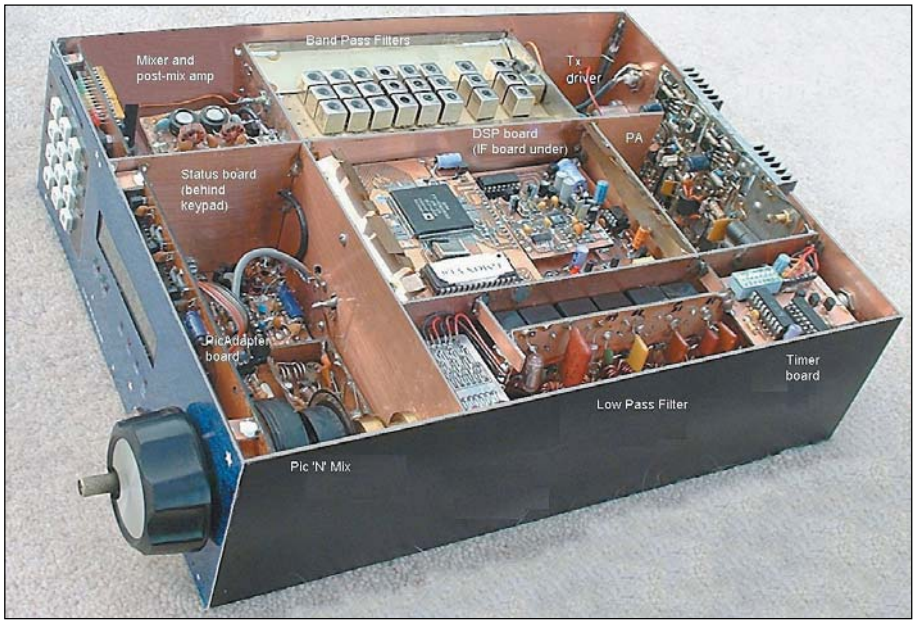
The same principle applies to the software. You can either use mine, supplied and tested, build your own, or migrate over time. The self-education opportunity is obvious.

HARDWARE

This month sees the completion of the DSP board, ie the mother and her two daughters. Subsequent months cover the IF board and its integration with the DSP board; the Status board; and the PicAdapter board. That will complete the hardware covered by the Components List in Part 3.

Following on from there is a 10-band Band-Pass Filter which has just completed Beta test as I write. This uses FST3126 band switches which perform delightfully - and result in a compact layout which befits the scale of the rest of the transceiver. You can see it in the photographs.

A fundamental frequency injection H-mode mixer using home-made transformers is the next development - and a post-mix amplifier. The next phase is a plug-in upgrade for the AD9850 in 'Pic 'N' Mix'. Designs for a stereo audio amplifier and a solid-state T / R switch are also planned. But, long before any of these developments appear, you should have a fully-functional transceiver.



G3XJP's STAR built in a PCB enclosure - shown with all compartment cover-plates removed. The overall dimensions of the case are 310mm deep by 240mm wide by 85mm high. This generous size allows good *in situ* access to all the boards.

SOFTWARE

All the software described in Part 2 is now up, running and available either as code or as ready-programmed plug-and-go chips. It has been rigorously tested before release. See Part 2 for the packaging detail and the release process.

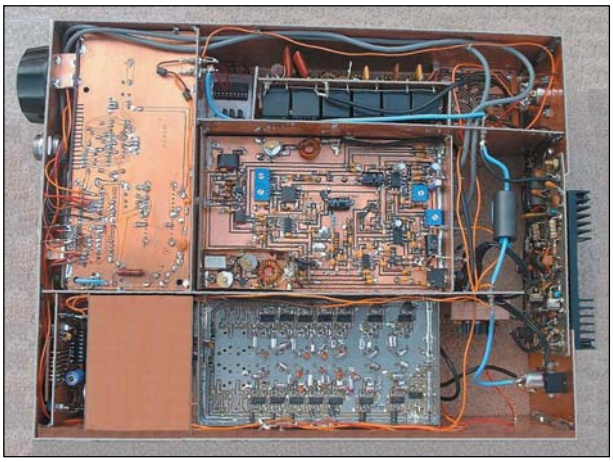
Further development is now under way to allow tailoring of both transmit and receive audio - and the addition of some simple utilities such as a two-tone test generator.

Instructions for building your own DSP filters will also be provided. These plug in as alternatives to mine as required.

DSP CODE DEVELOPMENT

IF YOU WANT to develop your own code, you will need the tools.

My code was developed using Analog Devices' older DOS-based development tools - which used to be supplied with its EZLITE board. These are available from its FTP site - see WWW. Nowadays it supplies its VisualDSP++ environment which has the merit of a 'C' compiler. As an evaluation package, it also has a program memory limit but, at the time of writing, STAR would only use about half this limit. This world can change very quickly, so visit the AD site for the latest information.



The view from underneath, traditionally somewhat less beautiful - so shown smaller.

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

DSP BOARD CONSTRUCTION

ALTHOUGH TARGETED specifically at the STAR DSP board, the technique for mounting the chips is totally general.

There are no special tools required to mount these 'difficult' chips - except a positive attitude. I have heard much moaning about how these chips spell the end of home-brew construction - but it turns out the opposite is true. You can lay these chips down with a minimum of histrionics, and I am indebted to Russ, AA7QU, for the process - which is completely repeatable.

TOOLS

Firstly, the soldering iron. I used an Antex CS series iron (17W) with a 0.1mm tip, filed back from a mere point to a small chisel. Any bit about 1-2mm is fine. The other ingredients are:

- laser film, Farnell 895-945;
- some common solder;
- desolder braid, 2.7mm or less;
- a flux pen, Farnell 891-186;
- jam (home-brew, of course) or tooth-paste.

The latter is for holding the CODEC chip in place long enough to tack its legs down and needs to be home-brew so it is neither runny nor full of seeds. Seriously, any water-soluble non-setting stick is fine.

CONSTRUCTION SEQUENCE

Make all three PCBs first as per **Fig 10** using the iron-on process previously described.

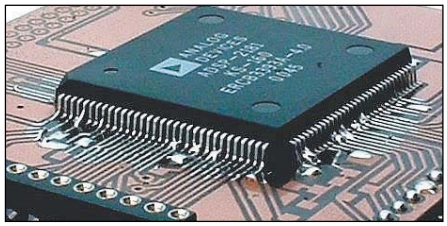
The daughter boards are double-sided but, by design, only just. Under all circumstances, treat these as two-pass single-sided boards. Any attempt to etch both sides in one pass is simply taking unnecessary risks. Do the complex top-side first. If you want to use the artwork for the second side, drill all the holes, register the artwork with pins through those holes and then iron it on. But much easier, just sketch the trivial track and ground-plane in with an indelible pen, joining up the dots. When etching either side, merely spray mask the other.

When you have fully etched a board, absolutely check every track for continuity or shorts, either inter-track or to ground. If you get an open-circuit track the likelihood is that it will merely not work till you find the problem. If you have shorted tracks, however, the likelihood is that you will cook a chip and never find the problem. If you have not used SMD Rs and Cs before, just tack one end down crudely, while holding it in position with a vertical screwdriver. Then solder the other end properly - and then revisit the first end.

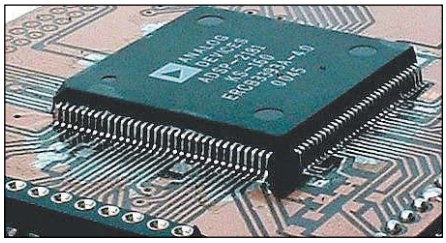
MOTHER BOARD

Build this first, less the daughter board sockets. This board is completely unetched on the reverse (ground-plane) side. The only points to watch are the sockets for IC21 and IC22. Cut all their pins back to the shoulder except the grounded ones, which are soldered both sides. Check that all the obviously grounded areas on the board are indeed continuous and if not, add links through to the ground-plane side.

For the external connections, I simply countersunk the holes on the ground side, soldered stub wires to the pads on the track side - and then applied epoxy resin on the ground side to fabricate instant feed-through insulators.



Processor chip before...



... and after removing excess solder. The target time to mount this 128-pin chip and clean up is 15 minutes.

PROCESSOR BOARD

Fit the inter-side links first. Then check the integrity of the tracking.

IC26 socket comes next. Cut back the pins which solder only to the top track; note that, exceptionally, pins 14 and 28 are soldered *both* sides.

Next the processor chip. Although it has more pins than the CODEC, it is somewhat easier to mount, since the pin spacing is greater and the chip is quite heavy so it is less inclined to skid around. The target time to mount this 128-pin PQFP chip is no more than 15 minutes - or you are doing something wrong!

Line the chip to the pads. Please check the orientation as you only have a 25% chance if you leave it to luck. The good news is that the correct quad-pack chip location on the board is totally unambiguous. Get someone else to hold it down while you roughly tack down a few legs in the middle of each side. It sounds cruel, but trust me, it feels no pain.

Running the iron and solder along each side at the point where the pins meet the track, run in a fillet of solder paying (almost) no attention to bridging the pins or the tracks. The only requirement at this stage is that every pin is indeed soldered to its track. Three minutes elapsed.

Saturate some desolder braid with flux. Rest some fresh braid - over the top of the chip - on the bridged pins. Lightly apply the iron to the braid and, when you see the solder appear on the braid, withdraw. Then repeat as needed. Lay the braid on any bridged tracks - and repeat until all surplus solder has been removed. Do not draw the braid *across* the tracks, only *along* them. Eight minutes elapsed.

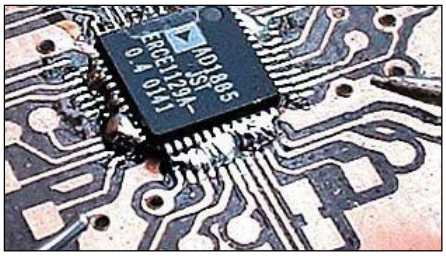
Using a continuity meter, preferably with a 'beep' - and fabricating some probes from sewing needles - check that all bridges have indeed been removed. Finally, wash off any surplus flux under tepid water, and air dry. Job done, seven seconds per pin.

Note that C120 and C121 mount on the pads of X3 on the underside of the board. Use SIL plug strip for both PL7 and PL8 - but use only the minimum population needed for the latter. Ensure the smaller diameter end of the plugs mates with the sockets. For the sockets on the mother board, cut back the pins - except the grounded ones which solder both sides. Fit the connectors dry to both the mother and daughter to ensure alignment - and then solder them to their respective boards.

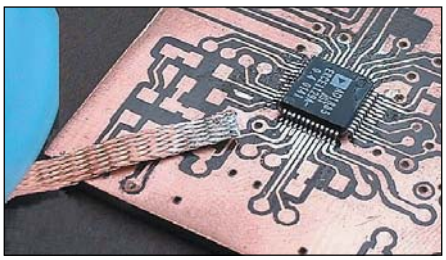
The partial assembly may now be tested. Apply 8-10V power to the mother board and check the voltage rails before and then after fitting IC21 and IC22. Then plug in the Processor daughter and, after power up, D35 should flash at about 1Hz. Pressing the Reset button, S2 should cause a momentary hesitation before the flash resumes. Now run the test program, details of which were provided last month.

CODEC BOARD

Having established that the digital and analogue ground-planes are mutually isolated, fit a wire link via a ferrite bead (FB) to join them. Then mount the CODEC chip as described for the



The CODEC chip before...



... and after desoldering. Don't panic, it works!

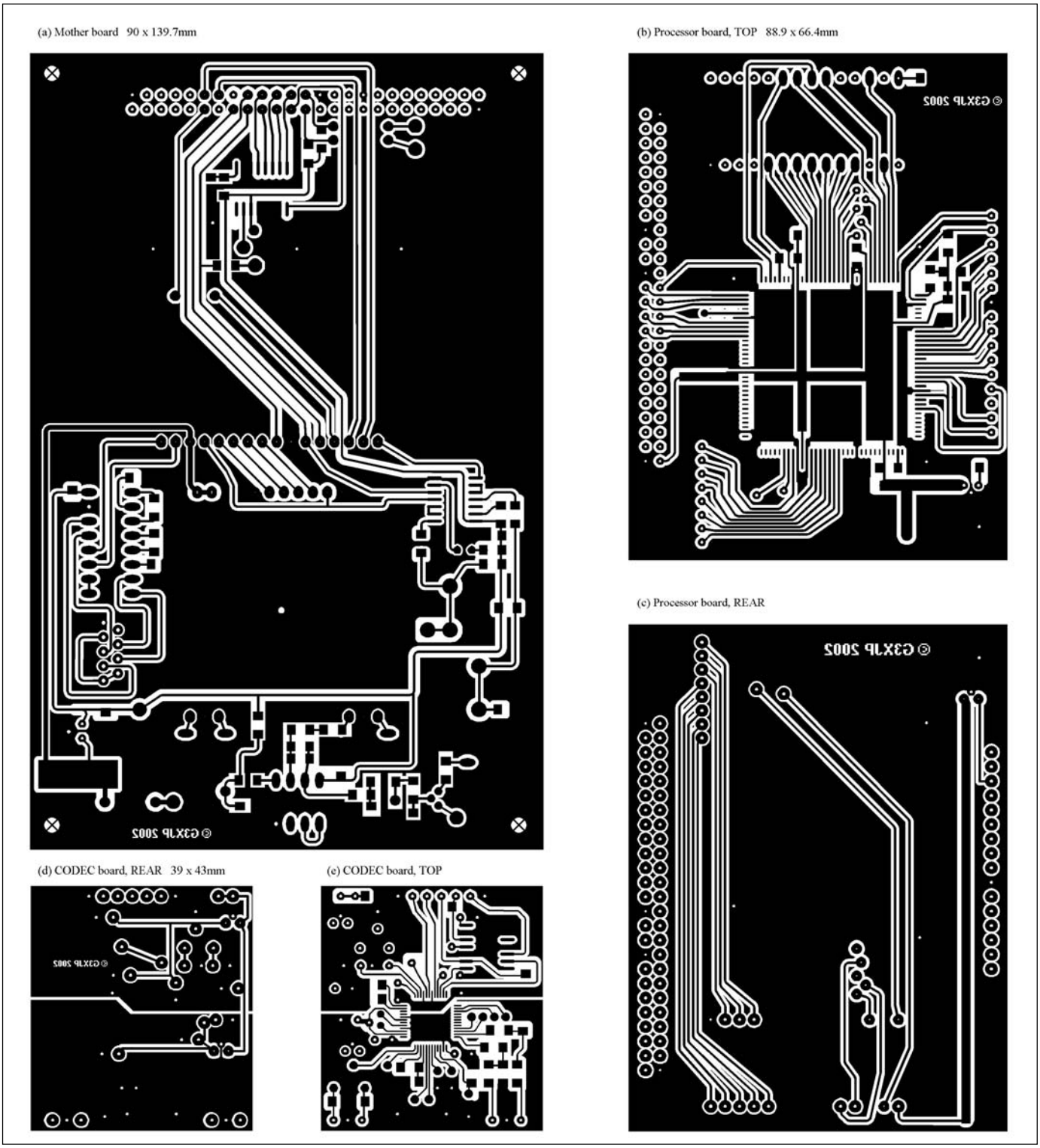


Fig 10: DSP boards PCB artwork. NB all these images are mirrored for direct copying to laser film. Should you wish to use an indelible pen to apply the artwork to the back of the daughter boards, the image needs to be flipped (or simply viewed in a mirror). All holes are 0.7mm.

processor, but in this case, use a *very* small amount of jam to hold the chip in register at first.

Then fit IC20 and C85-C89 and check integrity of ground and power. The other components should be mounted working outward from the chip, leaving the electrolytics till last.

Finally, after *rigorous* checking and probing of every pin and every track (it *must* be right first time), I mounted the daughter to the mother using short lengths of component lead. In the case of the left and right inputs and outputs, their leads pass right through the mother board.

With this approach, should you ever want to remove the daughter subsequently, cut each wire first and then desolder both ends.

The complete board may now be tested by again running the test program, details of which were provided last month. The pleasure and pride of success at this stage is indescribable! ♦

www.

STAR Beta build web sites

www.barville.freeserve.co.uk/star_build.htm

http://homepage.eircom.net/~ei9gq/pex.html

www.w4zcb.com

Analog Devices FTP download

ftp://ftp.analog.com/pub/dsp/21xx/218x/ez-kit-lite/

(You need the two files entitled disk1.zip and disk2.zip)

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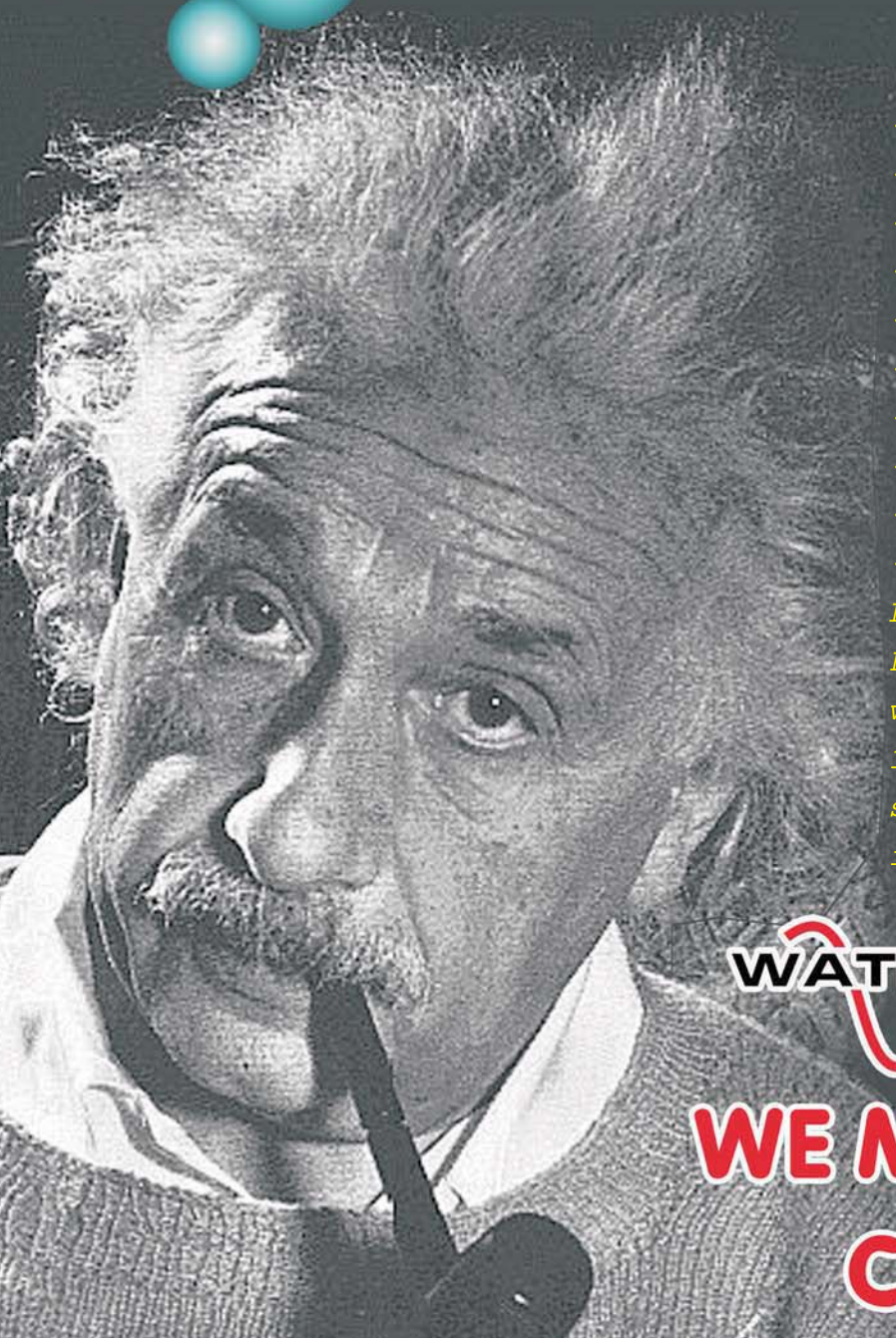

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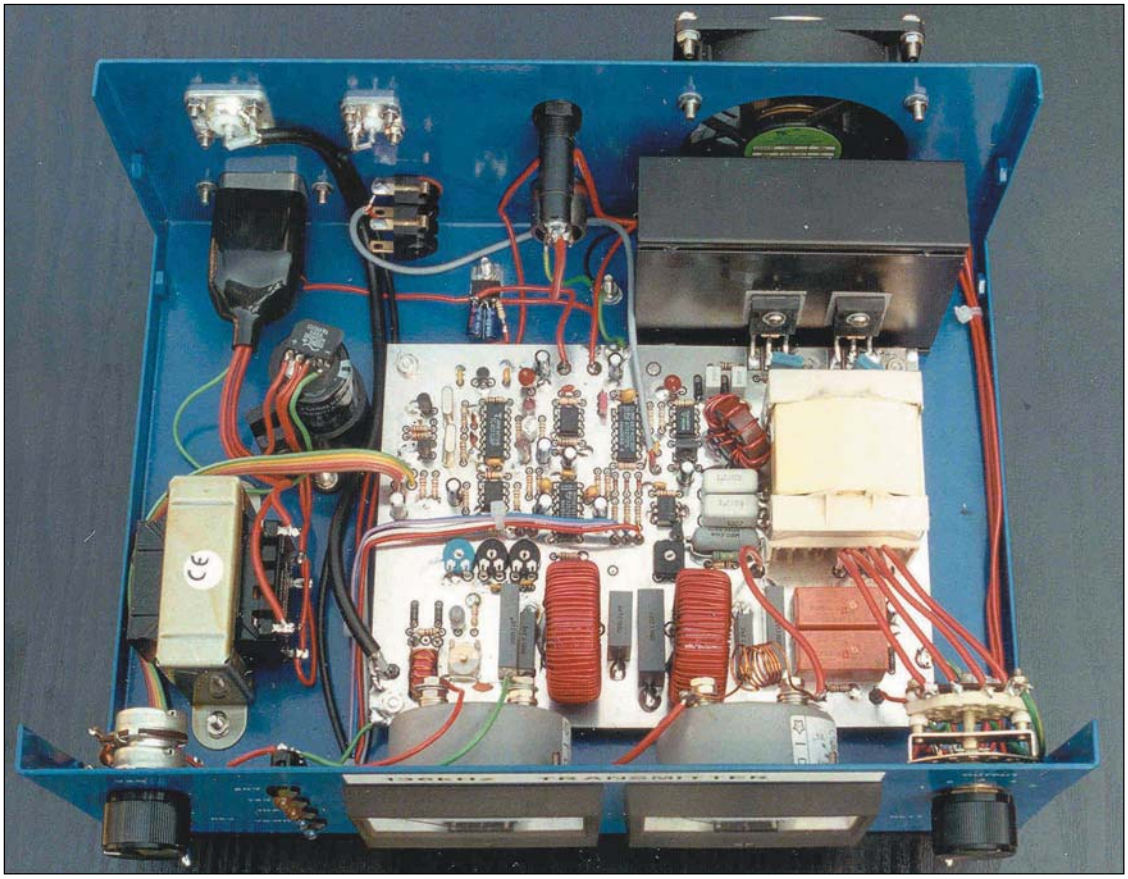
The concluding part of the 300W design by David Bowman, G0MRF *



The inside of the transmitter, showing the disposition of the circuit board and the other components.

