Updated Band Plans - from 136kHz to 76GHz

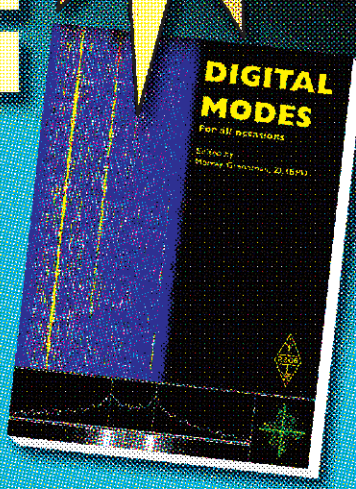
0402

www.rsgb.org

RadCom

OUT APRIL! see p28

£3.95 Vol 78 No 4 ♦ April 2002 The Radio Society of Great Britain Members' Magazine



Bugambic - a PIC-based Keyer

'Technical Topics' 45th Year

Discover the World of WorldSpace

'Top Drive' Antenna for the Lower Bands

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RIGblaster
a marriage of radio and computer

OVER 10,000 ON THE AIR

PSK31, MFSK, MT63, SSTV, RTTY, AMTOR, CW, PACKET-APRS, HELLSCHREIBER, REMOTE BASE, METEOR SCATTER, CLUB QST'S REPEATER CONTROLLER, VOICE KEYER.

TRY THAT WITH A TNC!

All programes and every lead included. Just change jumper lead to suit rig's mic socket pin-out

RIGblaster Plus	Auto mic switch 8-pin round (software and cables)	£139.95 B
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SOUTH, I

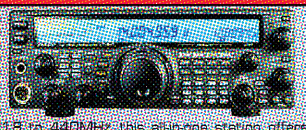
YAESU

FT-1000MP Mk-V 200W HF ALL MODE
3 YEARS FREE WARRANTY

SPECIAL OFFER
FREE HEIL GOLD LINE MICROPHONE
When you buy the amazing FT-1000 MK-V from us, we will offer you FREE the equally amazing Heil Gold Line microphone with dual inserts and matching lead (base stand optional extra)

£2899
Plus £9.00 Carr.

FT-847 160m - 70cm ALL MODE
3 YEARS FREE WARRANTY



1.8 to 440MHz, this all-in-one station offers unbeatable value. 100W on HF plus 6m, and 50W on 2m and 70cms. You get genuine RF clipping on SSB for up to 5dB gain and there are 4 separate antenna sockets

£1149
Plus £9.00 Carr.

FT-100 D 160m - 70cm ALL MODE
SAVE

Yaesu's latest version is now available and includes 500Hz CW filter, high stab. oscillator and CTCSS decoder

£899
Plus £6.00 Carr.

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

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

£1099
Plus £9.00 Carr.

W-25SM 25AMP SWITCH-MODE POWER SUPPLY
THE QUIET ONE

Switched 230v - 115v AC inputs and fixed 13.8V output at 22 Amps continuous and 28 Amps peak. Over voltage and over current protected and fan cooled. Measures 150mm (W), 75mm (H) and 190mm (D)

£69.95
Plus £6.00 Carr.

KENWOOD

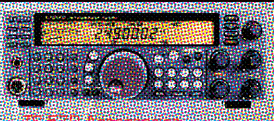
TS-2000 160m - 70cms+23cms OPTION
3 YEARS FREE WARRANTY

+FREE HEIL HM-10 MIC

The amazing TS-2000 offers coverage from HF to UHF. And you can go right up to 23cms with the optional module. Monitor the DX plus ear whilst working other DX, optimise your satellite contacts, enjoy the benefit of built-in ATU. It's all there in one very compact box. Colour brochures available on request.

£1695
Plus £9.00 Carr.

TS-570DG 160m - 10m All Mode
3 YEARS FREE WARRANTY



TS-570 Accessories

VS-3	Voice synth	£45	A
DRU-3A	Recording	£99	B
HS-5	Headset	£52	B
MC-90	Desk mic	£187	B
MC-60	Desk mic	£70	B
PG-3B	Power supply	£195	C
SP-23	Speaker	£68	B
CW	Filters each	£51	B
SSB	2.8kHz	£51.88	B

INTEREST FREE
DEPOSIT £85
6x MONTHLY £29.97
OPTION £580.18

£849
Plus £9.00 Carr.

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

It has IF stage digital signal processing on transmit and receive. This raises the performance to a level that is impossible for analogue circuitry to achieve. Also features automatic ATU, interactive menu system, built-in electronic keyer and 100 memories.

INTEREST FREE
DEPOSIT £135
6x MONTHLY £47.83
OPTION £928.22

£1349
Plus £9.00 Carr.

SGC SG-2020 £599
Plus £2.75 Carr.

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

NEW! SG-2020 ADSP now available £799 carriage £9.00

SG-237 mini auto coupler ideal for SG-2020 £369

ICOM

IC-756 PRO II £2495
Plus £9.00 Carr.

NEW

IN STOCK NOW!

This is Icom's new Flagship

IC-7400 160m - 2m ALL-MODE

NEW

IN STOCK NOW!

£1499
Plus £9.00 Carr.

IC-756PRO 1.8 - 52MHz 100W
3 YEARS FREE WARRANTY

INTEREST FREE
DEPOSIT £190
6x MONTHLY £66.89
OPTION £1303.66

£1895
Plus £9.00 Carr.

IC-706IIG 160m - 70cm ALL MODE
3 YEARS FREE WARRANTY

The IC-706MkIIG is the latest enhanced version of this popular HF/VHF/UHF mobile rig. It has more features but in the same physical size.

ICOM ACCESSORIES

AH-180	Auto ATU	£279.95	B
FL-100	500Hz CW	£59	B
FL-222	350Hz CW	£59	B
FL-103	SSB 2.8kHz	£59	B
FL-223	SSB 1.8kHz	£59	B
CIC Lead	(spare)	£16	A
3.5m	scp cable	£39	A
6m	scp cable	£49	A

£899
Plus £9.00 Carr.

IC-718 100W HF £549
Plus £9.00 Carr.

SAVE £150

LIMITED SPECIAL OFFER!

If you are looking for a radio with pedigree, but without a high price tag, then this may be the one for you. Covers all HF bands including wide band receive. Plus auto notch, dual VFO, s-m meter etc. Plus options including DSP & filters.

Built-in ATU and requires approx 80W drive.

£3899 C

QUADRA 1KW HF AMPLIFIER!

Main VL-1000 amplifier module (413W x 151H x 451D mm) has 2 RF inputs and 4 switched antenna outputs. Large display offers VSWR, peak power, voltage, current and functional information. With most Yaesu transceivers you enjoy automatic band-switching. The separate VP-1000 230V AC power supply with long interconnecting leads coasts along and measures 413W x 151H x 381D

EXCLUSIVE 3-YEAR WARRANTY!!

& FREEPHONE ORDERS: 08000 73 73 88

MIDLANDS, SCOTLAND.

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

YAESU

FT-1500M • 2m FM Mobile £159 Plus £9.00 Carr.

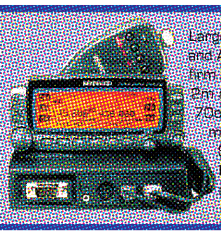
SPECIAL OFFER

SAVE £70

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

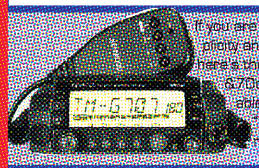
KENWOOD

TM-D700E • 2m + 70cm FM £449 Plus £9.00 Carr.



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

TM-G707E • 2m + 70cm FM £289 Plus £9.00 Carr.



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

TM-V7E • 2m + 70cm FM £359 Plus £9.00 Carr.

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

ICOM

IC-207H • 2m + 70cm FM £279 Plus £9.00 Carr.

A great budget class radio for VHF & UHF use.

IC-2800H • 2m + 70cm FM £419 Plus £9.00 Carr.

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

IC-2100H • 2m FM Mobile £229 Plus £9.00 Carr.

Rugged design with switched receive filters, 12.5/25kHz.

IC-910 2m + 70cm All Mode £1299 Plus £9.00 Carr.

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

YAESU

FT-7100 • 2m/70cm Mobile £399 Plus £9.00 Carr.

NEW

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

£25 ACCESSORY VOUCHER

AV-40 • VSWR METER £39.95 Plus £6.00 Carr.

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

KENWOOD

TH-D7E • 2m + 70cm £299 Plus £9.00 Carr.

DATA COMMUNICATOR

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

TH-F7E • 2m + 70cm £269 Plus £9.00 Carr.

NEW

WITH EXTRA WIDE RX COVERAGE

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

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

HORA

HORA C-408 • 70cm £49 Plus £6.00 Carr.

HOCKLEY ONLY

Very much underrated handy. Covers the full 70cm band. Wideband receive possible. Very compact fits into top pocket. Ideal for use at rallies. Only uses 2x AA batteries (not included).

SPECIAL OFFER

- 230mW, CTCSS
- Digital Display

LINEAR AMPLIFIERS

CHALLENGER II	HF LINEAR AMP 10-160m	£2095	D
EXPLORER	HF LINEAR AMP 10-160m	£1595	D
PIONEER 572H	HF LINEAR AMP 10-160m	£1295	D
RANGER 811H	HF LINEAR AMP 10-160m	£995	D
HUNTER	HF LINEAR AMP 10-160m	£1195	D
HUNTER 6	6m LINEAR AMP 50-54MHz 600W OUT	£895	D
DISCOVERY 2	2m LINEAR AMP 400-1000W OUT	£1395	D
DISCOVERY 6	6m LINEAR AMP 50-54MHz 400-1000W OUT	£1395	D

ADI

ADI AT-600 • 2m/70cms £179 Plus £6.00 Carr.

HOCKLEY WAREHOUSE EXCLUSIVE

- Dual Band 2m/70cms
- Up to 5 Watts out
- Airband Receive
- Nicad Pack • CTCSS
- Mod Charger

You won't find better value than this. Limited stocks

ADI AT-201 • £99 Plus £6.00 Carr.

- 2m Handy
- 2.5W, 5W (13.5V)
- 1750Hz & CTCSS
- Wideband receive
- Drycell case
- Batteries not included
- Full keypad

Higher power than most palm sized models. Fully illuminated keypad for ease of frequency entry. Channel or frequency readout.

ADI AT-147 • 2m 50W £199 Plus £9.00 Carr.

WITH AIRBAND RECEIVE

2m FM mobile transceiver. Three power levels 50/10/5W. Displays frequency or channel numbers, and offers Airband AM receive.

YAESU VX5R • BLACK OR SILVER £269 Plus £6.00 Carr.

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

YAESU VX1R • 2m/70cm £145 Plus £6.00 Carr.

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

HOCKLEY STORE SECOND HAND LIST

HF Transceivers		ICF-SW7600D	£79.00
FT-920	£899.00	WA-8000	£199.00
TS-680S	£549.00	*Scanners Hand Held*	
VHF/UHF Base/Mobile Transceiver		AR-8200 x 2	£259.00
AR-446	£199.00	*Station Accessories*	
2001 x4	£145.00	PK-900	£299.00
7003	£125.00	ALS-600XCE	£899.00
DR-110E	£125.00	SX-100	£69.00
IC-275E	£549.00	AMT-3	£50.00
IC-2100H	£169.00	FAX-1	£125.00
FT-225RD	£499.00	NTR-1	£99.00
FT-290R x3	£159.00	KAM Plus	£199.00
FT-290R II x2	£249.00	MFJ-247	£129.00
FT-690R II	£299.00	MFJ-411	£45.00
FT-5200	£289.00	MFJ-812B	£25.00
VHF/UHF Hand Held Transceiver		MFJ-1020A	£65.00
DJ-480	£99.00	MFJ-1274	£100.00
IC-M11	£199.00	MFJ-1610	£4.00
IC-T7E x 2	£199.00	MML-144-30-LS	£69.00
IC-W21ET	£125.00	3000A +	£289.00
C-108	£89.00	Micro-RF	£69.00
FT-41R x2	£99.00	Pico-2	£149.00
IC-M11	£199.00	PowerClear	£199.00
Shortwave Receivers		WMM-1	£49.00
ICF-SW100E	£115.00	*Miscellaneous*	
IC-R75	£499.00	AE-2850	£50.00
HF-225	£249.00	GPS-3000	£89.00
WR-2085	£29.00	...MANY MORE IN STOCK TOO MANY TO BE LISTED.	

- 3 MONTHS PARTS + LABOUR GUARANTEE.
- PLEASE RING BEFORE SENDING AN ORDER.

SCOTTISH STORE SECOND HAND LIST

HF TRANCEIVER & RECEIVERS		HF-150	£175.00
IC-746	£925.00	HF-225	£200.00
FT-100	£625.00	IC-R70	£275.00
FT-847	£950.00	*HANDHELD*	
IC-756	£845.00	TH-79E	£185.00
IC-706	£450.00	DJ-V5E	£169.00
SG-2020	£425.00	DJ-S41	£50.00
IC-726	£375.00	IC-2E	£40.00
TS8205 & VFO-520 & SP820 & DESK MIC	£300.00	VX-1R	£99.00
NRD-525	£450.00	*SCANNERS*	
VHF/UHF TRANSCEIVERS		IC-R10E	£185.00
FT-736R	£800.00	IC-R3	£300.00
TR-751E	£245.00	MVT-5000	£90.00
TM-741E	£269.00	*ACCESSORIES*	
FT-90R	£249.00	BNOS	£95.00
TM-707E	£219.00	FL3	£56.00
DR-135	£175.00	MD-100A8X	£70.00
TS-70D	£149.00	MD-1C8	£60.00
IC-207H	£199.00	MFJ 50 MHZ ATU	£35.00
TM-701E	£195.00	KPC-9612	£95.00
IC-229H	£135.00	SP-8	£99.00
FT-290RMK2	£149.00	MFJ-969	£149.00
FRG-100	£299.00	50MHZ ATU	£35.00
IC-R7100	£475.00	PS-15	£45.00
		TARGET	£85.00
		DSP-232	£125.00
		PB-38	£21.00

FT-817 'SPECIAL OFFER'

YAESU

SAVE £100!

INCLUDES AC CHARGER AND 1 AMP Ni-cad PACK

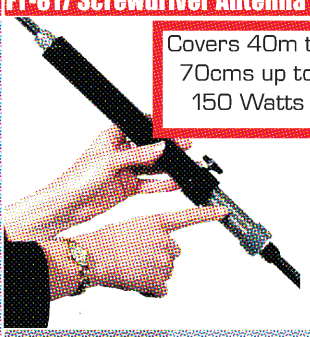
This amazing FT-817 offers all modes from 1.8MHz - 440MHz with up to 5 watts out. Buy one of our "WALKABOUTS" antennas at the same time and SAVE EVEN MORE! We will give you an extra 10% DISCOUNT on the antenna!

NEW MINI SM PSU PS-817 £19.95 carr.£9.00

£699 carr.£9

'Amazing' FT-817 Screwdriver Antenna

Covers 40m to 70cms up to 150 Watts



Manually slide it to set band and fine tune with 110cm telescopic whip. Supplied with universal table clamp and SO-239 socket, plus 3m radial kit. Can also be mounted on any 3/8" mount. Packed down length just 30cm. THIS IS NO MIRACLE, IT'S THE REAL THING! (80m kit and other accessories available)

£149.95 carr.£9

WATERS & STANTON

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

Get in Front with HUSTLER

5BTV £209.95 Carr. £9.00

4BTV £169.95 Carr. £9.00

HUSTLER®

BASE STATION ANTENNAS

Spec	5BTV	4BTV
Bands	5	4
Coverage	80m-10m	40m-10m
Bandwidth 10-40m	Full	Full
Bandwidth 80m	100kHz	N/A
Resonance	1:1	1:1
Power	1kW CW	1kW CW
Traps	3" forms	3" forms
Tubing	1.25"	1.25"
Bracket size	1.75"	1.75"
Height	25ft 1" (7.64m)	21ft 5" (6.52m)
Weight	17lbs. (7.7kg)	15lbs. (6.8kg)
Wind (112kph)	13kg	-

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

HUSTLER Mobile Antennas

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

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

Lower mast sections

MD1	54" (FOLD @ 22")	£33.95 C
MD2	54" (FOLD @ 27")	£33.95 C
MD3	54" (NON FOLD)	£28.95 C
MD4	27" (NON FOLD)	£22.95 C

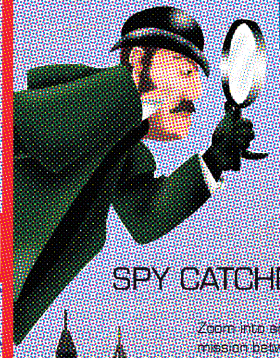
WATSON

CAPTURE THAT FREQUENCY!

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

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

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



SPY CATCHERS

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

WR-5001 £99.95 WR-5002 £169.95

WATSON

Avair VSWR Power Meters

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

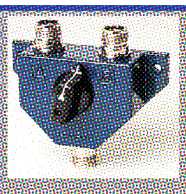
AV-200 1.8 - 200MHz 5/20/200/400W £49.95 B

AV-400 140 - 525MHz 5/20/200/400W £49.95 B

AV-600 1.8 - 525MHz 5/20/200/400W £69.95 B

All fitted with SO-239. PEP, RMS readings. 3W for FSD approx. AV-600 has dual sensors.

CS-600 • 2-way Coax Switch



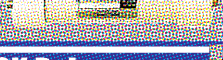
2-way coax switch ideal for use in antenna systems and service departments. Provides a very positive method of switching between two coax systems and offers very low loss.

£12.95 A

B1-2K Balun £25.95

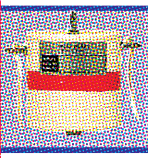
Plus £2.75 Carr.

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



B4-2K Balun £34.95

Plus £6.00 Carr.



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

REM-BAL4 • Remote Balun £49.95

Plus £6.00 Carr.

The REM-BAL4 is a 4:1 current type balun and is ideal for open wire to coax interfacing, especially external to the operating position. Unlike voltage baluns, current type baluns maintain output balance over a wide range of loads. Can be used with a transmatch.

WATSON

WEP-300B • EARPIECES £2.95

Plus £2.75 Carr.

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

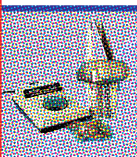
WSA-1 PSK-31 Adaptor £39.95

Plus £6.00 Carr.

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

YS-130 £79.95

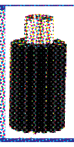
Plus £9.00 Carr.



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

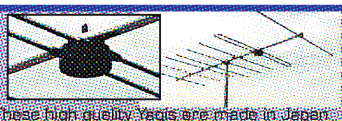
REVEX • 15W DUMMY LOAD £19.95

Plus £2.75 Carr.



- Range DC - 500MHz
- Power 15W / 50W
- VSWR 1.15:1
- Connector PL259
- 50 Ohms impedance
- Size 34 x 72mm
- Weight 70g

MASPRO VHF/UHF YAGIS



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

Take a look at our prices!

144-WH5	2m 5 el. 6.6dBd	0.93m	£26.95 B
144-WH9	2m 9 el. 9.6dBd	1.79m	£37.95 B
144-WH10	2m 10 el. 9.7dBd	2.3m	£41.95 B
435-WH9	70cms 9 el. 9.6dBd	0.8m	£29.95 B
435-WH13	70cms 13 el. 12.8dBd	1.51m	£36.95 B
435-WH15	70cms 15 el. 14.0dBd	2.16m	£41.95 B

To compare with dBi figures, add 2.4dB

WATSON

QS-112 • SPEAKER MIC £16.95

Plus £2.75 Carr.

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

SPM-102 • SPEAKER MIC £9.95

Plus £2.75 Carr.

Incredible value!

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

Limited stocks.

WM-308 • BASE MIC £59.95

Plus £6.00 Carr.

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

WCT-321 • LAPEL TALKER £19.95

Plus £2.75 Carr.

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

AVAIR VSWR • POWER METERS

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

AV-200 1.8 - 200MHz 5/20/200/400W £49.95 B

AV-400 140 - 525MHz 5/20/200/400W £49.95 B

All fitted with SO-239. PEP, RMS readings. 3W for FSD approx.

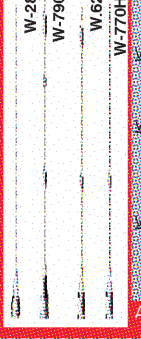
Also available AVEX-6 AV-60 compact meters.

BASE VHF/UHF VERTICALS

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

Dual Band 2m / 70cms		
W-90	3/6dB 1.15m long	£39.95 C
W-50	4.5/7.2dB 1.9m long	£49.95 C
W-900	6.5/9dB 3.1m long	£59.95 C
Triple band 6m / 2m / 70cms		
W-2000	0/6/9dB 2.5m long	£69.95 C

GREAT VALUE MOBILE WHIPS



W-285	2m 5/8th whip with PL-259 base	£14.95 B
W-7900	2m / 70cm 5 & 7dB length 1.38m	£32.95 B
W-627	6m / 2m / 70cm 2 / 4.5 / 7dB length 1.5m	£34.95 B
W-770HB	2m / 70cm whip 3dB / 5.5dB length 1.1m	£24.95 B

ALL WITH TILTOVER BASES

RSGB Matters

M3s ROCK THE FOUNDATION OF AMATEUR RADIO!

THE M3 REVOLUTION is very much under way. Figures released by the RA on 28 February show that 1407 M3 callsigns have been issued by the Radio Licensing Centre (RLC) in Bristol since 1 January. To date, 960 Full Class B and 134 Intermediate Class B licence holders have taken advantage of the Morse Assessment to get on the HF bands, while 313 candidates have successfully taken the Foundation course and been issued with their new M3 calls.

And the revolution does not stop here. . .

THE RSGB has been just as busy as the RLC. Since the start of the year the Society has registered 239 Foundation Instructors and sent out over 250 Foundation course packs which will fulfil the needs of in excess of 3000 Foundation Licence candidates. To date, 135 clubs have registered as Foundation course centres. Add to this the nearly 300 Morse Assessment packs that have been dispatched and we guess it's fair to say that we have been 'overwhelmed' at the interest being shown in the new Foundation Licence - so much so that extra staff have had to be taken on to cope with the mountain of requests which are received daily at HQ.

More support the work of the Society. . .

INTEREST IN THE work of the RSGB in support of the UK amateur community has risen since the introduction of the new licence. Over 400 new and lapsed members have joined the Society since 1 January and this figure grows day by day.

Further afield, the RSGB / RA initiative to introduce the Foundation Licence is being watched with interest in a number of countries, not least Australia, where the WIA is shortly to start discussions on the possible introduction of their own Foundation-style licence.

GB2RS RESERVE NEWSREADER WANTED

SIMON LLOYD HUGHES, GW0NVN, is looking for a reserve GB2RS newsreader. He broadcasts GB2RS on 10m, 6m, 2m and 70cm FM and PSK31 on 80m. His coverage is the South Wales and Severn Estuary. If you feel that you can help, please contact Simon on tel: 01446 744588, write to GW0NVN, 4 Blenheim Close, Barry, Vale of Glamorgan CF62 8AN; e-mail: derlo@rsgb.co.uk or contact Gordon Adams, G3LEQ, the GB2RS News Manager, on 01565 652652.

GOLDEN JUBILEE PREFIXES: GQ, MQ, 2Q

AS REPORTED BRIEFLY in the March edition of *RadCom*, the RA has agreed that all UK radio amateurs may use the prefix GQ in celebration of Her Majesty the Queen's Golden Jubilee. This also includes the prefixes MQ and 2Q as applicable. The special prefixes may be used from 0000UTC on **1 June** until 2400UTC on **30 June** inclusive.

If amateurs choose to use these prefixes, the operation will be in the same format as in 1977, when the prefix GE was issued in celebration of Her Majesty's Silver Jubilee. For G and M series, the Country locator is dropped in preference to the prefixes GQ and MQ respectively, eg G, GD, GI, GJ, GM, GU and GW all become GQ; and M, MD, MI, MJ, MM, MU and MW all become MQ.

Similarly, Intermediate callsign series drop the second letter of the callsign in favour of the letter Q, eg 2E becomes 2Q, 2D becomes 2Q etc.

As previously stated, the use of these prefixes is not mandatory. Radio amateurs may continue to use their normal callsigns during the period should they so wish.

Richard Horton, G3XWH (left), receiving the Kenwood Trophy from RSGB President Bob Whelan, G3PJT, for his significant contribution to training and development in amateur radio.

The RSGB's mobile amateur radio demonstration vehicle, GB4FUN, leaves RSGB HQ on 6 March for a 1300-mile round trip visiting schools and colleges in England, Scotland and Wales. This first major outing for GB4FUN coincided with National Science Week. First stop: Stranraer!

AROS TALK

THE AMATEUR RADIO Observation Service (AROS) Coordinator Barry Scarisbrick, G4ACK, will be giving a talk on the work of AROS at the Basingstoke Amateur Radio Society on **8 April**.

6M TO MICROWAVES CONVENTION

THE NEW '6m to Microwaves' Convention, organised by the RSGB VHF Committee, VHF Contest Committee, Microwave Committee and the UK Six Metre Group, takes place on Saturday 6 April at Reaseheath College, Nantwich, Cheshire CW5 6DF. The convention will feature lecture programmes from top 6m / VHF / Microwave operators all day. The UKSMG will also be holding its AGM at the event. The RSGB Contest Committee awards and other VHF presentations will be made during the day.

A 'DX Dinner' will be held in the evening and overnight B&B accommodation can be provided on site. Reaseheath College is located five miles from Junction 16 of the M6.

Entrance is just £5 for day visitors, with B&B £28.50 per night. The DX Dinner costs £25. Please phone 0870 904 7373 to book. Up to date details of the lecture streams and other information can be found at www.rsgb.org/vhfconvention

RSGB MORSE TEST 16TH ANNIVERSARY

THE RSGB's Morse Test Service celebrates its 16th anniversary over the weekend of 11/12 May 2002. As in previous years, County Morse test teams will be on the air (on CW of course!) using GB0 callsigns, mainly on 80 and 40 metres. A certificate will be made available at a cost of £2.50 for anyone contacting at least 10 of the stations active.

M3 QSL BUREAU SUB-MANAGER

THE RSGB QSL Bureau Sub-Manager for the new M3 series of callsigns is Steve Bainbridge, M1SWB, of 6 Sandyville Grove, Liverpool L4 8UL. Those holding Foundation Licences should send a series of SASEs to M1SWB if they wish to receive QSL cards for their M3 callsigns via the RSGB QSL Bureau system.

TAILOR-MADE MORSE PRACTICE TAPES

THIS IS AN RSGB service for the student or experienced operator. You can have 90 minutes of intensive Morse receive practice at the speed of your choice. Simply send a blank cassette tape to the Morse Practice Co-ordinator, specify the speed (anything from 5 to 55WPM) and the format (eg QSO-type as used in the Morse test, plain language - with or without signals - callsigns only, numbers only, old GB2RS scripts and so on) as would suit your own personal needs. If possible please include your latest callsign when requesting the tapes.

All you need to do is mail a blank C90 cassette, include a return-addressed envelope or a label and stamps together with a note of the speed and format required to: George M Allan, 22 Tynwald Avenue, High Burnside, Rutherglen, Glasgow G73 4RN. If you need more information please tel: 0141 634 4567 or e-mail: george@allan99.freeserve.co.uk

RSGB VHF AWARD NEWS

WHAT A SUPERB number of months! The majority of awards recently have been for 50MHz and February was no exception. A bumper claim arrived from Andy Kissack, GD0TEP (IM) in a large box, which firmly established him as the new leader. Andy also updated his Country (2-way) award to the 130 country level.

Roy Walsh, G4ZNK (BA), climbs on to the first rung of the award ladder with successful claims for 10 and 20 Countries (2-way) and also for 25 squares.

Robin Burrows-Ellis, M1DUD (IP), continues to enjoy success at QRP levels.

Grant Wilson, MM5TGW (GW), gains his 40 countries endorsement sticker; Don McKay, MM5AJW (KW), gains his 80 countries sticker; David Jarrett, G4DCJ (PE), continues to climb the table with a claim for 425s; and finally Frank Howe, G3FIJ (CO), gains stickers for 40 countries and also for 150 squares.

Ted Agar, G8AZA (YO) did a re-sort of his 2m cards and despatched enough for a 40/10, 60/15 and 80/18 squares award.

A reminder that there is now an award available for Foundation Licence holders. Details of this and all VHF, UHF and Microwave Awards can be obtained on receipt of an A4 or A5 SASE from the Awards Manager, Tony Jarvis, G6TTL (QTHR). They are also available on the Internet at www.rsgb.org/operating/index.htm Queries may be sent by e-mail to vhf.awards@rsgb.org.uk

Summary of Award Recipients for February

50MHz: 10 Countries (2-way): G4ZNK. 20C: G4ZNK. 40C: MM5TGW, G3FIJ. 80C: MM5AJW. 110C: G8BQX, GD0TEP. 120C: GD0TEP. **25S:** G4ZNK. 75S: M1DUD. 150S: G3FIJ. 425S: G4DCJ. 475S: GD0TEP. 500S: GD0TEP. 525S: G8BQX, GD0TEP. 550S: GD0TEP. 575S: GD0TEP. 600S: GD0TEP.

144MHz: Senior Operating: G8AZA. **40 Squares/10 Countries:** G8AZA. 60S/15C: G8AZA. 80S/18C: G8AZA.

Millennium 2000: G4DCJ.

RSGB YEARBOOK 2003 - YOUR VIEWS

THE RSGB HAS recently been looking at the style and content of the *Yearbook* and has decided to make significant changes in the 2003 edition. The Society hopes that in making changes that the *Yearbook* will become more relevant and better meet the needs of those purchasing it. Whilst making these changes the Society has decided to ask for your comments as to how best to change the *Yearbook* in future years. If you want to make a difference to the appearance of the book please send a letter (only) detailing your views to: The Commercial Manager, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

Alan Swanborough, G0JUS, seen here with his prize of a VideoLogic DRX-601ES Digital Radio Tuner that he won in the exclusive *RadCom* competition. Alan said, "The VideoLogic Digital Tuner is really amazing in the number of stations it receives (46 on the last count) and in their clarity. Gone is all the fading and interference, with all 46 stations received at approximately the same signal strength, even on the supplied indoor wire dipole. I still can't believe that I was lucky enough to win the only prize. Many thanks for the wonderful prize and for running the competition."

NEW EVENT

6 METRES TO MICROWAVES CONVENTION

6th APRIL 2002

AT REASEHEATH COLLEGE, NANTWICH, CHESHIRE, CW5 6DF

If you want to know what is happening in 6 Metres, VHF and Microwaves this is the 2002 event for you. This NEW event is being organised by the 6 Metre Group and the RSGB VHF Committee. There will be a series of lectures covering the entire spectrum with several distinguished speakers.

LECTURES

SIX METRES

PIERRE PASTEUR HB9QQ:
OPERATIONS FROM THE MALDIVES (8Q7) AND LIECHTENSTEIN (HB0).
PETER BOWER G4MJS:
OPERATING FROM SABAH 9M6BAA.
UKSMG AGM
6 METRE FORUM

VHF

DAVID BUTLER G4ASR:
MAKING MORE MILES AT VHF
IAN WHITE G3SEK:
DESIGNING AND BUILDING HIGH VOLTAGE POWER SUPPLIES
ANDY COOK G4PIQ:
EASY WAYS TO IMPROVE YOUR CONTEST SCORE

MICROWAVE

PETER DAY G3PHO:
MICROWAVE UPDATE CONVENTION

ADMISSIONS

DAY TICKET
TO A FULL DAY OF LECTURES AND PRESENTATIONS **£5**

DX DINNER
SPECIAL DINNER TO COINCIDE WITH THE EVENT **£25**

OVERNIGHT ACCOMODATION
SPECIAL LOW COST ACCOMODATION ON SITE AT REASEHEATH COLLEGE, BOTH FRIDAY 5th AND SATURDAY 6th AVAILABLE ON A BED & BREAKFAST BASIS for **£28.80**

BOOK ONLINE AT
rsgb.org/shop

FOR MORE INFORMATION SEE:
www.rsgb.org/vhf convention or Tel: 0870 904 7373

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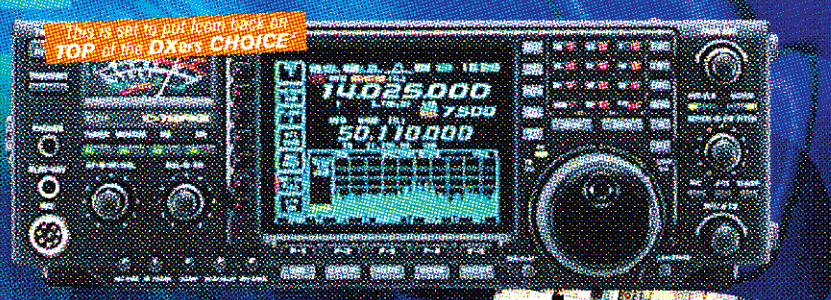
the very BEST EQUIPMENT brought to you by Martin Lynch & Sons



Icom IC-756 Pro Mk2

The new Icom flagship has all the features of the IC-756 Pro plus -

- Improved Receiver
- Digital Voice Storage
- 32 bit DSP Processing
- 24 bit AD-DA converter
- Plus much more!

£2495.00
NO DEPOSIT
48 payments of
£73.82

"Jim Moult, G0BGY is an avid Icom enthusiast and Chris Taylor, Sales Director of ML&S was delighted to supply the very first IC-756 Pro Mk2 to him at the famous London Store".

Icom IC-7400

This is the long awaited IC-746Mk2! With 32 bit DSP and 100 Watts on HF/50mHz and 144mHz plus a built in ATU this radio offers performance at a value for money price.

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NO DEPOSIT
48 payments of
£44.35

Features
- 100 Watts HF
- 100 Watts 50mHz
- 100 Watts 144mHz
- Internal ATU for HF & 50MHz
- DSP noise reduction
- Large clear display
- Twin Pass Band Tuning
- Supplied with Microphone DC [illegible]
- 2 Year Icom W[illegible]

Icom IC-910H

The LATEST VHF/UHF all mode radio from Icom. Features include 100 Watts on VHF, 75 Watts on UHF, True Dual Receive with independent volume and squelch for each receiver, Data sockets for simultaneous two band 9600 Packet operation, Electronic keyer built in and CTCSS encoder.

STANDARD UNIT
ONLY **£1299.00**
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OPTIONS AVAILABLE
1296MHz, DSP units, Voice Synthesizer, TCXO, Narrow CW filters.

Icom IC-R3

The LATEST scanner from Icom offering audio and Visual scanning facilities. Listening to your local repeater or watching 'Crossroads'. IT DOES THE LOT!

COMPLETE WITH LITHIUM ION BATTERY
ONLY **£399.00**
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FREE DSP THIS MONTH
ONLY **£699.00**
NO DEPOSIT
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Remote mounted Dual Band radio with colour TFT display.

£399.00
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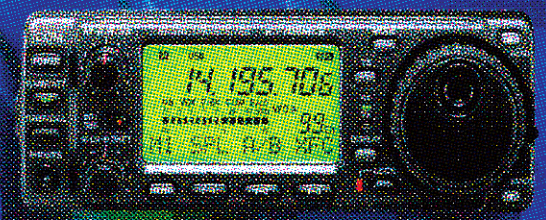

Icom IC-706

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One of the finest mobiles, offering HF/6/2&70 with all mode operation and DSP.

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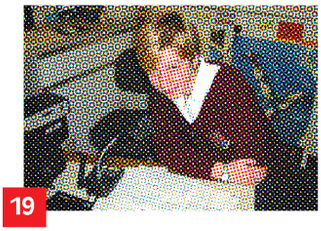
Front Cover:

Andrzej, SP5AHT, has been a ham for many years but is best known in Poland as editor of the magazine *Swiat Radio*. Having constructed a number of transceivers, he has given up on his attempt to beat the most recent technology and purchased a Yaesu FT-817. Even his son seems to be amazed by this midget radio!

Photo copyright Henryk Kotowski, SM0JHF / SO5JHF

RadCom This Month April 2002

News and Reports



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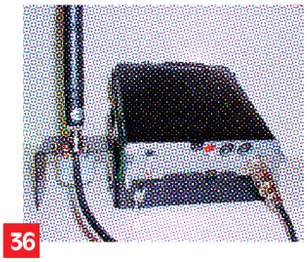
Technical Features

Down To Earth - Amateur Radio From The Ground Up



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Reviews

Regulars

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

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RSGB MEMBERSHIP - Annual Rates

Home Corporate	£40.50
Overseas Corporate	£40.50
Corporate (Senior Citizens)	£31.50
(Applications should provide proof of age at last renewal date)	
Corporate (50 years membership)	50% DISCOUNT
Corporate (60 years membership)	FREE
Family member	£16.50
(Must reside with existing member. Does not include RadCom)	
Student Members	£26.50
(Applications should include evidence of full-time student status)	
HamClub (under 18)	£16.50
Affiliated Societies (UK or Overseas)	£40.50

Subscriptions include VAT where applicable.
Special arrangements exist for blind and disabled persons.
Details and membership application forms are available from RSGB HQ.

RadCom NEWS

International Marconi Day

INTERNATIONAL Marconi Day (IMD), organised by the Cornish Radio Amateur Club, takes place this year on **27 April**. IMD is a 24-hour event held annually to celebrate the birth of Marconi on 25 April 1874. Each year, usually on the Saturday closest to Marconi's birthday, amateur radio stations are set up and operated from Marconi's original sites, or nearby. Amateurs throughout the world are encouraged to make contact with these 'Participating Stations'. An award is available and details are on the Internet at www.users.globalnet.co.uk/~straff/

TV Engineers' Industrial Injury

THE MARCH 2002 *RadCom* contained a news story about a new website of interest to those who may have suffered an industrial injury after working as a TV repair engineer. Unfortunately the website's address was printed incorrectly last month: the correct address is **www.toddweb.co.uk** As of press date, there was nothing on the website about occupational asthma, but the people running the site tell us that they hope to add further information soon.

World Amateur Radio Day: 18 April

A 'guest editorial' from International Amateur Radio Union HQ

AMID THE MUCH publicised commercial successes and failures in the telecommunications industry, it is easy to overlook the fact that radio amateurs continue to be an important source of innovation in communications technology.

A century has passed since Marconi spanned the Atlantic and excited the imaginations of the first generation of amateur wireless experimenters. Amateurs were the first to discover and to exploit the remarkable properties of the ionosphere that permit world-wide communications with less power than it takes to illuminate a light bulb. They were the first to make widespread use of single-sideband voice communication to conserve power and precious radio spectrum. Amateurs applied microprocessors to data communications, popularising packet radio and developing protocols that are now in widespread use in public safety and other services.

As we enter radio's second century, amateurs continue to lead the way in numerous areas. World Amateur Radio Day, held each year on 18 April to mark the anniversary of the founding of the International Amateur Radio Union in Paris on that date in 1925, provides an opportunity to pause and reflect on these current achievements.

Digital HF radio: radio amateurs are the leading developers of new digital techniques for high-frequency (HF) data and text communication. For example, PacTOR combines the strengths of packet radio and the mode known commercially as SITOR to offer reliable and essentially error-free data communication. Disaster relief agencies have adopted it for use from remote locations where no telecommunications infrastructure is available. PSK31 is a user-friendly mode that provides live keyboard communications at low transmitter power levels when error correction is not required. An implementation of PSK31 using computer sound cards has made this the most popular digital mode for radio amateurs in less than two years. Other developers, building on the success of PSK31, are using sound cards to explore a wide range of other digital modes tailored for the challenging HF environment.

Software-defined radios: perhaps the outstanding example of a DSP radio designed for experimental use is the DSP-10, a transceiver for the 144MHz amateur band designed by Bob Larkin, W7PUA, of Corvallis, Oregon, USA. Working with Mr Larkin, a team of amateur software developers is refining a family of programs tailored to explore a wide range of VHF, UHF, and microwave propagation media, including moonbounce (earth-moon-earth) and extended-range tropospheric scatter. These are but examples of what is happening in the 21st century Amateur Radio Service.

The IARU is the world-wide federation of national amateur radio organisations representing radio amateurs in 153 countries. It is a Sector Member of the International Telecommunication Union and is the recognised representative of the Amateur and Amateur Satellite Services at the ITU.

Where Do They Go Next?

THE FIVE STAR DXers Association (FSDXA), the group that put on the major DXpeditions to the Spratly Islands (9M0C) in 1998, and the Comoros (D68C) in February 2001, is now starting to plan its next operation, in late 2003 or early 2004. FSDXA has considerable experience in mounting large-scale operations to 'top 100' DXCC entities, with the ability to cover all bands and modes. The group is not planning to head for Peter 1 or Bouvet Island, but the sort of DXCC entity where you may have a 20m QSO, but are finding those low-band, WARC band or datamode slots hard to fill. The group has already reviewed 'most wanted' surveys, but would be interested to know your 9-band, 3-mode 'wanted lists', to help in its research. Being mainly a European group, the preference would be for an African location for reasons of cost, propagation and travel time. Please e-mail your needs to Don Field, G3XTT, at g3xtt@lineone.net

RMS Titanic Anniversary

MONDAY 15 April marks the 90th anniversary of the loss of the *RMS Titanic*. To commemorate the occasion, GB90MGY will be active (CW only) from 1000 on 13 April until 0219 - the exact time *Titanic* sank - on 15 April. MGY was the *Titanic's* callsign. The station will operate from a replica of the *Titanic* radio room at the Wilfrid Noyce Centre in Godalming, Surrey, which is open to the public from 10.30am to 6.30pm (admission is free). Activity will be on all bands from 10 to 80 metres.

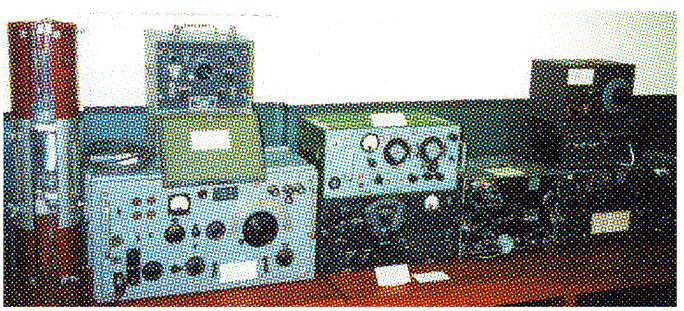
On **12 April**, Ralph Barrett, G2FQS, will give an illustrated presentation entitled 'Titanic and the Wireless SOS' at the Borough Hall, Godalming. The presentation will include interviews with *Titanic* survivors recorded in the USA in the 1950s: the first time these tapes have been heard in the UK.

Jack Phillips, *Titanic's* Chief Wireless Telegraphist who sent the famous SOS message, was born and bred in Godalming.

Radio in Museums

GB2PK WILL BE on the air from the Porthcurno Telegraph Museum near Land's End intermittently between **26 April** and **23 May**, in order to cover International Marconi Day on 27 April and to mark the 100th anniversary of the opening of the Porthcurno Wireless Station. The museum is open *Sunday to Friday* from Easter.

- THE BROOKLANDS Museum, Brooklands Road, Weybridge, Surrey, now has a display of aircraft navigation equipment and radio receivers and transmitters used in heavy bombers during WWII. The museum is open Tuesday to Sunday 10.00am - 4.00pm in winter and 10.00 - 5.00pm in the summer. Entrance is £7.00 for adults with concessions for senior citizens, children and families.
- THE INTERNATIONAL Museums Weekend 2002 will take place over the weekend of **15 / 16 June**. Early indications suggest this will be a much larger event than last year's 53 museums in the UK: over 20 museums and clubs have already registered, including the Franklin Museum in Philadelphia, USA. Registration is a requirement and this is free via the website at www.ukradioamateur.org/imw/ The organiser of IMW2002, Harry, M1BYT, is seeking help from a volunteer willing to design, colour print and post the awards for this year's event. Proceeds from the award, as last year, will go to a London Children's charity. Volunteers please e-mail harry_m1byt@ntlworld.com



Vintage radio equipment at the Porthcurno Wireless Museum.

UKRS Closes Down

IN A MESSAGE on the UK Radio Amateur Newsgroup on 19 February, the United Kingdom Radio Society (UKRS) announced that it was closing down for good. It said that two members of its 'Governing Body' had resigned and that the work of the UKRS had been left to its two Co-Founders. "The only way for the UKRS to survive now would be for us to recruit an entirely new Governing Body and effectively start over. Frankly, we don't have the heart for that", the message stated.

New 160m DF Organisation

THE BRITISH Topband DF Association (BTBDF) has recently been founded to promote this exciting aspect of amateur radio activity. The association has announced the following 'Qualifying Events' during the year:

21April Colchester/Chelmsford
16 June South Manchester
7 July Coventry
28 July Torbay
18 August Echelford
8 September Mid-Thames
22 September National Final

For further information, please e-mail: topbanddf@topica.com

Major Special Event Station Will Have International Appeal

Celebrating Her Majesty the Queen's Golden Jubilee

THE UNIQUE callsign GB50 (yes, Golf Bravo Fifty) has been issued by the RA for a very special Special Event Station to be established at Windsor Castle to celebrate the Queen's Jubilee. GB50 will be on the air between 29 May and 9 June. The station will be run by Cray Valley Radio Society (CVRS) and Burnham Beeches Radio Club (BBRC), with the support of the RSGB.

Activity will be on all bands from 3.5 to 50MHz on CW, SSB, PSK31 and RTTY. A 144MHz station will also be active on CW, SSB and FM.

The organising team hopes to make many QSOs with radio amateurs around the world, especially with the Commonwealth. The station, which will be open to the public, will be operational from 0700 - 2200UTC daily. It will be well equipped to allow simultaneous operation on several bands. Icom (UK) has kindly agreed to provide equipment for GB50, as it did for the millennium Special Event Station at Greenwich, M2000A.

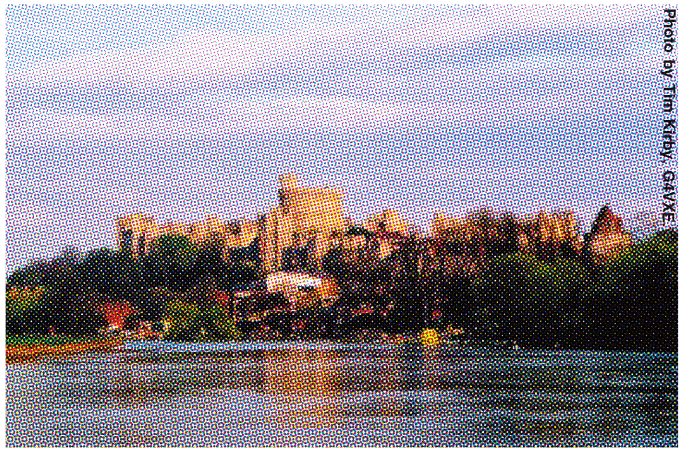


Photo by Tim Kirby, G4VXE.

Windsor Castle from the River Thames.

Windsor Castle is the perfect location for this high-profile, prestigious event. Not only will it celebrate a landmark in British history, it will provide an opportunity to establish an amateur radio station of national and international importance - one that will raise the profile of amateur radio in the British Isles, and will attract young people to the hobby.

Both CVRS and BBRC are well qualified to undertake this project as BBRC operated from Windsor Castle during the Queen's Silver Jubilee celebrations in 1977 and, in January and February 2000, CVRS organised the M2000A station. A website is now up and running and will be kept updated with the latest news: www.gb50.com

The QSL Manager for GB50 will be Owen, G4DFI.

Summits on the Air

A NEW AWARD scheme called 'Summits on the Air' (SOTA) started on 2 March. The idea is to encourage operation from hills with portable equipment. The rules have been carefully drafted so that SOTA is accessible for everyone - not just mountaineers. The award is especially suitable for the QRP fraternity as all of the equipment used must be light and portable - thus low power is likely to be the order of the day.

Details of SOTA and the SOTA manuals for England and Wales can be downloaded from www.sota.org.uk


Richard Newstead, G3CWI/P, at the summit of Caer Caradoc on 2 March.

Bad Bentheim's Golden Antenna

EVERY YEAR the town of Bad Bentheim in Germany presents an award called 'The Golden Antenna' to a radio amateur or an amateur radio group that utilises technology in connection with humanitarian work. Nominations are now invited for this year's award. If you know of any amateur radio enthusiast or group of enthusiasts whose utilisation of technology is connected to humanitarian work, please write **before 1 June 2002** to: The Town of Bad Bentheim, PO Box 1452, 48445 Bad Bentheim, Germany or e-mail: veldhuis@stadt-badbentheim.de

The prize winner or winners will be invited to the 34th German-Dutch Amateur Radio Days and their travel and accommodation costs will be paid. The jury evaluating the nominations includes the President of IARU Region 1 and the President and Chairman of the Dutch and German amateur radio societies.

QSL Communications Open Day

QSL COMMUNICATIONS in Weston-Super-Mare is holding an open day on **Sunday 21 April**. The shop will be open and representatives from Kenwood, Yaesu and Icom will be in attendance. For further details contact Jayne on tel: 01934 512757 or e-mail: jayne@qslcomms.f9.co.uk

Q u a l i t y • I n n o

ALINCO

£699.00

ALINCO DX-70TH

Fully Featured Portable HF+6mtr Transceiver

The DX70 TH packs a hefty 100W punch on all Ham bands 1.8 - 50MHz. It is backed by a superb receiver with narrow filters fitted as standard. Make no mistake - this is a real DX operators transceiver ideal for use at home, or for that portable DXpedition.

- TX - all HF + 6mtr
- 100W output on HF & 6mtrs
- RX - general coverage 150kHz - 30 MHz, 50MHz - 54MHz
- SSB, CW, AM, FM and digital modes
- 100 memories
- Detachable faceplate and remote mounting kit available
- Speech processor standard
- Narrow filters fitted as standard

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

EDX2

Auto Tuner

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

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

£289.00

HFM-1

A stainless steel, heavy duty HF mobile antenna complete with spring base. Covers 3.5 to 30MHz when used with the Alinco EDX-2 Automatic Tuner. Alternatively it may be base matched with any type of tuner for mono band or multi band use. Power handling with the EDX-2 is 150W.

- Covers: 3.5 - 30MHz (when used with EDX-2 auto ATU)
- Length: 2.7 metres

£59.95

ALINCO DR-605E Dual Band Mobile

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

- Ready for 9600 bps packet
- Extended RX capability 136 - 174MH, 420 - 470MHz
- 50W (2m) - 35W (70cms)
- 100 memory channels (+ CALL Channels)
- Cross band full duplex
- Tone search function
- Cable cloning function
- Channel indication mode
- CTCSS encoder fitted

£299.95

The 'NEXT GENERATION' Switch Mode Supply

COMING SOON!

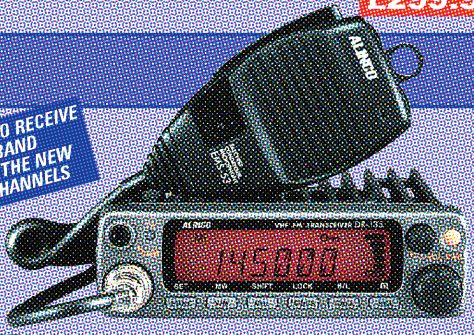
£129.95

DM-330MV

The combination of high quality space saving components and high efficiency switching technology made it possible for the DM-330MV to be super-compact and easy to carry for portable ops and still generate a high 30A continuous output! It comes with short circuit protection, a current-limiting system (over 32A) and extreme-temperature protection.

- 30 Amp Switch Mode Power Supply
- Ultra low noise output ideal for use with HF transceivers
- Voltage: 5 - 15 V DC Variable
- Lightweight: (weighs only 2 Kg)
- Compact: 175 (W) x 67 (H) 165 (D) mm
- Fully Protected: Current, Short Circuit, Temperature
- Large backlight Current/Voltage Meter
- Cigar-plug Socket (10 A Max.)

EXPANDABLE TO RECEIVE AM AIRBAND INCLUDING THE NEW 8.33KHZ CHANNELS



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
- 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 (25/12.5kHz) FM modes
- Theft alarm feature
- AM airband receive
- Ten auto dial memories
- Size: 142 x 40 x 174mm

£235.95

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v a t i o n • S t y l e

radios for 2002

DJS 193E

GREAT VALUE 2 mtr Handheld

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

£139.95

DJ-596 NEW Dual Bander

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

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

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

- 100 memory channels, any mix of VHF/UHF
- Alphanumeric channel labels
- Direct frequency input from keypad
- Large backlit display and keypad
- CTCSS, DCS encode+decode
- DTMF tones and autodial memories
- Tone bursts
- Three scan modes
- Theft Alarm feature
- Wide and narrow FM TX/RX
- 12VDC direct input (5w output)
- High-power NiMH battery (4.5w output VHF/4w UHF)
- Busy Channel Lock Out
- Mosquito Repelling feature (experimental)
- External Terminal Control
- Wire cloning capability
- Optional digital mode *(where permitted)*

£199.95

DJS 195E

2 mtr Handheld with Keypad

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

- New 2 metre (144-146MHz) handheld
- Easy to use, direct entry keypad
- Wide RX possible (typical 135-173MHz)
- Up to 5 watts output (0.8W low power)
- 40 memory channels + 1 call channel
- Large range of accessories available

£159.95

DJ-G5EY Feature Packed Dual Bander

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

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

Advanced Channel Scope

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

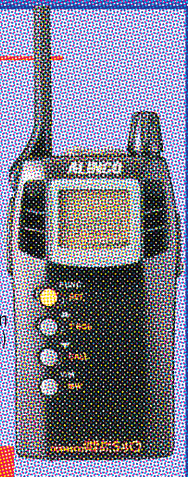
£289.95

DJ-S40 CQ

UHF Pager Sized Handheld

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

- Up to 1 W output (with 13.8V supply)
- Large illuminated display
- Loud clear speaker horn system
- 100 memories+1 call channel
- Multi Scan functions
- 38 CTCSS tones for selective calling
- S-meter
- Cable Cloning
- External device control feature (outputs 3Vdc 5mA signal from an accessory port when squelch opens)
- Additional features, including anti-theft alarm and experimental mosquito repelling tone!
- Huge selection of accessories available



£99.95

DJ-V5E

Compact Dual Bander

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

- New dual band handy transceiver
- 5W/1W/0.5W output power
- Super wide receive (76-999MHz)
- Includes wide FM mode
- CTCSS Encode+decode, DTMF squelch and 4 different European Tone Bursts
- 200 memory channels +2 call channels
- Alphanumeric Display, up to 6 characters
- Autodial memories
- Up to 6 character alpha-tagging
- 4 scan modes, 5 programmable scan banks
- Input voltage display with over voltage warning
- Automatic high temperature protection feature

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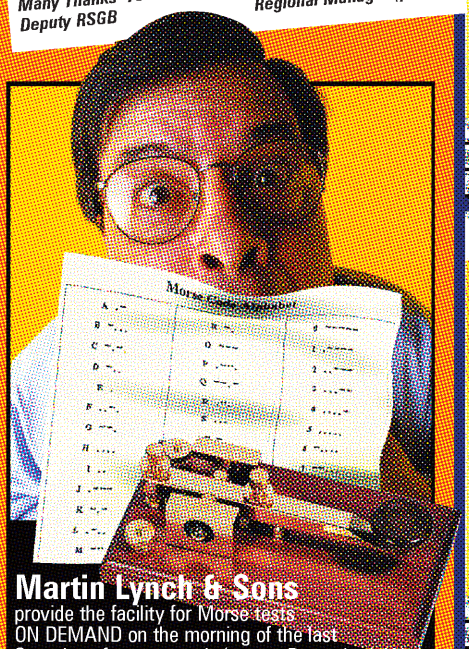
Dear Martin, I ordered a FC-20 Auto ATU for my FT- 847 also bought from you, at 02.30hrs and it arrived at 09.30hrs both today 17th January 2002. This was done on line, how can you achieve such fast delivery speeds? 7hrs in total and that included ringing me to confirm my card number.

Many Thanks 73 de Ian Townson M1/3BGY
Deputy RSGB Regional Manager (pro tem)



Martin Lynch & Sons provide the facility for Morse tests ... ON DEMAND on the morning of the last Saturday of every month *(except December)*. We offer the **5 WORD PER MINUTE MORSE TEST** and the **FOUNDATION MORSE ASSESSMENT**. This is a unique opportunity to take your morse test in a relaxed environment with ***FREE coffee & biscuits*** to **STEADY YOUR NERVES**!

If you have any questions call ***Chris Taylor*** on **0208 566 1120** or email: morse@hamradio.co.uk

Latest "5 WPM MAN" Rod, G7BZV seen here with three of the Morse Examiners, George G3NOH, Robin, G0VJI & Wayne G0JJQ.

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PLEASE NOTE: Payment by Cheque, Cash or Credit card ***ONLY*** can be accepted for these bargains.

Icom706 Mk 2	*used examples from -*	**£599**
FT1000's *used 200W Flagship DX radio*	*from -*	**£1495**
FT1000mp Mk v	*used examples from -*	**£2000**
Icom 746	*used examples from -*	**£799**
Icom 756 Pro	*used examples from -*	**£1495**
Icom 756 Pro (Mk1) *2 yrs warranty last 2 only -*		**£1699**
Icom 207H *Dual Band Mobile with DTMF multi function microphone*	*only -*	**£?**
Kenwood TS-850	*used examples from -*	**£595**
Kenwood TS-570.s	*used examples from -*	**£599**
Kenwood TH-22E *2M Handheld*	*only -*	**£159**
Yaesu FT-840.s	*used examples from -*	**£399**
Yaesu FT-840FM	*used examples from -*	**£599**
The very latest **TMD-700** *from* **Kenwood**	*only*	**£429.00**
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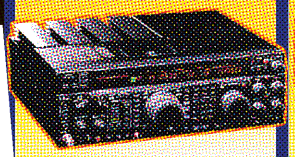
Yaesu VX5R	*at only*	**£269.00**
Icom ICR3E	*at only*	**£399.00**
Kenwood TS-2000X		***UNPRINTABLE!!!***
Yaesu FT-1500 *with DTMF mic ideal for internet linking*	*at only*	***£159.95***
TS-50S *Mini HF Mobile*	*only*	**£599**

YAESU FT1000MP MK5



Yaesu's Flagship radio still our number one selling radio among the discerning DXers.

ML&S £2899
ZERO DEPOSIT!
CALL FOR LOWEST UK PRICE!

YAESU QUADRA VL1000

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

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YAESU FT847

At only £1149.00 this is still the best selling multiband base radio offering HF/6/2 and 70cms plus still the only radio to offer all mode four metre operation.

was £1699 **ML&S £1149**
ZERO DEPOSIT!
48 * £34.00

ICOM IC910H

The LATEST VHF/UHF multimode. Features include 100W on VHF, 75W on UHF and true dual receive.

ML&S £1299 *STD UNIT*
ZERO DEPOSIT!
48 * £38.43

YAESU FTV1000

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

ML&S £799
ZERO DEPOSIT!
48 * £23.64

YAESU FT840 FM

now with FM!

An excellent basic radio offering top notch performance at a budget price.

was £799 **ML&S £599**
ZERO DEPOSIT!
48 * £17.72

YAESU FT817

FT817 PACKAGE
- Nicads
- Charger
- Protective Case
- Miracle Whip
- VHF/UHF rubber helical

This is a radio that every radio ham should own. As well as being an excellent portable radio this makes an ideal second receiver for the shack. Supplied as a package at only £850.00 you are ready to sample the delights of QRP operation.

ML&S £850
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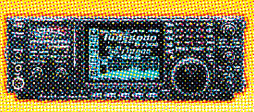
ICOM IC756 PRO MK I



LAST CHANCE *to grab one of these radios at this price!!!!*

ML&S £1699
ZERO DEPOSIT!
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YAESU FT920AF

A top grade starter radio HF and 6 metres with internal ATU

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ZERO DEPOSIT!
48 * £32.52

YAESU FT100D

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

RRP £1299 **ML&S BEST PRICE**
ZERO DEPOSIT!
48 * £25.12

YAESU VR-5000

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

ML&S £599
ZERO DEPOSIT!
48 * £17.72

NEW ICOM RADIO! ICOM IC-7400

The IC-7400 is the DSP version of the the IC-746 Like the IC756 Pro 2 featuring 100 Watts HF & 50MHz plus 100 Watts 144MHz. Does not have a second receiver or real time scope but has many features to make it an Ideal radio for those taking advantage of the new HF privileges. ***Call for price!***

We have a FEW IC-746'S at a *DAFT PRICE* CALL FOR AVAILABILITY!

YAESU VX5RS

Our best selling hand held ever with free SU1 and Case giving 5 Watts on 2/70 & 6metres. With built in wide band receiver (including AM & WFM) this is a scanner and a handheld.

RRP £339
ML&S £269

YAESU VX1R

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

RRP £229
ML&S
CALL FOR BEST PRICE

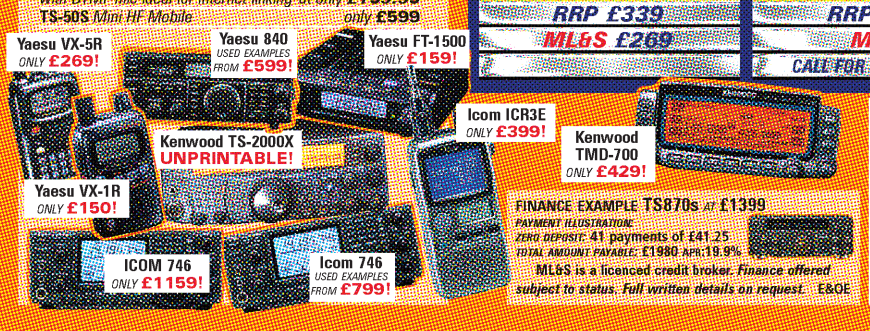
ICOM IC-?

