A Newcomers' Introduction to PIC Programming

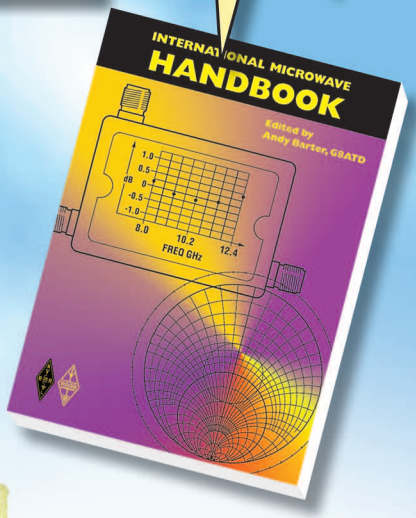
0 6 0 2

www.rsgb.org

RadCom

OUT NOW! see p25

£3.95 Vol 78 No 6 ◆ June 2002 The Radio Society of Great Britain Members' Magazine



Starting this month:
CDG2000 Transceiver
A Major New Construction Project

Reviewed:
ICOM IC-756PRO II
Walford 'Compton' Receiver Kit
New Books

RSGB

Celebrate HM The Queen's Golden Jubilee with Amateur Radio

WATERS & STANTON

HEAD OFFICE 22 MAIN RD, HOCKLEY, ESSEX, SS5 4QS **ENQUIRIES:**

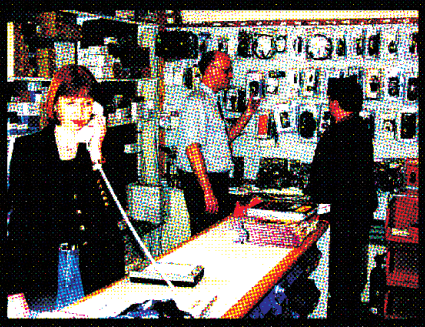
MIDLANDS + NORTH SHOP BENTLEY BRIDGE, CHESTERFIELD

SCOTLAND + BORDERS SHOP 20, WOODSIDE WAY, GLENRO

web: www.wsplc.com Freephone Order

PRICE MATCH

MIDLANDS BRANCH IS BUZZING!



Our Midlands Branch run by Richard at Lowe Electronics is getting busier by the week.

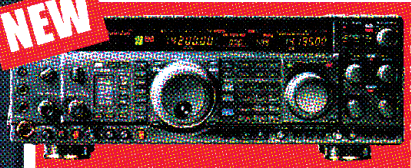
You'll find all the Waters & Stanton products at the same competitive prices. If you live in the Midlands, then give Richard a call or pay him a visit. It makes sense to be loyal to your local dealer, particularly with our prices!

WATERS & STANTON LOWE

PRICE MATCH

YAESU NEW FT-1000MP MKV FIELD £2199 C

NEW

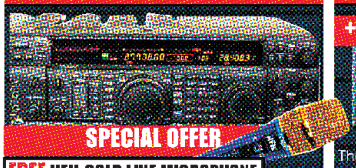


The Yaesu FT-1000MP Mk V has become the benchmark standard for HF transceivers, and has been used by more top DXpeditions than any other model. Now you can share this top performance at a very special price with the new "Field" model. This gives you all the superb features of its bigger brother but with 3dB reduction in power output, making it the same power output as most other radios. But you will be ahead of the pack with the unequalled receiver performance and the ability to operate under extreme conditions and still pull out the weak signals. We think Yaesu have pulled off a master stroke here, because the price reduction will not affect the value of the 200 Watt version, but does bring the FT-1000MP MKV performance within reach of so many more customers.

YAESU KENWOOD ICOM

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 C

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 6dB gain and there are 4 seperate antenna sockets.

£1149 C

FT-100 D 160m - 70cm ALL MODE

SAVE

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

£899 B

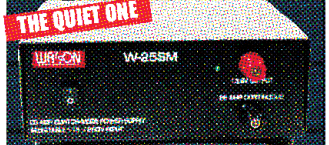
FT-920AF HF 160m-6m-100W

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

£1099 C

W-25SM 25AMP SWITCH-MODE POWER SUPPLY

THE QUIET ONE



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

£69.95 B

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 cluster 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 C

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	H'phones	£52	B
MC-90	Desk mic	£187	B
MC-80	Desk mic	£72	B
PS-33	Power supply	£199	C
SP-23	Speaker	£68	B
CW	Filters each	£61	B
SSB	1.8kHz	£61.95	B

£849 C

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.

£1349 C

SGC

SGC SG-2020 £599 A

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

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

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

IC-756 PRO II £2495 C

NEW

IN STOCK NOW!

This is Icom's new Flagship.

IC-7400 160m - 2m ALL-MODE

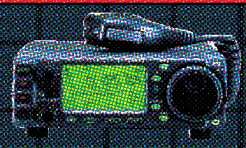
NEW

IN STOCK NOW!

£1499 C

IC-706MkIIG 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.

IC-706MkIIG ACCESSORIES

AT-180	Auto ATU	£379	B
FL-100	500Hz CW	£58	B
FL-232	350Hz CW	£58	B
FL-103	SSB 2.8KHz	£58	B
FL-223	SSB 1.8kHz	£58	B
DC Lead	(spare)	£16	A
3.5m	sep. cable	£33	A
5m	sep. cable	£49	A

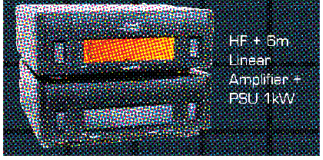
£849 C

IC-718 100W HF £649 C

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 wideband receive. Plus auto notch, dual vfo, swr meter etc. Plus options including DSP & filters.

YAESU

VL1000 QUADRA £3999 C



HF + 6m Linear Amplifier + PSU 1kW

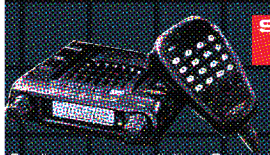
01702 206835/204965 FAX: 01702 205843
RD, MATLOCK, DERBYSHIRE, DE43 5LE ENQUIRIES: 01629 582380 FAX: 01629 580020
OTHES, FIFE KY7 5DF ENQUIRIES: 01592 756962 FAX: 01592 610451-CLOSED MONDAYS
Line: 08000 73 73 88

WE DON'T DISCOUNT..... THE ONLY THING WE CUSTOMER SERVICE

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

YAESU

FT-1500M • 2m FM Mobile £159 C



SPECIAL OFFER

SAVE £70

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

KENWOOD

TM-D700E • 2m + 70cm FM £449 C

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

TM-G707E • 2m + 70cm FM £289 C

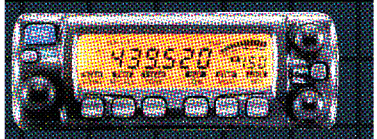
If you are looking for simplicity and low cost, here's the answer. 2m & 70cms with detachable front panel and "Easy operation mode." GREAT!

TM-V7E • 2m + 70cm FM £359 C

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

ICOM

IC-207N • 2m + 70cm FM £279 C



A great budget class radio for VHF & UHF use.

IC-2800H • 2m + 70cm FM £419 C

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

IC-2100H • 2m FM Mobile £229 C

Rugged design with switched receive filters 12.5/25kHz

IC-910 2m + 70cm All Mode £1299 C

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

YAESU

FT-7100 • 2m/70cm Mobile £399 C

NEW

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

£25 ACCESSORY VOUCHER

AV-40 • VSWR METER £39.95 B

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

KENWOOD

TH-D7E • 2m + 70cm £299 C

DATA COMMUNICATOR

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

TH-F7E • 2m + 70cm £249 C

NEW

WITH EXTRA WIDE RX COVERAGE

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

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

HORA

HORA C-408 • 70cm £49 B

"LAST FEW"

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).

- 230mW, CTCSS
- Digital Display

SPECIAL OFFER

LINEAR AMPLIFIERS

CHALLENGER II	HF LINEAR AMP 10-160m	£2095	D
EXPLORER	HF LINEAR AMP 10-160m	£1595	D
PIONEAR-572H	HF LINEAR AMP 10-160m	£1295	D
RANGER-811H	HF LINEAR AMP 10-160m	£895	D
HUNTER	HF LINEAR AMP 10-160m	£1195	D
HUNTER-6	6m LINEAR AMP 50-54MHZ 800W 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

YAESU

YAESU VX5R • BLACK OR SILVER £239 B

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

YAESU VX1R • 2m/70cm £149 B

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

FT-817 'SPECIAL OFFER'

SAVE

INCLUDES AC CHARGER AND 1 AMP Ni-cad PACK

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

£595 carr:£9

NEW MINI S/MODE PSU PS-817 £19.95 carr.£9.00

'Amazing' MP-1 Variable Antenna 7MHz - 430MHz! 150 Watts

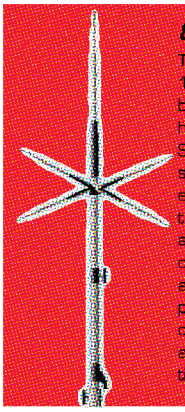
Use Portable, Mobile, Home or even balcony!

It's sweeping America as the most versatile antenna for any location. Kit includes telescopic whip, variable coil, lower mast, base bracket (SO-239), clamp and optional wire radials (3m approx). Total height approx 2m. Will also screw directly into 3/8" mobile mounts. The whole antenna packs down to pocket size, yet puts together in a couple of minutes. And with the high Q coil, you get high efficiency. Take it with your FT-817 as hand luggage!!

SLIDE TO CHANGE BANDS!!

£149.95 carr.£9

PBX-100 Portable HF £99 C

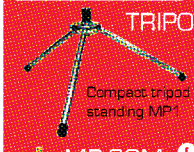


80m - 10m 200W

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.

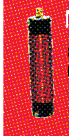
MP-1 Options

TRIPOD **£19.95 A**



Compact tripod for free standing MP1

MP-80M **£22.95 A**



80m Coil for MP-1 3.4MHz 4MHz

FT-817 BRACKET **£19.95 A**

MP1 bracket mounts on side of FT-817

HOCKLEY STORE SECOND HAND LIST

HF Transceivers		Scanners Mobile/Base	
DR-M03EX	£169.00	IC-PCR100	£149.00
IC-575A	£399.00	IC-R7000	£499.00
IC-706 Mk II x2	£549.00	**Scanners Hand Held**	
IC-735	£449.00	DJ-X10	£199.00
IC-746 x2	£999.00	DJ-X10	£199.00
IC-756 pro	£1,495	AR-8000 x3	£199.00
TS-570D	£599.00	AR-8200 II	£299.00
TS-680S	£549.00	IC-R2	£109.00
TS-850S	£899.00	SAB-2000	£35.00
MFJ-9020	£115.00	UBC-92CXLT	£79.00
MX-3.5S	£149.00	VR-500	£179.00
MX-21S	£189.00	**Station Accessories**	
FT-100 x2	£549.00	PK-900	£299.00
FT-847	£995.00	WA-2	£25.00
FT-920	£999.00	ALS-600XCE	£999.00
VHF/UHF Base/Mobile Transceiver		LPM-144-10-100	£139.00
AR-445	£199.00	LA-2080H	£99.00
2001 x2	£119.00	FL-3	£99.00
8001	£145.00	GSV-4000	£109.00
7003	£125.00	AMT-3	£50.00
DR-110E	£125.00	FAX-1	£125.00
IC-271E	£349.00	AT-180	£249.00
IC-910H	£899.00	PS-85	£179.00
TM-251E	£299.00	MR-10	£199.00
TM-D700E	£349.00	MTR-1	£99.00
TR-751E x2	£349.00	KAM Plus x2	£199.00
FT-225RD	£399.00	VC-H1	£169.00
FT-290R	£169.00	MFJ-947	£129.00
FT-290R II x4	£249.00	MFJ-411	£45.00
FT-690R II x2	£299.00	MFJ-462	£99.00
FT-790R II	£249.00	MFJ-4628	£119.00
FT-2500M	£169.00	MFJ-949E	£99.00
FT-8200 x3	£285.00	MFJ-989C	£219.00
FT-8100R	£299.00	MFJ-1020A	£85.00
VHF/UHF Hand Held Transceiver		MFJ-1274	£100.00
AT-201	£99.00	MFJ-1278BX x2	£225.00
AT-400	£115.00	MFJ-1283M	£49.00
AT-600	£175.00	MFJ-1283W	£49.00
Sendar 145	£95.00	MFJ-1810	£4.00
DJ-180	£99.00	R-30	£99.00
DJ-580	£145.00	RU-432-30	£149.00
DJ-G5	£169.00	MMC-144-28	£10.00
IC-25ET	£99.00	3000A +	£299.00
IC-A25	£199.00	Micro-RF	£99.00
IC-P2ET	£99.00	Pico-2	£149.00
IC-T7E	£199.00	P-335	£99.00
TH-D7E	£249.00	DSP-9+	£129.00
C-108 x2	£99.00	DSP-599ZX	£149.00
FT-41R x2	£99.00	WD6-30	£99.00
FT-50R	£149.00	WMM-1	£49.00
Shortwave Receivers		FL-2025 x2	£99.00
IC-R75	£399.00	MD-188	£99.00
NRD-525	£629.00	**Miscellaneous**	
R-5000	£499.00	AE-2350	£60.00
R-600	£59.00	UK-75-ST	£60.00
ICF-SW100E	£115.00	EMAP-EU	£280.00
ICF-SW7600G	£79.00	GPS-12CX	£179.00
		GPS-II +	£249.00
		EM-27	£80.00

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

Get in Front with HUSTLER

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

WATSON

£209.95 Carr. £9.00

£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	1.15:1	1.15:1
Power	1kW CW	1kW CW
Treps	1" forms	1" forms
Tubing	1.25"	1.25"
Bracket size	1.75"	1.75"
Height	25ft 1" (7.64m)	21ft 5" (6.52m)
Weight	17lbs. (7.7kg)	15lbs (6.8kg)
Wind (112kph)	13kg	-

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

HUSTLER Mobile Antennas

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

Model	Band	Bandwidth	Price
RM-10-S	10m	250-400kHz	£24.95 C
RM-15-S	15m	150-200kHz	£28.95 C
RM-20-S	20m	100-150kHz	£31.95 C
RM-40-S	40m	50-80kHz	£37.95 C
RM-80-S	80m	50-60kHz	£51.95 C

Lower mast sections

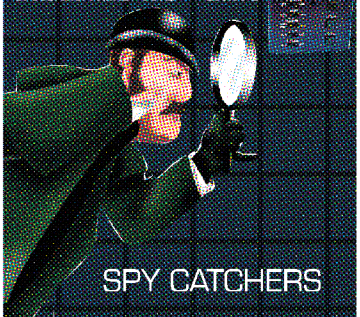
MD-1	54" (FOLD @ 22")	£33.95 C
MD-2	54" (FOLD @ 27")	£33.95 C
MD-3	54" (NON FOLD)	£28.95 C
MD-4	27" (NON FOLD)	£22.95 C

CAPTURE THAT FREQUENCY!

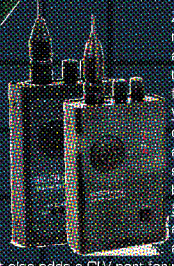
Supplied with telescopic antenna and AC battery charger. If you are within 200 ft or so of the hand-held, you should be able to read off the frequency. Note it down and enter it in your scanner. It's that simple and it's pocket sized.

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

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



SPY CATCHERS



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

WR-5001 £99.95 WR-5002 £159.95

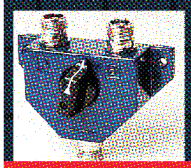
LDG USA

LDG AT-11MP Auto ATU £269.95 A

1.8MHz - 30MHz 150W

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

CS-600 • 2-way Coax Switch £12.95 A



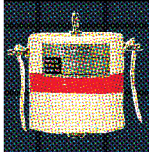
2-way coax switch ideal for use in antenna systems and service departments. Provides a very positive method of switching between two coax systems and offers very low loss.