TESTING SHOULD follow a logical procedure. Apply DC to the 12V and tuning voltage inputs. Check that the two crystals in the VXO are oscillating by looking for the 8MHz signals at pin 8 and 9 of IC1. With the oscillators running and tuning correctly, you should be able to see 274kHz at pin 6 of IC2 and 136kHz at the (Q) and (not Q) outputs of the 4013.

The range of the VXO at 136kHz will be typically 1.5kHz. While this is not sufficient to cover the entire 2.1kHz allocation, it is possible to adjust the values of C2 and C4 and select which portion of the band you wish to cover. On my prototype, I decided to cover the slow CW (QRSS) portion at the top of the band, down through the CW section to 136.3kHz.

Start by setting all the presets to mid-position and VC1 to 80% mesh. Connect the output to a 50Ω dummy load. At LF, almost any load will suffice, even wire-wound resistors are a good match at 136kHz! Fit a 5A fuse temporarily to the main FET supply and switch on. Select the lowest power tap at six turns. Ground the transmit / receive pin and key the transmitter. If luck is on your side you should see between 50 and 100W output. Don't be tempted to switch to high power at this point. Instead, spend some time checking the other functions at this power level. Measure the efficiency of the amplifier and you should see a value above 70%. Values up to 86% are not uncommon. The power meter should read correctly but, if it reads backwards, this can be corrected by reversing the connections on the directional coupler. With a 50Ω load, the trimmer, VC1, can be adjusted to show zero reflected power. When you are satisfied that the transmitter is operating correctly, replace the fuse with a 15A component, and test at the higher power levels. The total number of turns on the secondary of T2 has been specified as 21. In practice, you may only need to use this number of turns if you are using a supply of around 36V. If you have a higher voltage (around 45V), you will be able to achieve maximum power output using the 18-turn tap.

The final part of the setting-up procedure is to adjust the reflected power and over-current trip points. I suggest that you turn up RV3 to maximum sensitivity and see how it responds. The current trip should be set for 10-11A with a supply of 36V, but if you're using a higher voltage supply, then the trip should be arranged to cut in at 400W DC input. At 45V supply, this equals 8.9A. Preset RV6 provides a fine adjustment of the over-

* *38 Wyndham Crescent, Hounslow, Middx TW4 5HZ.*
E-mail: g0mrf@aol.com

current trip point. Coarse adjustments can be can be made by adding 1Ω 0.5W resistors in parallel with R25.

PRACTICAL ANTENNAS FOR LF

WITH A completed transmitter you're half way there. The only remaining problem is to choose an antenna and find some way of matching it to the transmitter. It's a popular misconception that you need huge antennas to be successful; you don't have to have access to a field and a 130ft tower to get good results. Practical antennas at 136kHz require a little ingenuity and care, but can be constructed with ease.

Three popular antennas are the Marconi T, an inverted-L or a simple vertical. As any choice will be electrically short ,you will need to arrange to resonate the antenna with a loading coil. **Fig 3** shows three possible arrangements: (a) is a loading coil in series with the antenna. Its function relies on the collective losses of the matching components and the earth system being approximately 50Ω; this arrangement has been found to work satisfactorily with simple earth systems and a wire antenna between 30 and 100m long; the arrangement has the advantage of having a high impedance when off resonance, offering extra protection to the transmitter; (b) and (c) show refined versions where a transformer or a tap on the loading coil can match a wide range of

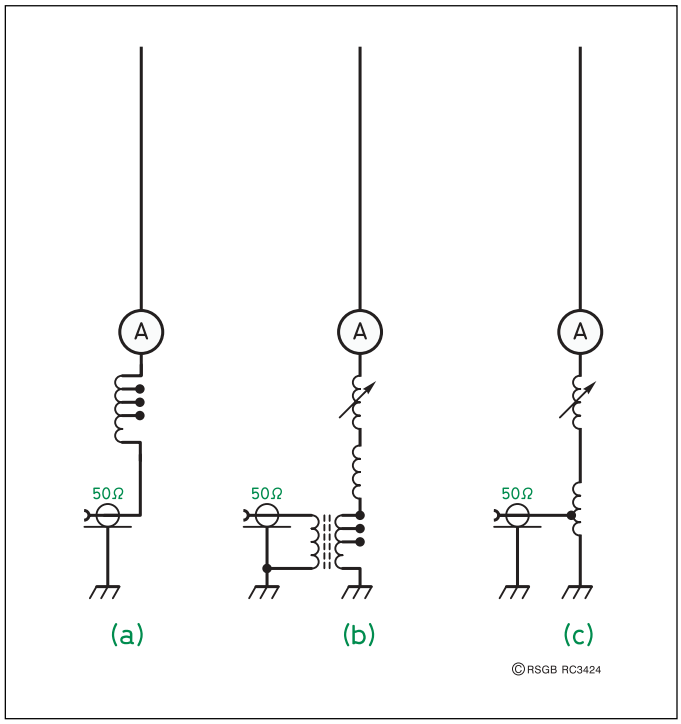


Fig 3: Antenna matching arrangements for LF.

COMPONENTS LIST

Resistors

R1, R2	10M	
R3, R4	22k	
R5, R12, R20, R21, R45	10R	
R6, R7, R31, R42, R43	1k	
R8, R9, R29, R39	10k	
R10, R41, R44	4k7	
R11, R33, R34, R36	12k	
R13	2k2	
R14, R15	680R	
R16	33k	
R17	1k5	
R18	3k9	
R19	150R	
R22	4k7	mounted off board
R23	4k7	mounted off board
R24	47R	
R25	R07	6W, RS Components.
R26		Shunt for 15A FSD
R27	47k	
R28	220k	
R30, R37	2k7	
R32, R35, R46	100k	
R38	5k6	
R40	100R	
RV1, RV2	10k	dual-gang potentiometer
RV3	10k	preset
RV4, RV5, RV6	22k	preset

Capacitors

C1, C3	1n	
C2, C4	33p	
C5, C8, C14, C15	10µ	
C17, C45, C46	10µ	
C6, C7	100n	
C9, C19	47µ	
C10, C11	1n	
C12, C29, C31	470n	electrolytic
C13	15p	
C16	4µ7	tantalum
C18, C32, C41, C42	100n	ceramic 50V
C20, C21	470n	polyester 63V
C22, C24	10n	50V pulse capacitors (polypropylene)
C23	470n	250V polyester
C25, C26	2µ2	100V polyester
C27	1000µ	63V - not on PCB
C28, C30	22µ	tantalum 16V
C33, C38	2n2	1kV polypropylene
C34, C37	10n	1kV polypropylene
C35	4n7	1kV polypropylene
C36	22n	1kV polypropylene
C39	2n2	polystyrene 160V
C40, C43, C44	100n	ceramic 50V

Semiconductors

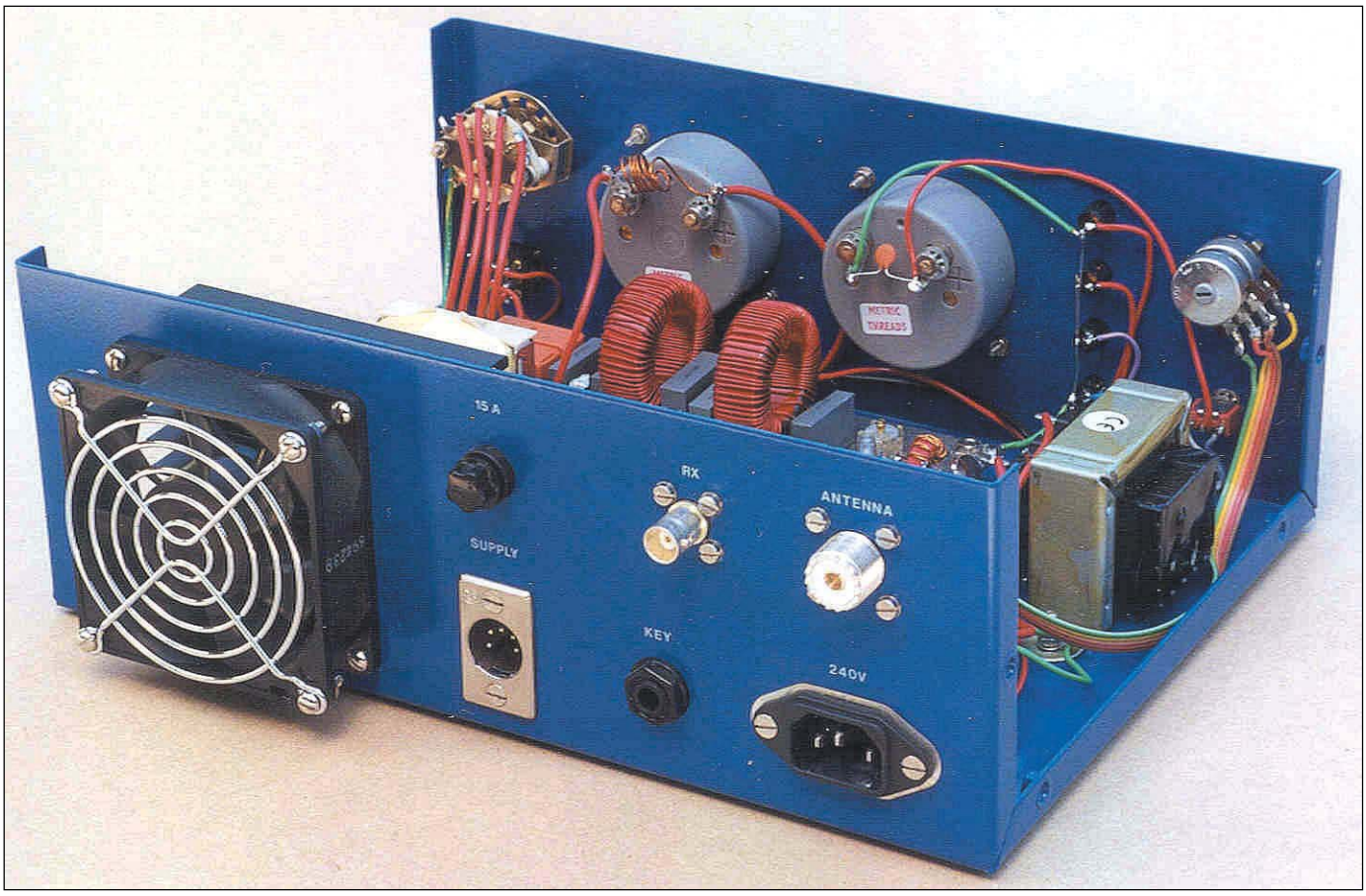
IC1	HEF4011B
IC2	TL071CN
IC3	HEF4013B
IC4	TC4426CPA
IC5	H11L1 Opto-isolator
IC6	HEF4538B
IC7	TL071CN
IC8	78L18AZ
D1, D2, D3	1N4148
D4, D5	MBR150
D6, D7	1N4944
D8, D9	BB405 varicaps
D10	1N4002
TR1	BD136
TR2, TR3	STW34NB20 MOSFET
TR4	2N5401
LED 1, LED 2, LED 3, LED 4	Two green for power: 12V and 40V. Two red ultrabright: VSWR and current trip.

Inductors

L1	470µH 7BA Toko
L2	54µH T157-2 powdered iron toroid. 59 turns of 0.8mm wire.
L3	54µH T157-2 powdered iron toroid. 59 turns of 0.8mm wire.
L4	11 turns 1.5mm on powdered iron toroid T94-2.
T1	Primary: 13 turns 0.4mm bifilar. Secondary: 1 turn (RG58 inner) on 15mm 3C85 ferrite.
T2	42mm 3C90 ferrite toroid Primary: 10 turns 1.5mm CT. Secondary: 21 turns 1mm with taps at 6, 10, 15, 18 turns.

Miscellaneous

X1	8.000 MHz crystal
X2	8.275 MHz crystal, QuartSlab. Fundamental mode, 20pF parallel load
RL1, RL2	12A relay. Single-pole change-over
VC1	5-57pF 809 series PTFE 300V trimmer, Farnell.
M1, M2	1mA FSD meter
S1	Rotary ceramic switch, single-pole 5-way, break-before-make.
S2	Forward / Reverse switch, single-pole 2-way switch.
S3	2-pole, centre-off toggle
Heat sink.	Single-sided 1.2°/W
Isolating washers	TO247
PCB	
Fan	80mm 12V, Farnell / Rapid / RS Components / Maplin, CPC, etc.



Rear view of the transmitter.

impedances. These latter two also have the important safety advantage of having a DC path to earth to discharge static. A thermocouple or RF ammeter can be used to monitor antenna current. Loading coils for LF are big, with a typical value between 1 and 10mH. They should be constructed from insulated wire because, at this power level, enamelled wire will fail as the insulation between turns is insufficient. Resonating the antenna system can be achieved by using a series of taps, or by making a small proportion of the inductance variable by including a variometer.

Finally, a word of caution: an electrically-short antenna will have very high voltages present - 20kV is not uncommon! Many antennas and kites have fallen from the sky at the instant the key is pressed. Use high quality materials, especially for the insulators and ensure that high-voltage sections are safely out of reach of family members and pets.

More information on LF antennas and operating techniques is available [4 - 6].

JOINING IN THE FUN

A GOOD GUIDE to LF reception in the UK is to listen for the German data transmitter, DCF39, on 138.83kHz. With a resonant antenna it should be S9+. The propagation characteristics of LF are broadly similar to topband. During daylight, the ground-wave predominates and, with a few hundred milliwatts ERP, it will be possible to work CW within the UK and into western Europe. At night, ground-wave and ionospheric propagation coexist. Alan Melia, G3NYK, has a website [7] which has a series of graphs showing the signal strength of the Canadian CFH transmitter on 137kHz, as received in the UK, and DCF39 as received in Portugal by CT1DRP. Most activity on the band is at the weekend, with normal CW operation taking place below 137.2kHz.

Finally, if you have a computer with a sound card, you can take part in some very weak-signal working. The upper and lower portions of the band are used for a technique known as QRSS or 'visual CW'. All the long-haul contacts have used this technique. By using either of two programs [8], you can use a computer to analyse the audio from your receiver. The computer uses a fast Fourier transform (FFT) to display very weak signals on the monitor. Speeds are very slow - a CW dot may take several seconds to send, but the technique is valuable, as the ability to turn your computer into a CW filter less than 1Hz wide allows you to see signals clearly that are many dB below the normal noise level.

A kit of parts for this project, or a PCB, is available from the author [5].

ACKNOWLEDGEMENTS

I WOULD LIKE to thank the following members of the LF community for their assistance: Dave Pick, G3YXM, and Peter Dodd, G3LDO, for circuit ideas; Bob, G8RW, André, N4ICK, and Mitch, VE3OT, for beta-testing prototypes; John, G4CNN (SK), for constructing a 400W version and producing the original circuit and component overlay drawings. Photographs by Maurice de Silva, G0WMD.

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[4] Dave Pick, G3YXM
www.wireless.org.uk

[5] G0MRF projects
www.g0mrf.freeserve.co.uk
Tel: 020 8572 8615.

[6] *Low Frequency Experimenter's Handbook*, edited by Peter Dodd, G3LDO (RSGB Shop).

[7] Alan Melia, G3NYK
www.alan.melia.btinternet.co.uk

[8] Two Windows-based programs can be used for weak signal reception. *Argo* or *Spectran* by I2PHD and IK2CZL, are available as freeware
www.weaksignals.com
QRS by ON7YD is used for transmitting slow CW.
All three programs from
www.wireless.org.uk/software.htm ♦

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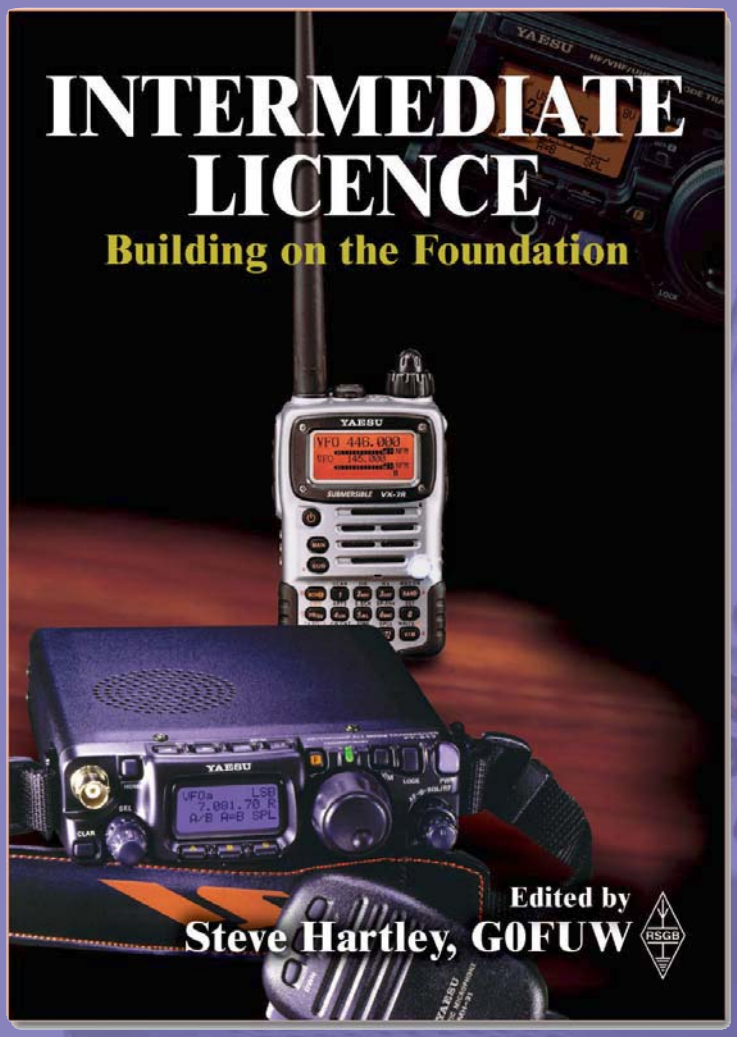

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Technical Topics

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RF SELECTIVITY & DYNAMIC RANGE

RECENT 'TT' ITEMS have noted that the actual performance of many of the factory-built transceivers and receivers has advanced only little in the past quarter-century despite the impressive specifications of dynamic range etc. It has been recognised that the most demanding HF reception conditions apply to the 7MHz band in Europe during the evening, when the number of very strong broadcast transmissions just above 7100kHz appearing at the input of the receiver reach the first mixer with little attenuation. It should be appreciated that the effect of multiple strong signals is additive, and all strong signals can contribute to the intermodulation products, which are sufficiently numerous to appear as 'noise' creating an artificially-high noise floor for the receiver.

Even with the older 'classic' valve receivers with up to three gang-tuned signal-frequency tuned circuits in front of a valve mixer, relatively strong 7MHz broadcast signals will inevitably appear at the mixer input, but the situation is significantly worse for modern receivers, particularly in general coverage receivers with minimum RF filtering. Even good sub-octave or amateur-band-only filters (covering the full American band of 7000 to 7300kHz) will allow through the 7MHz broadcast signals unattenuated. Much the same situation applies, for example, to the 15MHz broadcast signals when receiving the 14MHz band, or the 21.5MHz broadcast signals on 21MHz.

As long ago as July 1981, I attended an IERE Conference on *Radio Receivers and Associated Systems* at Leeds. Peter Chadwick, G3RZP, presented a paper on high-performance integrated circuit mixers including the SL6440, while I talked about the effect of receiver specifications on practical performance. It was at this conference that R A Barrs, the Chief Engineer of Rediffusion Radio Systems (formerly Redifon) gave a paper 'A Reappraisal of HF Receiver Selectivity' (noted in 'TT' October 1982), using an approach that had been pioneered five years earlier by B M Sosin of the Marconi Company. Sosin created the concept of a 'Reception failure factor' based on an analysis of the number and strength of the signals likely to be present at the input of a receiver.

Sosin and Barrs produced amplitude / frequency blocks based on measured spectrum occupancy. Such tables show the number of signals at strengths exceeding 100µV and in bands up to 100mV. Barrs considered three different front-end filtering topologies: no selectivity before the first mixer; sub-octave filters; and a narrow band tuned front-end filter having at least 20dB attenuation outside a bandwidth of ±2.5% and 37.5dB at ±5% off resonance. He found that only the third form of filter with some four gang-tuned resonant circuits with a working *Q* of 30 to 40 resulted in a negligible level of interference arising from intermodulation products. Looked at another way, the more effective the RF filtering, the less critical becomes the strong signal performance of the mixer.

This general approach to assessing HF receiver design was revived recently by Peter Chadwick, G3RZP, in his article 'HF Receiver Dynamic Range: How Much Do We Need?' (*QEX,* May/June 2002, pp 36-40). Using his impressive selection of antennas, he confirmed that at his European rural QTH, the largest signals were those to be found on 7MHz in the 41-metre broadcast band. Over a number of days, at different hours, he measured the number of strong 7MHz signals in three levels: (a) -10 to -20dBm; (b) -20 to -30dBm; and (c) -30 to -40dBm. He also measured the noise level at the various times, varying from -108dBm to some -91dBm when many strong signals were present from about 1700 to about 2100UTC. **Table 1** shows a selection of G3RZP's measurements.