NEW ICOM RADIO COMING SOON!

ICOM IC706 MK2G

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

ML&S £949
ZERO DEPOSIT!
48 * £28.08



FINANCE EXAMPLE TS870s at £1399
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TOTAL AMOUNT PAYABLE: £1980 APR:19.9%
ML&S is a licenced credit broker. *Finance offered subject to status. Full written details on request.* E&OE

LOOK! **NEW MIRACLE ANTENNA HAS *ARRIVED!***

IN STOCK ONLY £129.95

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

INTRODUCTORY PRICE ONLY **£249.95** DELIVERED TO YOUR DOOR

ML&S - where else!

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Suppliers of Communications

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KENWOOD TS2000

ALSO AVAILABLE: 23cm version £1999

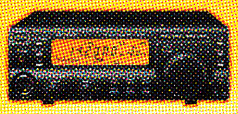
Offering all bands 1.8 to 23cms *(23 cms optional)* Built in DX cluster monitor and auto QSY plus dual speed packet modem make this radio stand out. Excellent Kenwood build quality and reliability - a radio that is going to be around for a long time.

ML&S £1699 STD UNIT

ZERO DEPOSIT!

48 * £50.27

KENWOOD TS50S



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

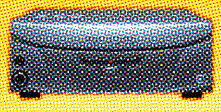
ML&S £599

ZERO DEPOSIT!

48 * £17.72

If you require the B2000 or 23cms **CALL FOR A PRICE PACKAGE**

KENWOOD B2000



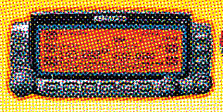
All the features of the TS2000 but no knobs. This radio is controlled via your PC or the Head of a TMD700E *(Upgrade will be required on early versions of the TMD700E)*

ML&S £1599

ZERO DEPOSIT!

48 * £47.31

KENWOOD TMD700E



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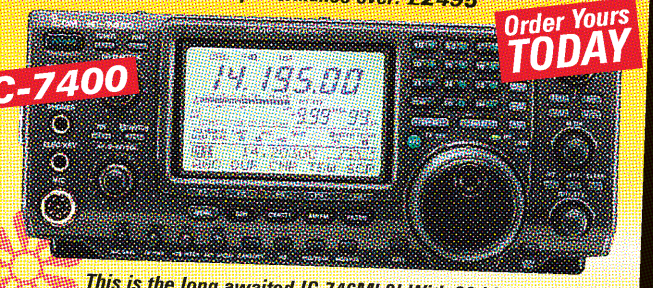

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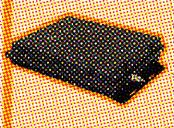

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Top-Drive for the Lower Bands

Part one, by Tony Preedy, G3LNP *

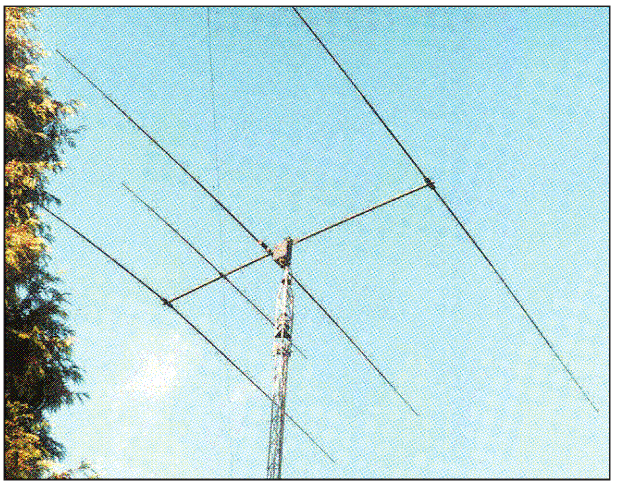
I RECENTLY came upon an interesting old engineering report, published in 1964 by the Research Station of the General Post Office, in which the authors effectively demonstrated why the antennas then used on board ships for 500kHz emergency communication were more efficient radiators than their designers had anticipated:

The typical ship MF installation consisted of multiple-wire-T or inverted-L antennas supported between masts or between mast and funnel, driven from a transmitter located in the radio cabin. The radio cabin was traditionally placed high on the superstructure because, historically, the wireless installation was a late arrival and for the practical reason of permitting unobstructed and safe clearance for the antenna feed wire which was, until then, believed to be the main radiator, with its necessarily very high voltage.

After describing the results of extensive testing on vessels named the *Beaver Ash* and the *Senorita* plus one-tenth scale 5MHz model tests, the GPO report concluded that the effective height of the antenna and hence the effective length of the radiating feed wire was more than could be expected from consideration of the height of the antenna relative to the superstructure of the ship. In fact, the metal hull of the ship extended the radiator down to the sea. An effective antenna could therefore still be installed if the top loading wires were no higher than the radio cabin or the vertical feed wire did not exist! In this case the hull was the radiator.

Relatively compact emergency antennas for 500kHz operation could, therefore, still be installed on vessels that had no other MF capability. This requirement has now been superseded by satellite systems, but the principle is still relevant to amateur operation on the lower frequency bands.

We see this effect in an HF mobile installation, where the vehicle body forms an appreciable part of the radiator and its electrostatic capacitance provides a ground connection.



The finished antenna with top-feed tuner, based on a Hy-Gain 14MHz Yagi and Strumech tower. The long Yagi elements, two half-waves in phase on 28MHz, are 11m. The short element, used only on 24 and 28MHz, is 5.3m and the boom, which houses the relay-selected tuning lines, is 4.9m. The number of active elements varies from one at 10MHz to seven at 28MHz.

GROUNDED-TOWER RADIATORS

MANY ATTEMPTS have been made to use grounded metal towers, usually supporting rotatable VHF and/or HF antennas, as radiators for HF. Typical arrangements are sloping wires insulated from the top of the tower [1], sloping wires joined to the tower and forming, with the ground, a triangular loop [2], and wires outrigged running nearly parallel to the tower for shunt-feeding [1].

I have tried them all and had good results on 160m using shunt-feed with a pair of wires attached at the rotator cage fixing bolts of a P60 Versatower and extending to the ground, where the wires were terminated and insulated, 1m apart and 1m from the tower. A series capacitor of 250pF, connected to the pair of wires, gave an impedance transformation to 50Ω. However, my tower is generally retracted and, in each case, the wires became a nuisance, both obstructing the garden and tangling with the tower as it was being raised.

Shunt-feeding of towers with the feed wires connected other than at their tops, forming a folded monopole, is usually not as efficient as base-feed, because the ground return current consists both of that causing radiation and that due to the feed. The effect is to increase the energy dissipated at the ground connection. A low-resistance ground connection is therefore important with shunt-feed, and this is not easily achieved in a typical domestic setting. In the shunt-fed arrangement, the HF Yagi beam antenna, supported by the tower, forms an effective non-radiating top, which enhances the radiation efficiency of the tower by making the current distribution throughout its length linear rather than triangular. The same effect can be obtained in theory by breaking the tower and driving it above the base... not very practical!

Obviously, some form of inverted-L antenna can be made by adding a horizontal wire and driving this via a remote-controlled tuner [3] against the top of the tower-plus-beam. In practice, life is not that easy, because optimum performance requires another support. With height comparable to that of the beam, the wire interferes with the directivity of the beam and requires a back stay, with an attendant compression load via the tower lifting tackle, to balance the head load on the tower.

A much more convenient drive point is the junction between the tower and the HF antenna which it supports, because there is already a coaxial feeder terminating at this point and it should be relatively easy to insulate the HF beam from the tower without loss of mechanical integrity. This is analogous to the old ship installations described in the GPO report. In this case, the HF beam replaces the multiple-wire top, the tower replaces the hull of the ship, and the remote tuner replaces the elevated radio cabin.

The potential for using an existing tower and HF beam for lower frequencies without adding any significant extra hardware or requiring further planning approval was immediately attractive, and prompted an investigation using the computer. To reduce the time taken to obtain the data, I simplified the antenna by making it representative, electrically, of a typical tri-band beam mounted on a 20m telescopic tower.

I obtained the data of **Fig 1** from the computer by using *ELNEC*, simulating the

* *7 Station Road, Tring, Herts HP23 5NG.*

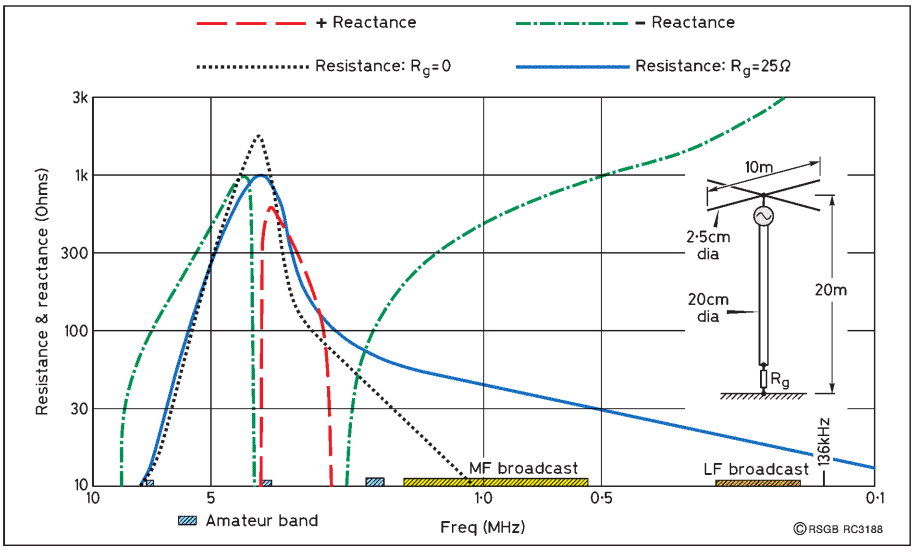


Fig 1: Computed impedance at the elevated feed point between an HF Yagi and a grounded telescopic tower.

typical grounded-tower lattice structure with a 20cm tube and simulating the electrostatic capacitance of a typical HF Yagi beam with a pair of crossed 10m horizontal metal tubes, of diameter 2.5cm.

FEED IMPEDANCE

ELNEC GAVE quite reasonable drive-impedance curves, for a generator located between tower and beam, not too far from those expected with base-feed. For example, at 1.85MHz the resistance was either 23Ω or 56Ω for a ground resistance (R_g) of zero or 25Ω respectively, each with a capacitive reactance near 165Ω. A series inductor coil, of about 15µH would, therefore, give a VSWR below two on the original 50Ω feeder. 25Ω was taken to be the best ground connection resistance likely to be achieved in a residential setting, incidentally. Primary resonance occurred at 2.3MHz, indicated by a pure resistance near to 80Ω. Above this frequency, a capacitor was required for tuning.

At 3.6MHz, where the system was electrically a half-wave, the impedance was 1800 or 1100Ω resistive, for R_g of zero or 25Ω respectively.

The above are within the capability of standard automatic tuners intended for random length wires or whip antennas. At 136kHz, the drive impedance was 16.5Ω with 5094Ω reactance for an R_g of 25Ω while, down at 73kHz, the corresponding drive impedance was 16.4Ω with 9500Ω reactance. In either of these two LF cases, the anticipated tuning inductor losses would be expected to make the resonant impedance close to 50Ω.

RADIATION PERFORMANCE

OPTIMUM LOW-ANGLE radiation was maintained up to 5MHz, above which the angle started to increase, reaching 34° at 6MHz and 50° at 8MHz. For DX working, the top-fed antenna, based on a 20m tower and HF Yagi, was, therefore, suitable only for amateur frequencies of 3.8MHz and below. **Fig 2** shows some computed 'gain' figures for top-feed relative to base-feed at the major lobe of radiation, for different values of R_g, over ground of average conductivity. From this, we see the potential advantage of top-drive for frequencies below the predicted resonance frequency of 2.3MHz. Base-drive would be superior from 2.3 to 6MHz, where R_g is less important, but this is academic with a grounded tower.

Operation on 136kHz required a tower-mounted tuning inductor of approximately 6mH . Assuming constant coil, feeder and ground-connection losses, the gain advantage at 136kHz over base-feed was substantially 3.6dB for any value of R_g significantly greater than the radiation resistance. The grounded tower makes it impossible to verify this, although it should not cause surprise because, in the extreme case of infinite R_g, the base-driven antenna has zero current and cannot, therefore, radiate. The top-driven antenna is still viable, however, as an unbalanced vertical dipole. Even at 1.85MHz, as Fig 2 shows, there is worthwhile gain to be had with top-feed, particularly if you cannot achieve a low ground-connection resistance. There are likely to be problems keeping RF out of the shack if the ground connection is eliminated, however.

At 73kHz, a tuning inductor of approximately 20mH was required but, even here, 3.8dB gain over base-feed was available at the cost of installing a dustbin-sized inductor just beneath the HF antenna! To put this in perspective, 3.8dB is equivalent to increasing the height of a base-driven antenna by a factor of 1.55, eg from 20m to 31m!

INSULATING THE BEAM FROM THE TOWER

THE INSULATION REQUIREMENTS at the gap between HF beam and tower for the 73kHz to 3.8MHz amateur bands can be seen in **Table 1**, on the assumption that we will be operating within the ERP limitations of our licence. The equivalent parallel resistance, derived from the series values of impedance in Fig 1, together with the computed gain figures, are used here to obtain drive voltage. The specified insulator, assuming a conservative voltage gradient of 400V/mm will allow up to 1kW input at 73kHz. At any higher frequency, an insulator of this size is not likely to restrict input power.

In view of the computed results, I decided initially to try adapting my installation to cover the bands 1.8 to 28MHz only, by using a commercial automatic tuner. I reserved the prospect of attempting to top-drive on the LF bands for the future, by building-in the 95mm insulation path. The practical arrangements were considered next .

IN PRACTICE

'DISCONNECTING' THE BEAM would be easy if I could find a piece of 2in-diameter insulating rod to extend the rotating mast by the amount required by Table 1. Such electrically-suitable materials are available at prices from £16 to £220 plus VAT for a 50mm rod of typically 1m. Many of these materials can be eliminated because of their susceptibility to ultra-violet radiation, atmospheric pollutants or water absorption. Many are just not strong enough for the torsional loads anticipated. None of the available insulation materials was considered to be hard enough not to yield when gripped by the teeth of the typical boom clamp of a full-

Freq (MHz)	Power (dBW)	Gain (dBi)	Tuning & feed (dB)	Input (dBW)	Input (Ω)	Parallel R(Ω)	Potential (Vrms)	Gap (mm)
0.073	0	-24	-6	30	1.0×10^3	1.4×10^6	3.7×10^4	93
0.136	0	-18.7	-3	21.7	1.5×10^2	7.9×10^5	1.1×10^4	28
1.85	26	-0.8	-0.5	26.5	4.5×10^2	4.7×10^2	4.6×10^2	1.2
3.6	26	-0.2	-0.8	26.8	4.8×10^2	1.1×10^3	7.3×10^2	1.8

Table 1: Determining mast insulator length with Rg of 25Ω. For higher Rg values the LF power input can be appropriately increased to maintain ERP without significant change in insulator voltage stress.

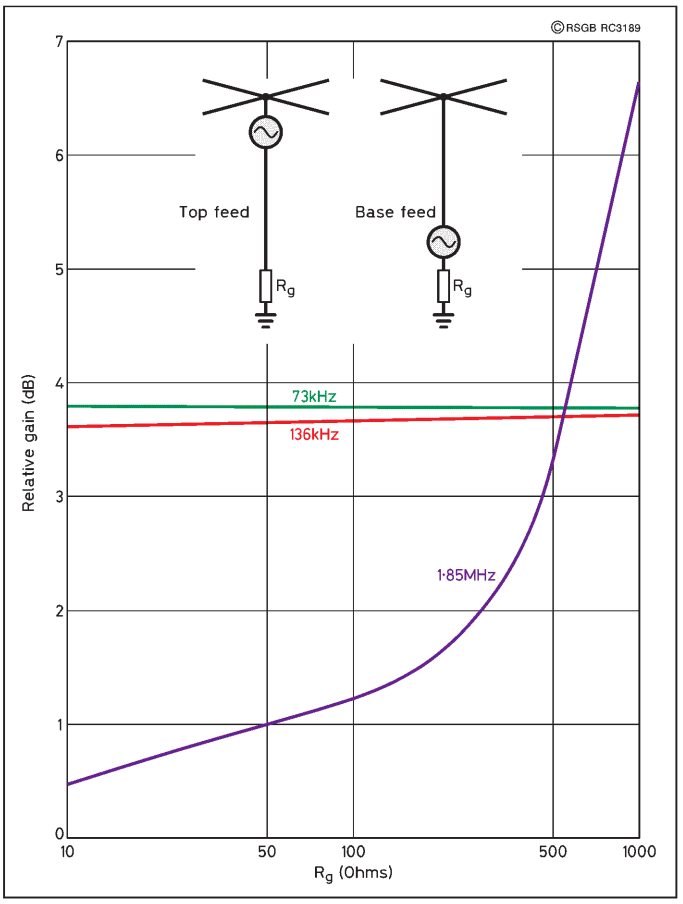


Fig 2: Computed gain of top-feed relative to base-feed for the antenna in Fig 1 for different values of ground connection resistance, R_g.

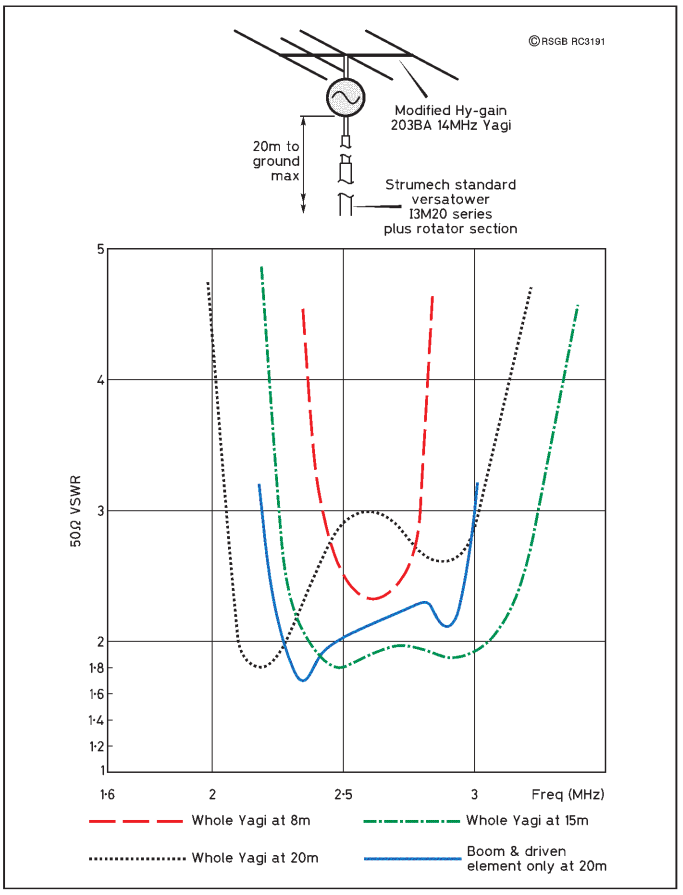


Fig 4: Measured VSWR, without any attempt at tuning, for the author's top-fed system in the vicinity of resonance at different heights and with some elements isolated.

sized 20m Yagi. A sleeve of tube cut from the rotating mast is thus necessary to prevent the antenna working loose.

Through-bolting and epoxy adhesive were desirable because of the requirement not to slip while the antenna is swinging in a gale. A reasonable choice is phenolic resin-bonded fabric (Whale brand, Tufnol. 50mm diameter. RS Catalogue. No 374-346). This tried-and-tested material comes in a nominal 585mm length, at a total cost of approximately £70, but will make two insulators. **Fig 3** shows the detail for modifying the top mast of a large tower system. The total length of top mast should allow for installation of a tuner below the insulator if this is to be added.

If you want to follow my design and lack appropriate workshop facilities, have the whole rotating mast assembly modified professionally, because the consequences of failure are frightening.

The measured VSWR referred to the radio-end of the 50Ω transmission line for top-feed in the vicinity of resonance on my installation, before tuning, is shown in **Fig 4**. I was quite elated by these results, because they confirmed my earlier input data assumptions, chosen for the computer analysis. The curves show the

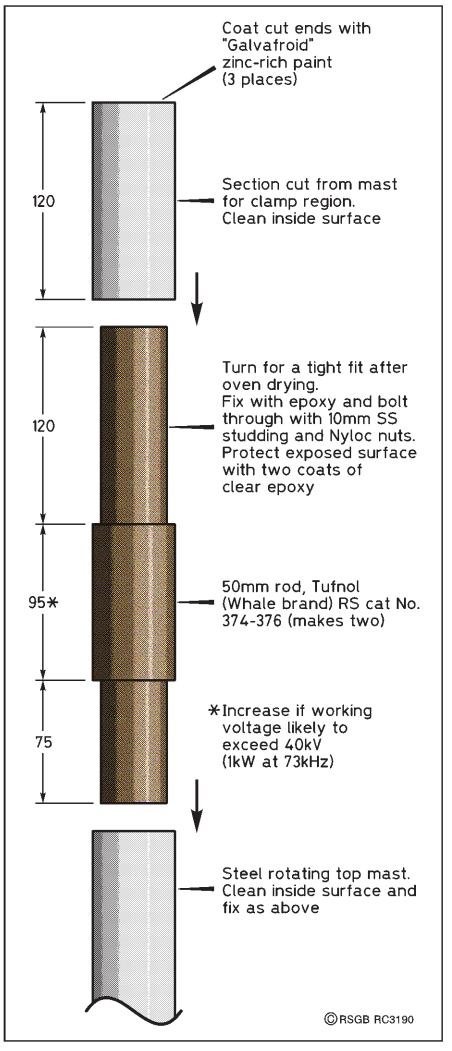


Fig 3: Detail of the insulator required to isolate a large HF beam from the rotating top mast of a tower.

effect on resonant frequency of changes to tower height and number of elements. ie where VSWR is minimum. Extrapolation of the resonant-frequency/height relationship indicates that an increase in height by 2.5m would cause self-resonance at 1.85MHz. Similarly, extrapolation of the resonant-frequency / number-of-elements relationship confirms that self-resonance at 1.85MHz could also be achieved with a larger antenna on the existing tower. With the tower at its minimum height of 8m, a good impedance was obtained over the 80m band with a minimum VSWR of 1.5 at 3.6MHz. The antenna was more effective at the lower frequencies than any other I had tried at this location, and a manual tuner permitted the antenna to be used in advance of installing the automatic tuner at the top of the tower.

REFERENCES

[1] *ARRL Antenna Book*, (ARRL), 16th edn, chapter 4.
[2] 'Half Delay Loop Antenna', *The Handbook of Antenna Design*, Vol 2.
[3] 'PicATUne - the Intelligent ATU', by G3XJP, *RadCom* Sep 2000ff. ♦

In the concluding part next month, G3LNP considers the use of remote tuners in some detail.

Harrogate Makes it a Hat-Trick

Harrogate Ladies' College was the first UK school to make amateur radio contacts with Mir and the Space Shuttle. On 7 March they made it a hat-trick by becoming the first UK school station to contact the International Space Station. With just 24 hours to go before the scheduled pass, RadCom *asked Richard Horton, G3XWH, the Director of Applied Physics and ICT Systems at the school, to explain the background behind this historic contact . . .*

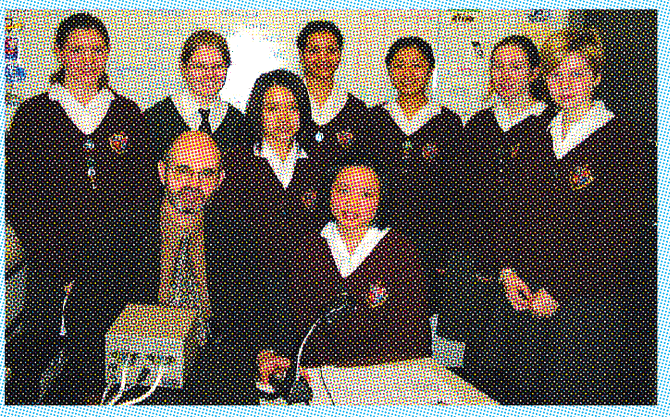
"ASK MOST radio amateurs what aspect of the hobby takes a period of over a year in planning and waiting for just 10 minutes of operation and I suspect they may have difficulty in giving the correct answer. This is because few have had direct experience of a scheduled contact with an orbiting manned vehicle - an event normally limited to those operating from a select few school amateur radio stations.

"Having been fortunate to take part in the first UK scheduled school contact with *Mir* in 1991 and the Space Shuttle in 1992, when we heard that the International Space Station was "open for school contact bookings" in November 2000, we lost no time in getting in a bid so we could complete the hat-trick.

"Although we have already made a total of four contacts with the Shuttle and *Mir*, it is still a nerve-wracking business as there is so little time to correct any problems which may arise during the 10 minutes or so which constitute a typical 'pass'. The penalty for getting things wrong can be severe, as we found to our cost during the first passes of *Mir* when British astronaut Helen Sharman was on board in May 1991. The day before our contact they performed a 'burn' to lift the orbit but we were unable to obtain the necessary corrected Keplerian elements and ended up tracking *Mir* in the null of the beam! Backup is essential and we have a printed set of Az / El values at 10-second intervals so the deputy head of Harrogate Ladies' College, David Andrews, G4CWB, can step in and take over manual control if necessary.

"Will it all work? We shall see! . . ."

GB2HC OPERATORS	
Standing:	
Sarah Haynes	M1SAZ
Laura Pollard	M1LAP
Amy Wong	M1HCA
Pragna Prakash	2E1HCX
Tiffany Fan	M0TIV
Kate Mieske	2E1HJA
Lauren Denton	M1SLD
Sitting:	
Richard Horton	G3XWH
Manutsavin ('Nan') Charernsuk	M1NAN



SUCCESS!

AT 0847UTC on 7 March, Richard Horton, G3XWH, began calling "NA1SS, this is GB2HC, Harrogate Ladies' College, standing by." Silence. Two minutes later, however, at 0849UTC, the squelch opened and there, faint at first but a moment later a fully-quieting 59 signal, came the voice of Carl Walz, KC5TIE, from outer space.

After establishing contact with NA1SS, Richard passed the microphone around the eight young lady licensees at the school. During the eight-minute 'pass', all of the girls were able to ask questions about life in space. The first question was asked by Pragna, 2E1HCX, who wanted to know how heavy Carl felt on take-off. He replied, "When we lift off it's about three times the normal weight. Of course we're sitting down, but it pushes us back into the seat and it's very difficult to move our arms to work the switches."

Nan, M1NAN, wanted to know how they use the toilet in zero gravity. Carl's answer, "Very carefully!" caused laughter from all in the room. He went on to explain, "We have a special toilet that has a strong fan for liquid waste and also we have another can for solid waste and also we have to restrain ourselves so we don't float around while we're using the toilet."

Not all the questions were about such every-day matters. Amy, M1HCA, asked "Have you seen flashes in the eyes due to cosmic rays whilst on the Space Station?" Carl replied, "Amy, yes I have seen some of the flashes, right before falling asleep."

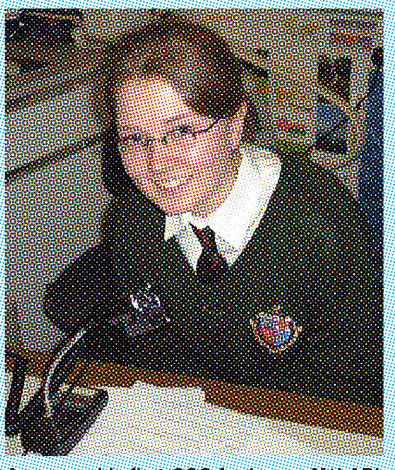
It is said that all radio amateurs will always remember their first contact, but for Laura, M1LAP, the contact was more memorable than most. Laura had taken the RAE in December and had only recently received her licence. As she had been busy with school examinations, she had not yet made any QSOs: her first contact was with NA1SS. What better introduction to her amateur radio career?

Audio and video of the contact is being put on the Harrogate Ladies' College website at www.hlc.org.uk

The historic contact attracted a lot of attention by the mass media, with both ITV and BBC television, BBC Radio York and local newspapers reporting on the event. Richard Horton and several of the girls were later interviewed by the media, providing much valuable positive publicity for amateur radio. ♦

GB2HC EQUIPMENT
Icom IC-746 (main)
Icom IC-970H (spare)
2m 10XY Yagi with circular polarisation (main)
2m Collinear (spare)
70cm Helical (for *Mir*, not used for ISS contact)
TAPR Trakbox (antenna steering)
NA1SS Downlink: 145.800MHz
GB2HC Uplink: 2m FM (confidential frequency)

The first question was asked by Pragna, 2E1HCX.



A memorable first QSO for Laura, M1LAP!

One Man's Vision: The Story of WorldSpace Radio

by Steve White, G3ZVW*

In one of the London broadcast studios, Robert Bou Abdou, who produces WorldSpace Arabic services 'Haneen' (longing) and 'Killa Musica' (all music) programmes.

IN 1990, NOAH SAMARA, an Ethiopian educated in England and living in Washington DC, formed WorldSpace. He did it for a reason, that reason now being enshrined in the company's Corporate Overview. It says "The WorldSpace mission is to create information affluence by using new audio technology to deliver programming to the three-quarters of the world's population that today lacks adequate radio reception and program choice, and that desires, deserves and demands news, knowledge and entertainment of the highest quality at an affordable cost."

The prospect of bringing 'information affluence' to those with none must have been truly daunting. Developing a new kind of radio receiver to a new standard would have been quite a challenge in itself, but then the idea would have to be sold to equipment producers such as JVC and Hitachi. Building and launching suitable satellites would require a great deal of financial backing. Then there was the question of getting broadcasters to take advantage of the service, place advertisements, purchase bandwidth, etc. Despite all this, WorldSpace has become a reality. Today they have 330 employees world-wide, 14 of them in the London office. Samara is now the Chairman and CEO, the company headquarters being in Washington DC.

HOW IT WORKS

WORLDSPACE is digital radio, pure and simple. The service is broadcast to large areas of the globe in MPEG2 level 3 format, using satellites built by Alcatel. At present two geosynchronous satellites, Afristar (21°E) and Asiastar (105°E) are in orbit. The third WorldSpace satellite, Ameristar, is awaiting a launch opportunity in 2002.

Afristar was the first WorldSpace satellite to be launched. It entered service in 1999. Asiastar followed in 2000. When Ameristar enters service, WorldSpace will be receivable by 5.2 billion people. The coverage footprints of the three satellites are shown in **Fig 1**.

UPLINKING

DATA ARE uplinked to each of the WorldSpace satellites on 7GHz (X-band). For the Asiastar satellite, all broadcast channels are currently transmitted from Singapore and Melbourne. For Afristar, the majority of the broadcast channels are transmitted from London and Johannesburg, but some channels are also transmitted from Nairobi, Kenya; Cotonou, Benin; and Dakar, Senegal. In most cases they are transmitted directly from a WorldSpace facility, using a 4.5m dish. For London the uplink station is located in Bedfordshire, the data to it being carried by landline. When Ameristar comes on line, uplinking is expected to be from two sites, one in Miami, USA, and the other in Sao Paolo, Brazil.

Data are uplinked digitally in 16Kbps 'Primary Rate Channels' (PRCs), one channel being sufficient for a mono voice service. Music services require multiples of 16K,

The 'Joy Ear' JSRA-WS0110 is the latest and smallest WorldSpace receiver.

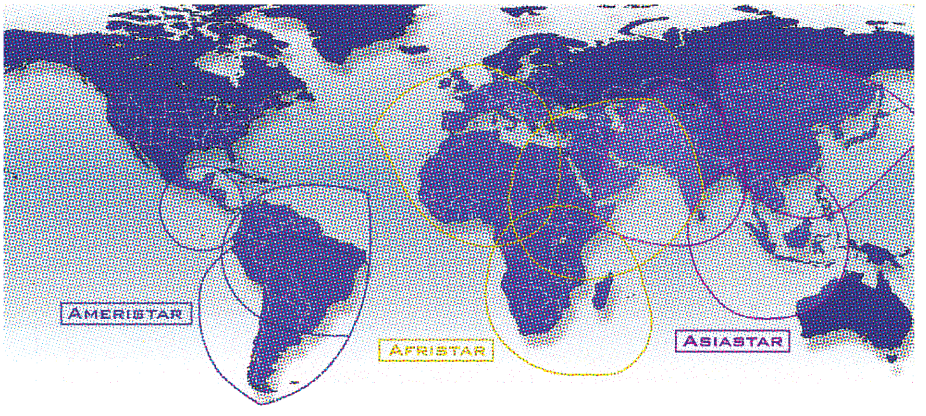


Fig 1: When the third satellite - Ameristar - comes into service, the WorldSpace satellites will bring digital radio to 5.2 billion people worldwide.

*31 Amberley Road, Palmers Green, London N13 4BH.

and stereo doubles that requirement still. For near CD-quality broadcasts, as many as eight PRCs are needed.

DOWNLINKING

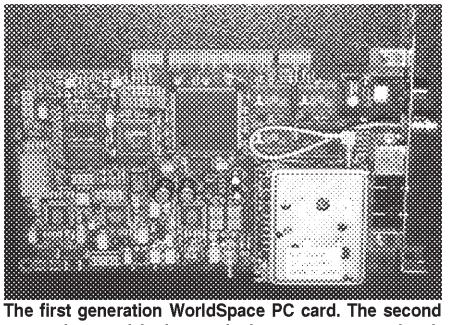
POWERFUL TRAVELLING Wave Tube amplifiers, operating in redundant pairs, are used to generate the RF. The signal is beamed back to earth in the L-band (1467 - 1492MHz). Each satellite transmits three 'beams', each containing right-hand and left-hand circularly-polarised signals. Where appropriate (as it is when using the standard 'patch' antenna on a WS receiver) polarisation switching is accomplished by changing the DC voltage fed to the antenna. Each beam has the capacity to support around 40 stations, plus data services. The method of modulation is Quadrature Phase Shift Keying (QPSK), and the transmissions that form a beam are a 3.68Mbps Time Division Multiplex (TDM) carrier.

Each beam uses different carrier frequencies, so that in areas where beams overlap they do not interfere with each other.

After the receiver has processed the received signal, depending upon the station being received, it will select the correct digital component(s) to reconstruct the analogue signal. Just like the uplink side of the proceedings, this will most likely be one 16Kbps PRC for a mono voice station, four for a pop music station, and eight for a classical music station. All the decoding takes place in the so-called 'StarMan' chipset, exclusive to WorldSpace.

PROGRAMMING

CURRENTLY, WorldSpace themselves provide about 16 branded stations / services. These are produced in various languages and are broadcast on various beams of the satellites. The photo at the top of page 20 shows Lebanese presenter Robert Bou Abdou, the man behind the microphone of the Arabic services produced by WorldSpace.



The first generation WorldSpace PC card. The second generation card looks much the same, except that it has a screen soldered over the electronics that prevents anything from being seen.

In London, programmes from external sources such as CNN, Bloomberg and the BBC, are received and processed. The photo below left shows some of the receive equipment, which is basically satellite TV receivers, plus the baseband digital encoding equipment. Other services are received by ISDN and leased line. In Johannesburg one service is even received by an infra-red link! From here it is on to the Broadcast Audio Processors, used to set audio levels precisely and reduce background noise. From there it is on to further equipment which enables the substitution or insertion of adverts into externally-received programmes. The bank of receivers pictured below monitors the satellite transmissions.

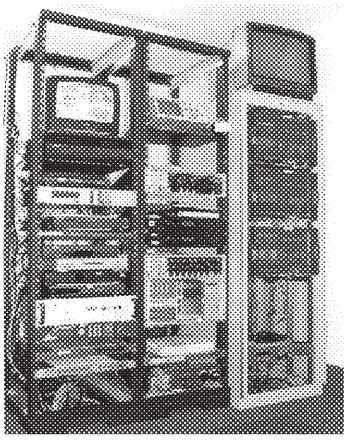
A similar set-up exists in Singapore, and in due course another similar set-up will be required for AmeriStar.

DEAD SPOTS

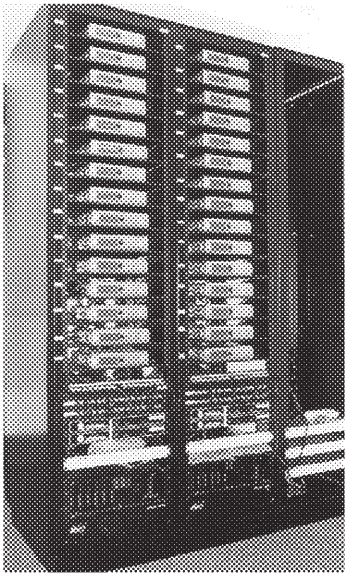
OF COURSE there are places where the WorldSpace service cannot be received, the most significant of these being North America. There are two reasons for this:

1. The USA and, to a lesser extent, Canada are already saturated with broadcasters.
2. Most residents of the USA and Canada already enjoy 'information affluence'.

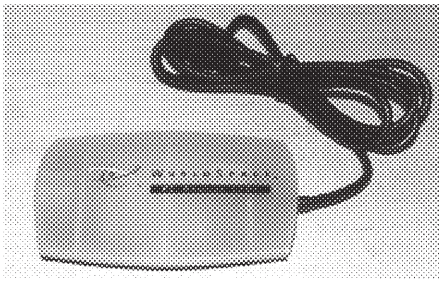
Australia is also not officially served by WorldSpace. However, there are reports that it has been received on the east coast of Australia. Looking at the footprint of beam 3 of Asiastar, I suspect a non-standard antenna was used to accomplish this.



The left and centre racks contain the equipment used to receive external broadcasts such as Bloomberg television, the sound content of which is re-broadcast by WorldSpace. The right-hand rack contains equipment that converts the analogue audio to baseband digital.



Banks of monitor receivers.



128k Digital Data Adapter (DDA). Connect between the data socket of a WorldSpace receiver and the USB port of a computer, wait for the cyclically broadcast data to fill the cache, run a suitable software package, and you have a cost-effective equivalent to the Internet available in areas well beyond the reach of a land line.

DIRECT MEDIA SERVICE

DMS IS THE name given to the data that is broadcast by WorldSpace. It can be received directly by a suitably-equipped computer, or via a Direct Data Adapter that connects between the data socket of a normal WorldSpace receiver and a USB socket on a computer (see photos above). Data is broadcast at 128Kbps.

Medical advice, weather warnings, information about harvesting, world and local news, images, web pages etc, it all ends up getting cached in a computer. The data is transmitted in a cycle and receiving it all takes a few hours, but by the time the process is complete the isolated communities that DMS is primarily intended to serve will have up to 1GB of useful information available . . . information that can save lives.

At the moment news updates are issued daily, but there are plans to increase the frequency to hourly once WorldSpace sign up the BBC.

THE FUTURE

MEASURING JUST 130mm square, the newest WorldSpace receiver (pictured at the bottom on page 20) is also the smallest. At 600g in weight (not including the antenna) it is the lightest, the weight reduction being brought about by (a) removing the mains transformer from the case and presenting it as a wall transformer, (b) deriving internal power from AA cells, and (c) unlike other WorldSpace radios that also incorporate other wavebands, providing WorldSpace coverage only. It is produced by Korean company JS Info, and branded the 'Joy Ear'.

I was also shown a pre-production model of a budget WorldSpace-only radio that uses a foldable 4-element Yagi, as opposed to the more customary 'patch' antenna. A car radio that receives WorldSpace via some kind of dome antenna is also planned.

To summarise, it looks very much as though the unique, high-quality mix of entertainment, information and educative material that WorldSpace is providing will result in it being around for a long time. Certainly it has cornered the market in digital radio to the developing world. ♦

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BNOS 25/12 Heavy Duty Power Supply	£ 95	Kenwood R-2000 General Coverage Receiver	£250
Icom EM-46L Speaker Microphone	£ 15	Mast P40 with ground post + extra base section	£250
Icom IC-735 HF Transceiver, boxed excellent	£375	Yaesu FT-757 GX boxed and mint	£350
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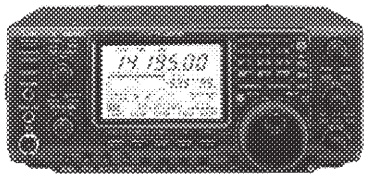
product news

NEW ICOM IC-7400

THE **IC-7400** is a new **HF / 50MHz / 144MHz base station transceiver** from Icom. The '7400 is a successor to Icom's popular IC-746 transceiver. Covering the HF, 6m and 2m bands, with the same 100W output power, the IC-7400 carries on the reputation earned by the IC-746 but offers improved performance and a host of new features.

The new transceiver incorporates the same IF DSP as the IC-756PRO and its successor, the IC-756PROII. Icom has used a 32-bit floating point DSP and 24-bit AD/DA converter at the heart of the IC-7400. The digital IF filter shape is selectable from 'sharp' to 'soft' for both SSB and CW modes, and DSP is used for the IF filters on all bands. This means no optional IF crystal filters are required for bandwidth selection. Fifty-one different passband widths are available according to operator needs from 50Hz to 3600Hz.

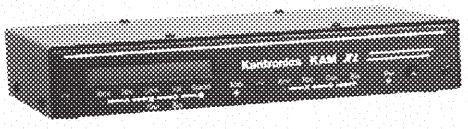
Other features include PSN (Phase Shift Network - all of the modulation and demodulation, including FM and RTTY utilises the DSP unit. The SSB demodulation reproduces received signals with a high Signal-to-Noise Ratio which is 10dB better than that of the IC-746) and digital twin Pass Band Tuning capability (the digital twin PBT actually changes the IF passband. The twin PBT narrows and shifts the IF passband to eliminate effectively interfering signals).



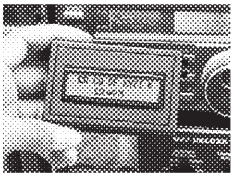
Icom (UK) Ltd, Sea Street, Herne Bay, Kent CT6 8LD; tel: 01227 741741; fax: 01227 741742; e-mail: info@icomuk.co.uk; website: www.icomuk.co.uk

NEW FROM WATERS & STANTON

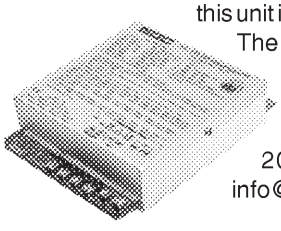
THE LATEST **TNC** from **Kantronics** in the USA is the **KAM-XL**, a multi-mode DSP controller. It can be used for 300 or 1200bps Packet, PSK31, RTTY, G-TOR, PacTOR, AmTOR ARQ, WEFAX and many other modes. The cost is £419.95.



The **MFJ-461 Morse reader** is a pocket-sized Morse code reader that displays Morse code on its 32-character LCD screen. It has a built-in microphone, so no electrical or physical connection is required: just hold it close to your receiver's loudspeaker! If you wish to display the text on a bigger screen there is a serial port to allow connection to a PC. The MFJ-461 costs £84.95.



The **SGC-239** is a new low-cost **fully automatic HF antenna tuner**. Operating from 1.8 to 30MHz, it will tune any antenna between 0.2 and 5000 ohms to an SWR of 2:1 or better. The power input required is between 1.5 and 200W. Note that this unit is not waterproof, as reflected by the low price. The SGC-239 requires 13.8V DC and the cost is £249.



Waters & Stanton plc, Spa House, 22 Main Road, Hockley, Essex SS5 4QS; tel: 01702 206835; fax: 01702 205843; e-mail: info@wsplc.com; website: www.wsplc.com

HAMCALC 52

THE LATEST version of *Hamcalc* is *Hamcalc* 52, released on 19 February. Subtitled 'Painless Math for Radio Amateurs', *Hamcalc* is a suite of hundreds of amateur radio calculation programs, provided on a CD-ROM. It costs just US$7.00, which just covers the cost of production of the CD and airmail anywhere in the world. Available direct from it compiler:

George Murphy, VE3ERP, 77 McKenzie Street, Orillia, ON L3V 6A6, Canada.

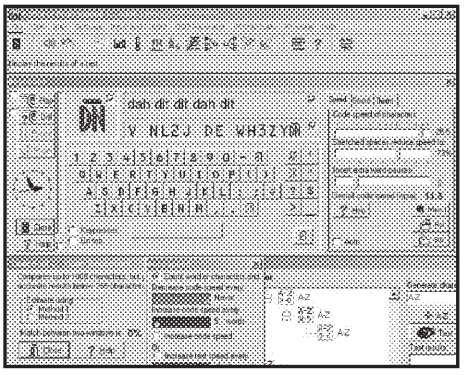
NUMORSE PROFESSIONAL

NU-WARE HAS released ***NuMorse Professional***, a Morse code training environment that runs under Windows and is aimed at beginners as well as experienced Morse enthusiasts. NuMorse Professional offers a choice of structured training courses as well as a range of features aimed at more proficient code users.

Beginners can select from a choice of two built-in structured training courses. On completion of the beginner's courses there is a range of features that will help build up confidence prior to taking a code test. Users who are competent typists will find features that monitor and report progress based on their keyboard responses as well as giving real-time feedback in the form of spoken voice phonetics and screen displays. Standard and Farnsworth code are supported from 2WPM up to 50WPM while word and character spacing are fully configurable. The program can play code from ordinary text files as well as a range of internal character and text generators.

More advanced users will find many features designed to enhance copy speed. These include the built-in QSO and callsign generators. *Nu-Morse Pro* can also provide a realistic simulation of DX work, the 'Real Morse Code' option adds fading, noise and ignition interference to the audio output. It can also simulate the signals generated by the early radio telegraphers. Both those with nostalgic memories of the early years of radio, and those new to the world of radio telegraphy, will be fascinated to hear the simulated spark transmitter and other 'antique' sounds.

The UK price *NuMorse Pro* is £24.95. For further details contact the developer:



Tony Lacy, G4AUD, Nu-Ware, Llanoris, Llanerfyl, Welshpool, Powys SY21 0EP; e-mail: TonyLacy@Nu-Ware.com or visit: www.Nu-Ware.com

DIDACTECH OSCILLATORS AND AMPLIFIERS - DIRECT DEAL DISCOUNT

DIDACTECH LTD OFFERS a range of electronic equipment for home and school at excellent prices. And if you buy direct from the company, there is a further 30% off!

Full details are on the Didactech website, but here are some examples:

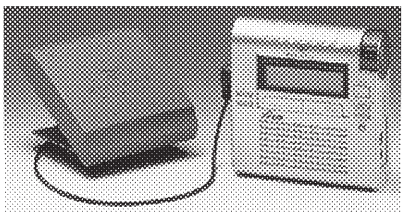
M200 Precision Sine Generator covers the whole audio band without the expense or inconvenience of a laboratory-style signal generator. Amplitude controlled to 5V AC into 2kΩ at 0.004% distortion (15Hz to 20kHz) (0.01% distortion for 20kHz to 45kHz). It is available at £37.81

The M500 Signal Generator and Amplifier is an all-in-one unit providing sine, triangle or square-wave output through an amplifier to drive a loudspeaker coil for demonstration of vibration and sound from low frequency across the full audible band. Switched sine, triangle and square-wave 3V AC into 8Ω or DC coupled input with gain of 20 through a class AB low distortion amplifier output, the M500 is available at £45.89. Both prices include batteries and VAT (postage extra at £2.20 for mainland Britain).

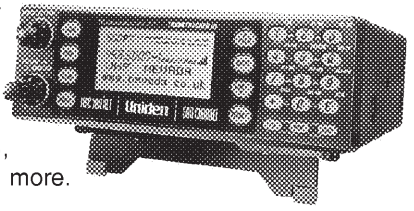
Didactech Ltd, 242 Melksham Road, Holt, Wiltshire BA14 6QW; tel: 01225 782815; website: http://ourworld.compuserve.com/homepages/Didactech/

NEW FROM NEVADA

THE VERY LATEST **WorldSpace satellite receiver** from **JoyEar** is compact and portable and weighs just 900g. It receives superb crystal-clear sound direct from satellite. The WorldSpace satellite system covers over two-thirds of the earth, broadcasting programmes in digital fade-free CD quality. Over 40 broadcasters from most parts of the world (including the BBC World Service) provide news, music, education, sport and entertainment programmes. The WorldSpace JoyEar satellite receiver costs £99.95 and is available from Nevada.

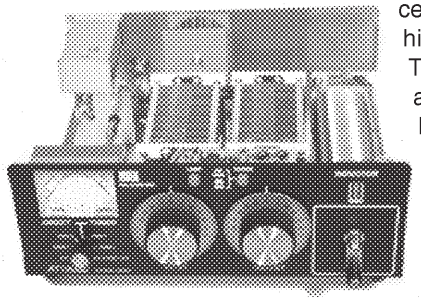


The new **Bearcat UBC780xlt base-station scanner** with trunk tracking capability has almost continuous coverage from 25 - 1300MHz. It is Bearcat's most comprehensive 'feature packed' model, and includes 'Trunktracking', a two-line alphanumeric display, PC Control, CTCSS/DCS, SmartScanner, and much more. The set will sell for £349.



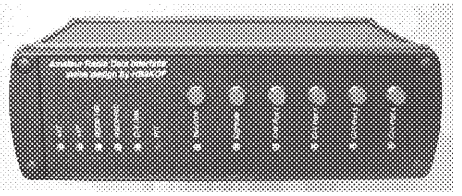
Nevada is now the UK distributor of **Maha chargers** and **Powerex batteries** from the USA. Maha specialises in 'high tech' battery chargers and high-capacity batteries. Among its first products to be released include the FNB-72 ultra high-capacity 1700mAh battery pack for the Yaesu FT-817. Included with the battery pack is a special rapid charging cable that allows the battery pack to be charged in around three hours using the Maha MH-C777 or MH-C888 charger. The price is £59.95. The Maha MH-C777PLUS is a charger that will charge, condition, analyse, and digitally display capacity, voltage and time for almost any lithium ion, NiMH, and NiCD battery pack. The unit will also work direct from a car cigarette lighter socket and the 'Plus' version is supplied with a universal 80V to 240V AC adapter to allow use anywhere in the world. The MH-C777 is priced at £49.95 while the MH-C777Plus is £89.95.

The **Palstar AT1500 CV** is an **antenna tuner** capable of handling 1.5kW. Built in the USA, this tuner is solidly constructed from 10 gauge aluminium. A ceramic roller coaster tuning coil ensures the highest reliability, especially at high power. The AT1500 CV will match a wide variety of antennas, and includes a built-in 4:1 balun for balanced feeders. A six-position antenna switch allows rapid selection of antennas whilst large, easy-to-read, Vernier dials give more accurate antenna settings. The unit is priced at £369 and is available from:



Nevada, Unit 1, Fitzherbert Spur, Farlington, Portsmouth PO6 1TT; tel: 023 9231 3090; fax: 023 9231 3091; e-mail: info@nevada.co.uk; website: www.nevada.co.uk

ARDI-1001 DATA INTERFACE



THE **ARDI-1001** is a versatile amateur radio **data interface unit**, available as a kit from Heinz Bolli, HB9KOF. Many radio amateurs have a PC in their 'shack' and the soundcard can be used for digital operating modes. However, the connection between a PC and transceiver is not always trouble-free and this has worn out the nerves of many an amateur! The question of audio frequency signal level to avoid overdriving the transmitter must be taken into account, as must hum, the keying of the transmitter and EMC considerations.

The ARDI-1001 controls the transceiver, antenna and other systems by the PC, serving as a bidirectional interface from 1 x RS232C to 4 x CI-V. It transmits and receives signals from the PC soundcard, serving also as a bidirectional AF interface, containing a VOX circuit for keying the transceiver.

For further details of this project, please contact **Heinz Bolli, HB9KOF, by e-mail: heinz.bolli@hbag.ch**

COBRA PMR-446

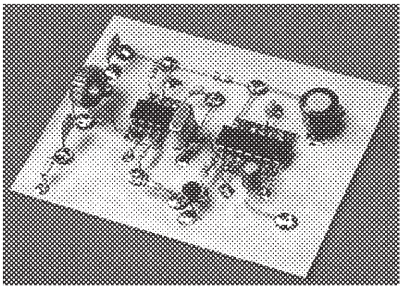
THE NEW Cobra MT-305 PMR-446 handheld transceiver has a host of features normally associated with far more expensive radios. With 500mW output, these PMR-446 radios require no licence and have no call charges. These units have 8 channels and 38 sub-channels, allowing the user to keep in touch with hundreds of other users at one time, and the ability of speaking in confidence to anyone, as they include private call facility (voice scrambling). They can store up to 10 numbers in the memory, so you don't have to hunt around trying to find someone you need. The call alert provides for an easily-recognisable alert for incoming calls, and there is also a handy 'roger' bleep to confirm end of transmission. The dual watch facility is another handy idea that allows you to monitor two channels simultaneously. A whole army of accessories is also available including rechargeable battery packs, voice operated headsets, lapel mics to mention but a few. The retail price is £99.99 inc VAT.

Tamms Direct, tel: 08705 10 20 20, or for further information please contact Harry Heaney at Pama on tel: 0161 248 1043 or e-mail: harry_heaney@pama.co.uk

'COPPER ISLAND' CONSTRUCTION

NO MORE messy chemicals or drilling: '**Copper Island**' makes electronic construction faster and easier than ever before - simply glue and solder! The 'Copper Island Construction Outfit' is a complete 262-piece self-contained kit includes two 150 x 100mm sheets of copper laminate board, pads for 8, 14 and 16 pin ICs, round pads for leaded components, adhesive, tweezers etc and full instructions. The kit costs just £15.00 (+£2.95 P&P) and 'top-up' materials are available.

Duncan Walters, G4DFV, 11 King George V Avenue, Mansfield, Notts NG18 4ER; tel: 01623 465443; website: www.copperisland.biz



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

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NEW! HF-50MHz-144MHz All-Mode DSP Tx!

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- Digital IF filter
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- Powerful 100W output for all bands

- PSN (Phase Shift Network)
- Digital twin PBT (Pass Band Tuning)
- Automatic Notch function.
- Built-in RTTY demodulator
- Digital RF Speech compressor
- Microphone equaliser
- Built-in Memory keyer
- Built-in Noise Blanker
- SSB/CW Synchronous Tuning
- Ample functions for CW operators

• Fantastic Value! • Exceptional Quality • Incredible Versatility •

IC-7400

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		GAIN (dBi)	BOOM (Metres)	PRICE
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2M7L	2 Metre 7 element	14.19	4.4	£99.95
6 Metre Yagis				
6ML	50 MHz 3 element	8.21	1.9	£85.95
6M5L	50 MHz 5 element	10.31	3.6	£119.95
6M5LDX	50 MHz 5 el. Long Yagi	11.75	6.0	£165.95
TR 6-5	50 Mhz 5 el. economy	10.2	3.6	£99.95
4 Metre Yagi				
4M3L	70MHz 3 element	8.7	1.48	£85.00
28MHz Yagis				
10M3L	28Mhz 3 element	7.41	3.0	£129.95
10M4LDX	28MHz 4 el. Long Yagi	9.42	5.4	£189.95
18MHz Yagis				
18M2L	18 MHz 2 element			TBA
18M3L	18 MHz 3 element			TBA
14MHz Yagis				
20M2I	14 MHz 2 element	6.37	3.0	£179.95
Log Periodic Yagis				
LP270	144 - 440 MHz	9.5	2.7	£110.00
LP1300	105 - 1300 MHz	11-13		£129.00
LP 1830	18 - 30 MHz	7.8	3.0	£399.00
Verticals				
V4M	70MHz 1/2 Wave Vert	2.2	2.35	£59.95
V6M	50MHz 1/2 Wave Vert	2.2	3.75	£59.95
TA2M258	144MHz 2 x 5/8 Colinear	8.5	3.2	£69.95
Baluns				
CB 18-52	18 - 52 Mhz 50 Ohm Yagi Choke Balun			£12.95

visit www.tridentantennas.co.uk for full details

FORCE 12 YAGI

N1217	12/17 Mtrs Dual band beam	~~£599.00~~	£479.00

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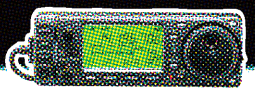

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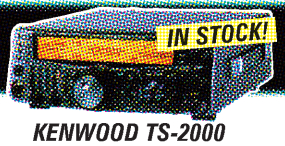

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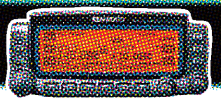

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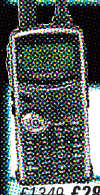

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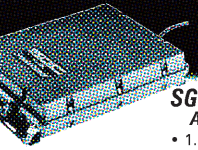

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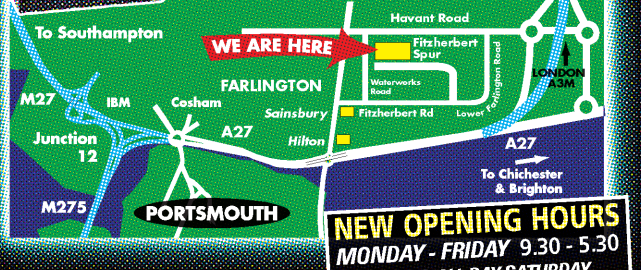

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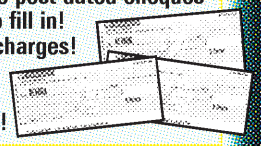

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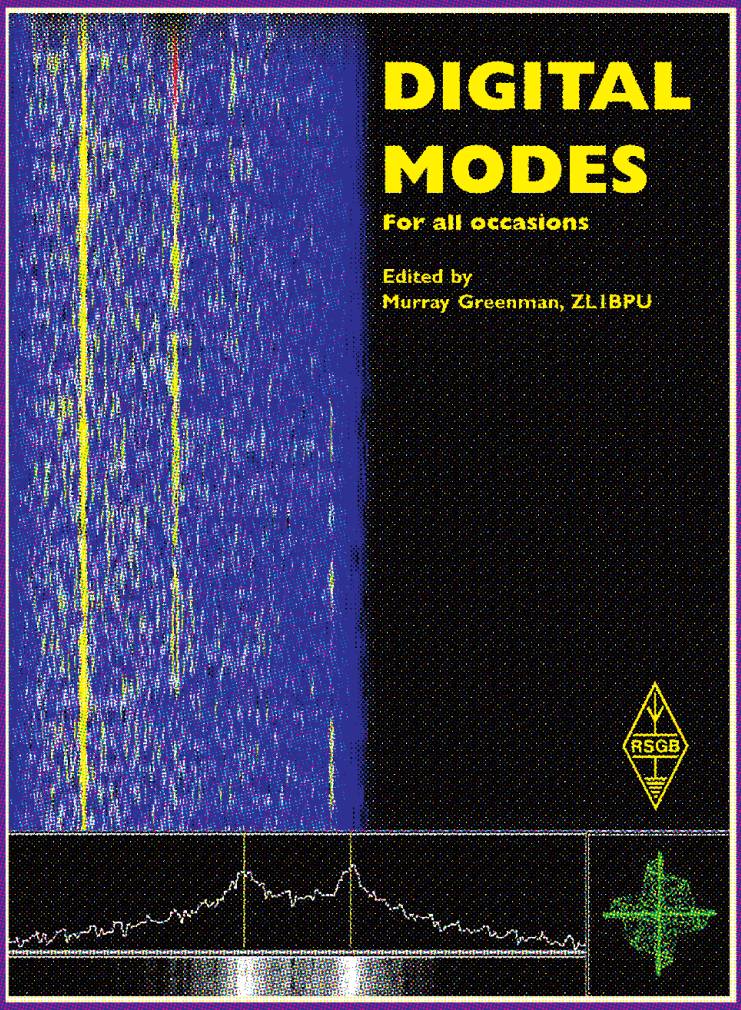

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Bugambic: Son of Superbug

By Chas Fletcher, G3DXZ *

SUPERBUG [1] WAS a project of 1990 intended to cure the serious shortcomings of my dearly-loved Lionel Bug key. When I was asked for a copy of the original circuit by a long-time user who had lost his copy, I thought an update might well be in order.

PIC-based designs of radio peripheral equipment are becoming quite commonplace in recent times, especially those based on the very useful Microchip 16F84. Although there are cheaper and faster PICs, the 16F84's EEPROM, (electrically erasable and programmable read-only memory), which allows one to re-write the code without cost until it is right, keeps it high in the 'most-useful' table. Thus, when thinking of updating my 1990 design, I decided to try to reduce the number of parts and the circuit complexity of the project by substituting machine instructions for components. The 'machine', of course, is the Microchip 16F84.

A micro-controller solution combines purely logical programming with physical construction of the electronic circuitry, and when it works, it's magic. For anyone thinking of taking up the challenge of learning assembly-language programming, a look at the articles (see WWW.) proves easy reading. Those readers wishing to go straight to the finished article are catered for in the final paragraph.

WHAT IT DOES

A MORSE KEY with mechanical contacts is always prone either to dirty contacts or to contact bounce. Listening on 40 metres reveals that the venerable Bug is still alive and kicking, in fact it seems more prevalent than ever. Not all, however, have a clean keying characteristic, and exhibit a scratchy sound due to one or other of the problems mentioned above. The Bugambic keyer will clean up contact action *whatever mode is used* and should be a worthwhile addition to any mechanical key.