RADIO WORKS

B1-2K Balun £25.95 A

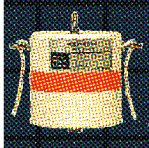
This balun is designed for dipoles, inverted V antennas, and similar 50 Ohm feed designs.

B4-2K Balun £34.95 B



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

REM-BAL4 • Remote Balun £49.95 B



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

WATSON

WEP-300B • EARPIECES £2.95 A

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

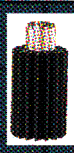
WSA-1 PSK-31 Adaptor £39.95 B

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

YS-150 ROTATORS £79.95 B

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

REVEX • T-20 15W DUMMY LOAD £21.95 A



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

MASPRO VHF/UHF YAGIS

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

Take a look at our prices!

144-WH5	2m 5 el. 6.6dBd 0.93m	£26.95 B
144-WH8	2m 8 el. 8.6dBd 1.79m	£37.95 B
144-WH10	2m 10 el 9.7dBd 2.3m	£41.95 B
435-WH8	70cms 8 el. 8.6dBd 0.8m	£29.95 B
435-WH12	70cms 12 el. 12.8dBd 1.51m	£36.95 B
435-WH15	70cms 15 el. 14.2dBd 2.19m	£41.95 B

To compare with dBi figures, add 2.4dB

WATSON

QS-112 • SPEAKER MIC £16.95 A

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

SPM-102 • SPEAKER MIC £9.95 A

Incredible value!

Has 4-way 3.5mm plug for VX-1, VX-5, FT-50 and IC-G7E Handies

Limited stocks.

WM-30B • BASE MIC £59.95 B

The perfect answer for a high quality base microphone. Built-in pre-emp 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.

WGT-321 • LAPEL TALKER £19.95 A

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

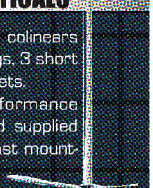
AVAIR VSWR • POWER METERS

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

AV-200 1.8 - 200MHz 5/20/200/400W £49.95 B
AV-400 140 - 525MHz 5/20/200/400W £49.95 B
All fitted with SO-239, PEP, RMS readings, 3W for FSD approx.
Also available AV20 & AV40 compact meters

BASE VHF/UHF VERTICALS

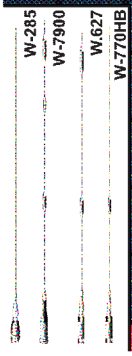
2m / 70cm fibre glass colinears with stainless steel fittings, 3 short radials and SO-239 sockets. These are high performance antennas, pre-tuned and supplied with all hardware for mast mounting.



Dual Band 2m/70cms

W-30	3/6dB 1.15m long	£39.95 C
W-50	4.5/7.2dB 1.8m long	£49.95 C
W-300	6.5/9dB 3.1m long	£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 & 7.5dB length 1.58m £32.95 B
W-627	6m / 2m / 70cm 2 / 4.5 7.2dB length 1.6m £34.95 B
W-770HB	2m/70cm whip 3dB / 5.5dB length 1.1m £24.95 B

ALL WITH TILTOVER BASES

RSGB Matters

QSL BUREAU NEWS

TWO NEW RSGB QSL Bureau Sub-Managers have recently been appointed. Robert Denton, G4YRZ (QTHR), takes over the G4Y series of callsigns from William Jones, G7PUJ. On the Isle of Man, the new Sub-Manager for all GD callsigns is Godfrey Baillie-Searle, GD4EIP (QTHR), who takes over from Andrew Kissack, GD0TEP.

New Foundation Licensees should note that they may use the facilities of the RSGB QSL Bureau under their new M3 callsigns *in addition to* any other callsign they may also hold. They should please just put in a note with the QSLs of their RSGB membership number or callsign under which they are registered as an RSGB member.

RSGB AT THE CLUBS

THE RSGB General Manager, Peter Kirby, G0TWW, is giving a presentation on the work of the Society at the **Torbay Amateur Radio Society** on **21 June** (details from John, G3RMA, tel: 01803 556425).

The RSGB Amateur Radio Observation Service (AROS) Co-ordinator, Barry Scarisbrick, G4ACK, will be giving talks on the work of AROS at the **East Kent Radio Society** on **17 June** (details from Paul, G3VJF, tel: 01227 365384) and at **Northampton Radio Club** on **27 June** (details from Norman, G0GBZ, tel: 01327 349188).

IARU RULES 2M DF HUNT

THE RSGB IS running an inaugural 2m Direction Finding competition to the IARU rules on **Saturday 22 June** at Kinver Million, near Stourbridge in the West Midlands. 2m ARDF has an internationally-agreed set of rules with IARU Regional and World Championship events. The UK is being left behind in international competition and, in a bid to catch up, the RSGB has taken the initiative to hold the event on 22 June. It is hoped that competent club 2m DFers will be attracted to take part.

If you have *ever* tried 2m DF, please give serious consideration to supporting this initiative. Contact Robert Vickers, G3ORI (QTHR), for further details or see www.ardf.btinternet.co.uk/index.html where there are plenty of hints and tips. If you don't have web access, give Robert a call on 01384 377008.

The scene at an IARU international ARDF competition.

EMC COORDINATORS WANTED

OUR TEAM of volunteer EMC Coordinators provides an excellent service for all of our members and we are most grateful for their efforts and for freely giving of their time and expertise in helping solve the many EMC problems. The work that they do is both challenging and rewarding. Rewarding in the sense that they are able help our fellow radio amateurs which has always been an identifying trait of our hobby.

However, our workload is expected to increase as more and more electric appliances appear on the market together with the constant threat to our bands. So we need more people to help out. There are two areas, in particular, where we desperately short of volunteer EMC Coordinators: Northern Ireland and Wales. If you feel you are able to offer your services in these, or any other areas, please get in touch with our EMC Membership Services Administrator, Charles, G4UJW, tel: 01283 791213 or e-mail: g4ujw@qsl.net Charles will be delighted to hear from you and will be pleased to answer any queries.

TWO NEW RSGB REGIONAL MANAGERS APPOINTED

THE FOLLOWING WERE co-opted to serve on the Regional Council until 31 December 2002 as RSGB Regional Managers:

Region 5 (West Midlands) - Roy Clarke, G8AYD / M0RLY, Beechfields, 3 Beechfields Way, Newport, Shropshire TF10 8QA;

Region 9 (London & Thames Valley) - Alan Ross, G1SQB, 84 Benhurst Avenue, Elm Park, Hornchurch, Essex RM12 4QT.

GB2RS NEWSREADERS WANTED

THERE ARE STILL vacancies for GB2RS newsreaders in various parts of the country, including the Cardigan Bay area of Wales. If you would like to volunteer your services, please contact the GB2RS news manager, Gordon Adams, G3LEQ, on tel: 01565 652652.

RMC VACANCY

THE RSGB Repeater Management Committee has a vacancy for a Voice over IP specialist. The successful applicant will be responsible for all aspects of the committee's work on repeater / Internet linking. This includes:

1. Providing advice to the RMC on repeater / Internet linking,

2. Processing applications for VoIP Internet links to repeaters,

3. Answering queries from radio amateurs about repeater / Internet linking.

The successful applicant will be a full member of the committee and attendance at committee meetings (about four times a year) is expected. All RMC members are also expected to attend major amateur radio events from time to time to help gain valuable feedback from repeater users and keepers.

If you are interested in applying for this position please write to Carlos Eavis, G0AKI, Chairman RMC, c/o RSGB HQ, Lambda House, Cranborne Road, Potters Bar, Hertfordshire EN6 3JE.

FOUNDATION LICENCE QUESTION BANK

THE RA HAS requested the assistance of the RSGB in finding suitable persons to write questions relating to items in the assessment objectives column of the Foundation syllabus. If you are interested in submitting (draft) questions, an information pack is available which contains guidance notes on writing suitable questions together with the appropriate stationery. Please contact Alan Betts, Radiocommunications Agency, Wyndham House, 189 Marsh Wall, London E14 9SX; tel: 0207 211 0160 or e-mail: alan.betts@ra.gsi.gov.uk

RSGB VHF AWARD NEWS

AFTER SEVERAL months of somewhat frenetic activity, April allowed the RSGB VHF Awards Manager a little time to relax. 'Six', as always, produced a number of claims, the first was from Heath Rees, GW3HWR (SA), who gains stickers for 100, 125 and 150 squares. Grant Wilson, MM5TGW (GW), gains a sticker for 125 squares.

A multiple claim was submitted by Roy White, G6XCY (CM), which resulted in stickers for 75 and 100 squares, 40 and 50 countries (2-way) and also 50 countries (DX).

At the microwave end of the spectrum, David Dibley, G4RGK (HP), submitted cards for 45, 50, 55 and 60 squares on 1296MHz. Many of David's cards were for contacts stretching back some 10 years which is an indication of the dedication required to operate on even the most popular of the microwave bands.

The 'Backpackers' series of 144MHz contests can produce some quite outstanding contacts given the low powers involved. None more so than a contact made by Neill Taylor, G4HLX (SN), during the July 2000 session. Neill was operating from Long Mynd in Shropshire and the contact was with UT5OH/P at a distance of 2044km, using just 3W to a 13-element Yagi at 6m AGL. This gave Neill a qualifying distance for the IARU Millennium Award.

Congratulations to all recipients.

Details on 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 http://www.argonet.co.uk/users/tonyg6ttl/awards/awards.htm (there is also a link from www.rsgb.org/operating/index.htm) Queries may be e-mailed to vhf.awards@rsgb.org.uk

Summary of Award Recipients for April

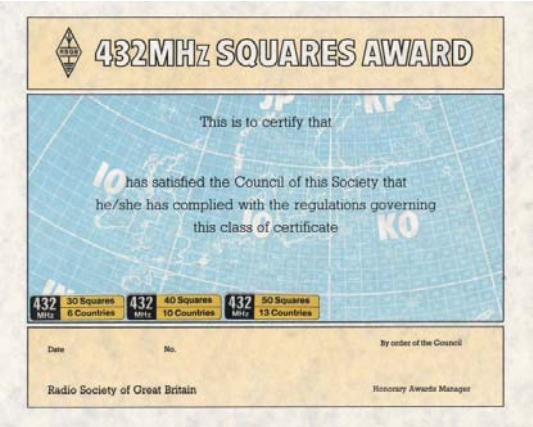
50MHz: 40 Countries (2-way): G6XCY. 50C: G6XCY.

50 Countries (DX): G6XCY.

75 Squares: G6XCY. 100S: GW3HWQR, G6XCY. 125S: GW3HWR, MM5TGW. 150S: GW3HWR.

Microwaves: 1296MHz: 45 Squares: G4RGK. 50S: G4RGK. 55S: G4RGK. 60S: G4RGK.

IARU Millennium Award: 144MHz: G4HLX/P.



COVENTRY PACKET CONFERENCE

AN INFORMAL packet radio conference took place in Coventry on 13 April. Attended by over 50 people, delegates were treated to presentations on 'APRS, the real-time mode' by G1HUL; 'XROUTER network infrastructure software' and 'PZT AX25/IP BBS software' by G8PZT; 'AX25/IP integration experiences' and 'Enabling Windows users to access IP hubs via radio' by G3ZFR; 'Thames Valley IP Group Projects' by G8ECJ; 'The MAXPAK local area network' by G0CNG; and 'The MAXPAK MAX02 packet modem' by G4VYA. Steve, G8SFR, also advised the conference on the status of packet clearance applications.

PICATUNE PCBS

PAUL BERKELEY, M0CJX, who has now given 12 talks at radio clubs on the *RadCom* PicATUne design by Peter Rhodes, G3XJP, is considering procuring another batch of professional bare boards for this project. The price will be dependent on the final batch quantities. If you are interested, please contact Paul Berkeley, M0CJX, by e-mail: m0cjx@lineone.net as soon as possible.

RAYNET AND THE GENERIC RAYNET & RSGB TRADE MARKS

THE RADIO Society of Great Britain (the Society) is the registered holder of the Raynet and RSGB Trade marks and the Generic Raynet reproduced herewith. The Trade Marks should not be used by any person or organisation without the prior permission of the Society. However, any group of organisation formally affiliated to the Society has permission to use the mark without prior reference to the Society, always providing the necessary acknowledgements as to the ownership of the copyright in the mark are made.

Members of the RSGB may use the marks on their personal correspondence and QSL cards without reference to the Society. The Society will give sympathetic consideration to applications to use the mark from groups and organisations not affiliated to the Society and in such cases requests should be addressed to the Company Secretary at the Society's registered office (see page 5).

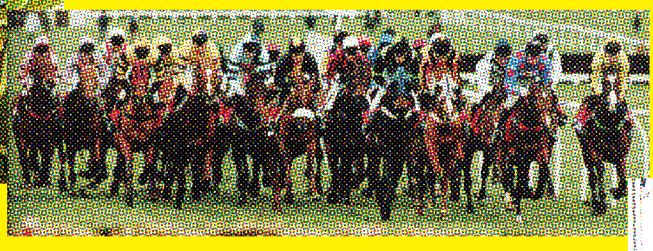
SUNDAY, 16TH JUNE 2002

EPSOM RADIO & ELECTRONICS FAIR

Our new event at Epsom Racecourse will be officially opened by the RSGB President Dr. R Whelan. Come along to see this *new style* historic event and enjoy our attractions.

- **MAJOR EXHIBITORS & TRADERS (ICOM, YAESU, KENWOOD, ML&S, RSGB, RA etc.)**
- **EXTENSIVE BRING AND BUY SALE**
- **MUSIC BY KEN MACKINTOSH AND HIS BIG BAND**
- **FREE ADMISSION FOR STUDENTS AND CHILDREN**
  (Also 1000 tickets sent to schools and colleges etc.)

ML&S

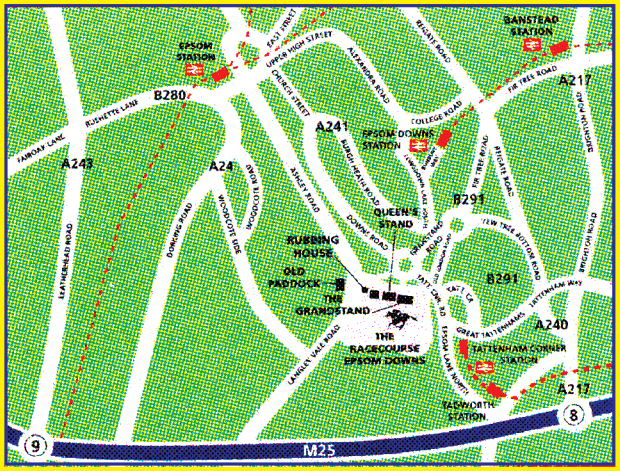


YAESU

- **RADIO CAR BOOT (PRE-BOOKED ONLY)**
- **2M TALK IN STATION GB2ERT**
- **EDUCATIONAL DEMONSTRATION HF SPECIAL EVENT STATION GB2ERF**
- **ENTRANCE FEE REFUND FOR MORSE CANDIDATES**
- **YAESU FREE PRIZE DRAW**

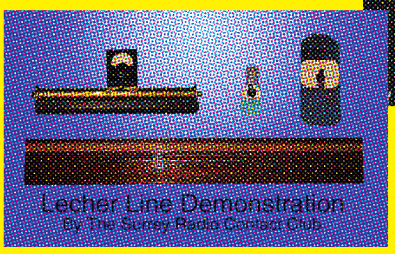
ICOM

- **AND MUCH MUCH MORE!**



OPENING TIMES
10.00am - 5.00pm

KENWOOD



Ken Mackintosh

TECHNICAL GROUPS INCLUDING REPEATER MANAGEMENT, ATV, LECHER LINE AND ILINK DEMONSTRATIONS ETC. - FURTHER DEMONSTRATIONS AND EXHIBITS WELCOME!