Based on these figures, G3RZP was able to show receiver noise figure (dB), IP3 required (dBm), and dynamic range required (dB), to cope on 7MHz at the various times of the day. A further table showed the phase-noise-limited dynamic range (PNDR) in dB required. Generally speaking, the ILDR was a maximum of +96dB, and the PNDR 100dB: "Generally speaking PNDR was found to be more stringent than the ILDR by up to 11dB". These two tables have been combined and condensed into **Table 2.** It should be appreciated that the figures will be affected by seasonal changes, the state of the ionosphere, and the receiving antennas. Nevertheless. they provide a useful guide.

G3RZP concluded, *inter alia*, "Are our receivers adequate in terms of reciprocal mixing? Phase-noise requirements have become more pressing since the introduction of synthesised equipment… the requirement for good phase-noise performance is shown, on the whole, to exceed the requirement for intermodulation performance, mostly because *all* the unwanted off-tune signals sum directly to degrade performance, even those at lower power levels. Do our receivers have adequate intercept points and ILDR? The answer is apparently 'yes, but only if you move the dynamic range up and down to suit conditions'. A not-too-distant future job at the G3RZP station is to build a finely-variable step attenuator to go in the antenna line to the receiver."

UTC	Noise level (dBm)	Number of strong signals (dBm)		
		-10 / -20	-20 / -30	-30 / -40
0200	-99	1	12	12
0615	-105	0	1	4
1500	-108	0	2	2
1715	-91	5	5	20
1815	-99	2	8	23
2000	-97	3	13	5
2200	-97	1	3	23
2255	-101	2	5	7

Table 1: Measurements for 7MHz selected from G3RZP's Table 1. (*QEX*)

UTC	NL (dBm)	Rx NF (dB)	IP3 required (dBm)	ILDR required (dB)	PNDR required (dB)
0200	-99	31	+32	94	98
0615	-105	25	+20	90	90
1500	-108	22	+21.5	93	86
1715	-91	39	+28	86	94
1815	-99	31	+32	94	99
2000	-97	33	+31	92	98
2200	-97	33	+31	92	94
2255	-101	29	+33	96	100

Table 2: Selected IP3, NF, ILDR and PNDR requirements for 7MHz.

In 1981, Barrs showed that four signal-frequency tuned circuits (microprocessor-controlled from the HF frequency synthesiser, backed up by an RF attenuator, were needed for a professional receiver to cope with the number of strong signals likely to be experienced in practice. His paper was noted in 'TT' October 1982, pp881/82. Barrs's paper was, in effect, promoting a new Rediffusion professional receiver,but it also encouraged Racal to market ancillary high-performance RF microprocessor-tuned, multiple-resonant LC signal-frequency-filtering units for use in front of their receivers. I remember that the late Ron Glaisher, G6LX, strongly advocated the use of additional tuned-circuit filtering in front of even high-performance receivers. Advances in receiver linearity have reduced the need for extreme pre-mixer RF selectivity but it can still provide benefits for many amateur-grade receivers.

VARIABLE CRYSTAL SF FILTER

OVER THE YEARS, it has been noted several times that the practical limit to signal-frequency (SF) selectivity is represented by the use of a crystal filter at the front-end of a receiver, a technique suitable for fixed-tuned single-channel receivers. One of those who have experimented with this approach, mostly on 3.5MHz, is Peter Haylett, G3IPV (see, for example, 'TT, July 1985). He has long decided, from experimental observations, that the best place to achieve selectivity in a receiver is as close to the antenna as possible.

He now writes: "**Fig 1** shows a tunable crystal filter for use between the antenna and a 7MHz receiver front-end. Clearly, putting narrow-band crystal selectivity at the front-end is not practicable where the receiver is required to be tuned over an appreciable frequency range, such as a complete amateur band. But, for specialised purposes, it is possible to use band-pass or tunable crystal filters over a restricted frequency range. The quartz crystal filter shown in Fig 1 can be used up to about 7MHz for narrow bandwidth communications and, for wider modes, such as SSB and AM, above 7MHz.

"The filter tunes over about 6kHz with a bandwidth of about 500Hz. At lower frequencies, the tuning range and bandwidth are reduced. To overcome filter losses, and for best results, the largest possible antenna should be used with filter input and output capacitors set near their minimum value although they may need to be adjusted for different propagation conditions, such as between day and night and summer and winter. When signals are weak, some amplification is needed between filter and receiver, but care should be taken that the amplifier has a low level of internal feedback and is linear.

"The filter can be constructed in an aluminium case 8 x 5 x 3in with SO239 input and output sockets. Crystals should be of high activity and commercial quality. The tuning range will be above the nominal crystal frequencies and has to be found experimentally, as it varies with input and output adjustments and how many crystals are used in the filter."

While G3IPJ's approach would certainly provide a high degree of pre-mixer selectivity, I must admit that I feel there are limitations both in application and (if multiple high-grade crystals have to be purchased for a specific frequency) in cost. The most obvious application would be for use at a QRP calling frequency in conjunction with a direct-conversion receiver. Nevertheless, there is no doubt that the use of signal-frequency crystal filters is a valid concept. A general outline of this approach is given in the July 1985 'TT' (see also *Technical Topics Scrapbook 1985-89,* pp39/40). The concept first came to my notice as a result of an article by Stuart Meyer, W2GHK, 'Front-End Crystal Filters For Amateur Radio Use' (*Interadio, 4U1ITU Calling, 1965*), where he drew attention to the use, at 4U1ITU, Geneva, of a series of filters supplied by Hammarlund to facilitate the simultaneous use of several transmitters. Typically, one of these special band-pass filters permitted reception over a 30kHz (±15kHz) segment of the 14MHz band, while providing 80dB attenuation off-tune. This range of filters had a nose bandwidth of about 15kHz at 7MHz and 7.5kHz at 3.5MHz. W2GHK reported in 1965 that filters for 21 and 28MHz presented considerable technical problems due to spurious responses etc. Clearly, the prime application for such filters was for overcoming the severe problems experienced on naval vessels where a number of transmitters are located in close proximity.

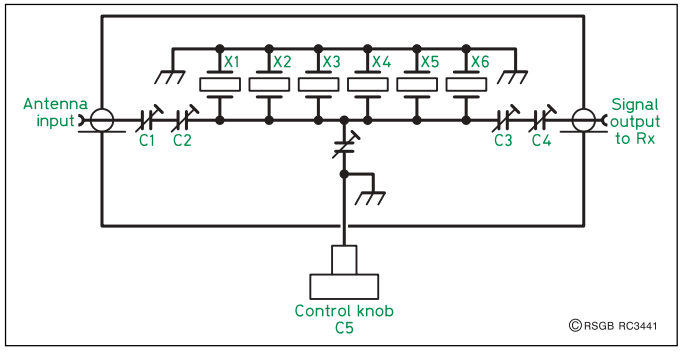


Fig 1: G3IPV's tunable signal-frequency crystal filter. C1 to C4 input and output coupling capacitors, small vane type 0-20pF. X1 to X6, HC6U 7020kHz quartz crystals, calibrated for series resonance. C5 filter tuning control 75pF, 0.25in shaft plus 3in knob. All components mounted on stand-off 1-inch high insulators where necessary.

HI-Z FROM LOW-Z MICROPHONE

A COMMON NEED is to obtain a high-impedance output from a low-impedance microphone without having a suitable (rare) step-up transformer or external battery. Roger Davis, ZS1J, provides an ingenious solution to this problem in the June 2000 issue of *Radio-ZS,* p7: **Fig 2.**

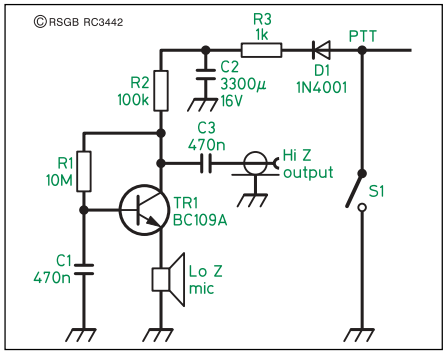


Fig 2: ZS1J's method of using a low-impedance microphone insert to provide a high-Z output with the impedance transforming transistor powered from a high-value capacitor charged from the PTT line of the transceiver.

This uses a common-base bipolar transistor amplifier to change the impedance which can be readily built into a microphone case, and then to use the voltage present on the push-to-talk (PTT) wire. This frequently carries a voltage somewhere between 6 to 12VDC, but which is grounded to earth during the time the transceiver is switched to transmit, precisely the time when you need to power the transistor amplifier.

ZS1J found the solution was to use the PTT voltage to charge up a high-value electrolytic capacitor (C2), and then to use this charge to supply the transistor while transmitting. By inserting a blocking diode (eg a 1N4001 silicon diode) before the 1kΩ resistor (R3) used to charge up C2, it will not discharge through R3 when the PTT line is grounded.

ZS1J designed the BC109A circuit to have very high output impedance as well as drawing an absolute minimum of current from C2. In practice, the circuit shown draws about 60µA using a 100kΩ

resistor in the collector and a 10MΩ resistor for the base bias. These values were selected for the BC109A transistor with a current gain of about 120.

ZS1J tested the system on his old FT-101. C2 charged up to 12V. With C2 a 3300µF, 16V electrolytic, the amplifier continued to function for some 25 minutes before C2 had been drained of most of its charge. Even supposing you ever need a longer transmit period than this, a momentary release of the PTT switch will recharge C2 back to full voltage, thus providing a further 25-minute 'over'.

NORWAY & STEAM CHARGERS

'TT' DECEMBER 1996 (see *TTS 1995-1996,* p131) drew upon SOE records at the Public Records Office to relate some aspects of the remarkable story of the wartime 'Antrim' operations near Ålesund in German-occupied Norway. Two brothers, Knut and Karl Johan Åsaether, each landed in Norway several times from the secret 'Shetland bus' service of converted Norwegian fishing vessels with their own crews (operated jointly by SIS/SOE). For various periods, each operated a secret radio (initially a B-1 and subsequently a B-2 transmitter-receiver) cunningly concealed in a farmhouse. The antenna was built into the wall of the house. The B-2 was in the basement where a large heavy cupboard could be moved by pressing a button to reveal a safe containing genuine documents. By crawling into the safe and opening its back, access could be obtained to a strong room where the B-2 was installed together with an electric light, electric fire, electric fan and ventilators, with all batteries and charging equipment in the corner. This, and a second station, were successfully operated over long periods from 1942 to 1945 in touch with the SOE Home Station in the UK. For a fuller account of these unusually well-conducted clandestine radio operations see 'TT' or *TTS*, December, 1996.

I was so struck by the sheer ingenuity and skill of the operation that I wrote: "It would be interesting to learn from any Norwegian reader whether either of the remarkable Åsaether brothers have ever, before or after the war, held amateur licences".

For almost six years my question remained unanswered. But then, in November 2002, a letter written by Norleif Bjørneseth, LA9FG, of Volda, Norway reached me via Rob Mannion, G3XFD, Editor of *Practical Wireless* to which LA9FG subscribes.

To quote edited extracts: "About a year ago I bought the *TT Scrapbooks* and in the 1995-1999 volume I found an interesting account of clandestine-radio activity from this area during WWII. Pat questioned whether the two brothers had ever held amateur licences, but I do not know if he received any answers. I can add further information.

"In November 2001, I attended a lecture by the famous Joachim Ronneberg (81), who was the leader of the sabotage attack against the Rjukan (Vemork) heavy water plant [one of most successful sabotage operations of WWII and featured in the film *Heroes of Telemark - G3VA*]. Ronneberg in his lecture talked about his youthful life before the war in the Tafjord mountains, a little east of Ålesund. He also described how, towards the end of the war, he and two other men from Ålesund were dropped from aircraft in the Tafjord mountains.

"He explained that there had been some difficulty in finding a night with suitable weather for a parachuting but finally the three landed safely with all their equipment. Their main mission was to blow up the railway line from Åndalsnes [east of Ålesund down towards Oslo]. He told us that the radio link with the SOE Home Station in the UK worked well. I asked him the name of his radio-operator and he replied 'Olav Åsaether' and that he was still living in Ålesund.

"I dropped a note to Olav and asked if he would be willing to see me. Although it is only 80km from my home to Ålesund, I was not able to visit him until yesterday (15 November) taking with me a wartime 'Sweetheart' radio receiver, headphones and a Morse key to enable me to take some appropriate photographs.

"Olav Åsaether is now 85 years old, living alone in his home. He told me that he was the brother of Karl Johan and Knut, both now silent keys. He pointed out a mistake in the 1996 'TT' explaining that it was Knut and not Karl Johan who was the eldest [presumably Olav was the youngest of this remarkable and almost certainly unique trio of brothers, all of whom were clandestine radio agents in WWII].

"He admitted that none of them had had any interest in radio operating before the war, and none had continued with it afterwards. Post-war, Olav had studied chemical engineering in Trondheim and had worked in Sandefjord as a civil engineer at Anders Jahre's chemical factories.

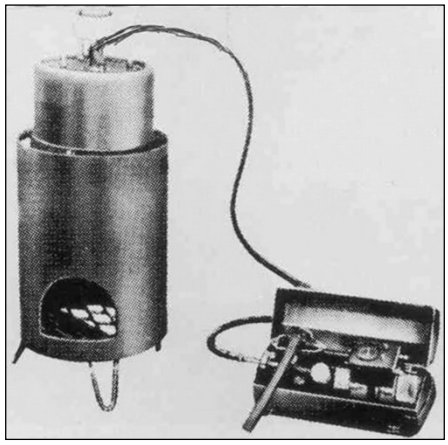
"During WWII, he had trained in the UK at a Services' radio school in Edinburgh, and was then stationed at an anti-submarine base near Reykjavik, Iceland as a radio operator on a Northrop aircraft. Later he received further [SOE?] radio training as a clandestine operator for the Norwegian 'Company Linge' underground army, and then joined the mission led by Joachim Ronneberg.

"Although Olav Åsaether has a clear brain (still driving his car), many details of his covert radio activities have faded from his memory, and he could not give me any details of frequencies, CW speed, etc. But he told me that the generator [charger] was driven by either a vapour- [steam-] engine or as a hand-generator. It was a terrific job to turn it by hand since the rotation speed needed to be high."

The 'Sweetheart' (SOE Type 31/1) three-valve miniature battery receiver (regenerative detector, two AF stages using three 1T4 valves, covering about 6-12MHz) was designed in the UK by the Norwegian radio-engineer Willy Simonsen, and manufactured by Hale Electric (see detailed article by Erling Langemyr, LA3BI, *Radio Bygones,* Issue 29, June/July 1994, pp32/33). It used 30V HT and 4.5V (series) LT, and has been claimed as the smallest receiver, consuming the least power, produced in quantity during WWII. The deaf-aid type Rochelle crystal headphone could not be flown above 15,000ft unless hermetically sealed; for transport it was packed in an hermetically-sealed tobacco tin.

ALCO PORTABLE STEAM CHARGERS

When very young, one of my cherished toys was a small steam engine with vertical boiler heated by a methylated spirits burner. I soon acquired as an accessory a small dynamo that, when (occasionally) all went well, could just



The 1944 Alco portable steam-generating set designed to be packaged in a standard parachute container. When packed, it occupied a total space of 14in diameter by 18in high. It was suitable for charging 6V vehicle batteries at 4A with wood fuel, and was one of several designs developed for use in Europe and in Malaya by both SIS and SOE.

(Source: *The Model Engineer* via PA0SE)

about power a small torch bulb. The boiler soon developed a leak that never responded well to soldering. The experience left me blithely unaware that model steam engines would, in WWII, prove a useful means of recharging the vehicle batteries used by clandestine radio agents such as Olav Åsaether.

Some time ago, Dick Rollema, PA0SE, sent me photocopies of a series of articles 'A Model at War', by Dave Lommos (*Model Engineer,* 19 January, 16 February, 16 March and 20 April 1990) describing the Alco 'Firefly' steam-powered battery chargers developed by Arthur Lyon & Co Ltd. These used the Stuart Turner 'Sirius' engine as a prime mover. The 1944 'Firefly' model, which could be dropped in a standard parachute container, included a boiler with lid and fittings, weighing 35lb, a furnace with two spare firebars weighing 25lb, and a generating set (type 37/1 which could be either driven by the steam engine or as a hand generator) weighing 30lb. The total weight was some 90lb (slightly heavier than an AR88 receiver). For transport, the generator packed inside the boiler, the boiler fitted inside the furnace, making a total size, when packed, of 14in diameter by 18in high.

The prime advantage for agents in the field was the much quieter running of the steam engine than, for example, an Onan petrol-electric AC generator or a Tiny Tim p-e DC battery charger (both of which were used by Whaddon). A further advantage was that wood sticks or blocks together with water were normally readily available in Europe and Malaya where the Firefly was also used. With care, the fire could be made virtually smoke free, the glow was shielded and the engine was near silent running. Water consumption was about one gallon per hour. The Firefly provided a DC output of 4A at 6 to 8V. Some care was needed to keep the machinery clean and in good running order. The photograph to the left shows an Arthur Lyon wartime catalogue illustration. The designer of the original Firefly was Ian Bradley who, at the time, was manager of the company – well known in the world of model making.

The 'Sirius' steam engine (cutaway view in the photograph, right) made by Stuart Turner (now Stuart Models Ltd) had been designed before the war to power fast flash-steam hydroplane models. David Lammas wrote in 1990: "Drawings and castings for this engine are still available from the company. Bevel gears take the drive from the crankshaft to the small vertical crank at one end of the cylinder block to reciprocate a piston valve within the cylinder head. Even at the low steam pressure of 30psi, the engine developed ample power to run the dynamo with the throttle valve only partly open, as it is a very efficient engine."

'BLUE TRAIN' & THE 'GOLDEN ARROWS'

It is interesting to compare the lonely clandestine operator, with about 5W or so to a random length, throw-out antenna, struggling to pass cipher traffic at about 15WPM with the massive mobile units used during WWII to send 'press' and military traffic at about 80WPM using automatic high-speed Morse.

Brian Bower, G3COJ, has sent along an article from a Cable & Wireless house journal by Bill Newby, a former wireless and keyboard operator in the Royal Signals in North Africa in 1943. 'Blue Train' was a mobile telegraph station in use during the North African campaign. The article describes how the 'Blue Train' unit was assembled to handle press traffic. It was so named because its length on the road was near that of a train. In front were two large semi-articulated units, each 30ft long, 8ft wide and 12ft 6in high, hauled by a Bedford tractor and followed by two 'three-tonners' carrying spares, supplies of tape, duplicating paper for the slip readers, tents, catering equipment and each towing a 27kVA Lister Mawdsley generator on a two-wheeled trailer. All this was followed by a pick-up truck for the CO. The Royal Signals 'Golden Arrow' units followed similar lines and were used in North Africa, Italy and during the Normandy campaign, etc.

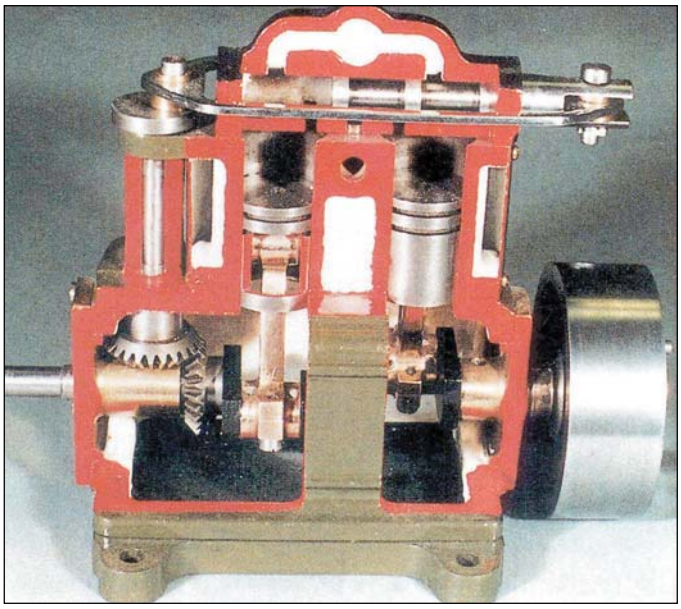
The transmitter was a Marconi SWAB8 (output some 10kW) and the receiving / operating van carried two Marconi CR100 receivers, recording bridges and undulators which played out the incoming Morse signals as a wavy line on paper tape ('slip'). The slip was read by two operators seated at a bench across the front of the van. GNT mechanical units could transmit perforated paper tape at up to 150WPM. The dipole antenna masts were erected to a height of 72ft for the receiver and 90ft for the transmitter.

The complement for the Golden Arrow units comprised 23 men - 12 operators 'wireless and keyboard', five drivers (one a trained mechanic), two electricians, one instrument mechanic, one cook, one admin sergeant and one officer commanding. Just as well these monster units were not required to operate behind the lines as clandestine units!

HERE & THERE

AN ILFORD member, D Kaye, feels strongly about the future EU ban on lead-based solder ('TT' October, 2002, p62). He agrees that the ingestion of lead is dangerous and is said to cause loss of intelligence. He would not recommend a lead-based paint where a child could eat or suck it. But he points out "lead has been in use for thousands of years, yet we are now approaching a lead-in-solder ban. *Why? Why?*" My understanding is that the enormous amount of discarded electronic material currently being deposited in landfill sites, from where the lead can leach into water supplies is creating a hazard that has not previously existed. But I would agree that with the present amount of home-soldering of radio equipment, the only real hazard comes from the flux which in unventilated conditions can provoke asthma attacks.