This circuit will permit a single- or twin-paddle keyer to act as a Bug key and let the user experience semi-automatic operation with very little outlay. In fact, the Bug key simulation is more elegant than the standard mechanical Bug, as it not only produces clean dots, but it also forces a one-dot space between dashes and between dots and dashes.

Simple software designs that claimed iambic operation failed, when tested, in one respect. When holding the dash paddle, a brief touch on the dot paddle during the dash period did not insert a dot into the dash stream. The reason was that the paddles were scanned only at the ends of dot or dash periods. The problem was solved using the processor's interrupt facility to set 'paddle-pressed' flags on a virtually-continuous basis, and by raising the clock speed. The performance was then found to be indistinguishable from other hardware-based iambic keyers.

A few older amateurs will remember the Side-Swiper key. Since all the necessary functions were available in the software, I have included the option – just in case.

CIRCUITRY

THE COMPLETE CIRCUIT of the keyer is shown in **Fig 1**. Inputs consist of a 'mode' switch, S1, with two halves, labelled B_I and SS. Only one of these switches can be closed at any time. The other inputs are the 'dot' and 'dash' contacts. There are three outputs. The keyed circuit is made by MOSFET TR1 which should be operated with the positive keying lead to the drain connection. Two sidetone outputs are provided. Pin 7 is a square-wave output of 4.5V p-p and intended to drive an efficient transducer typified by the telephone earpiece insert. Driven through R10, an earpiece of this type will provide adequate volume for normal, quiet, operating conditions. However, a further output on pin 8 is identical to the MOSFET drive and is intended to feed an external or more powerful sidetone generator. The output is at +4.5V while the key is pressed.

Speed control is via the PIC internal clock which is of the RC type, because absolute stability is of little importance. With the object of achieving long battery life, the clock rate is kept down to around 250kHz. This is a compromise between speed and power consumption, in that the keyer is fast enough to respond instantly, apparently, to the paddle, but the running power drain, which rises with the clock rate, is minimised. When the keyer is activated, pin 13 of the PIC is set to 4.5V, which supplies the mode switches and the voltage monitor divider resistors. This is done because when the PIC is in the SLEEP mode, the output on pin 13 is set to 0V and no power is wasted on these features. For the same reason, a high-brightness red LED is used for the low-battery alarm to give a good light at low current.

The internally-generated sidetone has the unusual feature of changing pitch with the speed setting. With a dot speed of 25WPM, the sidetone frequency is around 800Hz. For any user wishing to operate consistently at some other speed, the sidetone frequency may be adjusted by the software.

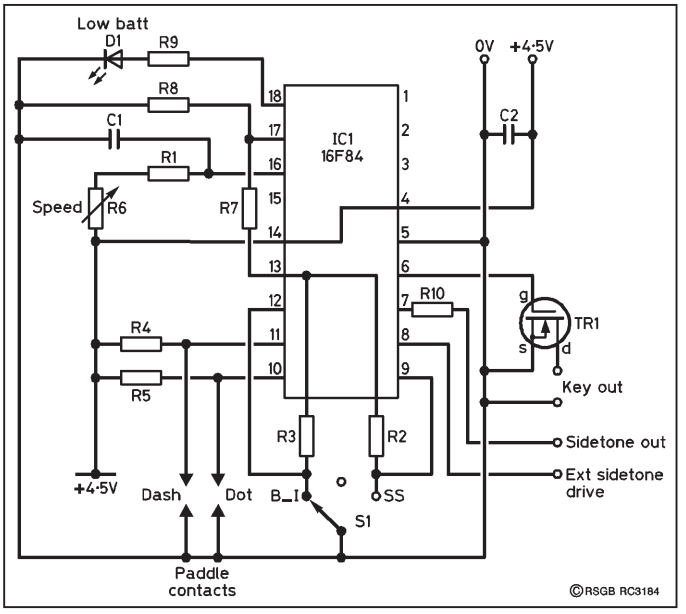


Fig 1: Circuit diagram of the keyer.

POWER SUPPLY AND CONSUMPTION

THE CIRCUIT was intended for battery operation, although any steady supply between 4.5 and

* 12 Park Crescent, Retford, Notts DN22 6UF.
E-mail: g3dxz@thersgb.net

6V would do. Because the actual key circuit is made by the action of a small MOSFET, which is the PIC's output device and will happily 'make' 200mA and withstand 50V, the supply voltage to the PIC needs to be not less than 4V in order to switch the MOSFET efficiently. The PIC itself will function happily down below 3V, so 4.5V was chosen as three 1.5V AAA dry cells in series will do the trick.

During standby, ie between paddle contact closures, the keyer consumes 250mA. In iambic mode, with both paddles squeezed, the drain rises to 1.4mA. If left inactive for about three minutes, the PIC will go to sleep and, in this mode, the current drain is below 5mA. Hence no power switch is needed and the battery life is as good as its shelf-life. These figures apply to the simple Bugambic keyer without sidetone output. If internal sidetone is used, the current consumption rises to around 2.5mA during keying. This latter figure translates to around 400 hours of continuous key-down operation from good AAA cells, which should not cramp the style of all but the most hardened contesters.

One adverse aspect of long battery life devices is that one either forgets when the battery was fitted or feels the need to check when it is still OK. To offset this nagging doubt, the PIC monitors its own battery supply and, if the voltage falls below 3.9V, it will blink an LED at the end of each dash sent, giving reasonable notice for replacement.

Pins 1, 2, 3 and 15 are shown as not connected in the circuit diagram and they should be left unconnected rather than be tied to ground. Pins 1, 2 and 3 are configured as 'output' bits, are set to 0V by software and hence are not at risk from static. Pin 15 is the internal clock output of the PIC and carries a square wave of 4.5V p-p when the PIC is running.

SOFTWARE

A FULL LISTING of the software used for this project is available from the *'RadCom* Plus' area of the RSGB members-only website. It is written in the assembly-language dialect, MPASM, that is used by Microchip Technology Inc for their MPLAB software. For those interested, their website offers free downloads of the software. Compilation into machine code is nicely done by the MPLAB suite in the Windows environment, but programming the chip needs a programmer and compatible software.

After a stumbling start (the cure for which remains unknown, but was accomplished by re-installing the program), I have found Microchip's *PICPROG* shareware software effective and very easy to use. Beware, however, of trying to program the chip at too fast a rate. I found a setting of 200 for both long and short timing intervals consistently successful after failing at faster rates. (See OPTIONS > ADVANCED in *PICPROG*.)

COMPONENTS LIST

R1	10k	R10	1k
R2 - R5	47k	C1	220p
R6	22k lin pot	C2	100n
R7	82k	D1	Red LED (see text)
R8	33k	TR1	BS170
R9	68R	IC1	16F84 (4MHz)

Basically, the programme surveys the state of the keyer paddles, the mode selection switches, the battery state and the length of time since the last paddle was pressed, in cyclic order. Action is taken (virtually) immediately a switch is made to service whatever the contact state demands and, afterwards, the loop cycle is resumed. Separate routines are provided for Bug, iambic or Side-Swipe/straight key operation, and the processor will move between them according to the setting of the B_I and SS switches.

During iambic operation, any change of state at the dot or dash paddle inputs is recorded by setting bits in the appropriate byte in memory. This byte is tested regularly by the processor and no fleeting contact of the paddles is missed.

Battery-checking is accomplished by comparing a fraction of the battery voltage supply to the input threshold voltage of one of the PIC's inputs, RA0. If the voltage at RA0 falls below the input threshold, a routine is invoked to flash an LED indicator for about 30ms after each dash is sent.

The published software is reasonably well commented, in order that the sharp-eyed or inventive can correct my minor blunders and untidiness, or add their own ideas to improve the program. It is also invaluable, when reviewing the software after the passage of time, to remember what on earth one had intended it to do!

CONSTRUCTION AND TESTING

THE CIRCUIT is low power and low frequency. The RC oscillator used by the processor has a 1µs period (mid speed range), resulting in the system clock occurring at 4µs intervals. Hence, almost any method of construction is admissible. My prototype was built on Veroboard and worked identically to subsequent versions that were mounted on PCBs.

A PCB layout is offered for those who enjoy the artwork and subsequent neat result. It is advisable to use an 18-pin socket for the 16F84 to ease subsequent reprogramming or re-use. Although the PIC cannot be described as delicate, it can be damaged by applying unlimited power to the wrong pins and, hence, is best fitted last after connections are verified.

Having assembled the circuit, it should work without fuss, assuming all is as it should be. An oscilloscope will show if the PIC is active - a sawtooth waveform of 5µs period will appear at pin 16 and a square wave of 4.5V amplitude, 20µs period, at pin 15. If no scope is available, pin 15 should show about 2.25VDC on an ordinary meter. The voltages on all other pins of the PIC are DC levels, either 0V or +4.5V, with the exception of pin 17.

I would recommend that, for primary testing of the basic keyer, only the paddles, speed control pot and the supply are connected. In this state, the circuit will emulate a Bug key and should be active immediately the supply is connected. A high-resistance voltmeter or oscilloscope should detect almost the full supply voltage at pins 14, 13, 12, 11, 10, 9, 4 and also across the paddles and at the I_B and SS tags. Pin 17 will show around 1.2V. Pressing and holding the dah paddle will cause pins 6 and 8 to go high. Pressing the dit paddle should produce alternating high and low at these pins according to the dit speed setting. If these actions occur, then you are in business and the other connections to the mode switches can be made. Remember, only one of the I_B or SS mode switches may be made at any time, otherwise operation will be abnormal. I used a centre off, three position slide switch as a combined mode switch which guarantees that only one can be made at a time.

To test the low-voltage alarm feature, the supply voltage should be slowly reduced to below 3.9V while sending repeated dahs. When the supply falls below the warning threshold, the LED blinks after each dah. If not, check that the voltage at pin 18 goes high briefly after each dah, that pin 17 voltage is 0.9V or less, and that the LED polarity is correct.

In operation, either a single paddle key with separate dot and dash contacts or a twin-paddle key may be used. For straight key clean-up operation, use the dash input and select either Bug or Side-Swipe action.

Seldom does one achieve anything entirely without help and, in this case, my thanks go to GM3HBT and GM3KCY for their efforts in constructing prototypes and bringing me down to earth!

Finally, for anyone wishing to have a go but lacking a PC and/or an Internet connection, a pre-programmed PIC, PCB layout and components (less box, switches and sidetone transducer) is available from the author at £11 inclusive, as is the software on disc, at £2.

WWW

Bugambic software	www.rsgb.org
Microchip Technology Inc	www.microchip.com
'PIC Tutorials', by J Becker, *EverydayPractical Electronics* March 1998ff	www.epemag.wimborne.co.uk
MAGENTA Super PIC Programmer Tel: 01283 565 435	www.magenta2000.co.uk

REFERENCE

[1] 'Superbug Simulator', by Chas Fletcher, G3DXZ, *RadCom* August 1990, pp48/9. ♦

Newcomers' News

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

THERE ARE TIMES when you have to bite your tongue. I had one such moment the other day when I heard a station proclaiming that "this new licence is no more than CB". I did resist the temptation to give him a blast but I think the station he was in contact with put him straight.

If anyone has any doubts about the Foundation Licence (FL) course being 'real' radio amateurs' training they should get themselves a copy of *'Foundation Now!'*, the excellent RSGB text book for the course. They would see from reading this that there is a reasonable degree of technical information provided and it is well tested in the written exam. The FL students also have to prove their competence in setting up and operating a station, something many, myself included, never had to do.

MAYOR ON THE AIR

GRAHAM PROCTOR, Lord Mayor of Chester, enjoyed his visit to the GB2COS Jamboree on the Air (JOTA) station so much that he returned the very next day for a second look. Arthur Brighton, G7BQY, helped to activate the station for the benefit of both Scouts and Brownies.

It is always good to see youngsters getting stuck in but it is not so common to see them in such dignified company! Keep up the good work, Arthur, and all the Chester gang.

MORSE ADVICE

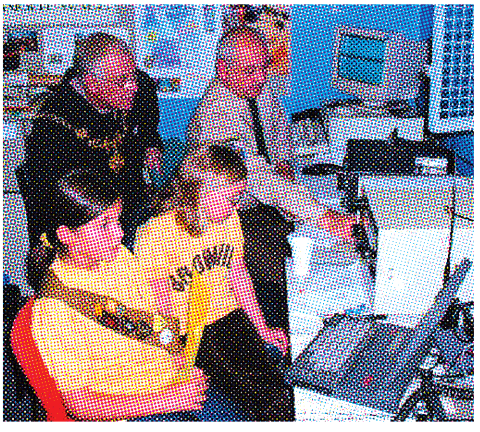
THERE IS NO DOUBT in my mind, your first Morse (CW) contact (QSO) is one of the most nerve-racking events in your time as an amateur! On the other hand, it is also one of the most rewarding. CW is a great mode for cutting through band noise and has few boundaries of culture, language or accent. It is an international language.

However, there can be pitfalls. 'Pol' Parrott, G3HAL, worked a newcomer so anxious to bag his first CW QSOs that he forgot the 'golden rule' of CW operating - *"never send faster than you can receive"*! The logic is that if you send at your top speed the other stations will assume that you can receive at the same speed. That's when things get sticky.

It is awfully tempting to speed up as you gain confidence, but you must put the brakes on. I have yet to come across anyone who can receive faster than they can send, indeed some of my Foundation Morse assessment candidates have sent perfect Morse at about 10 words per minute when they have yet to memorise the code.

Thankfully, Pol was patient enough to work at it and he did achieve a dialogue with the newcomer, others might be less tolerant so if you are just getting going on CW take it steady and you will gain speed over time. Better to go slowly and get the message first time than to waste time asking for repeat after repeat. Thanks for taking the time to help the newcomer, and for the tip Pol.

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



Arthur Brighton, G7BQY, at the controls of GB2COS with the Lord Mayor and some of the local Brownies looking on (see 'Mayor on the Air').

Fred, 2E1ICQ, and Graham, 2E1HVL / M3GDB, on duty at GB2DHH (see 'Life After the NRAE?').

HOT IRON NEWS

AVID READERS will recall the 'newsletter special' column from a couple of months ago. I asked if any other newsletters might be of interest and I was reminded of *Hot Iron,* the journal of the Construction Club.

This is a quarterly newsletter for radio amateurs interested in building equipment. It is published by Tim Walford, G3PCJ, who can be contacted at Upton Bridge Farm, Long Sutton, Langport, Somerset, TA10 9NJ or, via e-mail, through: walfor@globalnet.co.uk

Tim thought the newsletter might not be entirely suitable for newcomers but I think we often forget that not all newcomers to amateur radio are newcomers to electronics. I have taught some very competent engineers in my RAE classes. Thank goodness they knew little about the amateur licence conditions and operating practices or I would have been sunk!

The copy of the *Hot Iron* I was sent included articles on a loudspeaker driver, updates on kits, a display for a varicap tuning control and lots of other hints and tips over six pages. Subscriptions cost £6 per year from Tim at the address above.

LIFE AFTER THE NRAE?

DON LAMB, G0ACK, has provided us with an answer to the question 'What happens to newcomers after they get their callsigns?' Don helps to run Novice RAE classes at the Radio Society of Harrow and sent me some details of what some of his ex-students have been up to.

Fred Stevenson, 2E1ICQ, and Graeme Batsman, M3GDB / 2E1HVL, have got themselves involved in a museum station based at the de Havilland Aircraft Heritage Centre near St Albans. The museum has a permanent amateur radio station with the callsign GB2DHH so as well as cleaning the outside of the shack, a section of an old Mk2 Comet aircraft, they get the chance to operate on HF under supervision. Apparently this usually ends up with a major pile-up on 7MHz, good training for the M3s! ♦

Spread The Word!

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

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

Applying for the ARRL DXCC Award

by Ian Capon, G0KRL *

IN THE February and March 2002 RadComs, *you will have read the article by Phil Whitchurch, G3SWH, which gave some useful tips about QSLing. For most of the more common countries such as USA, Canada, Japan and most of Europe, QSLing via the bureau works well, but for the more unusual countries you may well wish to QSL direct, as explained by Phil in his article. Once you have received QSL cards from around 100 countries, or 'entities', you may want to think about applying for the ARRL (American Radio Relay League) 'DX Century Club' (DXCC) Award. This is the world-wide bench-mark for measuring your success as a DXer on the HF bands. Working the initial 100 countries may take anything from a single weekend (for the very well-equipped station) to a few months or even years for the less-active operator. But that isn't the end of the story: working* all *335 entities on the DXCC list can be a lifetime's endeavour! Several years ago, you had to trust your valuable and hard-won QSL cards to the international postal services if you wished to apply for DXCC. However, that is no longer the case and now it is possible to apply for DXCC in this country, as Ian Capon, G0KRL, one of the UK's DXCC 'Field Checking Representatives', explains . . .*

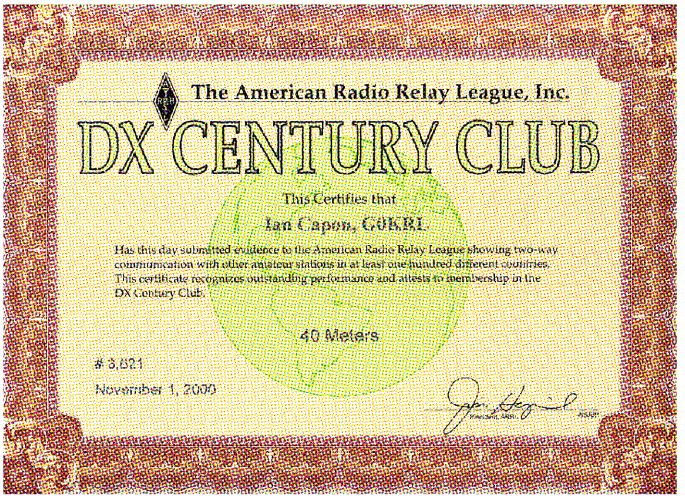
SO, YOU HAVE been steadily working countries and collecting QSL cards for a while now. You decide you want to get that DXCC piece of paper on the wall, but how do you go about it? Hopefully after you've read this you'll know exactly what you need to do and how to go about it.

I am one of the ARRL DXCC Field Checking Representatives for the UK and if I'm perfectly honest the reason I'm writing this is *not* to make *your* life easier, but *mine*! You see, if you send me a beautifully filled out application that is a joy to behold, I (and my fellow checkers) will be able to spend more time on the radio ourselves, instead of drowning under a sea of paperwork.

WHAT'S REQUIRED

RIGHT, LET'S get started. You've got all your QSL cards ready; what next? Firstly you need to know that we as field checkers are unable to check cards that are over 10 years old, for the 160-metre band, or 'deleted countries'. I'm sorry, but those are the rules. Then you need to get the latest ARRL application forms. Please don't use the form that's been sitting at the back of your desk for five years or more, it really does make everybody's life easier if you get the latest. Where do you get them? Well, you can go to the ARRL website (see WWW. at the bottom of page 35 if you have the Internet and download a copy, contact Fred Handscombe, G4BWP [1], or you can send me [2] an SASE and I will send you a copy and also an information sheet.

* *Ian Capon, G0KRL, Windon, The Green, Beyton, Bury St Edmunds, Suffolk IP30 9AJ.*



The author's own Single-Band DXCC award for 40 metres. A list of the different types of DXCC award available is on the ARRL DXCC website.

So now that's out of the way and you're sitting comfortably with a pen, a number of forms and a pile of QSL cards in front of you, what's next?

You need to organise your cards to follow the instructions on the form. That is, sorted by band and within each band by mode: all the 80m Phone cards, then the 80m CW, 40m Phone etc, then make one entry per line for each QSO credit. Any QSLs you have for multiple contacts (eg D68C on four bands) should be placed at the end of the listing and *very importantly* your pile of QSLs should be in the *exact* order they appear on the application form. Believe me, there is nothing worse than having to sort through someone else's unsorted pile of cards trying to find the next one on the list!

I should point out at this stage that it is perfectly acceptable to use a printout from a computer instead of sitting down and hand-writing your list. But I would emphasise *do not* have more than 30 entries on each page and *do* make sure your layout is exactly the same as the ARRL application sheet, as this will mean less chance of problems when your information is being transferred to the DXCC database by the ARRL.

MAKING THE APPLICATION

NOW TO FILL in the main application. This is all very straightforward but do note the line that says "print your name exactly as you want it to appear on the certificate".

Now decide how you want to pay: either by cheque, in which case make it payable to the Field Checking Representative you are sending your cards to, or you can put your credit card details on the form and have the ARRL charge you directly. The current charges are shown in **Table 1** but are subject to change if the exchange rate alters radically.

If you chose to pay by credit card there is a surcharge of £1 or four first class postage stamps, to be sent with your application, to cover the cost of sending it to the USA.

If this is not your first application, please enclose the last 'DXCC Award Credit Slip' which you received from the ARRL as this will help to process everything more efficiently.

Gather all your cards and forms

First DXCC Award Application	£7.50 (all applicants)
First submission in a calendar year (January to December)	£7.50 (ARRL Member)
	£15.00 (non-member)
Additional submissions in a calendar year	£15.00 (ARRL Member)
	£22.50 (non-member)

The first submission in a calendar year may contain claims for up to 120 QSOs. Additional QSOs (over 120) will be charged at 12 pence per QSO for all applicants.
Additional submissions in a calendar year may contain claims for up to 100 QSOs. Additional QSOs (over 100) will be charged at 12 pence per QSO for all applicants.

Table 1: Table of charges for ARRL DXCC Applications in the UK.

together, decide how you are going to pay and parcel everything up, remembering to include sufficient money or postage stamps plus packing to enable your QSL cards to be returned to you: you've worked hard to get them, so I'm sure you want them back!

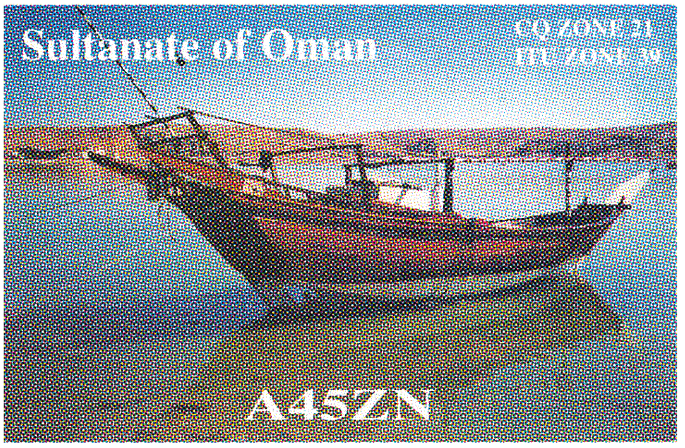
If you don't want to trust the postal service and I am your Field Checker, I'm quite happy if you want to contact me [2] and make arrangements to bring your cards in person for checking. However, please note that I (unfortunately) still have to work, so I'm unlikely to be available at a moment's notice!

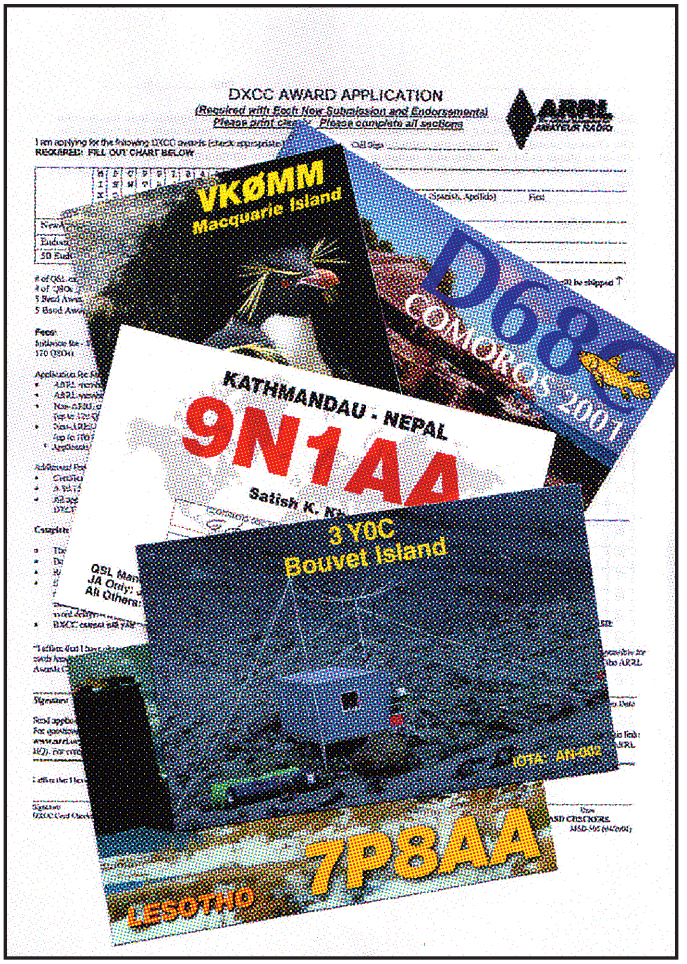
SIT BACK AND WAIT

THEN, WHEN ALL this is done, your cards have been checked and returned to you, it's just a matter of waiting for your certificate to arrive from the ARRL. This can take approximately three months depending on the number of applications the ARRL is dealing with at any given time. You will also receive a summary of the number of countries credited to your DXCC, a list of any contacts that may have been rejected, and a full list indicating which countries you have credit for.

You are advised to check this list carefully against the countries you submitted as mistakes occasionally occur. If you spot any errors you should contact the DXCC Desk at ARRL [3] directly to resolve them. You needn't waste this time while you're waiting. Carry on working and confirming those countries ready to update your DXCC again in the very near future.

For all English stations please send your cards to G0KRL [2]. Note that Jim Kellaway, G3RTE [4], continues to be a DXCC Field Representative and is available to check cards if this is more convenient for you. For those in Scotland, Wales, Isle of Man, Jersey, Guernsey and Northern Ireland send your cards to Rob Ferguson, GM3YTS [5].





Above: a clutch of rare QSLs from the Comoros, Macquarie Island, Nepal, Bouvet Island and Lesotho with a DXCC application form.
Left: a 'holiday DXpedition' QSL from the Greek isles.
Top: A45ZN's QSL from Oman.

CONTACT INFO

[1] Fred Handscombe, G4BWP, Sandholm, Bridge End Road, Red Lodge, Bury St Edmunds. Suffolk IP28 8LQ; e-mail: HF.Awards@rsgb.org.uk
[2] Ian Capon, G0KRL, Windon, The Green, Beyton, Bury St Edmunds, Suffolk IP30 9AJ; e-mail: g0krl@arrl.net
[3] E-mail to dxcc@arrl.org or write to the DXCC Desk, ARRL, 225 Main Street, Newington, CT 06111, USA.
[4] Jim Kellaway, G3RTE, 55 Ladbrooke Dr, Potters Bar, Herts EN6 1QW; e-mail: g3rte@genie.co.uk
[5] Rob Ferguson, GM3YTS, 19 Leighton Avenue, Dunblane, Perthshire FK15 0EB; e-mail: gm3yts@btinternet.com ♦

WWW.
ARRL DXCC pages:
www.arrl.org/awards/dxcc

Down To Earth

An Antenna Bracket for the FT-817 Stand

A useful addition to his FT-817 stand, by Tony Lifton, G0PEH *

THOSE WHO have made the stand described recently [1] for the Yaesu FT-817 transceiver may like to construct this little extra piece of hardware.

Having purchased a Mizuho vertical antenna for 40 metres, I realised that it was advisable not to mount it directly onto the rig, as this imposes a great strain on the socket. Also, of course, it would not be possible to use it with the rig in the stand.

To overcome these problems, I constructed the following antenna bracket which mounts on the main stand.

CONSTRUCTION

START WITH a piece of aluminium 1.6mm thick, cut to the dimensions shown in **Fig 1**, drill the holes as indicated to allow the fitting of the antenna socket and to attach a clip to restrain the short length of RG58 coaxial cable.

Next, bend the aluminium to form an inverted-U with square corners. Then, take a second piece of aluminium of dimensions 25 x 75mm, and bend to form a right-angle bracket with sides 25mm one way and 50mm the other

This is then attached to one of the legs of the inverted U-piece, using a couple of 1/8in pop rivets, the other part of this bracket being used to attach it to the side of the main stand, to impart stability when the antenna is mounted.

Place the two stands side by side and drill through the angle to allow a small bolt and nut to be used to join them together at the rear of the stand; I used a wing nut for easy removal of the two pieces in transit.

The completed bracket can now be painted. I found it best to do any painting at this point, before final assembly, using a small can of aerosol paint, in my case satin black to match that of the main stand. Continue the construction when the paint has dried.

Fit the BNC round chassis socket to the top of the U-bracket, and then solder a piece of RG58 about 40cm in length to the socket and a PL259 plug to the other end for attaching to the rear socket of the FT-817. Use a small clip to retain the coax as it leaves the stand.

As a final embellishment on my prototype, I cut a 35mm film canister in half and, after drilling a clearance hole in the bottom end for the BNC socket, fixed this using the nut and ground washer. Remember to make a hole in the side for the coax to come through and then fit the cap to the sawn-off end of the canister. The photographs make these procedures clear.

TESTING

TO TEST, fix the two stands together, place the rig into the main stand, connect the vertical antenna to the BNC socket and mate the PL259 plug on the end of the short coax with the SO239 rear antenna socket on the FT-817. After fitting either an earth connection or a counterpoise of suitable length, you can now test the SWR using the rig's own meter or a separate device fitted between the antenna and the FT-817. I found that, on 40 metres, after fully extending the antenna and then retracting one section to approximately 40mm, the SWR was unity.

Good luck with your construction. Have fun, and don't forget, summer is coming, so let's go '/P'!

REFERENCE

[1] 'A Stand for the Yaesu FT-817', by Tony Lifton, G0PEH, *RadCom* January 2002 pp36/7. ♦

PARTS LIST

1 off 60 x 160mm of 1.6mm-thick aluminium
1 off 25 x 75 mm as above
1 off BNC round chassis socket
1 off PL259 plug
1 off 40cm length of RG58 coax
1 off Small clip for coax

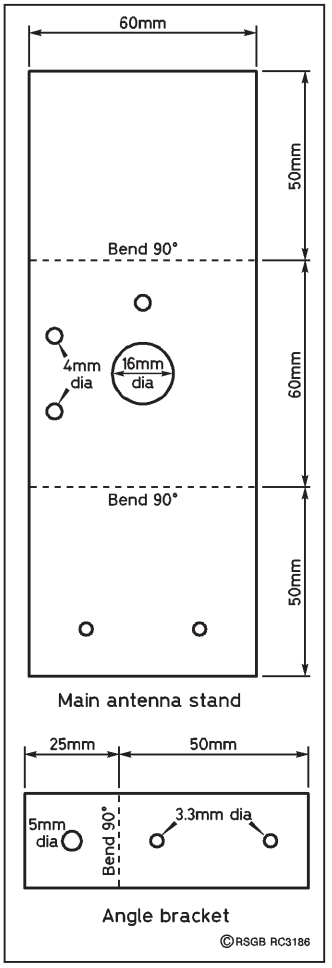
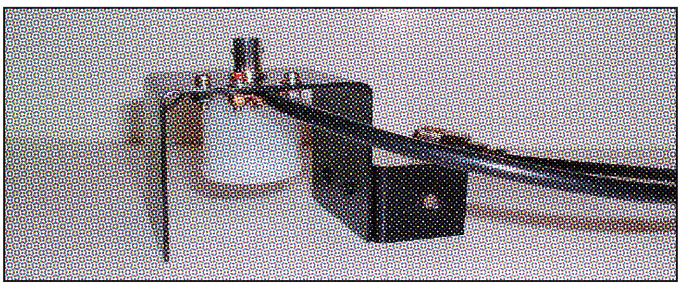
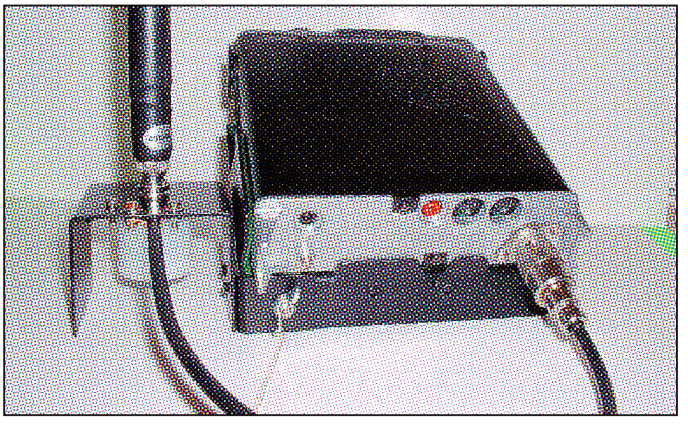


Fig 1: Details of the aluminium sections of the antenna bracket.



Close-up of the antenna bracket, showing the BNC plug, the cable to the FT-817, and the sawn-off film canister.



The antenna bracket fitted to the FT-817 stand, with the antenna in place and the short coaxial cable fitted to the rear antenna socket.

* *Marant Cottage, 70 Scrapsgate, Minster-on-Sea, Sheerness, Kent ME12 2DJ.*

The RSGB PSC

International Beacon Monitoring Project

by Gwyn Williams, G4FKH*, Vice Chairman, RSGB Propagation Studies Committee

RADIO propagation prediction is understandably a very emotive subject for a lot of keen amateur radio operators, not least among members of the RSGB Propagation Studies Committee (PSC). During a PSC meeting in 1999 it was noted that the *RadCom* propagation predictions had not been as accurate as they perhaps should have been. As proof of this, the reception of beacons in the NCDXF / IARU International Beacon Network was noted.

The Northern California DX Foundation (NCDXF), in cooperation with the International Amateur Radio Union (IARU) constructed and operates a world-wide network of high-frequency radio beacons on 14100, 18110, 21150, 24930, and 28200kHz.

After careful consideration, the author decided to initiate a PSC project using the NCDXF beacon chain to increase *RadCom's* prediction accuracy. A radical approach was needed.

THE PROJECT

IT WAS DECIDED to split the project into two parts. The first part was the information-gathering exercise and the second part the programming and automation side. *RadCom* assisted with the first part in as much as the editor inserted an advertisement asking for volunteers to listen and report reception of the beacons in the chain. The reporting team consists of G3PEM, G0IHF, G4WWA, G0KYA, M0AOG and myself.

The first results were received for July 2000. Initially, I designed an *Excel* spreadsheet and those who had computers either e-mailed me the monthly reception reports or sent me a diskette with the information on. Later, Alan Messenger, G0TLK, adapted his *BeSpeak* program [see WWW. below - *Ed*] so that the information was automatically captured to disk when the relevant program button was clicked.

As the reporting team is spread across the country, I receive a good geographical spread of beacon reception and therefore a good average for the UK. The information I requested was: date, time, band, beacon, S-meter reading and any special comments. As I requested the data to be sent to me each month, I was eventually able to verify the *RadCom* predictions against actual reception reports. The NCDXF beacon chain was selected for this purpose because it gave five-band coverage and had 18 beacons spread around the globe. One drawback is that not all the beacons are on the air all the time.

*21 Borda Close, Chelmsford, Essex CM1 4JY.

	Time														
Beacon	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
4U1UN		1	1				1	1	6				1	1			
4X6TU	1	2	1				2	3	5	5			1				
5Z4B													1				
CS3B	1	3	1		1		2	2	2	2		4	2	2			
JA2IGY		1															
KH6WO		1															
LU4AA		1	1														1
OH2B	7	4	6		6		4	5	7	7							
RR9O			2		1				2								1
VE8AT		1	1		1		1	1	2	1			1				1
W6WX		1							1								
YV5B													1				
ZL6B	1	1	1		1		1	1	1								

Fig 1: Analysed data for 14MHz. Only the hours that were reported are shown here.

MONTHLY RESULTS

ONCE THE REPORTS have been received I read them into an *Access* database, which has been programmed to analyse the data into a meaningful format.

An example can be seen in **Fig 1**, which shows the beacons heard during December 2001 on 14MHz. Missing hours represent times where no monitoring took place. What I end up with is a list showing all the bands monitored with S-meter readings against the beacons heard at the relevant time. Further examples are on my website (see WWW. below).

Now comes the radical approach! Instead of looking for a prediction program that produces the same results as those in my database, I change the parameters that the prediction program uses in order to obtain the desired results. The ITS HF Propagation, REC533 program is used, not because it produces the most accurate results, but because it has the most comprehensive (and complicated) set of parameters that can be manipulated by a separate program.

Currently I have 60,000 entries on my *Access* database for these beacons; this will grow steadily in the future. The database should be sufficient to verify the accuracy of propagation predictions programs.

Monitoring the beacon chain has thrown up some anomalies, such as the extreme reliability of the South African beacon, ZS6DN, on 28MHz. I believe this is due in part to a number of special circumstances, for example the reliability of the North - South path, and / or the 'Equatorial Anomaly'. By adjusting the prediction parameters for this path, this special reliability can be catered for.

AUTOMATION

THIS IS WHERE my good friend and colleague Dr J Sylvan Katz, G0TZX / VE5ZX, comes in. Sylvan has been responsible for producing the logic and programming so that all I need to do is alter certain parameters for each destination that is being predicted.

Changing such parameters as aerial type, power output, SSN, etc have a profound impact upon prediction output. Each month I produce beacon predictions for the following month. When that month's results are available, I merely compare them. If they are incorrect I play with the parameters until the results are the same and keep a record of the new parameters. In this way, month by month I find that there are fewer and fewer changes to make, proving that I'm on the right track.

RadCom readers who take note of the HF F-Layer Propagation Predictions should have noticed a gradual improvement in prediction accuracy since the inception of this project. For those hours that I do not receive reports, I merely use the program to extrapolate the most logical results.

Because of the need to predict three months ahead for *RadCom* purposes, the increase in accuracy is necessarily a little way behind that which I am able to achieve during a given month. This project is scheduled to continue until August this year, when I should have all the data necessary to verify that the predictions are as accurate as possible. It is expected that from time to time thereafter accuracy will be tested perhaps by the use of G0TLK's program, which has a completely automated routine and can be used in unattended mode. ♦

WWW.

NCDXF / IARU International Beacon Network www.ncdxf.org/beacon.htm
***BeSpeak* (Alan Messenger, G0TLK) www.alangm4.clara.net**
Gwyn Williams's, G4FKH, site: www.g4fkh.demon.co.uk/NCDXF/Table.htm

The RSGB Old Timers' Honour Roll

The RSGB has subscription concessions to reward loyal service of many years. On 21 February 2002, the following had been members of the Society for 50 years or more.

75 YEARS
G5YN Sir Evan Nepean Bt
RS2627 Mr W S Eadie

74 YEARS
GM6FT Mr R T Frost

73 YEARS
G2BY Mr H E Whatley
G3AZ Mr J J Hunter

71 YEARS
HB9T Dr R Stuber

70 YEARS
G3CJ Mr E H Heaton-Jones
G6XM Mr W James
G2JL Mr R V Allbright
G5VQ E W Taylor
GI5SJ Mr S N Johnson
G8SC Mr C Collins
G5VO Mr J H Hargreaves
G6NA Mr H C Spencer

69 YEARS
G5IJ Mr IJP James
G5WW Mr P M Carment MBE
G0BXB Mr R E Wilkinson
G2QT Mr F H Cooper
G3RQJ Mr P Woollett
G5RL Mr B K Rowell
G5LG Mr A W Lister

68 YEARS
G2PT Mr J Piggott
G2HW Mr H Whalley
G3AWA Dr A J Woiwod
G6LJ Mr S K Lewer
G3MA Mr E A Perkins
G5KM Mr H H Eyre
G6HY Mr R Healey
G8PO Cdr JE Ironmonger OBE

67 YEARS
G3KSH W/Cdr A R Gilding
G2ASF Coventry ARS
G2FBU Mr JCM Greig
G2KU Mr R M Herbert
G4LX L G Spencer
G6AG Mr C J McClelland
G6CS PTW Castle
G8PX Mr F A Jefferies
GM5NU Mr WBH Lord CB
G2DFP Mr J M Lowe
G5ZK Mr R N Lawson
G8FF Mr S Southgate
G8JM Mr W G Hall
G6RJ Mr A Robinson CBE
G2DYM Mr R Benham-Holman
G8GP Mr E V Neal
G3ADZ Maj DWJ Haylock
G8DR Mr D R Aston
G2AVV Mr G E Evans

66 YEARS
G8CXL Mr N K Read
VE3XE Mr E C Ilott
G2CIL Mr G A Hook
G8KW Mr R G Shears BEM
G7EEU Mr H W Skinner
G3WP Mr J H Brazzill
G8QM Mr V J Flowers
G2HV Mr J Dickson
G6JJ Mr W N Craig
EA6ZY S Ingram
G3LX Mr H P Arnfield
G8VF Mr A A Moss
G5BM Mr F H Watts

65 YEARS
G3LD Mr F W Foster
ZL1AH Mr J D Wightman
G8VL Mr J I Sinclair
G8FC RAF ARS
G4BU Mr R H Draper
G3HN Col JWW Cock
G2ARU Mr R A Loveland
GW3SB Mr T C Bryant
G8GD Mr H E Ward
RS2692 Mr E M Frost
G2BNI Mr D B Drage
G3VA Mr J P Hawker
G8JR Mr N P Haskins
G8RW Mr R W Standley
G2QA Mr T Simkins MBE

64 YEARS
G8GEA Mr K T Warriner
G2BMI Mr J Bramhill
G2HJP Mr I A Hennell
G4CM Mr C G Middle
G5DQ Mr P J Broom
GI3VQ Mr J K Thompson
GM3UU Mr A S McNicol
G2BTO Mr G Openshaw
G3CCH Mr J H Stace
G6GN Mr H J Gratton
G2CVV Mr F C Ward
G3DFA Mr D B Gaggs
G3FD Mr H T Brock
G3OEP Mr D J Buddery
G2CDT Mr F H Martin
G2DSP Mr R Allen
G3BR Mr S T Hall
G3ZTF Mr G T Sparkes
G4AL Mr G R Cox
G3CU Mr H F Knott
LA6A Col L R Heyerdahl MBE
GM2AOL Mr W S Hall
G2DTQ Mr A Goode
G4FB Mr F Barnard
G8FW Mr K E Walters
G3BOB Mr G M Ward
G3ENI Cdr AJR Pegler
5B4AGP Dr T A Appleby
GW3QN Mr J S Owen
G3CQ Mr A J Hallett

63 YEARS
RS3271 Mr D Armstrong
GW2DHM Mr W D Andrews
G2HKS Mr RPB Udall
G2CXT Mr A R Richardson
G4DR Mr D P Urquhart
G3FP Mr B R Arnold
G2CPM Mr W B Mansell
G3QX Mr T R Barlow
GM3AWW Mr W S Murray
GM3UM Mr G P Millar
G8CK Mr W E Bartholomew
GM3CFK Mr P Harrison
G3QD Mr J G Treece
G3AQM Mr F J Gregory BEM
G3DEQ Mr H N Woodnutt
G3YY Mr C T Fairchild
GM3AKM Mr L R Richardson
GW3CF Mr FGH Jones

62 YEARS
G2HHV Mr J Spivey
G3ANI Mr J R Senior
G2ART Mr FHP Cawson
G3APN Mr D Rabbage
G4GD Mr NGV Anslow
GW3ZV Mr J Banner
G6QI Mr R Walker
G2BGU Mr K Gasson
GW2HCJ Mr R C Taylor
RS37399 Mr D H Tomlin
G2FSI Mr L W Smith
G4DC Mr P W Winsford
G3AOS Mr J G Barnes
G3AIK Mr K N Watkins
G3BWV Mr F E Springate
GW2FLZ Mr B H Green
G2CVO Mr F H Osborn
G3SZ Mr A Chilvers

61 YEARS
G2BLA M A Pyle
GD0GBA Mr J G Carroll
GW3ARS Mr J Sagar
G3DVV Mr J O Brown
G2AMG H W Mitchell
GW2HIY Mr E M Davies
G2BDV Mr I D Brotherton
GU4GG Mr CDS Wintle
GW2HFR Mr A Ellis

60 YEARS
EI4L Mr J E Scanlon
G2BPW Mr IWK Smith
G4IOF Mr M East FSVA
G2FXQ Mr S W Saddington
G2HIX Mr GGP Holden
G3CLL Mr J Willy
G2HAX Mr S P Shackleford
G3AEZ Mr John Greenwell
G3DAM Mr H Barnett
GJ3EML Mr JHE Watson
GM2FVV Mr W Girvan
G2FUU Mr T Knight
G2HDU Mr C W Cragg
RS4430 Mr W Telfer
AB4SW Mr I T Haynes
G2DKI Mr P N Ridout
G8XXV Mr G L Clarke
VK2FFF Mr S J Hutchison
G3FVD Mr R K Mildren
GM3CIX Mr L J McDougall
G2FWZ Mr S I Biggs
G2FXZ Mr J B Hodgetts
G3AKX Mr R G Lascelles
G3ASE Mr H S King
G3LCZ Mr T W Hickinbottom
G2HKU Mr E H Trowell
G3BWX Maj A L Fayerman
G3DRN Mr E G Allen
G3GYE Mr P T Pitts
G3HYJ Mr O F Simkin
G8LOK Mr L E Currington

59 YEARS
G3BAP Mr R Cordingley
G3GJX Mr E B Grist
G3AQX Mr S Roberts
G2FRI Mr T J Swain
G4LW Mr L Huntley
G6NB Mr D N Biltcliffe
RS5272 Mr C L Chappell
G3ALK Mr E J Holmes
GM0IJA Mr B C Skinner
G3GBN Mr S H Feldman
G2AOY Mr J R Muddell
GM3BCL Mr A G Anderson
GM3DOD Mr A M Murray
G3AIN Mr D Withers
G3BPM Mr PJH Matthews
G3CXP Mr R A Gill

58 YEARS
RS6181 Mr R P Hope
G3AKU Mr R A Harding
G3IGM Mr R G Hindes
G3CAQ Mr W Moorwood
RS6464 Mr E Valentine
G3DKO Mr J W Stevenson
G3ENB Mr W E Gates
G3CBW Mr H Walker
G3GHS Mr J G Holland
G3LIA Mr R J Rogers
VK5ZO Mr D Clift
G3AAZ Mr G G Gibbs
G3BEG Mr P C Bond
G3ANG Mr J W Emmott
G3NOF Mr D McLean
G3AAJ Mr RJC Broadbent MBE
G3CJD Mr LFL Allen
G3CWW Mr AWW Timme
G3IRM Mr P Lumb

57 YEARS
G2FUD Mr A W Owen
G3EKL Maj R A Webb
G3FDG Mr R G Morris
GI5TK Mr A R Irwin
G3BVU C J Beanland
G3HKT Mr A R Partner
G4KID Mr B C Partridge
G2DQX Mr R J Woodroffe
G3ADQ Mr A W Walmsley
G2DGB Mr A G Short
G2AAN Mr J H Clarke
G2CAZ Mr M S Ellis
G2FQP Mr L J Avory
RS8618 Mr A R Cameron
G3ATH Mr H Pain
G3YLR Mr F R Blake
RS558 Mr RD Thomas
RS8896 Mr J Crabtree
G0RVQ Mr AJW Harrison
GW3HGL Mr B Clark
G3FZR Mr M W Capewell
ZL1AOA Mr J R Whitney
G3FPN Mr J R Davey
G2ADR Mr E Parvin
GW3CZC Mr P J Williams
RS9475 Mr J Smith

56 YEARS
G0TTK Mr M A Chatfield
G3DNJ Mr G F Weller
G3TXT Mr R T Laing
RS10128 Mr A C Lees
G3BPG Mr J H Richards
G3CRJ Mr B J Shaw
G3EBH Mr G C Newby
G3JON Mr J Bell
G5GC Mr GAH Eckles
G2FQS Mr R L Barrett
G3IJS Mr J F Stratfull
G2FSS Mr J A Caley
G3BVB Mr DRJ Adair
G3FOO Mr A Seed
RS10548 Mr J B Gurney
RS10817 Mr R J Baker
W2CIH Mr N A Champness
G3AMF Mr K G Thompson
G3BJC Mr R E Sparry
G3BYW Mr W M Dunell
G4IOT Mr A T Hunt-Duke
G4YK Mr B M Morrisey
G6RO Mr R C Kaye
G8GF Mr W A Higgins
GM2BMJ Mr T D Jardine
RS20428 Mr ARA Bunnage
RS9710 Mr F W Adderley
G2AOZ Mr GWF Ashford
G3CSC Mr S J Roddan
G3DWQ Mr G Lancefield
G4AQ Mr E G Filby
G8PG Mr A D Taylor
G2HCG Mr B Sykes
G3BNE Mr G W Alderman
G3INN Mr N S Lilley
GW3JGA Mr JET Lawrence
G0AEW Mr D T Arlette
G2BRR Mr R G Rugg
G3AUB Mr N R Paul
G3BZB Mr R T Cunliffe
G3EFS Mr W H Borland
GW2FYV Mr M Arthur
VK5CE Mr C Taylor
G0BFI Mr V E Heard
G3CLK Mr K J Vickery
G3CXI Mr P J Cooper
G3ENG Mr J D Mathews
G3FJN Mr J A Barson
G2FKZ Mr C E Newton
G2FTK Mr F A Noakes
G3CRH Mr HHA Sanders
G3EEQ Mr K C Gill
G3ESY Mr PWF Jones
G3FEX Mr B C Oddy
G3PFJ Mr J D Harris

55 YEARS
G0TTG Mr M Warriner
G2CQX Mr P V Pugh
G3DIT S Hampshire ITS
G3FRN Mr G N Myatt
G2FCA Mr A E Burnard
G2FSA Mr R L Harvey
G3AIU Mr KAH Rogers
G3BHF Mr E C Hasted
G3ESA Mr J H Oakes
RS12233 Mr H W Sennett
G3BJB Mr E Dandy
G3BKN Mr E W Batten
G3FKJ Mr W F Jeffery
G3IDG Mr F A Herridge
RS12415 Mr H J Wood
G2CHI Mr W G Bailey
G2CKQ Mr R S Trevelyan
G3CHD Mr S R Barker
G3COJ Mr AHB Bower
G3CRR Mr A E Glozier
G3CTQ Mr H Westwell
G3DII Mr J Bell
G3EOO Mr J Hamlett
G3EUS Mr J G Fitzgerald
GM3DSD Mr A Trayler
GM3JOA Mr H E Stanway
RS12840 Mr J L Butcher
RS644 Mr HJ Darling
5Z4DV Mr T H Hutchinson
G3AGF Mr R L Edginton
G3EAT Mr W H Burden
G3EUE Mr E F Jones
G3EUK Mr R W Curtis
G8ACR Mr RW Yates
G3ABA Mr L J Kennard
G3AIO Mr S Fenwick
G3BGA Dr D Finlay-Maxwell
G3CGQ Mr F W Tyler
G3CTR Mr R L Whorwell
G3CVI Mr B H Thwaites
G3EDW Mr P R Golledge
G3FEV Mr J R Platt
G3HCO Mr G A Errock
G4HSA Mr V C Whitchurch
G5DS Mr J L Danks
G2ACZ Mr G Whitehead
G2DQW Mr A Williams
G2FUM Mr H Hunt
G2HFW Mr E G Anthoney
G3AJX Mr G Stanton
G3ASH Mr R A Jackson
G3BXS Mr A G Stacey
G3EPO Mr K I Procter
G3JMG Mr J M Gale
G3YCN Mr W E Kent
G4FM Mr R H Kelsall
G6XN Mr L Moxon
GD3AHV Mr G W Ripley
RS13129 Mr E Chester
G2ALN Mr E W Taylor
G3AXI Mr R J Boal
G3JSB Mr S B Jeffrey
G4KEE Mr V A Tomkins
G8MVD Mr K Wilks
GM3DPL Mr E G Morgan
GW3ATM Mr D Nasey
G3BNF A G Embleton
G3BTM Mr N Shires
G3HJS Mr R V Woodford
G3ODH Mr S B Smythe
GD8COH Mr S T Dimmock
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 PER Courcoux
G3FNM Mr W R Parkinson
G3GAW Mr D J Redshaw
RS14170 Mr D H Clements
VK6PZ Mr P Zeid OBE
G2FYY Mr M B Rowles
G3AVE Mr FCP Flanner
G3EDS Mr K G Perkins
G5MS Manchester & DARS
VK6RV Mr RGB Vaughan
G3BDH Mr R R Flaum
G3EFP Mr J C Pennell
G3GIQ Mr H F Lewis
GW3ITT Mr J Cairns

54 YEARS
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
G3EKD Mr A A Sparrow
G3GFG Mr D R Payne
G3JIZ Mr J M Read
G4LKX Mr D C Hepworth
RS17044 Mr M Woodfield
RS19877 Mr H J George
G3BZS Mr C J Whistlecroft
G3VHP CBH Bradshaw
RS15448 Mr A S Kitching
VK2BPN Mr P J Naish
G3BDQ Mr J D Heys
G3DSV Mr RWP Wilson
G3EVT Mr R J Mutton
G3NTA Mr G A Couzens
G3SKI Mr R A Bravery
G8TB Mr B W Wynn
G3BMI Mr A Bolton
W8PR Mr D R Hearsum
ZB1AH Mr F Hague
G3BUF Mr B J Fost
G3CDE Dr G A Jackson
G3DOJ Mr W J Omer
G3EDM Mr G L Mills
G3FIB Mr G A Livesey
G3GGG Mr R A Bishop
G3HCY Mr H W Cross
G3HHU Dr JCW Ickringill

G3HTP Mr E G Drackley
G3IVF Mr H E Smith
G3NHU Mr A D Besford
G3BRW Mr R G Wyatt
VK2AYD Mr D A Pilley
G3BOK Mr W G Rennison
G3FDS Mr C F Ford
RS15845 Mr L Grout
RS15851 Mr K J Edwards
VK7LZ Mr C P Wright
G3ECM Mr P W Bowles
G3GGL Mr G Wormald
G3GOT Mr B W Legrys
GW3HCL Mr DEC Lockyer
G3BNG Mr R S Andrews
G3CMH Yeovil & DARC
G3DJK Mr K Rosier
G3DUL Mr H H Pickering
G3FMT Mr D W Robinson
G3GIH Mr J C Bird
G3HGM Mr J A Ewen
G3IIV Mr A Davies
G4CCA Mr MJL Fadil
G8NJF Mr A J Cox
HB9ALV Mr K J Marley
G2CBC Mr WEG Smith
G2XP Sutton & Cheam RS
G3AYZ Mr J F Turner
G3BPE Mr R G Holland
G3BRT Mr GOJ Parfitt
G3CEG Mr B King
G3COY Mr V J Reynolds
G3DPW Mr R L Knight
G3DWW Mr G Cripps
G3EFK Mr W T Clegg
G3IIY Mr E C Clayson
G3MUI Mr D J Durrant
GW3FPH Mr J W Hayes
EA7FSF Mr F Pilkington
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 RG McDonald
G3DEB Mr T A Bennett
G3EFY Mr TWA 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
RS16822 Mr G F Oliver

53 YEARS

G3DDA Mr K W Dyson
G3HRP Mr T J Wright
RS17032 Mr B M Collings
RS4190 Mr FJW Trollope
G3DIC Mr C H Bullivant
G3EWY Mr P F Walder
G3FYP Mr P S Robson
G3KXE Mr E W Bettles
GD3FLH Isle of Man ARS
GM3DEE Mr R P Russell
RS17058 AMC Macklow-Smith
VK6HD Mr M E Bazley
A2ACN Mr B J Bale
G3BSU Mr A F Cleall
G3FBN Mr W J Bolton
G3FNZ Mr J A Lambert
G3NOX Mr JRT Royle
G4LU Mr S F Brown
G3BYG Mr NLH 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

G3DZT Mr J H Beamand
G3EDD Mr B A Armstrong
G3EHZ Mr A H Wreford
G3FWB Mr P L Hunt
G3FZL Mr GMC Stone
G3JHI Mr RLS Hathaway
G3ORC Mr RRJ 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 LER Hall
G3KKD Mr I M Waters
DJ0OS Mr F C Hartles
G3EPV Mr R D Emes
G3ERR Mr JAW Edwards
G3HTC Mr G E Storey
G4CDB Mr G Lindsay

52 YEARS

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 NAS Fitch
G3BVW Mr C P Townley
G3FRX Mr J A Wilkes
G3SOL Mr JBG Parker
G3SVC Spen Valley ARS
G3FVL Mr H J Hudson

G8CDW Mr E H Double
GW3GEN Mr C F Cole
G3GXW Mr JGA Lamb
G3KQF Mr J Anthony
GU3HKV Mr E H Page
RS18567 Mr A H Turner
G1KEP Mr J G Houghton
G3GEJ Mr L M Airey
G3GGS Mr W E Waring
G3YJJ Mr R T Palmer
VK6PG Mr A J Gibbs
G3GJW Mr T I Lundegard
G3GKI Mr F V Kershaw
G3HEA Mr J U Burke
G3WKS West Kent ARS

51 YEARS

G3HJK Mr B J Mitchell
G3HMF Mr G G Kenyon
RS20443 Mr M B Greenberg
G2DOT Mr K Clark
G3GLB J E Lacey
G3IAS Mr A M Smith
G3MVV Mr N Miller
G3ORW Mr E J Gregory
G3PMW Mr K W Dews
G4IER C D Colbeck
G3KDP Mr A G Bounds
G3GLL Mr T N Green
G3GNQ Mr G C Cutting
G3KGW Mr J D Smith
G3OEG Mr E F Harverson
G3RQS Mr R A Rimmer
GM3IBU Mr A W Wright
G3GMY Mr FEA Green
G3GRV Mr G Halse
G3GVM Mr F Robins
G3HZM Mr M Barnsley
G3MGW Mr R Wheeler
G3JJA Mr E F Steventon
G3OCA Mr K Frankcom
G6BZ M C Bunting
G6JY Mr F T Farmer
GM3GRG Mr D R Rollo
GM3IQL Mr A Lawrence
G3DNH Mr J A Spicer
G3KPU Mr E Prince
GM3DDL Mr J Jackson
GW3IGG Mr JPG Jones

RS18978 Mr R G Clement
G3HQX Mr J Brodzky
G3IVZ Mr W E Stephen
RS18994 Mr H T Mason
G3DXJ Mr T H Holbert
G3GRO Mr D Atter
G3GWR Mr A G Stormont
G3HES Mr K G Pugh
GD3HDL Dr S E Kelly
G3GYF Mr AJF Powell
G3IGW Mr M G Whitaker
G3JLH Mr I L Hampton
G3GGO Mr C N Wridgway
G3IJA Mr J Allan
G3KXT Mr R I Richardson
G3VRB Mr J D Nias

50 YEARS

G3HIA Mr H C Young
G2HLL Mr F H Pickard
G3FJE Shefford & DARS
G3GMM Mr E McFarland
G3IUZ Canon H R Davis
G2XV Cambridge & DARC
G3HYH Mr S P Hay
VK2BE Mr LW Louttit
G8HLE REW Marshall
GW3INW A Davies
G3IJW Mr G S Garrett
G3HPZ Mr DWG Boast
G3JIE Mr D C Youngs
G3MEA Mr S Harle
GW3FPF Mr P F Jones
VK6LK Col GRK Lyon
G3HQH Mr H Froggatt
G3IFX Mr A R Cooke
VE3EZP Mr J C Watson
G3HRB Mr J Coatsworth
G3HRE Mr F Watson
G3JMX Mr P C Hayward
G3KKP Mr J Burgess
G3LMX Mr T W Mitchell
GM0UPE Dr G R Sutherland
G3ISX Mr C J Leal
G3FAU Mr V Cundall
G3HVX Mr W H Wells
G3KHR Mr J W Fox
G3MZO Mr D Rosen
G3CCM Mr W R Harris
G3IEW Mr S J Heard
G3JTJ Mr T Jones

Helplines FOR MEMBERS

● Mark, G0LGJ, would like some information, circuit diagram etc, for a **Sommerkamp TS-280DX** VHF handheld. All expenses paid. G0LGJ, QTHR. E-mail: mark@g0lgj.co.uk

● Steve, M1ECS/M0ECS, seeks a copy of the circuit diagram for the **Pye 165.20MHz transmitter** (probably used previously by the Police). All costs reimbursed. M1ECS, QTHR. E-mail: steveseabrook@waitrose.com

● Paul, MW0CDO, needs a circuit diagram for the **Datong ASP2 RF Speech Processor**, and will repay all expenses. MW0CDO, QTHR. Tel: 01792 518 602 (9am - 4.30pm) or 01639 770 137 evenings.

● Patrick, GW0VMR, is trying to find someone to help his friend Steve, M1ERP, become proficient in **Morse at 5WPM**. Steve is house-bound, lives near Carlisle, and is very keen to become Class A. If anyone can help, please contact Patrick on 01978 759 617 or e-mail qrper@bigfoot.com. Alternatively, Steve's e-mail address is m1erp@btinternet.com

● Mr C A Collins, G3THX, has a problem with his **Yaesu FRG-7 receiver**. The BFO is very sensitive to temperature changes and is unusable on USB and LSB. He has heard of T406 being changed to remedy this fault. Can anyone help? G3THX, tel: 01754 761 306.