For bookings and further information

see our web site www.epsomrally.co.uk

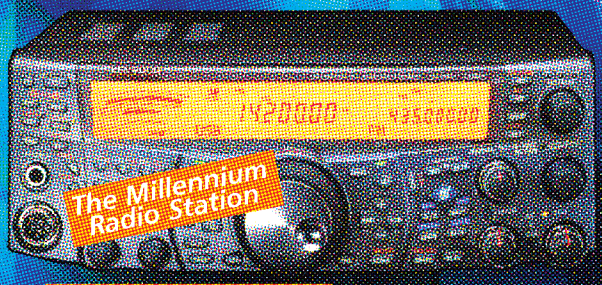
or Tel/Fax. 01737 279108 - E-mail: m0cjx@lineone.net

RadioFairs . . . Total commitment to the Hobby

KENWOOD

M&S

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



Kenwood TS-2000 **£1695.00**

Offering all bands 1.8 to 23cms (23 cms optional) Built in DX cluster monitor and auto QSY plus dual speed packet modem make this radio stand out. Excellent Kenwood build quality and reliability - a radio that is going to be around for a long time. (Requires 25 amp 13.8 volt PSU)
Kenwood TS B2000 **£1599.00**

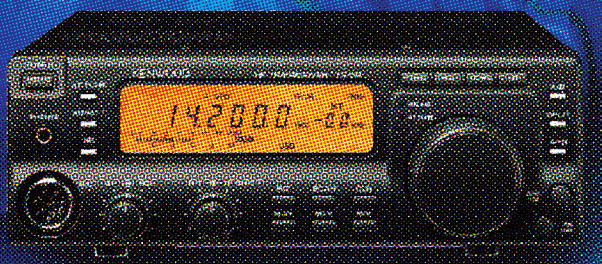
All radios on this page are available on our

BUY NOW PAY LATER

scheme-call for details

Kenwood TS-570DGE **£849.00**

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



Kenwood TS-50S **£625.00**

The original HF mobile radio 100 watts Top band to 10m all mode a bargain at only £649.00

Kenwood TS-870S **£1399.00**

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

Kenwood TH-D7E Mk2

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

£325.00

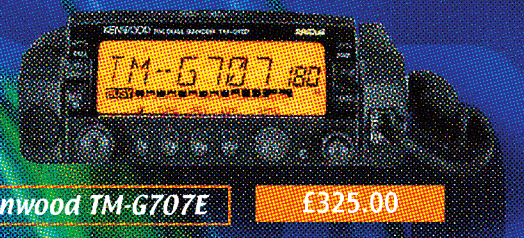
Kenwood TM-D700E **£429.00**

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

Kenwood TH-F7E

The Scanner that transmits . With a full blown all mode scanner plus 6 watts 2m & 70 cms this handy is a real winner. £289.95

£289.95



Kenwood TM-G707E **£325.00**

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

ACCESSORY LIST

PS53T.....Matching PSU for TS2000 and TS570DGE	£229.95
PS52.....Matching PSU for TS870S	£229.95
SP23.....Matching speaker for TS570DGE and TS2000	£68.95
SP31.....Matching Speaker for TS870S	£82.95
MC60A...Matching Deskmike for Kenwood HF Radios	£17.95
HS5.....Top Quality Headphones for HF Radios	£52.95

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

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

M&S martin lynch & sons

Suppliers of Communications Equipment

tel: 0208 566 1120

fax: 0208 566 1207

website: www.hamradio.co.uk

email: sales@hamradio.co.uk

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

Front Cover:

Windsor Castle - the venue for the GB50 special event station celebrating The Queen's Golden Jubilee (see page 12).
Photo: Tim Kirby, G4VXE.

RadCom This Month
June 2002

Radio Communication

Editor
Steve Telenius-Lowe, G4JVG

Technical Editor
George Brown, M5ACN

Technical Illustrator
Cover Design
Bob Ryan, 2E1EKS

Advertising Design
Annie McVicar

Secretarial
Lynn Wortley

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

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

Tel: 0870 904 7373

Fax: 0870 904 7374

E-mail: radcom@rsgb.org.uk

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

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

Tel: 0870 904 7377
(advertising ONLY)

Fax: 0870 904 7378
(advertising ONLY)

E-mail: adsales@rsgb.org.uk

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

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

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

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

Filmset by JJ Typographics Ltd, Southend, Essex.

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

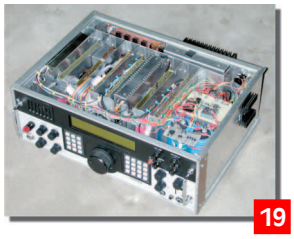
RSGB MEMBERSHIP - Annual Rates

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 RSGBHQ.

News and Reports

Technical Features



Down To Earth - Amateur Radio From The Ground Up

Reviews

Regulars

RadCom NEWS

Raleigh International Needs - You?

RALEIGH INTERNATIONAL, the youth development charity, needs to recruit more Communications Officers and has asked for the help of the RSGB to find suitable people. At present Raleigh International is working in Chile, Ghana, Costa Rica, Nicaragua, Namibia and Borneo. The Communications Officer is one of about 10 expedition Volunteer Staff based at the expeditions' field bases. The persons required need to have wide experience of HF and VHF radio systems, setting up and running an HF net 24 hours a day, as well as experience in diagnosing and repairing equipment faults which do not require full workshop facilities. They must also have the ability to teach all the above to Venturers and staff during induction periods. This is an ideal opportunity for an experienced radio amateur who loves the outdoors to put back something into their hobby, while at the same time helping young people. Radio operators typically stay for a 12-week expedition period in the country concerned. For further details and a full job description, please contact Floor de Jong, Marketing and Recruitment Co-ordinator, Raleigh International, 27 Parsons Green Lane, London SW6 4HZ; tel: 020 7371 8585; e-mail: floor@raleigh.org.uk or see http://www.raleighinternational.org

Raynet Takes a Standby Call

A MAJOR FAILURE of the telephone system in parts of Hampshire and Wiltshire occurred on 25 April. At 2030, Bob, G4VWP, received a call from the Duty Emergency Planning Officer for Hampshire, requesting that Raynet be put on standby, ready for callout should the need arise. Later another call was received asking that, if required, Raynet should set up a VHF communications link between the police Command and Control Centre at Netley and police HQ in Winchester.

Thirty-four members from four groups indicated that they were available for callout. The Forward Control Land Rover and 60ft mobile tower were collected from storage and a portable mast, radio, power supply and associated equipment were made ready to take to the police HQ. The callout was led by Clive McCloud, G4EFB; Roger Davies, G8SXC; John Witts, G6BBW; Ian Duffy, G7GMN, and Dave Minett, G6DJA. Roger had particular difficulty as his own phone had been taken out by the failure. In the event, Raynet was not required and members were stood down at 2310.

W&S Open Day

ON **SUNDAY 26 May** Waters & Stanton will be holding their 12th annual Open Day. Once again their car park will be covered by marquees and W&S will take the opportunity to clear out many items at bargain prices. Icom, Yaesu, Kenwood, the Essex Repeater Group and St Johns Ambulance will be represented. A limited number of Morse Assessments will be available (please call Mark Francis on 01702 206835 in advance). Entrance is free, as are the food and drink, parking, and the raffles - with some very good prizes.

Radar Memorial

The radar memorial at St Alban's Head, Dorset.

A NEW MEMORIAL has been erected at St Alban's Head in Dorset to commemorate the work done during WWII by the Telecommunications Research Establishment (TRE), based at nearby Worth Matravers. TRE was instrumental in the development of aircraft and ship radar detection systems between 1940 and 1942. Visitors to Worth Matravers may be interested to know that there is now a museum there dedicated to radar.

Helicopters On the Air

THE VERY special callsign GB21SHF (Signals/support Helicopter Force) will be activated on 8 June from the open day at 21 Signal Regiment (Air Support) Azimghur Barracks at Colerne Airfield near Chippenham, Wilts. In previous years some 5000 members of the general public have attended the open day. The callsign will be activated again between 24 and 28 June from the Training Wing by members of the Royals Signals ARS and RAFARS.

International Lighthouse / Lightship Weekend

THE INTERNATIONAL Lighthouse / Lightship Weekend (ILLW2002) will take place on **17 / 18 August**. You are invited to join in the fun and establish a station at a lighthouse, lightship or maritime beacon. Field-day type set-up at the light, adjacent ground or other building next to the light is quite acceptable, but please note that permission *must* be obtained from any interested parties. There is an entry form on the Internet at vk2ce.com/illw/index.html Submitting an entry form is not compulsory but it does guarantee that your entry will be listed in the official website list of entrants. Last year 348 stations were established at lighthouses and lightships in 46 countries. Further details of ILLW2002 can be obtained from the UK organiser, Mike Dalrymple, GM4SUC, by e-mail: gm4suc@compuserve.com

GB0NCI on the air during ILLW2001 from the National Coastwatch Institution St Ives Unit in Cornwall. Of the 40+ members of the St Ives Unit, two are radio amateurs: Deputy Manager Peter Caldwell, G4PAC (left), and Watch Keeper David Blackford, G3NPB.

Are You an 'Old Timer'?

RAOTA, THE Radio Amateur Old Timers' Association, recently published issue 61 of *OT News*. It includes: '80 years in amateur radio' by G3JNY, 'Valves in the early years', by G6JP and 'The role of Harold Kenworthy OBE in Signals Intelligence' by G3VA.

Although Old Timer infers someone of mature years, this is not always the case: full membership is open to anyone who has had an interest in amateur radio (licensed or listener) for 25 years or more. Some of today's young amateurs will be eligible for full membership while still in their 30s! For details of membership please contact RAOTA's Honorary Secretary, Mrs Sheila Gabriel, G3HCQ, Millbrook House, 3 Mill Drove, Bourne, Lincolnshire PE10 9BX. RAOTA is also on the web at http://go.to/raota

Tip for Hearing-Impaired Amateurs

NORMAN Williams, MW0HJG, reports that his hearing aid, which uses the loop system, works "brilliantly" with his HF transceivers. Norman says that those who have hearing problems can obtain the loop system free of charge from their local authority. He plugs the loop's 'black box' into the transceivers' headphone sockets and receives the audio through his hearing aid.

Dick Reid, GJ3IT, celebrated his 90th birthday on 4 April. Lawrence Woolf, GJ3RAX, attended the celebration and sent in this photo of 'the old man of Jersey'.

Well Over 2000 Foundation Licences Issued

Quicker Access to HF Bands for Class B Licensees

A PRESS RELEASE issued by the Radiocommunications Agency on 1 May stated that a change of rules for Class B Amateur Radio licensees came into effect on that date. Those who have held Full or Intermediate Class B licences for three months and have passed the Morse Assessment can now obtain a Foundation Licence and M3 callsign for access to the HF bands. Previously, a 12-month qualifying period applied before licensees could gain access to HF.

The Agency's decision is in response to feedback suggesting that three months is a more appropriate period. This allows time for licensees to gain the necessary experience and undergo the formal training and assessment of operating practices required for the HF bands. Details of where to take the Morse Assessment are available from RSGB headquarters.

The full text of the press release can be found on the RA website at www.radio.gov.uk/publication/press/2002/1may02.htm

Photo: Trevor, M5AKA.

Chris Chapman, G0IPU, explains HF propagation with the aid of a torch at a recent Foundation Licence course at the Chelmsford ARS.

According to the latest statistics from the RA, as of 18 April, 2283 Foundation Licences had been issued. This figure is made up of 1582 Full and Intermediate Class Bs taking the Morse Assessment and 701 individuals taking the Foundation Course. Of those 701 completely new entrants to amateur radio, 226 - or 32% - are under the age of 21. After only three-and-a-half months, these figures are being seen as a great success and thanks are due to the many radio clubs and individuals who are giving their time in order to provide Foundation Courses and Morse Assessments.

World Cup Fever

THE KOREAN Amateur Radio League is operating special event stations from the 10 host cities of the World Cup in Korea between **31 May** and **30 June**. The callsigns and locations are: DT1FWC in Seoul, DT2FWC Busan, DT3FWC Daegu, DT4FWC Incheon, DT5FWC Gwangju, DT6FWC Daejeon, DT7FWC Ulsan, DT8FWC Suwon, DT9FWC Jeonju and DT0FWC in Seogwipo. In addition, HL17FWC was active from 1 January to 30 May, just before the games start. The QSL manager for all these stations is HL0HQ, Korean Amateur Radio League, CPO Box 162, Seoul 100-601, Republic of Korea.

W&S Receive Kenwood Prize

DURING THE 12 months ending March 2002, Kenwood ran a dealer incentive scheme, the winner being the dealer who achieved the largest growth. Waters & Stanton PLC were pleased to learn that they were the winners of this competition and on 11 April were presented with a commemorative certificate, plus vouchers for a holiday in Africa.

Left to right David Wilkins, G5HY, from Kenwood (UK), Peter Waters, G3OJV, and Jeff Stanton, G6XYU.

Celebrate HM The Queen's Golden Jubilee with Amateur Radio

A round-up of events taking place during June marking the 50th anniversary of the accession to the throne by Her Majesty Queen Elizabeth II

ONE OF THE most ambitious special event stations ever in the United Kingdom will take place from the North Terrace of Windsor Castle between **29 May** and **9 June**. **GB50** will be on the air on all bands from 3.5 - 50MHz on CW and SSB, with a 144MHz station active on CW, SSB and FM. The station is being organised by members of the **Cray Valley Radio Society** and it will be operational from 0700 - 2200UTC daily.

The station will be open to the public and there will be a large 'Meet and Greet' area manned by members of the **Burnham Beeches Radio Club** and by **RSGB** staff. It is anticipated that very many members of the public will visit GB50 and, following the recent introduction of the Foundation Licence, it is hoped that many will be attracted to take up amateur radio by this high-profile event.

SPECIAL JUBILEE CALLSIGNS

ALL UK RADIO AMATEURS may celebrate the Golden Jubilee by using special prefixes during the whole of the month of June. The prefixes are GQ, MQ and 2Q. The special prefixes may be used throughout the whole of the United Kingdom, so G2AAA would become GQ2AAA, MM1ABC would become MQ1ABC and 2W0XYZ would become 2Q0XYZ, for example. For further information on the use of the Golden Jubilee prefixes, please see the panel on page 5 of the April 2002 *RadCom*.

SPECIAL JUBILEE QSLs

THE RSGB IS making available special QSL cards for all members to commemorate the Golden Jubilee. Specially designed so that you can overprint your own callsign using an inkjet printer, 400 blank cards are available for the remarkable price of just £9.99. Alternatively, we can overprint the cards with your callsign for £25.99 extra. Of course, the cards can be used whether or not you choose to use the special Jubilee prefix during the month of June. To order your cards, go to www.rsgb.org.uk/shop, e-mail: sales@rsgb.org.uk, tel: 0870 904 7373, or fax an order through to 0870 904 7374.

RSGB JUBILEE CONTEST

THE **RSGB JUBILEE Contest** takes place over the weekend of **8 / 9 June** from 1000UTC (11.00am local time) on Saturday 8 June, for 24 hours. Activity is on both CW and SSB in the 80, 40, 20, 15 and 10 metre bands. This is a great opportunity to celebrate the Queen's Golden Jubilee by making contacts throughout the Commonwealth. Take a look at the 'Down to Earth' article by Dave Lawley, G4BUO, on pages 36 / 37 this month which gives some useful tips for beginners (and experienced operators!) on how to take part in this exciting operating event. The full rules of the Jubilee Contest were published on page 53 of the January 2002 *RadCom*.

When you speak to your friends in Canada, Australia, New Zealand, or any other Commonwealth country, remind them of this event and ask them to get on the air during the contest. The more the merrier!

JUBILEE AWARDS

THE RSGB HF and VHF Awards Managers have each announced a new RSGB operating award to commemorate the Queen's Jubilee. The full rules were published on page 5 of last month's *RadCom*. You are reminded that the two awards are completely separate: you may apply for either or both of them, but you cannot 'mix and match'.