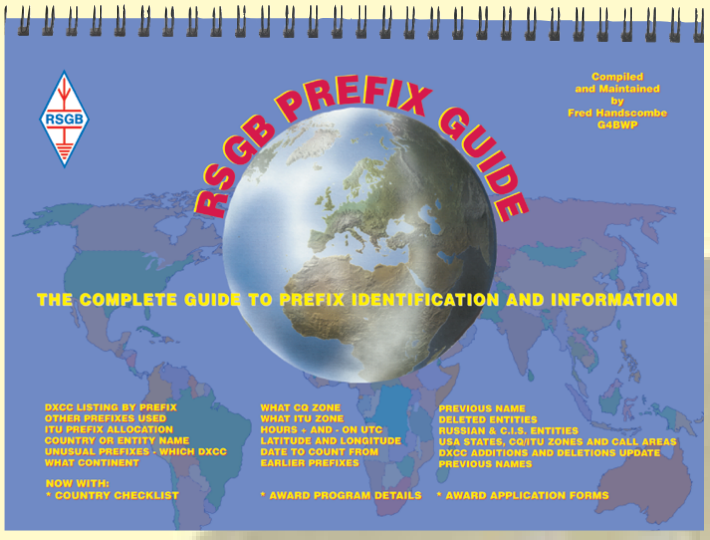
ROBERT E BAIRD, W9NN, of Plover, Wisconsin, "possibly the longest-licensed amateur in the USA", died last August at the age of 96. He was first licensed as a youngster in 1920 as 8BTI in Ohio and was later engineering supervisor at a Chicago radio station. He was active on 7MHz CW until shortly before his death. ♦



Sectioned view of the miniature Stuart 'Sirius' model steam engine originally developed pre-war for powering model hydrocraft. (Source: *The Model Engineer* via PA0SE)

RSGB - TWO OF THE BEST

RSGB PREFIX GUIDE



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WHATEVER NEXT

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

THE FREE MANUALS topic rumbles on, although I think it nears its end for now. Ian Wilson, GM1XOG, wrote recently to let me know about a comprehensive Internet source. He says "I have been using www.mods.dk website for quite some time now. On this site you will mostly find modifications for the various radios, but also copies of the manuals and, if you are lucky, the workshop manuals. These are primarily in PDF format, but with a few in DJVU style. It may be of use to you and the readers." I'm sure it will be. Meanwhile, Steve Wyatt, G6AQC, sent me the URL of a web site that could be useful to the owners of Shure microphones (see WWW.). It contains details of specifications, part numbers, etc. Thanks to both of you.

DIGITAL PENS

ISN'T IT STRANGE how, just when you think that the world is moving inexorably away from a particular type of communication, someone comes along with a new slant on the traditional method? The communication method I refer to is the hand-written word, which may not have been usurped in recent times, but has definitely been undermined somewhat by the computer keyboard. Wouldn't it be nice if you could write a message *on paper, using a pen*, then fax, SMS or e-mail it directly?

The problem with simple graphics is similar. Those of you with artistic or drawing office skills will know just how quick and effective a sketch can be. Equally, those of you who use graphics packages will know only too well that it isn't particularly quick to create a drawing, even when you know how to use the software properly. Wouldn't it be nice if you could sketch a design *on paper, using a pen*, then fax, picture-message or e-mail an accurate rendition of it?

These are the problems that have now been addressed by Anoto. Its so-called Digital Ink Pen (pictured below, left) works like any other ballpoint pen, you place the tip on a sheet of paper and write or draw with it, but this pen contains an interesting feature - the ability to store and wirelessly transmit what you have written.

Needless to say, there is some interesting technology behind this process. The pen contains a tiny camera that 'takes pictures' of your writing at the amazing rate of 70 frames per second. It doesn't actually photograph what you are writing, it uses a special grid on the paper to recognise when the tip of the pen is in contact with the paper and whereabouts it is. Thus it is possible for your sketch or handwriting to be stored *in the pen*. **Fig 1** shows a block diagram of the pen and samples of Anoto forms are shown in this photo. The paper is covered with a fine grid and a unique combination of tiny dots, which appear to the naked eye as slightly darker than the background colour of the paper. Each dot is either above, below, left or right of a grid intersection, the spacing between grid lines being 0.3mm. This gives a graphic capability of about 86dpi – not fantastic, but perfectly good for the purpose. A minute portion of the pattern uniquely defines the position of the pen, relative to the total pattern. As you make strokes with the pen (in any order and in any direction), the camera sees the dots, the processor de-skews the image (no-one holds a pen perpendicular to paper) and builds-up an image in the pen's memory. The pen has the capacity to store several 'pages', which can be retrieved and transmitted at any time using Bluetooth (nominal range, 30ft) to a suitably-equipped PC or cellphone.

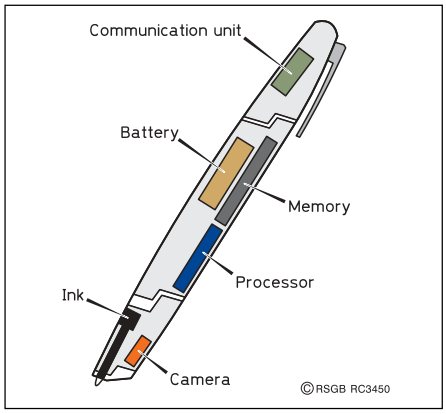
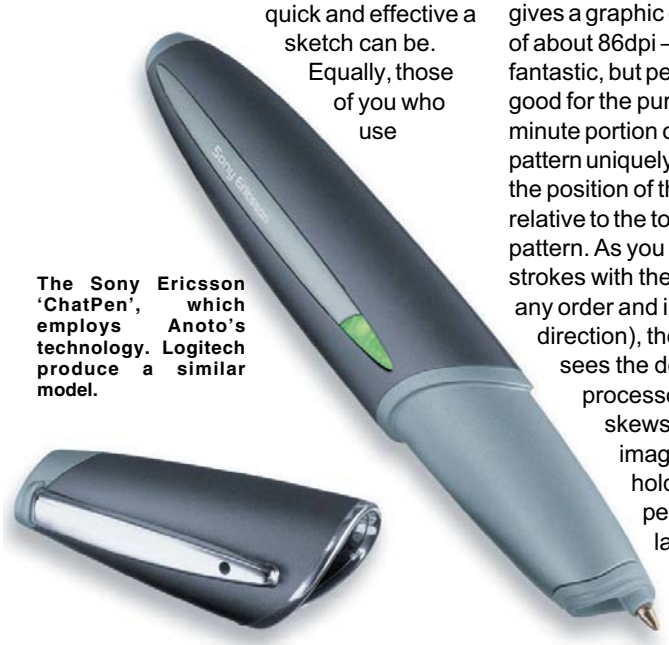


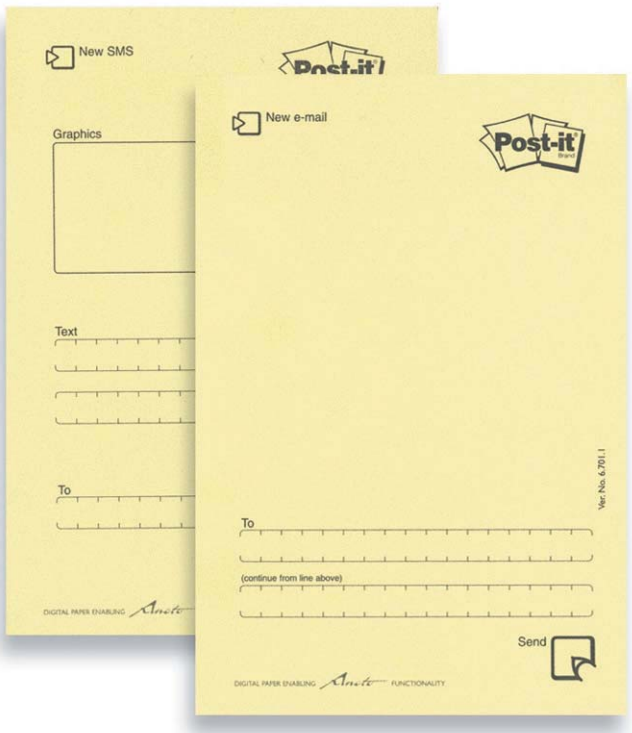
Fig 1: Block layout of the Digital Ink Pen developed by Anoto.

CYBERDRIVERS

FOLLOWERS OF Formula 1 racing know just how competitive it is. The stakes and the rewards are so high that anything - even the smallest thing - that can give an



The Sony Ericsson 'ChatPen', which employs Anoto's technology. Logitech produce a similar model.



These digital Post-it® notes are covered with the grid and unique pattern of dots that enable Anoto functionality. Certain areas can be reserved for calendars, notebooks, titles, e-mail addresses, 'send' and other buttons, etc.

Smaller than the ribbon cable to which it is mounted, is the Kopin CyberDisplay. Ralf Schumacher could be looking at one of these in his helmet as early as this year.

advantage over a competitor is fully exploited. To this end driver-to-team and car-to-team communication by radio has been employed for many years. Drivers are instructed and cars are remotely tweaked throughout the races, to get the best performance. Now it seems that BMW is going to stop using radio for team-to-driver communications in favour of a Helmet-Mounted Display (HMD).

The HMD, unveiled jointly by Kopin Corp and the BMW Group, is intended to help F1 drivers race faster, more safely, and with a definite competitive edge. It is part of an advanced telemetry system approved for installation by the F1 racing committee and may be used by the BMW-Williams team as early as this year.

The HMD system uses a 'CyberDisplay' imaging system supplied by Kopin that enables drivers travelling at speeds exceeding 200mph to communicate visually with the race crew and monitor all of their critical race data while continuing to focus on the track. Kopin teamed-up with the BMW Technology Office in Silicon Valley, DesignWorks USA (which is the BMW Group's design firm in Los Angeles), and Schuberth Helmets in Braunschweig, Germany, to develop and certify the HMD.

The Kopin CyberDisplay imaging system uses a tiny Active Matrix Liquid Crystal Display (AMLCD), less than 1in across. Despite its diminutive size, the display is said to produce a "beautiful image when viewed through an appropriate optic". It supports full-motion video and is visible in near-blinding sun. Pit crews control the data and messages that the driver sees, via a two-way wireless link that also enables the crew to monitor extensive data about the car's performance. Drivers receive information more promptly than by voice, but more importantly they are not subject to eavesdropping or track noise problems. Mounted just below the driver's line of sight, the display is said to be easier to view than a conventional instrument panel.

DIGITAL CINEMA

FOR OVER 100 years the technology of projecting the visual image in a cinema has changed little. OK, monochrome has become colour, film sizes and aspect ratios have changed, and images have definitely become more stable, but we still rely on the same basic principle of shining a light through a strip of celluloid, which can hardly be described as a robust medium, subject as it is to scratches, dirt, burns and splices. However, we stand now on the threshold of digital cinema, which could soon start to replace film projectors in the same way that digital cameras now outsell 35mm.

The Qualcomm QDEC-1000 digital cinema decoder is about the same size as an A4 sheet of paper. It may not look particularly impressive, but there must be a lot going on in there because it draws up to 10A at 5V! Picture resolution is adjustable up to 2560x1080 pixels.

In Britain at present there are just four digital cinemas, but that number is set to increase, with Qualcomm currently providing the hardware. Their digital cinema system delivers motion pictures that have been digitised, compressed and heavily encrypted to theatres using either physical media distribution (eg DVD-ROM) or electronic transmission methods such as satellite multicast. Authorised cinemas receive digitised films, trailers and adverts, and store them on hard disk in the encrypted and compressed form. At each showing, data is retrieved via a Local Area Network, then decrypted, decompressed and displayed. Needless to say, high-quality electronic projectors and digital quality sound are the order of the day.

For distributors, digital cinema reduces the high cost of duplicating (said to be about US $2000 per reel) and delivering film. In addition, end-to-end digital security is intended to alleviate the problem of piracy. Films can be distributed overnight to cinemas around the world, which allows film studios to change rapidly the number of cinemas that can show a given film without having to wait for additional copies to be made and delivered.

For audiences, digital cinema should make going to the cinema a more enjoyable experience, by providing a pristine digital image and sound at every showing. Images on the screen should be ultra-stable, and multiplex cinemas could easily show a popular film on more than one screen if an auditorium fills to capacity.

HALF WAY THERE

IAN HUNT, M5IAN, wrote to point me in the direction of the RAC, which already administers an alarm system very much along the lines of the first one I described in January's column ('Vehicles on the Move'). "The system works best because it is completely covert, hence why you may not have heard about this system before", he says. The 'Trackstar' system features a GPS linked to a transceiver in the vehicle. When activated, either by the control centre or automatically (depending on which version is purchased), the in-vehicle unit transmits its latitude, longitude, speed and direction to the control centre every 20 seconds. The control centre then liaises with the police to recover the vehicle and apprehend the miscreants.

I was unable to obtain details of the means by which alarm units transmit to the control centre but, because the system is covert, it will obviously require a discreet or hidden antenna. This means small in size, so either UHF or microwaves, in which case it could be via Tetra or the cellphone network.

It will be interesting to see if someone comes up with the second option, whereby the in-vehicle unit messages the owner directly, giving the opportunity to send a command message back to it. Naturally it would be inappropriate for such a system to inform the owner directly of the vehicle's location, because attempting to recover it oneself could be distinctly hazardous to the health! However, having established that a vehicle has been stolen, there seems no reason why the in-vehicle unit shouldn't be able to transmit its location to an appropriate third party. ♦

WWW

Modifications, user and workshop manuals	www.mods.dk
Discontinued Shure microphones	www.shure.com/datasheets/guides-discontinued.html
Digital pen	www.anoto.com
CyberDisplay	www.kopin.com
also	http://f1.racing-live.com/en/index.html?http://f1.racing-live.com/en/headlines/news/detail/021002054316.shtml
Digital Cinema	www.qualcomm.com
RAC 'Trackstar'	www.rac.co.uk/travelservices/raclive/trackstar

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.

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WHAT'S 'THE FREQUENCY'?

Q *THE DIGITAL READOUT on my transceiver says 14.100.00MHz. Am I transmitting on that frequency, receiving on it, or what?*

A THE MEANING OF those innocent words 'the frequency' depends on the mode you are transmitting and receiving, and often also on the make and model of the transceiver.

The first thing to understand is that the digital readout is not displaying your frequency! The display is derived from the instructions sent to the frequency synthesiser in your transceiver, and that is only indirectly related to the frequency on which you're actually transmitting or receiving. Also you need to understand the difference between *precision* and *accuracy*. Many transceiver displays show the frequency to a precision of 10Hz or even 1Hz, but this is hardly ever the true and accurate frequency, because everything depends on the accuracy of the master reference oscillator from which all other frequencies in your rig are synthesised.

It is common to display the frequency with a decimal point after the MHz digit, but also to include a second decimal point after the kHz digit for improved readability. For example, a frequency of 14100000Hz is commonly displayed as 14.100.00 or 14.100.000. Even with a highly accurate reference oscillator, the last few digits are rarely meaningful in terms of true *absolute* frequency. However, they are meaningful - and sometimes even useful - for displaying small frequency *changes*. For this article we'll have to assume that the master oscillator in your transceiver is correct, and I'll revisit the question of frequency accuracy in a later column.

Having set the scene, I'll now try to show you all the different things that 'the frequency' can mean, and explain why your frequency display behaves the way it does.

The most straightforward frequency display is probably on FM (any of the 'F' or 'G' modes listed in your copy of *BR68*). With a modern synthesised rig, and with no modulation to cause frequency deviation, the transmitted frequency should be a clean carrier on exactly the frequency displayed. On receive, that same frequency should also be exactly centred in the IF filter and the FM discriminator passband. Much the same applies to AM (A3E) - with no modulation, the transmission is a clean carrier on exactly the frequency displayed. On receive, that same frequency should also be exactly centred in the IF filter passband. With speech modulation, an AM signal consists of the carrier plus two sidebands (see box and **Fig 1**).

SSB - or as *BR68* describes it, 'single sideband, suppressed carrier (J3E)' - is notionally derived from an AM (A3E) signal by suppressing the carrier and one sideband - see the box and also Fig 3. The complication for SSB frequency readout is that the displayed frequency is that of the suppressed carrier - which isn't there! In traditional analogue SSB transmitters, the carrier and the unwanted sideband are generated but then removed. When SSB is generated by digital signal processing (DSP) the same ideas are implemented mathematically, so the carrier and unwanted sideband never physically exist. Even so, the CPU is programmed to send the correct instructions to the synthesiser to put this notional carrier frequency in the right place, corresponding to the frequency display. Many instruction manuals now call this the 'carrier point'. When you switch sidebands, the convention is that the carrier point stays the same, and your modulation frequencies swap over to become their mirror-image on the opposite sideband (Fig 3) [1].

The other important thing to know

CARRIERS AND SIDEBANDS

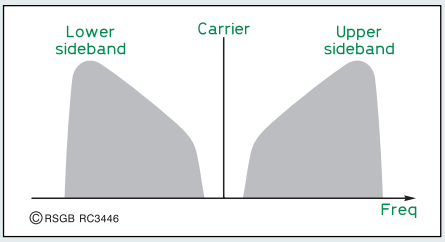

Fig 1: AM (A3E) signal consists of a carrier plus two mirror-image speech sidebands.

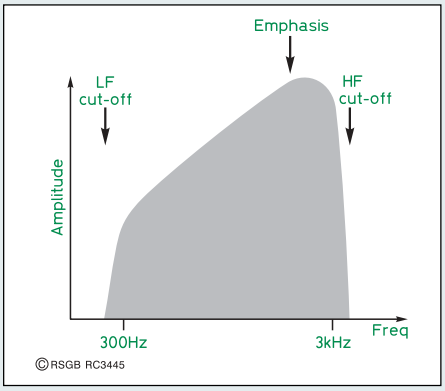

Fig 2: Average frequency content of a speech signal, tailored for 'communications quality'.

FIG 2 SHOWS a typical amplitude-frequency plot of normal speech, averaged over some time to show the frequency content. The frequency content will also be filtered and modified in your transmitter for improved intelligibility, usually by emphasising the 2 - 3kHz frequencies as shown, but with a cut-off at both high and low frequencies to avoid unnecessary bandwidth. This little shaded shape gives us a visual shorthand way of drawing the sidebands that are generated when amplitude modulation is applied.

Modulation is a mixing process, which can also be viewed as frequency-conversion from audio up to RF. Fig 1 shows traditional amplitude modulation (A3E) which generates two mirror-image sidebands above and below the carrier frequency. **Fig 3** shows how an SSB signal is generated by suppressing the carrier and one sideband, leaving only a single sideband containing all the necessary speech information. This can be either the upper sideband (USB) or the lower sideband (LSB). Note the 'carrier point', where the suppressed carrier was - this is defined as 'the frequency' for SSB.

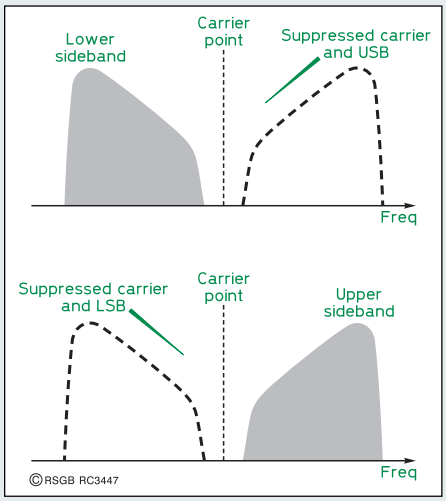

Fig 3: Single-sideband (SSB, J3E) signal is notionally generated from an A3E signal, by suppressing the carrier and the unwanted sideband.

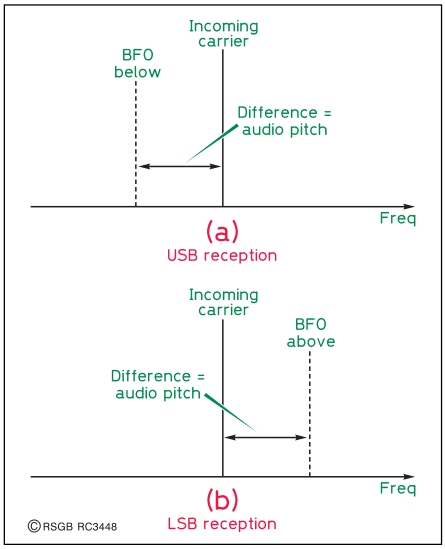

Fig 4: Receiving CW on either upper sideband or lower sideband - the BFO frequency is moved to the opposite side of the incoming carrier, to obtain the same audio pitch.

about SSB is that amateurs use LSB below 10MHz, and USB above 10MHz. Most transceivers handle this automatically as part of the band-switching, unless overridden by a front-panel control. Other services use USB almost exclusively, which is why other users on 1.8 and 3.5MHz seem to be transmitting 'upside-down', and also why we have to use USB on the 5MHz channels which belong to the MoD. However, the MoD channels are specified by their *centre* frequencies. To centre a USB signal with a bandwidth of about 3kHz within one of these channels, we therefore have to set the displayed frequency (carrier point) 1.5kHz below the nominal channel frequency [2].

On receive, your receiver mixes the incoming SSB signal down to some intermediate frequency (IF) and finally mixes it down to audio, using a product detector and a beat frequency oscillator (BFO) at the correct carrier-point frequency. As with SSB transmission, receivers with DSP detection implement the same processes in the realm of mathematics, but the audio comes out just the same.

CW (A1) is different yet again in its definition of 'the frequency' - it's simple on transmit, but much more subtle on receive. The display shows the frequency of the carrier that you will transmit when you press the key. It's assumed that you intend to receive an incoming CW carrier at that same frequency, so the display doesn't change between CW transmit and receive. You will hear that incoming carrier as an audio beat note, and most synthesised transceivers will allow you to choose your preferred pitch. Different models may use pre-set internal switches, a menu system or a fully variable front-panel CW PITCH control. All of these send appropriate instructions to the synthesiser, to make it shift the BFO frequency by the specified amount. But even when you change the CW PITCH setting, your frequency display stays the same because that's the incoming frequency that you *intend* to receive.

When you change the preferred CW pitch, almost all synthesised transceivers will also change the transmit sidetone signal to that same pitch. This allows you to net accurately on to an incoming CW signal, by tuning until its pitch is the same as your sidetone. You will then be transmitting on exactly the same frequency as the other station; this is 'good form' in a two-way QSO, but absolutely the wrong thing to do in a pileup! To help with netting, some rigs have a convenient SPOT button which mixes a sample of the sidetone into your received audio; others require you to disable the break-in function before pressing the key to hear the sidetone.

Some transceivers also let you choose whether to receive CW on USB or LSB. **Fig 4** shows how the BFO signal can be inserted on either side of the incoming carrier frequency to produce the same audio beat note. This inverts the whole audio spectrum and, when used in combination with IF-shift or passband tuning, it may be a useful way to avoid QRM. If the signal is tuned-in at exactly the preferred pitch that you programmed into the transceiver, the pitch will not shift when you swap sidebands; but in practice you don't always use that exact pitch, so it may shift a little when you swap.