● Ray, G3LHA, requires a service manual for a **Kenwood TS-440S** to photocopy. All expenses paid. G3LHA, QTHR. Tel: 024 7641 4333.

● Harry, G3DAM, has been looking for a replacement spring in his **Fulton (USA) winch model 596-597 200**, fitted to the ratchet control. The present one has broken and the usual firms cannot help. Costs will be reimbursed. G3DAM. Tel: 01386 41951.

● Mr A D Hitchcock, G3ESB, still needs manuals and information on the **Trio oscilloscope type CS1022** and the **Airmec 304 oscillator**, as his previous requests have been unsuccessful. G3ESB, QTHR. Tel: 01332 735 896.

● Chuck, VE1SOL, needs a user manual for his **KW PEP meter**, made by KW Electronics of Dartford, having a range of 0-300W and a range selector for bands, balance, tones and output. VE1SOL, e-mail: thedoc@auracom.ca

● Richard, G7EML, has an **AWA-810 low-band PMR transceiver** which he would like to use on 4m. He needs alignment details or, preferably, a copy of the manual. He will refund any costs. G7EML, tel: 0113 258 4903.

● During a recent 'lift' on VHF/UHF, Adrian, G4UVZ, had an unusual contact. He writes: "While transmitting on 144.750MHz, the ATV calling channel, I was called by a GM in Dundee (I live in Somerset). However, it became apparent during the contact that **he was transmitting on 434.850MHz**. Listening carefully at the end of each over, I could hear a slight 'squelch tail' on 144.750MHz. We were obviously going through a repeater, somewhere! What was even more interesting was that, if I transmitted on 434.850MHz, I was able to receive my own signal back on 144.750MHz. The phenomenon lasted for about 24 hours, on and off. Can anyone deduce **where the repeater is located?**" G4UVZ QTHR. E-mail: adrian.whatmore@tst.nhs.uk

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

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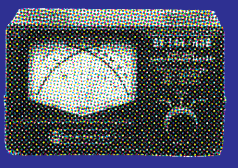

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WHATEVER NEXT

STEVE WHITE, G3ZVW
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IN NOVEMBER of last year I featured the 'DataPlay', a disc drive that employs a removable cartridge in which the medium is just 32mm in diameter. It is available in 250MB (single sided) and 500MB (double sided) versions. I said that it was "the latest and smallest 'true' disk on the market (as far as I know)". Well, now I know of an even smaller 'true' disk, and it is one that contains mechanical engineering the likes of which a Swiss watchmaker might be proud.

BIG BLUE'S MINI MARVEL

IBM HAS RECENTLY introduced the Microdrive (see photo below), a removable storage device that can store 340MB, 512MB, or 1GB of data on a 1in (25mm) disc. Depending on whose publicity material you read, it has an average seek time of 12ms or 15ms, and spins at 3600 or 4500rpm. Also depending on whose material you read, it is either very susceptible - or not in the least bit susceptible - to mechanical shock.

The primary target for the Microdrive is the digital photographer, as it is the same physical size as a Compact Flash card used in digital cameras. However, I understand that adapters are available for the Microdrive to be used in other devices.

As I see it, the biggest difference between the DataPlay disk and the IBM Microdrive is that the IBM is not a removable medium, it is a removable drive. I'm not in the least bit convinced the average owner of an MP3 player would pay almost US $500 for an IBM Microdrive, whereas he would pay the much lower cost of a DataPlay disk. However, the cost would be less intimidating to the owner of a top-of-the-range digital camera, indeed it might not be long before a Microdrive works out cheaper per Megabyte than Compact Flash cards.

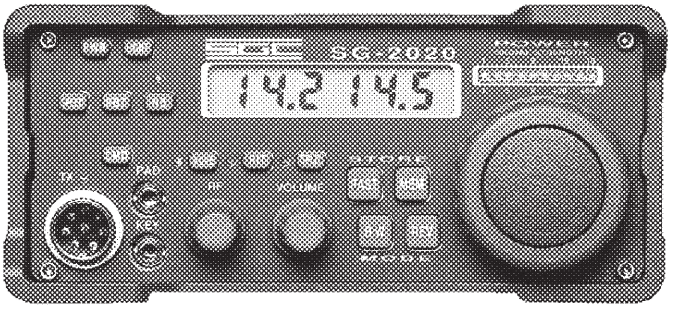
HYBRID CAMERA

ANOTHER ITEM of photographic technology I came across recently is what I call a 'hybrid' camera. Pictured below is the Kodak Advantix Preview, a new camera that employs APS film, plus a liquid crystal display to review the photo you have just taken. When you have reviewed your shot and decided how many prints you would like of it (0 to 9), the camera records a mark on the film that instructs the printing machine how many copies of each shot to print when the roll of film goes for processing. It is for this latter reason that Kodak can call the camera 'Preview', rather than 'Review'.

It occurred to me that a logical next step for this kind of technology would be to wait until you have reviewed your shot, *before* committing it to film digitally. To my way of thinking, this would make the term 'preview' more meaningful. Also, shots which don't work out as planned could be discarded before being committed to film, which would save money (not that film is expensive if you buy it at the right place). So long as imaging was at 800x1200 or more (ie about 1MB), I'm sure pixellation wouldn't be noticeable in a postcard-sized print. For conveying the image to film, it would not be necessary to provide a complete picture, all that would be necessary would be to drive the film slowly past three rows of emitters, one row for each primary colour, rather like a scanner but in reverse.

If this kind of technology were applied to a 35mm camera, another interesting possibility would be to commit shots digitally to transparency film, although I would readily acknowledge that the quality when viewed on a big screen wouldn't be as good as a photo taken directly onto film.

There could be drawbacks associated with colour temperature, as recording emitters that used three primary colours wouldn't provide as accurate a rendition of colour as the full range of colours visible to the eye. Having said that, no one seems to complain about the pictures on a colour TV, and they use phosphors of just three colours.

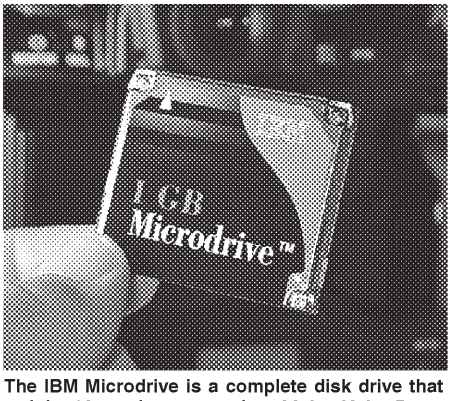


Front panel of the SG-2020 from SGC, an amateur transceiver that can be returned to the manufacturer for a software upgrade.

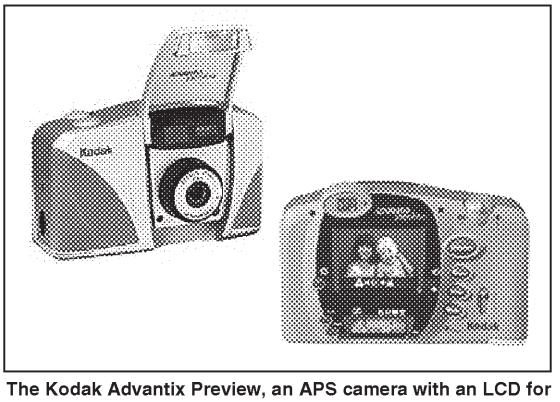
SOFTWARE UPDATES

MANY OF US are familiar with using the Internet for downloading updates for such things as printer drivers, but how about using it for downloading updates for amateur radio equipment? I know that I can go on the Internet and download new user settings for my HF transceiver and then transfer them to it using an RS232 link, but, far as I know, it isn't possible to update the DSP software in the same way.

American companies seem to be the first offering a software upgrade service for amateur radio products, the SGC SG-2020 and Ten-Tec RX-350 receiver and Jupiter transceiver being the equipments they are offering it for. In the case of SGC, the upgrade provides an additional feature. To obtain it, one has to return the equipment to the factory, suggesting to me



The IBM Microdrive is a complete disk drive that weighs 16g and measures just 36.4 x 42.8 x 5mm.



The Kodak Advantix Preview, an APS camera with an LCD for reviewing your shots.

that it is not possible to make the changes at home. This seems a pity, but it's an interesting first step. In the case of Ten-Tec, the upgrades can be downloaded and flashed into the memory of the equipment at home. From seeing Ten-Tec's software revision notes, it is clear that numerous bugs can been fixed and additional features added in this way.

Wouldn't it be good if all new commercial transceivers could have updates - or have entirely new features added - simply by logging on to a web site and downloading a driver? Of course they would need some non-volatile memory and a bit of processing power to implement this, but basic computing power doesn't cost much these days and most radios are already equipped with at least one CPU.

PLASTIC EVERYTHING

POLYMERS ARE long 'chain molecules', based around carbon atoms. Since the invention of the first artificial plastic (Bakelite) by Belgian chemist Leo Baekeland almost 100 years ago, the development of new polymers has resulted in a huge range of substances with an equally huge range of uses.

The one property that most polymers share is that they are good insulators, but some years ago scientists started to look at making electrically-conductive polymers. Thanks to the nature of atomic bonds, so-called conjugated polymers such as polyacetylene are electrically conductive.

It was realised that, rather like doping silicon to form N-type or P-type semiconductor, polyacetylene could be doped to alter its conductivity. The problem is that polyacetylene is unstable at the best of times, and once doped it tends to explode on contact with the air. Since then other electrically-conductive polymers such as polythienylene vinylene (PTV) and polyphenylene vinylene (PPV) have taken the process forward, indeed electrically-conductive polymers are now commonplace in batteries for cellphones, the introduction of which has resulted in batteries that are lighter in weight and higher in capacity.

About 10 years ago, Light Emitting Polymers (LEPs) were discovered, indeed I remember seeing a tiny, flexible, wafer-thin monochrome video display being demonstrated on *Tomorrow's World*. Although things seem to have gone quiet on this front, apparently significant improvements have been made to the light emitting efficiency of polymers, plus they can now be produced in a variety of colours.

Recently, a 'molecular switch' that can operate at room temperature (earlier ones needed to be cooled) has been made from polymer. Apparently it is a much better switch than silicon, and potentially much cheaper to manufacture.

Whatever Next? A wafer-thin video display that doesn't require back lighting? A plastic 'wire' inside a plastic sleeve? A polymer CPU in my computer? Clothing that can be made to change colour electrically? Maybe that girl's dress in the AOL TV advertisement isn't so far-fetched, after all! ♦

A BASIC CHEMISTRY LESSON

A CARBON ATOM has four electrons in its outer 'shell'. Carbon is very happy to bond with other atoms to form molecules, in which case it likes to share each of its four available electrons with adjacent atoms (and they share their available electrons too). One simple carbon-based substance is a molecule of methane (see **Fig 1**). Carbon atoms form stable compounds or molecules when they have eight electrons in their outer shells and hydrogen atoms form stable compounds or molecules when they have two electrons in their outer shells, even though those electrons are being shared with other atoms. Methane fulfils that requirement.

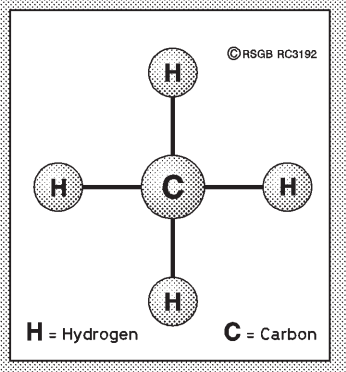


Fig 1: A molecule of methane consists of one carbon atom and four hydrogen atoms. The carbon atom shares its four available electrons, one with each of the hydrogen atoms, and each hydrogen atom shares its single electron with the carbon atom.

The simple carbon-based chain molecules (methane, butane and propane, to name but three) are all gases, but as the length of the chain increases the substances become liquids. One particularly familiar substance, octane (petrol), consists of eight carbon atoms and 18 hydrogen atoms. As the chain becomes longer still, the substances become solids and are often called polymers. Polyethylene (**Fig 2**) consists of a long chain of carbon atoms.

These compounds belong to the hydrocarbon family. Hydrocarbons are stable compounds, although the chemical bonds can be broken by combustion. Liquid and solid hydrocarbons make good insulators, oils being used to cool large transformers, and plastics being used as insulators. Incidentally, there are plenty of polymers that aren't true hydrocarbons, as hydrogen atoms can be replaced with other chemical elements (or combinations of elements) to produce materials with different properties.

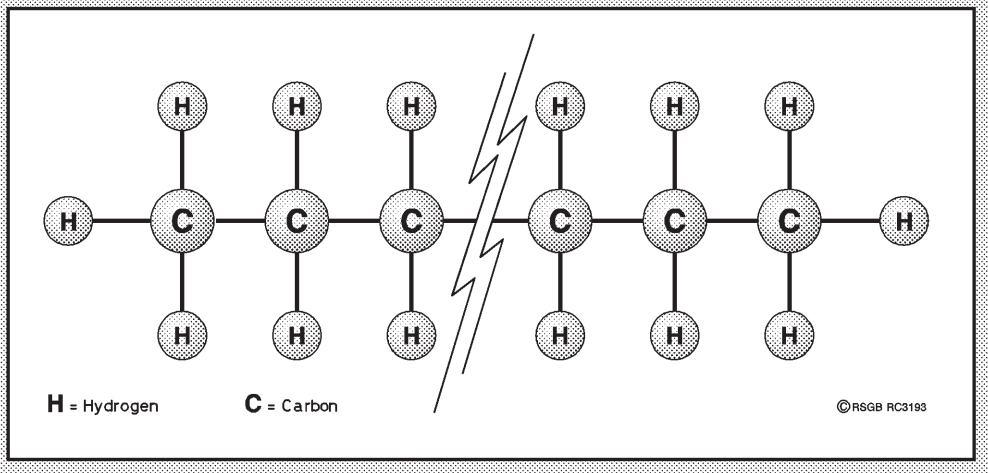


Fig 2: A molecule of polyethylene consists of many carbon atoms in a chain, each of them (except for the ones at each end) sharing an electron with two hydrogen atoms and its neighbouring carbon atoms. The carbon atoms at each end of the chain bond to three hydrogen atoms.

WWW.

Ten-Tec	**www.tentec.com**
SGC	**www.sgcworld.com**

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.

UK Amateur Radio Band Plans

136kHz

No rigid band plan is proposed for the 136kHz band, but amateurs are asked to work within the following conventions, giving long-distance communications and experimentation priority:

135.7 - 136.0	**Station tests & trans-Atlantic reception window** ● 135.900 - 135.980kHz preferred trans-Atlantic window for Europe to North American transmissions of very slow CW (QRSS)
136.0 - 137.4	**CW** ● 135.980 - 136.050kHz preferred trans-Atlantic window for Europe / North American contacts
137.4 - 137.6	**Non-CW modes (Hell, Wolf, PSK etc)**
137.6 - 137.8	**Very slow CW (QRSS centred on 137.7kHz)** ● 137.700 - 137.800kHz preferred trans-Atlantic window for North America to Europe transmissions

CD1900-2

1.8MHz (160m)

Licence Notes: 1.810 - 1.850MHz, Primary. Remainder secondary. *Available on the basis of non-interference to other services (inside or outside the UK)*
Power limit:1.810 - 1.850MHz: 26dBW PEP. Remainder 15dBW
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
1.810				
CW only				
1.838				
Digimodes (and CW but excluding AX25 packet)				*RTTY (Baudot) is the preferred digital mode on this band* *Phone may be used above 1.840*
1.842				
Phone (and CW)			✓	*1.843* *QRP* *1.960* *DF contest beacons (14dBW) 12.5kHz b/w max*
2.000				

Note: AX25 packet should not be used on the 1.8MHz band.

CD1901-2

3.5MHz (80m)

Licence Notes: Primary. *Shared with other services.*
Power limit: 26dBW PEP.
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
3.500				
CW only				*3.500 - 3.510* *Priority for CW inter-continental working* *3.500 - 3.560* *CW contest preferred segment* *3.560* *QRP*
3.580				
Digimodes (and CW)				*3.590 - 3.600* *AX25 packet frequencies* *(Phone may be used and has priority above 3.600MHz)*
3.620				
Phone (and CW)				*3.600 - 3.650* *Phone contest preferred segment* *3.690* *QRP* *3.700 - 3.800* *Phone contest preferred segment* *3.730 - 3.740* *SSTV fax recommended* *3.775 - 3.800* *Reserved for inter-continental phone working*
3.800				

CD1902-2

7MHz (40m)

Licence Notes: Amateur and Amateur Satellite Services: Primary.
Power limit: 26dBW PEP.
Permitted modes: Morse, telephony, RTTY, data, fax SSTV

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
7.000				
CW only				*7.030* *QRP*
7.035				
Digimodes (and CW, SSTV, Fax, but excluding AX25 packet)				*(Phone may be used above 7.040)*
7.045				
Phone (and CW)				
7.100				

Note: AX25 packet should not be used on the 7MHz band.

CD1903-2

10MHz (30m)

Licence Notes: Amateur Service: Secondary.
Power limit: 26dBW PEP.
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

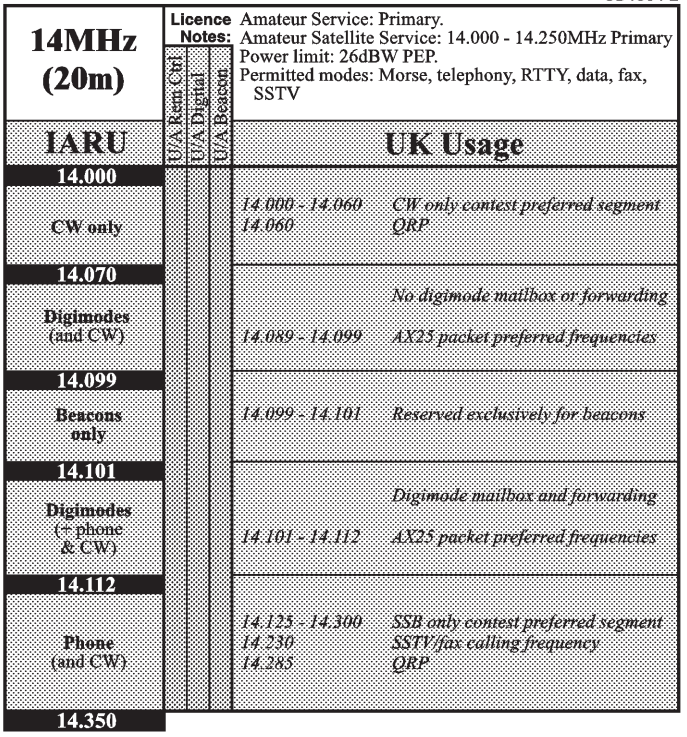
IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
10.100				
CW only				*10.106* *QRP*
10.140				
Digimodes (and CW, but excluding AX25 packet)				*(Unattended digimode stations should avoid the use of the 10MHz band)*
10.150				

Notes:
1. AX25 packet should not be used on the 10MHz band.
2. The 10MHz bandplan is allocated to the Amateur Service only on a secondary basis. Therefore, IARU has agreed on a worldwide basis that only CW and digimodes, being narrow bandwidth modes, are to be used on this band. Likewise, the band is not to be used for contests and bulletins.

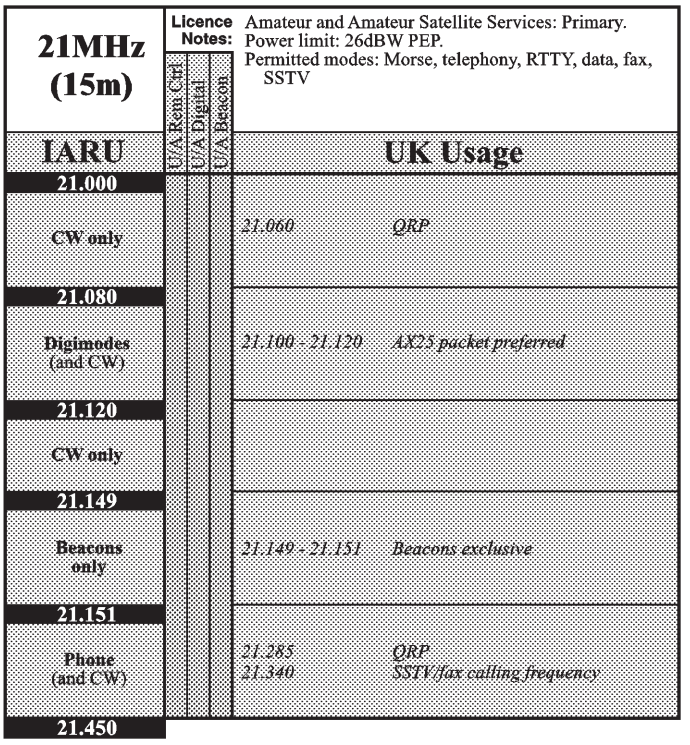
Notes on the HF Band Plans

1. The word 'phone' includes all permitted forms of telephony.
2. If transmitting very close to a band edge, take care not to radiate outside of the band.
3. Before transmitting, all operators should check that the frequency is not already occupied. The normal advice is to use the question "Is this frequency in use?" on SSB or "QRL?" using Morse.
4. Digimodes are defined as including AmTOR, PacTOR, Clover, ASCII, RTTY (Baudot), PSK31 and AX25 packet.
5. LSB is recommended on bands below 10MHz, and USB on bands above 7MHz.
6. The Region 1 IARU HF band plans are designed to enable the best utilisation of the HF spectrum space available. They achieve this objective because the vast majority of licensed amateurs observe the voluntary recommendations. In some countries (eg the USA), licence regulations require that specific modes be confined to specific sections of each band.
7. The frequencies 14.230, 21.230 and 28.680MHz should be used as calling frequencies for SSTV and fax operators. After having established contact, they should move to another free frequency within the telephony section of the band.

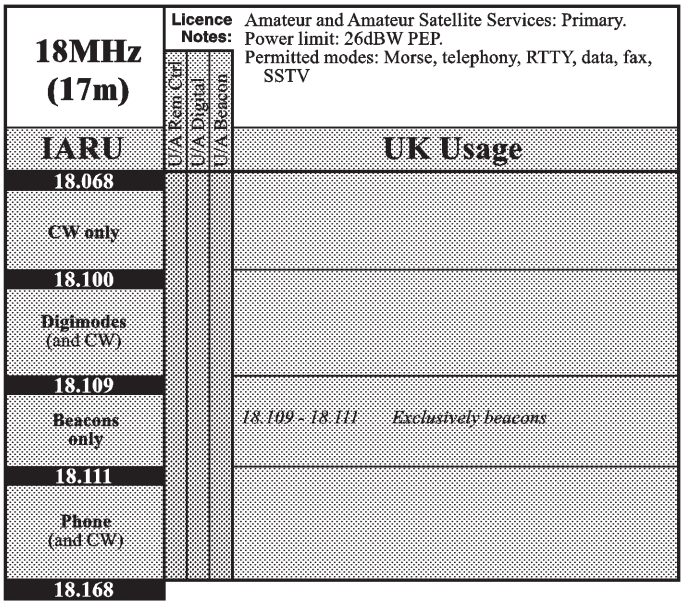
CD1904-2



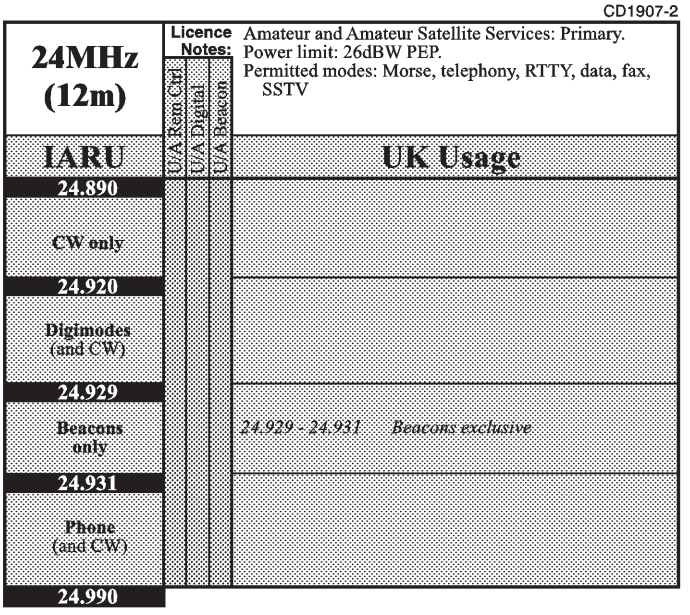
CD1906-2



CD1905-2



CD1907-2



Unattended (U/A) Operation

Frequencies on which unattended (U/A) operation is permitted are shown in these band plans. Remember that unattended operation requires the prior consent of the local Radio Investigation Service before operation can begin, to enable close down arrangements to be made.

Unattended beacons are limited to 14dBW ERP max. Do not confuse this type of unattended beacon operation with the normal beacon sections of the bands (these are fully site cleared, have special licences and are co-ordinated on an international basis.

Unattended low power remote control is limited to –20dBW ERP and should not radiate outside the boundary of the premises from which you are operating.

Unattended digital operation is limited to 10dBW on the 50MHz band and 14dBW on the other bands where it is permitted.

CD1908-2

28MHz (10m)

Licence Notes: Amateur and Amateur Satellite Services: Primary.
Power limit: 26dBW PEP.
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV
Unattended beacons: Only for DF contests 14dBWPEP max (not within 50km of NGR SK985640 Waddington)

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
28.000				
CW only				
28.050				*[28.050 - 28.190 Novice]*
Digimodes (and CW)				*28.060 QRP*
				28.120 - 28.150 AX25packet preferred
28.150				
CW only				*Regional time shared*
				28.190 - 28.199 International Beacon Project - Exclusive
28.199				
Beacons only				*Worldwide time shared*
				28.199 - 28.201 International Beacon Project - Exclusive
28.201				
Phone (and CW)			✓	*28.201 - 28.255 Continuous duty International Beacon Project - Exclusive*
				28.360 QRP
				28.680 SSTV/fax calling frequency
29.200				
AX25 packet (+ phone and CW)				
29.300				
Satellite downlinks				*29.300 - 29.500 Reserved exclusively for satellite downlinks*
29.550				
Phone (and CW)				*Some experimental FM repeaters may be established in IARU Region 1*
29.700				

CD1909-2

50MHz (6m)

Licence Notes: Amateur Service: 50.0 - 51.0MHz Primary,
51.0 - 52.0MHz Secondary. *Available on the basis of non-interference to other services (inside or outside the UK).*
Power limit: 50.0 - 51.0MHz 26dBW PEP,
51.0 - 52.0MHz 20dBW PEP.
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
50.000				
CW only				*50.020 - 50.080 Beacons*
				50.090 CW calling frequency
50.100				
SSB and CW only				*50.100 - 50.130 DX window - Note 1*
				50.110 International calling - Note 2
				50.150 SSB Centre of Activity
				50.185 Cross-band activity centre
	✓			*50.200 MS Reference frequency (CW & SSB)*
50.500				
All modes				*50.500 - 50.700 Digital communications*
				50.510 SSTV
				50.550 Fax
				50.600 RTTY
				50.710 - 50.910 FM repeater outputs
51.000				
All modes				*51.210 Emergency comms. priority*
				51.210 - 51.410 FM repeater inputs
51.410				
All modes				*51.430 - 51.590 FM telephony - Note 3*
				51.510 FM calling
				51.530 Note 4
51.830				
All modes				*51.940 - 52.000 Emergency comms priority*
52.000				

Notes:
1. Only to be used for QSOs between stations in different continents.
2. No QSOs on this frequency. Always QSY when working intercontinental DX.
3. 20kHz channel spacing. Channel centre frequencies start at 51.430MHz.
4. Used by GB2RS news and for slow Morse transmissions.
5. 50.385MHz ± 0.005 designated for PSK31 use in the UK.

CD1910-2

70MHz (4m)

Licence Notes: Amateur Service: Secondary. *Available on the basis of non-interference to other services (inside or outside theUK).*
Power limit: 22dBW PEP.
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
70.000				
Beacons				*70.030 Personal beacons*
70.030				
SSB and CW only				*70.150 Meteor scatter calling*
				70.185 Cross-band activity centre
				70.200 SSB/CW calling
70.250				
All modes				*70.260 AM/FM calling*
70.300				
Channelised operation using 12.5kHz channels	✓		✓	*70.3000 RTTY/fax calling/working*
		✓		*70.3125 Digital modes*
				70.3250 Digital modes
				70.3375 Digital modes
				70.3500 Emergency comms priority
				70.3625 Digital modes
				70.3750 Emergency comms priority
				70.3875 Digital modes
				70.4000 Emergency comms priority
				70.4125 Digital modes
				70.4250 FM simplex - used by GB2RS
				70.4375 Digital modes
				70.4500 FM calling
				70.4625 Digital modes
		✓		*70.4875 Digital modes*
70.500				

Notes:
1. 70.085MHz ± 0.005 designated for PSK31 use in the UK.

Notes on the VHF Band Plans

1. The beacon and satellite services must be kept free of normal communication transmissions to prevent interference with these services.

2. The use of the FM mode within the SSB/CW section and CW and SSB in the FM-only sector is not recommended.

3. Repeater stations are primarily intended as an aid for mobile working and they are not intended to be used for DX communication. FM stations wishing to work DX should use the all-modes section, taking care to avoid frequencies allocated for specific purposes.

CD1911-2

144MHz (2m)

Licence Notes: Amateur Service: Primary.
Amateur Satellite Service: Primary
Power limit: 26dBW PEP.
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV
Unattended beacons: Only for DF contests.

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
144.000				
EME (SSB/CW)				*144.000 - 144.035 Moonbounce (only)*
144.035				
CW only				*144.050 CW calling frequency* *144.100 MS CW ref frequency (Note 1)* *144.140 - 144.150 CW FAI/EME working*
144.150				
SSB and CW only				*144.150 - 144.160 SSB FAI/EME working* *144.175 Microwave talk-back (UK)* *144.195 - 144.205 SSB random MS* *144.250 GB2RS and slow Morse* *144.260 Emergency comms priority* *144.300 SSB calling frequency* *144.390 - 144.400 SSB random MS*
144.400				
Beacons				
144.490				
Guard band				
144.500				
All modes non-channelised				*144.500 SSTV calling frequency* *144.525 ATV talkback (SSB)* *144.600 RTTY calling frequency* *144.600± RTTY working (FSK)* *144.625 - 144.675 Emergency comms priority* *144.700 Fax calling frequency* *144.750 ATV calling+talk-back* *144.775 - 144.800 Emergency comms priority*
144.800				
Digital modes				*144.800 - 144.990 Digital Modes (incuding unattended)*
144.990				
Guard band	✓	✓		
145.000				
FM Repeater Inputs				*145.000 RV48* *145.025 RV50* *145.050 RV52* *145.075 RV54* *145.100 RV56* *145.125 RV58* *145.150 RV60* *145.175 RV62*
145.200				
FM Simplex Channels				*145.200 V16 Emergency comms priority* *145.225 V18 Emergency comms priority* *145.250 V20 Used for slow Morse transmissions* *145.275 V22* *145.300 V24 RTTY AFSK* *145.325 V26* *145.350 V28* *145.375 V30* *145.400 V32* *145.425 V34* *145.450 V36* *145.475 V38* *145.500 V40 FM calling channel* *145.525 V42 Used for GB2RS* *145.550 V44 Recommended channel for rally and exhibition talk-in* *145.575 V46*
145.600				
FM Repeater Outputs (Note 2)				*145.600 RV48* *145.625 RV50* *145.650 RV52* *145.675 RV54* *145.700 RV56* *145.725 RV58* *145.750 RV60* *145.775 RV62*
145.800				
Satellites				
146.000				

Notes:
1. Meteor scatter operation can take place up to 26kHz higher than the reference frequency.
2. 144.085MHz ± 0.005 designated for PSK31 use in the UK.

CD1913-2

430MHz (70cm)

Licence Notes: Amateur Service: Secondary.
Amateur Satellite Service: 435 -438MHz Secondary.
Exclusion: 431-432MHz not available within 100km radius of Charing Cross, London.
Power limit: 430-432MHz 16dBW ERP PEP, 432 - 440MHz 26dBW.
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
430.000				
All modes				*430.000 - 430.810 Digital communications (Notes6, 7)* *430.0125 Internet voice linking (Note 9)* *430.0250 Internet voice linking (Note 9)* *430.0375 Internet voice linking (Note 9)* *430.0500 Internet voice linking (Note 9)* *430.0625 Internet voice linking (Note 9)* *430.0750 Internet voice linking (Note 9)* *430.600 - 430.800 Note 5*
430.810				
Low power repeater i/p Note 1				*430.810 - 430.990 Low power repeaters*
431.000				
All modes Note 1				*430.990 - 431.900 Digital communications (Note 6)*
432.000				
CW only				*432.000 - 432.025 Moonbounce* *432.050 CW centre of activity*
432.150				
SSB and CW only				*432.200 SSB centre of activity* *432.350 Microwave talk-back calling frequency (Europe)*
432.500				
All modes non-channelised	✓	✓		*432.500 - 432.600 IARU Region 1 linear transponder outputs* *432.600 - 432.800 IARU Region 1 linear transponder inputs* *432.500 SSTV activity centre* *432.600 RTTY (fsk) activity centre* *432.625 Digital communications* *432.650 Digital communications* *432.675 Digital communications* *432.700 Fax activity centre*
432.800				
Beacons				*432.800 - 432.990 Beacons*
433.000				
FM repeater outputs in UK only Note 1				*433.000 RU240 (RB0)* *433.025 RU242 (RB1)* *433.050 RU244 (RB2)* *433.075 RU246 (RB3)* *433.100 RU248 (RB4)* *433.125 RU250 (RB5)* *433.150 RU252 (RB6)* *433.175 RU254 (RB7)* *433.200 RU256 (RB8)* *433.225 RU258 (RB9)* *433.250 RU260 (RB10)* *433.275 RU262 (RB11)* *433.300 RU264 (RB12)* *433.325 RU266 (RB13)* *433.350 RU268 (RB14)* *433.375 RU270 (RB15)*
433.400				

Notes:
1. In Switzerland, Germany and Austria, repeater inputs are 430.600 - 431.825MHz with 25kHz spacing, and outputs are 438.200 - 439.425MHz. In France and the Netherlands repeater outputs are 430.025 - 430.375MHz with 25kHz spacing and inputs at 431.625 - 431.975MHz. In other European countries repeater inputs are 433.000 - 433.375MHz with 25kHz spacing and outputs at 434.600 - 434.975MHz, ie the reverse of the UK allocation.
2. Emergency communications priority.
3. IARU Region 1 fax/AFSK.
4. Fast Scan Television carrier frequencies shall be chosen so as to avoid interference to other users, in particular the satellite service and repeater inputs. IARU Region 1 recommends that video carriers should be in the range 434.000 - 434.500MHz or 438.500 - 440.000MHz.

CD1914-2

430MHz (cont)

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
433.400				
FM simplex channels				*433.400 U272 (SU16)* *433.425 U274 (SU17)* *433.450 U276 (SU18)* *433.475 U278 (SU19)* *433.500 U280 (SU20) FM calling channel* *433.525 U282 (SU21)* *433.550 U284 (SU22) Recommended channel for rally and exhibition talk-in* *433.575 U286 (SU23)* *433.600 U288 (SU24) RTTY afsk* *433.625 Digital communications* *433.650 Digital communications* *433.675 Digital communications* *433.700 Notes 2, 3 and 5* *433.725 Notes 2 and 5* *433.750 Notes 2 and 5* *433.775 Notes 2 and 5* *433.800 - 434.250 Digital communications (Note 8)*
		✓		
434.600				
FM repeater inputs (in UK only) - note 1; and fast scan television - note 4				*434.600 RU240 (RB0)* *434.625 RU242 (RB1)* *434.650 RU244 (RB2)* *434.675 RU246 (RB3)* *434.700 RU248 (RB4)* *434.725 RU250 (RB5)* *434.750 RU252 (RB6)* *434.775 RU254 (RB7)* *434.800 RU256 (RB8)* *434.825 RU258 (RB9)* *434.850 RU260 (RB10)* *434.875 RU262 (RB11)* *434.900 RU264 (RB12)* *434.925 RU266 (RB13)* *434.950 RU268 (RB14)* *434.975 RU270 (RB15)*
435.000				
Satellites and fast scan TV - note 4				
438.000				
Fast scan TV				*438.025 - 438.175 Note 5* *438.200 - 439.425 Note 1*
438.425				
Low power repeater o/p + fast scan TV				*438.425 - 438.575 Low power repeaters*
438.575				
Fast scan TV				*438.200 - 439.425 Note 1* *439.600 - 439.750 Digital communications (Note 6)*
439.750				
Packet radio				*439.750 - 440.000 Digital communications (Note 6)*
440.000				

Notes:

5. IARU Region 1 packet radio.
6. The DCC will recommend usage of this sub-band at a later date.
7. Users must accept interference from F/PA repeater output channels in 430.025 to 430.375MHz. Users with sites which allow propagation to other countries (notably F and PA) must survey the proposed frequency before use to ensure that they will not cause interference to users of repeaters in those countries.
8. 432.085MHz ± 0.005 designated for PSK31 use in the UK.
9. Internet voice linking channels: maximum deviation ± 2.4kHz, maximum effective radiated power 10dBW.

CD1915-2

1.3GHz (23cm)

Licence Notes:
Amateur Service: Secondary.
Amateur Satellite Service: 1260 - 1270MHz
Secondary *Earth to space only.*
Powerlimit:26dBW PEP.
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV
Unattended operation: Not permitted in Northern Ireland.
In the sub-based 1298 - 1300MHz, unattended operation is not allowed in Northern Ireland or within 50km of SS206127 (Bude) or SE202577 (Harrogate).

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
1,240.000				
All modes				*1240.150 Packet radio (150kHz b/w)* *1240.300 Packet radio (150kHz b/w)* *1240.450 Packet radio (150kHz b/w)* *1240.600 Packet radio (150kHz b/w)* *1240.750 Packet radio (150kHz b/w)*
1,243.250				
ATV				*1248.000 FM TV repeater input* *1249.000 FM TV repeater input*
1,260.000				
Satellites				
1,270.000				
All modes				
1,272.000				
ATV				*1276.500 AM TV input* *1280.000 FM TV Repeater input*
1,291.000				
Repeater inputs				*1291.000 RM0 (UK) 25kHz spacing* *1291.375 RM15*
1,291.500				
All modes				
1,296.000				
CW only				*1296.000 - 1296.025 Moonbounce*
1,296.150				
SSB and CW				*1296.200 Narrow band centre of activity* *1296.400 - 1296.600 Linear transponder input* *1296.500 SSTV* *1296.600 RTTY* *1296.700 Fax* *1296.600 - 1296.800 Linear transponder output*
1,296.800				
Beacons exclusive				*1296.800 - 1296.990 Beacons*
1,297.000				
Repeater outputs - note 1				*1297.000 RM0 (UK)25kHz spacing* *1297.375 RM15*
1,297.500				
FM simplex - note 1				*1297.500 SM20* *1297.750 SM30*
1,298.000				
All modes	✓		✓	*Remote control* *Digital communications*
1,299.000				
All modes		✓		*1299.000 Packet radio (25kHz b/w)* *1299.425 Packet radio (150kHz b/w)* *1299.575 Packet radio (150kHz b/w)* *1299.725 Packet radio (150kHz b/w)*
1,300.000				
TV repeater outputs (UK only)				*1308.000 FM TV repeater output* *1310.000 FM TV repeater output* *1311.500 AM TV repeater output* *1312.000 FM TV repeater output* *1316.000 FM TV repeater output*
1,325.000				

Notes:

1. Local traffic using narrow-band modes should operate between 1296.500 - 1296.800MHz during contests and band openings.
2. Stations in countries which do not have access to 1298 - 1300MHz (eg Italy) may also use the FM simplex segment for digital communications.

CD1917-2

2.3GHz (13cm)

Licence Notes:
Amateur Service: Secondary. *Users must accept interference from ISM users.*
Amateur Satellite Service: 2400 - 2450MHz Secondary. *Users must accept interference from ISM users.*
Power limit: 26dBW PEP.
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV
NOTE: ISM = Industrial, Scientific and Medical.
In the sub-bands 2310.00 - 2310.4125, 2355 - 2365 and 2392 - 2450MHz, unattended operation is not allowed in Northern Ireland or within 50km of SS206127 (Bude) or SE302577 Harrogate).

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
2,310.000				
Sub-regional (national band plans)				*2310.000 - 2310.500 Repeater links* *2310.100 Packet radio (200kHz b/w)* *2310.300 Packet radio (200kHz b/w)* *2310.000 - 2310.500 Remote control* *2311.000 - 2315.000 Highspeed data*
2,320.000				
CW exclusive				*2320.000 - 2320.025 Moonbounce*
2,320.150				
CW and SSB				*2320.200 SSB centre of activity*
2,320.800				
Beacons exclusive	✓	✓	✓	*2320.800 - 2320.990 Beacons*
2,321.000				
Simplex & repeaters (FM) - note 1				
2,322.000				
All modes				*2322.000 - 2355.000 ATV & ATV repeater outputs* *2355.100 - 2364.000 Repeater links* *2355.100 Packet radio (200kHz b/w)* *2355.300 Packet radio (200kHz b/w)* *2356.000 - 2360.000 Highspeed data* *2364.000 Packet radio (1MHz b/w)* *2365.000 - 2370.000 Repeaters* *2370.000 - 2390.000 ATV* *2390.000 - 2392.000 Moonbounce*
2,400.000				
Satellites				
2,450.000				

Notes:
1. Stations in countries which do not have access to the All Modes section (2,322 - 2,390MHz), use the simplex and repeater segment 2,321 - 2,322MHz for data transmission
2. Stations in countries which do not have access to the narrow band segment 2,320 - 2,322 MHz, use alternative narrow band segments: 2,304 - 2,306MHz and 2,308 - 2,310MHz.
3. The segment 2427 - 2443MHz may be used for ATV if no satellite is using the segment.

CD1919-2

5.7GHz (6cm)

Licence Notes:
Amateur Service: 5.650 - 5.680GHz Secondary. 5.755 - 5.765GHz & 5820 - 5850GHz Secondary, *users must accept interference from ISM users.*
Amateur Satellite Service: 5.650 - 5.670GHz Secondary *earth to space only.* 5.830 - 5.850GHz Secondary, *users must accept interference from ISM users, space to earth only.*
Power limit: 26dBW PEP.
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV
NOTE: ISM = Industrial, scientific and medical.
In the sub-band 5670 - 5680MHz, unattended operation is not allowed within 50km of SS206127 (Bude) or SE302577 (Harrogate).

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
5,650.000				
Satellite uplinks				
5,668.000				
Narrow band CW/EME/SSB	✓	✓	✓	*5668.200 Alternative narrow band segment*
5,670.000				
All modes				
5,680.000				
5,755.000				
All modes				
5,760.000				
Narrow band CW/EME/SSB	✓	✓	✓	*5760.100 Current centre of activity* *5760.800 - 5761.000 Beacons*
5,762.000				
All modes				
5,765.000				
5,820.000				
All modes				
5.830.000				
Satellite downlinks	✓	✓	✓	
5,850.000				

Note:
1. IARU aims to move narrow band operation to this segment, but for the time being operation will continue in the 5760 - 5762GHz band.

CD1918-2

3.4GHz (9cm)

Licence Notes:
Amateur Service: Secondary.
Power limit: 26dBW PEP.
Permitted mode: Morse, telephony, RTTY, data, fax, SSTV, FSTV
In the sub-bands 3420 - 3430 and 3450 - 3455MHz, unattended operation is not allowed within 50km of SO916223 (Cheltenham), SS206127 (Bude) and SE302577 (Harrogate).

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage
3,400.000				
Narrow band CW/EME/SSB				*3400.100 Centre of activity* *3400.800 - 3401.000 Beacons* *3401.000 - 3402.000 Remote control*
3,402.000				
All modes				
3,456.000	✓	✓	✓	
Narrow band CW/EME/SSB				*3456.000 EME to USA*
3,458.000				
All modes				
3,475.000				

Note:
Shown here are the UK licence conditions, and national and international band plans for most amateur bands. The licence conditions are for guidance only, are subject to change and must be read in conjunction with the appropriate RA booklet for your class of licence. These band plans, including any updates, will be published in the *RSGB Yearbook* 2003 Edition, and most can also be found on the Internet at www.rsgb.org

Note that the power levels shown in these band plans are for the UK Full licences. Intermediate Licensees are limited to 50W PEP, while Foundation Licensees are limited to 10W PEP. Intermediate and Foundation licence holders should refer to their appropriate RA licence booklet for full details.

CD1920-2

10GHz (3cm)

Licence Notes: Amateur Service: Secondary.
Amateur Satellite Service: 10,450 - 10,500MHz Secondary
Power limit: 26dBW PEP.
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV
In the sub-band 10,000 - 10,125MHz, unattended operation is not allowed within 50km of SO916223 (Cheltenham), SS206127 (Bude), SK985640 (Waddington) or SE302577 (Harrogate).

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
10.000.000					
Digital modes	✓	✓	✓	*10,002.5 - 10,027.5*	*WB transponders 015 OUT*
				10,027.5 - 10,052.5	*WB transponders 040 OUT*
				10,052.5 - 10,077.5	*WB transponders 065 OUT*
				10,080 - 10,090	*Packet links*
				10,090 - 10,110	*Wideband Beacons & Operating*
				10,110 - 10,120	*Speech repeaters OUT*
10,125.000					
10,225.000					
All modes				*10,227.5 - 10,252.5*	*WB transponders 425 OUT*
				10,252.5 - 10,277.5	*WB Simplex*
10,250.000				*10,277.5 - 10,302.5*	*WB transponders 015 IN*
Digital modes				*10,302.5 - 10,327.5*	*WB transponders 040 IN*
10,350.000				*10,327.5 - 10,352.5*	*WB transponders 065 IN*
All modes				*10,352.5 - 10,368*	*Wideband modes*
10,368.000					
Narrow band CW/EME/SSB beacons				*10,368 - 10,370*	*Narrowband modes*
				10,368.1	*Centre of activity*
				10,368.8 - 10,369	*Beacons*
10,370.000					
All modes				*10,370 - 10,390*	*Wideband modes*
				10,390 - 10,410	*WB beacons and operating*
				10,412.5 - 10,437.5	*WB transponders 425 IN*
				10,440 - 10,450	*Speech repeaters IN*
				[10,400 - 10,475	*unattended operation]*
10,450.000	✓	✓	✓		
All modes + satellites				*10,450 - 10,452*	*Alternate narrowband CW/EME/SSB - note 5*
10,475.000					
All modes + satellites					*Amateur satellite service only*
10,500.000					

Notes:
1. 10,400 is the preferred frequency for wideband beacons, but 10,100 is still used.
2. Wideband FM is preferred around 10,350 - 10,400 to encourage compatibility with narrowband systems; however, there is still activity around 10,050 - 10,125.
3. The current NB sub-band is at 10,368; however, a sub-band at 10,450 is being considered as a possible future alternative.
4. Simplex TV operation should take place on wideband transponder inputs which are not used by local transponders.
5. Wideband transponder pairs are designated by input/output fequency. The pairings shown are recommended but occasionally variants may be needed to suit local circumstances.
6. Note that 10,475 to 10,500 is allocated ONLY to the Amateur Satellite Service and NOT to the Amateur Service.

CD1921-2

24GHz (12mm)

Licence Notes: Amateur Service: 24,000 - 24,050 Primary. *Users must accept interference from ISM users.*
24,050 - 24-150 Secondary. *May only be used with the written consent of the Secretary of State. Users must accept interference from ISM users. 24,150 - 24,250MHz Secondary. Users must accept interference from ISM users.*
Amateur Satellite Service: 24,000 - 24,050 Primary. *Users must accept interference from ISM users.*
Power limit: 26dBW PEP.
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV
In the sub-band 24,000 - 24,050MHz, unattended operation is not allowed within 50km SK985640 (Waddington) and SE302577 (Harrogate).
NOTE: ISM = Industrial, scientific and medical.

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
24.000.000					
Satellites	✓	✓	✓	*24.025*	*Preferred operating frequency wideband equipment*
				24.048 - 24.050	*IARU proposed narrowband operating*
24.050.000					
All modes				*24.192 - 24.194*	*Narrowband op*
24,250.000					

Notes:
1. Will eventually be used if and when allocation changes force this.

CD1922-2

47GHz (6mm)

Licence Notes: Amateur and Amateur Satellite Service: Primary.
Power limit: 26dBW PEP.
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV
Unattended operation is not allowed within 50km of SK985640 (Waddington) and SE302577 (Harrogate).

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
47.000.000					
	✓	✓	✓	*47.088*	*Centre of narrowband activity*
47,200.000					

CD1923-2

76GHz (4mm)

Licence Notes: Amateur and Amateur Satellite Service: Primary.
Power limit: 26dBW PEP.
Permitted modes: Morse, telephony, RTTY, data, fax, SSTV, FSTV

IARU	U/A Rem Ctrl	U/A Digital	U/A Beacon	UK Usage	
75.500.000					
	✓	✓	✓	*75.976*	*Centre of UK activity*
76,000.000					

Notes:
1. Most continental activity is around 76,032MHz in the Secondary segment that is not currently available in the UK.

Note:
As part of a major reorganisation of allocations above 71GHz at WRC 2000, the amateur allocations were re-arranged, with the intention that a phased changeover should take place by 2005. The UK implementation of the new allocations and the details of the changeover process are under discussion with the Radiocommunications Agency, and it is hoped that the changeover can begin during 2002. Bandplanning information will be provided once the nature of the changeover is clearer; it is hoped that activity will focus on the Primary segments.

Current UK Allocation	New ITU Allocation	
75,500 - 76,000		Primary
	76,000 - 77,500	Secondary
	77,500 - 78,000	Primary
	78,000 - 81,000	Secondary
	122,250 - 123,000	Secondary
	134,000 - 136,000	Primary
	136,000 - 141,000	Secondary
142,000 - 144,000		Primary
	241,000 - 248,000	Secondary
248,000 - 250,000	248,000 - 250,000	Primary

TRIDENT® antennas

Trident Mono Band Yagis

Trident Antennas is a collaboration between ***Mike Devereux G3SED*** and ***John Barker G0UPB.***

Mike brings his 40 Years experience as a world class DXer and Dxpeditioner and *John* his skills as an experienced antenna designer and manufacturer.

All Mono Band Yagis are *computer optimised* for the *very best performance* using the latest industry software. Wind loading and mechanical stress are optimised with a separate computer programme to provide *high survivability in the worst of weathers.* Finally, the antennas are *exhaustively tested* to ensure they meet our high standards.

We use a *riveted construction* to give *extremely strong,* yet *ultra lightweight* antennas that hold their profile in high winds. Only *high grade extruded aluminium* is used throughout, *no welded seams.* Other hardware and fixings are of *stainless steel.*

Trident Yagis are *easy to assemble* in just a few minutes straight out of the box without the need for measurements. All antennas are index drilled at the factory with the boom to element brackets pre-fitted to ensure *perfect element alignment.*

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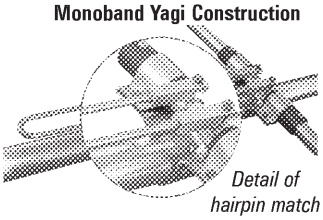
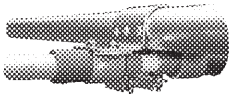
Elements on the HF antennas use up to five telescoping tube sections, double walled where they cross the boom to achieve high wind survivability. Most of these sections are riveted at the factory, just leaving one or two sections for the customer to assemble.

Monoband Yagi Construction



Detail of hairpin match

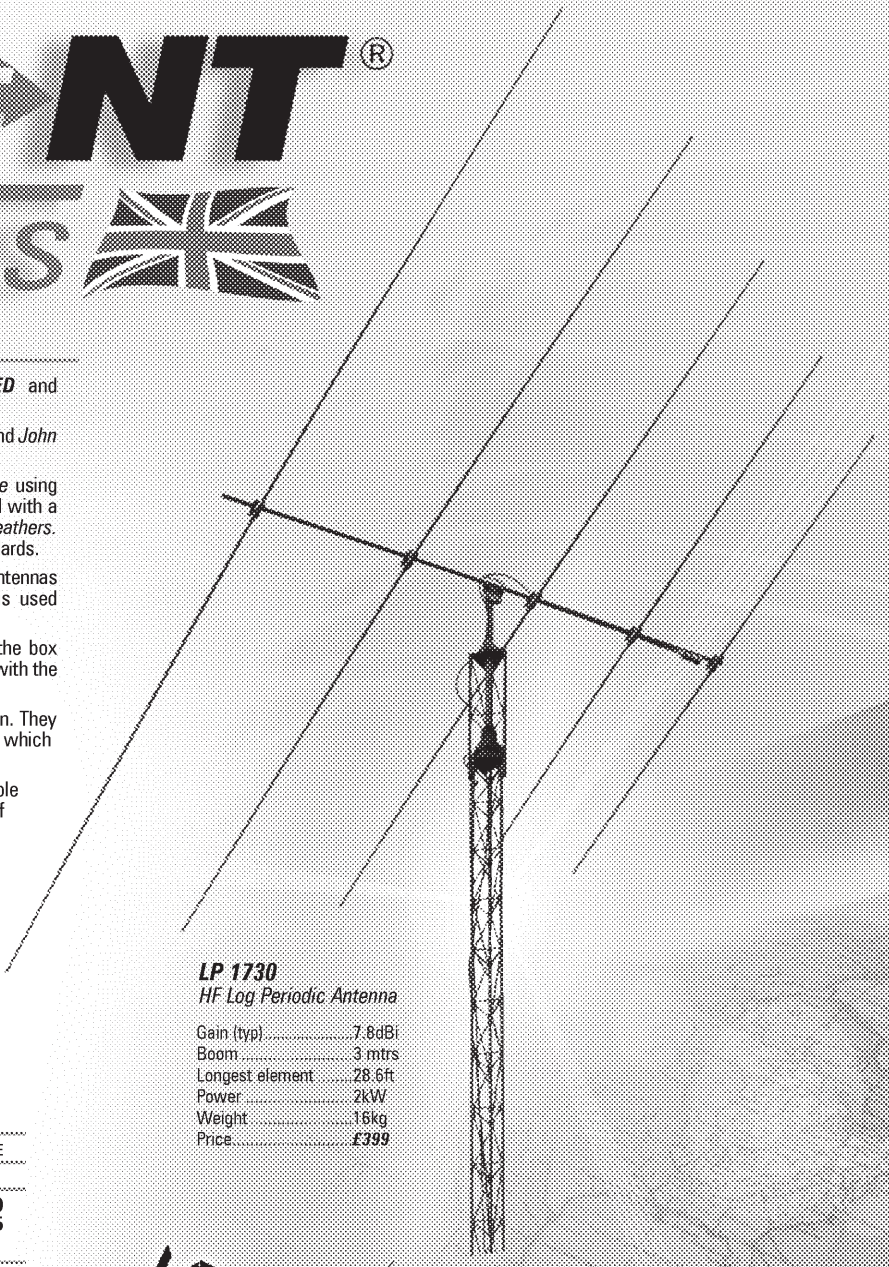


Detail of Yagi feed

Detail of element joint

Trident Mono Band Yagis

MODEL	DESCRIPTION	GAIN dBi	BOOM MTRS	PRICE
2 Metre Yagis				
2M5L	2 Metre 5 element	12.31	2.5	**£85.00**
2M7L	2 Metre 7 element	14.19	4.4	**£99.95**
6 Metres				
6M3L	50 MHz 3 element	8.21	1.9	**£85.95**
6M5L	50 MHz 5 element	10.31	3.6	**£119.95**
6M5LDX	50 MHz 5 element Long Yagi	11.75	6.0	**£165.95**
6M7L DX	50 MHz 7 ele 3KW Long Yagi	13.31	9.6	**£199.95**
TR 6-5	50 MHz 5 element economy	10.2	3.6	**£99.95**
4 Metre Yagi				
4M3L	70MHz 3 element	8.7	1.48	**£85.00**
28MHz Yagis				
10M3L	28MHz 3 element	7.41	3.0	**£129.95**
10M4LDX	28MHz 4 element Long Yagi	9.42	5.4	**£189.95**
24MHz Yagis				
12M2L	24Mhz 2 Element Beam			**£TBA**
12M3L	24Mhz 3 Element Beam			**£TBA**
21MHz Yagis				
15M2L	21Mhz 2 Element Beam			**£TBA**
15M3L	21Mhz 3 Element Beam			**£TBA**
18MHz Yagis				
18M2L	18 MHz 2 element			**£TBA**
18M3L	18 MHz 3 element			**£TBA**
14MHz Yagis				
20M2I	14 MHz 2 element	6.37	3.0	**£179.95**
20M3L	14 MHz 3 element Beam			**£TBA**
Log Periodic Yagis				
LP270	144 - 440 MHz	9.5	2.7	**£110.00**
LP1300	105 - 1300 MHz	11-13		**£129.00**
LP 1830	18 - 30 MHz	7.8	3.0	**£399.00**
Verticals				
Constructed of fibreglass, stainless steel and heavily chromed brass. Supplied complete with mounting kit for masts up to 55mm diameter.				
V4M	70MHz 1/2 Wave Vertial	2.2	2.35	**£59.95**
V6M	50MHz 1/2 Wave Vertial	2.2	3.75	**£59.95**
TA2M258	144MHz 2 x 5/8 Colinear	8.5	3.2	**£69.95**
Baluns				
CB 18-52	18-52MHz 50 Ohm Yagi Choke Balun			**12.95**



LP 1730
HF Log Periodic Antenna

Gain (typ)	7.8dBi
Boom	3 mtrs
Longest element	28.6ft
Power	2kW
Weight	16kg
Price	***£399***

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RELAY SPEED-UP CIRCUIT

FOLLOWING YOUR item in January 2002 about suppressing voltage spikes when relays are switched off, how can I make a relay pull-in faster? The antenna changeover relay on my linear amplifier is rather slow, and when my transceiver keys it, there is an RF spark. I think this is because the RF power appears before the relay has fully changed over.

YOU'RE PROBABLY RIGHT. Many modern transceivers provide a delay of 10 - 15ms between key-down - or pressing the PTT or transmit button, or tripping the VOX - and the start of actual transmission. But, since many antenna changeover relays take 20 - 30ms to pull in, you can indeed expect some RF arcing. I will describe a modification that gives you a sporting chance of speeding-up the relay so that it has changed over before the RF arrives.

To make a relay close faster, you need to build up the magnetic field in the solenoid very quickly, but the large inductance of the solenoid fights back against any change in current. There are three ways to overcome this: the classic way, the dirty way and the clever way. The classic way is to operate the relay from a higher voltage than normal, and use a dropping resistor (R1 in **Fig 1**) to establish the correct steady-state current through the coil. The current through the relay coil ends up at the same value, but it gets there much more quickly if you supply the relay from a higher starting voltage. Fig 1 gives a family of curves showing how the current in a typical relay builds up. The slowest build-up is when the relay is operated from its normal voltage V, and with R1 short-circuited. The fastest build-up shown is when the same solenoid is operated from a supply voltage of 5 x V, with R1 equal to four times the solenoid's internal resistance, so that the final current is the same as before. The intermediate curves are for 2 x V and 3 x V. If you compare the times taken to reach, say, 90% of the final steady-state value, you find that the speed-up ratio is simply equal to the voltage ratio (and if you know your differential calculus, here's your cue to say "Yes, obviously"). However, this method has certain disadvantages, especially if you wish to modify an existing amplifier - you have to provide a higher-voltage source, often at substantial current, and then throw away a lot of heat in R1 while the relay is energised. Also you have to be prepared to switch this higher voltage, and to handle the switch-off transient as discussed in January.

The dirty way? Oh, simply run the relay from about 2 x V all the time, and hope the coil doesn't burn out!

Now for the clever way. This one came from K1KP, and it's a way of effectively doubling the relay voltage for the first few milliseconds when it matters, without any of the disadvantages of Fig 1. **Fig 2** shows the circuit. Initially the PTT line is un-grounded, and C1 charges up to the full supply voltage V via the relay solenoid RL1, D1 and D2. TR1 has no forward base bias at this time, and does not conduct. Activating the PTT line grounds the positive terminal of C1, so that the negative terminal of C1 takes the emitter of TR1 down below ground potential, almost to -V. This causes base current to flow into TR1, which turns fully on so that its collector is also very close to -V. At this moment the relay RL1 sees +V on one terminal and -V on the other, a total of twice the normal voltage, so it pulls-in very smartly. This golden moment doesn't last, of course, because the relay current will discharge C1 within a few milliseconds. D1 and D2 were both reverse-biased while C1 was pulsing the relay, but when C1 discharges, D1 starts to conduct again and holds the relay in at its normal operating voltage for as long as the PTT line is grounded. Note that R1 is essential to allow the base of TR1 to follow the emitter down towards -V. 1kΩ is a suitable value.

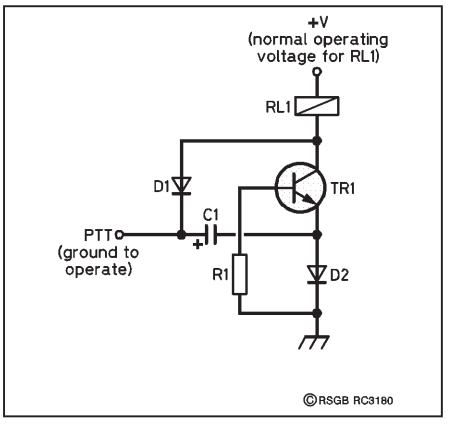

Fig 2: K1KP's relay speed-up circuit will roughly halve the pull-in time, while still using the normal supply rail. This makes it ideal for modifying existing rigs.