In addition to the two RSGB Jubilee Awards, two awards are also available from the organisers of the GB50 special event station (see above). Full details of the 'GB50 Golden Jubilee Award' and the 'GB50 Jubilee Points Award' can be found at www.gb50.com/award.html

CLUB EVENTS

THE **BROMSGROVE & District Amateur Radio Club** is running special event station **GB2QE** from the club shack at the Avonscroft arts and craft centre in Bromsgrove. The station will be on the air from **1 to 8 June** on HF and VHF and on all modes. The club will be issuing special commemorative QSL cards to anybody who contacts GB2QE plus 49 other UK amateurs during the period 1 - 8 June. Anybody is welcome to visit GB2QE.

The **South Bristol ARC** is holding a 'Jubilee Open Day' on **3 June**. Details from Len, G4RZY, tel: 01275 834282.

Members of the **South Normanton, Alfreton and District ARC** will be holding Golden Jubilee Celebrations on **3 June**. Details from Lyn, M0BMY, tel: 01773 520 353.

Members of the **Itchen Valley ARC** will be participating in the RSGB Jubilee Contest on **8 / 9 June**. Details from Mike, G6AIQ, e-mail: mamjh@yahoo.com

The **Scarborough Special Events Group** will be active as both **GQ0OOO** and **2Q0OOO** throughout the month. The Intermediate-class demonstration station will be particularly active on QRP frequencies during International QRP Day on **17 June**. A special QSL card will be sent to all those contacting either of the stations.

The HQ station of the **Royal Naval Amateur Radio Society** at **HMS Collingwood** is running special event station **GB5ER** from **1 - 28 June**. Activity will be on SSB with some CW on all HF bands including the WARC bands. Further details from g4zmp@rnars.org.uk ♦

OTHER JUBILEE SPECIAL STATIONS

Callsign	Location	Contact	Event start
GB0SGS	Burslem, Stoke-on-Trent	M5GWH	25 May
GB2CHD	Chatham, Kent	M0AAK	2 June
GB2CJC	Clanfield, Hampshire	G0DHZ	21 June
GB2COS	Chester	GW4IGF	30 May
GB2RJ	Market Rasen, Lincs	G0MNI	16 June
GB2SC	Taplow, Bucks	G0FFL	2 June
GB4FAA	Neyland, Pembs	GW4XQK	3 June
GB4GJ	Tydesley, Manchester	G0KEV	1 June
GB5GJ	Nr Kettering, Northants	G4ZPL	1 June
GB5OJ	Ryde, Isle of Wight	G0NTH / G3JLN / M5PDL	18 May
GB5OM	Nr Petersfield, Hants	G0DHZ	13 July
GB5OQ	Sudbury, Suffolk	G0IBZ	3 June
GB5OY	Pontefract, Yorkshire	G4KMW	21 May
GB5QJ	Preston, Lancs	G0NEI	1 June
GB5SI	Summer Isles	MM0BQI	7 June
GB8ER	Withernsea, East Yorks	M5EXY	1 June

ICOM

IC-756PROII

IC-756PROII HF/50MHz All-mode Transceiver

The Next Generation!

The IC-756PRO achieved a fantastic reputation among enthusiasts by offering a wide selection of features including 32-bit floating point DSP, 24 bit AD/DA converter, 4.9 inch colour TFT display, Twin PBT, dual-watch function etc. Now its direct successor, the IC-756PROII, is here and contains all of the great features that made the original so popular... and a lot more besides, just look at the list:

- Improved Receiver Performance
- Selectable Filter Shape
- One-Touch Record/Playback button
- External Control Function
- Increased Performance of SSB Data Mode
- USB Standard in CW Mode
- Changed Keyboard Lettering and Color
- Improved Readability
- Increase In Noise Blanker Performance
- 8 New Screen layouts with 7 font styles
- SSB/CW Synchronous Shift Function
- ...and *soooooo* much more!!!

Icom (UK) Ltd. Sea Street, Herne Bay, Kent CT6 8LD. Telephone: 01227 741741 Fax: 01227 741742
e-mail: info@icomuk.co.uk or visit our website: www.icomuk.co.uk

Count on us!

Q u a l i t y • I n n o

ALINCO

~~£699.00~~ SPECIAL £599.00

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
- 101 memory channels
- Built in speech compressor
- Front mounted speaker, loud clear audio
- Optional keyer

~~£599.00~~ SPECIAL £499.00

EDX2

Auto Tuner

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

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

£289.00

HFM-1

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

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

£59.95

ALINCO DR-605E Dual Band Mobile

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

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

£299.95

DJ-X3

Ultra modern scanning receiver

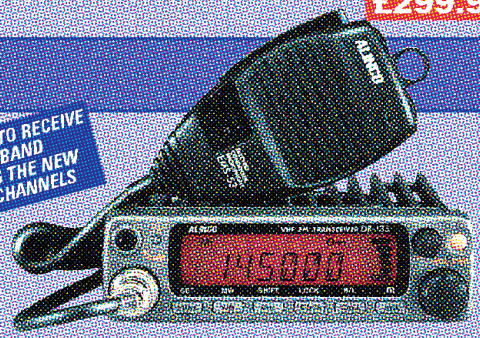
- 100kHz - 1300MHz
- AM/FM/WFM
- 700 memory channels
- Steps: 5/6.5/8.33/10/12.5/15/20/25/30/50/100kHz
- Auto descrambler
- Bug detector
- Stereo FM (with headphones)
- Attenuator
- SMA Antenna
- Battery saver cct
- Size: 56w x 102h x 23d mm
- Weight: 145g (without batteries)
- Supplied c/w 3 AA dry cell battery case carrying strap

with 8.33kHz for airband

Optional extras

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

£129.95



DR135E

- TX: 144 - 146MHz RX: Expandable 118 - 174MHz
- 50/10/5 Watts power settings
- 100 memory channels
- Frequency Steps: 5, 8.33, 10, 12.5, 15, 20, 25, 30, 50kHz
- 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

NEVADA®

UK Distributors of Alinco Products

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

ORDER HOTLINE: **023 9231 3090**

v a t i o n • S t y l e

radios for 2002

DJS 193E

GREAT VALUE 2 mtr Handheld

- New design 2m (144-146MHz) handheld
- Up to 5W V-HF
- 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-S96 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-G5EX 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

£225.95

available from our dealers in the UK or direct

visit www.nevada.co.uk for more information

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

MOONRAKER

www.amateurantennas.com
TEL: (01908) 281705 - FAX: (01908) 281706

LOG PERIODIC

MLP32 TX & RX 100-1300MHz one feed, S.W.R 2:1 and below over whole frequency range professional quality (length 1420mm) £99.95
MLP62 same spec as MLP32 but with increased freq. range 60-1300 (Length 2000mm) ***New Low Price*** £169.95

MOBILE HF WHIPS
(with 3/8 base fitting)

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

DUAL BAND MOBILE ANTENNAS

MICRO MAG 2 Metre 70 cms Super Strong 1" Mag Mount (Length 22") £14.95
MR700 2m/70cms, 1/4 wave & 5/8 Gain 2m OdB/3.OdB 70cms (Length 20")
3/8 Fitting £7.95
SO239 Fitting £9.95
MR 777 2 Metre 70 cms 2.8 & 4.8 dBd Gain (5/8 & 2x5/8 wave) (Length 60")
(3/8 fitting) £16.95
(SO239 fitting) £18.95
MRQ525 2m/70cms, 1/4 wave & 5/8, Gain 2m 0.5dB/3.2dB 70cms (Length 17") S0239 fitting commercial quality £19.95
MRQ500 2m/70cms, 1/2 wave & 2x5/8, Gain 2m 3.2dB/5.8db 70cms (Length 38") S0239 fitting commercial quality £24.95
MRQ750 2m/70cms, 6/8 wave & 3x5/8, Gain 2m 5.5dB/8.0dB 70cms (Length 60") S0239 fitting commercial quality £39.95

SINGLE BAND MOBILE ANTENNAS

MR 214 2 Metre 1/4 wave
(3/8 fitting) £3.99
(SO239 fitting) £5.00
MR260S 2 Metre 1/2 wave 2.5 dBd Gain (Length 43")
SO239 fitting £24.95
MR258 2 Metre 5/8 wave 3.2 dBd Gain (3/8fitting) (Length 58") £12.95
MR 650 2 Metre 5/8 wave open coil (3.2 dBd Gain) (Length 52") (3/8 fitting) £9.95
MR258S 2 Metre 5/8 wave 3.5dBd Gain (Length 51")
SO239 fitting £19.95
MR280S 2 Metre 6/8 wave 5.8dBd Gain (Length 58")
SO239 fitting £29.95
MR775 70cmc 5/8 wave 3.0dBd Gain (Length 19")
(SO239 fitting) £14.95
(3/8 fitting) £12.95
MR 776 70 cms 5/8 over 5/8 wave 6.0 dBd Gain (Length 27") (SO239 fitting) £18.95
(3/8 fitting) £16.95
MR 444 4 Metre loaded 1/4 wave (Length 24") (3/8 fitting) £12.95
(SO239 fitting) £15.95
MR 614 6 Metre loaded 1/4 wave (Length 56") (3/8 fitting) £13.95
MR 644 6 Metre loaded 1/4 wave (Length 40") (3/8 fitting) £12.95
(SO239 fitting) £15.95

1/2 WAVE VERTICAL FIBRE GLASS (GRP) BASE ANTENNA 3.5dBd
(without ground planes)

70 cms (Length 26") £24.95
2 Metre (Length 52") £24.95
4 Metre (Length 80") adjust top section £34.95
6 Metre (Length 120") adjust top section £44.95

TRI BAND MOBILE ANTENNAS

MRQ800 6/2/70cms 1/4 6/8 & 3x5/8, Gain 6m3,OdBi/ 2m 5.OdB/70 7.5dB (Length 60") S0239 fitting commercial quality £39.95

PROFESSIONAL MOBILE GLASS MOUNT ANTENNAS

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

SWR/WATT METER

KW520 Freq: 1.8 - 200 MHz 140 - 525 MHz Pwr: 0.5 - 400 watts Swr 1:1/1:3 £99.95

VERTICAL FIBRE GLASS (GRP) BASE ANTENNAS

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

BM100 Dual-Bander £29.95
(2 mts 3dBd) (70cms 6dBd) (Length 39")
SQBM100 Dual-Bander £39.95
(2 mts 3dBd@ (70oms 6dBd) (Length 39")
BM200 Dual-Bander £39.95
(2 mts 4.5cBd) (70Cms 7.5dBd) (Length 62")
SQBM200 Dual-Bander £49.95
(2 mts 4.5dBd) (70cms 7.5dBd) (Length 62")
SQBM500 Dual-Bander Super Gainer £59.95
(2 mts 6.8dBd) (70cms 9.2dBd) (Length 100")
BM1000 Tri-Bander £59.95
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")
SQBM1000* Tri-Bander £69.95
(2 mts 6.2dBd) (6 mts 3.0dBd) (70cms 8.4dBd) (Length 100")

SQBM 100/200/500/1000 are Polycoated Fibre Glass with Chrome & Stainless Steel Fittings. 2 years warranty.

2 METRE VERTICAL CO-LINEAR BASE ANTENNAS

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

70CMS VERTICAL CO-LINEAR BASE ANTENNAS

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

ROTATIVE HF DIPOLE

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

MINI HF DIPOLES

MDO20 20mt £39.95
MDO40 40mt £44.95
MDO80 80mt £49.95

HAND-HELD ANTENNAS

"New Lower Price"

MRW-300 Rubber Duck TX 2 Metre & 70 cms RX 25-1800 MHz (Length 21cm) BNC fitting £12.95
MRW-310 Rubber DuckTX 2 Metre & 70 cms Super Gainer RX 25-1800 (Length 40cm) BNC fitting £14.95
MRW-232 Mini Miracle TX 2 Metre 70 & 23 cms RX 25-1800 MHz (Length just 4.5cm) BNC fitting £19.95
MRW-250 Telescopic TX 2 Metre & 70 cms RX 25-1800 Mhz (Length 14-41cm) BNC fitting £16.95
MRW-200 Flexi TX 2 Metre & 70cms RX 25-1800 MHz (Length 21cm) SMA fitting £19.95
MRW-210 Flexi TX 2 Metre & 70cms Super Gainer RX 25-1800 MHz (Length 37cm) SMA fitting £22.95

All of the above are suitable to any transceiver or scanner.
Please add £2.00 p&p for H/held antennas.

HB9CV 2 ELEMENT BEAM 3.5dBd

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

CROSSED YAGI BEAMS
All fittings Stainless Steel

2 Metre 5 Element
(Boom 64") (Gain 7.5dBd) £74.95
2 Metre 8 Element
(Boom 126") (Gain 11.5dBd) £94.95
70 cms 13 Element
(Boom 83") (Gain 12.5dBd) £74.95

YAGI BEAMS
All fittings Stainless Steel

2 Metre 4 Element
(Boom 48") (Gain 7dBd) £24.95
2 Metre 5 Element
(Boom 63") (Gain l0dBd) £44.95
2 Metre 8 Element
(Boom 125") (Gain 12dBd) £59.95
2 Metre 11 Element
(Boom 185") (Gain 13dBd) £89.95
4 Metre 3 Element
(Boom 45") (Gain 8dBd) £49.95
4 Metre 5 Element
(Boom 128") (Gain l0dBd) £59.95
6 Metre 3 Element
(Boom 72") (Gain 7.5dBd) £54.95
6 Metre 5 Element
(Boom 142") (Gain 9.5dBd) £74.95
70 cms 13 Element
(Boom 76") (Gain 12.5dBd) £49.95

ZL SPECIAL YAGI BEAMS
All fittings Stainless Steel

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

YAGI COUPLERS

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

HALO LOOPS

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

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

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

SALES 01908 281705

E&OE.

MULTI PURPOSE ANTENNAS

MSS-1 Freq RX25-2000 MHz TX 2 mtr 2.5 dBd Gain, TX 70cms 4.0 dBd Gain, (Length 39") £39.95

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

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

Above antennas are suitable for transceivers only

G5RV WIRE ANTENNA

All fittings Stainless Steel

	FULL	HALF
Standard	£22.95	£19.95
Hard Drawn	£24.95	£21.95
Flex Weave	£32.95	£27.95
PVC Coated Flex Weave	£37.95	£32.95
Deluxe 450 ohm PVC Flexweave	£49.95	£44.95

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

INDUCTORS

"New Lower Price"

Convert your g5rv half size into a full size with only a very small increase in size. Ideal for the small garden £19.95

SHORT WAVE RECEIVING ANTENNAS

MD37 SKY WIRE £39.95
(Receives 0-40MHz)
Complete with 25 mts of enamelled wire, insulator and choke Balun Matches any long wire to 50 Ohms. All mode no A.T.U. required. 2 'S' points greater than other Baluns.

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

MOUNTING HARDWARE ALL GALVANISED

6" Stand Off Bracket *(complete with U Bolts)* £6.00
9" Stand off Bracket *(complete with U Bolts)* £9.00
12" T & K Bracket *(complete with U Bolts)* £11.95
18" T & K Bracket *(complete with U Bolts)* £17.95
24" T & K Bracket *(complete with U Bolts)* £19.95
36" T & K Bracket *(complete with U Bolts)* £29.95
3-Way Pole Spider for Guy Rope/ wire £3.95
4-Way Pole Spider for Guy Rope/ wire £4.95
1¼" Mast Sleeve/Joiner £8.95
2" Mast Sleeve/Joiner £9.95
Solid copper earth rod £9.95

POLES H/DUTY (SWAGED)

1¼"x 5' Heavy Duty Aluminium Swaged Poles (set of 4) £24.95
1¼"x 5' Heavy Duty Aluminium Swaged Poles (set of 4) £34.95
2"x5' Heavy Duty Aluminium Swaged Poles (set of 4) £49.95

REINFORCED HARDENED FIBRE GLASS MASTS (GRP)

1¼" Diameter 2 metres long £16.00
1¾" Diameter 2 metres long £20.00
2" Diameter 2 metres long £24.00

GUY ROPE 30 METRES

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

10/10 METRE VERTICALS

G.A.P.12 ¼ wave aluminium (length 18' approx) £19.95
G.A.P.58 ⅝ wave aluminium (length 21' approx) £24.95

VISA SWITCH MasterCard

COAX

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

PHONE FOR 100 METRE DISCOUNT PRICE.