Another complication is the way different manufacturers and models handle the process of switching between SSB and CW in mid-QSO. This is quite rare on HF, but it's common practice in DX operation at 50MHz and above - a contact that started with weak but fading SSB can often be completed by simply switching to CW. Most Yaesu rigs will automatically shift the CW frequency upwards by the same amount as the 'CW pitch' setting, and you can see the displayed frequency change when you press the CW mode button. If the other person had been listening to your USB, they will now hear your CW at a comfortable pitch without needing to re-tune. **Fig 5(a)** shows the original situation, and **Fig 5(b)** shows what happens when you switch and shift. But most Icom rigs don't shift, so if you simply switch to CW your signal will appear at zero-beat to the other person (**Fig 5(c)**), who then needs to tune downward a little to produce an audible beat note. But unless their receiver has ESP as well as DSP, they're not going to do that. As far as the other person is concerned, you have simply disappeared. Icom have finally caught up with this problem, and now offer 'CW synchronous tuning' as a feature on their latest rigs. If you have an earlier Icom rig and this SSB/CW switching is a problem for your style of operating, I'd advise you to listen on another receiver, and practise how to use the ΔTX control to shift your transmitted CW upward to an audible frequency.

This should help you to understand what those big glowing numerals on the front of your 'black box' are really saying. I'll return to digital modes next month.

NOTES AND REFERENCES

1. Swapping sidebands in mid-QSO is generally regarded as antisocial, because in effect it jumps to an adjacent 'channel' which may already be occupied by another QSO.
2. *RadCom*, September 2002, page 11; **www.rsgb.org.uk/licensing/fivemegs/fivemegs_doc_02.htm**
   Contrary to some opinions heard on 80m, this -1.5kHz offset has *not* changed the definition of 'the frequency' for SSB! ♦

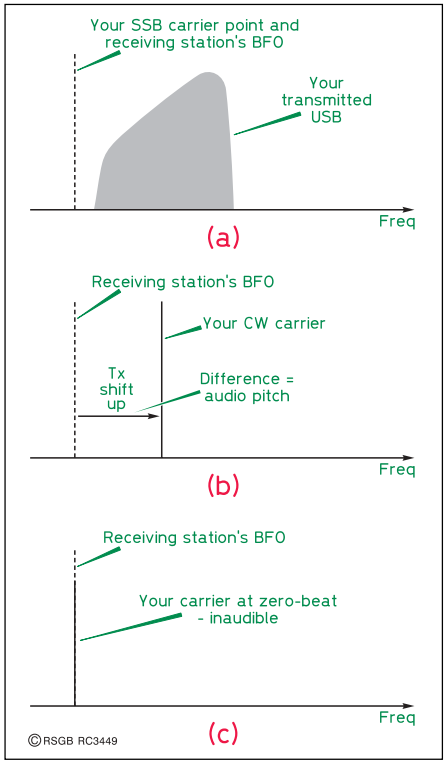

Fig 5: Switching from SSB to CW in mid-QSO. (a) The original situation, receiving your USB signal. (b) Your CW carrier has to be shifted up in order to be audible. (c) What happens if you don't shift - your carrier is at zero-beat and will not be heard.

Please remember that I can answer questions through this column only, so they need to be on topics of general interest.

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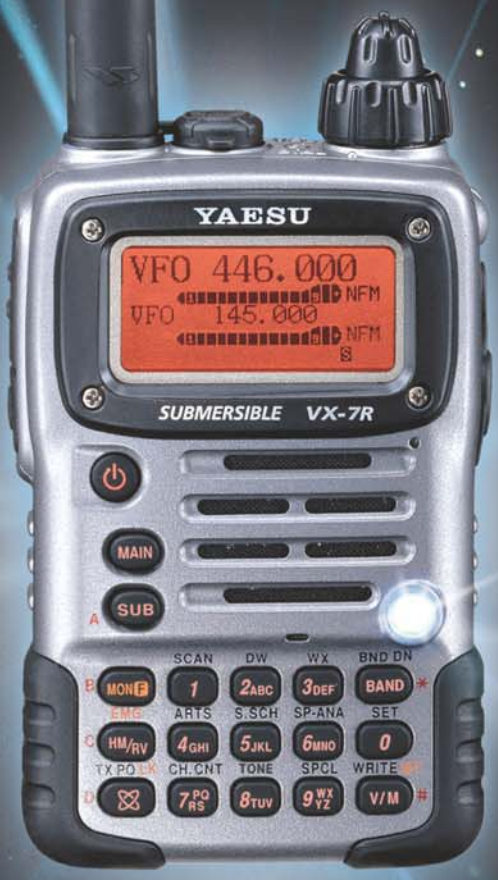

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Antennas

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IN THE JULY 2002 'Antennas' column I mentioned that I am often asked, usually by those who live in restricted locations, if certain commercial antenna products will solve their antenna problems. I said that in many cases a simple wire antenna, suitably placed and suitably fed, will outperform them even in the most restricted of locations. I proposed an experiment in the form of a competition to construct the cheapest of all antennas - a 50ft piece of wire.

THE '50-50' COMPETITION

THE OBJECTIVE WAS to see how many stations could be worked using the 50ft wire, over a period of 50 days between 1 September and 20 October 2002.

The antenna wire could be any diameter up to 2mm and fed at any point using any length of feeder, but the feeder must not be part of the radiating system. The antenna could be re-orientated during the test period as part of the experimental process. The full details were given in the July 2002 'Antennas' column.

We had *two* winners! Their comments on antenna construction and operating illustrate the points I was trying to make so well that they have been included in this double-length 'Antennas' column.

PETER COLE, G3JFS

G3JFS MADE 1248 QSOs with 139 countries to make 173,472 points under the competition rules. All contacts were made using a 50ft end-fed wire hung from trees at the bottom of his garden. The antenna, used for quick band hopping, is tuned by an SGC SG-230 Smartuner situated in a garden shed. About 60ft of buried low-loss 50Ω coax and control wires are used between the shed and the upstairs shack. The first 30ft of the antenna wire slopes northwards from the shed to about 25ft and the remainder slopes W to E up to 30ft. The earth system uses quite a lot of wire buried in the ground as well as fence wires on two sides of the garden.

G3JFS used an Icom IC-706 for QRP operation (5 watts) and an FT-990 and FT-1000 (100 watts) using CW, SSB, RTTY and PSK31. The total number of contacts was enhanced by casual operating in the large number of contests during the period of the test. However, a lot of the contacts were 'proper' QSOs of 10 - 30mins.

G3JFS goes on to say. "Like you I have been asked many times for advice on what antenna to use. My usual recommendations for a restricted site are:
"1. Put up the longest bit of wire you can and centre feed it with open wire line.
2. Put up a half-wave dipole for one of the HF bands and find out what you can do with it.
3. As a last resort use an end-fed wire on the lines of the W3EDP, preferably with quarter-wave counterpoise wires for the bands of interest.

"Invariably this advice is ignored in preference for a G5RV or a trap vertical because the man in the shop or the hyped up adverts recommended them! When G5RV devised his antenna it was meant to be a good performer on 20m and adequate for inter-G contacts on 80m. At that time we had no WARC bands, no 15m band and 10m was still dead (in fact I am not even sure if the band was available - I was 11 at the time!) 20m was the main DX band and 80m the 'wafflers' band. Few people could afford a beam (homebrew of course!) Coax was not in common use but 80Ω balanced twin, or even twin lighting flex, was - and this gave a low SWR with the feed impedance of 90 - 100Ω of three half-waves on 20m whilst the mismatch on 80m was acceptable. Louis also emphasised that on other bands a full-length open wire feeder should be used with a balanced ATU. Then it was no longer a 'G5RV', but a doublet antenna which had been around for many, many years.

"My preference for a simple wire antenna is a doublet with provision to change its length on the higher bands to go from a multi-lobe to figure of eight pattern. On the low bands it can be used as a 'T' with the feeder strapped. The end-fed wire plus the Smartuner is generally weaker but is very convenient. The Smartuner is very expensive but the same results could be achieved with a relay switched, pre-tuned matching / tuning ATU."

The 139 countries worked by G3JFS include 9L1BTB Sierra Leone, 3XY6A Republic of Guinea, FR/PA3GIO/P Reunion Island, JT1CO Mongolia, C98DC Mozambique, XX9TEP Macao, JY9AX Jordan, HC8N Galapagos Islands, XV9DT Vietnam, ZL7C, Chatham Island, YA5T Afghanistan, plus many more - not bad for 50ft of wire. Just imagine what the sales blurb of simple multiband commercial antenna be likely to say if it had been used to work these DX stations!

DES VANCE, GI3XZM

GI3XZM USED THE competition in a rather different way, by orientating the 50ft length of wire in many ways. He says, "In the process I have learned a bit, noticed a few things which seem to have been overlooked and had some fun. It was not a scientific exercise. I made an aerial, loaded it up and had a few contacts covering the appropriate bands, so that I could say, 'It seems to work', then took it down and started again . . . And again . . . I didn't try to run up a score or chase DX. It was more like shooting at the first thing that moved, then moving on. Everything did work. Some might say that I have only demonstrated the 'wet string principle' which states that almost anything will radiate if you load it up, but hopefully I did a bit better than that.

"Just for the record, the log shows that the rig was used on 26 days covering a total time of roughly 17 hours. In this time I had 90 QSOs covering 28 countries. Not an operating triumph!

However, I hope that you will find something useful in the following, which

G3LDO's own '50-50' antenna - a 50ft length of wire centre fed with home-made twin-line feeder. The green and white pole flying the union flag is part of a different antenna system.

will help you nudge a few folk towards amateur, rather than cheque book, antennas."

The following is a brief description some of the antennas tried by GI3XZM.

Dipole 50ft long, 30ft high, fed with open wire feeder. This antenna was tried first simply because it is an obvious starting point. This is a very good antenna on the all bands from 40 to 10m although the routing of the open wire feeder might pose some problems is some locations. With an estimated radiation resistance on 80m of only about 2Ω and wire losses perhaps three times this (with 70ft of feeder) it is a poor choice for this band, but contacts were secured using 15W CW without difficulty. The antenna could be used as an end-fed T for 80 or 160m by connecting the feeders together and feeding against ground using an ATU (although this would have broken the competition rules as they were formulated). GI3XZM states that this would probably be his first choice in a small suburban garden. This is in line with the advice given by G3JFS above.

50ft inverted L. This is the simplest antenna of all but perfectly serviceable, given a good earth. On 80m, with radiation resistance of perhaps 12Ω, a good RF ground is essential since earth losses could far exceed this figure. Nevertheless, GI3XZM was pleased to work PY on 80m. His 'standard' ground system is described below. This is the type of antenna G3JFS used to contact 139 countries during the competition period.

End-fed T. the 'T' uses a 20ft top and a 28ft vertical and is designed for the 40, 30, 20m bands. It is fed with coax against buried radials via an ATU, which comprises a series capacitor on 40m while a parallel tuned circuit [tapped] is used on 30m. On 20m the antenna is nearly a half-wavelength long and is matched using a series inductor. A good DX antenna with a radiation resistance better than 30Ω on 40m, and higher on other bands.

GI3XZM tried five other antennas in all, although lack of space precludes their description here. His standard RF ground system comprises a number of 14SWG wires pushed into spade cuts in lawn. The 18SWG wire for antenna building was obtained from the mains transformer primary of a microwave oven, which provided over 200ft of wire. The insulators and spreaders are made from scrap Perspex from a shop signs maker.

PETER DODD, G3LDO

WELL, I MIGHT as well put in my two pen'orth. I used a remotely-tuned 30ft x 20 ft inverted L with the MFJ Versa Tuner V (989C) ATU situated in the garden shed. This required a trip down the garden every time I wanted to change bands - not exactly operating convenience but it kept me fit! During my LF antenna experiments I tried various types of RF earthing systems. One of these is 50 square feet of chicken wire laid out on the lawn during the spring (about four years ago) and allowing the worms to bury it over the following couple of months. This works better than earth rods on the higher frequency bands.

I also tried the centre-fed antenna, which I found the best for the higher frequency bands (confirming the results described above). This arrangement is described in 'Antennas', September 2002. I operated on most days between 1 and 28 September and made 108 contacts with 53 countries.

COMPARING ATUs

DOUG HARRIS, GW3NDR, has been comparing several ATUs and thought we might be interested in the results. They were all tested with a centre-fed wire about 80ft long and fed with slotted feeder some 20ft long and about 28ft above the ground. The balanced output of the ATU was measured using a twin meter version of the RF meter, see Fig 10.11 of [1]. The input to the ATU was measured using a standard SWR bridge.

The tuners compared are listed below in order of efficiency:

'Homebrew', as in **Fig 1**
MFJ Versa Tuner V (989C)
SSM Z Match
MFJ Versa Tuner II
SGC SG239 Smartuner

With differing ease all the tuners were able to match the transceiver to the antenna although there was a 6dB

MFJ Versa Tuner V (989C), which rated well on GW3NDR's efficiency test. Note that the components are quite chunky to handle high power, which may have contributed to good performance.

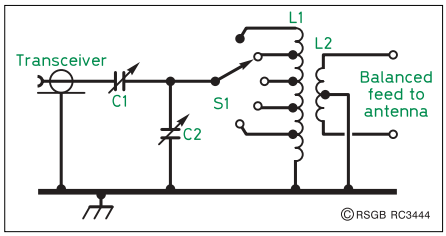

Fig 1: C1 and C2 are unidirectional 300pF capacitors. The coil L1 and switch S1 is from an old valve rig PA pi-tank tuner. The coupling coil (no details on number of turns) is close wound to the cold end of the coil.

difference in efficiency between the best and the worst (although it is not stated if this difference occurs on all bands). The ATU with the greatest losses was the SGC SG239 Smartuner, which often had a 2:1 SWR even after several attempts. The MFJ Versa Tuner II could be difficult to tune and was some 3dB down on the best. The SSM Z match was about 1 to 2dB down on the MFJ-989C and the homebrew tuner. The difference between the homebrew and the MFJ-989C was marginal, but the homebrew was just slightly better and was certainly easier to tune.

I looked at the circuit diagram of the SG239 and noticed it was designed specifically for an end-fed antenna and that there was no provision for a balanced feed, which exists on all the other tested ATUs. If the SG239 were connected directly to the test antenna described above without some balancing arrangement, it might explain its inferior performance.

The diagram of the homebrew ATU is shown in Fig 1, which GW3NDR describes as a half Z-match. Although he does not claim it to be original he hasn't seen it described elsewhere.

I have not tested this circuit but have included it in this column because, according to GW3NDR, it has a lot going for it. Firstly, it is so easy to make. There are a lot of old valve transmitters around (that one hasn't the heart to throw away) with pi-tank circuits that could be pressed into service in this ATU. It is claimed to be at least as good as the MFJ-989C although it probably wouldn't handle high power unless the pi circuit came from a linear. Finally, it is easy and not critical to tune.

GW3NDR notes that RF current meters are essential in monitoring the efficiency of ATUs.

REFERENCE

[1] *Backyard Antennas*, Peter Dodd, G3LDO (RSGB Sales). ♦

ANDY TALBOT, G4JNT
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THE COMMENTS in October's 'Data' column from Peter, G3PLX, obviously filtered through to the right ears! The recent IARU Region 1 conference in San Marino approved a new HF bandplan that contains footnotes which should solve the problem of mutual interference between SSB and digital modes on 160, 80, and 40m. This was caused in the past by some SSB operators believing it was permissible to operate lower sideband with the 'dial reading' on the sub-band edge [see this month's 'In Practice' column - *Ed*]. The footnotes define guard bands which will ensure that all the sideband energy is above the sub-band edges of 1840, 3600 and 7040kHz on the respective bands, and should eliminate conflict between digital and SSB operators. In particular, it will stimulate significant use of narrow-band digital modes in the 1838-1840kHz sub-band. The new bandplan also introduces the concept of bandwidth separation for the first time, adding breakpoints to separate all transmissions with bandwidths less than 500Hz from those greater than 500Hz. These breakpoints are at 1840, 3600, 7040, 14100, 18110, 21150, 24930 and 28225kHz. There is no wideband segment on 10MHz. This is more-or-less where the traditional 'phone/CW' breakpoint has always been, and so the new plan is not a major change from existing patterns of activity. It does solve the problem that has been worrying those concerned about mutual interference between new wideband and existing narrowband digital modes, if they had to share the same sub-band. This move to a bandwidth-separation philosophy - and not just for digital modes - is part of a long-term plan and will be a gradual process. One immediate benefit on 7MHz is that it solves the conflict between narrow digital modes and (wide) SSTV which has been an anomaly in the 7MHz bandplan for a long time.

DATA ON TOPBAND

SOME OPERATORS have obviously been following these moves. Already there is RTTY activity around 1840kHz to be heard; one evening, without much hope of success with my small antenna, I put out a CQ on 1838.15kHz - the traditional 'centre' for PSK31 activity. Much to my surprise, DK7UY replied almost immediately! So, can we look forward to an increasing occupation of 1838 to 1840kHz with PSK31 and RTTY? And how about slow CW or *Jason*? These modes have proved themselves on 73 and 136kHz, so how about trying them on the next band up? Trans-Atlantic on 1.8MHz with a few milliwatts perhaps.

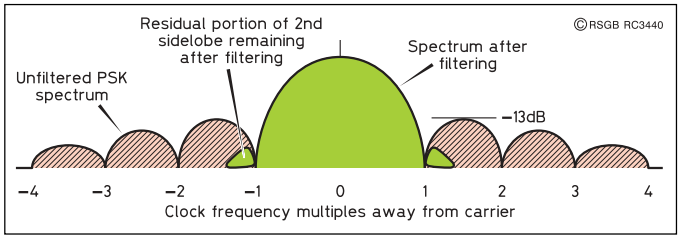

Fig 1: Filtering a PSK signal to the minimum bandwidth necessary for transmission.

AUTOMATIC TIME-SETTING FOR PCs

DATAMODES SUCH AS WSJT rely on the host computer's internal clock for control of transmit and receive timing. This has to be accurate to the nearest second, ideally, and the real-time clock internal to most PCs is just not renowned for accurate timekeeping.

Steve, M0ECS, wrote in to say: "I came across two programs on the Internet to synchronise the time on PCs using the net. *Webtime* is a utility which will connect to the Internet and synchronise your PC's clock. It will not automatically disconnect. *Dimension4* is a utility which can be set up to run automatically when you connect to the Internet and synchronise the PC's clock; it runs in the background. Both programs use any one of many listed US time servers, will configure for the UK and provide very accurate time. When I ran *Dimension4* on my machine it informed me that it had corrected the 0.03 second error!"

METEOR SCATTER DATA MODE

LAST TIME, we adopted QPSK as the waveform of choice for a proposed communications system to exploit the short duration meteor 'pings' present at all times outside the major showers. The next job is to choose the best data rate. There are two ways of approaching this. One is to work upwards knowing the bandwidth of the signal and then look for the best way of filling this space. The second is to decide what data rate is actually required over the air, and select the speed accordingly, letting the bandwidth fall out of the results. We know that the pings will be of short duration, occasional, and relatively strong which suggests that a high data rate could be supported, but gives no upper limit, so theoretically we could use tens or hundreds of kilobits per second. The signal bandwidths associated with these high rates are not compatible with amateur radio operation on the VHF bands (or indeed with commercial frequency allocation practices), so we need to approach from the other direction.

Nearly all amateur communications make use of existing voice band transceivers which are usually SSB-based with a bandwidth of typically 2.8kHz and, as we don't want to have to use special hardware, we will adopt this standard too.

The spectrum of a typical QPSK signal is shown in **Fig 1**, an unfiltered waveform which has sidelobes slowly reducing in amplitude either side of the carrier, but extending a long way out. For optimum use of bandwidth, it is usual to filter a PSK signal to include the main lobe shown shaded, although a small bit of the second lobe may be present. As we have 2.8kHz bandwidth available you might think we ought to be able to adopt a signal with a symbol rate of 2800Hz, but this is not so. Most amateur SSB filters have a poor amplitude response across their passband and this is at its worst within a couple of hundred Hz of the edges.

Furthermore, many SSB filters are significantly narrower than 2.8kHz, so let us take a figure of 2.4kHz as being the maximum bandwidth allowed, which forces the symbol rate to the very convenient figure of 2400 baud. As QPSK, with its four phase states, gives two bits per symbol, we have a raw data rate of 4800b/s. Incidentally, 2400 baud is common to most HF high-speed data waveforms, such as STANAG 4285, for precisely the same reasons of voice-channel compatibility. Now we have adopted 4800b/s differential QPSK, we next need to look at a signaling protocol to detect and exploit the pings. ♦

WWW.

Webtime	www.gregorybraun.com/
Dimension4	www.thinkman.com/dimension4/

EMC

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IT SEEMS A PITY that products intended to reduce environmental pollution by saving energy may increase pollution of the electromagnetic environment. This month we report on a batch of low energy lamps that seem to radiate RF noise.

PLC UPDATE

ON THE SUBJECT of Power Line (Tele)communications (PLC / PLT), I wrote a letter to the Editor of the IEE *Electronics & Communication Engineering Journal* (*ECEJ*) about an article on home networks published in the August 2002 issue of *ECEJ*. The article mentioned power line networking as a possible technique for home networking without any mention of EMC issues.

The Editor of *ECEJ* published my letter in the December 2002 issue so now, information about EMC issues relating to PLC systems and the 'Broad Band Britain Bulldozer' should reach a wider audience.

Regarding PLC trials, as far as the EMC Committee is aware, the only trials currently taking place in the UK are in Crieff and Campbeltown in Scotland. Larger scale trials are taking place in Germany, however. A report has been written by Ingo Dittrich of Rundfunk Betriebstechnik GmbH, entitled, 'A Paper on the Difficulty of Measuring Broadband Interference Emissions from Cables and the Problem of Assessing the Results with Respect to Interference to Radio Reception. Tests and Experiences From an Installed PLT System'. This is available on the RSGB EMC Committee web site (see WWW.).

LOW-ENERGY LAMPS

THANKS TO SEVERAL members who sent copies of an article about low-energy compact fluorescent lamps (CFLs) in the *Evening Post*, a Nottingham local newspaper on 30 November 2002 (see WWW.). The story was featured on the front page with the headline, 'Bulbs Send Radio Ga-Ga'. The definitive version of this story comes from Dave, M5ABH, the radio amateur who identified the source of RF noise.

Dave works for a Private Business Radio (PBR) shop in Nottingham that does sales and repairs. It is located at one of the high points in Nottingham, and also has a PBR communications site and tower in the back yard for their customers.