The degree of speed-up you can achieve with this circuit depends partly on how quickly it pulses current into the solenoid, and then partly on the mechanical reaction time to move the contacts. Based on detailed simulations of the transient behaviour, the circuit of Fig 2 is equivalent to operating the relay from about three times its normal supply voltage with a series resistor (see dashed line of Fig 1). The speed-up of contact closure seems to be about a factor of two, depending on the mechanical design of the relay.

When the PTT line is released, C1 recharges quickly through RL1, D1 and D2, so the circuit is soon ready for a repeat operation. The unexpected bonus is that when you release the PTT, you don't need to worry about handling the energy stored in the solenoid's magnetic field (see January) because it all goes into recharging C1. This makes the field collapse very quickly, with only a small voltage transient from the back-EMF, so the circuit also shortens the relay's drop-out time. The value of C1 is not very critical. Most antenna relays would need 50-100µF, or possibly more if you're driving the input and output relays in parallel. If C1 is too small, the circuit won't pulse all the way down to -V, and the back-EMF transient on switch-off will increase. If C1 is larger than necessary, it pulses closer to -V and stays there longer, but the critical rising edge of the current waveform hardly steepens at all. The drop-out time extends by a few milliseconds if the value of C1 is very large, and the recovery time before a repeat operation also increases, although this is not normally a problem. If you want full break-in CW at very high speed, you might then need

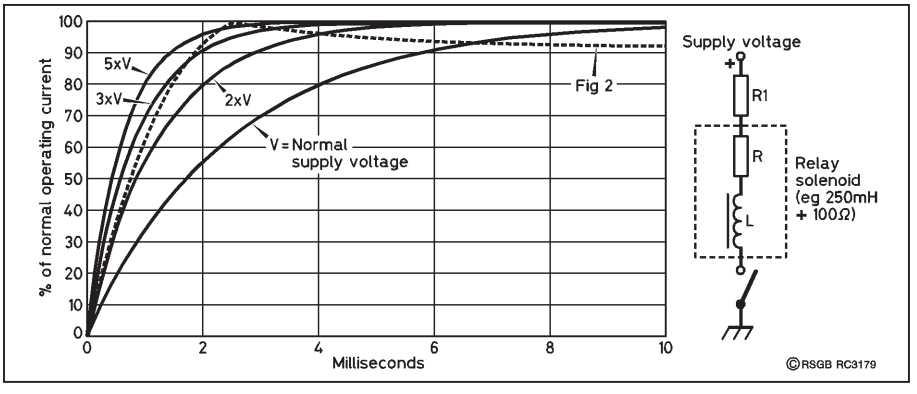

Fig 1: Family of curves showing how the rise-time of current in a relay coil can be speeded-up by supplying the relay from a higher voltage through a dropping resistor. R1 is adjusted so that the final current is the same in all cases.

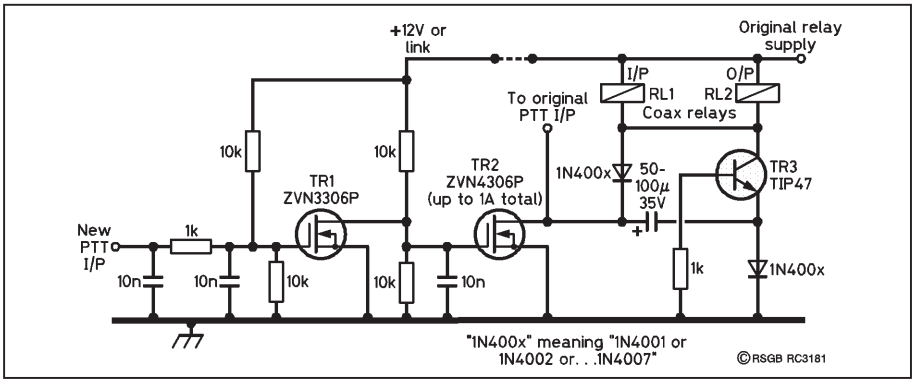

Fig 3: A more practical version of Fig 2 with an interface for fast, low-current keying from any transceiver. The rating of TR2 depends on the current demand of other keying circuits in the power amplifier.

to optimise C1 more carefully, and spend some time measuring the performance with an oscilloscope.

In order to have the relay contacts closed before the RF arrives, you *must* activate the speedup circuit from the transceiver's fastest PA control output, which is usually an open-collector npn transistor. If you key the PA through another relay inside the transceiver, you're losing valuable milliseconds while that relay changes over first. Every millisecond counts here, because the antenna relay contacts need to have changed over *and also stopped bouncing* before the RF arrives - otherwise you'll get RF arcing as the contacts bounce open again. The difficulty with using the transistor-switched output of many transceivers is that the transistor itself may be quite low-rated in terms of voltage and current. Often this transistor cannot handle the full load of one or two coaxial relays plus whatever else is connected to the power amplifier's PTT line. **Fig 3** is a more practical version of Fig 2, with a simple two-transistor interface that keys the power amplifier without delay, and allows you safely to use the fast PA control output of any transceiver. For the fastest possible response, you should check with a scope that the relay switching is not pulling down the supply rail and, if necessary, reinforce it with an additional reservoir capacitor close to the relays.

I've modified a few relay systems in power amplifiers using this speed-up circuit, and it has greatly reduced the incidence of RF arcing. In particular, it can speed-up the popular CX520 coaxial relays used at VHF/UHF, to bring them inside the typical 15ms deadline. It is still a race against time, so this modification is not guaranteed to work in every case (especially with older transceivers that do not have a deliberate delay before the RF appears). Obviously it isn't as good as a fully-sequenced changeover system that can sense when the relay contacts are fully settled, and also send a hold-off signal back to the transceiver until the amplifier is completely ready for the RF... but that's a much longer story.

Some relays used for antenna changeover in HF transceivers are really AC/DC power relays, with switching times of 30ms or even more. You may not be able to speed these up enough to prevent RF arcing, particularly because the contacts are very prone to bouncing. You may see arcs from time to time, but not always, which indicates either that the contacts are sometimes bouncing, or that the armature is sometimes sticking on its pivot (most relays are far from being precision mechanisms). The only solution is to replace these relays with something faster. The best solution up to 50MHz is probably to use small ceramic vacuum relays, most of which are very fast because of their special construction [1]. Many vacuum relays have switching times of less than 10ms, and this can be roughly halved by the speed-up circuit. The disadvantage is that most are designed for 24 - 28V operation, so you may require a new relay supply, and may also need to uprate the transistors in Fig 3.

SHORTENING SCREWS, AGAIN

THE DECEMBER 2001 item about shortening screws brought a number of practical comments and suggestions.

SEVERAL COMMENTS were about the technique for removing the raised lip that occurs when you run the nut over the sawn-off end to restore the damaged start to the thread. Ideally the aim is to re-create the shape of the original factory-made end... which is somewhere on the floor. You can make a fair effort at this by filing a chamfer all around and then cleaning out the start of the thread where it's squashed down. With a large steel screw, the knife-edged needle file that I suggested may be a bit too fragile for cleaning out the thread - try the edge of a small half-round file instead. If the screw is quite small and made of brass, the needle file is still probably your best bet - just take care, and don't be too heavy-handed. With small screws the best technique is probably to run the nut back over the cut end, rub off any sharp bits and repeat until the nut starts easily. (It's really much easier to do this than to read about it here.)

If you have a set of taps and suitable drills for common screw sizes such as 2BA, 4BA, 6BA, M5, M4 and M3, G3VTS suggested an alternative to holding the screw in the two nuts. Make a plate out of aluminium or mild steel as shown in **Fig 4**, and make a set of tapped holes near the edges of the plate in a range of useful sizes. Then slit each hole through the centre and the job is done. The slits make cheap-and-cheerful cutting edges which help to clean up the screw threads more effectively, so there is less filing to do. Although a set of proper split dies in these thread sizes would clean up the threads even better, Colin's idea saves you from the temptation to clamp your good dies in the vice and use them as a sawing guide.

For making the narrow slits as suggested in Fig 4, I'd recommend the X-Acto range of fine saw blades which are available from most model shops. These fit into the handle of an X-Acto knife, which most of the time can hold one of its excellent range of sharp, strong blades.

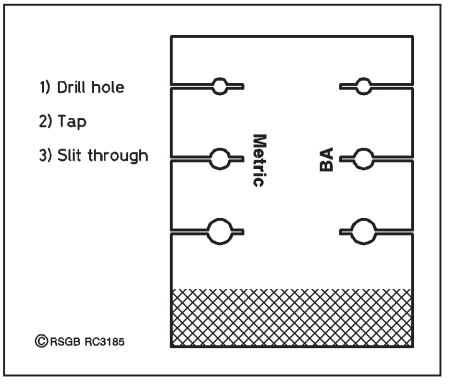

Fig 4: G3VTS suggests this simple idea for cleaning up a wide range of screw threads. Make tapped holes in the screw sizes you commonly use, and then slit them through. The plate is gripped (where shown) in a vice.

NOTE

[1] Vacuum relays sometimes appear as surplus in this country, particularly the small ITT Jennings RF1E types which are suitable for light HF use. The best source for surplus vacuum relays is probably Allen Bond, whose web pages offer many different types at very reasonable prices, including the popular Jennings RJ1A and Kilovac HC-1 types.

WWW.

Allen Bond **www.mgs4u.com/relay.htm**

The 'In Practice' website (see the previous page) contains a cumulative index from 1994-2001, and links to component suppliers, etc. ♦

If you have new questions, or any comments to add to this month's column, I'd be very pleased to hear from you by post or e-mail.

Please remember that I can answer questions through this column only, so they need to be on topics of general interest.

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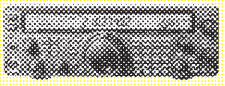
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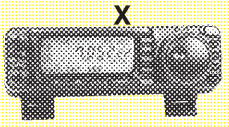
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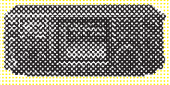
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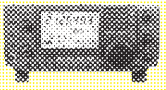
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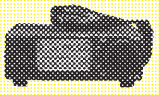
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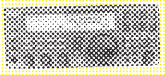
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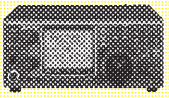
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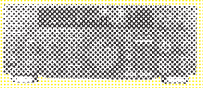
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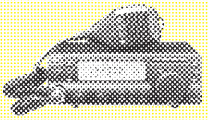
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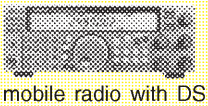
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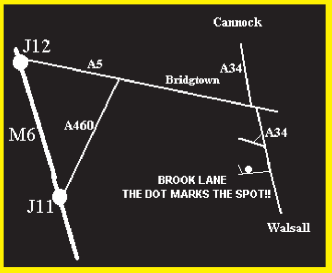

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MCL	MCL1100	EASY READER	£75.00
MFJ	MFJ-414	MORSE CODE TRAINER	£120.00
MFJ	SET-UP	971-9015-4114 PORTABLE 21MHz	£299.00
MICROSET	PT-135	POWER SUPPLY	£80.00
MICROWAVE MODULES	28/144	TRANSVERTER 28/144	£125.00
PACCOM	TINY 11	TNC	£99.00
PACCOM	TNC-320	TNC	£90.00
PLESSEY	PR-2250	HF RECEIVER BEST QUALITY CLASSIC!	£1,200.00
QM 70	28/144	TRANSVERTER	£100.00
RACAL	RACAL 1792	HF RECEIVER	£499.00
REALISTIC	PRO-2037	SCANNER BASE	£99.00
REALISTIC	PRO-394	HF RECIEVER	£99.00
SGC	SGC-2020	HF TRANSCEIVER	£450.00
SOMMERKAMP	FT290R	2m MULTI-MODE TRANSCEIVER	£180.00
SONY	ICF-SW77	FM/SW/MW/LW PORTABLE AS NEW!	£250.00
SONY	SW-100E	FM/SW/MW/LW PORTABLE	£90.00
ST3 HEADPHONES		DELUXE HEADPHONES	£45.00
SYNCRON	PS-1220VU	20 AMP POWER SUPPLY	£60.00
TAGRA		22AMP POWER SUPPLY	£70.00
TENTEC		SCOUT + MODULES	£350.00
TIMEWAVE	DSP-9+		£125.00
TOKYO HY-POWER	HL-30V	2M and 25W AMPLIFIER	£75.00
TOKYO HY-POWER	HL-37V	LINEAR AMPLIFIER	£60.00
TONNA	7000E	TERMINAL	£130.00
TRIO	R-2000	RECEIVER + CONVERTER	£300.00
TRIO	TR-9130	2M ALL MODE TRANSCEIVER	£250.00
TRIO	TRIO 9130	2M MOBILE MULITMODE TRANSCEIVER	£250.00
TRIO	TS-780	DUAL BAND BASE TRANSCEIVER	£275.00
WELZ	AC-38M	200W MOBILE MATCHING NETWORK	£50.00
WELZ	SP-15M	SWR & POWER METER	£20.00
YAESU	FC-102	1 .2KW ATU WITH 4 WAY SWITCHING UNIT	£200.00
YAESU	FC-20	AUTO ANTENNA TUNER FOR 847/FT100	£175.00
YAESU	FC-902	ATU 500W	£140.00
YAESU	FL-2100Z	HF AMPLIFIER	£450.00
YAESU	FP700	POWER SUPPLY	£100.00
YAESU	FP-757HD	HEAVY DUTY POWER SUPPLY	£120.00
YAESU	FRG-100	HF RECEIVER	£300.00
YAESU	FRG-7700	HF RECEIVER	£220.00
YAESU	FRG-8800	RECEIVER INCLUDES CONVERTER	£399.00
YAESU	FRT-7700	ATU MINT!	£75.00
YAESU	FRV-7700	UHF CONVERTER MINT!	£80.00
YAESU	FT-1000MK5	200W DSP HF TRANSCEIVER	£2,600.00
YAESU	FT-1000MP	AC HF BASE DSPTRANS-CEIVER (Late serial no)	£1,550.00
YAESU	FT-1000MP	DC BASE TRANSCEIVER	£1,200.00
YAESU	FT-101ZDmk111	HF TRANSCEIVER inc FM	£375.00
YAESU	FT-225RD	2M BASE MULTIMODE CLASSIC!	£399.00
YAESU	FT-23R	HANDY TRANSCEIVER	£180.00
YAESU	FT-2500M	MOBILE TRANSCEIVER	£190.00
YAESU	FT-290RMK1	2M ALL MODE TRANSCEIVER	£180.00
YAESU	FT-290RMK11	MOBILE 2M MULTIMODE TRANSCEIVER	£275.00
YAESU	FT-411E	2M HANDY TRANSCEIVER	£99.00
YAESU	FT-41R	HANDY TRANSCEIVER	£120.00
YAESU	FT-470	2/70CM HANDY TRANSCEIVER	£140.00
YAESU	FT-650AC	26-50MHz 100w BASE STATION TRANSCEIVER	£599.00
YAESU	FT-690MK11	6M MULTIMODE MOBILE TRANSCEIVER	£295.00
YAESU	FT-690RMK	1 6M MULTIMODE MOBILE TRANSCEIVER	£250.00
YAESU	FT-690RMK11	6M PORTABLE	£375.00
YAESU	FT-726R	2 / 70 / HF TRANSCEIVER	£400.00
YAESU	FT-726R	2 / 70 / 6m TRANSCEIVER	£575.00
YAESU	FT-730R	70CM MOBILE TRANSCEIVER	£120.00
YAESU	FT-736R	2/70/6/23CM TRANSCEIVER	£1,050.00
YAESU	FT-736R	2m / 70cm TRANSCEIVER	£650.00
YAESU	FT-736R	2m/70cm/6m TRANSCEIVER	£750.00
YAESU	FT-7400	70cm MOBILE TRANSCEIVER	£160.00
YAESU	FT-747GX	HF TRANSCEIVER	£399.00
YAESU	FT-747GX	TRANSCEIVER	£299.00
YAESU	FT-757GXMK11	TRANSCEIVER MINT!	£400.00
YAESU	FT-757MK1GX	HF TRANSCEIVER	£375.00
YAESU	FT-767GX	HF BASE 100watt built-in ATU	£599.00
YAESU	FT-77	INCLUDES FM MINT!	£275.00
YAESU	FT-790R	70CM MULTIMODE MOBILE TRANSCEIVER	£225.00
YAESU	FT-7B	HF 50W MOBILE TRANSCEIVER	£199.00
YAESU	FT-80C	0-30MHz COMMERCIAL TRANSCEIVER	£375.00
YAESU	FT-8100	2/70cm MOBILE TRANSCEIVER	£249.00
YAESU	FT-811E	70CM HANDY TRANSCEIVER	£99.00
YAESU	FT-847	HF / 2 / 6 / 70cm BASE TRANSCEIVER	£999.00
YAESU	FT-900	HF TRANSCEIVER	£550.00
YAESU	FT-902DM	HF BASE TRANSCEIVER	£400.00
YAESU	FT-920AF	HF/6M BASE WITH DSP	£899.00
YAESU	FT-980	HF TRANSCEIVER	£495.00
YAESU	FT-990AC	HF BASE STATION TRANSCEIVER	£750.00
YAESU	FT-ONE	HF BASE TRANSCEIVER	£450.00
YAESU	FTV-901	TRANSVERTER Inc 2m Mod	£165.00
YAESU	FV-707	VFO UNIT	£99.00
YAESU	SP-8	LOUDSPEAKER Including Audio Filters	£100.00
YAESU	VFO-102	MINT CONDITION!	£199.00
YAESU	VR-5000TOP	RANGE SCANNER RECEIVER	£500.00
YAESU	VX-5R	2 / 70 / 6 HANDIE 5W	£220.00
YAESU	XF-114SN	2KHz SSB FILTER	£60.00
YAESU	YO-100	SCOPE VERY RARE!	£150.00
YAESU	YS-60	SWR METER 1.6 - 60MHz	£30.00
YUPITERU	MVT-7000	HANDY SCANNER	£99.00
ZETAGI	B-132	10 / 11m LINEAR AMPLIFIER, MAINS	£60.00

The 45th year of Technical Topics

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USING SURFACE MOUNT TECHNOLOGY

I HAVE TO CONFESS that I have never really come to grips with surface mount technology (SMT), much preferring the relatively-massive devices and components of yesteryear. But my excuses must surely be shown as spurious after reading the detailed and very practical 'Hints and Tips for Using Surface Mount Technology (SMT)', by Luke Enriquez, VK3EM (*Amateur Radio*, September 2001, pp12-16, with further information on www.geocities.com/vk3em). Here there is space for only a few brief extracts.

"To use SMT and not get too stressed does require the following: Have a steady hand; practise your technique; invest in a good pair of tweezers; have reasonable eyesight or use magnification. [A convenient form of hands-free binocular magnifier is shown in **Fig 1** - *G3VA*.]

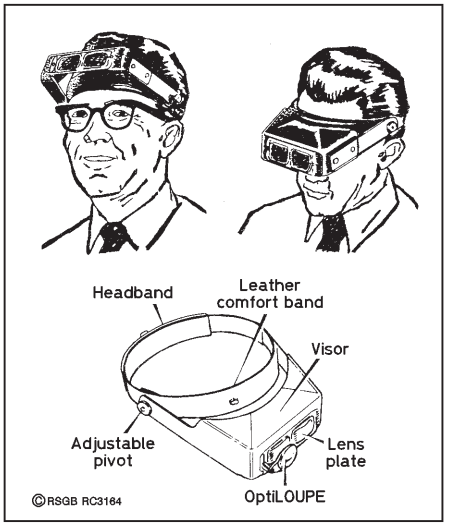

Fig 1: The American OptiVisor and similar UK hands-free binocular magnifiers can provide assistance when working on miniature SMD devices etc. When not required the 'visor' is raised. Provision is made for the use of an Optiloupe for either eye. The illustration shows an OptiVisor Model DA5 made in the 1980s by the Donegal Optical Company, Kansas that has been found useful at G3VA for some 20 years. It is fitted with good quality glass lenses, ground and polished to full ophthalmic standards. Similar devices are often advertised in model-maker magazines.

"The following techniques should be used for soldering small SMT parts such as resistors, capacitors, inductors, transistors, etc with a soldering iron:

"1. Add a small amount of flux to the area (if required) and add a small amount of solder to one pad.
2. Pick up component in tweezers making sure it is horizontal. Alternatively, just place the component close to the final position.
3. While holding the component with your tweezers, melt the solder on the pad and move the component into position.
4. Remove your iron, but continue holding the component until the solder has solidified. Check to see that the component is sitting flat on the PCB. If not, remelt the solder while pushing gently on top of the component with tweezers.
5. Solder the other side of the component.
6. Re-melt the first solder joint and let solidify. This ensures both joints are stable during solidification.
7. Check your work under magnification.
8. The joint should be shiny and concave. If you added too much solder, wick up with small solder wick and try again."

VK3EM stresses that SMT ICs require a slightly different technique:

"1. Apply flux to the IC pins.
2. Use solder wick to remove as much solder as possible from each pin.
3. Thread fine enamelled wire under one row of pins.
4. Secure one end of the wire on a nearby component (eg large electrolytic capacitor).
5. Starting at the loose end, heat each pin and pull wire simultaneously. Pull the wire as close to the PCB as practical. As the solder between the pin and pad melts, the wire will pop out and leave the pin standing free of the pad (and slightly bent up).
6. Repeat steps 3 to 5 for the other side."

VK3EM also provides step-by-step procedures for de-soldering small SMT components and small-outline ICs. His article includes advice on tools, common SMT packages, and general soldering tips, advice on recycling SMT components, etc. He considers that surface tension may be the constructor's best friend: "SMT is shrinking the size of component packaging at an alarming rate. How does one possibly avoid shorting pins with spacing like 0.3mm or even less? The answer is simple. You don't! What do I mean by this? With such small pin spacings, you would go crazy trying to solder each pin individually. With the aid of flux, you can increase the surface tension of solder to such a point that it is difficult to bridge the gap between pins and cause a short.

"Several techniques exist, but an easy one is to apply flux and make sure each pin is soldered without caring about shorts. Then, return to the pins with solder wick and soak up the excess solder. This will leave solder between the pin and the pad, but not between the pins..."

Further relevant information can be found in earlier 'TT' items. For example, in the July 1999 column 'Working With Surface Mount Technology' (see also *Technical Topics Scrapbook, 1995-1999* pp282-3) there were some extracts from a series of articles by Sam Ulbing, N4UAU (*QST*, April 1999 *et seq*). He gave a useful comparison of sizes. See **Fig 2,** although the July 1999 'TT' also included dimensions of SMT resistors and ceramic capacitors, and also SMT solid tantalum capacitors.

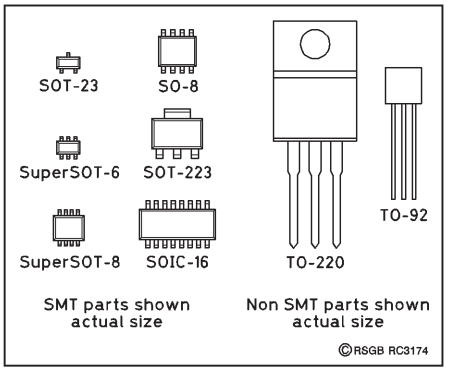

Fig 2: Size comparisons of some surface-mount devices against standard 'TO' outlines. Sizes of SMT resistors and ceramic capacitors, and solid tantalum capacitors were given in 'TT' July 1999.
(Source: N4UAU, *QST*, April 1999)

N4UAU listed some of the advantages of building with SM devices, including smaller, more energy-efficient projects. SM devices may outperform earlier DIP versions (eg FST3125 fast bus-switches as mixers). VHF projects can benefit from the short signal leads. Experience in building SM projects gives confidence in tackling repairs to factory-built gear. With no need for through-hole parts, PCBs are easier to make. New SM devices often have entire built-in modules, making it much easier to build complex circuits than with older ICs and far easier than with discrete components.

N4UAU also described in some detail the equipment needed to work with SM, emphasising that lots of expensive equipment is unnecessary and that you don't really need an eagle's eyesight if you use hands-free optical magnification.

He gave as fundamental requirements: an illuminated magnifying glass (eg a 5in diameter lens giving 3x magnification with built-in circular light – this is more powerful than the hands-free magnifier shown in Fig 1 which may not suffice for the tiniest individual SM components); a low-power soldering iron with an earthed, screwdriver tip, used with *thin* (0.020in diameter) resin-cored solder; 0.031in solder tends to flood the pads, resulting in bridging. Also useful

is a wet sponge for cleaning the tip of the soldering-iron. A flux pen can come in handy if a clean flux is used, as can good desoldering braid to remove excess solder on a pad. ESD protective devices such as wrist straps may be necessary in dry, static-prone areas. A pair of non-magnetic stainless steel draughting dividers with two very sharp needle points can be a great help.

MORE ON 'GROUNDED-MARCONI' ANTENNAS

IN PRESENTING the January 2002 notes from Malcolm Healey, G3TNO, on his use of a 'grounded-Marconi' antenna, it was noted that this form of antenna has an established history and that various versions (under various names) have appeared several times in 'TT' and elsewhere. G3TNO has traced its history back to 1923 and I suggested that its use on MF and LF probably stretches back to the early years of the 20th century.

Dr John Belrose, VE2CV, is by no means convinced that this form of end-fed antenna should be attributed to Marconi and regards the antenna used by G3TNO as a 'ground-plane (GP) type half-loop' - an antenna which can have several shapes: a quad shape (as described; a diamond shape, or a delta-loop shape. He agrees that the GP half-loop is a very good antenna type that he has used for 20 years (*Ham Radio Magazine*, May 1982, *QST,* September 1982). He has experimented with half-loops fed against stake grounds, buried radial wire ground systems, and fed against elevated radials (*QEX,* August 1997, *Communications Quarterly*, Spring 1998). He has also extensively studied the use of elevated radials for use with various types of GP antenna systems (*Communications Quarterly,* winter 1998 and spring 1999).

He writes: "For *single-band operation*, two resonant elevated radials are quite sufficient; you will not get any more directive gain, directed in a broadside direction from the loop towards the direction one wishes the half-loop to fire. A bi-directional pattern is obtained by using four resonant elevated resonant radials, the other two collinear with the first set, running in the opposite broadside direction. A wire connecting the ends of the half loop is not needed since, if the ends of the loop see an effective ground (as described), there should be no current on this wire. [Nevertheless, in practice where the ground system is less than ideal, it can be useful even for single-band operation - *G3VA.*]

"For *multi-band operation*, two or four sets of resonant radial wires should be used, or sets of random lengths of elevated radial wires. In this case, more wires are needed. I have used my 3.5MHz resonant half-loop on all bands except 1.8MHz - I do not have an efficient antenna system tuning unit (ASTU, as G5RV liked to call this box) that will tune to the 1.8MHz band."

John D Heys, G3BDQ, was interested to read G3TNO's experiences. In his book *Practical Wire Antennas,* he discusses this family of antennas at some length. He writes: "More than 60 years ago, AC4RF in Tibet was using a grounded long-wire and VE2CV's grounded half-delta was the inspiration for my own tests which led to the 'steeple' and the formidable 'double-bass' antennas although, almost 40 years ago, I tried a grounded-top Zepp-fed wire (*RSGB Bulletin*, February 1964) on 3.5MHz." He has contributed a number of other articles on this topic, including *RadCom* (August 1986), and *Practical Wireless* (November 2000).

"Although designed primarily for DX working on the lower-HF and MF bands (130 countries including KH6 and many ZLs on 1.8MHz), they have proved very effective on the higher amateur bands with many DX contacts on 50MHz during 2001. When I open the ground connection (using a mercury switch) I obtain excellent results on 136kHz, where the grounded wire would be like a short circuit and cannot be recommended!"

The removal of the ground connections to form a vertically-orientated, large-loop antenna on 136kHz has also been recommended by other correspondents.

G3KTH'S FLEXIBLE 'INVERTED-U' ANTENNA

THE PRINCIPLE OF the grounded-Marconi or half-loop antenna has been incorporated into a multi-configuration, multi-band wire antenna capable of good DX performance from 1.8MHz upwards, despite having an overall span of only 60ft.

For 10 years, M J Darkin, G3KTH, has been using a 120ft (60ft top span) 'inverted-U' system on all bands with very satisfactory results. He has implemented the antenna to provide great flexibility, making it possible to operate the antenna in balanced/unbalanced, isolated/grounded, resonant/non-resonant modes by means of patch boxes at near-ground level.

The basic antenna is shown in **Fig 3**. It is top-fed with open-wire feeder, 31ft long at 3.6MHz and impedance 500Ω - a figure chosen for easy use with the Smith Chart. An individual line should be identified in determining to which half of the antenna it is connected. Below each vertical line and the centre point is mounted a watertight plastic box some 20in above ground level. Each contains a patch panel. These are interconnected with four 30ft lengths of wire. Two 15ft long wires are added to the outer boxes. All wires are insulated from their surroundings in order to extend or ground the basic antenna element. The 'balanced' (normal) configuration (a) requires no earth point; the 'unbalanced' (common) mode (b), where the open-wire feeder line is strapped at the ATU output, needs an earth/counterpoise patch to the ATU.

With this setup, more than 20 different antenna configurations are possible, depending how the 'handbag' links are arranged in the patch boxes and ATU. A few of the possibilities are shown in **Fig 4**.

Be aware that with some of the arrangements there are safety issues, since there will be high RF voltages and currents close to ground level; these could present hazards to people or animals. In G3KTH's set-up, the ATU is located in the shack, from where it can be tuned with ease and in comparative comfort. He believes that such a flexible system is attractive for

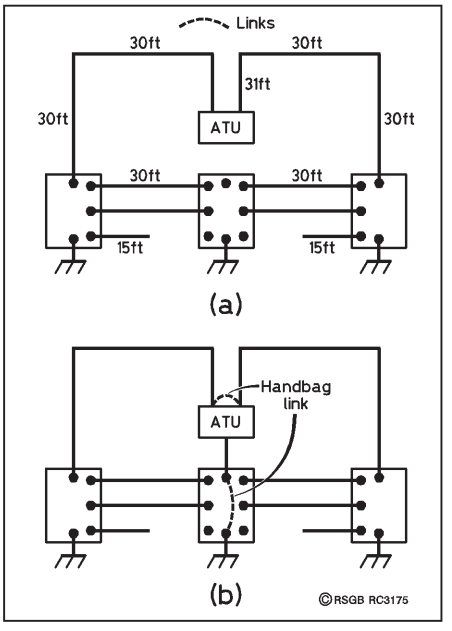

Fig 3: Basic arrangement of G3KTH's flexible multi-band 'inverted double-U' antenna and patch boxes in the normal/balanced configuration with span of only 60ft. (b) In common/unbalance mode.

those amateurs who like to 'play' with wire antenna systems and seek results in return for just a little more work than installing a conventional dipole/doublet antenna. He uses a slightly-modified Minimitter-style tuning unit, originally designed for centre/end-feeding open-wire transmission lines.

THE QUEST FOR LOW-NOISE OSCILLATORS

IT HAS BEEN STRESSED on many occasions that one of the significant limitations to the performance of receivers, particularly those with good dynamic range, is

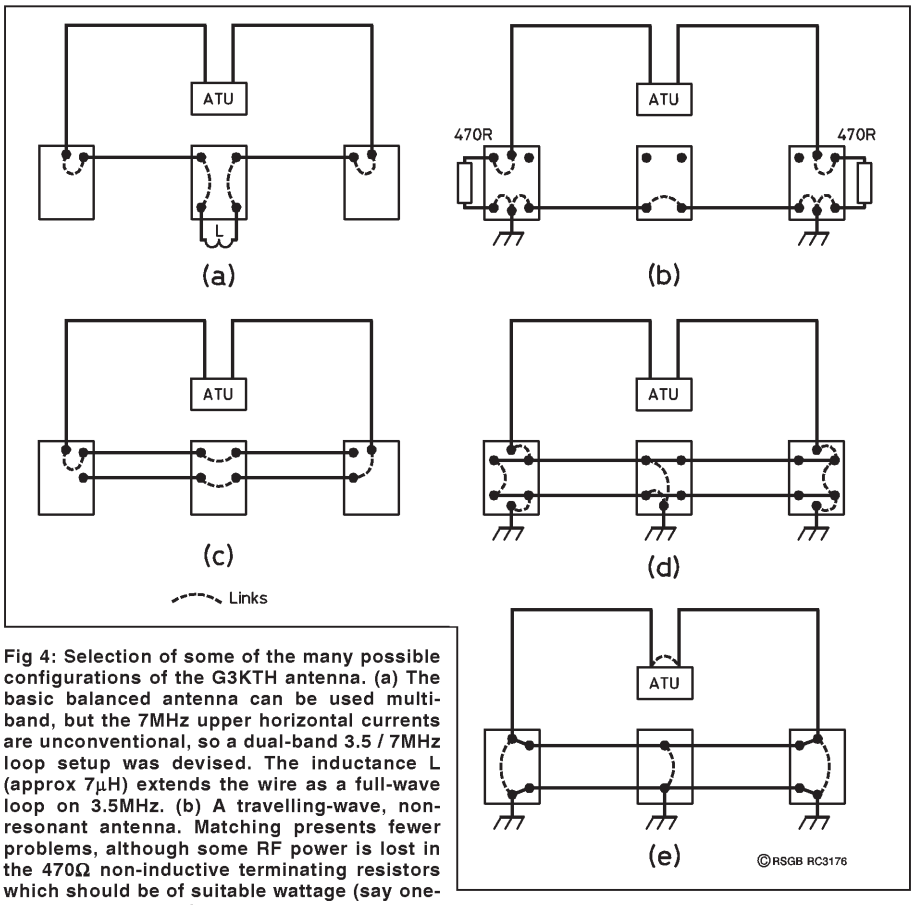

Fig 4: Selection of some of the many possible configurations of the G3KTH antenna. (a) The basic balanced antenna can be used multi-band, but the 7MHz upper horizontal currents are unconventional, so a dual-band 3.5 / 7MHz loop setup was devised. The inductance L (approx 7μH) extends the wire as a full-wave loop on 3.5MHz. (b) A travelling-wave, non-resonant antenna. Matching presents fewer problems, although some RF power is lost in the 470Ω non-inductive terminating resistors which should be of suitable wattage (say one-sixth or one-tenth of output power). (c) 1.8MHz balanced antenna provides UK coverage, but with reduced efficiency compared with a linear half-wave dipole. Total antenna length 240ft. (d) and (e) Balanced and unbalanced antennas for 1.8 / 3.5 / 7MHz bands are virtually two grounded-Marconi antennas that allow speedy band-changing. Balanced and unbalanced versions can be chosen to vary polarisation. The system also functions on 10 and 14MHz without alteration. For 1.8MHz DX working, the two inverted-L sections should resonate below 1.8MHz. As such, no lumped inductance is needed and resonance is achieved by self-inductance and capacitance.

imposed by the phase-noise generated by the local oscillator causing reciprocal mixing. It was not until the 1960s that this began to be recognised by professional design engineers such as B M Sosin of the Marconi Company. An early, clear description of the effect of oscillator noise on receiver performance was given by Barry Priestley, G3JGO, in *Radio Communication,* July 1970, pp456-7. He wrote: "Oscillator noise is becoming the limiting factor in receiver design due to interference in the HF bands and improvement in amplifier noise figures at VHF and UHF. Amateurs can apply with advantage the basic principles of low-noise oscillator design, even though the actual measurement of oscillator noise is rather difficult."

This was probably the first time this topic had been brought to the notice of radio amateurs, though G3JGO did not use the term 'reciprocal mixing'. But, the following year, I wrote in 'TT' (January 1971 and subsequent editions of *Amateur Radio Techniques*): "A term new to me turned up recently in a lecture by B M Sosin on the design of HF solid-state communications receivers. This was 'reciprocal mixing', and was used to cover the effect of signal and local-oscillator noise sidebands." Sosin wrote "Only relatively recently has a phenomenon called reciprocal mixing been appreciated. In superhet receivers, the radio frequency is converted to intermediate frequencies in various mixers. Under normal conditions, incoming signals are mixed with locally-generated heterodyne signals. However, no signal is noise-free. When a large interfering signal appears at the mixer, it will also mix with the noise of the heterodyne and, although the interfering signal may not fall in the IF band, the noise so produced may be in-band.

"This is called 'reciprocal mixing', and is measured by the amount of noise introduced into the output by this phenomenon, ie when the level (dBμV) of signal spaced 20kHz away from the wanted signal produces a reduction of signal-to-noise ratio by 10dB [later, and more often in amateur practice, 3dB]. It is possible to consider reciprocal mixing as an equivalent path bypassing the IF filtering... It is evident that only a receiver with a high figure of reciprocal mixing will perform well. Some 70dB of reciprocal mixing will introduce severe limitations on receiver performance. Only very few [1960s] receivers have this parameter better than 70dB, and many are considerably worse. Such a receiver will appear noisy under operating conditions, and an operator will confuse this with the receiver having a high noise factor when, in fact, this may not be the case." It is worth noting that incoming signals will have noise sidebands that can contribute to the problem.

Until 1970, I suspect that very few of us even realised that the output of any oscillator generates sidebands in the form of close-in phase noise that falls off rapidly on either side of the signal frequency. Even today, it is unusual to find any specification of this significant characteristic in manufacturers' specifications, although oscillator phase noise is featured in the more critical equipment reviews such as those of Peter Hart, G3SJX. Measurement of oscillator phase noise requires the use of high-grade professional signal generators providing extremely low-noise signal sources.

In the February 'TT', I quoted Peter Chadwick, G3RZP, giving an example of a receiver with a 10dB noise figure, a 1kHz bandwidth and a +20dBm intercept point, having a noise floor of -134dB, giving a spurious-free dynamic range of 102dB. He pointed out: "In order that phase noise is not dominant, the oscillator noise needs to be below -134dB when signals 102dB higher are applied, so that the phase noise needs to be at least -132dBc/Hz at the same offset as the closer of the signals causing IMD. Even then, the noise floor will be of the same magnitude as the IMD product..."

The importance of achieving oscillators having very low phase-noise is becoming increasingly recognised. For example, Mike Hall, G3USC, has written recently: "The purpose of this letter is to point out that there is one more very important attribute of a good VFO than just good temperature stability or low long-term drift. Temperature and drift performance are governed by mechanical design and layout as much as by anything else, and all we can do there is to build a VFO as if it were intended for use at a much higher frequency, adding some temperature compensation or 'huff and puff' stabilisation if necessary.

"What I am talking about is good short-term stability, or phase-noise performance, which is so important for low reciprocal mixing. I do not believe that, in this respect, the G3PDM VFO (see 'TT', November 2001, p79) can be anything to write home about - that 4k7 gate resistor and the low resistance presented to the circuit by the buffer amplifier must be affecting its close-in noise fairly significantly, not to mention

the effect of the high flicker noise corner frequency of the 2N3819 FET.

"This is still largely guesswork, based on gut feeling and a few computer analyses. The real proof will lie in actual measurement. I have just started on a new VFO design of my own, the result of my coming across a forgotten 30-year-old Plessey transceiver board, well-known in its time, in my junk box. I decided to have a go at resurrecting it. It was to have had a 5 - 5.5MHz VFO based on the well-publicised RCA FET Colpitts design of that era, which was pretty good, but I had only half-finished it. I had previously adapted that VFO design for use in my ancient KW2000 and remember it was a big improvement over the original, seeming much cleaner.

"My interest has been in crystal oscillators and, more recently, in low-noise ones particularly. The Q of a crystal, which influences the close-in phase noise, is many times that of an LC circuit, so I thought it would be an interesting experiment to determine how best a VFO could be optimised in that respect [see also the important work of G3SBI below - *G3VA*].

"My investigation is, as much as anything else, about determining the optimum operating level for a free-running oscillator, since the benefit of using high power is evident from the classic equation of Leeson. But a high-power oscillator is more non-linear than a low power one, producing intermodulation products which degrade the performance - compromises, compromises, always compromises! With a crystal oscillator, the power that one can apply is constrained by the quartz, and the need for low ageing. Here, I am tempted to say 'bring back FT-243s, which you could blast with a 6L6' as in Fig 5 of the November, 2001 'TT'.

"I hope to produce three essentially-similar free-running oscillator designs, each operating at a different level controlled by an ALC circuit. Being fortunate in having access to phase-noise measurement equipment, I intend to produce comparison plots for all three, and for the G3PDM and RCA designs."

A different approach, breaking new ground, based primarily on improving the Q by using a double-tank circuit was described in 'TT' (July 1994) by Colin Horrabin, G3SBI. He also discussed this approach with John Thorpe, the designer of the AOR 7030 HF communications receiver. John Thorpe independently adopted the double-tank principle for the 7030 which still remains an outstanding design, especially in respect of its low phase noise, resulting in its low susceptibility to reciprocal mixing.

G3SBI was recently in touch with Wes Hayward, W7POI, co-author of the classic ARRL *Solid State Design for Radio Amateurs*, and also author of books aimed at professional engineers. Wes is currently producing a new book for ARRL which will include G3SBI's outstanding H-mode mixer first described in 'TT' October 1993, and subsequently in *Technical Topics Scrapbook 1990-1994* and *Radio Communication Handbook*.

G3SBI suggested, unfortunately too late for the new book, that Wes might include also the double-tank oscillator approach. In 1994, G3SBI had hoped for a fall-off of 40dB per decade (instead of the typical 20dB) in phase noise, because two coils were involved. But he was not at the time in a position to make phase-noise measurements. When this became possible, he found the fall off from the carrier was in fact some 30dB per decade, compared with 20dB or less for a single resonator. John Thorpe used his own version of this oscillator as a VCO including band-switching to cover the range 45 to 78MHz. The enthusiastic Peter Hart review of the 7030 (*RadCom,* July 1996, p44), gave detailed reciprocal-mixing measurements based on 3dB noise contribution, ranging from 80dB at 3kHz to 109dB at 30kHz (29dB per decade), very close to G3SBI's own 30dB per decade. This gives a performance exceptional for a receiver intended for the amateur market. G3SJX commented in his review: "The receiver gives very clean results under all conditions…"

G3SBI points out that a sharp fall-off "is particularly important with a hybrid DDS / PLL synthesiser, since the closed-loop bandwidth of the PLL must be narrow (1kHz or so) to stop DDS spurs from modulating the VCO. This means that the basic phase noise performance of the oscillator itself dominates sideband noise. Currently, the double tank oscillator probably represents 'state of the art'.

Although too late for his book, W7POI spent quite a lot of time looking at the double-tank oscillator. He e-mailed G3SBI: "My calculations show that, at starting, the phase slope is a little more than twice as high with the extra tank in place. A critically-coupled second resonator was even better, although the tuning is much more critical… I would urge you to publish your results. It does not matter if they are in the form of equipment that some ham newcomer can duplicate. Rather, what *is* important is to get the idea out in the public domain where it can be used. This is a significant concept, perhaps even more significant than your mixer work, and it would be a shame to let it pass with nobody in the world using it. It could impact on the very nature of electronic communications… The classic Leeson noise analysis does not apply. Leeson examined a single resonator oscillator… This is a wonderful piece of work, Colin, don't let it go by without getting the credit for it that you deserve. Be sure it gets into the public domain so folks can use it."

While I might have hoped that the first-publication of the double-tank concept in 'TT' in July 1994 might have attracted more attention than it did at the time, I am glad to report that G3SBI is working on further ideas aimed at improving the phase-noise slope beyond 30dB per decade. G3SBI writes: "I am hopeful that it may be possible to improve this approach further by adding two more resonators but, since my retirement, I have only recently acquired some simulation software. Another interesting possibility is to fit another J310 to the dummy coil in the double-tank oscillator, since a practical test a few years ago suggested that an extra FET causes a further increase in Q.

"The use of the double-tank circuit in the AOR 7030 made its reciprocal mixing performance superb, and it has proved a popular receiver over the past six years. The principle behind the double-tank oscillator is that, with one coil, DC power is fed into the cold end of the tank coil, which must be bypassed to ground for the oscillator to work. If the DC power is fed via a choke, the dummy tank must be series-resonant at the same frequency to hold the cold end of the active tank at RF ground. The two tank coils therefore work together to produce

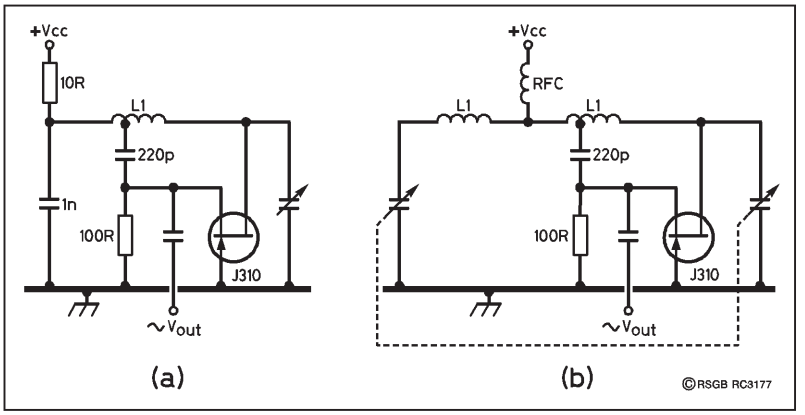

Fig 5: (a) Basic single-tank FET oscillator. (b) Double-tank FET oscillator. Details of G3SBI's prototype stripline VHF double-tank oscillator were given in 'TT' July 1994.

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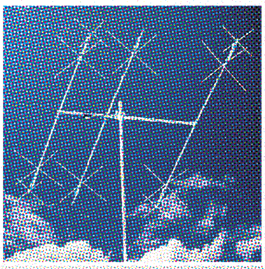
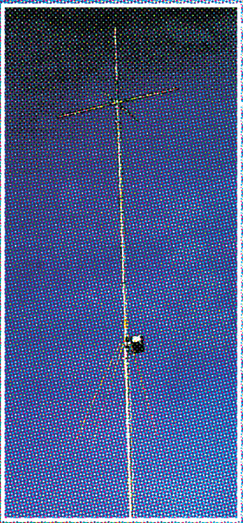
MA5B HF 5-BAND 3 EL. 'MINI BEAM'



- Bands: 10, 12, 15, 17, 20m
- Max gain: 5.3, 0, 4.8, 0, 3.6dBi
- Front to back ratio: 10, 0, 12, 0, 22dB
- Power rating: 1.2kW
- VSWR: 2:1
- Bandwidth: 665, >110, 255, >100, 90kHz
- Boom length: 2.2m
- Turning radius: 2.7m
- Weight: 12kg

£349.95 C

MA5V HF 5-BAND COMPACT VERTICAL



- Bands: 10, 12, 15, 17, 20m
- Gain: 2dBi
- Power rating: 500W
- VSWR: 1.3:1 (typical)
- Height: 3.7m
- Wind survival: 160 kph
- Weight: 3.2kg

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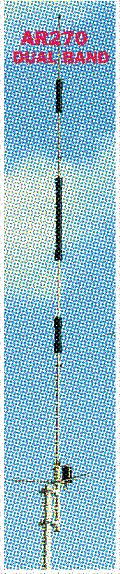
AR-270 BROAD BAND VERTICAL ANTENNA



- Frequency Band: 2m/70cm
- Bandwidth (MHz): 4/15
- Gain (dBv): 3.7/5.5
- Power (kW) FM:250W
- Height (m):1.13
- Mast Size (mm): 32-51
- Radials (mm): 171
- Wind Load (m): 0.03
- Weight (kg): 0.9

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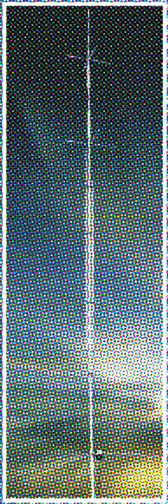
R8 HF 7BAND VERTICAL ANTENNA



- Bands: 6, 10, 12, 15, 17, 20, 30, 40m
- Gain: 3dBi
- Power rating: 1.5kW
- VSWR: 1.2:1 (typical)
- Height: 8.7m
- Weight: 10.5kg

£499.95 C

A50-6S 6M 6 ELEMENT BEAM ANTENNA

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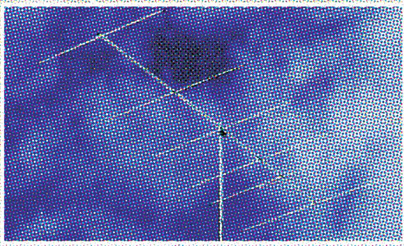

- Frequency Band: 6m
- Elements: 6
- Power (kW) : 1
- Forward gain (dBi): 11.6
- Front to back (dB): 26
- SWR typical : 1.2:1
- Bandwidth (MHz): >1
- Boom length (m): 6.1
- Longest element (cm): 302
- Turning radius (m): 3.5
- Mast Size (mm): 38-51
- Wind Load (m2): 0.41
- Weight (kg) : 8.2

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D-3W	10/18/24 MHz 2KW 10.37m long	£249.95	C
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AR-10	10m vertical 3.75db gain 5.36m high	£79.95	C

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AR-270	2m/70cms vertical 3.7/5.5db gain 1.13m high dualband Ringo	£89.95	C
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A148-20S	2 x 10 ele beams c/w stacking frame & harness 16.2db 3.6m	£189.95	C
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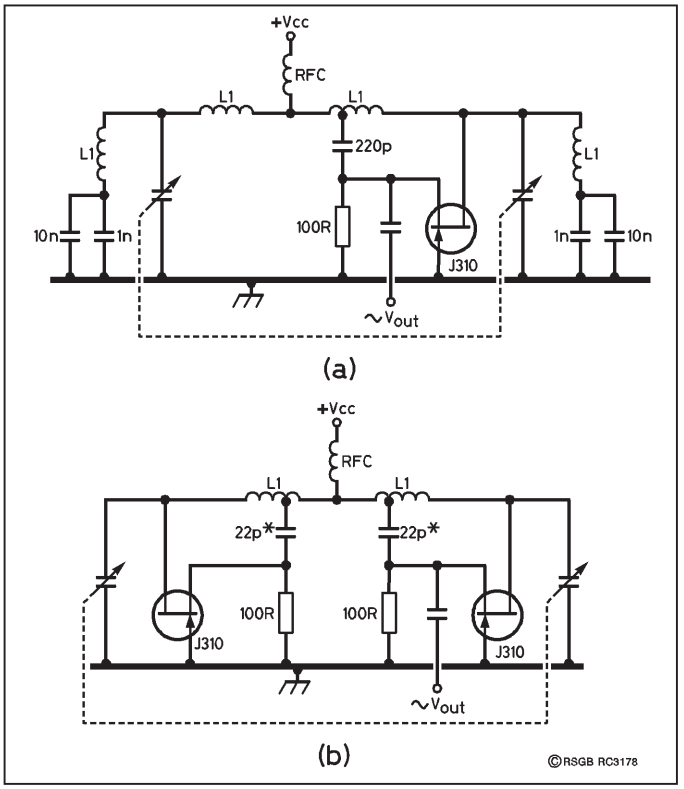

Fig 6: (a) Four-tank oscillator. (b) Double-tank oscillator using two J310 FETs. * see text.

improved sideband noise. A further benefit is that the phase slope at resonance is a factor of two better than a that of single tank, so that the overall Q has been raised."

Fig 5(**a**) Shows a basic single-tank oscillator with (**b**) a G3SBI double-tank oscillator. **Fig 6(a)** shows a possible four-tank oscillator with (**b**) the use of an extra J310 FET in a double-tank arrangement. In this, the feedback capacitor was reduced to 22pF from 220pF. This showed that an increase in Q had resulted from the use of the two FETs. Without reducing the feedback capacitor, the oscillator produced outputs at two slightly different frequencies.

THE PASSING YEARS

THIS MONTH, 'TT' enters its 45th year of publication. April 1958 was almost, but not quite, a different world in amateur radio and in life in general, but one staggers on. Unhappily, this is not the case for all of us. I was sorry to learn of the recent passing of Harold Wilson, G3OGW. His outstanding work on using a fast bus-switch version of the Tayloe mixer in conjunction with a polyphase filter to produce a prototype high-performance single-sideband, direct-conversion receiver ('TT' April, May, June 2001) was carried out at advanced age and in terminally-fading health. I did not suspect this until, in a final telephone call, when I asked if he intended next to produce a fully-developed receiver. He replied "No, I will leave it to others to do this". I gather that his prototype boards have been handed over to Ian Gardner, G3CDM, and, hopefully, a multi-band operational receiver will emerge.

I was also sorry to be reminded by Jack Hardcastle, G3JIR, of the passing last August of Lorin Knight, G2DXK, an occasional 'TT' contributor, but remembered also for many constructional articles in *RadCom* (including a multi-band HF/SSB transceiver in June to October 1984 and associated linear amplifier in March 1986). He wrote a 1950s series of helping-hand articles on amateur transmitters and antennas in the *RSGB Bulletin* that I later used in at least nine editions of the RSGB *A Guide to Amateur Radio*. He wrote occasionally for the professional magazines (G3JIR still uses his 'Coil Winding Data', *Wireless World,* January 1953), and spent some years in the USA after, I believe, a long stint with Murphy Radio. ♦

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E-mail: keith@g3ttc.freeserve.co.uk
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RACAL 17L nice clean cond, aligned in steel cabinet, man, £180 ono. Racal 117E beautiful cond, man, exchange Yaesu FRG-7, Sony 2001D, portable comms rcvr, extras, £95. Military self-focus binoculars 7 x 42 rubber coated, £75. Julian, GW0FPY, QTHR, 01248 681 782 (Llanfairfechan).
RACAL RA-1217 transistorised HF comms rcvr 1-30MHz, ex Portishead Radio BC (before computers), with operator's man and maintenance man, £260. Telequipment single-beam oscilloscope S43 with man and spare valves, £40. Marconi Marine Morse key type 365B, £15. G4CKO, QTHR, 01278 786 419 (Burnham-on-Sea).
RACAL RA17, £140. AR-88D, £90. Linear 811H as new, £550. Ameritron AL-811, £350. FT-101ZD excellent, £190. Argonaut II, £299. FTDX-401 as seen, £60. Atlas 210X, £150. ERA Microreader, MFJ Multireader, MFJ-426B Morse keyboards MFJ as new, Datong worn but working HRO with full set coils excellent, £140. Yaesu FC-902 antenna tuner boxed, Trio TM-255E, £399. Test gear list, all ono, will haggle. 01509 880 279 (Loughborough).
E-mail: lauriepartington@compuserve.com
REORGANISATION of shack results in surplus equipment for sale. MFJ-9040 QRP 40m tcvr, £90. MFJ-9020 QRP 20m tcvr, £100.MFJ-752B signal enhancer, £25. Dewsbury Electronics Star master key, £45. Nye SSK-1 squeeze key, £25. AKD 2m tcvr 2001, £85. All offers considered, prefer inspect & collect. Contact Gwyn, GW3LHK, 01545 570 020 (Aberaeron).
SEALEY bench pillar drill, 100mm height, 370W, 16mm (5/8in) chuck , 210-2500RPM, £75 ono. John, 0870 904 7373.
SERVICE mans etc. Prices including p&p. Kenwood TS-570D, £40. Kenwood TS-870S, £40. Icom IC-706 MkII, £15. Yaesu FT-736R technical supplement, £35. Kenwood YK-88SSN-1 1.8kHz narrow SSB filter, £40. 01293 774 303 (Horley).
SEVERAL new boxed 2m antennas, £10 each. Buyer collects. Proceeds of sale to South Staffs Raynet. Contact Dave, G4LQT, 01785 356 356 (Stafford).
E-mail: headteachers@barfields.staffs.sch.uk
SILENT key sale. FT-101E. Junkers key. Boxed, 813. Boxed TT-22 and others. Multi 700 ex 2m tcvr co-ax switch THA TR-9000 mobile 2m tcvr. Pentax 351 camera. Multi-band vertical aerial dismantles, other items. G3OEP, QTHR, 01493 662 323 (Great Yarmouth)
SILENT key sale. Sensible offers invited for Yaesu FT-902DM tcvr, FT-101 external VFO, SP-901 external loudspeaker, FF-501 filter, Weltz SP-200 power meter, SEM Z-match, , Shure 444 desk mic, Datong FL1 frequency-agile audio filter, SEM QRM Eliminator, G3WPO FET-GDO, DRAE 6A power supply. Contact G3NXC, QTHR, 0121 706 3109 (Birmingham).
E-mail: tony_plant@compuserve.com
SILENT key sale: Sommerkamp FT-707 with ATU and power/speaker unit, gwo, £240 ono. Yaesu FT-290 MKI c/w 6m tvtr and triband colinear antenna, £150 ono. Visit www.systec.pwp.blueyonder.co.uk/reg/radio.html . 07971 887 772 after 10am (Bristol).
E-mail spanner@spanner-in-works.com
SILENT Key, G1ORD. Mast approximately 22ft, extends to 38ft, 10-ele 2m crossed Yagi, AR40 rotator, £150. Already dismantled. G3HKQ, 01777 704 597 (Retford).
TH3 Thunderbird HF beam. Kenpro 600RC controller and rotator wkg order, buyer inspects, dismantles, £250 cash, G4ACK, QTHR, 01749 677 326 (Wells).
E-mail: barryg4ack@bushinternet.com
TL-922 soft-start, full AG6K protection, spare pair 3-500Z, £995. ANC-4 noise canceller, £95. 01352 771 520 (Mold).
E-mail: jhj@gw3tmp64.freeserve.co.uk
TRIO SM-220 station monitor with panadaptor, mans, £175 ono inc postage. 01482 896 471 (E Yorks).
TS-530 100W tcvr, WARC bands, vgc with power unit, man and box, £175. Cushcraft A3 beam, £100, G3DQY, 01424 424 319 (Hastings).
E-mail: vaughdqy@aol.com
TWELVE metre lattice mast, crank-up and tilt-over, dismantled and ready for transport, £300. 01202 708 660 (Poole).
E-mail: nick@g0eov.freeserve.co.uk
VALVE radios, Bush VHF62, Berec 'Fiesta', Portadyne, McMichael 381, plug-in coils 2V filament valves, Philips rectifier, all vgwo, £100 the lot. Frank, G4FGP, 01922 453 680 (W Midlands).
VINTAGE radio collectors, restorers - 12 volumes *Radio & TV Servicing*, £2 each, lot £20. Scott-Taggart *Modern Radio*, *Practical Radio*, £5 each, plus carriage. G3ISD, 01795 477 431 (Sittingbourne).
E-mail: g3isd@ehatch.frreeserve.co.uk
YAESU FL-2100Z linear & h/book, A1 condition, £350. 01677 423 750 (nr Ripon).
E-mail: paul.rollin@whsmithnet.co.uk
YAESU FP-757HD 13.8V 20A power supply. Good condition and good working order, built in speaker, £50 ono or part exchange HF general coverage rcvr. Mr Hall, 01603 744 197 (Norwich).
E-mail: g0mqg@talk21.com
YAESU FT-100 mobile HF with CTCSS board, duplexer, ATAS 100 antenna, remote mounting kit and end-fed wire Penetrator HF antenna, gc. Radio boxed with mans, £850 the lot. Phone Paul, M0CRD, 07808 919 545 or 01274 549 590 (Bradford).
E-mail: don-ross@lineone.net
YAESU FT-1000MPAC vgc recent refurbishment by Yaesu, £1300. Western Ultimast 30ft telescopic tilt-over mast with rotator cage, £150. 01525 860 582 (nr Bedford).
E-mail: don-ross@lineone.net
YAESU FT-102s 200W HF tcvrs, £200 and £175. SP-102 spkr, £60. FV-102 VFO, £100. MD-1 desk mic, boxed, £60. FTV-107R 2/70 tvtr, £100. Pair h/helds FT-23R, FT-73R, 2/70, boxed, accessories, vgc, £160. Labgear LG-300, £60. Carriage extra on all items. 07867 926 101 or 01453 845 013 (7-8pm).
E-mail: mail@ken-brooks.fsnet.co.uk
YAESU FT-2500M 50W 2m FM tcvr boxed as new. Never used mobile, £150. MFJ-259 ant analyser with nicads, £90. 023 9226 5101 (Waterlooville).
E-mail: lears@tesco.net
YAESU FT-757GX general coverage, mic man, boxed, £350. Yaesu FC auto ATU, man, boxed, £90. Yaesu full station FT-107M tcvr, FC ATU, Yaesu FP-107E power supply, speaker, all boxed with mans, leads etc, offers? 01332 880 633 (Derby).
YAESU FT-757GXII all-band, all-mode HF tcvr. Solid state, fully synthesised, 100W output, built-in CW keyer, very sturdy, very reliable rig, genuine reason for sale. Ideal first rig or cheap way to get on HF with that new M3 call, £175 no offers. Also CCTV cameras with lenses, colour £25 each, mono £15 each. M0CTC, QTHR, 07711 093 390 (Northampton).
E-mail: phil_ridgeon@hotmail.com
YAESU FT-840 HF-tcvr, vgc, boxed with MH-1B mic, £425, G3ZSQ, 024 7637 3232 (Nuneaton).
YAESU FT-920, 2 CW narrow filters, £250 ono. Icom IC-251, £225 ono. MFJ DSP filter, £60 ono. 0113 252 5552 (Leeds).
E-mail: g8gxp@blueyonder.co.uk
YAESU G-400 rotator, top bearing, cable, mounting brackets, £195. 2m 13-ele Tonna Yagi, £35. 70cm 21-ele Tonna Yagi, £45. 07976 300 056 (Nottingham).
E-mail: abingham-ward@orange.net
YAESU G-450C antenna rotator, brand new, not been removed from supplier's packaging, £250. 01493 780 579 (Great Yarmouth).
E-mail: vichamward@aol.com

WANTED

EARLY crystal and one-valve sets wanted, all early valve equipment is of interest including valves, speakers, components and catalogues. Very keen for early Marconi items, still want a good Hallicrafters SX-42 or similar top-end valve comms rcvr. G4ERU, QTHR, 01202 510400 (Bournemouth).