CONNECTORS

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

BALUNS

MB-1 1:1 Balun £23.95
MB-4 4:1 Balun £23.95
MB-6 6:1 Balun £23.95
MB-Y2 Yagi Balun 1.5 to 50MHz £24.95

RIBBON LADDER USA IMPORTED

300W Ribbon (20 Metres) £13.00
450W Ribbon (20 Metres) £13.00

TRI/DUPLEXER & ANTENNA SWITCHES

MD-24 (2 Way Internal Duplexer) (1.3-35 Mhz 500w) (50-225 MHz 300w) (350-540 MHz 300w) insert loss 0.2dBd SO239 fittings £22.95
MD-24N same spec as MD-24 'N-type' fitting £24.95
MD-25 (2 Way external/Internal Duplexer) (1.3-35 Mhz 500w) (50-225 MHz 300w) (350-540 MHz 300w) insert loss 0.2dBd £24.95
Triplexer 1.6-60MHz (800w) 110-170MHz (800w 300-950MHz (500w) SO239 fitting £49.95
CS201 Two way antenna switch, frequency range 0-1Ghz, 2.5 Kw Power Handling SO239 fittings £18.95
CS201-N same spec as CS201 'N-type' fitting £28.95
CS401 4 way antenna switch £29.95

ANTENNA ROTATORS

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

ROTATOR CABLE

3 Core ..... 0.45p per metre
7 Core ..... 0.80p per metre

MOUNTS

Turbo mag mount (7") ⅞ or SO239 ..... £14.95
Tri-mag mount (3 x 5") ⅞ or SO239 ..... £39.95
Stainless Steel Heavy Duty Hatch Back Mount with 4 mts of coax and pl259 plug (⅞ or SO239 fully adjustable with turn knob) £29.95
Stainless Steel Heavy Duty Gutter Mount with 4 mts of coax and PL259 plug (⅞ or SO239 fully adjustable with turn knob £29.95

BEST QUALITY ANTENNA WIRE

The Following Supplied in 50 metre lengths

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

POWER SUPPLIES

PS-20 20amp with 25amp surge Dual Meter & Adjustable Voltage 5-15v £99.95
PS-30 30amp with 35amp surge Dual Meter & Adjustable Voltage 5-15v £119.95

TRAPS

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

HF BALCONY ANTENNA

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

HF DELTA LOOP

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

HF YAGI

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

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

ADEX-6400 6 BAND 4 ELEMENT TRAPPED BEAM FREQ: 10-12-15-17-20-30 Mtrs GAIN: 7.5dBd BOOM 4.27m LONGEST ELE: 10.00m POWER 2000 Watts £499.95
40Mtr RADIAL KIT FOR ABOVE £99.95

HF VERTICALS

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

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

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

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

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

EVX8000 8 BAND VERTICAL FREQ: 10-12-15-17-20-30-40 Mtrs (80m optional) HEIGHT: 4.90m RADIAL LENGTH: 1.80m (included) POWER: 2000 Watts £269.95
80 Mtr radial kit for above £79.00

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

TRAPPED WIRE DI-POLE ANTENNAS

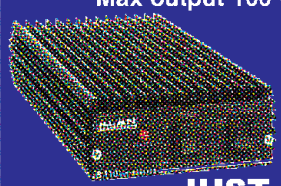
(Hi Grade Heavy Duty Commercial Antennas)


(picture for reference only)

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

"BULK PURCHASE!!"

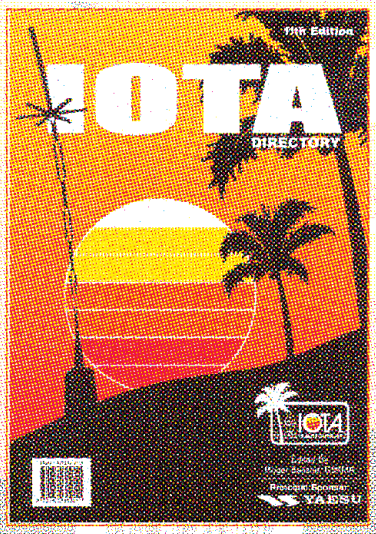
B110 2mtr 100w Linear
Freq 140-150 MHz
Input 0.5-25 watts
Max output 100 watts



RRP £149.95
SCOOP PRICE
JUST £99.00
(While stocks last!!!)

All prices plus £6.00 per order

NEW PUBLICATIONS FROM THE RSGB



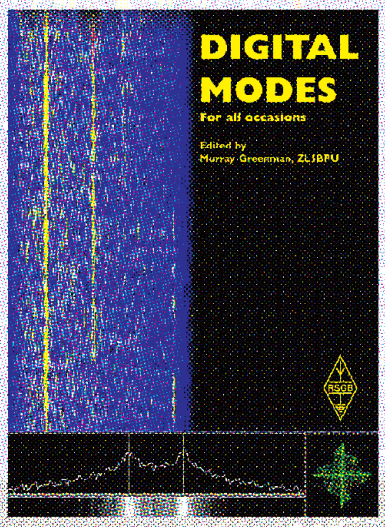
IOTA DIRECTORY - 11th Edition

This book is an essential guide to participating in the IOTA (Islands on the Air) programme. It contains everything a newcomer needs to know to enjoy collecting or operating from islands for this popular world-wide programme.

New For This Edition

* A listing of accepted operations from the 500+ rarest IOTAs
* 1018 of the 1200 IOTAs now numbered
* Hundreds more islands added
* Illustrated in colour
* Articles on major DXpedition activity in Russia, China and Indonesia.
* A report on one of the most ambitious IOTA operations ever mounted.
* A fully updated list of Most Wanted IOTA groups (with notes of operations in the last 2 years).

ONLY £8.49 + p&p (£9.99 non-members)



DIGITAL MODES FOR ALL OCCASIONS

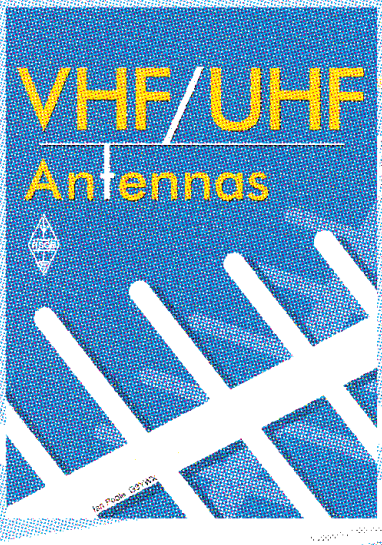
This is the book for every person who is interested in digital modes, as it is simply the most complete book yet written on this subject. The book describes serial transmission and various data and error correction techniques. It explains the differences between a bit, a byte and a symbol, the baud and BPS, Baudot and ITA2 and much more.

With this book you will be able to:

- Set up your computer effortlessly, using hints to avoiding all the pitfalls
- Learn how to connect the computer and radio together safely and simply
- Learn where to find all the software you need, at no cost
- Operate exciting real-time QSOs, working across town or around the world
- Learn which modes to use, which are best for certain conditions
- Operate visual modes, such as Hellschreiber, FAX and SSTV

Written for the average radio amateur through to the seasoned digital mode expert, this book is a must for everyone!

ONLY £14.44 + p&p (£16.99 non-members)



VHF/UHF ANTENNAS

This great new book from the popular author Ian Poole investigates the exciting area of VHF and UHF antennas. The VHF and UHF bands provide an exciting opportunity for those wishing to experiment, whilst the antenna sizes at these frequencies mean that they do not occupy great amounts of space.

VHF / UHF Antennas contains both the basic theory and constructional details for many antenna designs, taking the reader through the essentials in an easy to understand fashion. Chapters are devoted to different types of antenna from dipoles to Yagis, and verticals to log periodic antennas, giving details of the way in which they work and constructional information for a variety of designs. Simple antennas for broadcast reception supplement the amateur radio projects. The final chapters in the book cover measurements and installation techniques.

The book is a mine of information for anyone wanting to understand more about antennas for the VHF and UHF bands, or wants to construct them.

ONLY £11.89 + p&p (£13.99 non-members)

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

THE CDG2000 HF TRANSCEIVER

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

(*hence 'CDG2000'*)

Part one of a major new series describing a new HF transceiver design combining 'a high-performance receiver with a fairly standard transmitter'. Readers who have been following the items in Pat Hawker's 'Technical Topics' pages on the quest for low-noise oscillators will recognise the provenance of the series. Part one introduces the project, and outlines some of the aims and achievements of the design.

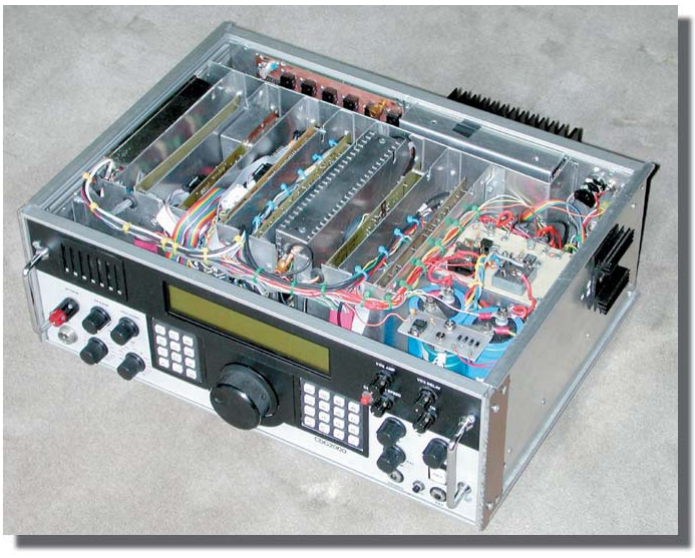
THE DESIGN of an HF transceiver today cannot easily be performed by one person. Although RF considerations must predominate, expertise in computer hardware and software as well as digital circuitry, is essential. Thus a team of three was formed, each with his own expertise, with a desire to design a transceiver with receive performance at least equal to the best currently on the commercial market, and one which could be reproduced by an experienced amateur constructor.

We do not claim that this is the last word in analogue circuitry. It *is*, however, designed to offer the best performance we could achieve with a design that is reproducible. On a practical note, its modularity lends itself to replacement of modules as time progresses. Unlike many commercial transceivers, it does not offer unlimited bells and whistles, many of which, on inspection, appear to be no more than sales gimmicks. We *have* included those features that we consider to enhance operation, the receiver exceeding most commercial designs with regard to performance. Receive IP3 (third order intercept) is about +40dBm. Noise figure is around 10dB. On SSB, 10dB(S+N)/N is about 0.22µV (-120dBm). Its oscillator phase-noise levels and close-in performance achieve -140dBc / Hz at 9kHz offset from carrier and -150dBc / Hz at just over 20 kHz on the 20-metre band.

We do not expect that many people will want to make exact copies. It is a project intended for the experienced amateur only. If your motive in home construction is to save money, this design is not for you, but if you want the best receive performance possible at a price lower than commercial rigs, then this may be of use. If you take only a couple of ideas for your own design, we suggest that you look at the synthesiser and the front-end.

In this series we will present some of the modules. These include the front-end board, post-mixer amplifier, IF amplifier, synthesiser and controller. Those modules that do not appear will be made available via the Warrington Amateur Radio Club website (see 'WWW.'). A CD-ROM will also be made available by the authors.

In this introductory part, we will discuss the system design and present an overview of the main elements. The aim is to achieve excellence in a modular fashion so that, as new techniques become available (and affordable), they can be readily incorporated into the transceiver, enhancing performance or improving operator convenience.



During the series, we shall be featuring photographs of the same transceiver as constructed by each of the authors. Each contains the same modules, but is built to individual preferences. This model was built by G3OGQ.

DESIGN PHILOSOPHY

THERE IS NO DOUBT that the fairly near future will see the introduction of all-digital amateur designs, but a study of current state-of-the-art designs rules them out on grounds of performance. Doubtless, in years to come, digital design will catch up with analogue design and economic grounds will ensure its adoption. It is clear that the designs most of us grew up with are now far removed from current design, as is evident from recent items in G3VA's 'Technical Topics' column.

It was therefore decided to produce a predominantly-

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

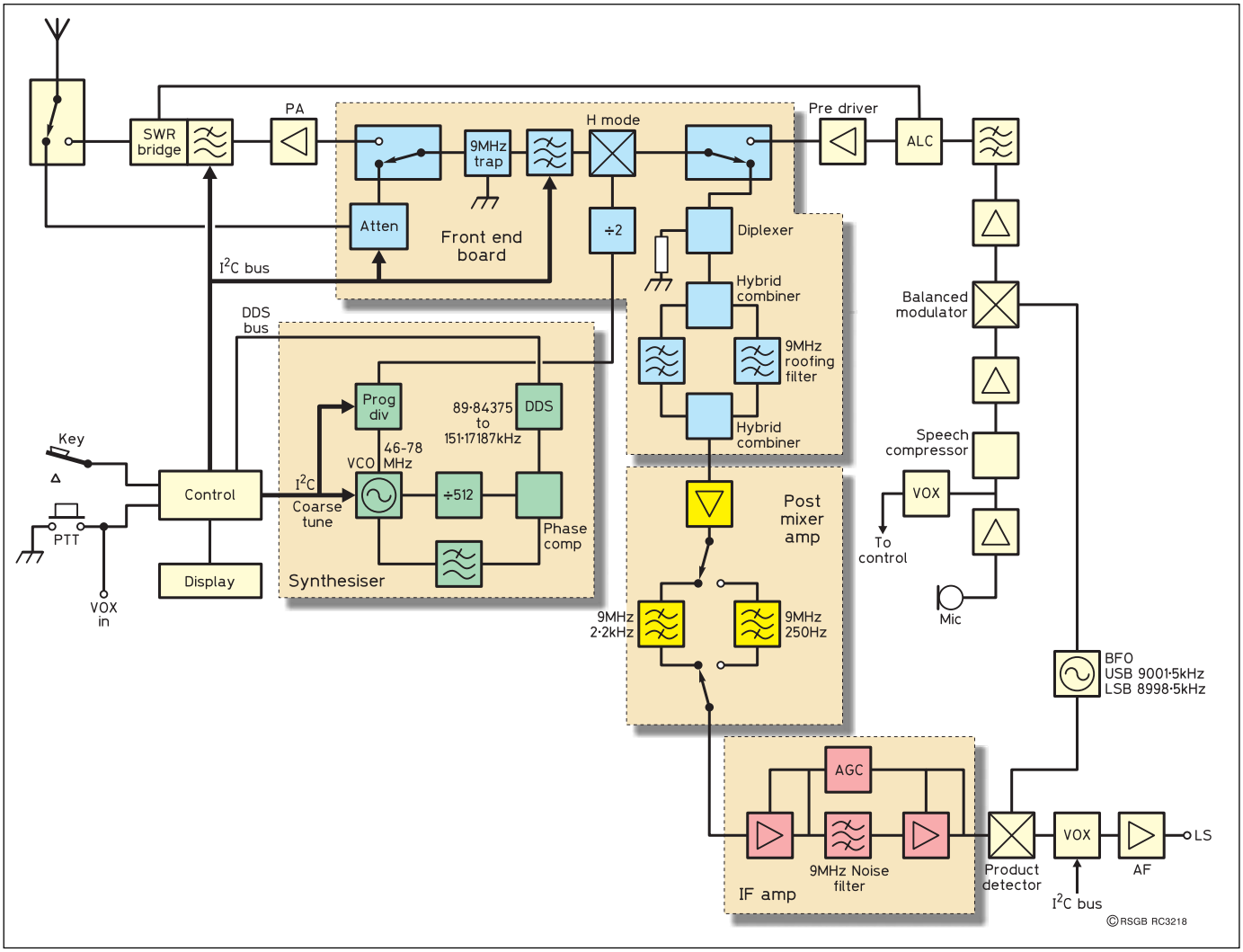


Fig 1: Block diagram of the transceiver.

analogue design, but with computer-controlled functions and digital audio circuitry.