Some customers use the PBR site with repeaters and line-controlled base stations on the PBR VHF high band (155 - 175MHz). In November 2002, some of these customers started complaining about periods of interference, mostly in the evening. Dave describes the sound as a 'bacon sizzling' sound which was annoying on strong received signals and prevented reception of medium and weak signals. He tuned an old AM receiver to 165MHz, because AM receivers are more suitable than FM for tracing noise sources. He then connected it up to an external aerial to monitor the noise.

There was no noise during daytime but, in the evening, the noise would appear and disappear and vary in intensity. As PBR is a protected radio service, Dave's company contacted the RA who sent some officers to investigate, but did not find a conclusive answer.

A compact fluorescent lamp (CFL). Some types may radiate significant RF interference on VHF.

The noise continued for a couple of weeks, with customers complaining and threatening to leave so Dave and his colleagues made a beam aerial for 165MHz and went out to do some direction-finding (DFing). They tracked the interference to a house on a street behind their shop. They approached the occupier of the house and he kindly agreed to switch off his mains to see whether the interference went away, which it did. They then switched things on one at a time until they found the source, which was a CFL.

The owner of the CFL allowed Dave to take it away in exchange for a normal light bulb and the problem was solved, until the next day when the interference returned. It came from a different direction and they traced it to a different house with the same type of CFL. The residents of the second house said that these lamps were given out free by the Council. This carried on for several nights with Dave and his colleagues collecting several more of the CFLs given out by the Council from different houses in the area local to the PBR shop.

He tested the CFLs at the shop with a spectrum analyser and reports that he observed radiated RF noise between about 140MHz and 200MHz. There was a peak at about 165MHz with significant energy down in the 144MHz amateur band. Dave confirmed that, using one of these CFLs in the shop, caused interference to their PBR base stations. He found that only the free CFLs from the Council caused this effect. He bought some similar CFLs from B&Q but these produced no detectable interference on his equipment.

Dave then found that Nottingham City Council had been giving out CFLs to people on benefit on completion of an 'energy survey' form.

The RA came back and took some CFLs to test. Eventually a Council representative came to Dave's shop with some CFLs out of all the batches they had and all proved to be noisy at RF.

After some discussions the Council agreed to send out a letter telling householders in the local area of the shop to stop using the CFLs, but they appear to be reluctant to recall all the CFLs. Investigations are continuing and discussions are reported to be taking place between the RA, Osram (the manufacturers) and the Council.

This subject has been mentioned in several articles since then, including one which quotes Peter Burton, head of the RA Radio Technology and Compatibility Group.

Further articles on this subject have appeared in the *Evening Post*, where one reader reported problems with crackling on baby monitors, but a number of others reported problems with TV remote controls. The baby monitor is probably a 49MHz type and could be affected by RFI from a compact fluorescent lamp, although baby alarms are an unprotected radio service. The issue of TV remote controls is a completely separate one, however.

CFLs use a transistor switching circuit operating at a typical frequency of 32 - 45kHz. This causes some modulation of the light output at this frequency which can interfere with infra-red remote control receivers in TV sets or other equipment. This is a known problem with many types of CFL, but it is an optical compatibility problem, not related to any radio interference issues.

We have received other reports of CFLs that generate RF noise, either on the 144MHz amateur band or on the 156 - 162.5MHz marine band. A possible cause is parasitic oscillation in the switching transistor in the CFL.

There is also an EMC standards issue

WWW.

Report on PLT trials in Germany on RSGB EMC Committee web site — www.qsl.net/rsgb_emc/PLTREP.pdf

Nottingham Evening Post — www.thisisnottingham.co.uk
Search the site for 'bulbs'.
Articles should be available until May 2003

US eham web site, discussion articles on plasma screen TV sets — www.eham.net/articles/4285

however. The EN55015 standard for CFLs does not currently require a test for radiated RF emissions above 30MHz, because fluorescent lamps were considered unlikely to radiate above 30MHz. Clearly this needs to be reconsidered and work is underway in standards committees to do this.

80m NOISE

LETTERS FROM ENVER, G3DCS, were published in 'The Last Word' in the July, September and November 2002 *RadCom* about an unidentified source of noise on the 3.5MHz band. So far it has not been established whether it is natural or man-made. If it is man-made, it could be some sort of spread-spectrum radio transmission or unintentional emissions from electrical equipment. PLT is not thought to be a likely explanation unless we are hearing something from outside the UK. Any further information on this subject will be received with interest.

PLASMA SCREEN TV SETS

THANKS TO RICHARD, M0LLY (that's Mike Zero Lima Lima Yankee), for pointing out the discussion on the US eham website regarding RFI problems from the new plasma screen televisions (see WWW.).

The discussion was started by Paul D Sergi, NO8D, who reports RFI from his new 42-in Panasonic plasma screen TV set. At the time of writing (mid-December), this was followed by a long discussion thread whose contributors included Ed Hare, W1RFI, the ARRL EMC expert. Another contributor reported that he services these products and that the circuit boards inside do not have any screening.

The TV sets in question would be 525-line NTSC versions tested to the US FCC Part 15 Rules whereas in the EU, TV sets must meet European standard EN55013. Nevertheless, both standards have one thing in common which is that they do not test radiated emissions of interference below 30MHz. Instead, conducted emissions via the mains are tested. The reasoning for this is that below 30MHz, the equipment itself is considered to be too small a fraction of a wavelength to radiate significantly so that the predominant source of radiated emissions is considered to be from connected mains wiring.

These standards were introduced before 42in television sets existed. A 42in screen diagonal is 1.06m and that's over 10% of a wavelength at 28MHz. I would be interested to receive any reports of noisy plasma screen TV sets in the UK.

FRIDGE 'SAVAPLUGS'

FURTHER TO the item in October EMC about 'SavaPlugs' for fridges, it appears that this type of product will soon be subjected to a new test in the EN 55014-1:2000 standard. The 2000 edition includes new tests for regulating controls incorporating semiconductor devices. A voltage probe is used to measure the level of RF interference emitted by the output terminals of such devices.

Until 1 August 2003, household appliances, electric tools and similar apparatus can still be tested to the previous version of the standard, EN 55014-1:1997, which does not test emissions from output terminals. After 1 August 2003, the 1997 edition of the standard is being withdrawn.

EMC STANDARDS ENFORCEMENT

FOR CERTAIN ELECTRICAL and electronic equipment, such as household appliances, portable tools and fluorescent lights, compliance with the relevant British Standards for EMC has been compulsory since 1978. Compliance with emission standards for other equipment, including computers and compliance with immunity standards only became compulsory in 1996, but what has happened since 1996 to ensure that equipment placed on the market does actually comply with the relevant EMC standards?

Enforcement is the responsibility of local council Trading Standards Departments but, for some years, there was very little funding available for this activity. In 2001, however, the DTI funded a £50,000 programme in South Wales to purchase samples of over 200 items and test them for EMC compliance and safety. Such items included hairdryers, electric fans, juicers and hand blenders. The tests revealed that some manufacturers were not applying the regulations correctly but it also revealed shortcomings in the standards themselves.

The November 2002 edition of *EMC Compliance Journal* reported that Cardiff Trading Standards had prosecuted a company on six charges relating to the EMC Regulations. These related to two types of 'Vidal Sassoon' brand hairdryers that failed EN55014. One model also failed EN50081-1 by 19dB and is reported to have caused visible interference on terrestrial TV reception.

The use of the Generic Standard, EN50081-1 in addition to EN55014 in this case has caused quite a stir in the world of EMC compliance because hairdryers are not required to comply with EN50081-1. They are required to comply with EN55014-1 but can still be tested to an edition that does not require any tests above 300MHz. The 2000 edition of EN55014 requires radiated emission tests up to 1000MHz but, as explained above, the 1997 version can still be used until 1 August 2003. What this case shows is that compliance with a harmonised product-specific EMC standard may not guarantee full compliance with the EMC regulations if the standard is limited in scope.

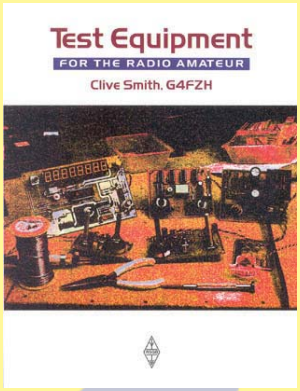
It is also necessary to comply with a general requirement in the UK EMC Regulations, Statutory Instrument 1992 No 2372. Regulation 5(2)(a) states that relevant apparatus shall be so constructed that the electromagnetic disturbance it generates does not exceed a level allowing other relevant apparatus to operate as intended.

THREE-PHASE CONVERTERS

I HAVE RECEIVED a report of a new type of electronic single-phase to three-phase converter to allow three-phase electric motors to operate from a single-phase supply. I understand that these devices use switch-mode power supply techniques and that there is potential for interference from the three-phase output if it is not well filtered. I would be interested to hear from anyone who has more information about this type of product. ♦

RSGB MEMBERS SALE - SALE - SALE

Test Equipment for the Radio Amateur



This book describes a range of test equipment and measurement methods to satisfy the requirements of most amateur radio stations. The theory behind the methods is given, and complete constructional details are included for the majority of the instruments featured. Emphasis has been placed on the simpler type of equipment which is easier to make or more affordable to the radio amateur.

170 pages

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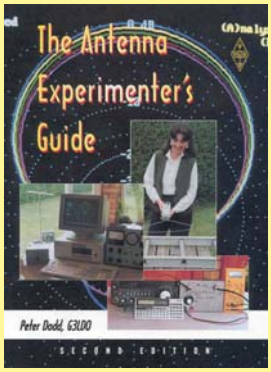
The Antenna Experimenters Guide



The Second Edition of this book takes the guesswork out of adjusting any antenna, home-made or commercial, and makes sure that it's working with maximum efficiency. To this end, it describes how to build and use simple RF measuring equipment to measure major antenna parameters such as impedance, resonance and performance. There's much more for the keen designer and experimenter, including how to construct fold-over masts, your own antenna test range and much more.

160 pages

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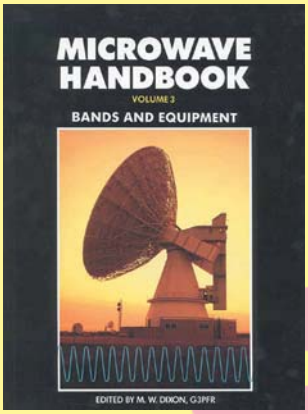
Microwave Handbook - Bands & Equipment

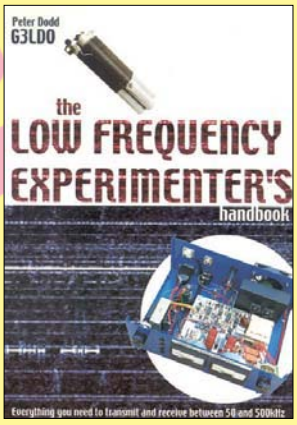


In the last few years there has been an almost explosive growth in amateur microwave techniques, designs and devices available, leading to increased band occupancy and to some quite startling practical results. As a consequence, the need for an authoritative yet accessible source book for the growing numbers of enthusiasts involved has never been greater.

360 pages

40% off - ONLY £11.39

The LF Experimenters Handbook



This book has been written to meet the needs of amateurs and experimenters who have interest in low power radio techniques below 200kHz. Most of the techniques described are targeted at those using the 136kHz band, but they are also of great interest to readers in New Zealand and Australia with the 183kHz band and the Lowfers in the USA on 180kHz.

146 pages

25% off - ONLY £14.24

Space Radio Handbook

All about amateur radio satellites and how to use them. This book was published some time ago, hence the silly price, but it's still a really useful reference for anyone trying out satellite operation for the first time. Don't wait for Phase 3-D to be launched, get on the 'birds' now.

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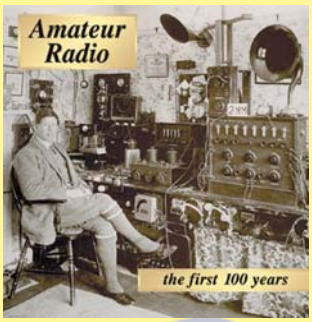
Amateur Radio ~ the first 100 years
- 'A Pictorial History'

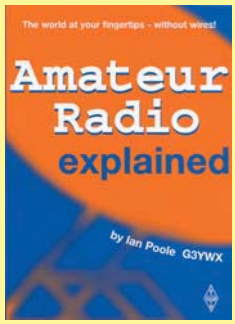


Containing only the best of selected photographs from the Radio Society of Great Britain's extensive photo-library, this lavishly illustrated, large format title, plots a memorable visual history of amateur radio over the last 100 years. Each numbered copy of this limited edition, is beautifully bound and gold blocked.

256 pages

40% off - ONLY £29.99

Amateur Radio Explained



Have you ever needed to explain to someone what amateur radio is all about? Have you ever wanted something to help fan the flames of someone's initial interest in the hobby? Do you give talks about amateur radio? If so, this book will help you. This new volume covers setting up a station, what you are likely to hear on each band, how to receive and transmit, what's involved in getting a licence,propagation, and much more.

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RSGB Technical Compendium

For the first time, we have collected all of the technical material from a whole year's RadCom and published it in a single volume including - All of the technical features from the 1999 RadComs - Every page of "Technical Topics" and much more. That's nearly 300 pages of construction, technical innovation and practical advice.

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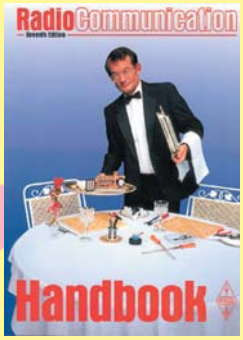
Radio Communication Handbook

The Radio Communication Handbook has been one of the world's largest and most comprehensive guides to the theory and practice of amateur radio communication since it was first published in 1938. This seventh edition has been revised, with several chapters being extensively re-written to incorporate the latest technical innovations and techniques.



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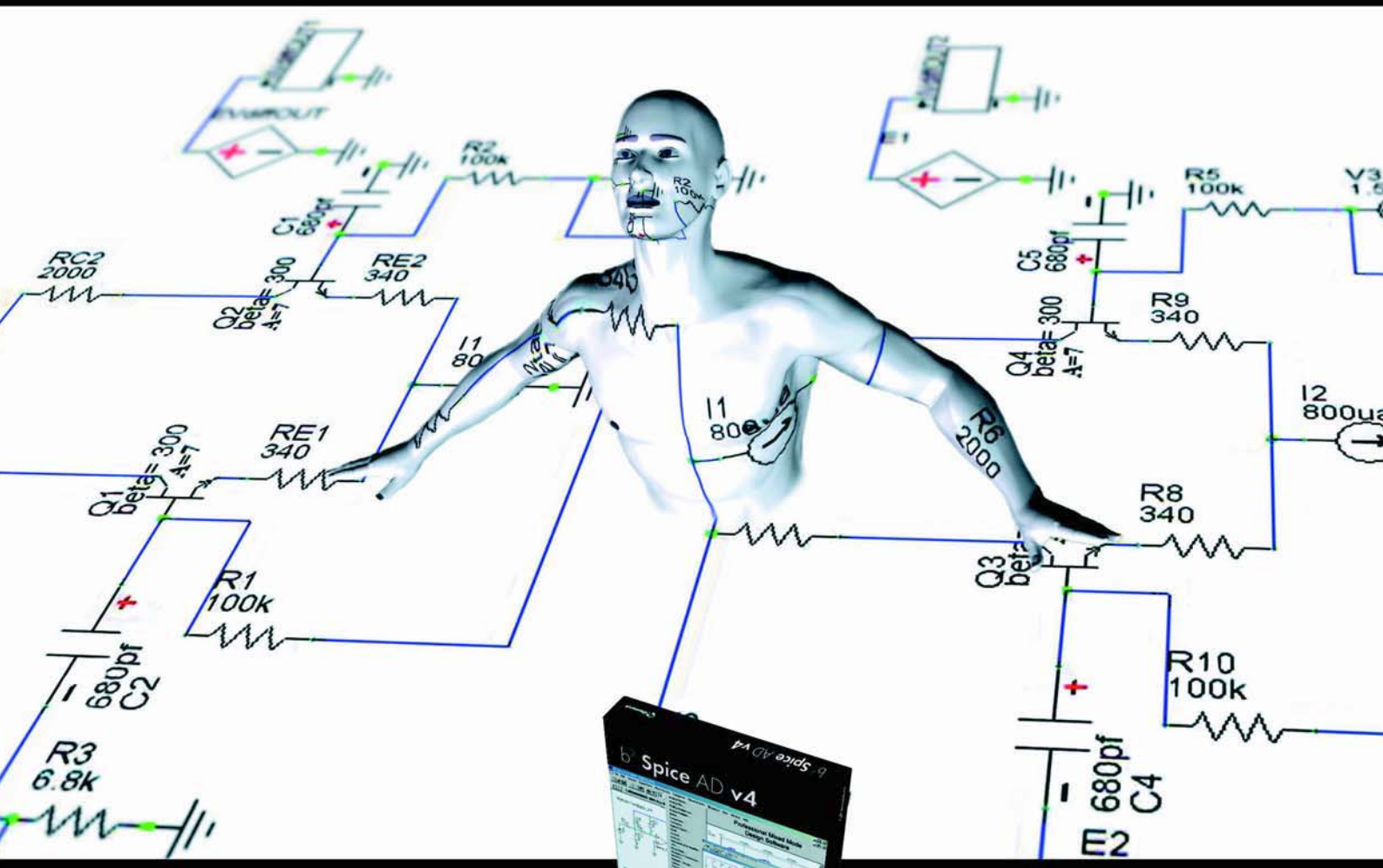

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The closing date for copy is the first day of the month prior to publication, eg the deadline for the March issue is 1 February.

Warning: *Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchaser' 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

ALINCO DX-70H, HF-50MHz, £275. TS-850S auto-ATU etc, £375. G0LHE, QTHR, 0121 327 0412 (Birmingham).

CAPCO ATU 400W SPC-3000D unused, £199, p&p £19. Sony AIR-8 h/held scanner, synthesised digital rcvr. AM or FM for LW, MW. VHF: Airband 108-136MHz , PSB & 2m 144-174MHz, £90 p&p £9. 01463 772 169 (Inverness).

COLLINS R390A, engraved panel, vgc with mans and service history, £295. Collins KWM-2A, 312B-4, 516F-2, Spectronics DD-1C digital display unit and a Shure hand mic. All vgc with man, £375 the lot. David, G4JMF, QTHR, 0151 355 3854 (Ellesmere Port).
E-mail: davidg4jmf@tinyworld.co.uk

DUE to emigration, Kenwood TS-940SAT with SP-940, MC80, £400. Alinco DX-70TH, £350. Kenwood TM-241E, £70. Alinco DR-430E, £60. Heathkit 2kW amp, £180. Yaesu FT-23R plus extras, £50. PS-430 30A PSU, £50. Tennamast HD tower with ground post, Cushcraft A35, TET 2-ele tribander, 2-ele 6m beam and various other antennas, two HD rotators, cage and KR2000 controller, £600 the lot. PM-2000 2kW power meter, £30. Lots of other 'bits and bobs' and test equipment. G0RNT, Tim, 01425 477 651 or 07769 773 352 (Ringwood).

FT-707, FV-707, FC-707, immaculate, boxed, owned 15 years, never used mobile, inc mans, £350 ono. G0GQZ, buyer collects, can be seen working. 07770 232 560 (Bedford).
E-mail: koenraadr@hotmail.com

HEATHKIT mans. SB101 tcvr, £80. PSU HP-23A, £1. Signal generator RF-IU, £2. KW200A circuit, £1. BC221AF with charts and mains PSU, £8. Collect or carriage extra. Several 4in and 5in ceramic coil formers plus wide-spaced AMU capacitors. GW3KAJ, QTHR, 01686 413 511 (Llanidloes).

ICOM 706 with auto-ATU AT-180, £500. Racal RA-1792 rcvr, £425. Alinco DJ-F1 2m h/held, £65. Hitachi WorldSpace rcvr KH-WS1, £95. Carriage extra or deliver short distances. Jim, G4ACI, 01695 622 754 (Skelmersdale).
E-mail: blackburnbla7f2@supanet.com

ICOM IC-706 MkI, exc cond in original packing, £450. G0PSF, QTHR, 023 9226 4638 (Portsmouth).
E-mail: g0psf@boltblue.com

KENWOOD MC-60A mic, unused, boxed, £75. W9GR DSP-3 digital signal processor, boxed, as new, £180. Martin, G3ZZS, 01752 216 455 (Plymouth).

KENWOOD TR-9130 plus base plinth. Yaesu FT-290 MkI, case, charger. MM linear 25W for above. BNOS 144MHz linear 25W in 160W out. CP-100 10m linear 10W in 100W out, built-in preamp. HX-240 tvtr 144MHz in, 30W HF out, suit FT-290. Welz SP-300 SWR/pwr meter, three sensors 1.8/500MHz. Dave, M0DSB, QTHR, 01502 578 105 (Suffolk).
E-mail: dave@m0dsb.fsnet.co.uk

KENWOOD TS-950SD, as new cond, boxed. Kenwood cardioid mic type MC-60A, also as new cond, boxed. Both complete with mans. Purchase receipt available, £895 ono. Brian, G0DBR, 01530 222 453 (nr Loughborough).

LINEAR Amp UK Challenger II new GS35 ceramic triode model (March 2002). 160m-10m, operating man, as new condition, prefer buyer collects, could assist delivery in north, £1275 ovno. 01751 476 380 (Pickering).

MICROSET RV45 multi-mode 2m linear amp 45W o/p, £40. Pye/Philips MX-294 PMR converted to 2m. 12.5kHz channel spacing, CTCSS, £50. MX-296 PMR converted to 70cm, CTCSS, £50. Daiwa CN-103L 145-525MHz SWR/pwr meter, £40. Would consider a deal on above for YF-155C CW filter for FT-847 or buy. G4OXD, 01462 435 248 after 6pm (Hitchin).
E-mail: tim.rose@thersgb.net

MILLEN Transmatch 2kW with Collins SWR - a quality American ATU, £300. 01379 783 657 (nr Diss).