R1155 rcvr, bathtub key, Yaesu MD-1 (any suffix) desk mic, Yaesu FTV-700 tvtr, WS19 for spares, G3XBE, 07866 077 249 (Notts).

2m pre-amp for all-mode tcvr (RF switched). Tcvr old and a little deaf, like its owner! G3BEF, 01258 471 786 (Dorset).
E-mail: keithdenton74@aol.com
ANY HRO bandspread coilpacks and 100-200kHz, 50 - 100kHz.. Codar AT5 tx. 01335 343 201 (Ashbourne).
E-mail: ian@g3tvu.co.uk
COLLINS tx KWS –1 with or without power supply, cash or part exchange Collins KWM2A, 312B5 516F2, 30L1 linear and Collins ATU, all in excellent cond. 01379 783 657.
E-mail: jmunro2@ukonline.co.uk
DISABLED enthusiast seeks old QSL cards, log books etc. Also British magazines pre-1970, *QST* pre 1950, *CQ* pre-1970. Also valve tester and capacitor test instrument. Mike, 8 Windsor Road, Reydon, Southwold, Suffolk, IP18 6PQ.
DRAKE 4-B or 4-C line rig. Also looking for Yaesu S99 twins! WHY? Call M0NZA, QTHR, 01580 892 637 (nr Maidstone).
E-mail: m0nza@hotmail.com
DRAKE TR-7 tcvr reqd for spares, will collect. Also accessories WH7 w/meter, MS7 speaker, L7 linear. M0KFB, 01754 762 453 (Skegness).
EA12 Eddystone rx in nice condition, no mods, tnx Barry of Manchester for circuit diag. Bob, G3JJU, 01252 615 831 (Fleet).
GLOBAL CX-401 4-way coaxial switch with SO-239 connection sockets. Phone or E-mail. Steve, G7JCF, 01986 798 524 (Woodbridge).
E-mail: steve@sboldvic.demon.co.uk
GREY-line enthusiast wants DX Edge/Xantek tool. 01454 615 632 (Bradley Stoke).
KENWOOD SM-220 station monitor scope with man for Kenwood 9305. G4ZXP, 01305 770 139 (Weymouth).
KW EZE-match ATU or twin-stator capacitor 250 pF - 250 pF, will pay reasonable price. MM5WIG, QTHR, 01988 403 364 (Wigtown).
E-mail: weebooks@globalnet.co.uk
MIC MC-44 for Kenwood TM-231 VHF tcvr. 01872 242 121 (Truro).
E-mail: straff@globalnet.co.uk
PYE T10 domestic 1940s table wooden cabinet radio in gwo if possible, or a similar derivative. Can collect, 01539 567 521 (Carnforth).
E-mail: gordon_higton@yahoo.co.uk
R7 or similar antenna. Icom EX-627 automatic antenna selector. 01527 541 502 (Redditch).
E-mail: g3kwkroger@aol.com
SILENT key clearout or just not needed. Wanted for research project, QSL accumulations, old call books etc, can collect. 0113 269 3892 (Leeds).
E-mail: g4uzn@qsl.net
TELEPHONY Vol.2 Atkinson J, New Era. Also GPO extension bell set and also older wall mounted connection box, original apparatus cables. Steve, G0EZB, QTHR, 01492 593 343 (Llandudno).
E-mail: steve_cowie@g0ezb.fsnet.co.uk
TEXAS Bugcatcher mobile antenna wanted, your price paid for item in good condition; please phone
E-mail or write, GW3PDW, QTHR, 01437 891 017 (Haverfordwest).
E-mail: gw3pdw@telco4u.net
TR9 radio wanted for Hurricane fighter rebuild, anything in any condition considered, including parts. Also any Hurricane parts. David, G4DNX, 01394 276 034 (Felixstowe).
E-mail: david.ddyer@tesco.net
VERSATOWER, 60ft, post or base plate mount, call with details. Duncan, G7PNE, 01438 232 482 (Herts).
WORKSHOP mans for Icom IC-240 also Lowe SRX30 or Drake SSR-1. Trio DG5 display wanted non-worker considered if complete. 01869 277 475 (Bicester).

SILENT KEYS

WE REGRET to record the passing of the following radio amateurs:

G0BLL	Mr A A Dorrill	
G0WQN	Mr C H Orchard	
G2CVY	Mr W H J Yeo	16/01/02
G2DXK	Mr L Knight	08/01
G3BYY	Mr E W Elliott	01/02/02
G3FTQ	Mr A Frost	12/01/02
G3GPE	Mr K Smethurst	12/11/01
G3KXT	Mr I Richardson	19/02/02
G3RK	Mr H A Spashett	
G4YJZ	Mr R V Atkinson	17/02/02
G6WEM	Mr R H Reynolds	11/02/02
G7MBI	Mr N Davies	30/01/02
G8XXR	Mr W Bodicoat	
GD3YDB	Mr J D Thorpe	17/01/02
GM4AGS	Mr J N S Miller	19/04/01
GW0MDB	Mr D North	25/01/02
M0BPZ	Mr D A Kinghorn	12/01
M0SYD	Mr S Yates	25/01/02
TR8XX	Mr J-C Jupin	11/02/02

Rallies & Events

6 APRIL 2002

RSGB VHF COMMITTEE / UK 6 METRE GROUP 6 metres to Microwave Convention - Reaseheath College, Nantwich, Cheshire. £5. LEC. RSGB 0870 904 7373.

7 APRIL 2002

45th NORTHERN MOBILE RADIO & COMPUTER FAIR - Sports Hall, Harrogate Ladies' College, Clarence Drive, Harrogate. Gerald, G0UFI, 01765 640 695. [www.harrogaterally.co.uk]

14 APRIL 2002

CAMBRIDGESHIRE RG Annual Rally - Bottisham Village College, Bottisham, 6 miles east of Cambridge via A14 and A1303. OT 10.30am, £1.50. A, TS, B&B, CBS, CP, C, TI on S22. Paul, G0LUC, 01462 683 574 or g0luc@ btinternet.com [www.gb3pi.org.uk]

LOUGH ERNE ARC Annual Rally - Killyhevlin Hotel, Dublin Road, Enniskillen. OT 12 noon. Herbie, 028 6638 7761 or Frank, 028 6632 9507.

TYNE & WEAR REPEATER GROUP Spring Auction - Great Lumley Community Centre, nr Chester-le-Street. OT 10.30am for booking in, auction at 12 noon. C, DF. Nancy 0191 274 4274 (day). [www.twrg.co.uk]

18 APRIL 2002

WORLD AMATEUR RADIO DAY - theme: 'Amateur Radio: continuing innovation in communications technology'.

21 APRIL 2002

THE SOUTH YORKSHIRE RG & RSGB Region 4 Hamfest - Metrodome Leisure Centre, Queen's Road, Barnsley, less than 2 miles from M1 jn 37, and 5 minutes' walk from train and bus stations. Follow the brown 'Metrodome' signs from all directions. OT 10am, £2.50. DF, TS, SIG, B&B, TI via GB3NA on 145.675MHz. Ernie, G4LUE, 01226 716 339 or 07787 546 515 (6pm - 8pm) or e-mail ernest.bailey1@virgin.net

YEOVIL & DARC 18th QRP CONVENTION – Digby Hall, Hound Street, Sherborne, Dorset. OT 10am. LEC, C, TS, B&B, TI on S22 by GB2LOW. Derek, M1WOB, 01935 414 452, m1wob@tiscali.co.uk

26 - 28 APRIL 2002

53rd INTERNATIONAL DX CONVENTION - Visalia, California. [www.qsl.net/visalia2002]

27 APRIL 2002

CORNISH RAC International Marconi Day - John, G4LJY, QTHR. [www.users.globalnet.co.uk/~straff]

28 APRIL 2002

213 (CITY OF ROCHESTER) SQUADRON, ATC, Junk Sale - rear of Wainscott School, Wainscott, near Rochester, Kent. OT 2pm. All junk donations received on or before the sale. Peter, G4EVY, 01634 716 463.

ALDRIDGE & BARR BEACON ARC Surplus Radio & Electrical Sale - Aldridge Community Centre, Anchor Meadow, Middlemore Lane, Aldridge, Walsall. OT 10.30am, 50p. John, G0SWZ, 01922 458 014.

ANDOVER RAC 2nd Radio & Computer Spring Boot Sale - Village Hall, Wildhern. OT 10am, £1 per vehicle, boots £5. TI on S22, CP. Terry, G8ALR, 01980 629 346 or Jim, G4NWJ, 01980 610 594. [www.arac.co.uk]

6 MAY 2002

DARTMOOR RADIO CLUB Radio Rally - Pannier Market, Tavistock, Devon. OT 10.15/10.30am. DF, CP, C, TS, B&B, TI on S22. Ron, G7LLG, 01822 852 586.

MID-CHESHIRE ARS Rally - Civic Hall, Winsford. OT 10am, £1. MA, TS, B&B, C, LB, CP free. David, G4XUV, 01606 77787.

WEST WALES AMATEUR RADIO & COMPUTER RALLY - Penparcau School, Aberystwyth. OT 10.30am, £1. CP, DF, TS, B&B, SIG, C, TI on S22. Ray, GW7AGG, 01686 628 778, fax 01686 621 880 or mwmg01@aber.ac.uk

11 MAY 2002

YORKSHIRE DX CLUSTER SUPPORT GROUP Rally - John, G3LZQ, g3lzq@john-dunnington.freeserve.co.uk

12 MAY 2002

DUNSTABLE DOWNS RC 19th Amateur Radio Car Boot Sale - Stockwood Country Park, Luton, Beds. CBS, DF, C, CP. [www.ddrcbootsale.freeserve.co.uk]

19 MAY 2002

MIDLAND ARS Drayton Manor Radio & Computer Rally - Drayton Manor Park, Fazeley, Tamworth, on A4091 close to M42 jns 9 & 10. OT 10am. TS, FM, B&B, SIG, Clubs. Peter, G6DRN, 0121 443 1189 (eve).

22 MAY 2002

SURREY IEE MEETING - Theatre M, University of Surrey. 7.30pm, free admission. 'Time and the BBC', by Geoffrey Goodship. R Longman, rlongman@iee.org

25 MAY 2002

RADIO FLEA MARKET - Beetsterzwaag, the Netherlands. OT 9am. TS, C, FM, TI on 145.650MHz. [www.veron-a63.tmfweb.nl]

26 MAY 2002

SPALDING & DARS Annual Rally - Springfields Exhibition Centre, Spalding. OT 9.30/10am, £2. CP, TS, CBS, SIG, C, WIN, CS by arrangement, DF. Ray, M0CTM, 01775 711 953, or John, G4NBR, 07946 302 815. [www.sdars.org.uk]

WEST MANCHESTER RC 6th Red Rose QRP Festival - Formby Hall, Alder Street (off High Street), Atherton, Manchester. OT 11am, £1. TS, RSGB, G QRP, FISTS, B&B, C, LB, DF, CP, TI on S22. Les, 01942 870 634 or g4hzj@btinternet.com

5 JUNE 2002

SURREY IEE MEETING - Philips Research Laboratories, Cross Oak Lane, Redhill. 7pm, free admission. 'IFF: Friend or Foe', by Richard Trim, OBE. John Stevens, jstevens@iee.org

9 JUNE 2002

33rd ELVASTON CASTLE National Radio Rally - Elvaston Castle Country Park near Derby. £5 per car (inc passengers), £15 per coach. Les, G4CWD, 01332 559 965 or les@g4cwd.demon.co.uk

15 / 16 JUNE 2002

INTERNATIONAL MUSEUMS WEEKEND - Harry, M1BYT, 0113 286 6897 or harry_m1byt@ntlworld.com

WREXHAM ARS special event station GB2WHO - BBC 'Doctor Who' Experience, Llangollen, in support of International Museums Weekend. Active on HF and VHF. [www.qsl.net/gb2who]

16 JUNE 2002

BRITISH AMATEUR TELEVISION CLUB Convention

EPSOM Radio & Electronics Fair - Epsom Downs Racecourse Grandstand. MT, B&B, CBS, special event station GB2ERF, TI on S22 (GB2ERT), RSGB, TS, FAM. Paul, M0CJX, m0cjx@lineone.net [www.epsomrally.co.uk]

MOORLANDS & DARS Bring-&-Buy and Table-Top Event - Creda Factory, Blythe Bridge, Stoke-on-Trent. OT 12.30pm, free. CP free. Paul, M5DAD, 01782 542 944 or m5dad@qsl.net

NEWBURY & DARS Boot Sale - Cold Ash, nr Newbury. Mark, M0CUK, 01635 36444. [www.nadars.org.uk]

23 JUNE 2002

BANGOR & DARS Summer Radio Rally - Crawfordsburn Country Club, near Bangor, Co Down. OT 12 noon. TS, B&B. Myles, GI0VTS, 028 9146 5635, myles@boyle1.freeserve.co.uk [http://welcome.to/bdars]

MID-LANARK ARS Scottish Convention - Summerlee Heritage Centre, Coatbridge. OT 10am. TS, B&B, TI. Elvin, GM8BBA, 01698 748 616 or elvin8bba@blueyonder.co.uk

NORFOLK ARC Barford Radio Rally - Barford, 9 miles SW of Norwich, near the A11 and A47. OT 10am. CP, TI, CBS, B&B, C, TS. John, G0VZD, 01953 604 769 or David, G7URP, 01953 457 322, fax 01953 457 888.

29 JUNE 2002

REDDISH RALLY - St Mary's Parish Hall, St Mary's Drive, South Reddish, Stockport (jn of Broadstone Road South and Reddish Road). OT 11am, £1. TI on S22, C. John, G4ILA, 0161 477 6702.

30 JUNE 2002

ALEXANDERSON DAY - SAQ on 17.2kHz and SA6Q on 136kHz. [www.telemuseum.se/grimeton/defaulte.html]

CITY OF BRISTOL RSGB GROUP Longleat Amateur Radio & Computer Rally - Longleat House, Warminster, Wiltshire. OT 10am, £3. TS, SIG, CS, RSGB, RA, CBS, CP, C, LB. Ron, G4GTD, 0117 985 6253 or ronford@g4gtd.freeserve.co.uk [www.longleatrally.co.uk]

7 JULY 2002

YORK RADIO CLUB Rally - yorkradiorally@btopenworld.com [www.john.g4fuo@btinternet.co.uk/rally.htm]

13 JULY 2002

CORNISH RAC Radio & Computer Rally - Ken, G0FIC, ken@jtarry.freeserve.co.uk or John, G4LJY, g4ljy@hotmail.com

21 JULY 2002

HULL & DARS 9th Humber Bridge Radio Rally - Leigh, G0UBY, leigh@sydney.karoo.co.uk

McMICHAEL RALLY & BOOT SALE - Dave, G4XDU, 01628 625 720 or g4xdu@amsat.org [http://go.to/mcmichaelrally]

26 - 28 JULY 2002

AMSAT-UK COLLOQUIUM - [www.uk.amsat.org]

RADIO AMATEURS OF CANADA National Convention - [www.rac2002.org/]

28 JULY 2002

COLCHESTER RA Amateur Radio Rally & Computer Fair - Ron, G4JIE, 01206 826 387 or ron@g4jie.freeserve.co.uk [www.g3co.ccom.co.uk]

9 AUGUST 2002

COCKENZIE & PORT SETON ARC 9th Annual Junk Night - Bob, GM4UYZ, 01875 811 723 or bob.gm4uyz@btinternet.com

11 AUGUST 2002

FLIGHT REFUELLING ARS Hamfest - Keith, G1VHG, 01202 577 937 or keithg1vhg@netscapeonline.co.uk [www.qsl.net/g4rfr]

17 / 18 AUGUST 2002

INTERNATIONAL LIGHTHOUSE / LIGHTSHIP WEEKEND - Entry form from www.vk2ce.com/illw/index.html

24 - 31 AUGUST 2002

NORTH WALES RRC Bardsey Island DXpedition - Ted, GW0DSJ, 01745 336 939.

25 AUGUST 2002

COLERAINE & DARS Radio & Computer Rally - Peter, MI0CIB, 028 7035 1335 or Jim, GI4ORI, 028 7035 2393.

TORBAY ARS Communications Fair - rally@tars.org.uk

1 SEPTEMBER 2002

TELFORD & DARS Rally - 01952 299 677 or e-mail mstreet@g3jkx.freeserve.co.uk

8 SEPTEMBER 2002

LINCOLN SWC Hamfest - Dave, 01522 878 481 or 07961 961 494.

14 / 15 SEPTEMBER 2002

TRANSMISSION 2002 - John 01634 832 501.

15 SEPTEMBER 2002

BARRY ARS Welsh Amateur Radio Show - Richard, GW4BVJ, 01656 658 830 or 07971 017 148.

20 / 21 SEPTEMBER 2002

LEICESTER Amateur Radio Show - Geoff, G4AFJ, 01455 823 344, fax 01455 828 273 or g4afj@argonet.co.uk

13 OCTOBER 2002

NORTH WAKEFIELD RC Radio Rally & Computer Fair - [www.nwrc.org]

26 OCTOBER 2002

CARRICKFERGUS ARG Rally - Billy, MI0CZF.

27 OCTOBER 2002

GALASHIELS & DARS Annual Rally - Jim, GM7LUN, 01896 850 245 or gm7lun@qsl.net

2 / 3 NOVEMBER 2002

16th NORTH WALES RADIO & ELECTRONICS SHOW - Muriel, GW7NFY, tel/fax: 01745 591 704

10 NOVEMBER 2002

12th GREAT NORTHERN HAMFEST - Ernie, G4LUE, 01226 716 339 or 07787 546 515 (6pm - 8pm) or e-mail ernest.bailey1@virgin.net

23 / 24 NOVEMBER 2002

LONDON COMMUNICATION & COMPUTER SHOW - RadioSport 01923 893 929. [www.radiosport.co.uk]

1 DECEMBER 2002

BISHOP AUCKLAND RAC Rally - Mark, G0GFG, 01388 745 353 or Brian, G7OCK, 01388 762 678.

GB calls

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.

1 Apr	GB2LOW: Low Power Operation. Yeovil, Somerset. L (G3ICO)
3 Apr	GB0BTC: Belfast Titanic City. Belfast. LHV2 (GI0VAB)
13 Apr	GB90MGY: 90th Anniversary MGY Titanic. Surrey. LH (G3GJX)
21 Apr	GB2LOW: Low Power Operation. Sherbourne, Dorset. LHV2 (G3ICO)
26 Apr	GB2DID: Callsign of HMS Ganges ARC. Lowestoft, Suffolk. (G3DID) GB4JAM: Jameson Connection. Cowes, Isle of Wight. LHV (G4SIQ)
27 Apr	GB4MBP: Marconi Bass Point. The Lizard, Cornwall. LH (G3MRT)

KEY

Rallies & Events

TI - Talk-In; **CP** - Car Park; **£** - admission; **OT** - Opening Time - time for disabled visitors appears first, eg (10.30/11am); **TS** - Trade Stands; **FM** - Flea Market; **CBS** - Car Boot Sale; **B&B** - Bring and Buy; **A** - Auction; **SIG** - Special Interest Groups; **MT** - Morse Tests; **MA** - Foundation Morse Assessments; **LB** - Licensed Bar; **C** - Catering; **DF** - Disabled Facilities; **WIN** - prize draw, raffle; **LEC** - LECtures / seminars; **FAM** - FAMily attractions; **CS** - Camp Site.

Club & Regional NEWS

Region 1: Scotland West & Western Isles

PAISLEY (YMCA) ARC

3, Aerial matching. 17, Magnetic loop aerials, GM3UWX. Jim, GM3UWX, 01505 862817.

Region 2: Scotland East & the Highlands

ABERDEEN ARS

5, Junk sale. 12, Foundation Licence overview, GM4BKV. 19, QRP tcvr demo, GM3EWC. 26, On air. Robert, 01224 896142.

COCKENZIE & PORT SETON ARC

27, 10-pin bowling. Bob, GM4UYZ, 01875 811723.

LIVINGSTON ARS

2, 9, 16, 23, 30, meetings at Crofthead Community Centre, Dedridge (West), Livingston. RAE courses, 5WPM Morse tests available. Sandy, MM0CJT, mm0cjt@blueyonder.co.uk

LOTHIANS RS

10, Moonbounce, David Anderson, GM4JJJ. 24, Enigma codes, Prof Alan Peacock. Peter, 0131 446 0155.

MORSE ENTHUSIASTS GROUP SCOTLAND

28, Samuel Morse annual birthday party. M T Black, GM0PIV, 01382 465771.

Region 3: North West

FYLDE ARS

11, Computer night. 25, Night out on air at St Annes or foxhunt (if wet in clubhouse). Ken, G3RFH, 01253 407952.

MID CHESHIRE ARS

3, Activity night. 10, Antenna tower work evening. 17, On air VHF. 24, 'Sunspot Cycle 23', Prof Martin Harrison, G3USF. Niall, G0VOK, 01606 871413.

SOUTH MANCHESTER RADIO & COMPUTING CLUB

5, Vintage Austin 7, M3GES. 12, 'Technical Topics'. 19, 'Kodak Special Deal'. 26, Computer clinic. Edward, G7FQY, 0161 969 1964.

THORNTON CLEVELEYS ARS

8, Auction. 15, Antenna design, construction & testing (HF & VHF), Charles, G4FWM. 22, On air. 29, Tales of travel & adventure, Brian, M3YMB. Jack, G4BFH, jack@jduddington.fsnet.co.uk

Region 4: North East

DENBY DALE ARS

17, Constructors' trophy. Tony, G4LLZ, 01484 318750.

GOOLE RADIO & ELECTRONICS SOCIETY

5, Fund raising, *Barnes Wallis Inn*. 12, Contest equipment check, Lionel Winder, Selby. 19, Social evening, *Black Swan*, Asselby. 26, 'Engineering Challenge', Courtyard, Goole. Richard, G0GLZ, 07867 862169.

GRIMSBY ARS

4, 2m RoPoCo contest. 18, HF DXpedition video. Brian, G4DXB, 01472 231383.

HALIFAX & DARS

16, 'Ultra intelligence & the war at sea', R Challen. R E Nolson, G0PMU, 01274 600297.

HAMBLETON ARS

3, Operating night. 17, Multi-project construction Night. Ian Brickwood, 01609 775598.

KEIGHLEY ARS

11, On air. 18, Used equipment sale. 25, Film show. Ian, M1BGY, 01274 723951.

SOUTH YORKS RG

21, South Yorkshire RG and RSGB Region 4 Hamfest. Ernie, G4LUE, 01226 716339.

SPEN VALLEY ARC

4, 'Ale, Rail and Radio', Roy, G4YDI. Russell, G0FOI, russellwilde@lineone.net

Region 5: West Midlands

ALDRIDGE & BARR BEACON ARC

8, Talk and live demo of gateway mode to world-wide stations. Charles, G0NOL, 01922 636162.

BROMSGROVE ARS

9, Free night at Lickey End, details for DF hunt 2. 23, DF hunt 2. Angus, G8DEC, 01257 875573.

GLOUCESTER AR & ELECTRONICS SOCIETY

1, Portable VHF from escarpment site. 8, 15, 22, 29, Workshop / HF on air. Tony, 01452 618930 office hours.

THE RSGB REGIONS AND DISTRICTS

Region 1	**Scotland West & the Western Isles**	**Gordon Hunter, GM3ULP**	
District 11	MM0BHX	Central, City of Glasgow	
12	GM4GZQ	Lanarkshire, Renfrewshire	
13	MM0BRG	Ayrshire, Dumfries & Galloway	
14	GM3UWX	Dunbartonshire, Argyll & Bute, Western Isles	
Region 2	**Scotland East & the Highlands**	**Billy Jenkins, MM0WKJ**	
District 21	GM3WKZ	Highlands	
22	MM1CNA	Aberdeenshire, Moray	
23	GM4ZNX	Angus, Perth & Kinross	
24	GM6CMQ	Fife, Lothian, Borders	
25	GM7GMC	Orkney	
26	GM7RKD	Shetland	
Region 3	**North West**	**Kath Wilson, M1CNY / M3CNY**	
District 31	G4USW	Cumbria	
32	G1GNS	Lancashire	
33	G4YYB	Gtr Manchester	
34	G7OBW	Cheshire, Merseyside	
35	GD0TEP	Isle of Man	
Region 4	**North East**	**Geoff Darby, G7GJU / M3GJU**	
District 41	M0ACV	Northumberland, Tyne & Wear, Cleveland, Co Durham	
42	G0VRM	North Yorkshire, East Yorkshire	
43	M1BGY	West Yorkshire	
44	G3PTV	South Yorkshire, NE Lincolnshire	
Region 5	**West Midlands**	**Position Vacant**	
District 51	G3FZW	Shropshire, Staffordshire	
52	-	West Midlands	
53	G0JWJ	Hereford, Worcestershire	
54	-	Gloucestershire, Warwickshire	
Region 6	**North Wales**	**Liz Cabban, GW0ETU**	
District 61	GW4GTE	Flintshire, Wrexham	
62	GW3RBM	Conwy, Denbigh	
63	GW0ABL	Gwynedd, Ynys Môn (Anglesey)	
64	GW0RJV	Powys	
Region 7	**South Wales**	**Simon Lloyd Hughes, GW0NVN**	
District 71	-	Pembrokeshire	
72	-	Ceredigion (Cardigan)	
73	-	Carmarthenshire	
74	-	Vale of Glamorgan, Cardiff, Newport, Swansea	
Region 8	**Northern Ireland**	**Jeff Smith, MI0AEX**	
District 81	MI5JYK	N Belfast, Co Antrim	
82	GI6ATZ	S Belfast, Co Down	
83	GI8RLE	Co Armagh, Co Fermanagh	
84	GI4YWT	Co Londonderry, Co Tyrone	
Region 9	**London & Thames Valley**	**Position Vacant**	
District 91	G3MCD	London north of the Thames	
92	G0SVN	Berks, South Bucks	
93	-	Herts, North Bucks	
94	M0CJX	Surrey, London south of the Thames	
Region 10	**South & South East**	**Ivan Rosevear, G3GKC**	
District 101	RS176562	Oxfordshire	
102	G0GRI	Wiltshire	
103	G4DRV	East Sussex, West Sussex	
104	G4KWX	Hampshire, Isle of Wight	
Region 11	**South West & Channel Islands**	**Richard Atterbury, G4NQI**	
District 111	G3VWK	Cornwall	
112	-	Devon	
113	-	Somerset, Bristol	
114	G0KKL	Dorset	
115	GJ0JSY	Jersey	
116	GU4YOX	Guernsey	
Region 12	**East & East Anglia**	**Malcolm Salmon, G3XVV**	
District 121	M0CNX	Cambridgeshire	
122	G4NZQ	Norfolk, Suffolk	
123	-	Essex	
124	G3ROO	Kent	
Region 13	**East Midlands**	**Position Vacant**	
District 131	-	Leicestershire & Rutland	
132	G3XZF	Lincolnshire, Nottinghamshire	
133	-	Derbyshire	
134	M0NTY	Bedfordshire, Northamptonshire	
Region 14	**Overseas**		

This listing shows the 14 RSGB Regions, as revised in January 2002, with their RSGB Regional Managers (RRMs) and, underneath each Region, the RSGB Districts with their Deputy RSGB Regional Managers (DRRMs), and the areas making up those Districts. The RSGB Regional Representation Scheme is designed to allow changes to the district boundaries as required in order to support the membership most effectively, therefore further changes to the districts shown above may take place in the future.

KIDDERMINSTER & DARS
2, Eddystone Radio, Graeme, G3GGL. Tony, G1OZB, 01299 400172.
MIDLANDS PACKET USER GROUP
3, AGM. Miles, G4GSB, 01952 585447.
MID-WARWICKSHIRE ARS
9, 'Technical Topics' evening, by members. 23, 'Codes & Ciphers', Van, G0IZZ. Bernard, M1AUK, 01926 420913.
SANDWELL RC
26, Morse tests. John, G4AAL.
SOLIHULL ARS
18, 'How we first got interested', facilitated by Tony, G3NXC. Roger, G4BBT, r_a.hancock@which.net
STRATFORD UPON AVON & DRS
8, GPRS. 22, AGM. David, 01926 642858 or 07816 550075.
TELFORD & DARS
3, Open evening, on air. 10, 'Digital filters, pt 2', M1RKH. 17, Visit to Merlin at Woofferton. 24, Contest planning, map reading, DF training. Mike, G3JKX, 01952 299677.

Region 6: North Wales

DRAGON ARC
1, Planning for International Marconi Day. 15, Quiz night. Stewart, GW0ETF, 01248 362229.
NORTH WALES RADIO RALLY CLUB
4, Foundation and Morse Assessment, free evening. 11, Restoring old receivers, John Parry, GW3VVC. 18, Bardsey Island DXpedition planning, Foundation and Morse Assessment. 25, Foundation and Morse Assessment, free evening. Ted, GW0DSJ, 01745 336939.

Region 7: South Wales

PEMBROKESHIRE RS
5, 12, 19, 26, Meeting, RAE Facilities. Details: Evan, GW4AKZ, evan.long@magstim.com

Region 8: Northern Ireland

BANGOR & DARS
3, Annual constructors' contest. Mike, GI4XSF, 028 42772383.

Region 9: London & Thames Valley

BRACKNELL ARC
10, 'Loops and other small antennas', Mike Underhill, G3LHZ. John, G3NCN, johnellerton@beeb.net
CHESHAM & DARS
3, General meeting. 10, Dunstable boot sale planning. 17, Technical topic. 24, On air. Terry, terence.thirlwell@eds.com
CHESHUNT & DARC
3, Members' forum. Jim, G0JXN, 01992 468204.
COULSDON ATS
8, Weather satellites, Keith Holland, G3MCD. Steve, G7SYO, 01737 354271.
CRAY VALLEY RS
18, AGM. Bob Treacher, BRS32525, 020 82657735 after 8.00pm / weekends.
CRYSTAL PALACE & DRS
5, Club project. 19, Small tuned loop aerials, Prof Mike Underhill, G3LHZ. Bob, G3OOU, 01737 552170 or Victor, 020 86532946.
ECHELFORD ARS
11, Inter-club quiz. 25, AGM. Robin, G3TDR, 01784 456513.
EDGWARE & DARS
11, RSGB Regional System, Keith, G3MCD. David, G5HY, 01923 655284 (days) / 020 89549180 (eve).
GUILDFORD & DRS
16, AGM. Nigel, G0ADA, 01483 824665.
MAIDENHEAD & DARC
4, 'Electronic intelligence: Boer war to WWII', Robert Snary, G4OBE. 16, 'Six metres: four sunspot cycles', John Patrick, G3TWG. John, G3TWG, 01628 525275.
NEWBURY & DARS
24, Video. Mark, M0CUK, 01635 36444.
NORTH HERTFORDSHIRE RAYNET ASSOCIATION
12, AGM. 25, 25, Mildenhall Air Fete. Stephen Clarke, G8LXY, 01582 615772.
READING & DARC
11, 'Fibre-optics communication at the speed of light', Mike Dixon. Pete, G8FRC, 0118 969 5697.
SOUTHGATE ARC
11, Grand surplus equipment sale. Mike, M0ASA, 020 83660698.
SURREY RADIO CONTACT CLUB
8, AGM. Ray, G4FFY, 0208 6447589.
SUTTON & CHEAM RS
18, 'The Yaesu FT-817 and Miracle Whip antenna', Chris Taylor, G0WTZ. John, G0BWV, 020 86449945.
WIMBLEDON & DARS
12, Using oscilloscopes, Len Stuart. 26, Surplus equipment sale. Jim, G4WYJ, 01737 356745.

Region 10: South & South East

ANDOVER RAC
2, 144MHz activity sale. 16, Boot sale planning evening. Terry, G8ALR, 01980 629346.
BASINGSTOKE ARC
8, AROS, Barry Scarisbrick, G4ACK. Bob Brown, M0CJJ.
CHICHESTER & DARC
2, AGM & constructors trophy competition. Graham, G0WSD, 01243 788292.
CRAWLEY RC
6, DXpedition video, Stewart, G3YSX. 24, Purley Internet repeater, Terry, G4CDY. Derek Atter, G3GRO, 01293 520424.
CROWBOROUGH & DARS
25, 'The Foundation and Intermediate Licences', Jim Harris, G4DRV. Eric, G3TXZ, 01892 654633.
FAREHAM & DISTRICT ARS
3, On air. 10, How it works: the valve receiver, Colin, G7MTA. 17, Valve receiver fault finding, Andrew, G0AMS, and Mick, G4ITF. 24, HF aerial construction, Mick, G4ITF, and Brian, G4ITG. Steve, G7HEP, 01329 663673.
FARNBOROUGH & DRS
10, Talk & demo: Tesla coil, Chuck, G0MDK. 24, 'Just Flying', Ian, G3RRA. Norman, G0VYR, 01483 835320.
HASTINGS E & RC
15, All you need to know about printers, Lee Bentley. 17, Spring auction of surplus equipment. R C Gornall, G7DME, 01424 444466.
HORSHAM ARC
4, 'Homebrew'. David, G4JHI, 01403 252221.
ITCHEN VALLEY RC
6, Foundation Licence course (Thornden School, Chandlers Ford). 12, APRS Bournemouth club. 13, Foundation Licence course. 26, PSK31 Bournemouth club. G0VNI, 023 8081 3827.
SOUTHDOWN ARS
8, Sale of surplus equipment, Foundation Licence details. John, G3DQY, 01424 414319.
TROWBRIDGE & DARC
3, Air display organisation, communications & insight, Paul Brown, Julian Sims. Ian, G0GRI, 01225 864698 eves / weekends.
WATERSIDE ARS
2, AGM. Tony, G0LKG, 023 8084 4316.
WORTHING & DARC
3, Local emergency radio. 10, Antennas and matching, G8FCD. 17, Discussion. 24, Hints and tips. Roy, G4GPX, 01903 753893.

Region 11: South West & Channel Islands

BLACKMORE VALE ARS
2, On air. 9, AGM. 16, HF on air. 23, 'Dayton convention', Gary, G0ENU. 30, WAB on air night. Tony, G0GFL, 01258 860741.
BOURNEMOUTH RS
5, 'Radio Ramble', Bill Journeaux. 19, Construction. Chris, M5AGG, 01202 893126.
BRISTOL RSGB GROUP
29, 'Why match your antennas?', Frank Field, G0CEN. Martyn, G3RFX, 0117 973 6419.
CORNISH RAC
4, AGM. 8, *Windows XP*, Clive. 26 - 28, International Marconi Day. John G4LJY, 01872 863849.
POLDHU ARC
9, 'Home from yet more travels', Andy, G0KZG. Keith, G0WYS, 01326 574441.
POOLE RADIO SOCIETY
5, Operating (shack). 12, AGM. 19, Construction (shack). Phil Mayer, G0KKL, 01202 700903.
SOUTH BRISTOL ARC
3, Horticultural evening. 10, Wine & cheese tasting. 17, On air. 24, Shack instrument tutorial. Len, G4RZY, 01275 834282.
TORBAY ARS
19, '90/10 Sale'. Ged, G6CLD, 01803 812117, or e-mail: rally@tars.org.uk
WEST SOMERSET ARC
2, AGM followed by talk on Quay West Radio, David Mortimer. Details from Jean, G0SZO, 01984 633060.
WESTON-SUPER-MARE ARS
8, 'My time in Yemen', Dave Nock. 15, Workshop evening. Graham, G4DPH, 01934 838298.
YEOVIL ARC
11. 56th AGM. 18, Pre-QRP Convention briefing. 21, 18th QRP Convention. 25, On air. Derek, M1WOB, 01935 414452.

Region 12: East & East Anglia

BRAINTREE AR & CCC
1, Construction contest. Keith, M0CLO, 01376 347736.

BURY ST EDMUNDS ARS
16, RSGB today and in the future, Phillip Brooks, G4NZQ. George, G3LPT, 01359 259518.

CAMBRIDGE & DARC
5, Smart home-brew HF linear, Bob, G3PJT. 12, Epiphyte SSB 80m transceiver project, phase 1: component kits. 19, Informal. 26, Epiphyte project, assembly. Ron, G3KBR, 01223 501712.

CHELMSFORD ARS
2, 'Amateur Television', Ian Waters. David Bradley, M0BQC, 01245 602838.

EAST KENT RS
8, Spring cheese and wine. Paul, G3VJF, 01227 365384.

FELIXSTOWE & DARS
15, AGM. Paul, G4YQC, 01394 273507

GREAT YARMOUTH RC
12, CW evening. 26, Jack Simpson's video evening. A D Besford, G3NHU.

HARWICH ARIG
10, 'Florida quad antenna', John Pears, G0FSP. Eugene, G4FTP, 01206 826633.

LEISTON ARC
2, Presentation by RSGB Deputy Regional Manager, Philip Brooks, G4NZQ. David, G1YRF, 01728 833202.

LOUGHTON & EPPING FOREST ARS
5, AGM. 19, Foundation Licence discussion. 27, 40th anniversary dinner. Marc, G0TOC, 07803 023501.

MAIDSTONE YMCA ARS
5, Junk sale. 12, 19, RAE course. 26, RAE pre-examination night. Andy, M0CST, 01622 661035.

NORFOLK ARC
3, AGM. 10, Informal Morse practice and instruction. 17, 'The generally-unknown aspects of Packet', Roger, G3LDI. 24, Informal Morse practice and instruction. Peter, G3ASQ.

RAF AIR DEFENCE RADAR MUSEUM RAF NEATISHEAD
7, RAFARS permanent special event station GB2RAF on air. Terry, G4PSH, 01692 582064.

SUDBURY & DISTRICT RADIO AMATEURS
2, 'Back to the age of steam radio', Patrick Hemphill, G0HUG. Bryan, G1TWY, 01787 247893.

Region 13: East Midlands

DERBY & DISTRICT ARS
2, Junk sale. Martin, G3SZJ, 01332 556875.

MELTON MOWBRAY ARS
19, The design and preparation of Raynet website, G Griffiths. Geoff, G3STG, 01664 480733.

RAF WADDINGTON ARC
4, RAE course. 11, HF Mobile 1960s to 90s, Bob, G3VCA. 18, 25, RAE course. Bob, G3VCA, 01522 528708.

SHEFFORD & DARS
11, Spring junk sale. 18, 'QRP for Beginners', Victor, G3JNB. Derek, G4JLP, 01462 851722.

SOUTH NORMANTON, ALFRETON & DARC
1, Junk sale (convention room). 8, On air (club shack). 15, AGM. 22, On air (outdoors). 29, On air (club shack). Lyn, M0BMY, 01773 520353.

SOUTH NOTTS ARC
10, On air HF & VHF. 17, Open forum, members only. 24, On air HF & VHF. Details: 01509 569679.

DATAMODES BOOST IN CHELMSFORD


Photo: Anthony, M1FDE.

Iain, G0OZS (right), demonstrating PSK31. On the left is Chelmsford ARS treasurer Brian, G3CVI, adjusting the ATU.

SOME 65 MEMBERS of the Chelmsford Amateur Radio Society were captivated by a first-class presentation and demonstration of PSK31 given by Iain, G0OZS, at a recent meeting of the club. In order to help popularise data modes in the Chelmsford area Trevor Hawkins, M5AKA, has compiled a CD-ROM of some of the more popular freeware data programs. Copies of this CD were given to members of the Chelmsford ARS after the PSK31 meeting, and it has helped to generate local activity on data modes, mainly PSK31. To help newcomers to the hobby the CD also includes a copy of G4VSZ's CD-ROM based Foundation Licence course. The club will be running another Foundation Course in May.

The Chelmsford Amateur Radio Society meets at 7.30pm on the first Tuesday of each month in the Marconi Social Club, Beehive Lane, Great Baddow, Chelmsford. For further information contact the secretary David Bradley, M0BQC, 01245 602838, e-mail: DavidWBradley1@activemail.co.uk or visit the website at www.g0mwt.free-online.co.uk/

CLUB-TO-CLUB HELP: FOUNDATION COURSE MATERIAL FREE

THE BANGOR and District ARS has just completed a Foundation Licence course, the first in Northern Ireland. Those helping included GI0HWO, GI0VTS, GI4AAM, GI4VIV, GI4XSF, GI6JGB, MI0AEX, MI5AFL and XYLs Karen and Anna. 22 students attended and 100% passed. Everyone had a great time and the 22 new hams have been eagerly awaiting their new MI3 callsigns.

The club made a *Powerpoint* presentation to teach the course. If any other club would like a copy of the presentation to use as part of their own course, a copy is available free of charge from Mike Stevenson, GI4XSF, QTHR (please send a disk and an SASE).

The Bangor and District ARS plans to run another course later this year. Details will be on their website at http://welcome.to/bdars


Photo: Bill Langley, GI4AAM

ENCOURAGEMENT FROM COLCHESTER'S M3s

DURING THE Foundation Course held by Colchester Radio Amateurs over the weekend of 9 / 10 February, replies to CQ calls by the trainees on HF, VHF and UHF came from M3 licensees who were mainly operators under 16 years of age. This was a tremendous encouragement for the trainees and also satisfying for the M3s who had successfully completed an earlier course at Colchester. The club now has a waiting list for Foundation Licence training and will be holding further courses, perhaps in April and May. No details were available at the time of going to press. Contact Frank Howe, G3FIJ, tel: 01206 851189 for more information.

YEOVIL QRP CONVENTION

ON 11 April the Yeovil Amateur Radio Club holds its 56th AGM, having been founded in 1946. The first amateur station in Yeovil, however, was GWX way back in 1913.

This year's **Yeovil QRP Convention** takes place on **21 April** at Digby Hall, Hound Street, in Sherborne, just over the border in Dorset. This has become an event of international standing and is sure to attract a large number of QRP enthusiasts. Low-power communications have been a forte of the Yeovil ARC even well before the founding of the QRP Convention in 1984: as early as 1954 the club made history by making what is without doubt the first long-distance radio contact using a transistor transmitter.

For more information about this very active club, or about the Yeovil QRP Convention, please contact Derek, M1WOB, tel: 01935 414452.

VHF/UHF

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

AFTER AN exciting January, the 50MHz band began to quieten down in the first 12 days of February, at least on the North American path. Nevertheless, solar activity remained high considering that the peak of Cycle 23 is supposed to be long gone.

All times are in UTC, ODX indicates best DX and QTHR signifies that the operator's address is in the current *RSGB Yearbook.* An asterisk (*) after a callsign denotes a CW contact, (DT), (LU) etc refers to the postcode area and (IN89), for example, is the locator grid.

CONVENTIONS

THERE WILL be a VHF Convention this year at a new venue, the Reaseheath College, Nantwich, Cheshire. The event, on 6 April, has been organised by the RSGB's VHF, VHF Contest and Microwave Committees and the UK Six Metre Group: full details on page 7.

Bob Cumming, W2BZY, the President of the Orlando ARC, reports on a short VHF Forum held during the Orlando Hamcation in Florida in the 8-10 February period chaired by Steve, N2CEI. Gordon West, WB6NOA, gave a talk on tropo ducting. Attendance was modest but, if it becomes a regular feature, Bob hopes it will attract more attendees in future.

PUBLICATIONS

THE WINTER 2001 edition of *VHF Communications*, edited by Andy Barter, G8ATD, includes several articles of interest to VHF/UHF experimenters. Wolfgang Schneider, DJ8ES, describes a 70MHz preamplifier for frequency counters complete with printed circuit board (PCB) layout. Joop van Sundert, PD1APO, writes about Optimising Yagi Antennas with the YGO3 generic optimiser, which he used with the Yagimax and NEC2D software.

Angel Vilaseca, HB9SLV, contributes a fascinating article on fractal antennas, which are linked to the chaos theory described in James Gleick's 1987 book, *Chaos*. Gunthard Kraus's, DG9GB, contribution is on bandpass filters made from coupled lines using the popular PUFF CAD and ANSOFT *Serenade* software. This article is full of mathematical formulae but includes practical designs. His 'Internet Treasure Trove' piece refers to the Mini-Circuits website and that of Tactron, which has set up an HF electronics 'flea market'. *VHF Communications* is published by KM Publications, 63 Ringwood Road, Luton LU2 7BG and there is a website - see the list.

Issue 4/2001 of *DUBUS Magazine* comprises 100 pages, the first 23 of which are technical reports. 17 pages are devoted to EME topics and include the EME Toplist, contest and expedition reports and news from many individual stations. During the second leg of last year's ARRL EME Contest, Leif, SM5BSZ, made a trip to SM5FRH's QTH. He took a wideband radio and a PC running his *Linrad* software - see the February VHF/UHF column, page 77. He writes, "Compared to what I'm used to the signals are *fantastic!*" He has placed some recordings on a website - see the list - including a 700MB file, compressed to half size.

Keen EME operator Geert, PA3CSG, in his shack.

There are the other regular columns of 6m, tropo, FAI, aurora, Sporadic-E (Es) and meteor scatter (MS) news. In the 'News and Comments' section there is feedback on WSJT (FSK441) mode with contributions from ON4AVJ and the program's originator K1JT. There is an 8-page Beacon List covering 50-433MHz. The UK agent for *DUBUS* is Roger Blackwell, G4PMK (QTHR) whose e-mail address is dubus@marsport.demon.co.uk and there is a website.

GEOMAGNETIC AND SOLAR ACTIVITY

IN THE 30 DAYS up to 11 February the 10.7cm solar flux averaged 226.2 units, slightly less than in the previous period but still very high. It peaked at 261 on 29 January and the minima were 192 on 7 and 8 February. 45 new sunspot regions were reported. Middle latitude geomagnetic parameters were low being in the quiet category on all but five days. The maximum A-index was 15 on 5 February and the three-hourly K-index only reached 4 on four occasions.

PROPAGATION

THE LATEST ISSUE of *The Six and Ten Report* is for last October. Co-editor Steve Reed, G0AEV, comments on the difficulty in categorising the propagation modes of inter-European QSOs. During the month there was a lot of Es and F-layer backscatter, as well as some auroral-E and E-like MS. He writes, "Reports were sometimes confusing with both Es and scatter attributed by different reporters to the same opening, while on a few days it seems that Es and backscatter really did occur to the same area on the same day."

There are very detailed analyses of tropo, auroral, E- and F-layer events, a table of solar, geomagnetic and particle activity and reports from observers world wide. The *Report* is an activity of

MOONBOUNCE

IN THE 26/27 JANUARY sked weekend Howard Ling, G4CCH (IO93), was active (QRV) on 23cm. He completed on CW with HB9BCD, HB9BBD, ZS6AXT, SM2CEW, HB9Q, OE5EYM, W2UHI, IK3COJ, WA1JOF and W4OP on the 26th. Next morning brought W7SZ (53/52), then a three-way with K5JL (58/57) and HB9BBD (58/57).

Ian Offer, W9/G4FDX (EN60VL), has been QRV again on 2m for several months in spite of a 20ft fall off his tower resulting in his pelvis breaking in four places. Up to 26 January he had worked 36 stations and 21 countries. He runs an 8877 PA with an MGF1402 preamp.

The following information comes from the February *432 and Above EME Newsletter*. Peter Blair, G3LTF (IO91), was QRV on 23cm in the windy January sked weekend and on the 27th he only worked DF3RU and SK0CC for a new initial during a lull in the storm. On the 29th he listened for GM0ONN's skeds with HB9BBD and copied Iain at 'T' level. He has been busy improving his 70cm PA and has upgraded his 23cm system. He now has a system that automatically drives the polar axis of his dish at a rate to suit the Moon's change of 14.5°/hour or the Earth's rate of 15°/hour.

The second leg of the REF/*DUBUS* contest is over the 20/21 April weekend and the bands are 2m, 23cm and 3cm. London latitude stations will have just over 31 hours of Moon time and the declination varies from +24.32° to +18.86°. The 144MHz sky temperature range is 332-201K and the signal degradation, referred to perigee, ranges from -0.49dB to -0.16dB.

This year's EME Conference is scheduled for 16-18 August in Prague. Conrad Farlow, G0RUZ, has already registered on the website and urges others to attend. There is a link to the full details on the *432 and Above EME Newsletter* website - see the list. When you get there, click on the February 2002 (2) copy, then scroll all the way down to the 'FINAL' section and click on 'Prague EME Conference'.

the RSGB's Propagation Studies Committee (PSC) and is edited by G0AEV and Prof Martin Harrison, G3USF. Subscription inquiries should be addressed to Steve (QTHR) whose e-mail address is g0aev@explore.force9.co.uk and there are websites - see the list.

The December 2001 issue of Neil Clarke's, G0CAS, *SunMag* includes an article 'Where Lightning Strikes', being a résumé of the results from two satellite-based detectors: the Optical Transient Detector (OTD) and the Lightning Imaging Sensor (LIS). These enable a global picture of lightning activity to be observed.

The problems with the Japanese Yohkoh satellite, which has been monitoring solar activity, are covered in 'Yohkoh's Troubles'. The immediate problems followed the deep solar eclipse it experienced on 14 December when the temperature of the batteries dropped to -40ºC.

There are the usual tables of daily solar, geomagnetic, particle and sunspot data, a 7-page list of all the energetic events of 2001 and a solar flare list. For subscription information contact G0CAS (QTHR) whose telephone number is 01302 531925. His e-mail address is neil@g0cas.demon.co.uk and there is a website - see the list.

METEOR SCATTER

THE NEXT significant meteor shower is the Lyrids and the OH5IY software suggests a broad peak in the 1930-2200 period on 22 April with a zenithal hourly rate (ZHR) of 15. The radiant is above a mid-UK horizon for 20 hours from 1830. No activity reports were received this month, so what happened in the Quadrantids?

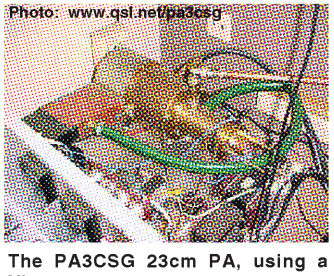

Photo: www.qsl.net/pa3csg

The PA3CSG 23cm PA, using a YL1050.

BAND REPORTS

50MHz

Chris Gare, G3WOS, Vice-Chairman of the UKSMG, is looking for volunteers to join the Committee since several long-serving members are standing down. In particular the group would like someone to take over the running of the website and another to undertake a secretarial function. Chris is QTHR and his e-mail address is chris.gare@gare.co.uk if you would like to discuss this important matter. The UKSMG will have a stand at the VHF Convention.

Bryn Llewellyn, G4DEZ (JO03), worked EX8QB in Kyrghystan for a new country on 14 February. Bryn has worked over 1000 stations in North and South America and the Caribbean since 1 January.

Bob Harrison, G8HGN (CM), reckons he goes into temporary hibernation in the winter months, only appearing when there is an opening or a contest. Luckily he had a day off work on 31 January so caught the opening to North America which, for once, landed into JO01. Between 1303 and 1500 he contacted VO1BC (GN38), N2YEV (FN34), K1TOL (FN44), VY2SS (FN76), K1WHS (FN43), W1AIM (FN34), AF1T (FN43) and VY2RU (FN86). He heard others in W1-3, VE1 and 3 and VO1.

John Armstrong, GW3EJR (SA), worked Ws and VEs in January but reckons it is not easy to work the DX, especially with his "little 3-element" antenna. He hopes to upgrade it when the better weather arrives. Phil Catterall, G4OBK (YO), has added more grids to his tally thanks to the recent good openings to North America.

Congratulations to Jamie Ashford, GW7SMV, who now has another callsign, MW3SMV. David Whitaker, BRS25429, reports that 5U6W in Niger was blasting through at 1030 on 12 February, also PY8EA (GI58SN), so concludes, "Looks as if 6m is back from its holiday!"

Carl Halkier, OZ1IEP, was very active on SSB in late January. Between 1305 and 1615 on the 26th he completed 123 QSOs, the majority with Ws and VEs. Others were P49MR (FK42 and ODX at 8523km), YV4DDK (FK60), FP5BU (GN16), VO1PJN (GN38), OX3OX (GP36), KG4IPY (FM06) and VO9S (EN61). Between 1346 and 1542 next day he made another 54 contacts with Ws and VEs, plus VO1BC and VO1TY (GN37) and ODX was K5LLL (EM10) at 8306+km. He is QRV around 50.200MHz in the Nordic Activity Contests on the 4th Tuesday every month. These are from 1700 to 2100 in April through October. He runs a homepage - see the list.

Now to Ted Collins's, G4UPS (EX), reports, starting from the 15 January when D44TD was heard from 1128 with a huge European pile-up till fade-out at 1206. 1010-1707 saw lots of North American activity and 10 QSOs. Best DX next day were P43JB* (FK42), P49MR and YV4YC. On the 17th VOs were copied from 1143, along with backscatter from PA7MM. QSOs on CW and SSB were completed with stations in W1, 2, 4, 8, VO1, VE1 and TG9NX (EK44) for DXCC country 176 till fade-out at 1700.

On the morning of the 18th the band opened to the Middle East bringing QSOs with JY9NX and 4X6XQ (KM71), 4X6UO (KM72), SU1SK (KM50), 4Z8GZ and 4X4IF* (KM72), JY4NE (KM71), OD5/OK1MU (KM73) and S92JHF*. The North American path was open 1209-1625 and N9FH* (EN63) was a new grid. There was another Middle East opening from 0808 on the 20th when 4X4IX* and JY4NE were worked.

There were weak openings to W and VE in the afternoons of the 22nd, 23rd and 24th and better ones on the 25th and 26th into EN and FN fields. The morning of the 27th saw another Middle East opening. From 1330 till 1500 a few Ws and VEs were heard and worked, but from 1551 till rapid fade-out at 1628 Ted made contacts with Ws in EM48, 66, 78, EN53, 82, 91 and FN12; N4GN* (EM78) was another new grid. More North American openings occurred on the 28th and 30th and the month rounded off with a fairly extensive event from 1301 to 1633 with W9UD* (EN41) and W7XU/0* (EN13) providing yet more new grids on the 31st.

Coming to February, there was a major North American opening on the 4th, 1336-1740 when stations in EN54, 74, 76, 90, 91, FN24, 31, 42, 44, 96 and GN08 were contacted. On the 11th, an opening to W and VE started at 1418 with VE1YX (FN74) mentioning that propagation into F and DL began with Bob at 1342. At 1427 Ted heard a CW station in EL96 and W4OV working an SM.

70MHz

Brian Williams, GW0GHF (CF), is disappointed at the lack of 4m news so would like to encourage more operators to use the band. He suggests it is the only "real radio band" because we have to either build our own

LOCATOR SQUARES TABLE

Starting date: 1.1.1970

Call	50	70	144	432	1296	Total
G3IMV	744	20	816	125	83	1568
G4YTL	-	53	524	111	-	688
G0EVT	506	14	309	77	16	922
G0FYD	609	1	283	20	-	913
GJ4ICD	780	1	267	121	79	1248
G4ZHI	86	10	256	32	-	384
G0XDI	228	-	254	67	-	549
G3XDY	-	34	251	175	123	583
G7CLY	248	-	248	16	-	508
GU3PPK	30	-	246	-	-	276
G7SWH	350	42	240	81	30	743
G4TJF	509	28	235	112	-	884
GW7SMV	606	-	205	-	-	811
G8HGN	280	-	166	62	-	508
GW6VZW	488	-	146	6	-	640
G8TOK	351	32	135	56	29	603
G3TTL	220	-	133	90	27	470
G1UGH	280	-	130	17	-	427
G4OUT	-	23	107	-	-	130
G3FIJ	268	29	107	50	23	477
EA7II	-	-	102	-	-	102
GM4VVX	186	-	100	-	-	286
G4DEZ	536	15	91	37	20	699
G0ISW	215	1	85	22	-	323
MW3AJN	316	-	76	32	-	424
G1EFI	230	-	67	2	-	299
G4OBK	414	4	57	-	-	475
G0JHC	940	26	48	4	-	1018
G4APJ	188	-	44	22	-	254
GU6AJE	333	13	32	-	-	383
M1DUD	196	1	31	1	-	229
G4FUU	74	19	23	5	5	126
G7KHF	434	-	-	-	-	434
GW3EJR	289	-	-	-	-	289
GM0MEN	166	-	-	-	-	166
M5PLY	120	-	-	-	-	120
M1DRK	113	-	-	-	-	113

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Next deadline is 10 April. Band of the month 144MHz.

equipment or modify commercial gear, such as PMR sets, and mentions that ex-fire brigade equipment should soon be coming onto the market. He reports a pocket of activity in the Bristol Channel area using 70.450MHz FM and 70.260MHz, usually FM. He has regular skeds three or four times a week with G6EED, GW1SXT and GW6CUR. He is looking for regular skeds on SSB or FM with stations more than 50 miles away from Penarth. So, If you know of any nets in your neck of the woods, please let us know.

144MHz

G0RUZ will be in Jersey over the 23/24 March weekend as the guest of Joe Bette-Bennett, GJ0NYG. He will be taking an IC-746, a 3-wavelength DJ9BV antenna, 20m of FSJ4-50 feeder and a preamp for the shack end. Linear Amp UK has kindly loaned him a GS31B desktop amplifier. He hopes to be QRV 1400-2100 on the 23rd and from early morning next day. He will be QRV on MS using high speed CW (HSCW), tropo and ". . . if absolutely necessary, WSJT". The QTH will be the old WWII German signal station at La Moye, the Jersey ARS's shack for GJ3DVC. The normal callsign will be GJ0RUZ/P with GJTRUZP on CW MS. He won't take skeds until he is actually operational.

Angie Sitton, G0HGA (SG), writes that the Monday CW activity is going well from 7.30pm local time for a couple of hours. Some operators are using the Yahoo Messenger for real-time talkback. The reflector has 45 members but there is no obligation to join it. Most members will be pleased to slow down (QRS) for beginners and strugglers.

Now for a bit of detective work. Since 1998 Steve Eldridge, G8IZY (IO91VC), has been plagued by a continuous "wobbly carrier" on 144.198MHz, just below the MS calling frequency. It varies in strength, so is not thought to be local. Other locals copy it on a beam heading (QTE) of 120-140º. It was even stronger on a site 40km in that direction, so the source may be in the Mayfield/Crowborough area. He would appreciate others in this SE England area listening for it and taking bearings. His e-mail address is g8izy@eurobell.co.uk

430MHz

John Storey, G0FZQ (BM), sent in a copy of the log of the first of this year's 432MHz Cumulatives, held on 8 January, from the South Birmingham RS, G8OHM (IO92AJ). There was a welcome 15min opening to Scandinavia from 2057 during which OZ9KY and OZ1FF (JO45) and SM7FMX and SK7MW (JO65) were worked; SK7MW was ODX at 1036km. 36 QSOs were completed in five countries and 16 grids for a claimed score of 157,968 points. They ran 400W to a single Yagi 60ft AGL. The other operators were G0TIB, G8ACR, G8GDZ and G8IFT.

Ken Punshon's, G4APJ (BL), only operation so far this year was in the 70cm AFS Contest on 3 February when conditions were pretty bad. OZ1IEP is QRV every third Tuesday of the month on 432.237MHz in the NAC contests.

DEADLINES

THAT'S IT FOR another month. The copy deadline for June is **16 April** - *not* as stated in the March column - and the July date is **14 May**. My telephone answering and fax machine is on 020 8763 9457 and the CompuServe ID is g3fpk ♦

WWW.

VHF Communications	http://www.vhfcomm.co.uk
Linrad demo	http://ham.te.hik.se/~sm5bsz/arrl2001/index.htm
DUBUS	http://www.dubus.org
Six & Ten Report	http://www.explore.force9.co.uk/6and10/
PSC	http://www.keele.ac.uk/depts/por/psc.htm
SunMag (G0CAS)	http://www.g0cas.demon.co.uk/main.htm
EME *Newsletter*	http://www.nitehawk.com/rasmit/em70cm.html
EME Conf Regn	http://www.emeconference2002.cz/ajka.htm
OK1IEP home page	http://qsl.net/oz1iep
Geert, PA3CSG	http://www.qsl.net/pa3csg/

CONTEST

TIM KIRBY, G4VXE
11a Vansittart Road,
Windsor SL4 5BZ
E-mail:tim@ukgateway.net

ONCE AGAIN, we seem to have plenty of contest results to publish, so not much space for editorialising. However, when I was compiling the column, I noticed a comment from one of the adjudicators regarding competitors in a contest self-spotting on a *DXCluster*. This is where contest entrants enter themselves as a DX spot on the system for the purpose of attracting more calls. This is prohibited by many contest rules and, in any case, seems to me against the spirit of the contest. Usually, particularly at VHF, if distant stations are heard, they will be spotted. I always make a point of trying to spot distant contest entrants in order to remind casual contesters that the contest is on – and to come on the band. So please, don't spot yourself, but do spot others in a contest. Who knows. Perhaps they will do the same for you!