Most high-performance receivers today feature multiple conversion with a high first intermediate frequency. This is very cost-effective, reducing the need for good band-pass filtering in the front-end, and improving image rejection. However, multiple intermediate frequencies require multiple oscillators, each with its own noise problem etc, leading to the production of 'birdies' and intermodulation distortion. We therefore decided to adopt a conventional single-conversion superhet with a fairly low intermediate frequency, but using a divided-down synthesiser running at VHF. This technique has the advantage of reducing phase noise and avoids the use of multiple VCOs. It was also decided that the best performance would be achieved by limiting the range to the amateur bands only.

Initial work concentrated on the receiver design, as a great deal of the circuitry would be common to the transmitter. It would be true to say that the receiver is the main part of the design, and that its performance has been the main focus - the transmitter chain is something of an afterthought but, nevertheless, benefits from the common use of the mixer, synthesiser and band-pass filters. The block diagram of the overall transceiver is shown in **Fig 1**.

RECEIVER DESIGN GOALS

THE RECEIVER DESIGN was to meet the following goals:

- IP3 point to be as high as possible;
- noise figure to be as low as possible *as long as it did not compromise IP3 performance*;
- coverage of amateur bands only, so as to maximise signal-handling performance;
- close-in performance (sideband noise, filters, IP3) to be as good as possible;
- frequencies to be derived from a stable source.

PERFORMANCE ACHIEVED

THE PERFORMANCE achieved, in brief, is as follows, and we welcome comparison with equipment reviews that have appeared in *RadCom*.

Measurements indicate an IP3 in the region of +40dBm. This performance is maintained for close-in signals. It is limited in part, not by the mixer, but by the coils in the band-pass filters, being up to 13dB better for hand-wound coils than for commercial inductors. Details of both methods will be given. IP3 degrades slightly for CW signals with an offset of less than 2kHz, due to the post-roofing-filter amplifier. With an IP3 of +40dBm, it is likely that the 1dB compression point is about +25dBm.

The noise figure is around 10dB, varying slightly from band to band. On SSB this gives a noise floor of:

(-174+10 x log(2200)+10)dBm,

or -130dBm [1]. With an IP3 of +40dBm and a noise floor of -130 dBm, this gives an IP3 dynamic range of 113dB using the formula:

$$\text{IP3 DR} \quad 2\,\frac{\text{IP3} \quad \text{MDS}}{3}\ \text{dB},$$

where MDS is the minimum discernible signal - the noise floor.

Sideband noise of the VCO varies by band, due to the use of programmable

dividers. On 14MHz it measures -140dBc / Hz at an offset of 9kHz, and -150dBc / Hz at an offset of 22kHz. The detailed performance is shown in **Fig 2**.

In respect of local oscillator leakage from the antenna socket, the transceiver performance is comfortably within the relevant limits defined in CEPT / ERC / REC 74-01 and ETSI specification ETC 300-684. The requirement is -57dBm; the worst-case measurement (which occurs at 29MHz) is -90dBm, with the best case being -108dBm at 18.1MHz.

How good a performance is needed? Tests by members of the RSGB Technical and Publications Advisory Committee (TAPAC) suggested that, in normal usage, an amateur is unlikely to require a receiver with a spurious-free dynamic range (SFDR) exceeding 95dB. The design presented here is 18dB better than this. It may be that this is more than is normally needed, but gives some margin for future proofing or for more onerous situations, where adjacent signals are encountered at higher levels than normal. In this regard, local oscillator noise leading to reciprocal mixing is more troublesome than pure IMD performance, and the design presented also achieves very good phase-noise performance. Subjective comparisons demonstrated at the Warrington Amateur Radio Club reveal that it performs better than most current commercial designs, even under normal band conditions.

Finally, a plot of the signal-to-noise ratio against input signal level is shown in **Fig 3**. This was measured at 14.220MHz.

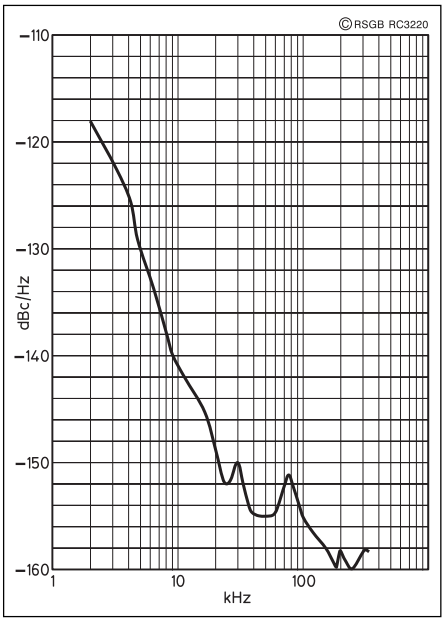


Fig 2: Sideband noise measured at 14MHz as a function of the frequency offset.

BLOCK DIAGRAM

The block diagram of the complete transceiver, shown in Fig 1, is deceptively simple. Each block represents a module, built on the same size board, with the exception of the front-end. A more detailed explanation of each function will be given with the description of each module.

Tracing the receive path first, the signal from the antenna is fed to an antenna changeover relay and applied to the front-end board. This is instead of feeding the signal through the low pass filter board which is used in transmit only, to avoid any attenuation due to ripple in the passband of the low-pass filters. The signal is then applied to an attenuator, which can be switched to give 0, 6, 12 or 18dB attenuation by means of two relays. Where the extreme sensitivity of the receiver is not required, attenuation provides even better IP3 performance. A 9MHz trap follows, which helps to attenuate signals at the intermediate frequency.

The nine band-pass filters which follow are identical in design, except for those covering the 10, 18 and 24MHz bands. All are relay-switched with DC-wetted contacts. Diode switching in the RF path is not an option in this transceiver, because relay switching provides superior IMD performance.

Following is the H-mode mixer [2] developed by G3SBI which is fed by the local oscillator signal frequency divided by two. After the mixer, the signal is split into the receive / transmit paths. The received signal is fed to a diplexer and then to the roofing filter - two filters fed 90° out of phase with a hybrid combiner at each end.

Following the front-end board, the signal, now at 9MHz, is fed to the post-mixer amplifier board which has a four-FET amplifier with a gain of about 14dB. The main filters are on this board, one for SSB and one for CW.

Notice that there is no amplifier before the roofing filter and no AGC signal external to the IF unit.

The filtered signal then goes to the IF amplifier board, which is the excellent design [3] of Bill Carver, W7AAZ (formerly K6OLG), modified to fit on a Eurocard of 160 x 100mm, these dimensions being common to all modules except the front-end. A noise filter is fitted between the second and third amplifier stages. AGC is derived on this board and applied to the IF amplifiers. The S-meter is also driven from here, but the level is altered by the control board to reflect changes in sensitivity following switched-in attenuators, changes of gain with band etc, all of which can show a difference in signal strength when, of course, none exists.

The product detector, a double-balanced diode mixer is part of the next board, which also incorporates the transmit exciter.

The resultant audio signal is then fed to the DSP board (where noise reduction takes place) and on to the audio amplifier. The DSP is a re-boxed commercial unit for which no information will be given. An alternative that combines receive and transmit DSP with DDS generation of the transmit signal is under construction.

The local oscillator signal is derived from a very low-phase-noise synthesiser which runs at 46 to 78MHz. The VCO is a novel two-tank oscillator design [4] by Colin Horrabin, developed further by John Thorpe for his excellent AOR7030 design. To understand the operation of the synthesiser consider, as an example, how a local oscillator signal for the 1.8MHz band is generated. For 1.8MHz, we require a local oscillator frequency of 10.8MHz (1.8 + 9MHz). This frequency is applied to the mixer after the divide-by-two IC on the front-end board. We therefore need a synthesiser output of 21.6MHz. Our VCO covers 46 to 78MHz so, in order to generate a 21.6MHz signal, we need to produce a

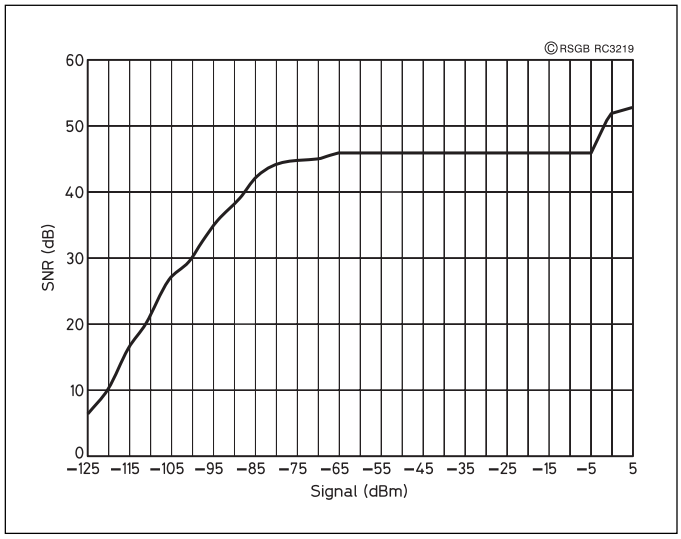


Fig 3: Signal-to-noise ratio as a function of signal level at 14.220MHz.

VCO signal at 64.8MHz and then divide the frequency by three. The VCO frequency is also divided by 512 in a phase-locked loop, and when the resultant frequency of 126.5625kHz is compared with a similar frequency from the DDS, the loop will lock. The synthesiser is controlled by a DDS reference derived from the control board, which is based on a high-end PIC microcontroller, the PIC17C766. It controls all functions of the transceiver by means of switched power, an I²C bus and a separate DDS bus. It provides an on-screen S-meter and power meter, remote control and enough processing power to update the display without compromising tuning.

The transmit path shares many of the circuits of the receive path.

The 9MHz BFO signal is keyed in the transmit exciter board for CW operation, an automatic keyer function being included in the control unit. For SSB, the microphone signal is fed through an optional speech processor to the transmit exciter board which also includes the VOX circuitry.

The DSB signal from the balanced modulator is fed to the pre-driver board, which also includes the SSB filter and ALC-controlled amplifier. Following this board, the signal, either CW or SSB, is fed to the H-mode mixer on the front-end board, through the band-pass filters, and thence to the PA.

The PA is either a 15W Hands Electronics AMP1 or a 20W amplifier using a Motorola AN779H module.

Traditional low-pass filters follow the PA, and this board also provides the forward and reverse voltages to feed the ALC circuit.

IN GENERAL

THERE IS NO 'this is it' aspect to the design; we all have different tastes. Three transceivers have been built, one by each of the design team and each differs according to individual tastes. What they all have in common is the use of identical modules. The first photograph shows the transceiver built by G3OGQ, which has separate controls for each function. Future articles will show the models built by the other authors, illustrating their individual preferences.

Further development proceeds; for instance, SSB will be generated directly at 9MHz using a DDS modulator with audio processing being performed in a companion DSP unit that also performs receive DSP functions.

There will also be the facility to control the transceiver from a computer.

Each month, a separate module will be described. At present, there is no intention to supply PCBs, although we will think again if demand warrants it. Layouts etc will, however, be available from the Warrington Amateur Radio Club website.

NEXT MONTH

THE DESIGN DESCRIPTION begins in earnest next month, when the front-end board will be covered in detail.

REFERENCES

[1] For details of this formula, see *Radio Communication Handbook*, (RSGB) sixth edition, p6.10.

[2] 'Technical Topics', *RadCom* January 1996, pp65, 68.

[3] 'A High Performance AGC / IF Subsystem', by Bill Carver, K6OLG, *QST* May 1996, pp39-44.

[4] This topic is discussed most recently in 'Technical Topics', *RadCom* April 2002, pp64, 69. ♦

WWW.

Warrington ARC www.warc.org.uk
Hands Electronics www.rf-kits.demon.co.uk
AN779H module available from suppliers such as Mainline, or see the Motorola website www.motorola.com

WHATEVER NEXT

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

FOLLOWING the item on the IBM Microdrive ('Whatever Next', April 2002), Paul Shayler, G6TSF, wrote to inform me of a new disc drive from Toshiba. In between the time that he wrote and I researched this device, a new and even larger capacity one has been produced, which brought it home to me just how fast technology is continuing to march along.

In the meantime, the price of the smallest capacity IBM Microdrive (340MB) has been slashed, which suggests to me that a larger capacity one is just around the corner.

PCMCIA DISKS

PORTABLE DATA for personal computers is a big thing now, and no longer are we restricted to media such as floppy disks and CD-ROMs to carry it around. The MK5002MPL is Toshiba's latest disk drive. It packs 5GB of storage into a Type-II PCMCIA card weighing just 55g (see photo below). The disk itself is 46mm (1.8in) in diameter, which is pretty much the standard for PC Card devices.

The Toshiba drives look remarkably similar to two new drives from Kingston Technology, the so-called 'DataPak' (pictured below right). These also come in capacities of 2GB and 5GB, and share some of the same specifications (eg rotational speed, cache size, spin-up time).

Toshiba's 5GB PC Card hard drive. There is also a 2GB version.

Interface	ATA-1/2/3/4/5 (68-pin)
Formatted Capacity	5.027GB
Rotational Speed	3,990rpm
Avg Rotational Latency	7.52ms
Spin-up Time	3sec (typical)
Buffer	256Kb
Seek Time	Average 15ms, Maximum 26ms
Internal Transfer Rate	93-125Mbits/sec
Host Transfer Rate	Ultra DMA mode 66.7Mbytes/sec PIO mode 16.6Mbytes/sec
Interleave Factor	1:1
Number of Disks	1
Number of Data Heads	2
Track Density (TPI)	1638 (41.6k)
Logical Cylinders	10,390
Logical Heads	15
Logical Sectors / track	63
Bytes per Sector	512
Logical Blocks (LBA)	9,818,530

Specifications of Toshiba's MK5002MPL 5GB PC Card.

DIGITAL AM

IN THIS COLUMN in February 2001 I wrote about the adoption of Digital Radio Mondiale (DRM) as the world-wide standard for digital radio broadcasting on LW - SW. Now that a live demonstration of a trans-Atlantic broadcast has taken place, it brings the implementation a step nearer. Clearly it is time to take a closer look, to see how the system works and what it offers.

The first thing that ought to be said is that DRM is not a single solution to the problem of broadcasting digitally. It is a flexible system and offers a suite of options. Although a DRM-only receiver could be offered for sale - indeed it probably will be eventually - the initial introduction of DRM is likely to take the form of an additional feature or mode, in much the same way that a shortwave receiver can have an additional demodulator for SSB. It is also intended that DRM should evolve, but that first generation DRM receivers should not be rendered useless by future format transmissions.

DRM is designed to operate within the existing 9kHz (Europe) or 10kHz (USA) channels (or multiples thereof) that medium-wave broadcasts use. A Digital Sound Broadcast (DSB) signal can be 'piggy-backed' around and beneath an existing AM broadcast, as **Fig 2** shows, with no discernable effect on the broadcast when received on an AM receiver. Alternatively it can replace an existing AM broadcast, as **Fig 3** shows, in which case a more robust and compact transmission is produced. In the former case it is called a 'hybrid' transmission and in the latter 'all-digital'. In each case an acronym that applies is IBOC (In-Band On-Channel).

In the hybrid transmission, the digital modulation is applied at a much lower level than the analogue modulation, most of it well outside the passband of a normal AM receiver. Of course the digital modulation could well overlap a broadcast on an adjacent frequency, but because it is transmitted at a lower level it is intended that it will simply be 'lost' by a conventional AM receiver. In an all-digital transmission, the core part of the signal is brought in to the carrier and the overall bandwidth reduced.

The Kingston DataPak, available in 2GB and 5GB versions.