MINT condition. Less than 10 hours use by non-smoker. Kenwood TL-922 linear amp. Boxed with man, £650. Light use only: TS-940S with built in ATU complete with instruction man and full service man, boxed and with Kenwood MC-60 mic, £550. Kenwood SP-230 speaker, £50. Kenwood station monitor SM-220 plus man, £200. MFJ differential 3kW roller inductor tuner, model MFJ-986, £150. MFJ artificial ground, model MFJ-931, £50. All equipment carefully used and in mint cond. Buyer to collect or pay courier charge. G0LJH, 01889 591 175 (Uttoxeter).
E-mail: g0ljhmanacor@aol.com

NATIONAL HRO-5T (R106) with nine coil packs 50kHz to 30MHz, gwo, PSU not included, £60. Murphy B40, £40. Buyer collects. 01453 832 725 (Stroud).

SCHLUMBERGER 4021 test set, mains PSU fault, works fine on 12V, £150. Two Philips PRP76 h/helds programmed all 4m channels, with charger, £100. Two Icom IC-3A h/helds, thumbwheel channel change (on about 200MHz), £20. Spy set B2 rcvr only, working with non-original PSU, sensible offers. All buyer collects or carriage at cost. Richard, G7EML not QTHR, 0113 258 4903 (Leeds).
E-mail: jrhardcastle@aol.com

SGC HF QRP tcvr in mint cond, all original packing etc, £450 ono. Carriage cost included. Ray, G4OWY, 01305 777 691 after 6.30pm (Weymouth).
E-mail: g4owy@aol.com

SHURE 444D (black) vgc, boxed, instructions, £25 + carriage. Still want Icom IC-AT100 auto ATU, Des, G0JCF, 01895 633 118 (Ruislip).
E-mail: gonedes@aol.com

SILENT key sale. Kenwood Trio 930S matching MC-60 mic and speaker, used on transmit only three times since new, as G6NRA was a class B operator, as new, £600. JRC NRD-515 plus memory unit £250, just been serviced. AR3000A, £450. K2RIW 2m linear amp, 2 x 4CX250Rs with 2500V PSU, £400, only used twice. 10A Variac, £10. 432MHz linear tvtr Microwave Modules, £100 as new. Watson 30A PSU, as new, £75. FT-480R 2m multi-mode, £150. High performance 2m Microwave Modules 144MHz converter, £20. Grid dip oscillator commercially made, £10. AVO 7, £15. High power coax relay 12V, brand new, £20. Trio 515 100W hybrid with 6146B in final, matching PSU and spkr unit in perfect wkg order, £150. David Hird, G4RVH, 01946 811 418 (Cumbria).
E-mail: david@hirdd.freeserve.co.uk

YAESU FT-767GX with 2m module inc mic, man and box, inspect/collect, £375. G0RVW, 01928 701 117 (Runcorn).
E-mail: g0rvw.dave@btinternet.com

YAESU FT-847, as new, boxed, £850 no offers. Icom R2 miniature all-band rx, boxed, as new, £100. Buyer collects or postage and insurance extra. GW4MVA, 01244 536 753 (nr Chester).

CONGRATULATIONS

50 YEARS

to the following
whom our records show as having reached
50 years' continuous RSGB membership this month:

G3IKR	Mr J P Moore
G3INU	Mr R J Appleby
G3JMY	Mr E C Halliday

WANTED

ANY Racal or Watkins-Johnson rcvrs, parts and accessories wanted. Especially looking for a backlit RA1792, also a WJ-8888 (quad-8) and an HF multicoupler. Prefer all in good wkg order, but anything considered. Can buy outright or have a quantity of Racal RA17 rcvrs for disposal if interested. G8WKA, QTHR, 01252 795 234 (Surrey).
E-mail: richardreich@aol.com

EARLY valve and crystal wireless wanted, especially interested in early Marconi items. Also looking for good top-end valve comms rcvr and early valve test equipment. G4ERU, 01202 510 400 (Bournemouth).

EDDYSTONE 740 front panel, AVC/BFO switch (original type). BFO knob and RF gain knob. Will consider complete scrap radio if above parts available. Tony Hall, 01603 744 197 (Norwich).
E-mail: tony122@ntlworld.com

HALLICRAFTERS electronic keyer, valve/relay design. Bob, M0CCE, 01609 773 188.

KW Supermatch ATU, must be in perfect wkg cond, appearance unimportant. Call anytime, G3RJX, QTHR, 07958 481 087 (Birmingham).

RACAL TA99 linear, PU99, MA89, MA90, MA91, MA92, RA237, MA174, MA168 and/or info. Plessey MkIV 3-pin socket. RA17 BFO. 01637 875 848 (Newquay).

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

TECHNICAL information, circuit diagrams, coil winding information for Globe King short-wave radio originally sold as kits. Dennis, G4IAD, QTHR, 01942 817 556 (Bolton).

TEN-TEC type 1207 variable capacitor 40-500pF in kit form or assembled. G4SIS, QTHR, 01277 657 754 or 01277 623 224 (Billericay).

TO purchase DC lead for FT-902DM. 01472 313 153.

Rallies & Events

2 FEBRUARY 2003

SOUTH ESSEX ARS Canvey Island Radio & Computer Rally - The Paddocks, Long Road, Canvey Island, Essex, at the southernmost extremity of the A130. Radio, computers and electronics. OT 10.30am, £1.50. C (home-made), CP free, DF, TS, MT, MA (book with examiners before midday for both exams). Brian, G7IIO, 01268 756 331 or briang7iio@yahoo.com [www.southessex.ars.btinternet.co.uk]

9 FEBRUARY 2003

HARWELL ARS RADIO & COMPUTING RALLY. Ann, G8NVI, 01235 816 379 or ann.stevens@btinternet.com [www.hamradio.harwell.com]

16 FEBRUARY 2003

CAMBRIDGE & DARC Rally - Britten Arena, Wood Green Animal Shelter, King's Bush Farm, London Road, Godmanchester. OT 10am, £2, concessions £1.50. CP free, LB, C, FAM. [www.cdarc.org.uk]

WAKEFIELD & DRS Northern Cross Radio Rally - Thornes Park Athletics Stadium, Wakefield, W Yorkshire. Just out of town on the Horbury Road. Easy access from M1 jns 39 and 40 - well signposted. OT 10.15/10.30am. B&B, MT. John, G7JTH, 01924 251 822 or g7jth@wdrs.org.uk [www.wdrs.org.uk]

23 FEBRUARY 2003

SWANSEA ARS Amateur Radio & Computer Show - Swansea Leisure Centre, on the A4067 Swansea-to-Mumbles coast road. OT 10.30am, £1.50, children 50p. TS, B&B, SIG, C, LB. Roger, GW4HSH, 01792 404 422.

2 MARCH 2003

18th RAINHAM RADIO RALLY - Rainham School for Girls, Derwent Way, Rainham, Kent. Exit M2 jn 4, on to A278, follow RRR arrows. OT 9.30/10am, £2, under-14s free. TI on S22, TS, SIG, C. Martin, M0AAK, martinm0aak@yahoo.co.uk

8 MARCH 2003

CRYSTAL PALACE R & EC Spring Radio Fair - St John's Hall, Sylvan Road, SE19. OT 10.30am, £1 (includes one free drink), under 16s free. C, CP free, tools. Bob, G3OOU, 01737 552 170. [www.members.aol.com/rfcburns]

LAGAN VALLEY ARS Annual Rally & Hamfest - Conference Centre, Lagan Valley Hospital, Hillsborough Road, Lisburn. OT 12 noon. TI on S22. Martin, MI3TIN, 07986 171 256 or martinsailor@hotmail.com

9 MARCH 2003

9th WEST WALES Amateur Radio & Computer Rally - Penparcau School, Aberystwyth, as part of National Science Week. OT 10am, £1. CP, DF, TS, GB4FUN, B&B, SIG, motorcycle display, C, TI on S22. Ray, GW7AGG, 01686 628 778, fax 01686 621 880, mwmg01@aber.ac.uk

BLACKMORE VALE ARS Valve Day - Youth Club Hall, Coppice Street, Shaftesbury, Dorset. OT 10am, entry free. LEC, demonstrations, displays, test gear, TS, C, Internet resource hobby groups, BYLARA, BVARS and YARC. Tony, 01258 860 741.

WYTHALL RC Radio & Computer Rally - Wythall Park, Silver Street, Wythall, on A435, 2 miles jn3, M42. OT 10am, £1.50. TS, LB, C, B&B, free park-&-ride, TI on S22. Martin, G8VXX, 0121 474 2077 (OH), or enquiries@wrcrally.co.uk [www.wrcrally.co.uk]

16 MARCH 2003

BOURNEMOUTH RS 15th Annual Sale - Kinson Community Association Centre, Pelhams Park, Millhams Road, Kinson. OT 10am, £1. TI on S22, TS, B&B, SIG, C. Olive & Frank, G0GOX, 01202 887 721.

NORBRECK Amateur Radio, Electronics & Computing Exhibition - Norbreck Castle Exhibition Centre, Blackpool. TS, B&B, CP free, DF. TI on S22. MT. Peter, G6CGF, 0151 630 5790.

22 MARCH 2003

SOUTH NORMANTON & DARC and G QRP CLUB Junction 28 Mini-Convention - Village Hall Community Centre, South Normanton, 5 minutes from jn 28 of M1 and A38. OT 10am, £1. TS, SIG, LEC, B&B. Duncan, G4DFV, 01623 465 443 or pentode@ntlworld.com

30 MARCH 2003

TIVERTON (Mid Devon) Radio Rally - Pannier Market, Tiverton. OT 10am, £1. TS, B&B, C, CP free, TS, B&B. 07815 439 432 or club@g4tsw.freeserve.co.uk [www.g4tsw.freeserve.co.uk]

6 APRIL 2003

LOUGH ERNE ARC 22md Enniskillen Amateur Radio Show - Killyhevlin Hotel. OT 12 noon, £3 inc raffle ticket. CP, B&B (no fee), TS, LB, C, WIN. Herbie, GI6JPO, 028 6638 7761, h.graham@ bigfoot.com

NORTHERN MOBILE RALLY - Gerald, G0UFI.

25 - 27 APRIL 2003

SCANDINAVIAN HAMVENTION 2003 - Gothenburg, Sweden. Exhibition, TS, FM, B&B, ham dinner, ladies' programme, AGM of Swedish Radio Association. [www.scandiham. com]

26 APRIL 2003

INTERNATIONAL MARCONI DAY - [www.gb4imd.co.uk]

27 APRIL 2003

ALDRIDGE & BARR BEACON ARC 4th Annual Radio & Electrical Sale - Aldridge Community Centre, Anchor Meadow, Middlemore Lane, Aldridge. OT 10.30am, CP, C. Doug, G4LQY, 01543 571 269.

ANDOVER RAC Radio & Computer Spring Boot Sale - Village Hall, Wildhern, 5km N of Andover. OT 10am. TI on S22, CP, TS, CBS, MA, C, DF. Terry, G8ALR, 01980 629 346 or aracnews@ntlworld.com

4 MAY 2003

SOUTH YORKSHIRE REPEATER GROUP Spring Great Northern Hamfest - Ernie, G4LUE, 01226 716 339 or 07787 546 515.

SILENT KEYS

WE REGRET to record the passing of the following radio amateurs:

G0IHM	Mrs U Sadler	22/11/02
G0DKE	Mr O Anese	03/12/02
G0IEI	Mr D M Waddington	29/10/02
G1TEW	Mr J Gadsby	17/11/02
G2CVV	Mr F C Ward	04/01/03
G3BYW	Mr W M Dunell	22/11/02
G3DXB	Mr R Gladwell	
G3ENB	Mr W Gates	03/12/02
G3HVY	Mr R Murcott	
G3OMH	Mr D Hayward	30/11/02
G3SHU	Mr H D Critchlow	21/10/02
G3WBX	Mr M V Kathrens	04/12/02
G3WVW	Mr R J Casemore	08/11/02
G4BVA	Mr J A Edwards	12/11/02
G4GEU	Mr J Terry	13/11/02
G4HGF	Mr P Chadwick	03/12/02
G8ABC	Mr P L Hovenden	10/02
G8TSN	Mrs M M Gascoigne	10/01/02
GM3NHW	Mr W K Heggie	08/08/02
GW4WFP	Mr R Gibson	05/08/02
UT8LL	Mr V Rusinov	23/12/02

5 MAY 2003

DARTMOOR RC Dartmoor Radio Rally - Ron, G7LLG, 01822 852 586.

MID-CHESHIRE ARS Rally - David, G4XUV, 01606 77787.

18 MAY 2003

MIDLAND ARS Drayton Manor Radio & Computer Rally - Norman, G8BHE, 0121 422 9787 or 07730 132 726. [http://midamradio.members.beeb.net]

26 MAY 2003

6th RED ROSE QRP FESTIVAL - Les, G4HZJ, 01942 870 634, g4hzj@btinternet.com

31 MAY / 1 JUNE 2003

LONDON COMMUNICATION & COMPUTER SHOW - New Venue - Stevenage Leisure Centre, Stevenage, Herts. OT 9.45/10am. TS, B&B, TI (2m & 70cm), CP, SIG, MT, MA, LB, C, DF. RadioSport 01923 893 929. [www.radiosport.co.uk]

1 JUNE 2003

SPALDING & DARS Annual Radio & Computer Rally - New venue - Ray, M0CTM, 01775 711 953, or John, G4NBR, 07946 302 815. [www.sdars.org.uk]

WEST MANCHESTER RC 7th Red Rose QRP Festival - Les, G4HZJ, 01942 870 634, g4hzj1@ ntlworld.com

8 JUNE 2003

NUNSFIELD HOUSE ARG 34th Elvaston Castle National Radio Rally - Les, G4CWD, 01332 559 965 or secretary@elvastonrally. co.uk

YEOVIL & DARC 19th QRP Convention - Digby Hall, Hound Street, Sherborne, Dorset. OT 10am. LEC, C, TS, B&B, Con-

The Members' Ads order form is now published here. If members do not wish to cut the form out of the magazine, photocopies will be accepted, as will recent copies of the form from previous months, or recent copies of the 'carrier' sheet. *As a last resort*, members may also send in their advertisements on separate sheets of paper, but if you choose to do this, you *must* supply an accurate word count - and, of course, the correct fee in the normal manner.

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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.

struction Challenge, TI on S22 via GB2LOW. Derek, M0WOB, 01935 414 452, m0wob@tiscali.co.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]

12 JULY 2003

CORNISH RAC Radio & Computer Rally - John, G4LJY, g4ljy@hotmail.com

20 JULY 2003

LINCOLN SWC Hamfest - New venue. John, G8VGF, 01522 525 760.

McMICHAEL RALLY & BOOT SALE - Roger, G3MEH.

27 JULY 2003

COLCHESTER RA Amateur Radio Rally & Computer Fair - Gary, 01621 818 620 or James, 01255 242 748. E-mail cra2003@garycavie.com or cra2003@mcginty.net

8 AUGUST 2003

COCKENZIE & PRT SETON ARC 10th Annual Radio Junk Night - Bob, GM4UYZ, 01875 811 723 or bob.gm4uyz@ btinternet.com

10 AUGUST 2003

FLIGHT REFUELLING ARS Hamfest - hamfest@frars.org.uk [www.frars.org.uk]

24 AUGUST 2003

TORBAY ARS Communications Fair - Anna, anna.cok@btinternet.com

31 AUGUST 2003

TELFORD & DARS 2003 Telford Rally - mstreet@g3jkx.freeserve.co.uk

26 OCTOBER 2003

GALASHIELS & DARS Annual Rally - Jim, GM7LUN, 01896 850 245.

2 NOVEMBER 2003

SOUTH YORKSHIRE REPEATER GROUP 13th Great Northern Hamfest - Ernie, G4LUE, 01226 716 339 or 07787 546 515.

GB calls

These callsigns are valid for use from the date given, but the period of operation may vary from 1 – 28 days before or after the event date. Operating details are provided in an abbreviated form as follows:

T = 160m; L = 80 or 40m; H = HF bands (30 - 10m); V = 6 and / or 4m; 2 = 2m; 7 = 70cm; S = satellite and P = packet.

Please send operational details of your special event station to the *RadCom* office at least five weeks before publication.

The *only* QSL Bureau sub-manager for special event station callsigns is as follows:

GBxAAA-MZZ - Mike Evans, 322 Heol Gwyrosydd, Penlan, Swansea SA5 7BR. E-mail mw0cna@ntlworld.com

Will organisers of special event stations please ensure that they lodge plenty of envelopes with Mike?

1 Feb GB4CEB: Comms & Electronics Branch. Norfolk. LH2 (G4OHX)

Helplines
FOR MEMBERS

● Ted, G4EGB, has a **Fuji FVR K7S Inverter**, 240V single-phase input, 240V three-phase output. 'OH2' is displayed when switched on, but no output is available. Advice would be much appreciated. G4EGB, QTHR. Tel: 01723 362 537 or e-mail g4egb@yahoo.com

● Lawrence, GJ3RAX, is looking for information on the **'Barber' method of generating SSB**. It was briefly mentioned in the book *Filter Design* by Steve Winder as a relative of the Weaver method. Please e-mail: gj3rax.lawrence@localdial.com

● D J Long, G3PTU, needs a circuit of the **Philips 2503/3 FET Multimeter**. He will defray any reasonable expenses. G3PTU, tel / fax: 01274 877 211.

● David, G4BXH, would be grateful to receive an original or copy of the booklet ***SSB Equipment*, by G2DAF**. All costs will be paid. G4BXH, QTHR. E-mail: dhardy@emirates.net.ae

● Bruno, G4FZG, requires a copy of the instructions for **Tradiper model TE-15 GDO** (440kHz - 280MHz). All expenses will be reimbursed. G4FZG, QTHR. Tel: 01242 256 295.

● John, G3GTJ, seeks technical information and operating instructions for the **Marconi Instruments Signal Generator TF995A/5** and **Q-meter TF1245** and **TF1247** (two linked units). G3GTJ, QTHR. Tel: 01963 240 319.

● Mike, G4ADE, would appreciate any information on modifications to the **4CX250B PA unit** of a **Collins 618T**, enabling its use as an HF linear. He has the circuit diagram. G4ADE, QTHR. Tel: 01964 534 365, or e-mail: g4ade@btinternet.com

● A DC lead is urgently required for the **Yaesu FT-902DM**. Tel: 01472 313 153.

● Richard, one of our Polish readers, would be pleased to receive unwanted collections of **QSL cards, 2003 diaries, calendars, posters, notebooks**, etc. Please send to Richard Pilewski, Broniewsk 12, 09-200 Sierpc, Woy Mazowieckie, Poland.

● Brook, G0VEB, is looking for a copy of the manual, circuit, or other information on the **KW77 HF receiver**, or perhaps an old one for spares. All costs and postage will be covered. G0VEB, QTHR. Tel: 020 8882 4110.

● Ted, G4TLY, needs any information, service and operating manuals for the **Albrecht AE-550 2m transceiver**. G4TLY, QTHR. Tel: 01666 822 935 or e-mail g4tly.ted@virgin.net

● Howard, M1DRD, has had a catastrophic failure (shown below) of his **vertical antenna**. He would be pleased to receive any enlightenment regarding the possible causes of this damage. He is convinced that wind is not the principal culprit. M1DRD, QTHR. E-mail: howard.twigg@ntlworld.com

● Nilay Mine Aydogmus, TA3YJ, the XYL of TA3J, would like to find out who was the **world's first female radio amateur**, or the **world's first female contest operator**. Can anyone help? TA3YJ, e-mail: ta3yj@trac.org.tr

- 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.

Damage to M1DRD's vertical antenna. Can anyone help?

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the last WORD

Putting the 'FUN' Back in Soham

It was great to hear and work GB4FUN (op Simon Thompson, M3SDT) on 40m today from Soham Village College - such a positive thing to do after what happened there earlier in the year. Well done RSGB for making this possible.

Jon Wheeler, G0IUE

Eagle Radio Group

Thank you for the Eagle Radio Group article. We have been getting some really good feedback. Several clubs have asked us for suggestions on how to revitalise their clubs. Our website [www.eagleradio.netfirms.com] has had a considerable number of hits. We have attracted new members from further afield in the county. From my point of view it has been very worthwhile. I feel that many clubs do not take advantage of their local press to promote our hobby and their clubs' activities. We have a fantastic relationship with our local paper, the *Mablethorpe Leader*, and so far we have never failed in getting a write-up, often with pictures, about our meetings. Once again many thanks for the exposure.

Nevil Brinnen, G3VDV

The Prisoner's Friend

I was horrified to read about the enormous fine imposed upon a brother 'ham' for using illegal SSB CB equipment (*RadCom News*, November 2002, page 10). What had he done? Only broken a minor man-made regulation and injured nobody. I hope a robust appeal has been entered against the penalty.

Some years ago I went to the Court of Summary Jurisdiction as 'the prisoner's friend' when one of my colleagues had been accused with an identical offence. He pleaded guilty as he had been 'caught in the act' by a prowling detector van. When a defendant pleads guilty he cannot be cross examined. I worked hard and savaged the prosecuting solicitor and damaged his case considerably. Later I met the Chairman of the Bench socially who said "why on earth did that clot plead guilty? After what you said we would otherwise have discharged him." In fact the Board bound him over for a year.

I hope in any similar future cases a robust defence will be entered.

David J M Buddery, G3OEP

'Miracle Whip' Competition

Thanks for your letter with the great news of winning the FT-817 [in the *RadCom* 'Miracle Whip' competition, rules in March 2002 - *Ed*]. Well, I received my 'Miracle Whip' on 23 April and soon connected it up to my 5W QRP rig. My first contact was VK3RP in Melbourne - no mean feat in itself at 5 watts with the outfit just sitting on the desk. That was with CW on 20m.

At 1510UTC I thought "nothing ventured, nothing gained" and called in to the Family Hour Net run by W6BMG on 14245kHz. He answered straight away and was amazed at what I was using. The East Coast net controller also said he could work me from Fort Valley, Georgia, so I asked him to confirm the contact with a QSL card. According to a distance program he has he makes it 8794 miles - truly amazing.

I am still in wonder at this little antenna. My thanks to the RSGB for running the competition and of course to Martin Lynch for supplying the prize.

Roy Charlesworth, DU9/G4UNL
(Mindanao, Philippines)

Hands-Free Mobile

I am pleased to see that sense might prevail regarding telephone operating while driving. There should be no concessions for holding a transmitter's microphone while driving (*RadCom*, December 2002, page 5, 'Mobile Operation'). The only safe method is a hands-free system.