Whilst we're on the subject of *DXCluster* and contests, I have been wondering whether the 'Assisted' category in a number of contests has run its course? When *DXClusters* were new, they represented a significant advantage (as they still do) to the select few that could use a cluster whilst contesting. Now, surely, most entrants have the capability to use a cluster should they choose to do so. Isn't the decision whether to use a cluster just another strategic decision of how to operate the contest – such as what antenna to use, or whether to use a second receiver? I anticipate a divergence of opinion on this one, but would welcome your thoughts which, as usual, you can be assured will be fed to the different contest organisations.

May 144MHz Contest, 2001

THIS CONTEST was held under temporary rules barring portable operation during the Foot and Mouth outbreak. This year GD0EMG returned to produce another excellent score in the Multi Op section. They had a hefty points per QSO advantage over most stations, with 70 QSOs over 700km. John Lemay, G4ZTR, made the most of having to stay at home and went on to win the Single Operator Section. Congratulations also go to GW5NF and G0HAS for heading the 6-hour sections. Dave, G8ZRE, normally a Backpacker, also stayed at home and picks up the certificate for the highest scroing 25W / Single antenna station.

Pete Lindsay, G4CLA

May 144MHz Contest, 2001

Pos	Call	Loc	QSOs	Point	Mults	Total Power	Ant	Best DX	Dist
Multi Operator									
1*	GD0EMG	IO74QD	467	192,785	115	22,170,275 400	8x9 + 4x9	DG2NBN	1193
2*	G4SIV	IO92WS	398	116,333	99	11,516,967 400	4x12	DG2NBN	861
3	G3FEC	IO91BO	220	43,054	86	3,702,644 400	2x17	DF0WD	711
4	G0DLR	IO01EI	157	28,522	72	2,053,584 400	15	GM3WKZ/M	844
5	G3YNN	IO00EU	152	30,184	52	1,569,568 70	9	EI5FK	628
Single Operator									
1*	G4ZTR	IO01KW	281	79,201	81	6,415,281 400	2 x 9+2 x 9	F6FHP	807
2*	G3MEH	IO91QS	276	66,891	82	5,485,062 400	2 x 10 el	DG2NBN	865
3	GM4AFF	IO86ST	104	47,968	71	3,405,728 400	4x9	ON1DLL	821
4	GI6ATZ	IO74AJ	83	28,815	62	1,786,530 400	13	G3YNN	581
5	PE1EWR	IO11SL	52	13,090	32	418,880 80	10	EI3GE	677
6	GW4HBK	IO81KP	47	8,079	42	339,318 200	9	GM4AFF	577
7	GW8IZR	IO73TI	36	8,205	33	270,765 400	17	GM4AFF	403
8	G3FEB	IO01KV	40	6,026	36	216,936 10	10	GM4AFF	588
9	2E1GUA	IO01FS	33	4,310	30	129,300 10	13	GI6ATZ	518
10	MIDUD	IO02QC	31	5,298	19	100,662 20	7EL	DL1NBM/P	604
6-hour Multi Operator									
1*	GW5NF	IO81KQ	59	10,733	48	515,184 100	2x9	GM4AFF	572
2*	G4ADV	IO70LK	31	4,790	20	95,800 400		G4SIV	427
6 hour Single Operator									
1*	G0HAS	IO81VH	90	16,072	61	980,392 250	4x13	DL6FAW/P	720
2*	M0RAD	IO92AC	96	16,767	57	955,719 100	11	EI4IX	535
3	G8VYK	IO01FO	106	16,605	56	929,880 100	17	GM3WKZ/M	819
4	G7ULL	IO01AK	107	20,526	38	779,988 150	11	DI3LE	729
5	G0ODQ	IO91NQ	77	12,496	56	699,776 120	11	EI4IX	622
6*	G8ZRE	IO83NE	50	7,942	42	333,564 25	8XY	GM4AFF	404
7	G0TPH	IO92IO	47	7,691	40	307,640 25	9	ON1LPA	548
8	G1KHX	IO81MI	42	6,542	38	248,596 80	9	GM4AFF	608
9	G3YJR	IO93FI	37	6,573	36	236,628 60	9	GM4AFF	384
10	G4APJ	IO83UP	23	5,665	29	164,285 25	9	GU3EJL	436
11	G1WFM	IO91VU	29	4,296	31	133,176 100	9	GM4AFF	570
12	G7NBE	IO92GS	17	3,120	21	65,520 250	9	GM4AFF	455
13	GM4VVX	IO78TA	6	623	6	3,738 400	10	GM8BDX	291

144MHz Trophy, 2001

THIS WAS the first VHF contest following the resumption of portable activity. Many entrants commented that they were glad to be back out in the field. A number of groups who do not normally enter this event used it to relieve their frustrations of inactivity! Some groups were forced to use alternative sites due to ongoing foot and mouth restrictions.

Conditions were assessed as fair to good with some reasonable DX being worked. Conditions deteriorated on the Sunday. Activity was generally regarded as low, in particular in the UK. However, in general, QSO numbers and scores were comparable with those in 2000 and the number of entrants was only slightly down. Two entrants tried, unsuccessfully, to boost their scores by claiming large numbers of multipliers! Logging standards were generally high.

There were the usual equipment issues with blown receivers and generator problems.

The Parallel Lines Group returned to the event this year and recorded a huge winning margin to take the Mitchell-Milling Trophy. Mike, G8TIC, chose Kent rather than Cornwall this year to win the single operator open section and hence the Thorogood Trophy with a score that would have placed him third in the multi-operator section. A closely-fought single operator fixed section saw Dave, G7RAU, recording a narrow victory. G4DBL was the leading low-power entrant and 2E1GUA the leading Novice. These stations, together with the leading overseas entrants, DL2KK and PE1EWR, and the section runners-up will receive certificates.

Roger Dixon, G4BVY

144MHz Trophy, 2001

Multi Operator

Pos	Callsign	Locator	QSOs	Score	Pwr	Ant	ODX Call	ODX Loc	km	Group
1	G8P*	JO01QD	813	326776	400	6*17ele	EB1FSU/P	IN73TA	1002	Parallel Lines CG
2	G5B*	JO03CE	523	210315	400	8*12+4*16	DK0IL/P	IN57CI	961	Five Bells CG
3	DL2KK*	JO30EP	645	187562	400	4*10ele	OM/S57C/P	KN09CE	1002	
4	G0VHF/P	JO01HW	431	139083	400	2*15ele	SK7MW	JO65MI	902	Colchester CG
5	MD6V	IO74QD	315	115935	400	8*9+4*9+2*17	DK0UKW	JO31OM	846	Northern Lights CG
6	G0FBB/P	JO01LD	339	102493	400	5WL m2	F8NSC/P	JN12EK	974	
7	G4BRA/P	IO91PK	232	73117	400	17ele	DL0GTH	JO50JP	808	Bracknell ARC
8	G8EVY/P	JO02CE	219	54321	200	2*17ele	F9IE	IN86WW	607	Cambridge & DARC
9	M6S	IO81XQ	203	54041	400	2*17ele	DK0FY	IN49PU	822	Swindon & DARC
10	G3YNN	JO00EU	120	26258	70	12ele	DK0FY	IN49PU	642	Herstmonceux Mo's CG
11	G0DLR	JO01EI	146	25850	350	15ele	GM4ZUK/P	IO86RW	649	Culverstone CG
12	G7RIH	IO91RR	101	22089	50	17ele	DF0LBO	JO53CT	759	Dacorum ARS
13	G3ZTI	IO83QE	79	17605	400	17ele	DM1CG	JO31IC	677	Mid Cheshire ARS
14	M1PIA	IO91IN	51	15481	25	17ele	TM1Y	JN36BP	768	Harwell ARS
15	G4ADV	IO70LK	19	1948	400	8/8	G8P	JO01QD	458	Newquay & DARS

Single Operator – Other stations

Pos	Callsign	Locator	QSOs	Score	Power	Ant	ODX Call	ODX Loc	km	Group
1	G8TIC/P*	JO01KJ	573	194558	400	2*10ele	SK7OA	JO65RJ	944	
2	GM4ZUK/P*	IO86RW	244	110771	400	4*13ele	DK3OS	JO30EM	922	
3	GW8ASA/P	IO81FP	171	41580	200	10 + 5 ele	DK0HN	JO31PP	747	
4	G6FEB/P	IO81TL	158	32257	100	2*17ele	DF0GVT	JO40BC	753	Yate CG
5	GM4WLL/P	IO85NR	69	21324	25	14 + 8/8	ON6ZT/P	JO10UU	696	
6	GW8ZRE/P	IO83JA	55	12836	10	7ele	DL2KK	JO30EP	709	

Single Operator – Fixed stations

Pos	Callsign	Locator	QSOs	Score	Power	Ant	ODX Call	ODX Loc	km	Group
1	G7RAU*	IO90IR	194	63528	400	2*9 ele	HB9MS	JN47PH	859	
2	G3MEH*	IO91QS	230	60454	400	2*10 ele	DL0NT/P	JN48TO	809	
3	PE1EWR*	JO11SL	99	36628	60	10ele	OL1C	JO60LQ	715	
4	G4DBL*	IO91HC	80	24246	25	12ele	TM1Y	JN36BP	739	
5	G4PIQ	JO01MU	58	22458	400	4*15ele	SK7MW	JO65MI	882	
6	G4JTI	IO92SD	63	18299	60	9ele	DK0FY	JN49PU	728	
7	G4DEZ	JO03AE	55	15611	400	13ele	DF0OL	JO40BP	621	Mudhoppers
8	GW4HBK	IO81KP	45	10115	200	9ele	GM4ZUK/P	IO86RW	590	
9	MIDUD	JO02QC	45	10112	2	7ele	DL0WAE	JO42DC	472	
10	2E1GUA*	JO01FS	42	10101	10	13ele	GM4ZUK/P	IO86RW	606	
11	G1KHX	IO81MI	33	8603	80	9ele	GM4ZUK/P	IO86RW	621	
12	G3YJR	IO93FI	24	5623	2	9ele	PI4GN	JO33KK	558	
13	G4XPE	IO92GU	23	5556	25	10ele	F5CUA	JN19KR	460	

UHF/SHF Contest, May 2001

THE FOOT AND MOUTH outbreak took a severe toll on this contest during 2001, but hopefully things will be back to normal for 2002. An interesting set of check-logs was received from HA2M who obviously seemed to work almost a completely different contest to the UK entrants. In the single operator section, G4LDR and G4BRK duelled it out with multi-band entries, but in the end Neil Whiting's efforts on the lower bands paid off, enabling him to take the overall award.

Andy Cook, G4PIQ

UHF/SHF Contest, May 2001

Single Operator Overall Results

Pos	Call	Loc	432MHz	1.3GHz	2.3GHz	3.4GHz	5.7GHz	10GHz	24GHz	47GHz	Total
1*	G4BRK	91DK	258	1000	1000	1000	710	756	0	0	4724
2*	G4LDR	91EC	103	257	311	0	1000	1000	1000	0	3671
3	G3MEH	91QS	422	706	791	0	0	0	0	0	1918
4*	PE1EWR	11SL	851	354	113	0	0	0	0	0	1318
5	G4PIQ	01MU	1000	0	0	0	0	0	0	0	1000
6	G0GCI	01ED	332	0	0	0	0	0	0	0	332
7	G4LRT	92LJ	19	35	21	0	0	55	0	0	131
8*	2E1GUA	01FS	114	0	0	0	0	0	0	0	114
9	GW8ASA	81EM	89	0	0	0	0	0	0	0	89
10	G4APJ	83UP	22	0	0	0	0	0	0	0	22
11	G3YJR	93FJ	20	0	0	0	0	0	0	0	20

Multi Operator Overall Results

Pos	Group	Loc	432MHz	1.3GHz	2.3GHz	3.4GHz	5.7GHz	10GHz	24GHz	47GHz	Total
1*	The Northern Lights	74QD	568	766	402	1000	1000	684	1000	0	5420
2*	Colchester CG	01IT	859	1000	1000	0	0	1000	0	0	3859
3	Five Bells CG	92WS	1000	0	0	0	0	0	0	0	1000
4	South Birmingham RS	92AJ	345	189	0	0	0	0	0	0	534

432MHz Single Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G4PIQ	21452	1000	69	01MU	300	2 x 26Y	DG7LAZ	619
2*	PE1EWR	18253	851	68	11SL	130	2 x 21Y	DF0MIT	684
3*	G3MEH	9050	422	45	91QS	250	2 x 23Y	DF0MMO	616
4	G0GCI	7113	332	34	01ED	100	2 x 21Y	DF0MMO	540
5	G4BRK	5529	258	18	91DK	50	21Y	DL0WR	676
6*	2E1GUA	2451	114	16	01FS	10	21Y	PI4GN	471
7	G4LDR	2214	103	8	91EC	90	18Y	PA6C	593
8	GW8ASA	1902	89	10	81EM	50	17Y	PA6NI	536
9	G4APJ	478	22	3	83UP	25	19Y	G4SIV	174
10	G3YJR	436	20	3	93FJ	10	19Y	GD0EMG	219
11	G4LRT	416	19	2	92LJ	250	2 x 18Y	PA6NI	354

432MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G4SIV	40199	1000	114	92WS	400	4 x 21Y + 8 x 28Y	DL0GTH	788
2*	M1CRO	34534	859	112	01IT	100	2 x 21Y	DL6NAA	795
3	GD0EMG	22837	568	63	74QD	300	4 x 20Y	DL0GLP	819
4	G8OHM	13866	345	67	92AJ	400	4 x 21Y	DK0BN	730

1296MHz Single Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G4BRK	7466	1000	31	91DK	40	67Y	PI4GN	614
2*	G3MEH	5271	706	24	91QS	50	4 x 35Y	PI4GN	540
3*	PE1EWR	2643	354	14	11SL	80	2 x 25QLY	G4PBP	407
4*	G4LDR	1916	257	11	91EC	8	55Y	PA6NL	409
5	G4LRT	265	35	3	92LJ	120	27QLY	M1CRO	135

1296MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	M1CRO	15919	1000	64	01IT	150	4 x 23Y + 2 x 23Y	DL3YCW/P	590
2*	GD0EMG	12195	766	37	74QD	400	8 x 23Y	PA0MB	695
3	G8OHM	3002	189	22	92AJ	150	4 x 23Y	PI4GN	603

2320MHz Single Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G4BRK	3232	1000	16	91DK	30	0.9m	ON4CP	454
2*	G3MEH	2555	791	11	91QS	10	67Y	PA0EZ	403
3	G4LDR	1006	311	9	91EC	1.5	66QLY	G4FTH	228
4*	PE1EWR	365	113	3.5	11SL	7	25Y	M1CRO	199
5	G4LRT	68	21	1	92LJ	8	4SQLY	G4MAP	68

2320MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	M1CRO	3756	1000	19	01IT	40	25Y	PA0EZ	312
2*	GD0EMG	1509	402	6	74QD	25	1.5m	M0GHZ	342

3400MHz Single Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G4BRK	340	1000	1	91DK	5	0.9m	GD0EMG	340

3400MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	GD0EMG	340	1000	1	74QD	20	1m	G4BRK	340

5700MHz Single Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G4LDR	138	1000	3	91EC	1	0.9m	G8BKE/P	62
2*	G4BRK	98	710	2	91DK	4	0.9m	G4LDR	61

5700MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	GD0EMG	400	1000	2	74QD	10	1m	G3PHO/P	203

10368MHz Single Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G4LDR	1232	1000	11	91EC	8	0.9m	F6DKW	378
2*	G4BRK	932	756	10	91DK	1	0.6m	M1CRO	108
3	G4LRT	68	55	1	92LJ	1.2	0.4m	G4MAP	68

10368MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1	M1CRO	1879	1000	9.5	01IT	5	0.6m	ON7WR	287
2	GD0EMG	1285	684	6	74QD	15	1.0m	G4MAP	267

24000MHz Single Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	G4LDR	93	1000	2	91EC	0003	0.9m	G8BKE/P	62

24000MHz Multi Operator

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1*	GD0EMG	294	1000	2	74QD	0.3	0.3m	G0IVA/P	147

Sig, N3RS at one of several operating positions at his successful contest station.

CONTEST CALENDAR

HF Contests

Date	Time	Mode	Contest	Bands	Exchange
2 April	1900-2030	CW	RSGB Slow Speed Cum	3.5	RST+ First Name
6/7 April	*1500-1500*	*CW/SSB*	*SP DX Contest*	*1.8-28*	*RST+Serial*
7 April	0700-0900	CW	RSGB ROPOCO I	3.5	RST+Previous postcode received
10 April	1900-2030	CW	RSGB Slow Speed Cum	3.5	RST+ First Name
13 April	*1500-1859*	*SSB*	*EU Sprint SSB*	*3.5-14*	*Serial+First Name*
14 April	*0600-1000*	*SSB*	*UBA Spring*	*3.5*	*RST+Serial*
18 April	1900-2030	CW	RSGB Slow Speed Cum	3.5	RST+ First Name
20 April	*0000-2400*	*PSK31*	*TARA PSK Rumble*	*3.5-50*	*RST+Country*
20 April	*1500-1859*	*SSB*	*EU Sprint CW*	*3.5-14*	*Serial+First Name*
26 April	1900-2030	CW	RSGB Slow Speed Cum	3.5	RST+ First Name
27/28 April	*1300-1300*	*CW/SSB*	*Helvetia Contest (HB9)*	*1.8-28*	*RST+Serial (No SSB on 160)*

VHF Contests

Date	Time	Mode	Contest	Bands	Exchange
2 April	2000-2230*	ALL	RSGB 144MHz Activity	144	RST+Serial+Locator
9 April	2000-2230*	ALL	RSGB 432MHz Activity	144	RST+Serial+Locator
14 April	0900-1300	ALL	RSGB 1st 70MHz	70	RST+Serial+Locator+QTH
14 April	*0500-1100*	*CW*	*Courte Duree (F)*	*144*	*RST+Serial=Locator*
16 April	2000-2230*	ALL	RSGB 1.3/2.3GHz Activity	1.3/2.3	RST+Serial+Locator
21 April	*0500-1100*	*CW*	*Courte Duree (F)*	*144*	*RST+Serial=Locator*
21 April	0900-1300	ALL	RSGB 50MHz	50	RST+Serial+Locator+District
21/22 April	*0000-2400*	*CW*	*European EME*	*144MHz,1.3,10GHz*	
23 April	2000-2230*	ALL	RSGB 50MHz Activity	50	RST+Serial+Locator

* = LOCAL time.

Microwave Contests

Date	Time	Mode	Contest	Bands	Exchange
21 Apr	0900-2000	ALL	RSGB Millimetre Bands		

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 web sites from which comprehensive details are available. These are www.rsgbhfcc.org and www.blacksheep.org/vhfcc

21/28MHz SSB, October 2001

"WOW!" just about summed up the 2001 contest. Conditions were excellent and many favourable comments were received with the entries. 28MHz had favourable propagation over 21MHz for a change, with sustained openings to Japan and the USA. Over 150 logs were received, which is the highest for many years (and possibly all time.) These logs represented some 23,000 QSOs! Four DX stations each made over 300 QSOs which also shows a healthy 'casual' participation by UK stations not submitting entries.

The 'big gun' battle this year was between Andy, G4PIQ/P, again operating at Martlesham, and Chris, GM3WOJ, from his QTH in Invergordon. Chris took a good early lead, but was overtaken by Andy before the end when propagation to the USA favoured more southerly latitudes. Well done to both of you for a great effort.

There was also a lot of competition for the Powditch Transmitting Trophy this year as several stations focussed their activity on 28MHz. Runaway winner was David, G4DHF, with an impressive 788 QSOs. The enhanced propagation also boosted the scores of entrants in the Restricted and QRP categories. There was little to separate the top three UK Restricted stations, with Ian, G4IIY, taking the honours using 100W to a Cushcraft R7000 vertical.

On the DX side, Ruslan, EO3Q, was Open section leader, ahead of Paul, EI2CA, operating portable from KP2. As Paul says, "I must go on holiday again next October!" Entries were received from all continents. There was some slight confusion with other events running at the same time, the most notable being the Californian QSO Party. Note for this year the lower frequency limit on 28MHz has been extended to 28.400MHz to allow more stations calling CQ in other contests to be contacted.

From both DX and UK stations large and small, moving rare multipliers between bands was a vital tactic to maximise scores. Also note you don't need two radios or a huge signal to do this effectively.

It was very pleasing to see 10 multi-operator groups submit entries, including a nine-strong team including Class B and Intermediate Licensees from the Cockenzie and Port Seton 'A' station, MM0CPS/P. The leading multi-op station was M0SDX, with Mark, M0DXR, operating with Sergei.

Although it seems unlikely that such good conditions will exist in autumn 2002, I hope we can see similar participation for the 2002 contests. Congratulations to the section winners and runners up, and thank you to those submitting checklogs.

Lee Volante, G0MTN

21/28MHz SSB, October 2001

UK Open Section

Pos	Call	Overall Score	21 Q	21 M	28 Q	28 M	Multi-Op
1*	G4PIQ/P	443034	314	84	595	79	
2*	GM3WOJ	422628	502	85	364	80	
3*	M0SDX	340167	273	68	497	81	M
4	G3IBK	303732	316	86	349	71	
5	G4RCG	290640	280	73	430	69	
6	G4IRC/P	266526	243	66	428	68	M
7	G6LW	245520	294	57	371	67	M
8	MM0CPS/P	236979	276	67	339	65	M
9	M0RAD	222525	239	66	345	63	M
10	GW4CC	214533	194	61	408	63	M
11*	G4DHF	202275	0	0	788	89	
12	G3MGW	140400	231	69	172	49	
13	G3PJK	135786	150	50	287	59	
14	G0TSM	126360	0	0	528	81	
15	G3PIV	89076	164	47	143	51	
16	G3SII	82740	0	0	401	70	
17	GM0NTL	74313	237	43	129	27	
18	G4IUF	61380	0	0	375	58	
19	G0EHT	47880	121	44	97	32	
20	GW4BLE	45969	68	30	132	47	
21	MU0FAL	43656	166	47	49	21	
22	G0DLR	42846	70	32	138	42	M
23	G0GFQ	40596	103	33	96	35	
24	GM0FGI	34968	121	36	68	26	
25	G4PRS	13677	44	21	55	27	M

UK Restricted Section

1*	G4IIY	106794	225	60	126	42	
2*	M5ARC/P	100320	167	50	189	46	M
3*	M0TTT/P	97968	172	52	146	52	
4	G0AJH	69222	124	36	155	47	
5	G3YEC	44694	115	42	86	37	
6	MM0BQU/P	27552	129	37	36	19	
7	G3KKP	26895	96	33	71	24	
8	GW0AJI	19320	91	28	49	18	
9	M0CNP	11808	49	22	47	19	
10	M5TEM	7665	41	20	32	15	
11	G4DDX	6720	39	19	31	13	
12	M0BEX	6237	36	19	28	14	
13	M0EEE/P	4445	35	17	21	10	
14	G0EYX	4140	27	17	19	13	
15	GM4UYZ	4116	27	16	22	12	
16	G3ZRJ	1812	6	5	23	13	
17	G0MTN	1512	19	14	9	4	
18	G3VYI	1134	0	0	27	14	

UK QRP Section

1*	M0BJL	42966	153	41	65	26	
2	G3FNM	8880	41	23	33	17	

UK SWL Section

1*	BRS32525	81510	52	32	234	63	
2	BRS88921	13530	86	36	51	19	

Overseas Open Section

Pos	Call	Overall Score	21 Q	21 M	28 Q	28 M	Multi-Op
1*	EO3Q	187170	141	28	231	92	
2*	KP2/EI2CA	164379	125	70	229	92	
3*	9I2BO	138150	115	67	196	87	
4	UR3IWA	125697	105	65	198	86	
5	UA6ADC	113184	103	68	159	76	
6	9H1DE	104394	81	99	177	82	
7	RK9KWB	87420	159	73	76	51	
8	YO9FIW	84120	71	51	93	59	
9	YO9HP	84120	84	41	110	69	
10	LZ9V	81744	95	64	61	30	
11	N4UH	49434	60	45	96	64	
12	RN1AO	46206	46	34	105	68	
13	OL5KRT	35964	139	74	9	7	M
14	LY3CY	33150	93	60	38	26	
15	RV9BB	31680	39	32	81	36	
16	YO2BEB	28290	64	46	51	36	
17	UT1T	26160	55	38	55	42	
18	RU3DVR	26001	47	38	60	43	
19	RA3DAH	24780	0	0	120	70	
20	RD4M	22869	58	45	41	32	
21	OM4KK	21186	106	65	1	1	
22	RW0BG	16767	44	38	38	31	
23	VE3MQW	15642	44	38	35	28	
24	RM9A	13950	36	29	39	33	
25	RU3WR	11178	24	21	47	35	
26	SP4XQN	10854	65	52	2	2	
27	YU1AAV	10335	41	31	26	22	
28	EX2T	9945	30	24	35	27	
29	RA9OW	9639	22	19	41	32	
30	RC3DBG	8568	33	27	24	24	
31	VA3UZ	7128	22	20	32	24	
32	YL2PP	6150	40	32	10	9	
33	VK2BI	5499	24	20	23	19	
34	K3ZO	5031	19	17	26	22	
35	JR7OMD	4428	32	27	9	9	
36	IG2REJ	3861	13	12	27	22	
37	S57OAN	3108	36	27	1	1	
38	YO6ADW	2697	28	25	3	3	
39	YL3FW	2688	32	28	0	0	
40	YU7SF	2688	32	28	0	0	
41	OM7YC	1914	34	27	3	2	
42	LZ2LDS	1500	0	0	25	20	
43	SM4BTF	1386	20	18	4	4	
44	EX8MIO	1254	6	6	16	13	
45	VA3IX	1020	1	1	19	16	
46	JH1CML	918	0	0	19	18	
47	SP1DMD	867	14	14	3	3	
48	WA3SWN	675	0	0	18	15	
49	HL3GOB	672	8	6	9	9	
50	YO9AHX	576	16	15	1	1	
51	YO3KYO	300	0	0	10	10	
52	EA3AAW	147	7	7	0	0	
53	IA4ESR	48	4	4	0	0	
54	IR2TRC	3	0	0	1	1	

Overseas Restricted Section

Pos	Call	Overall Score	21 Q	21 M	28 Q	28 M
1*	YT1RA	99828	141	81	95	60
2*	ER3DW	83530	49	37	205	85
3*	UA3LHL	45792	63	48	81	58
4	ER5DX	35604	61	47	68	45
5	ZC4DW	23868	46	37	56	41
6	SP6IHE	23754	93	61	14	13
7	5Z4IC	23430	7	7	103	64
8	LZ4UU	20304	29	24	65	48
9	RA3XO	16683	39	32	44	35
10	ZC4BS	12483	45	36	29	22
11	UY5TE	12180	31	28	39	30
12	EU1GA	6996	26	23	29	23
13	EA/DK3WN	6930	49	37	6	5
14	LZ2FM	6300	20	18	30	24
15	LY1DJ	5911	45	37	9	8
16	RU4SS	5148	27	23	17	16
17	EW1ABF	4752	0	0	44	36
18	SP4CJA	3348	36	31	0	0
19	OI5KRT	3342	37	30	2	2
20	SP9KRT	3060	37	30	2	2
21	T94KW	2592	28	23	4	4
22	SP9MCU	2178	29	25	1	1
23	RZ9IB	1872	21	20	5	4
24	EA7FRX	1584	25	22	0	0
25	SP4AAZ	1044	29	12	0	0
26	SM3T	918	18	17	0	0
27	SM3ARR	855	21	17	0	0
28	7N2UQC	585	0	0	16	14
29	RX9WN	507	15	15	0	0
30	JA1KK	507	6	6	8	8
31	OH1BOL	432	8	8	4	4
32	JE3UHV	90	0	0	6	5
33	JA7ADV	75	5	5	0	0
34	JG1GCO	3	1	1	0	0

Overseas QRP Section

1*	YO3FLQ	13200	14	12	67	44
2*	RA3DGH	12744	37	31	35	28
3*	VE3KZ	7755	21	19	34	28
4	YO4AAC	7590	36	31	20	16
5	KG4CHX	4095	25	23	18	16
6	RX3RC	396	8	7	4	4
7	SP2QVS	240	10	8	0	0

Overseas SWL Section

1*	UA3-170-84768904		89	58	89	58
2	5A/LY0MF	41031	62	47	79	50

*=certificatewinner.Checklogswerereceivedwiththanksfrom LZ1DM, G3LUW, GM4HQF, G4FEV, RA1QDP, RA3DNC, RA3DPD, RZ9ZR, and RJ9J.

432MHz Trophy, 2001

2000 seemed quiet in this contest, but 2001 was quieter still – mainly due to the ban on portable contesting in place at the time in the midst of the foot and mouth crisis. Let's celebrate the revival of portable contesting in 2002 and all get on and send in an entry – even if only for a few QSOs.

The contest wasn't without its problems for various people. G4PIQ started late after having to repair a relay at the top of the tower, and operated for a few hours until it fell apart again. GD0EMG got through a large selection on MGF1302s in the pre-amp and M1CRO made an excellent second place in the multi-op section operating on reduced power due to the TVI constaints of operating from a village rather than an open contest site. Congratulations to the Five Bells CG who take the trophy by a good margin – due reward for making the effort of putting on a big station from a fixed site in response to the portable contesting ban.

Andy Cook, G4PIQ

432MHz Trophy, 2001

Single Operator Section

Pos	Call	Points	QSO	Loc	Pwr	Ant	Best DX	km
1*	G4PIQ	21452	69	01MU	300	2 x 26Y	DG7LAZ	619
2*	PE1EWR	11799	45	11SL	130	2 x 21Y	DL6NAA	595
3*	G3MEH	7706	39	91QS	250	2 x 23Y	DF0MMO	616
4	G0GCI	7113	34	01ED	100	2 x 21Y	DF0MMO	540
5	G4IRK	2350	10	91DP	50	21Y	PI4GN	614
6*	2E1GUA	2016	15	01FS	10	21Y	PI4GN	471
7	GW8ASA	1902	10	81EM	50	17Y	PA6NL	536
8	G4LDR	1619	5	91EC	90	18Y	PA6C	593
9	G4APJ	478	3	83UP	25	19Y	G4SIV	174
10	G3YJR	436	3	93EJ	10	19Y	GD0EMG	219
11	G4LRT	416	2	92LJ	250	2 x 18Y	PA6NL	354

Multi Operator Section

Pos	Call	Points	QSO	Loc	Pwr	Ant	Best DX	km
1*	G4SIV	40199	114	92WS	400	4 x 21Y + 8 x 28Y	DL0GTH	788
2*	M1CRO	21942	76	01IT	100	2 x 21Y	DF0EM/P	634
3	GD0EMG	13010	42	74QD	300	4 x 20Y	DF1JM	775
4	G8OHM	10487	62	92AJ	400	4 x 21Y	DL2DAO	647

HF HF HF HF

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

AS I WRITE this the bands are very lively, with plenty of activity from TI9M (Cocos Island), H7DX (Nicaragua), PW0T (Trindade Island), H40T (Temotu), S07X (Western Sahara) and others. All have been relatively easy to work from the UK on most bands. Enjoy this while it lasts. If you haven't been on the HF bands during a sunspot minimum (which we will be gradually entering over the next few seasons) you may not realise just how frustrating it can be to hear little or nothing on those high bands (especially 10 and 12 metres) for several years. Enjoy these good conditions while they last!

DX NEWS

MANNY, ZB2CI, writes that he is now active on SSTV from **Gibraltar** and believes he is the first to activate ZB2 on this mode.

The DL0FTL group will be active 12 to 20 April from **Usedom Island** (IOTA EU-129, German Island Award O-13), and on 14 April it plans to activate a new one for the German Island Award, Grosse Wotig, GIA O-35.

Joao, CT1BFL, will be in **Angola** for the next two years, and plans activity on all bands, SSB and CW, but says the low bands suffer badly from tropical static. He has been allocated the callsign D2U. QSL via his home call.

Jan, PA9JJ, reports he will operate from Kololi, **Gambia** from 15 to 29 April. He will get his call (hopefully C56JJ) upon arrival in Banjul and plans are to concentrate 40, 80 and the WARC bands SSB, with some activity on the other bands and on CW (no RTTY and no 160m). Logs will be available at his website after the operation. QSL to his home call.

The Vietnam Amateur Radio Club (VARC) is planning to be on the **Spratly Islands** (AS-051) during April with the callsign XV9TH. I do not have specific dates at the time of writing.

The **Cham Island** (AS-NEW) IOTA expedition has been re-scheduled for 17 to 22 April. JA6IEF, JI6KVR and 3W6LI will have two stations active, phone and CW.

VK2IR and VK2KLM will sign 5W0IR from **Samoa** (OC-097) 40-10m from 28 March to 3 April. QSL to VK2IR.

Jack, VK6CTL, reports that he will be active from **Lord Howe Island** (OC-004) from 11 to 22 April signing VK9LT, mostly on SSB.

Two major expeditions are scheduled for this month. Firstly, the team that operated from Willis Island (VK9WI) in 2000 and Mellish Reef (VK9ML) last year will be going back to **Mellish** between 10 and 25 April for a bigger operation. They plan to be active again as VK9ML on all bands, but with a focus on CW and the WARC bands, using five stations. The international team of operators includes G4EDG, JH7OHF, JJ1LIB, JP1TRJ, K3NA, VK4DH, VK4GL, VK4WR, VK4APG and ZL4PO. The group acknowledges support from Yaesu, The Chiltern DX Club, 5 Star DXers Association, BT Exact Technologies and PCA.AA.

The other major expedition is to **Baker Island** (KH1). A large team, including YT1AD, YU1AU, YZ7AA, Z32AU, Z31FU, Z32ZM, RZ3AA, RA3AUU, K1LZ, K6NDV, N6TQS, KW4DA and K3NA expects to arrive on the island around 29/30 April. Some of the team members were flying to Tuvalu (T2) on 23 April, and hoped to operate from there for a few days before the departure of the boat to Baker Island. The operation required a special permit from the United States Fish and Wildlife Service (USFWS) and a special callsign has been issued, which will be announced once the team arrives on the island. All previous expeditions to the DXCC entity of Baker and Howland Islands were actually from Howland Island. There will be three operating tents, each with two stations, and activity is expected to take place between 30 April and 10 May. Equipment will include six radios, three Acom 1000 amplifiers, two 400-watt amplifiers, two 5kW generators, two 2kW generators, three Yagi beams (10 - 30MHz), and three verticals (160/80/40). Expect activity on all bands and modes. QSLs for CW, PSK, RTTY and SSTV go via YT1AD. QSLs for SSB go via RZ3AA. A webpage will also be available.

Jean-Claude Jupin, TR8XX (F2XX), died on 11 February. He had been an avid DXer for a long time both in France and Gabon. He was one of Africa's most active CW operators. Jean-Claude had operated in a lot of African countries including TR, 3C and S9.

RSGB member Eran Abarbanell, 4X1MO, in his Ramat-Hasharon, Israel, shack.

The BBC recently announced that, due to rising sea levels caused by global warming, the 11,000 inhabitants of the **Tuvalu** (T2) archipelago will start to abandon the islands early next year and move to New Zealand. The exodus will be a slow process, which could take 30 years or more. The highest point on the island is approximately 15 feet above sea level. This one could eventually become very rare on the DXCC list!

AWARDS

THE 2002 EDITION of the *K1BV DX Awards Directory* will soon be ready and access will be available via Internet.

The **European Regions Award** is a new award gained by working and confirming contacts with stations in the different Euro-Regions as displayed in the official table. At the moment there are 180 of them, but their number will increase as new members join the EU. The validity of the contacts starts from the date of membership, as follows:

- 1 January 1958 (Treaty of Rome) for Belgium, Fed Rep of Germany, France, Italy, Luxembourg and Netherlands.
- 1 January 1973 for Denmark, Great Britain and Ireland.
- 1 January 1981 for Greece.
- 1 January 1986 for Portugal and Spain.
- 3 October 1990 for ex-GDR (Y2/Y9 prefixes are *not* valid)
- 1 January 1995 for Austria, Finland and Sweden.

All the contacts must be made from the same country and using the same callsign. There are five classes of Award, identified by coloured star-shaped stickers:

1. Basic: 50% of the Euro-Regions confirmed (at the moment 90)
2. Bronze: 60% of the Euro-Regions confirmed (at the moment 108)
3. Silver: 75% of the Euro-Regions confirmed (at the moment 135)
4. Gold: 90% of the Euro-Re-

COUNTRIES WORKED, 2002

(sorted by Mixed countries worked)

CALL	CW	SSB	DATA	MIXED
G0NXX	172	0	0	172
G4PTJ	94	117	0	167
ZC4BS	118	118	58	152
G3SED	125	67	0	143
G3JFS	68	36	82	131
G4IRN	106	0	0	106
G4UCJ	96	0	41	105
G3LHJ	78	10	60	102
G0ARF	0	0	100	100
G4OBK	80	15	46	98
G0URR	0	0	81	81
ZC4VG	73	8	0	73
ZC4DW	43	13	53	65
M0CNP	63	2	24	63
M0CAL	0	60	0	60
G3XTT	14	9	44	55
G3YVH	45	12	0	52
G0GFQ	0	51	0	51
G4FVK	16	44	0	50
MM0BQI	7	6	40	43
M5AEF QRP	5	39	0	42
M0BZK	0	29	30	40
G4DDL	23	10	8	29

gions confirmed (at the moment 162)

5. Honour Roll: 100% of the Euro-Regions confirmed (at the moment 180).

As new members join the European Union, the numbers above will change, according with the fixed percentages. Issued awards won't change, but further upgrades will have to respect the new levels. To claim the award, QSL cards need not be sent but must be in the possession of the applicant and could be requested for checks. Application forms must be sent to: EURA Manager, IK2UVR, c/o Sezione ARI Busto Arsizio, PO Box 125, I-21052 Busto Arsizio (VA), Italy. The fee is 5 Euros or $5 per award. Upgrades are free. Software is available to support the award, and is downloadable from IK6CAC's website.

The ARI (Italian national society) celebrates its 75th anniversary this year, and is issuing various awards for contacting Italian stations during 2002. The **ARI 75 Years Award** requires 75 points to be gained, one point for each Italian station worked, but three points each for up to three of the following special event callsigns: IY1TTM, IY4FGM, IY0GA, IY0TC, IY0TCI, II2ARI and IQ2ARI. The **Worked Italian Provinces 75 Award** requires contacts with 50 different provinces and two of the special stations. You can download an application form at the ARI website which should be sent, along with the fee of 6 Euros, $5 or 10 IRCs to I2MQP, ARI 75 Years Award Manager, c/o ARI, Via Scarlatti 31, 20124 Milano, Italy. A list of provinces is also available from the website. The foregoing requirements and costs apply to European applicants. Check the website or contact me for differences applicable to non-European applicants.

The **Italian Castles Award (DCI)** issued by the Mondovi (Cuneo) section of ARI is for confirmed contacts with 20 castles in at least two different regions of Italy, with at least one castle in the Province of Cuneo. Contacts after 1 January 2001 are valid. The Cuneo Province Castles Award (DCPC) is for confirmed contacts with at least 10 different castles specifically in Cuneo Province. In both cases, further details (including a list of castles) are available from the website, or from the UK checkpoint, K Porter, G0FEX, 462 Braunstone Lane, Leicester LE3 3DG, or by e-mail: k.porter@virgin.net

QTH Corner

H44LB, H44ZG, H40T Baerbel Linge, DL7AFS, Eichwaldstr 86, D-34123 Kassel, Germany.
H7DX Hans Uebel, DL7CM, Hartmannsdorfer Chaussee 3, Spreenhagen 15528, Germany.
IZ8CCW Antonio Cannataro, PO Box 360, 87100 Cosenza, Italy (also for Sagar Island QSLs).
LA7JO Stig Lindblom, PO Box 827, N-7408 Trondheim, Norway.
RZ3AA Roman Thomas, PO Box 38, Moscow, 129642, Russia.
S92JHF Henryk Kotowski, SM0JHF, Sibeliusg 28 XI, SE 16477 Kista, Sweden.
TI9M Bill Boeckenhaupt, AK0A, 8904 Westbrooke Dr, Overland Park, KS 66212, USA.
VK4FW Bill Horner, PO Box 1343, Maroochydore, 4558, Australia.
VK9LT Erwin Fink HB9QR, Toedistr 7, CH-8572 Berg, Switzerland.
VP6 (Ducie Island) Garth Hamilton, VE3HO, PO Box 1156, Fonthill, Ontario L0S 1E0, Canada.
VP8THU Garry V Hammond, VE3XN, 5 McLaren Avenue, Listowel, Ontario, Canada, N4W 3K1.
VP8GEO Maple Leaf Radio Society, VE3GCO, 5 McLaren Avenue, Listowel, Ontario, Canada, N4W 3K1.
VU2JIX Prakash Shetty, Bala House, Bala Post, Bala 574149, India.
VU2JRO Manikant Lodaya, c/o Srikanth Bhat, 37 Ananth Nagar, Manipal 576119, India.
VU2MTT Vishnumoorthy S G, Shantharam Complex, Shakthinagar, Mangalore 575016, India.
VU2NJN Somashekhar Bhat, C16A, Kailas Quarters, Manipal 576119, India.
VU2PAI Ananth Pai, P-Box 730, Bharath Beedi Works Ltd, Bharath Bagh, Mangalore 575003, India.
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VU2SBJ Srikanth Bhat, 37 Ananth Nagar, Manipal 576119, India.
VU3DMP Chethan L Pujara, PO Box 778, Mangalore 575003, India.
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XR2D CE4USW, PO Box 128, Talca, Chile.
XW0X Hiroo Yonezuka, PO Box 2659. Vientiane, Laos.
YT1AD Dr Hrane Milosevic, Vitanovac 36206, Yugoslavia.
ZD7VC Bruce Salt, PO Box 58, Half Tree Hollow, St Helena Island, South Atlantic Ocean.
5W0MP, YJ0AOW Michel Perrin, F6COW, 28 Boulevard Dumesnildot, 44560 Paimboeuf, France.
5W0DA, YJ0APY Dominique Auprince, F6EPY, 4 Allee de la Genestriere, 91600 Savigny-sur-Orge, France.
7X0DX Teddy Barczyk, DL4DBR, Pappelstrasse 34, 58099 Hagen, Germany.
9U5D Leif Hammarström, SM5BFJ (ex-SM0BFJ), Lerklockan 4, SE-73091 Riddarhyttan, Sweden.

TABLES

SOME OF YOU are already posting high table scores, and the level of interest in the datamodes (this total includes RTTY, PSK31 etc) is increasing. Robert, G0URR, for example, has upgraded his station, mainly with a view to some serious RTTY contesting and says "RTTY is a great lower-power mode and is perfect for novices; it was great to work 2E0ROB in the RTTY WPX Contest and to see him doing so well". Robert thinks the availability of good software (much of it free) such as MMTTY and WF1B has contributed greatly to this growth of interest in the datamodes, and his only complaint about this column is that I don't mention them enough!

M5AEF writes that he is concentrating his QRP (1 watt) efforts on 17m this year, on the basis that it is open most days, is quiet and contest free, and offers him a better chance than the other bands of working the DX. To prove the point, his log so far this year includes contacts all over Europe as well as USA, EA8 (Canaries) and 4L (Georgia). He confidently expects to work over 100 countries in the course of 2002.

CQ WPX SSB Contest 2001

Call	Category	Score
GM7V (op: GM4YXI)	A	4,903,138
GM3BCL	A	846,906
GW3NJW	A	444,185
G3UFY	A	146,704
G3UEG	A	118,950
GX4WSM	21	2,664,186
*GW7X (op: GW4BLE)	A	6,225,688
*G2TO (op: G0KRL)	A	1,699,800
*M0BRK	A	1,308,951
*MU0FAL	A	274,215
*G4NXG/M	A	217,679
*G4PIQ	A	201,128
*G4DDX	A	49,915
*MM0BQI	A	38,025
*MW5EPA	A	32,595
*G3YOG	28	18,450
*GW0AJI	21	89,232
*M4T (op: G0VQR)	14	30,915
*G4VGO	1.8	49,950
QRP/p		
GM4ELV	A	45,560
GW0VSW	A	27,612
F/G3VQO/P	A	891
Multi-single		
G4UJS		7,084,340
M2H		3,000,480
GX4NOK		955,017
M4U		735,672
M5W		194,756
Multi-Multi		
GM3GBZ		4,536,960

*denotes low power

CONTESTS

RESULTS FOR LAST year's ***CQ* WPX SSB Contest** appear in the table. Particular congratulations to Steve, GW4BLE, operating as GW7X, who not only led Europe in the all-band low-power category, but did so with almost twice the score of the next-placed European station. G4VGO was World and European 3rd on 1.8MHz.

In the 2001 **SEAnet Contest**, UK results were: SOSB (15) CW 1st G4OGB 100; SOMB SSB 3rd G3VAO 1710. Les, G4OGB, comments that he received a nice plaque from the organisers and that it's a pity there aren't more entries.

In the 2001 PACC contest, UK results were: single-op - GM3CFS 16,064, G2HLU 15,934, G3LIK 11,387, G3AEZ 11,232, GW3SYL 6600, G0MTN 4200, G3YCH 2332, MM5AJW 2156; multi-op - GB5TT 3420.

The 2001 **Russian DX Contest** attracted a number of UK entries, as follows: SO CW - 12th GW3NJW 1,757,052, 25th GU3SQX 702,200, 33rd M0BKB

357,072, 50th G3TXF 107,460, 61st G3UFY 46,650; SO CW LP - 12th G4OGB 1,575,612, 21st M0AJT 826,280, 22nd G4EBK 808,218, 36th G3RSD 520,572, 62nd G3VQO 152,781, 83rd M0BZU 30,044, 89th G0MRH 12,198; SO SSB - 26th MM5AJW 92,625; SO SSB LP - 13th GM0FET 606,730, 21st GW4BLE 382,143; SO 20m - 11th M0EEE/P 213,497; SO 15m - 12th GM3CFS 148,149.

Finally, in the October 2001 **ON Contests**, UK results were: CW 6th G0MRH 612; SSB 1st G0AOZ 7623.

The **TARA PSK31 Rumble** (The Spring Wakeup), sponsored by Troy ARA, will take place from 0000 to 2400 on 20 April (PSK only on 80, 40, 20, 15, 10). Rules are available at the website.

This year's **Holyland DX Contest** has a new starting time, running from 0000 to 2359 on Saturday 20 April. One of the main purposes of the event is to help amateurs around the world make the contacts they need for the various Israeli awards. Details are available at the Israel Amateur Radio Club website.

Rules, full results, past scores and all time records for the **European Sprint** contests are available at I2UIY's website (the free EU Sprint software can be downloaded at this same address). This year's contests (two in spring and two in autumn) will take place on 13 April and 5 October (SSB) and on 20 April and 12 October (CW). The contest runs from 1500 to 1859 on 20, 40 and 80m.

QSL DB

BOYE CHRISTENSEN, OZ7C, reports that he has updated his QSL DBase (which now contains 297,707 unique records) for *PacketCluster*. You can download oz7c0201.exe from his website.

DX CONVENTIONS

THE LA-DX GROUP'S annual meeting will be held in Norway on 13 / 14 April, just 30 minutes' drive from Oslo's airport. Presentations include G3SXW (various DXpeditions), 3B8/LA7MFA, S9LA and Market Reef by LA6YEA.

The International DX Convention, sponsored by the Southern California DX Club, will be held at the Holiday Inn Plaza, Visalia, California from 26 - 28 April. Features include DX forums / programmes, vendors, Saturday banquet and Sunday breakfast with major DXpedition speakers. Admission is $60 in advance, $65 at the door.

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). Thanks also to VK3WAC. Please send items for the **June** issue by **19 April.** ♦

WWW.

ARI:	www.ari.it
ARI Cuneo awards:	http://utenti.tripod.it/dci/
European Regions Award:	http://ir2b.too.it
IK6CAC:	http://www.ik6cac.com
Israel Amateur Radio Club:	www.iarc.org
I2UIY:	http://loja.kkn.net/~i2uiy/
K1BV Awards Directory:	www.dxawards.com/2002edition.htm
LA DX Convention:	www.qsl.net/ladxg
PA9JJ:	http://www.qsl.net/pa9jj
QSL DB:	http://www.qsl.net/oz7c/qsl
TARA PSK31 Rumble:	http://www.qsl.net/wm2u/rumble.html
Visalia DX Convention:	http://www.qsl.net/visalia2002
VK9ML:	http://www.qsl.net/vk9ml/2002/

HF F-Layer **Propagation Predictions** for **April 2002**

	3.5MHz	7.0MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** Europe							
Moscow	8.....778	971....17889	23766777 8843	258999999854	.368999997 32	....23332...	....
*** Asia							
Yakutsk	....	.....11.	46766677 8887	..6777775342	..377764222.	...4553.....	...233.....
Tokyo	.....1..	.....37..	....124561.	....133435..	....2322.2..	...24532....	....22.....
Singapore	....	.....254.	68751	.....48862.	.....15773..	....13676...	.....2453...
Hyderabad	....	123	3.....47877	2221126898 75	..6445789742	..5788899 62.	..4688898 3..
Tel Aviv	74.....2566	881.....7888	8986667899 99	3323768788 75	.2.3788448 43	....9993 3632	....7882252.
*** Oceania							
Wellington	....	.....5...	....35678...	....23323...	....222.....	....332.....	....
Perth	....	.....144.	24321	.....14554.2	.....332....	..22464.....	..2246.....
Sydney	....	.....36..	.....2666..	....1577772.	....266654..	..2367764 2..	...3565 3....
Honolulu	.....1....	..2342.....	...132.....	....2.....	....	....	....
W. Samoa	....	....	..23332.....	...24432....	....233.....	.....2.....	....
Ducie Is. DXped.	....	132.....	42464.....1	...35.....	....41.....	....2.....	....
*** Africa							
Mauritius	1.....1556	6.....1556	3.....17776	57653	.....6752.	.....1551..	.....143...
Johannesburg	77.....66	99.....6999	561....19999	..631128 9997	..665568 9984	..7778899 87.	..5778888 985.
Ibadan	....	45.....333	87831.137888	6588877 89987	4368888 89865	4268899 99865	2.5778888 743
Nairobi	....	2.....111	76.....3467	8741...36788	5464213 67888	2.7666778 863	..4777788 632
Canary Isles	562.....765	887.....2888	8887545 67888	7578888 89997	5358888 99975	...5878 8872.	...3578784..
*** S. America							
Buenos Aires	231.....	888.....38	7671.....277	76742...1887	4242421 14875	....3434674.	....344466..
Rio de Janeiro	....	565.....45	656.....666	867531.14988	6353633 36976	....6556785.	....656677..
Lima	....	545.....2	3133.....22	525741...476	...6331 13562	...3.433552.	.....32343..
Caracas	....	11.....2	4353.....34	2..53....252	...2521 1143.	...2576 6773.	....356775..
*** N. America							
Guatemala	....	211.....1	1.11.....1	....	....	.....1..22..	....
New Orleans	....	21.....	3.131.....12	3124266 56675	1..2.7777752	.....488873.	....35675..
Washington	1.....	442.....5	7356411 11367	2.2236666 774	....2777 7762	.....377762.	.....3453..
Quebec	76.....7	886.....78	...32.122552	...3777778 52	...2455 6763.	....3345652.	....223453..
Anchorage	....	11.....	..22..112134	..22..235763	23442	.....2.	....
Vancouver	....	.2.....	....	.....3555.	.....362.	.....342.	.....2..
San Francisco	....	.21.....	....	.....1232.	.....223..	.....233..	....

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 February 2002 issued by the Sunspot Data Centre, Brussels, was 108.0. The maximum daily sunspot number was 159 on 3 February and the minimum was 78 on 19 February. The predicted smoothed sunspot numbers for April, May and June are respectively: (SIDC classical method – Waldmeier's standard) 112, 109, 107 (combined method) 94, 91, 86.

Antennas

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The GM4UTP multiband antenna showing the inverted-V configuration. The antenna also supports a single quad element for 10 metres.

IF YOU DO NOT have an ATU and you wish to operate on all bands, you need a multiband antenna that presents a near to 50Ω feed impedance on all bands. The G5RV is often the first antenna to come to mind, but an ATU is essential when using this antenna with a transceiver having a solid-state PA.

One solution is to use several dipoles fed in parallel from the same feed line. The length of each separate dipole is a half wavelength for each band so that each dipole presents a good impedance match to the feed line on the band for which it is intended and a poor match on all the others.

However, placing several dipoles in parallel can present some mechanical problems and there can be considerable interaction if the ends of the dipoles are spaced too close together. The ends of the dipoles must be arranged so they are far apart as practical. The only multiband dipole that I have used [1] is the example shown in **Fig 1**.

The multi-element structure is supported by the lowest-frequency dipole. Each dipole in the parallel-fed combination may be supported from different directions if different directions of radiation are desired and the space is available. This also has the advantage of placing the ends of the dipoles some distance apart. The ends of the lowest frequency dipole can be bent to fit into an available area if necessary, but the length will have to be increased slightly above the normal dipole length to get the lowest SWR.

TWO OTHER SOLUTIONS

IF MORE THAN three parallel dipoles are used, using the construction method shown in Fig 1, the structure becomes complicated and difficult to manage. One solution is to use the G3BDQ 10-way ribbon cable arrangement, which is described and illustrated in [2]. This cable is 13mm wide and only 1.3mm thick and each of its conductors is made from 14 x 0.13mm tinned copper strands.

The cable can be obtained in complete lengths of up to 50m and a multiband antenna can made from a 40m section. The antenna is constructed by cutting away the unwanted parts of the cable. For this antenna to work, around 20% of each end of each higher frequency dipole is arranged so that it hangs down and away from the next supporting lower-frequency element.

This antenna, in common with other multiband arrangements, uses the inverted-V configuration with a single pole to support the centre insulator and coaxial cable feeder. Even so, the ribbon cable antenna will require some support because the weight of all the elements is carried by the lowest-frequency dipole. G3BDQ used 1mm diameter nylon cord, which was stitched into the multi-way ribbon cable with a packing needle using 500mm long 'stitches'.

Stewart, GM4UTP, uses a more rugged parallel dipole design. This arrangement uses the lowest frequency dipole to support the higher-frequency dipoles using spacing insulators made from 11mm plastic electrical conduit. The construction is shown in **Fig 2** and in the photo. The 24MHz dipole is not shown in Fig 2, but if included the element length each side of the centre insulator is 2.84 metres.

The antenna is configured as an inverted-V with the weight of the centre insulator and the 1:1 balun mounted on a 10m high aluminium scaffold pole. Low centre-band SWRs are possible if some time is spent tuning each dipole. This can be achieved by arranging the ends of the elements so that they are clear of their support insulators by about 200mm. The dipole lengths can be reduced or increased by folding back the end and securing with plastic tape.

The resonances of these dipoles can be interactive - when you adjust one it affects the resonance of the others, so be prepared to have to re-resonate elements.

A similar arrangement is described by K0GPD [3]. In this design all the spacer insulators are made the same length and a nylon cord is run from the end of the highest frequency dipole to the end of the multi-wire sections of the antenna to improve mechanical stability.

REFERENCES

[1] *Backyard Antennas*, Peter Dodd, G3LDO (available from RSGB Sales).
[2] *Practical Wire Antennas*, John D Heys, G3BDQ (out of print).
[3] 'A Great 10 Through 40 Portable Antenna', Edward L Henry, K0GDP, *The ARRL Antenna Compendium, Volume 1* (available from RSGB Sales). ♦

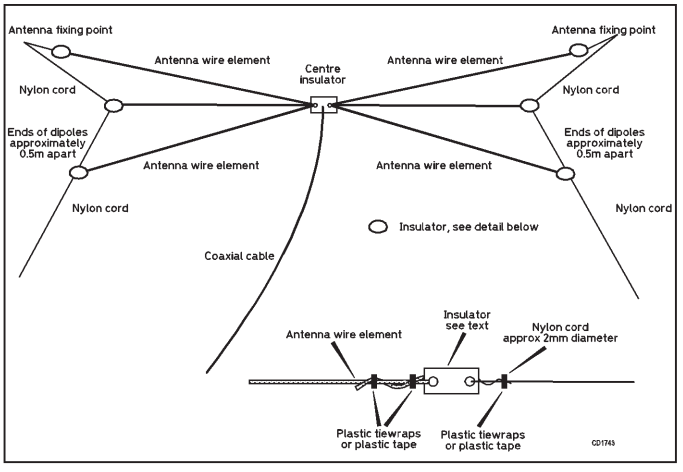

Fig 1: Dipoles can be connected in parallel using a common coax feeder. Interaction can be minimised by keeping 500mm spacing or more between the ends of the wires. Each dipole end support should be adjusted to keep all the dipoles reasonably tight, which keeps them looking tidy and prevents them from getting tangled when they blow around in the wind.

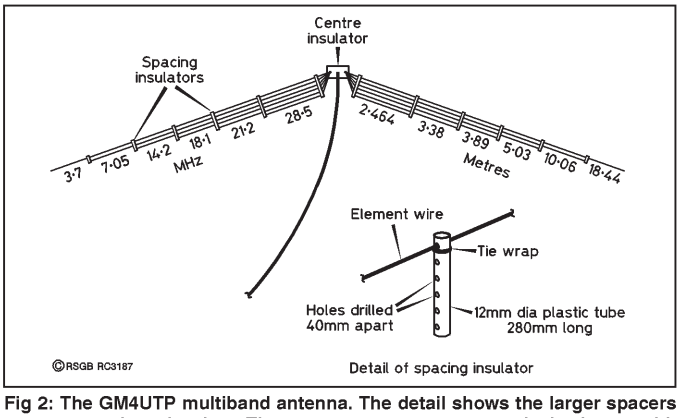

Fig 2: The GM4UTP multiband antenna. The detail shows the larger spacers to accommodate six wires. The outer spacers are progressively shorter with holes drilled for five, four, three and two wires respectively.

SWL

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E-Mail: brs32525@compuserve.com

AT THE TIME of penning this 'SWL' column, active HF listeners cannot have failed to have caught up with H40T, PW0T and TI9M: three rare DX spots and three DXpeditions that were fairly easy to log on most bands. Leaving aside 160m, the H40 on 3.5MHz is the only slot now missing from this location in respect of these three DXCC entities.

Talking of DXpeditions, SWLs (and our licensed colleagues) might be interested to know that the recent VP8GEO and VP8THU expeditions made over 70,000 QSOs using SSB, CW and RTTY. They were only on the air for 80 hours at VP8THU, but were active from VP8GEO for seven days. No amplifiers were used at VP8THU which is why their signals tended to be on the weak side, but many SWLs did hear the South Sandwich Islands, including Simon, RS177448, who logged them on 21 and 24MHz. One linear amplifier was used from VP8GEO on South Georgia, but that was for the low bands. Again signals were weak, but they were audible. Finally, a reminder that the QSL routes are: VP8THU via VE3XN, and VP8GEO is via VE3GCO. QSL cards had been printed by mid-February so you might even have received your card before you read this!

AFS

HAVING KEPT THE computer log at G3RCV in this year's AFS 80m SSB contest, it made me think that it would be interesting for the column to hear of listeners' experiences in assisting with special event or contest stations. With the summer season soon upon us, there should be plenty of scope for listeners to get involved with the setting up and organisation of a special event station. I will be pleased to have short articles and / or a photograph to include in the column.

HF PROPAGATION CHARACTERISTICS

FOR THOSE SWLs who are new to HF, you may find these general notes about propagation of interest:

10m - primarily a daytime band with long skip, >1500 miles.

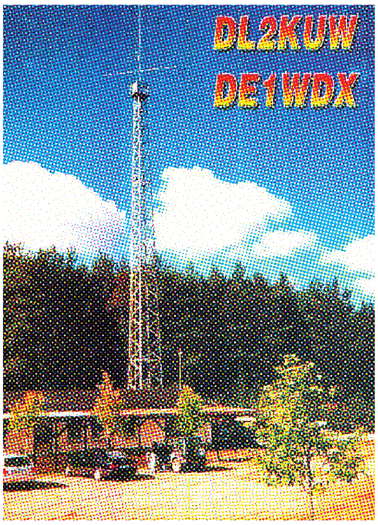
15m - primarily a daytime band with short and long skip, and right now, can stay open a couple hours past local sundown.

20m - 24/7 band right now (open 24 hours a day).

30m - 24/7 band

40m - 24/7 band *always* (even during the quiet sun). Noisier than the higher bands due to sensitivity to our magnetic field generating noise currents, atmospheric effects, local RFI, power line noise, etc. Ground wave (few hundred miles) mostly during daylight hours, and ground wave, short and long skip all possible at night.

80m - 24/7, about the same as 40m, except even noisier for the same reasons and favouring ground wave and short skip. Long skip more unusual and generally requires big power.



The spectacular antenna mast at the station of German SWL DE1WPX.

50MHz – THE JA PICTURE

ISAO HASEGAWA, JA1-20784, is a keen 50MHz SWL. He uses a five-element Yagi at about 15m. It performs well, but he finds it difficult to copy signals from European stations when the band is open. This is due to *big* pile-ups of JA stations calling the Europeans.

Isao explained that he had caught several big openings from Europe since October 2001. He remarked that the opening on 26 October 2001 was probably the first-ever *great* opening between EU and JA. The band was full of European signals. That opening marked the first of many good openings through to early November. Isao admits to not having entered the 2001 CQWW SWL Challenge because 50MHz conditions to Europe were so good!