THE HISTORY OF PCMCIA

PCMCIA stands for 'Personal Computer Memory Card International Association'. It is an industry association that was formed in California in 1989 to establish standards for portable computers. Their specifications for the 68-pin so-called 'PC Card'™ have evolved over the years and have enabled manufacturers to produce all kinds of plug-compatible peripherals, not just for computers. Manufacturing to the same standard has enabled costs to be cut and markets to be maximised.

PC Cards come in three standard sizes:

Type I - the original. 3.3mm-thick, generally used for memory cards, but modems are also found in this size.

Type II - the most common. 5.0mm thick. Network cards and earlier modems.

Type III - the big one! 10.5mm-thick cards, to accommodate technology that cannot be made smaller. Until recently this meant hard disks.

In each case the card is the same length and width - 85.6 x 54mm. **Fig 1** shows how one Type-III card or two Type-II cards can be plugged into a machine equipped with two PC Card sockets.

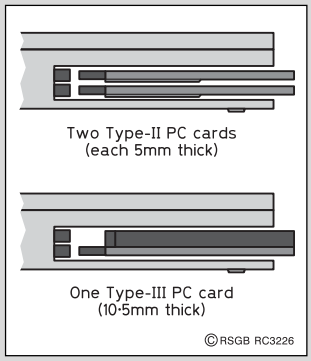


Fig 1: Thinner PC Cards can always be plugged into deeper sockets, but not vice versa.

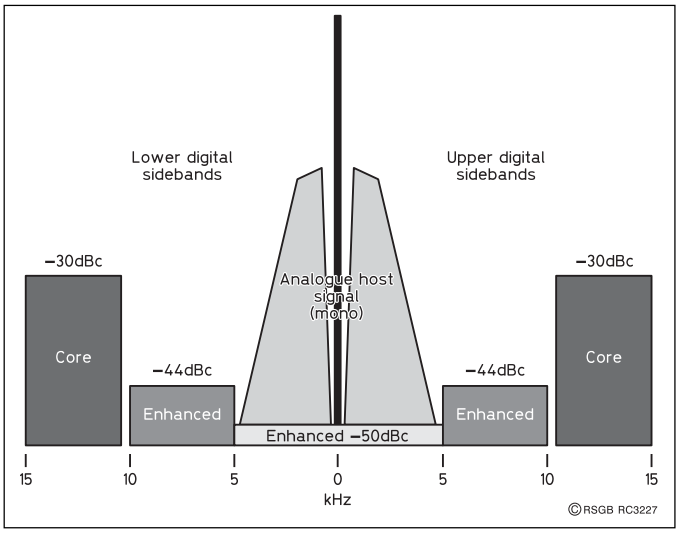


Fig 2: Spectral makeup of Digital Sound Broadcast, piggy-backed onto an existing AM transmission.

In each case the digital bit stream contains data for:

1. audio
2. error protection and correction, and
3. data (station ident, etc)

Depending on the frequency band (LF, MF, or HF) and on the intended use (eg groundwave, short distance skywave or long distance skywave), the content of the bit stream can be changed. In other words, there are trade-offs available so that the system can match the diverse needs of broadcasters. An example of this would be that a short-wave transmission which was likely to be subject to a great deal of fading and multipath reflection would need more of the bit stream allocated to error protection and correction than a broadcast that was intended to be received via groundwave. Of course this would mean that the shortwave broadcast would be of lower fidelity, but still better than existing AM. Higher quality transmissions can be achieved by allocating multiple channels and spreading the signal across a wider bandwidth.

TRANSMISSION

DRM employs Advanced Audio Coding (AAC - see 'Whatever Next', *RadCom*, July 2001), and transmitting it requires a special modulator. **Fig 4** shows a block diagram, in which you will see that a DRM multiplex contains three basic streams of information:

1. Main Service Channel (MSC). The audio and data of the service. Up to four services can be multiplexed together. Data is transmitted in 400ms-long packets.

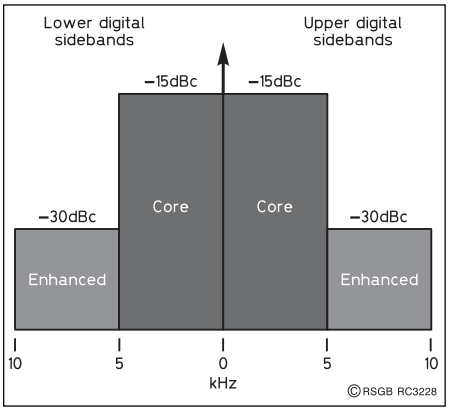


Fig 3: The spectral makeup of a DRM-only broadcast.

2. Fast Access Channel (FAC). Information on signal bandwidth, other technical aspects, language, etc. Data is transmitted in 400ms-long packets.

3. Service Description Channel (SDC). Information for the receiver on how to decode the MSC, how to find alternative sources of the same MSC, attributes to the services within the multiplex, date and time, etc. Data is transmitted in 1200ms-long packets.

DRM permits Single Frequency Networks (SFNs) to be created, so on medium wave you could drive from one transmitter's service area into another's without fading, without the distortion that we are all familiar with when we receive signals from multiple transmitters, and without re-tuning.

Unfortunately, SFNs don't overcome what can occur on short wave, where signals fade out altogether, but DRM has a way to deal with that problem as well. It provides the capability for automatic frequency switching, which is of particular value for broadcasters who transmit the same signals at different frequencies (routine practice by large HF broadcasting organisations that use this technique to increase the probability of at least one good signal being received in the intended reception area). The DRM system can enable a suitable receiver to select the best frequency for a programme automatically, without any effort on the part of the listener.

A DRM transmission contains both amplitude and phase variations, and can achieve the same coverage as an AM transmitter with significantly less power.

Next month the operation of a DRM receiver will complete the picture. ♦

WWW.

Toshiba 5GB PCMCIA disk
www.toshiba.com/taissdd/products/features/MK5002mpl-Over.shtml
Kingston DataPak **www.kingston.com/products/pccard.asp**
Digital Radio Mondiale **www.drm.org**

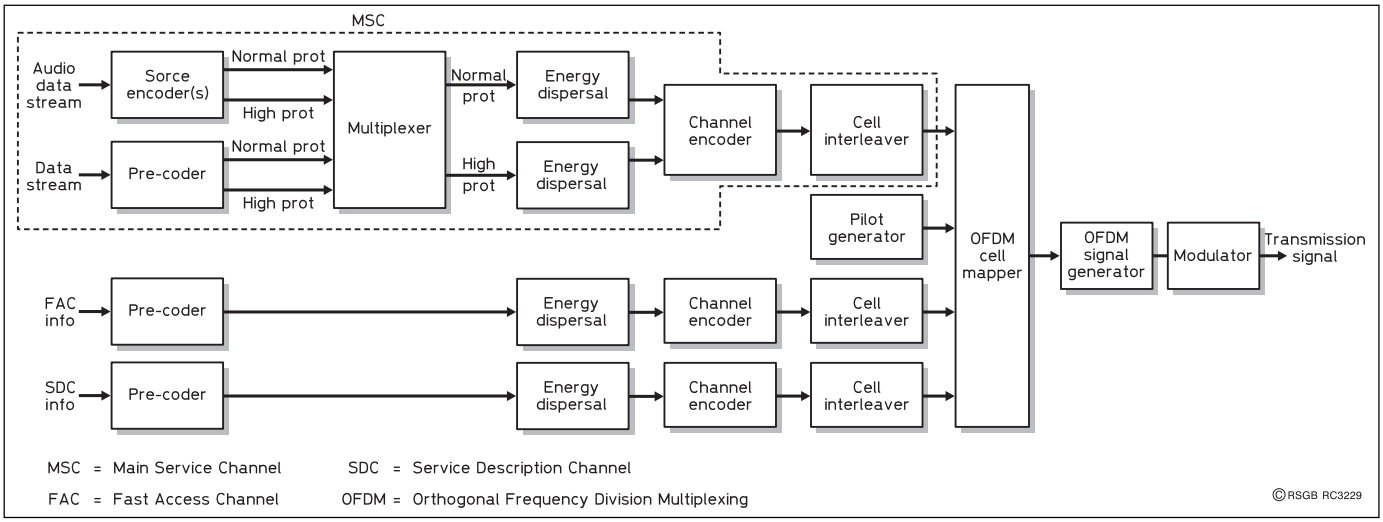
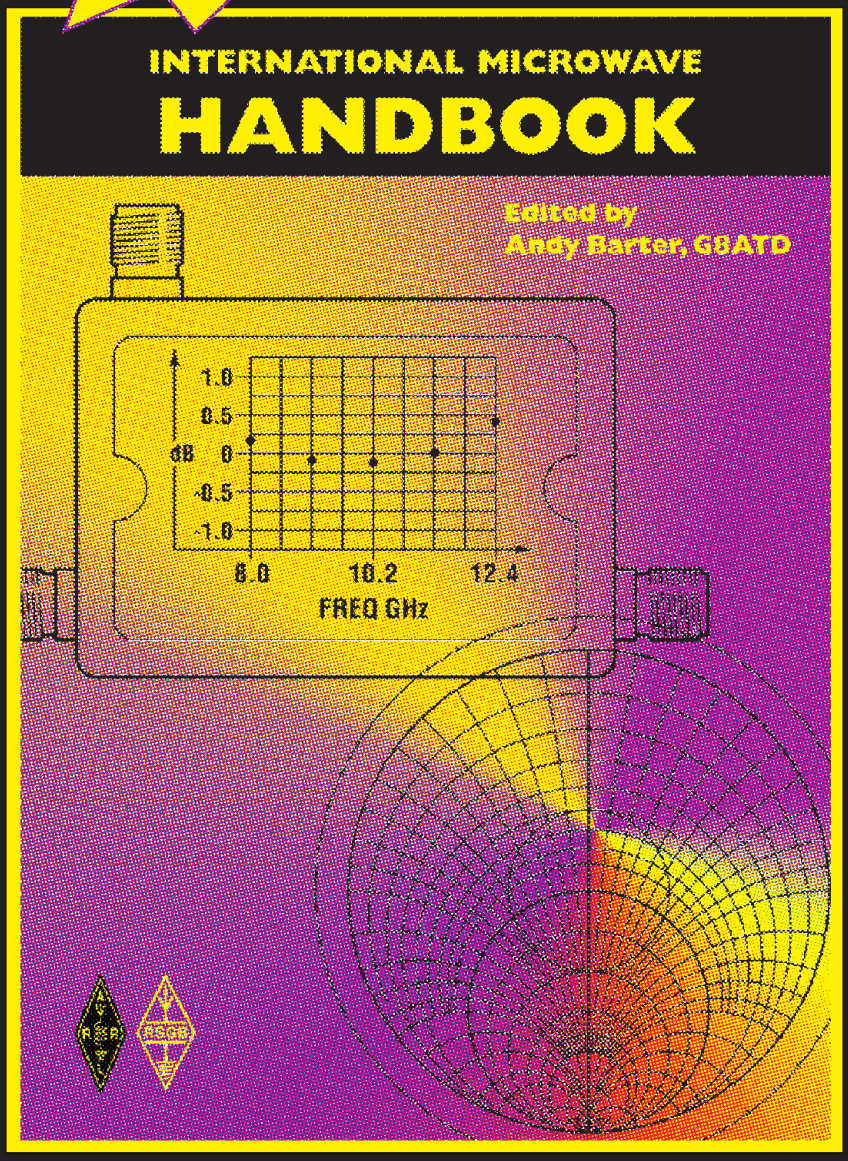


Fig 4: Block diagram of the input to a transmitter.

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.

NEW

INTERNATIONAL MICROWAVE HANDBOOK



Edited by Andy Barter, G8ATD

The microwave bands are an excellent area for radio amateurs who want to experiment and construct their own equipment. The RSGB in partnership with the ARRL has produced this invaluable source of reference information for those interested in this area, along with excellent designs from around the world to fire the imagination. Material has been drawn from many sources including the RSGB journal RadCom and the ARRL publications QST & QEX. Alongside this material a truly international range of sources have been used including items from Germany, Denmark, New Zealand, Slovenia and many more.

The earlier chapters in the book provide the invaluable reference material required by all interested in this exciting area of experimentation. Techniques and devices are covered in depth, leading the reader to understand better the wide range of equipment and techniques now available to the microwave experimenter. This book contains a wide selection of designs using the latest technology that can reasonably be used by radio amateurs and ranges from ones that can be reproduced by most radio amateurs to those that require a high degree of skill to make.

With the explosion in consumer electronics using microwave frequencies the opportunity to experiment has never been greater and this book is simply the best guide to the area of microwave radio.

ONLY £21.24 + p&p (£24.99 non-members)

www.rsgb.org/shop - Tel: 070 904 7373

www.nevada.co.uk

Nevada®

023 9231

more than

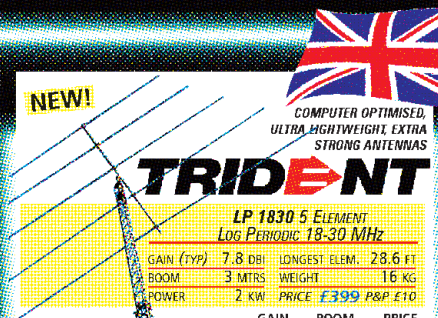
• Unit 1 • Fitzherbert Spur • Farlington • Portsmouth • PO6 1TT • e-mail: info@nevada.co.uk • we

...ORDER ONLINE...ORDER BY PHONE...ORDER BY FAX...ORDER BY POST...OR COME F

NEW!

COMPUTER OPTIMISED, ULTRA LIGHTWEIGHT, EXTRA STRONG ANTENNAS

TRIDENT



LP 1830 5 Element Log Periodic 18-30 MHz

GAIN (TYP)	7.8 DBI	LONGEST ELEM.	28.6 FT
BOOM	3 MTRS	WEIGHT	16 KG
POWER	2 KW	PRICE	£399 P&P £10

		GAIN (dBi)	BOOM (Metres)	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 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

SIRIO 28MHz Beams

SY27-3	3 element 26 - 30 MHz	7.6dB	£69.95
SY27-4	4 element 26 - 30 Mhz	9.6dB	£79.95

CUSHCRAFT

		OUR PRICE
A3S	3 element Beam 10/15/20 Mtr	£459.95
A3WS	3 element Beam 12/17 Mtr	£349.95
MA5B	Mini Beam 10/12/15/17/20	£299.95
D3	Dipole 7/14/21/28 MHz 7.86 Mtr Long	£199.95
D4	Dipole 7/14/21/28 MHz 10.3Mtr Long	£299.95
MA5V	Vertical 14 - 30 MHz	£229.95
R6000	Vertical 14 - 50 MHz	£299.95
R8	Vertical 7 - 50 MHz	£469.95
AR2	2 Mtr Ringo Ranger	£39.95
ARX6	6 Mtr Ringo Ranger Hi-gain	£129.95

ROTATOR

AR300	Lightweight rotator with controller	£49.95

20% DISCOUNT on all ZX YAGIS

ZX 20-4	4 El.	14Mhz Beam	11.4dB	~~£259.00~~	£207.20
ZX 30-3	3 El.	10Mhz Beam	9.1dB	~~£220.00~~	£176.00
ZX 4-3	3 El.	70Mhz Beam	9.1dB	~~£99.95~~	£79.96
ZX 6-2	2 El.	50Mhz Beam	6.2dB	~~£49.95~~	£39.96
ZX 6-5	5 El.	50Mhz Beam	12.1dB	~~£129.00~~	£103.20
ZX 6-6	6 El.	50Mhz Beam	12.5dB	~~£149.95~~	£119.96

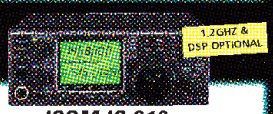
ICOM

IN STOCK!