Road crashes are the most avoidable cause of death to which the average person is exposed. Few of the nine deaths per day in Britain (equivalent to a wide-body airliner crash every month!) are genuine accidents. In the pages of your journal, 'Technical Topics' reported an American study that found the only cause of excess mortality that correlated with number of hours of cellular 'phone usage was car crashes (and not, for example, brain tumours or cancer).

Both myself and my YL have been in nasty near-misses while driving, when we realised (just in time!) that another driver could neither see us nor control their vehicle due to holding a telephone to their head. They thought they were safe - as we avoided them, they never realised how close they came to crashing into us.

As responsible members of the community with a specialised training and understanding and the privileges that go with it, we should set an example and make it clear that *amateurs do not support holding 'phones / mics while driving!*

Dr Godfrey Manning, G4GLM

Come Back AM, All is Forgiven!

"You're S9 - QRZ?" Pile-ups so great you can't hear a thing. Two-letter callsigns so you never know who the station is. This is the state of the DX bands. And for what purpose? To prove what has been proven a million times before. That a £1000 box of tricks with a wire attached can reach the other side of the world. So we go to the LF [sic] bands. As Mr Clegg, G3EFK, says ('The Last Word', November 2002), virtually all the QSOs are nets which operate on a daily basis, so obtaining a one-to-one QSO is well-nigh impossible.

What can be done? Very little. We who go back to the AM days know that we have seen the best days of amateur radio and should be grateful for that. Before the advent of transceivers a CQ call was an adventure: "Searching the band for any possible call". Such a search could take all of five minutes, especially on 10m, but the anticipation of finding a reply was a very relaxed way to enjoy the hobby. No pile-ups in those days. It was the height of bad manners to net on a caller's frequency, and 'nets' were not possible. A QSO was very much a personal, one-to-one affair.

I do not think that SSB is quite as unintelligible as Mr Clegg says, but it is a very poor substitute for a good AM transmission. To those who say, "Your transmission is BBC quality" I say "Just a minute, think about what it is you are saying!". Telephone phone-in programmes, maybe, but that is all. A good AM transmission was a pleasure to listen to and, as a retired sound engineer, I miss hearing the voice of the person in as near its full frequency range as possible.

How we used to strive to improve our modulators (I can still hear the hum of those big transformers!) And we were allowed to transmit one commercial record a day to test our systems. Choosing the record was quite an enjoyable experience.

As I say, those days are gone, and will not return. I do believe, though, that there is no reason why there should not be a dedicated segment on the bands where AM only were allowed. I think the RSGB should campaign for that, although it might not be possible on 40m, it being such a narrow spectrum.

Most people do not have the time or patience to build an SSB rig, so just go along to the shop, buy one, and plug it in. On the other hand, it is relatively easy to build an AM crystal-controlled transmitter and, apart from giving a lot of pleasure, this would also give a boost to home construction. Wishful thinking?

Bob Collett, G3EGS

. . . I have every sympathy with Mr Clegg, G3EFK ('The Last Word', November 2002), on the difficulty with understanding SSB on most old receivers. Frequency drift is half the trouble and the rest is due to the inability to apply manual gain control to remove AGC. Transceivers without a manual RF Gain control are a menace. The use of AGC perpetually in circuit *ruins* the quality of SSB.

For clarity and quality, use a transceiver with manual gain turned down so the

S meter sits at about S7 or S9 and then to 40m and he will understand and recognise people clearly.

If Mr Clegg doesn't have a modern drift-free transceiver, perhaps someone near him could lend him one to use for a while until he can overcome his difficulty with frequency drift. It is a shame that an 'old timer' like Mr Clegg should be unable to enjoy his latter days with this superb hobby for the house-bound.

Maurice C Hately, GM3HAT (licensed 52 years)

. . . Did I read that correctly ('SSB Not Intelligible?', 'The Last Word', November 2002)? "To me SSB spoilt ham radio. . . " Well, it takes all sorts I suppose, one man's meat is another man's poison and so on. A bit like the seemingly never-ending battle between the tappers (CW) and yakkers (SSB). Or, in the case of G3EFK presumably, the AMers. Is this gentleman aware that AM nets exist on the HF bands I wonder? And how about FM? No "constant fiddling" required there - just "clear speech" and the instant recognition of the voices of "friends and acquaintances" - if and when one hears them, that is.

If it's any consolation to G3EFK, my persistent CQs go unanswered too sometimes on 40m - especially at the tappers end of the band.

Ray J Howes, G4OWY

IRLP on JOTA

I had the pleasure of running a JOTA (Jamboree on the Air) station over the weekend of 19 / 20 October. I wish to thank all the people involved in setting up the Internet Radio Link Project (IRLP). It made the difference between the weekend being a success or a failure. In the past I have worked JOTA stations on the HF bands. Exciting contacts could not be guaranteed because propagation varied so much. With the IRLP we had a high probability of making contact with stations in places where most of us can only imagine visiting. The quality of the link was amazing, with no QRM! As a result I had an enthusiastic group of Scouts asking me "who shall we talk to now?" Never had that before! The QSO that got the Scouts really talking was with Don, KA0ZOU, at McMurdo Base, Antarctica. Our Scouts got primary source information of what conditions are like in Antarctica (summer, a warm 0ºC, with constant daylight. The seal pups on the Ross ice shelf are now almost the same size as their mothers at 300lb each). These are the sorts of experience that inspire people to become radio amateurs. Thank you to all the hams that have set up IRLP nodes, especially G4EID here in Southport.

Mike Davis, G0ROT

As well as using the postal service, letters for 'The Last Word' may be e-mailed to: radcom@rsgb.org.uk

Pirate Activity?

Just in passing, thought you might like to hear this. No doubt you have heard it all before, however. A German amateur, Klaus, DL1IO, returned my QSL card with a nice message telling me he has not been active on the radio for a long time and there was no doubt this was a pirate using his callsign. I have just received more QSL cards returned via the bureau with a stamp on each saying that sorry, this station does not use the QSL service of the DARC. Having checked *Callseeker 2002* and found that the callsign was not known, and those that were were also returned.

Of course I could check each callsign whilst having a QSO, but when you get that 100% QSL on its way to you what do you do? Throw those returned QSL cards in the bin, and treat the real amateur with great respect.

That's my moan over with. Kind regards,

Vic Saundercock, M0AVS

[*'Pirate' activity is certainly an explanation, but if a callsign is copied incorrectly - even a single 'dit' on CW, or a mis-heard letter on phone - the QSL would not find its way to the correct station. If a callsign does not appear in* Callseeker *it does not necessarily mean that that station is unlicensed. Finally, some countries' national societies, including DARC in Germany, do not allow non-members to collect QSLs via their bureau system. In such circumstances QSLs are normally returned to the originator, with the stamp described by Vic* - Ed.]

Letters published in 'The Last Word' do not necessarily reflect RSGB policy. It is a condition of publication that all letters may be edited for grammar, length and / or clarity.

Helplines Thanks

I am writing to say how very useful the 'Helplines' section is. My request about something not directly connected with amateur radio (a tape recorder for recording contacts) had many responses. Through the pages of *RadCom* I want to thank G4JDW, G0OJP and in particular G3ULL, who all gave me items free of charge.

Roger Curtis, G0CYC

[*'Helplines' is available to all members. Just send in your request either by e-mail to radcom@rsgb.org.uk or by post to the* RadCom *editorial address. All 'Helpline' requests are published strictly in the order in which they are received, and as and when space is available* - Ed.]

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FREEPHONE ORDER LINE:

08000 73 73

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

COAXIAL SWITCHES

WATSON


CS-600

Coax switches ideal for use in antenna systems for transceivers or receivers

CS-600	2-way coax switch 3x SO239	£12.95	A
CX201	2-way coax switch 3x SO239	£18.95	A
CX201N	2-way coax switch 3xN-socket	£26.95	A

DIAMOND ANTENNA


CX-310A

Thru power 1.5kW (max) Range DC-1500MHz Isolation 50dB 500-1500MHz

CX-310A	3-way coax switch 4x SO239	£65.95	B
CX-310N	3-way coax switch 4x N-socket	£75.95	B

MFJ


MFJ-1702C

Many models have centre earth position and static discharge protector.

MFJ-1702C	2-way coax switch + ground	£28.95	A
MFJ-1702CN	2-way coax switch N-type	£36.95	B
MFJ-1704	4-way coax switch SO-239	£69.95	B
MFJ-1704N	4-way coax switch N-type	£79.95	B
MFJ-1701	6-way coax switch SO-239	£52.95	B

REVEX


S20

These switches are well engineered and sold in large quantities to the commercial market

S20	2-way coax switch 1kW SO-239	£32.95	B
S-20N	2-way coax switch 1kW N-type	£56.95	B

ROTATORS

CREATE

All require 7-core control cable. **MC-2** Optional lower mast clamps (if needed)

RC5-1	Medium duty rotator	£349.95	C
RC5-3	Medium duty rotator with presets	£449.95	C
RC-5A-3	Heavy duty with variable presets	£649.95	C
MC-2	Optional lower mast clamps	£59.95	B

hy-gain

AR-40X designed for light VHF/UHF antennas, c/w mast clamps Control cable not provided.

AR-40X	Lightweight with mast clamps 5-core	£299.95	C
CD-45IIX	Light-med rotator 8-core cable	£425.95	C
HAM-IVX	Medium duty rotator 8-core cable	£599.95	C
T2XX	Tailtwister med-hvy 8-core cable	£699.95	C
MS-LD	Lower mast clamps for CD-45IIX	£35.95	B
MS-HD	Lower mast clamps for HAM-IVX/T2XX	£89.95	B

POWER METERS

AVAIR

AV-600 VSWR/Pwr meter, reads RMS & PEP covers 1.8-525MHz in two ranges.

AV-20	X-needle VSWR/PWR 1.8-150MHz	£39.95	B
AV-40	X-needle VSWR/PWR 140-525MHz	£39.95	B
AV-200	VSWR/PWR 1.8-200MHz	£49.95	B
AV-400	VSWR/PWR 140-525MHz	£49.95	B
AV-600	VSWR/PWR 1.8-525MHz	£69.95	B

WATSON

W-220 VSWR/Pwr meter, reads RMS & PEP covers 1.6-200MHz max pwr 200W

W-220	VSWR/PWR 1.6-200MHz	£49.95	B
W-420	VSWR/PWR 118-530MHz	£49.95	B
W-620	VSWR/PWR 1.6-530MHz	£89.95	B

ANTENNA ANALYSERS

MFJ

MFJ-269 Analyser also frequency counter, resistance meter and RF generator.

MFJ-269	HF/VHF/UHF digital analyser	£349.95	B
MFJ-259B	HF/VHF digital analyser	£269.95	B
MFJ-39C	Carry case for MFJ-269	£26.95	A
MFJ-29C	Soft case for MFJ-259B	£29.95	A

KURANISHI

BR-200 Antenna analyser 1.8-170MHz with digital and analogue dislays.

BR-200	HF/VHF digital analyser	£329.95	B
BR-400	VHF/UHF digital analyser	£399.95	C

FREQUENCY COUNTERS

WATSON

All frequency counters supplied with internal NiCad's, charger and antenna.

Super Searcher	RF finder & freq. cnter 10MHz-3GHz	£99.95	B
Super Hunter	Frequency counter 10Hz-3GHz	£149.95	B
Hunter	Frequency counter 10MHz-3GHz	£59.95	B
FC-130	Frequency counter 1MHz-3GHz	£79.95	B

OPTOELECTRONICS

Xplorer 2002 Version also with reaction tune & 500 memories

Xplorer	Freq. cnter / CTCSS/DTMF decode	£849.95	B
Digital-Scout	Digital Freq. counter 60MHz-2.6GHz	£529.95	C
Scout	Freq. finder 10MHz-1.4GHz	£379.95	B
Mini-Scout	Freq. finder (no memories)	£199.95	B
Micro-Counter	Micro freq. counter 10MHz-1.2GHz	£119.95	B
Cub	Mini counter 1-2.8GHz	£134.95	B
N-100	FM notch filter 88-108MHz	£99.95	B
TA-100S	Telescopic whip BNC	£14.95	A
DB-32	VHF/UHF mini rubber duck BNC	£29.95	A
RD-27	Helical antenna 26-150MHz BNC	£33.95	A
RD-50	Helical antenna 50-54MHz BNC	£23.95	A
RD-150	Helical antenna 144-165MHz BNC	£21.95	A
RD-440	Helical antenna 440-480MHz BNC	£21.95	A
RD-800	Helical antenna 500-1000MHz BNC	£34.95	A
TMC-100	Antenna for micro-counter	£9.95	A
CC-30	Leatherette case for any cntr	£14.95	A
CC-40	Hard leather case for scout&cub	£14.95	A

DATA & CODE

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RIGblaster PSK31, MFSK, MT63, SSTV, RTTY, CW, packet/APRS

RIGblaster Plus	Data interface 8-pin, software & cables	£139.95	B
RIGblaster M8	Data interface 8-pin, software & cables	£109.95	B
Rigblaster RJ	Data interface RJ45, software & cables	£109.95	B
RIGblaster nomic8P	Data interface 8-pin, software & cables	£62.95	B
RIGblaster nomicRJ	Data interface RJ, software & cables	£62.95	B
M-4 Adaptor	Adapts nomic units to 4-pin output	£12.95	A
M-FT100 Adaptor	Adapts all units to FT100 input	£17.95	A
RB-CD	Standard RIGblaster program CD	£9.95	A

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W-GMP

All Morse keys made of brass and on wooden bases. Spring tension & gaps adjustable.

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W-GMC	Standard Extra Morse key on base	£34.95	B
W-GMV	Deluxe brass Morse key on base	£39.95	B
W-CRI	Paddle key brass on base	£46.95	B

KENT

KPTA Twin paddle Morse key. Can be used as normal electronic or iambic keyer.

KSKA	Standard brass straight Morse key	£62.50	B
KSPA	Single paddle brass Morse key	£65.50	B
KTPA	Twin paddle brass Morse key	£76.50	B
EK-4M	Electronic keyer with 4 mems	£73.50	B
KMOA	Morse practice oscillator	£19.50	A
KMT	Morse tutor battery operated	£49.50	B

Most products are also available in kit form.

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LDG

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AT-11MP Asm	Desktop Auto ATU HF 5-150W	£269.95	B
Z-11 Asm	QRP Auto ATU HF 0.1-60W	£209.95	B
RT-11 Asm	Remote Auto ATU HF+6m 5-150W	£239.95	B

Also available in kit form. Choice of interface leads.

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Ideal for foot control of radio PTT. Comes with 3.5m lead at present terminated in 1/4 inch jack plug.

£6.95 A

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W-25SM	25A 13.8V DC SM pwr supply	£79.95	B
W-40SM	40A 13.8V DC SM pwr supply	£149.95	B
W-20SM	22A 13.8V DC SM pwr supply	£69.95	B
SEC-1223	23A 13.8V DC SM pwr supply	£99.95	B
W-5A	5A 13.8V DC pwr supply	£29.95	B
W-30AM	30A 0-15V DC pwr supply	£119.95	C

DIAMOND ANTENNA

GZV-4000 40A Switch-mode variable power supply

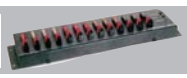
GZV-4000	40A 5-15V DC S/M PSU	£159.95	C
GZV-2500	25A 5-15V DC S/M PSU	£119.95	C
GSV-3000	30A 1-15V DC PSU	£149.95	C

LOWE

Switch-mode 40A 3-15V DC PSU with analogue meters.

SPS-8400	40A 3-15V DC S/M PSU	£99.95	C

WEST MOUNTAIN



RIGRUNNER 4012 Distribution board with 2m cable + connectors

RIGrunner 4005	13.8V DC 5-way	£49.95	B
RIGrunner 4008	13.8V DC 8-way	£89.95	B
RIGrunner 4012	13.8V DC 12-way	£109.95	B
C30/PK/12	12 spare connector pairs	£13.95	A

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PT-105	5-6A 13.5V DC pwr supply	£34.95	B
PT-107A	7A 13.5V DC pwr supply	£64.95	C
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PM-110A	10A 13.5V DC pwr supply	£119.95	C
PT-1012	12A 13.5V DC pwr supply	£89.95	C
PT-120	20A 13.5V DC pwr supply	£139.95	C
PC-120	20A 8-15V DC pwr supply	£179.95	C
PT-135	35A 13.5V DC pwr supply	£169.95	C
SP-135	35A 13.5V DC SM pwr supply	£149.95	C
PC2S-30	30A 5-15V DC pwr supply	£189.95	C
PT-50A	50A 13.5V DC pwr supply	£229.95	C

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£89.95 C

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The EP-925 is a general purpose 3-15V DC 25A (30A peak) power supply able to provide the needs of the modern 100W HF transceiver. It offers dual analogue meters and has over current protection. Large power terminals for rigs as well as quick snap connectors for ancillaries.

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These infrared headphones are designed for mono applications such as radio communications. Smart padded headset is completely free from trailing wires. Infra red module plugs into your receiver or transceiver. Supplied with AC mains adaptor and mono input lead with phono plug and 3.5mm adaptor. Walk round the shack and keep in touch. Even lay in bed! 2 x AA cells for headphones included.

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Base Microphones			
WM-308	Desk electret mic c/w ML-308	**£59.95**	B
ML-308	Spare mic lead for WM-308	**£8.95**	A
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FBI-9	Over the ear, 3.5mm mono, biege	**£9.95**	A
FBI-9K	Over the ear, 2.5mm mono, biege	**£9.95**	A
WEP-300B	Over the ear, 3.5mm mono jk-plug	**£2.95**	A
WEP-400	Deluxe adjustable, 3.5mm mono	**£14.95**	A
17-0576	Earpiece 8 Ohms 3.5mm mono	**£0.95**	A
17-0575	Earpiece 8 Ohms 2.5mm mono	**£0.95**	A
Speaker Microphones			
QS-112(Y,K,I,M)	H/held spkr/mic (state which model)	**£16.95**	A
Headphones			
HP-100 *New*	8 Ohm H/phones	**£19.95**	A
HP-200	8 Ohm padded comms H/phones	**£22.95**	A
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SP-160	Mobile comms ext. speaker	**£9.95**	A
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Designed for Motorola 2-pin Motorola Hand helds. This is a really tough unit. We have a supply of these brand new at a silly price. Stock up now.

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Heil Classic HCL series Base mic's with stand and Studio one + HC elements

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Hand Microphones			
GM-4	Goldline HC-4 hand mic	**£129.95**	B
GM-5	Goldline HC-5 hand mic	**£129.95**	B
GM-V	Goldline Vintage Hi-z hand mic	**£159.95**	B
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HST-817	Traveler single side headset for FT-817	**£89.95**	B
HST-706	Traveler single side headset for IC-706	**£89.95**	B
HST-IC	Traveler single side headset for ICOM	**£89.95**	B
HSTA-817	Extra interface cable for HST-817	**£24.95**	B
HSTA-706	Extra interface cable for HST-706	**£24.95**	B
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PRO-SET-PLUS	Large H/phones with HC-4 & HC-5	**£199.95**	B
PRO-SET-PLUS-IC	Large H/phones with IC & HC-4	**£219.95**	B
PRO-SET-4	Large H/phones with HC-4 element	**£129.95**	B
PRO-SET-5	Large H/phones with HC-5 element	**£129.95**	B
PRO-SET-IC	Large H/phones with ICOM element	**£149.95**	B

bhi

NES10-2 Kills noise, brings up signals. Dip switches offer variable settings. Includes 12V pwr lead.

NES10-2	DSP spkr with user adjustment	**£99.95**	B
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**Locks onto local atomic standard *18 different world paths *5 HF DX bands *Mimics beacons' sequences - not a receiver *Ext 12V, PP3 back-up*
Use your receiver to listen to the appropriate band. An absolutely essential item for DX working.

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**24 Hr Quartz clock *Full 24 Hr dial format *Superb time keeper *World map on face *Principle cities on outer trim *Size 305mm*
Know what time it is locally and around the World.

MFJ-115 24 Hr World Map Clock **£29.95** A

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Equally great for the radio shack or bedroom.

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*Giant 59mm (2 1/4in) red LEDs * Selectable 12 or 24 Hr * 220V AC powered with battery back up * Built-in mounting holes * Size 330 x 160 x 20mm * Weight 600g*
Superb shack clock with highly visible red LED's.

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MORSE CODE READER

MFJ-461 MORSE CODE READER

**Stand alone unit *Built-in mic *32char high contrast LCD *Automatic speed tracking *Serial port *Built-in speaker *9V PP3 (not included)*
Simple PC program available (user supplies disk)

MFJ-461 Pocket size Morse code reader **£84.95** B

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SATURDAY 8th FEBRUARY

Morse code assessments at Waters & Stanton's Hockley Store on Saturday 8th February 2003.
4 Candidates per session (push to 5 if we have to).

Session times;
10 am
11 am
12 noon
2 pm
3pm

Best to book a session as we anticipate high demand for places. Candidates need to bring;
1) £5 Fee
2) Current Licence Validation Document
3) One other form of I.D.

Book by e-mail / phone / fax / post to Mark Francis at W&S

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We treat each and every order as very important and try to despatch them the same day that they are received by us. Please note that our parcels are collected at 4pm therefore orders received after this will be sent out the next day.

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CODE D:	Next day for goods to offshore islands inc. N. Ireland	**£12.00**
CODE E:	Next day by noon OPTIONAL	**£15.00**
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CODE Q:	Special case please contact us first	**£ ?**

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2 Midlands & North
WATERS & STANTON @ LOWE
Bentley Bridge, Chesterfield Rd, Matlock, Derbyshire, DE43 5LE
Tel:01629 582380 Fax:01629 580020

3 South
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Spa House, 22 Main Rd, Hockley, Essex, SS5 4QS
Tel:01702 206835/204965
Fax:01702 205843

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Ultra Compact size:	7.87" x 3.15" x 10.3" W.H.D.
High Power Output:	HF/6m 100W, 2m 50W, 70cms 20W w/AC or 13.8VDC or 20W, (10W on 70cms) w/optional Ni-MH Battery

Optional Accessories include

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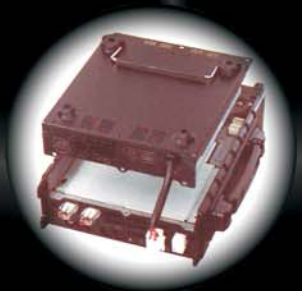
Ni-MH Battery Pack



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FC-30 External
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