When conditions are good, JAs can hear stations in Central Asian countries such as EX and UN around 0300 - 0400UTC, and then those in Eastern European countries such as LZ and 9H from 0600 to 0900UTC. When the conditions are *really* good, JA can hear stations in F and DL. - but this does not happen so often!

Isao does not believe that many JAs have worked G stations on 50MHz, and he has never heard one. However, he has heard stations in CT3, EA8, and EA7 via the *long path* around 2300 - 0100UTC. Isao believes that this would be a better path to G-land.

He passes on the news that there are several JA stations who operate with very good equipment and have superb antenna arrays for 50MHz - some of them are using, for example, 2 x 10-element Yagis and 1kW.

David Whitaker, BRS25429, heard his first JA in mid-February, but I am still to hear my first JA on 'the magic band'.

Isao passed on details of a JA 50MHz DX Web Cluster http://www.big.or.jp/~ham/pubhtml/dxcl50.html

WPX 2002

A REMINDER THAT the SSB leg of the *CQ* WPX Contest takes place on **30 / 31 March**. Entries were quite poor in 2001, so I hope for more interest this year. The rules are reproduced below. ♦

CQ WORLDWIDE WPX SWL CONTEST 2002 RULES

SHORT WAVE LISTENERS AROUND THE WORLD ARE INVITED TO TAKE PART IN THE 2002 CQ WORLD WIDE WPX SWL CONTESTS. THE OBJECTIVE IS TO LOG AS MANY STATIONS AND PREFIXES AS POSSIBLE ON THE 28, 21, 14, 7, 3.5 AND 1.8MHz BANDS.

WHEN: SSB - 0000UTC 30 March to 2359UTC on 31 March 2002
CW - 0000UTC 25 May to 2359UTC on 26 May 2002

SECTIONS: Single and multi-operator sections. Only 36 hours logging is permitted in the single operator section. Single band logs can be submitted.

SCORING: (i) Stations heard from different continents to the listener are worth 3 points on 28, 21 and 14MHz, and 6 points on 7, 3.5 and 1.8MHz.
(ii) Stations heard in the same continent as the listener are worth 1 point on 28, 21 and 14MHz, and 2 points on 7, 3.5 and 1.8MHz.
(iii) Stations heard in the same country as the listener are permitted for multiplier credit but are worth 0 points.

MULTIPLIER: A prefix is counted only once regardless of the number of times the prefix is heard. A prefix is the letter/numeral combination that forms the first part of an amateur callsign – M8, 7K4, OT2, LZ8, WB9, EN50. In cases of portable operation, the portable designator becomes the prefix - KH9/W1AAA or NH9/W1AAA. KH6XXX operating from Ohio would be W8/KH6XXX. Portable designators without numbers will be assigned a zero (0) after the portable designator to form the prefix - PA/W1AAA would become PA0/W1XXX. /MM, /AM, /A and /P suffixes do not count as prefixes.

FINAL SCORE: Total points (from each band) multiplied by the number of different prefixes (prefixes are only counted once).

PENALTIES: Any unmarked duplicate will lose 10 times the logging value.

AWARDS: Certificates will be awarded to the leading stations.

LOGS: Logs must show Date, Time (UTC), station heard, RS(T) report and serial number given by station heard, prefix multiplier, points. A check list of claimed prefixes must be provided. A cover sheet showing the points, multipliers and score claimed must be provided. Entries not complying with these rules will be subject to disqualification.

ENTRIES: All entries must be postmarked no later than 29 April 2002 for the SSB section, and 5 June 2002 for the CW section. Please enclose 2 IRCs or $1 for a copy of the results. Entries should be sent to WPX SWL Contest Director, Bob Treacher, BRS32525, 93 Elibank Road, Eltham, London SE9 1QJ.

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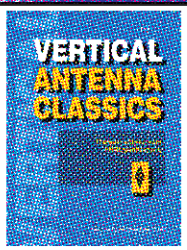

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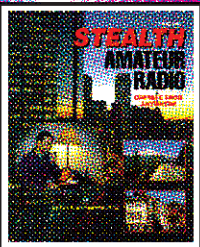

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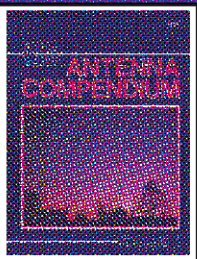

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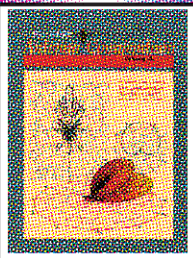

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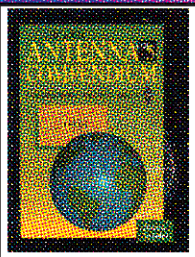

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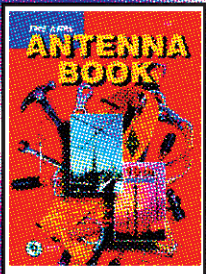

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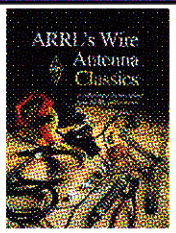

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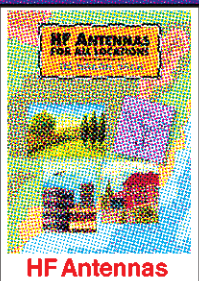

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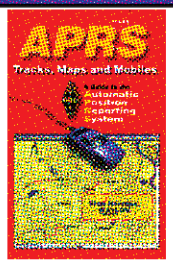

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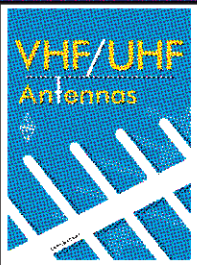

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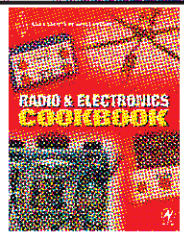

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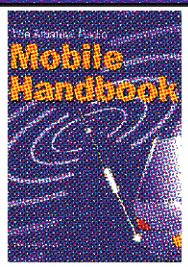

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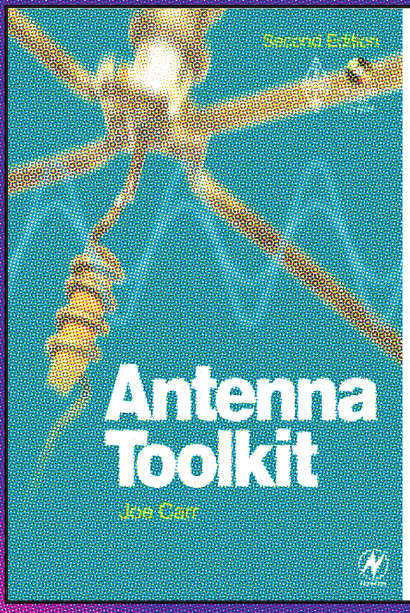

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Joe Carr's latest book provides radio amateurs with the definitive design guide for sending and receiving radio signals.

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The new edition has been revised from the original to include further cases of propagation, additional antennas and new chapters on Small Loop Antennas and Yagi Beam Antennas.

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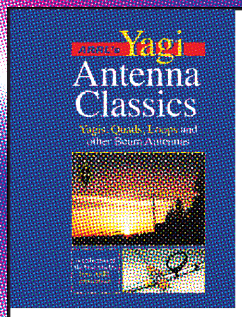

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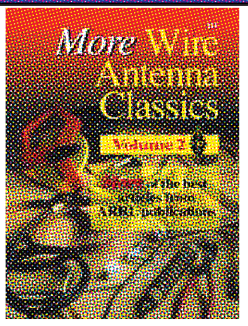

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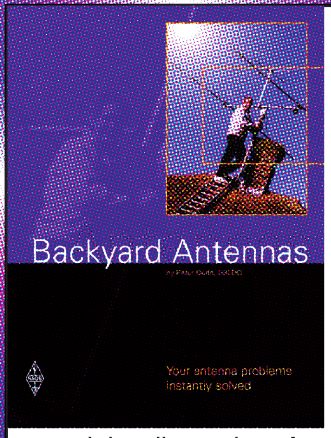

Backyard Antennas

Radio amateurs and short-wave listeners all want to chieve the very best from their HF and VHF equipment. Receivers and transmitters are available to professional standards, but very few people have the real estate to erect the sort of antenna used by a commercial radio station. Antenna guru Peter Dodd explains how, by using a variety of simple techniques, it is possible to achieve very high performance from a compact antenna. Also detailed is how to make an antenna efficient on several bands at once.

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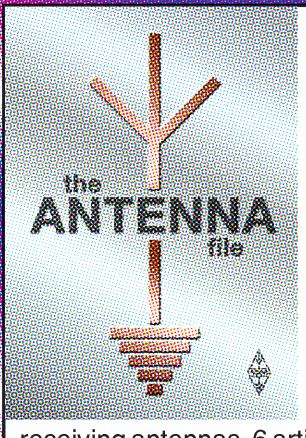

The Antenna File

The Radio Society of Great Britain produces some of the best works on antennas and this is a collection of that work from the last ten years. This book contains 288 pages of articles drawn from the Radcom magazine and includes:

50 HF antennas, 14 VHF/UHF/SHF antennas, 3 receiving antennas, 6 articles on masts and supports, 9 articles on tuning and measuring, 4 on antenna construction, 5 on design and theory, and 9 Peter Hart antenna reviews and much more. In fact everything you need to know about antennas and how to get the best out of them.

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REPEATERS

MARK LEWIS, GW7KDU
14 Hornbeam Close, St Mellons, Cardiff CF3 0JA. E-mail: rmc-wales@net.ntl.com

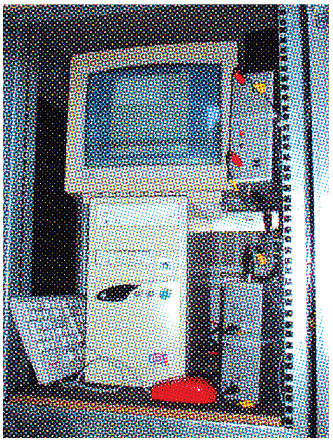
LAST YEAR we looked at the project that the Clacton CLPK group started to link GB3CL to the Internet. It has now provided some more details of its experiences and news of progress. The repeater was one of the first to be connected via a 24-hour dedicated link on site to the Internet. A telephone line provides the link with a PC connected to the repeater logic. The interface was designed and built by Mike Stevens, G8CUL. Initially *Iphone* was the software of choice but due to this being withdrawn a change to software produced by Paul, M0ZPD, was made. This can be downloaded from his website [1].

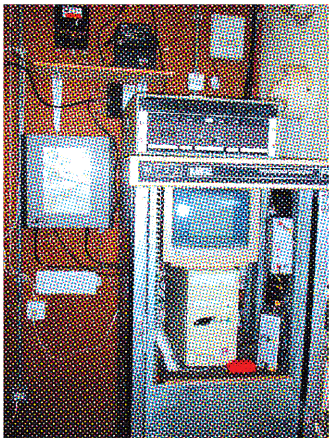
Using the software is quite straightforward and here are some tips provided by Tony Horsman, G0MBA:

"Download and install the software; enter the few details required (ie your callsign and location) and you are ready to go. The software will offer you room number 101, which is where most users start. This is quite often busy. Simply delete the number 101 and enter gb3cl in the box. After this click the connect button.

"Once you are logged on, GB3CL will appear in the window and you can monitor all the traffic on the repeater. If you wish to join in or simply call CQ, follow the PTT option in the software and this will automatically open the repeater for you."

Apart from a break in service due to the software change, the Internet repeater link has been considered a huge success since April 2001. The repeater, which previously was very quiet, now carries a huge amount of traffic and there have been many interesting contacts and exchanges of information from all over the world.





Two views of the GB3CL logic.

LATEST CLEARED REPEATERS

Call	Type	Channel / Frequency	Keeper
GB3ES	Site change 2m Hastings, East Sussex	RV54 / 145.675MHz	G7LEL
GB3HE	Site change 70cm Hastings, East Sussex	RB14 / 433.350MHz	G7LEL
GB3HF	Site change 6m Hastings, East Sussex	R50-5 / 50.760MHz	G7LEL
GB3LD	Site change 2m Lancaster, Lancs	RV54 / 145.675MHz	G7MCE
GB3LF	Site change 70m Kendal, Cumbria	RB14 / 433.350MHz	G3VVT

Outstanding voice repeater proposals submitted for licensing are:

Call	Type	Process Stage	Proposed Keeper
GB3BK	70cm Site change, Reading, Berks	RA	G8DOR
GB3BZ	New 70cm Wide split, Braintree, Essex	RIS	G0DEC
GB3CH	Site Change, East Cornwall	RIS	G1RXR
GB3IB	New 70cm Wide split Weston-super-Mare	RIS	G4SZM
GB3IE	New 70cm Wide split Plymouth	RIS	G7DQC
GB3IT	New 70cm Wide split Tamworth	RIS	G6NHG
GB3MG	70cm Site change Bridgend, Mid Glam	RMC	GW3RVG
GB3ND	New 70cm Bideford, Devon	RIS	G4SOF
GB3SY	70cm Site change, Barnsley	RIS	G4LUE

Repeater proposal status as of 13 February 2002. The latest clearance status can be obtained from the RMC website [4].

More information can be obtained from Clacton CLPK's website [2].

'ROGUE' TRANSMISSION

JOHN Senior, G7RXS, chairman of the Leicestershire Repeater Group (LRG), has sent details of a transmission in the Leicester area that appears to be coming from a non-approved cordless telephone operating on 145.080 MHz. One of the members of the repeater group has reported suffering interference across the 2m band from this. Although it isn't causing problems to GB3CF, the frequency is in the repeater input part of the band and if more of these telephones have been imported interference may be caused to other repeaters. A little research on the Internet has revealed that there are 'long distance' cordless telephones available in the US that can be programmed to operate on 145MHz and have ranges of 15km or more. John would welcome reports about this interference and also would like to hear from any other group that has suffered similar problems. John is co-ordinating the information for the Leicester area and intends to pass this on to the RA for further investigation. John can be contacted by e-mail via LRG's website [3] and is QTHR.

John has also provided some news of the group's repeaters. Both GB3UM and GB3CF have had brand new dedicated antennas and feeder installed. GB3LE is now operating on a dualband collinear but with old feeder. The group has been unable to dispense with its duplexer but it hopes that there may be a slight improvement in the performance of the repeater. The next stage of 'LE's refurbishment is to replace the collinear with its own antenna and feeder.

Close-up of the mast at GB3CL.

OTHER NEWS

GB3WG (70cm) in Swansea has been withdrawn from service and the group has no plans to re-establish it. This leaves a significant gap in 70cm repeater coverage in South Wales and the RSGB Repeater Management Committee would like to hear from anyone interested in operating a 70cm repeater in this area.

The West Wales repeater GB3WW requires a site change due to increased site fees at its present location. The repeater group has been unable to secure a new site to date. If anyone can help the group find a suitable site, please send your details to me and I will forward this to them.

An application for a new 23cm ATV repeater near Crawley has been received; this has been processed by RMC and submitted to the RA for clearing. ♦

WWW.

[1] http://www.qsl.net/m0zpd/download.htm
[2] http://www.g3crc.co.uk/
[3] http://homepages.stayfree.co.uk/lrg/
[4] http://www.coldal.org.uk/rmc

EMC

DAVID LAUDER, G0SNO
20 Sutherland Close, Barnet, Herts EN5 2JL
E-mail: emc.radcom@rsgb.org.uk

ONE OR TWO items this month may sound a little improbable and, as this is the April edition, you may be wondering whether there are any 'April fool' items. I can assure you otherwise.

FIELD STRENGTH

ONE MEMBER enquired about the item in the February 'EMC' about field strength measurements by the RA. Details of RA policy on field strength measurements in relation to amateur radio stations were published in August 1999 'EMC' with a correction in October.

The EMC Committee has been in contact with the RA with a view to clarifying certain details and we plan to publish further information when it is available.

RF EARTHING

IN THE FEBRUARY 'EMC', an RF earth was shown in the diagram on good radio housekeeping. If your amateur station has any earth separate from the mains earth, you need to be aware of Protective Multiple Earthing (PME) if your house is wired for PME. Details can be found in *The RSGB Guide to EMC* and the previous edition *The Radio Amateur's Guide to EMC*. The EMC Committee also has an information sheet EMC07 on PME. This is available on the EMC Committee web site.

HF 'NOISE FLOOR'

THERE SEEMS TO BE some confusion among some of the proponents of Power Line Telecommunications (PLT) about the meaning of the 'noise floor' or background noise level on the HF bands.

The International Telecommunication Union has published ITU-R Recommendation PI.372-6 on Radio Noise. Section 1, 'Sources of radio noise' states, "Radio noise external to the radio receiving system derives from the following causes:
- radiation from lightning discharges (atmospheric noise due to lightning);
- unintended radiation from electrical machinery, electrical and electronic equipment, power transmission lines, or from internal combustion engine ignition (man-made noise);
- emissions from atmospheric gases and hydrometeors;
- the ground or other obstructions within the antenna beam;
- radiation from celestial radio sources.

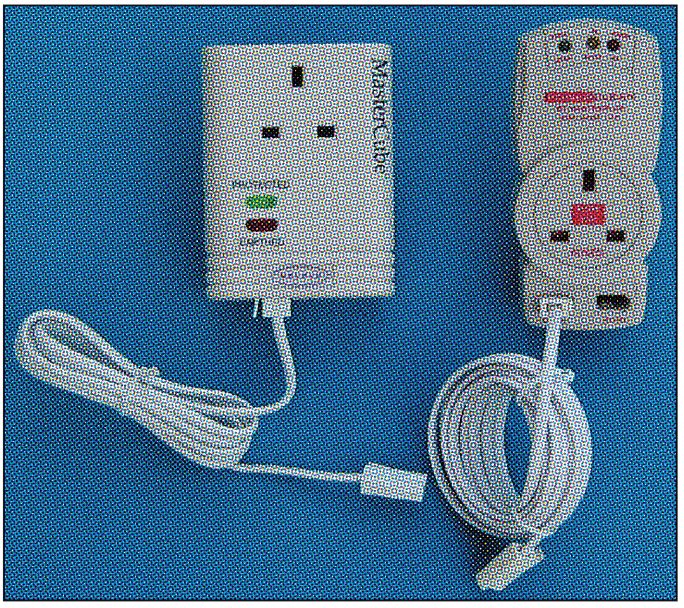
"Note that noise or signal due to unwanted co-channel transmissions or due to spurious emissions from individual transmitting or receiving systems are not considered in this Recommendation."

There are several important points to note. The first is 'radio noise *external* to the radio receiving system'. As explained in October 2001 'EMC', measurements made with an active-loop EMC measuring antenna such as the Rohde & Schwarz HFH-Z2 or Schaffner HLA6120 will be limited by *the noise level of the receiving system*, not the background man-made or natural *atmospheric* noise level.

The second point is that intentional radio transmissions are not 'noise'! We have seen results of tests on power line communications equipment where a sweep of the HF bands has been performed using an EMC measuring receiver with 9kHz bandwidth and the result has been referred to as the 'background noise level'!

At any frequency below the Maximum Usable Frequency (MUF), it can be difficult to find any 9kHz portions of spectrum that are completely free of intentional radio signals. In any case, the selectivity of CISPR 16 measuring receivers is only specified down to the -20dB points, so substantially more than 9kHz would have to be free of intentional signals if there are strong signals on adjacent frequencies.

To measure the true natural or man-made background noise level at HF, it is necessary to use a much narrower bandwidth, such as 100 - 200Hz and to search for the minimum levels found at 'quiet' frequencies between intentional transmissions. Even then, it is difficult to know whether it is the true background noise level that is being measured. Such results can then be scaled to other bandwidths such as 1kHz or 9kHz.



Telephone and mains filters / surge arresters - the Belkin 'Mastercube' and the Masterplug 'PowerClean'.

TELEPHONE FILTERS

A READER who is very well informed about telephone RFI matters has provided some useful information on the elusive BT plug-in telephone filters. He is not surprised that they are difficult to obtain as they are used only in small quantities and BT shops don't stock items that don't sell well.

He also points out that the correct name has always been 'Plug in RFI filter, Item code 877596, Product Code A17871', not 'Freelance' filter. The BT sales staff will only recognise the Product Code. The name 'Freelance' filter occurred only when it was used to prevent conducted RF from the BT 'Freelance' range of cordless phones from affecting other telephone equipment. The 'Freelance' cordless phone was discontinued several years ago.

A further complication has arisen recently. The sale of these small ancillary items has been transferred to a separate department which can be contacted on 0800 085 7223 but, as of March 2002, it had none in stock.

The only new BT telephone RF filter is a common-mode replacement for the hard-wired filter fitted by engineering staff. Like the plug-in RFI filter, it is intended for medium-wave broadcast problems and is used on ISDN and Home Highway installations. It also has applications for ADSL systems. It has been available for several months but it is not a sale item.

MAINS/PHONE SURGE ARRESTERS

DEVICES SUCH AS the Belkin 'Mastercube' and the Masterplug 'PowerClean' (see photo) are designed to protect against overvoltage surges on the mains supply and on telephone lines. They also include some RF interference filtering but, from the details on the packaging, it is not entirely clear what filtering is provided. Several members have got the impression that these products may be useful for RF interference filtering of telephone lines, so I decided to find out.

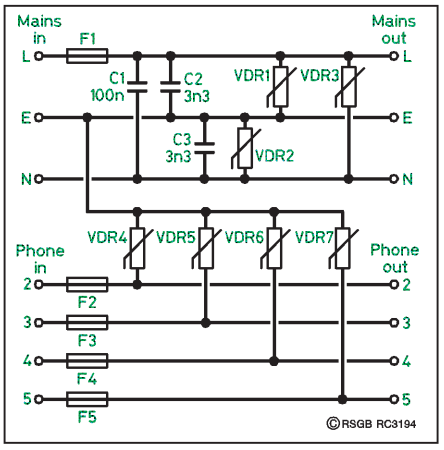


Fig 1: Schematic diagram of a typical telephone line and mains filter/surge arrester.

The technical specification on the box of the Belkin 'Mastercube' states, "EMI/RFI Filtration: 150kHz - 100MHz ≤50dB. Electromagnetic interference/radio interference causes AC line contamination that leads to computer lockups, audio/video interference, and data loss. The greater the decibel reduction across a wider frequency range, the greater the clean protection."

The packaging of the Masterplug 'Powerclean' describes the product as a "Surge + RFI Protected Adaptor for Telecoms". It also states: "RFI Filter. Radio Frequency Interference (RFI) can be particularly disruptive to data, aerial and telecom connected equipment. Some Masterplug PowerClean Surge Protectors also use RFI filters to remove radio frequency noise and interference. This product is fitted with an RFI filter for added protection of sophisticated equipment such as computers, telecommunication devices satellite receivers, videos and TVs".

It also states, "Maximum protection protects valuable hardware and software from power surges and mains-born (*sic*) radio frequency interference (RFI)".

Fig 1 shows the general principle of these devices, but does not apply exactly to either device and does not show various indicator lights.

Both devices have mains surge arresters using metal oxide varistor devices VDR1, 2 and 3, as shown. The Masterplug PowerClean has an additional gas discharge tube surge arrester in series between the junction of VDR1 / VDR2 and mains earth.

On both devices, the mains RFI filtering is somewhat basic with no series inductors. The Masterplug PowerClean has three capacitors, C1, C2 and C3, as shown in Fig 1, but the Belkin Mastercube has only one capacitor, C1 (100nF), between live and neutral.

The Belkin RF filter specification claims ≤50dB in the range 150kHz - 100MHz. This could only be for differential-mode signals (live to neutral) not common-mode (live and neutral together relative to earth), because there is no RF filtering for common-mode signals. It can be shown in theory that an ideal 100nF shunt capacitor between live and neutral could only achieve 50dB loss in a 50Ω test circuit at frequencies of 10MHz and above.

For the telephone line, the Belkin Mastercube has four fuses F2 - F5 and four surge arresters, VDR4 - VDR7, which clamp any overvoltages on the telephone line to mains earth. The Masterplug PowerClean has only two fuses and two surge arresters which protect pins 2 and 5 of the telephone line but not the 'ringer' wire (if used).

These devices should be useful for protecting modems and TV set-top boxes from damage by lightning-induced overvoltages on the telephone line but, of the two products tested, only the Belkin Mastercube protects all four telephone wires.

Neither product provides any RF filtering for the telephone line, however and, as a mains filter, it seems unlikely that either would solve problems of breakthrough of amateur transmissions. Such problems can seldom be solved using a mains filter at the affected equipment and, in any case, the mains filtering capability of these devices is limited due to the lack of any series inductors.

W W W .
EMC Committee web site:
www.qsl.net/rsgb_emc

VIDEO ON MAINS

THE LATEST PRODUCT that uses mains-borne communication in the US is a covert video surveillance camera type CVL32 from Supercircuits Inc. It contains a monochrome 525-line video camera built into a PAR38 type reflector flood lamp. The lamp also contains some LEDs (presumably infra-red) for illuminating the subject. The video output is sent to a receiver via the mains supply with a claimed range of up to 2000 feet on the same power circuit. In view of the bandwidth required for video transmission, this application would require frequencies in the HF band or above.

It is not known whether this product meets US FCC requirements or whether a 240V 625-line version is likely to appear in the UK soon.

TV AUDIENCE RESEARCH DEVICES

THE ITEM in December 2001 'EMC', about TV audience research devices, has resulted in quite a lot of interest, although it is really a spectrum utilisation matter rather than an EMC matter.

Chris, G4CLB, reports that we have solved a mystery for him. He had noticed weak intermittent interference pulses on or around the 433.500, 433.525, 433.550MHz 70cm FM simplex channels. Chris's household is one of 6000 that accepted a request to join a TV audience research viewing panel. He had an ATR monitoring device installed on his TV set about six months ago, but didn't associate it with the 70cm interference until he read the December *RadCom*.

In Chris's case, the equipment appears to have been tuned to 434.520MHz. Signals on this frequency are S9+, but his receiver detected signals on the U280 FM calling channel (formerly SU20) that were still high enough to open the squelch, making routine monitoring of this channel annoying.

Chris has informed ATR, but is prepared to live with the signals for the time being unless they cause a problem to any other radio amateurs nearby. He reports that the installation and / or testing of the monitoring equipment took at least two hours per visit and that he had four such visits to fit software upgrades.

For standard installations, ATR telephones its modem in the home to download the data. The installing technicians modify the BT junction box to prevent the phone ringing when they dial in to download the viewing data in the early hours of the morning. In Chris's case, the phone *did* ring causing a household furore at 3am so the ATR technician paid another visit to fit a mobile phone to replace the landline modem.

NECK MASSAGERS

WE HAVE RECEIVED a report of a battery-operated neck massager which produces considerable interference on the HF bands. Below 30MHz, such equipment is required to comply with limits for *conducted* emissions via the supply cable, but this product has no supply cable and there are no *radiated* emission limits below 30MHz at present.

I would be interested to hear of any other similar reports about massagers. With some other types of battery-operated massager, users might not wish to broadcast the fact that they are using the device! ♦

IARU

TIM HUGHES, G3GVV
10 Farm Lane, Tonbridge TN10 3DG.

THE International Telecommunication Union (ITU) is a world-wide organisation which brings governments and industry together to coordinate the establishment and operation of global telecommunications networks and services. It is responsible for standardisation, coordination and development of international telecommunications including radiocommunications, as well as the harmonisation of national policies.

To fulfil its mission, ITU adopts international regulations and treaties governing all terrestrial and space uses of the frequency spectrum, as well as the use of all satellite orbits which serve as a framework for national legislations; it develops standards to foster the interconnection of telecommunications systems on a world-wide scale regardless of the type of technology used; and fosters the development of telecommunications in developing countries. ITU organises world-wide and regional exhibitions and forums, bringing together the most influential representatives of government and the telecommunications industry to exchange ideas, knowledge and technology for the benefit of the global community, and in particular the developing world.

AMATEUR RADIO AND THE IARU

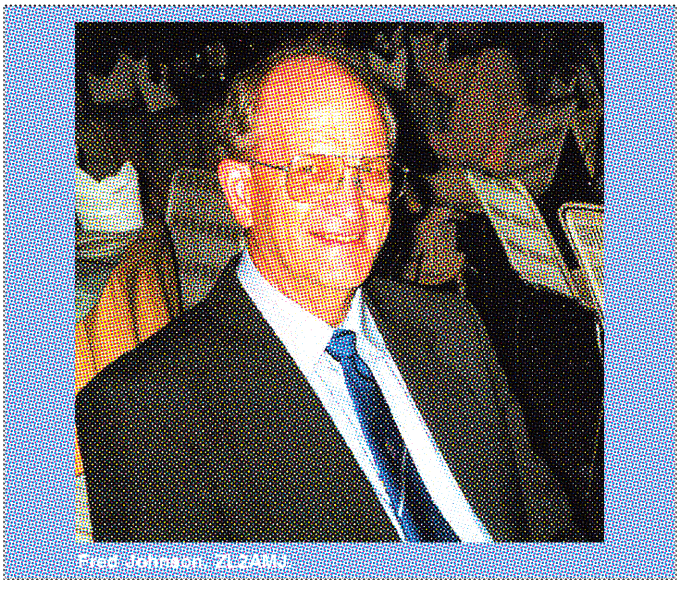
THE AMATEUR radio movement as we know it today emerged shortly after the beginning of the 20th century, and in 1927 achieved formal international recognition at the International Radio Convention in Washington, DC. Today, the service operates under a general mandate that has remained virtually unchanged since that time.

The ITU provides these formal definitions: "Amateur Service: A radiocommunication service for the purpose of self-training intercommunication and technical investigations carried out by amateurs, that is by duly authorised persons in radio technique solely with a personal aim, and without pecuniary interest. Amateur Satellite Service: A radiocommunication service using space stations on earth satellites for the same purposes as those of the amateur service."

In a recent publication, the International Secretariat of the IARU outlined 10 ways in which the amateur service benefits humanity:

1. It provides disaster communications resources. When natural disasters cause normal communications channels to be lost or overloaded, radio amateurs can respond swiftly and effectively for calls for assistance. This capability is internationally recognised: in 1991 the Tampere Declaration on Disaster Communications "encouraged the development of the amateur services and their application to disaster communications". In 1997 at the World Radiocommunication Conference, the ITU Radiocommunication Sector included amateur radio facilities and mobile and portable satellite terminals amongst the systems available in case of disasters.
2. It develops a national source of electronics expertise. Radio amateurs train themselves in electronics, in radio wave propagation theory, and in telecommunications techniques. The practical, hands-on experience gained as a radio amateur is valuable across a wide range of disciplines.
3. It contributes and demonstrates electronic innovations. What is learned and discovered is to the advantage of employers, governments, and the general public.
4. It promotes the exploration of signal propagation phenomena and the development of techniques to utilise the radio frequency spectrum more efficiently. Radio amateurs have demonstrated the feasibility of using a variety of propagation modes, such as moonbounce, meteor scatter, auroral propagation, tropospheric ducting, Sporadic E, transequatorial spread-F, and low power satellites.
5. It promotes international friendship and understanding. Amateur radio provides the opportunity for direct, person-to-person international contact among the peoples of the earth.
6. It projects the national image. Radio amateurs can be said to represent their countries over the air.
7. It provides a learning opportunity for all, including the young, the old, and the disabled. It is a learning opportunity for the young, a productive outlet for older persons, and for the disabled it offers an exceptional opportunity for external contact.
8. It is a disciplined and self-regulating service.
9. It is a growing service. Increasing numbers of people are being attracted to amateur radio, with almost three quarters of a million involved.
10. It needs spectrum space. The benefits of amateur radio are available throughout the world, because of the enlightened and long-standing international policy of allocating segments throughout the frequency spectrum for use by radio amateurs. This policy is maintained through the constant and continuing efforts of the IARU.

Whilst these 10 points are valuable in discussions at international meetings, they are equally valid when describing the strengths of amateur radio at local and national levels.



Fred Johnson, ZL2AMJ

FRED JOHNSON, ZL2AMJ

THE FEBRUARY 2002 issue of *RadCom* carried the welcome news that Fred Johnson, ZL2AMJ, had been awarded the Calcutta Key for outstanding service to international friendship.

An RSGB member since August 1961 ("I joined to get 'Technical Topics' and have been an avid *RadCom* reader every month since", he tells me), he lives near Wellington, New Zealand. For many years he has been actively associated with NZART, both as a Councillor, President and Vice-President, and since 1980 (with a short break in 1999) as its Administration Liaison Officer. Fred served as a member of the New Zealand Delegation as the Amateur Radio Representative at two World Radio Conferences.

At the 1985 IARU Region 3 Conference in Auckland, he was elected to be a Director of that Region and was appointed Director / Chairman at the Region 3 Conference in Singapore in September 1994. He has subsequently attended several meetings of the IARU Administrative Council. ♦

DATA

ANDY TALBOT, G4JNT
15, Noble Road, Hedge End, Southampton SO30 0PH.
E-mail: data.radcom@rsgb.org.uk

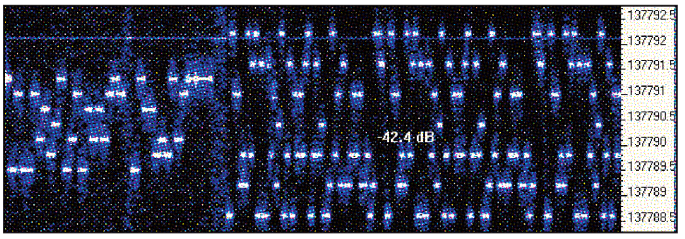
SEVERAL MEMBERS of the Flight Refuelling Amateur Radio Society in Wimborne are experimenting with 2.4GHz data comms. As Paul Marsh, G7EYT, explains: "At FRARS we are keen to explore new technology when it appears. Wireless networking using the 802.11b standard is a good example of this, and it mixes radio with computers, so provides experience in both spheres of technology." This low microwave frequency band falls into one of the low-power licence-free allocations and its use for local area networking normally is by type-approved, low-power equipment. The big difference for us, however, is that the lowest six channels of the WLAN band fall into the 2.3 - 2.45GHz amateur radio band, where we can use bigger antennas or higher power, or any other means to cover longer distances and wider areas. Members of the group regularly network at 11MB/s over long-distance paths of 6km and, on Saturday 19 January 2002, Paul, G7EYT; Carl, G6NLC; and Neil, M1NCD, successfully completed a 14km range check with 802.11b equipment and home-built antennas. Paul was located at Whiteways car park on the Purbeck Hills in Dorset, and Carl was located in Lychett Minster, also in Dorset. Apparently, whilst on the Purbecks, other access points could be detected, from at least six to eight kilometres away. The photograph below shows several commercial WLAN cards as well as a home-built antenna.

Some commercial WLAN cards, together with a home-built antenna.

LF DATA COMMS UPDATE

DATA COMMUNICATIONS on the 136 and 73kHz bands continues to show its advantages in distances and paths worked. In recent columns, I have mentioned the use of Slow CW (QRSS) with dot lengths of many seconds received on a waterfall display. In an attempt to speed up the time for an exchange of information, dual-frequency CW (DFCW) is used by several operators, where dot and dash symbols are made the same length, but separated in frequency by anything from a fraction of a Hertz to several Hertz, depending on signalling speed. This way, the exchange can be speeded up by a factor of approximately two, enabling maximum use to be made of the short-lived propagation enhancements typical on LF paths. For CW, approximately 10 dot periods are needed for each character. For DFCW this reduces to about the period of one symbol .

In an attempt to speed up the exchange further, two different multi-frequency modes were dreamed up. In December, Rik, ON7YD, tentatively proposed a multi-tone coding scheme where an alphabet of 49 characters is represented by two frequencies sent one after the other out of a possible seven tones; for this reason it was given the name 7FSK. By viewing the received signal on a waterfall display or spectrogram, and with the aid of a crib sheet overlay, it is possible manually to decode the text sent. Several operators who have the ability to set their transmit frequencies accurately under computer control quickly wrote software to transmit this mode and test it. Reception reports showed that it was successful, but most receiving stations commented that they needed to make up grids or overlays to place over the computer screen in order to work out the tones and relate these to the alphabet—all rather tedious. However, the concept was proved and, of course, we are now down to two symbols per character, potentially five times faster than QRSS for the same noise bandwidth (for reception of a single tone), albeit with a wider total signal bandwidth. Some signals were decoded over the trans-Atlantic path. The 'spotty' nature of the received signal as viewed on a spectrogram caused one LF operator to refer to it jokingly as 'Measles Mode'. An off-air photograph of my 7FSK transmissions, as received by NL-9222, is shown above.



The author's 7FSK signals, as received by NL-9222.

JASON

A MONTH LATER Alberto, I2PHD, wrote the *JASON* software. *JASON* is also a multi-tone mode but, this time, operates via a PC soundcard and, by making use of machine decoding of the received symbols, removes the need to interpret a visible trace by eye. An alphabet of 64 characters was originally differentially coded by taking the absolute change in frequency between a pair of tones chosen from a set of 33. By using differential coding, the effect of tuning errors was reduced, as the machine no longer had to detect the actual frequency of a tone received, merely the change from the last one. Since the direction of frequency change was irrelevant, up to 16 values could be coded from one shift (if the no-change state were prohibited), which meant four bits of the character could be coded per shift. The next frequency change gave another four bits and, after taking one bit from each set to label which of the two frequency shifts corresponded to high and low nibbles, the six remaining bits formed the character sent. By making use of the absolute frequency shift only, the use of lower- or upper-sideband reception was made irrelevant. *JASON* was coded into symbols of approximately five seconds in length, or 10 seconds per character, with a frequency spacing between tones of 0.25Hz, leading to a total signal width of around 8Hz. The noise bandwidth, or received bandwidth per tone, is around 0.08Hz. By popular demand, Alberto changed the coding to use 17 tones to reduce occupied bandwidth, but now the direction of frequency change became important and provision for USB / LSB switching was built into the software. The mode is in quite widespread use now on LF, and its machine decoding superiority over visual decoding of QRSS etc *when sent at the same symbol speed* shows up clearly. ♦

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the last WORD

The Marconi Inheritance

I was privileged to participate in manning a special event station, GB3PMA, at the Haven Hotel, Sandbanks, Poole, for a week in December 1971. The occasion was the 70th anniversary of Marconi's historic trans-Atlantic transmission. The management of the Haven Hotel were most helpful and provided a room above the 'Marconi' room. They also allowed several antennas to be erected on the roof. In evidence at that time was a considerable amount of artifacts, documents and pictured of Marconi's activities.

Around 1997, I was approached by a colleague, who told me of his experience while visiting the Haven Hotel with the hope of seeing the Marconi 'Museum'. There was no evidence of any of the Marconi relics to be seen anywhere. None of the staff present seemed to have any knowledge of the historic connections with Marconi.

Remembering the support given by the local newspaper, *The Daily Echo*, I wrote to them reminding them of the event and their support. They published my request for any information regarding the fate of the Marconi memorabilia. They included a picture of one of the operators at a transceiver, which they had originally published. There was no public response.

It looks as if a valuable part of the Marconi history has been lost forever.

Arthur Lawrance, G3RZV

[*If any member knows the whereabouts of these artifacts, please write to G3RZV QTHR or e-mail radcom@rsgb.org.uk and we will forward the information on to Arthur - Ed.*]

DTVI

This week, for the first time in 12 years of regular operating, I have had a complaint of TVI from my next-door neighbour. He has just had a wide-screen digital TV installed and was experiencing black lines across the picture. On investigation I found that the Tandy split ferrite I had fitted to the TV end of his fly lead many years ago had found its way to the wall socket end. Switching it round seems to have resolved the matter. I was obviously overloading the TV front end. So much for Digital TV being less susceptible to interference, or is it because of lower TV transmitter power?

There may, however, be a bonus for me in all this. For years his old TV filled the 15m band with time-base buzz which made the band unusable for me and hopefully the new one may be better. How ironic he can complain about me causing TVI but I have no redress about his TV causing me problems that can't be resolved with a simple ferrite or trap.

Jim Brightman, G0JXN

RAE - RIP?

Last year the RAE was taken by just 500 people and over the last 15 years the number of courses being run has steadily declined. In much of the country it is impossible to find a course.

While the RAE may have been OK way back in the 60s and 70s it is no longer suited to the requirements of modern amateur radio. It fails to cover even the basics such as the correct on-air operating procedure and the operation of a station. Both the Foundation and Intermediate exams are far superior in this respect.

As things stand I find it hard to believe that many will bother to progress beyond the Intermediate licence. The RAE [course] takes almost a year from starting the course to getting the exam result. Since most amateurs run 100 watts or less the only gain for all that effort will be a 3dB increase in power level over Intermediate.

Perhaps we need to re-think whether we really need more than two levels of licence. If we do want to keep the existing three level structure the way ahead has to be the addition of a couple of extra course modules that can be taken at any time to upgrade from Intermediate to Full. Such upgrade course modules should be administered by the RSGB as the City & Guilds have proved themselves to be too inflexible for our needs.

Trevor, M5AKA

[*The Radiocommunications Agency and the RSGB are well aware of the inadequacy of the current RAE syllabus to meet the needs of today's radio amateur. Throughout this year the Society, in partnership with the RA, is conducting a full review of the Intermediate and Full licence examination syllabi. The aim is to have complementary and dovetailed syllabi in place for the Foundation and Intermediate licences by January 2003 and the Full licence by June 2003 - Peter Kirby, G0TWW, General Manager.*]

M3 Power No Barrier

I had some initial doubts about the 10W power restriction [of the Foundation Licence] but these proved to be unfounded. For my very first QSO on 40m I received a 58 report from LY2FY and shortly afterwards on 20m, a respectable 57 from 9A1BHI. I did hear from one or two Class A licensees that they had been a bit worried about the 'M3 invasion', but that they had subsequently been surprised by the good standard of operating. I should also like to thank all the Class A operators, with whom I and other M3s have been in contact, for their help and encouragement.

Harry Arrowsmith, M3KNK / G7KNK

E-Mail Pirates?

As an amateur who is very active on the Internet I was somewhat shocked to find that upon attempting to sign up for an e-mail account using my callsign, someone has apparently already taken it. I know I am not the only one because I have seen amateurs using things like "2002" after their callsign in an e-mail address. I am sure I am not the only one who feels indignant that my hard-earned callsign is being used as an ID by someone else who, for all I know, may frequent dubious chat rooms.

I am proud of my call and all it stands for. For an amateur it is the logical e-mail address and Internet ID and I want to use it! May I suggest that all amateurs who are active on the Internet or who intend to be secure their callsigns at as many e-mail providers as they can, as well as their own ISP? Even if you do not need multiple e-mail addresses, securing them now will keep their exclusivity to you.

The Internet is here to stay and so is amateur radio. I think most amateurs are on-line in some way, so is it possible, I wonder, for an approach to be made to the IARU to secure the use of our callsigns exclusively on the Internet?

Angie Sitton, G0HGA

Make Source Code Available

Software has a strange position within amateur radio. While it has great properties for experimentation - low cost, very good reproducibility (better than the average RF design), it never oscillates, and one can't blow expensive finals - the amateur community sees software as a 'magic' black box.

Few amateurs are willing to learn how to program, how to make changes etc. Indeed, a fair amount of effort seems to go in illegal copying, illegally exchanging enabling codes for shareware / commercial software, and similar activities; these activities can be heard on the bands all too often.

I believe it is time for the amateur community to change its attitude towards software. People should see programming capabilities as something they should learn as an effort to stay current with technology, and be careful to use open standards, so that others can experiment, and perhaps enhance and improve, just like we do with RF radio gear. This would also go a long way towards avoidance of incompatible standards, and 'closed' software, which is currently hampering developments on repeater linking, and many other topics.

Geert Jan de Groot, PE1HZG

WATERS & STANTON

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SOUTH,

2002 W&S CATALOGUE NOW OUT

HYGAIN

HYGAIN ROTATORS BACK IN THE UK

CD45IIX	£399	C
HAMIVX	£499	C
T2XX	£649	C

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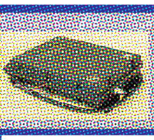
HYGAIN ANTENNAS

TH7DX	£799	D
THIIDX	£995	D

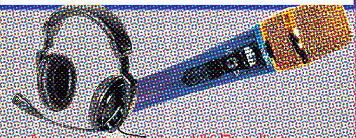
SGC-230 Smart Tuner £359.95

Plus £9.00 Carr.



Covers 1.6 - 30MHz and handles 3 - 200W. Designed for end fed wires, just connect to 12V and feed with RF via coax. Can be mounted outside or at top of mast.

HEIL MICS + HEADSETS



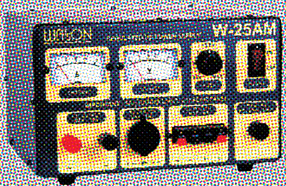
Appointed by Heil as UK Distributor

Proset-4	H'phone/boom mic	£129.95 B
Proset-5	H'phone/boom mic	£129.95 B
Pro-5-4	Single H'phone/mic	£119.95 B
Pro-5-5	Single H'phone/mic	£119.95 B
AD-1	Cables Y, K, or I	£16.95 A
HM-10-4	Stick mic	£76.95 B
HM-10-5	Stick mic	£75.95 B
CC-1	Cables Y, K, or I	£29.95 A
HC-4	Spare insert	£32.95 A
HC-5	Spare insert	£32.95 A

You can convert your mic to Heil by simply purchasing HC-4 or HC-5 insert.

POWER SUPPLIES £89.95

Plus £9.00 Carr.

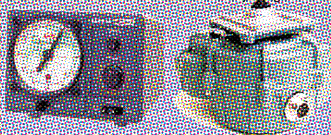


Watson power supplies guarantee the very best performance and value for money. Tried and tested, they have been submitted for independent laboratory testing for safety and electrical performance.

W-3A	3 Amp fixed supply	£22.95 B
W-5A	5 Amp fixed supply	£29.95 B
W-10AM	10 Amp variable supply	£59.95 C
W-25AM	25 Amp variable supply	£89.95 C
W-30AM	30 Amp variable supply	£119.95 C

CREATE JAPANESE ROTATORS

These are tough rotators that weigh almost twice as much as similar priced units and have great turning capacity. Made by Create of Japan, they will handle 4 element HF yagis with ease. Our own Create model has been on our roof for 12 years turning a 4-element HF beam. We wouldn't use anything else!

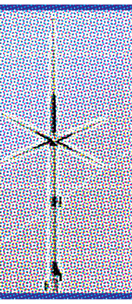


RC5-1	Standard control box. OK for 4-el Yagis - needs 7-core cable	£349.95C
RC5-3	Control box features pre-set or manual control. Otherwise the same as RC5-1 above	£449.95C
MC-2	Lower mast clamps	£59.95 B

PBX-100 PORTABLE HF £99.95

Plus £9.00 Carr.

80m - 10m 200W



The PBX-100 offers 80m - 10m operation (max 4 bands at any time) with a height of just 3.6m. Supplied with ground spike, it takes seconds to erect, yet collapses down to little more than 1m. Like all ground mounted verticals, it benefits from radials, and the radial wire is provided. Use it in the garden, in the countryside or abroad. SO-239 connection.

CAROLINA WINDOMS

CW-80 Special

Just 66ft long yet covers 80m - 10m. It will out perform a G5RV and give lower angle of radiation because of the 10ft vertical section which is forced to radiate. It will handle 1.5kW.

Carolina Windom 80 Special

£109 C

Other Models (all with low angle radiator stub)

CW-160	160 - 10m 171ft long	£129.95 C
CWS-160	160 - 10m 133ft long	£129.95 C
CW-80	80 - 10m 133ft long	£99.95 C
CW-40	40 - 10m 66ft long	£94.95 C
CW-20	20 - 10m 34ft long	£79.95 C

80-40-20m Mini Dipole

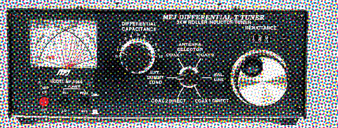
The "80 plus 2" Mini - Dipole was designed by our Director, Peter Waters, G3OJV. Just 52ft long, it uses linear loading - no tuned traps. It can be directly fed without ATU and also operates at 2.5:1 VSWR on 15m. Amazingly efficient, it handles 400 Watts and is balun fed. Erect it as an inverted V and it takes up less than 40ft of space. If you have a small garden, don't miss out on the LF bands anymore.

£79.95 Carr. £6.00

MFJ-986 ATU £349.95

Plus £9.00 Carr.

3kW Differential 1.8 - 30MHz

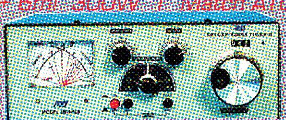


One less knob to twiddle, but all the facilities of the MFJ-989C

MFJ-969 ATU £199.95

Plus £9.00 Carr.

HF + 6m! 300W "T" Match ATU



It has a very accurate PEP meter built-in. (PP3 battery needed) Includes VSWR cross needle meter, dummy load and lovely roller coaster for critical adjustment. Handles coax, balanced an wire. Size 268 x 242 x 95mm.

MFJ-949E ATU £159.95

Plus £9.00 Carr.

1.8 - 30MHz 300W "T" Match ATU

Our most popular ATU because it covers all HF bands and matches anything from coax to long wire to balanced feed. Take a look at the price and then consider that it even includes a dummy load plus power and VSWR meter. Measuring 260 x 190 x 83mm, it really is great value.

MFJ

MFJ-914 • Auto ATU Extender £64.95

Plus £9.00 Carr.

Match into that G5RV or similar

If your internal auto ATU is having trouble matching your G5RV or similar antenna this should solve the problem. Just place it in series with the coax feed to the rear of your transceiver. Magic!

MFJ-418 £79.95

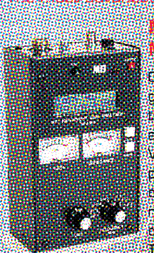
Plus £9.00 Carr.

The easy way to learn CW

Unlike other tutors, this one sends true text and full length QSOs, just like the real test. The massive database avoids frequent repeats too! Will also send groups and displays the text.

MFJ-269 AND MFJ-259B

The most advanced antenna analysers



MFJ-259 £269.95 Carr. £9.00

MFJ-269 £369.95 Carr. £9.00

Connect it to your antenna and get all the information you need to optimise it for best performance including resonance, VSWR and impedance. Totally portable (using AA cells), you can work right up by the antenna. The MFJ-259 is the basic design covering 1.8 - 170MHz. The MFJ-269 has extended coverage up to 470MHz and gives an extremely wide range of measurements, even indicating where a break is in a coax cable.

MFJ DUMMY LOADS

MFJ-264 or MFJ-264N

1.5-150MHz 1.5kW £74.95

"N" version of above £79.95

MFJ-260C or MFJ-260CN

1.5 - 150MHz 300W £37.95

"N" version of above £44.95

Carr. £9.00

MFJ-962D ATU £289.95

Plus £9.00 Carr.

1.8 - 30MHz 1.5kW "T" Match

For use with medium linears. Using the famous "T" Match design, this ATU will cope with any antenna whether it be coax, end fed wire or balanced feed. You can monitor your power (average or PEP 200W or 2kW max) and VSWR. Antenna switch selector is included for two antennas. Size 270 x 375 x 115mm.

MFJ-989C ATU £379.95

Plus £9.00 Carr.

3kW 1.8-30MHz "T" Match

This design has a roller coaster coil and a 4:1 balun to match balanced line. Ideal for coax, end fed wires and open wire feeder. Features PEP or RMS power measurement, VSWR, antenna switch, bypass, built-in dummy load etc. Size 270 x 375 x 115mm.

MFJ

MFJ-1025 • Local Noise Canceller £159.95

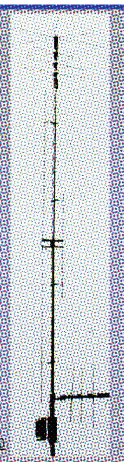
Plus £9.00 Carr.

Kills local noise, but lets signals through. Handles electrical noise, TV time-base etc. Short length of wire picks only local interference and cancels it out.

MFJ-1026. As MFJ-1025, but has active whip antenna for picking up noise signals (as illustrated above). £159.95 Carr. £9.00

MFJ COMPACT VERTICALS

MFJ verticals are compact, yet offer a large number of bands. Being vertical dipoles, they offer exceptionally low angle of radiation for DX. They are rated up to 1kW on the HF bands.



MFJ-1796 (40, 20, 15, 10, 6 & 2m)

Just 3.65m long, it is the ideal antenna for really small spaces. VSWR typically 1.2:1 £234.95 Carr. £9.00

MFJ-1798 (80, 40, 30, 20, 17, 15, 12, 10, 6 & 2m!)

Only 6.7m long, it covers every popular band. No radials and no ground needed. £319.95 Carr. £9.00

MFJ-616 SPEECH INTELLIGIBILITY ENHANCER £169.95

Plus £9.00 Carr.

HEAR SIGNALS BETTER

Designed to enhance the audio of your transceiver. MFJ President, Martin Jue suffers with deafness and said that this has put the enjoyment back into radio for him!

MFJ-461 • MORSE CODE READER £84.95

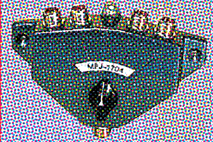
Plus £6.00 Carr.

The MFJ-461 is a stand-alone pocket sized Morse code reader. Similar in size to the MFJ Morse tutors, all you do is hold it close to your receiver and it instantly displays CW on the 32 character high contrast LCD. It has automatic speed tracking, a serial port - if you wish to connect to a computer to display the text on a bigger screen. It can also be connected to your receivers audio if required. Truly pocket sized at 57 x 82.5 x 25.5mm and 156g.

MFJ-1704 • 4-way switch £69.95

Plus £6.00 Carr.

DC - 500MHz 2.5kW



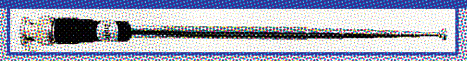
This is a heavy duty die-cast 4-way switch with SO-239 sockets, central earth position and built-in static discharge protector. Makes changing antennas a breeze!

MFJ-392 Mono Padded Communications Earphones £24.95

Plus £3.00 Carr.

These are purpose designed communications padded headphones that are ideal for all the modern transceivers and receivers. Suits 3.5mm and 1/4" jacks - adaptor provided.

AT-2 2m Telescopic



* Tx: 140 - 160MHz * Rx: same
* 10W Max power handling
* 14-52cm long * BNC fitting
£9.95 A

WRH-169 Tuneable VHF

* Tx: 135 - 175MHz * Rx: Tx band only
* 10W Max power handling
* 22cm long approx * BNC fitting **£7.95 A**

AT-70 Flexible

* Tx: 430-440MHz * Rx: same
* 10W Max power handling * 18cm long
* BNC fitting **£9.95 A**

WSW-2 2m Super-Wand

* 144 - 148MHz * Gain 2.15dBi * VSWR <1.5
* Power 10W * 62cm long * Weight 36g
* BNC fitting * Colour black **£9.95 A**

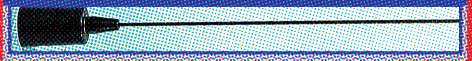
AT-270 Dualband Telescopic

* Tx: 135-440MHz * Rx: Tx band only
* 10W Max power handling * 16-45cm long
* BNC fitting **£14.95 A**

WBV-70 Half Wave Vertical

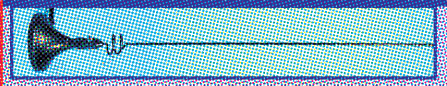
* Frequency 69-71MHz * GRP & Aluminium * 3.5dB
* Max power 150W * Impedance 50 Ohms * SO-239 socket * SWR 1.1.5 or better * Mast size 25 - 50mm
* 2m Long * Weight 1kg **£39.95**

WMW-500 Adjustable



* Tx 50-500MHz adjustable * 2.15dBi
* VSWR <1.5:1 * 200W max* Length 1.27m
* Base PL-259 * Weight 100g **£12.95 B**

WSM-225 Airband



* Dual band Military & Civil
* VHF transmit - (50W max)
* VHF freq. 118 - 137MHz
* UHF freq.225 - 400MHz receive
* Whip length: 725mm * Micro magnetic mount: 29mm
* Coax lead 2.5m long * BNC plug **£22.95 A**

W-901 Airband

* Tx: 118 - 137MHz * Rx: 225 - 380MHz
* 10W PEP Max power handling * 21cm long
* BNC fitting **£19.95 A**

W-2002 Counter Gainer

* 25 - 1300MHz * 50 Ohms * 62cm long
* Weight 36g * BNC fitting * Colour black
£9.95 A

WHX-7000 Dual Band

* Tx: 144 & 430MHz * Rx: Tx bands only
* 10W Max power handling * 21cm long
* BNC fitting **£14.95 A**

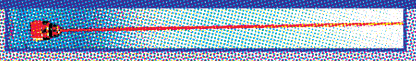
AT-6 6m Telescopic

* Tx: 50 - 54MHz * Rx: same
* 10W Max power handling * 150cm long
* BNC fitting **£4.95 A**

WSMA-450

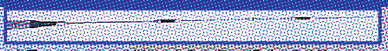
* Tx: 144, 430 & 1200MHz
* Rx: 120/150/300/450/800MHz
* 10W Max power handling
* 4.5cm long * SMA fitting **£12.95 A**

W-2LE 2m 1/4 wave



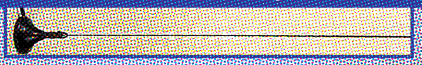
* Tx 144MHz * 2.15dBi * 200W max) * Spring foldover
* Length 0.48m * Base PL-259 **£9.99 A**

W-7900 2m/70cm



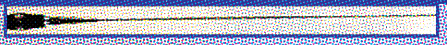
* Tx 144 & 430MHz * 5 & 7.6dB * 150W max
* Spring foldover * Length 1.68m * Base PL-259
£32.95 B

WSM-138 Mini-Mag



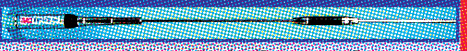
* Adjustable 138 - 470MHz * Gain - unity
* 50W max * Micro magnetic 29mm base
* Element max length 0.55m
* 2.75m mini coax with BNC **£19.95 B**

W-285 2m 5/8th



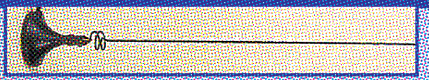
* Tx 144 MHz * 3.4dB * 200W max
* Length 1.33m * Base PL-259 **£14.95 B**

W-627 6m/2m/70cm



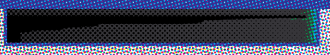
* 432MHz 144MHz 50MHz * 2dB (6m) 4.5dB (2m)
* 7.2dB (70cms) * Length 1.6m * Max power 120W
* VSWR <1.5:1 * Weight 460g **£34.95 B**

WSM-270 Mini-Mag



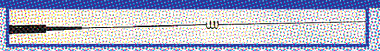
* Tx 144-146 & 430-440MHz * 2.15dBi, 6.15dBi
* 50W max * Micro magnetic 29mm base
* Element length 0.46m * 2.75m mini coax with BNC
£19.55 A

W-77LS 2m/70cm

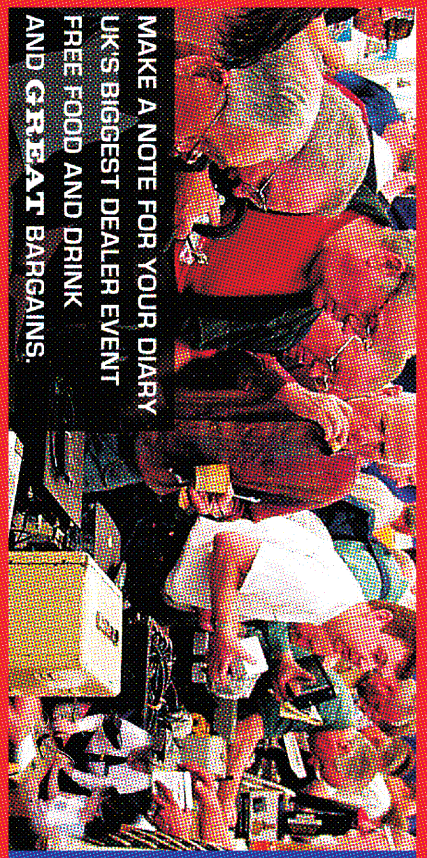


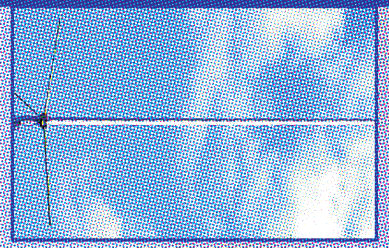
* Tx 144 & 430MHz * 0dBi & 2.5dBi
* VSWR < 1.5:1 * 50W max* Length 0.42m
* Base PL-259 * Weight 70g **£14.95 A**

W-770HB 2m/70cm



* Tx 144 & 430MHz * 3dBi & 5.5dBi
* 200W max * Length 1.1m * Base PL-259
£24.95 B





W-30

* 270MHz * 3/6 dB * 150W * 1/2, 2x5/8
* 1.15m * 0.885kg **£39.95 C**

W-50

* 270MHz * 4.5/7.2dB * 200W
* 3x1/4, 3x5/8 * 1.8m * 1.2kg **£49.95 C**

W-300

* 270MHz * 6.5.9dB * 200W * 2x5/8, 5x5/8
* 3.1m * 1.46kg **£59.95 C**

W-2000

* 6/2/70MHz * 2.15/6.2/8.4dB * 150 (50W 6m)W
* 1/2, 2x5/8, 4x5/8 * 2.5m * 1.2kg **£69.95 C**

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