ICOM IC-756 PRO MK II
- 100W HF plus 100W 6 mtrs
- LATEST DSP Technology

~~£2606~~ **£2495** | 3 CHEQUES OF **£835.00** | P&P £10

PAY BY CHEQUESPREAD INTEREST FREE

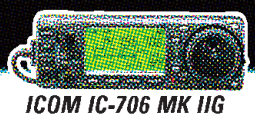


1.2GHZ & DSP OPTIONAL

ICOM IC-910
- VHF/UHF All mode TX
- 100W 2mtr/ 75W 70cm

~~£1399~~ **£1299** | 3 CHEQUES OF **£436.33** | P&P £10

PAY BY CHEQUESPREAD INTEREST FREE



ICOM IC-706 MK IIG
- 100W HF/6 + 50W
- 2M + 20W 70cms

~~£1299~~ **£899** | 3 CHEQUES OF **£303.00** | P&P £10

PAY BY CHEQUESPREAD INTEREST FREE

PRICE MATCH

ICOM IC-7400

Improved version of IC-746 with same DSP chip system as IC-756 Pro II
- 100W HF + 6mtrs • 100W 2mtrs

£1499 | 3 CHEQUES OF **£503.00** | P&P £10

PAY BY CHEQUESPREAD INTEREST FREE

ICOM IC-718

100W HF Transceiver
- Built in Keyer • General coverage RX

~~£699~~ **£549** | 3 CHEQUES OF **£186.33** | P&P £10

PAY BY CHEQUESPREAD INTEREST FREE

KENWOOD

IN STOCK!

KENWOOD TS-2000
- 0 - 500MHz (with 1200MHz optional)
- Built in Tuner - GREAT RADIO!

£1699 | 3 CHEQUES OF **£569.66** | P&P £10

PAY BY CHEQUESPREAD INTEREST FREE

KENWOOD TS-570 DGE
- 100W HF radio with a superb DSP RX.

~~£899.05~~ **£849** | 3 CHEQUES OF **£286.33** | P&P £10

PAY BY CHEQUESPREAD INTEREST FREE

KENWOOD D700E
- Dual Band Mobile
- Built in TNC

£449 | 3 CHEQUES OF **£153.00** | P&P £10

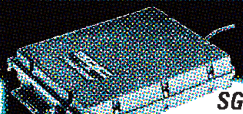
PAY BY CHEQUESPREAD INTEREST FREE

IN STOCK!

KENWOOD TH-F7E
- Dual band 144/430 TX
- Wideband (100kHz - 1300MHz) RX

~~£1349~~ **£289** | 3 CHEQUES OF **£99.66** | P&P £10

PAY BY CHEQUESPREAD INTEREST FREE



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

£359.95 | 3 CHEQUES OF **£123.31** | P&P £10

PAY BY CHEQUESPREAD INTEREST FREE

YAESU

1 ONLY at SPECIAL PRICE CALL!

NOW WITH FREE ACCESSORIES

FT 1000MP MK V
- HF 200W All mode transceiver

£2899 | 3 CHEQUES OF **£969.66** | P&P £10

PAY BY CHEQUESPREAD INTEREST FREE

NEW!

YAESU FTV1000 Mk V FIELD

New 100 Watt version of the Famous MKV above with built in Power supply

£2200 | 3 CHEQUES OF **£736.00** | P&P £10

PAY BY CHEQUESPREAD INTEREST FREE

YAESU FT 920
- HF + 6 metres
- full DSP and ATU c/w AM & FM

~~£1199~~ **£1099** | 3 CHEQUES OF **£369.66** | P&P £10

PAY BY CHEQUESPREAD INTEREST FREE

TRADE IN BEST PRICES

YAESU VX-5R
- 50-144-430MHz
- Wide Band Receiver
- Ultra Rugged Construction

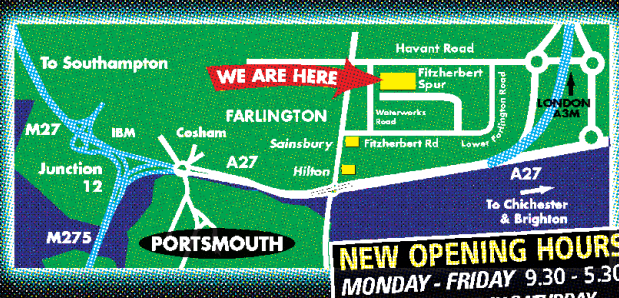
~~£359~~ **£269** | 3 CHEQUES OF **£93.00** | P&P £10

PAY BY CHEQUESPREAD INTEREST FREE

MH-FNB72

YAESU FT817 - HEAVY DUTY BATTERY PACK
- Ultra high capacity 9.6V 1700 mAH
- Includes special 3 hour rapid charge cable for use with MH-C777

£59.95 P&P £2.75



NEW OPENING HOURS
MONDAY - FRIDAY 9.30 - 5.30
CLOSED ALL DAY SATURDAY

CHEQUESPREAD INTEREST FREE!

- Simply divide the price *(including carriage)* into 3 equal payments.
- Write 3 cheques dated in consecutive months starting with today's date.
- Write your telephone number, cheque card number and expiry date on the back of each cheque.
- Post them to us, enclosing your name & address & we will (subject to status) send your goods immediately.

- **Pay by three post dated cheques**
- **No forms to fill in!**
- **No hidden charges!**
- **No hassle!**
- **No catch!**
- **No problem!**

CHEQUESPREAD prices quoted include postage & packing CHEQUESPREAD minimum order: £99

ALL GOODS SHIPPED FOR 24 HR DELIVERY P&P: £10 (UK Mainland) unless otherwise stated E&OE

MAHA CHARGERS AND BATTERIES - buy online on our secure website www.mahaenergy.co.u

.....LARGE STOCKS.....FAST DELIVERY..... EXPERT ADVICE.....

3090
n a radio store

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

ebsite: www.nevada.co.uk • fax: 023 9231 3091
AND SEE US AT OUR RADIO SUPERSTORE...

Listen to **CRYSTAL CLEAR, FADE-FREE, CD QUALITY**
radio programmes direct from the
WorldSpace Satellite
as you travel almost anywhere in the world
WORLDSPACE

WS2000

NEW!

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

£129.00
3 CHEQUES OF £46.33 P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

Small but dynamic! Keep tuned to news, music, info and entertainment!

Hitachi WS1

IN STOCK!

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

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

WS-0110

NEW!

The very latest **Worldspace receiver** compact and portable with superb crystal clear sound.

- 10 presets & last station memory
- Built-in speaker
- Headphone jack
- Easy-to-aim antenna
- Detachable WorldSpace Antenna
- External jack for multimedia & data services
- Powered from internal batteries *(not supplied)*
- Inc mains Adaptor
- 130mm x 130mm x 40mm
- 600g inc batteries

£99.95
3 CHEQUES OF £36.65 P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

Sanyo WS1000

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

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

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

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

YAESU

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

~~£1600~~ **£1199** | 3 CHEQUES OF £403.00 | P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

PRICE MATCH

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

~~£709~~ **£599** | 3 CHEQUES OF £203.00 | P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

FREE MAINS PSU

YAESU FRG-100
- Solid coverage from 50kHz - 30MHz
- All mode reception of AM, SSB & CW

~~£489~~ **£399** | 3 CHEQUES OF £136.33 | P&P £10
PAY BY CHEQUESPREAD INTEREST FREE

NEW HIGH POWER TUNER

PALSTAR AT1500 CV
1.5kW (2kW Peak) HF Antenna Tuner
Now with:
- NEW Heavy Duty Edge-Wound **silver plated roller inductor** for ***ultra high efficiency*** and ***reliability***
- Matches dipoles, centre fed doublets, G5RV's balanced feeders, Verticals, single wire, delta loops, beams, windoms, Inverted V's
- Built in 4:1 balun for balanced wire feeders
- Bypass position for quick straight-through antenna connection with SWR/POWER monitoring.
- 6 position antenna selector switching
- Average power meter reading to 3000 Watts
- Vernier dial plates for more accurate settings.

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

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

HF TRANSCEIVERS		
ICOM IC706MkII+DSP	HF/2M TRANSCEIVER	599
ICOM IC-751A	100W HF TRANSCEIVER	399
ICOM IC756 PRO	HF/6M DSP TRANSCEIVER	1399
ICOM IC-775DSP	HF BASE STATION	1895
KENWOOD TS-950S	HF BASE STATION	999
KENWOOD TS-430S	100W HF TRANSCEIVER	349
YAESU FT1000MP	100W HF TX+CW 500HZ	1399
YAESU FT900	100W HF MOBILE BASE	539
VHF/UHF TRANSCEIVERS		
ALINCO DJ-580E	2M/70CM HANDIE	129
ALINCO DJ-G5E	2M/70CM HANDIE	175
ALINCO DJ-SR1	PMR 446 TRANSCEIVER	79
ALINCO DJ-V5E+ACC	2M/70CM HANDIE	159
ALINCO DR-140E	2M MOBILE TRANSCEIVER	159
ALINCO DR-430E	70CM MOBILE TRANSCEIVER	169
ALINCO DR-610E	2M/70CM MOBILE TX	225
ICOM IC207H	2M/70CM MOBILE TX	215
KENWOOD TH-G71E	2M/70CM HANDIE	162
KENWOOD TM-231E	2M MOBILE TRANSCEIVER	119
KENWOOD TM-D700E	2M/70CM MOBILE	329
KENWOOD TS780E+PS31	2M/70CM/23CM BASE STATION	1195
STANDARD C558+ACC	2M/70CM HANDIE	165
STANDARD C5900	6M/2M/70CM MOBILE	299
TRIO TR-7500	2M 10W MOBILE TX	99.95
TRIO TR-7800	2M 25W MOBILE TX	149.95
YAESU FT-1500M	2M MOBILE TRANSCEIVER	129
YAESU FT290R	2M MULTIMODE TX	159
YAESU FT290R2+CASE	2M MULTIMODE PORTABLE	229
YAESU FT290R2	2M MULTIMODE TX	225
YAESU FT290R2+FC305	2M MULTIMODE + 25W AMP	239
YAESU FT470+ACCS	2M/70CM HANDIE+DC ADAP CASE	139
YAESU FT-40R	70CM HANDHELD	125
YAESU FT-470	2M/70CM HANDIE+MO8 ADAPTOR	139
YAESU FTL2014	VHF PMR TRANSCEIVER	75
AMPLIFIERS		
TOKYO HL100B	100W AMP 21 - 28MHZ	129
SCANNERS & RECEIVERS		
ALINCO DJ-X2000	HANDHELD SCANNER	375
ALINCO DJ-X3	HANDHELD SCANNER	99
AOR AR8600	BASE SCANNER	499
BEARCAT UBC780XLT	HANDHELD SCANNER	149
MAYCOM AR108	HANDHELD RECEIVER	55
ICOM IC-R7000 +	REMOTE....WIDEBAND RX	495
ICOM R75	HF RECEIVER	499
ICOM PCR1000	COMPUTER BASED RECEIVER	249
REALISTIC PRO 2026	MOBILE SCANNING RX	125
LOWE HF225 EUROPA	HF RECEIVER	399
LOWE HF225+ACC	HF RECEIVER + FM, CASE ETC	329
YAESU VR5000+DSP	WIDEBAND RECEIVER+DSP	529
ACCESSORIES		
AEA PK232MBX	MULTIMODE DATA TERMINAL	139
ALINCO EDC91	FAST CHARGER DJ-V5	32
ALINCO EME-12	ALINCO HEADSET & MIC	25
AMDAT ADC60	FREQ STANDARD CLOCK UNIT	99
DAIWA LA-2080H	2M 80W AMP & PREAMP	85
ICOM IC-AT500	AUTO ANTENNA UNIT	293
ICOM BC-135	BASE CHARGER R3 ETC	29.95
KENWOOD SO2 TCXO	UNIT FOR TS-950	65
TIMEWAVE DSP599ZX	DSP FILTER	259
TONO Q-550	TERMINAL UNIT	125
W4RT 1 TOUCH	ONE TOUCH TUNER FT817	49.95
YAESU FIF232 CVAN	COMPUTER INTERFACE (FT736R)	79
YAESU MFT+SB10	BOOM MIC & SWITCH BOX	35
YAESU NC-37	YAESU FAST CHGER FT23/470	29

YAESU ROTATORS

G1000C HEAVY DUTY
C/W Control Box & 25m Cable
~~£550.00~~ **£499.00** | P&P £10

G650C MEDIUM DUTY
C/W Control Box & 25m Cable
~~£450.00~~ **£399.00** | P&P £10

G450C LIGHT DUTY C/W Control Box & 25m Cable
~~£340.00~~ **£325.00** | P&P £10

GC038 LOWER MAST CLAMP **£25.00**

HEIL PRO-SET

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

£129.95 | P&P £7.50

DAIWA

Please add £6 p&p (uk mainland)

SWR/POWER METERS

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

MINI 2000
LOW PROFILE 3 BAND MINI BEAM
£229.95 | P&P £15

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

P&P £10

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

GP3W....**£69.95** 12/17/30M, 5 mtrs

SPECIAL OFFER! MH-C204F Plus -

- 1 MH-204 Intelligent Charger
- 4 x AA 1600mAH batteries
- UK AC adaptor
- Car kit

WORTH £45! IF PURCHASED SEPARATELY

£39.95 | P&P £6.50

MH-C204
3 HOUR INTELLIGENT CHARGER for 4 AA/AAA cells

PowerEx MH-C204F Plus Charger named "BEST CHARGER & BATTERIES" by PCPhoto Magazine 2001 EDITORS' CHOICE PCPhoto

- Rapid charge 2 or 4 AA/AA NiCD/NiMH batteries safely
- 2 independent charging banks, ie you can charge 2 NiMH AA in one bank and 2 NiCD AAA in the other simultaneously!
- Rejuvenate and restore dead batteries
- Can be used on a 12V power supply and in a car with optional car kit (£5)
- Supplied with UK AC adaptor

for use in the CAR or at HOME!

£26.95 | P&P £6.50

MH-C777 plus
UNIVERSAL CHARGER AND ANALYSER

- Charge almost any Lithium Ion, NiMH, and NiCad battery packs for your ham radios, scanners, PMR 446, cellular phones, digital cameras, camcorders.
- Analyse & condition battery packs and display capacity
- Display digital voltage, time and capacity
- Lightweight international 80-240V AC mains adaptor
- Car kit for charging from cigarette lighter
- Charge AA, AAA, C, D battery cells using optional holders. Battery holders...*£2 each*

for use in the CAR or at HOME!

£89.95 | P&P £8.50

MH-DPB140LI *POWEREX LITHIUM ION POWERBANK*

High capacity Lithium Ion external battery pack for Digital Cameras

- This 7.2V 1400 maH pack includes a handy belt pouch to carry the main battery, a UK mains charger, A Car cigar adaptor lead for re-charging in the car, and a selection of camera adaptor leads.
- Shoot up to 2 or 3 times more photo per recharge than with the internal battery
- Compatible with Nikon Coolpix 995, 880, 885, 775, Olympus E-10, E-100, HP Photosmart 618, 912, and Minolta Dimage 5, 7. and cameras using 7.2V DC

Take MORE PIX with your digital camera

DIGITAL CAMERA OWNERS LOOK!

£69.95 | P&P £6.50

MH-DPB180M *POWEREX NIMH POWERBANK*

Digital Camera External Battery Pack

- A complete solution this Powerbank battery system includes, 6V 1,800 mAH Battery Pack, 4 hour Mains quick charger, Car cigar adaptor charger, Universal Camera cable and carrying case. Compatible with most leading brands of camera.

£59.95 | P&P £6.50

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

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

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

DELTA MasterCard SWITCH VISA

ICOM IC-756PROII HF / 50MHz Transceiver

Reviewed by Peter Hart, G3SJX*

THE IC-756 WAS originally introduced by Icom as a high-end HF + 6m base station over five years ago. Since then the radio has been significantly upgraded and relaunched on two separate occasions, the IC-756PRO about two years ago and the IC-756PROII version just recently. The PRO version brought about a major change to the architecture of the radio with the introduction of DSP IF filtering for the main channel selectivity, and this filtering block is now being used with most other new introductions and model upgrades from Icom. The new PROII version, whilst not such a major change, introduces further enhancements to the DSP filtering, enhancements to the display and other features and improvements to the dynamic range of the front-end and signal path of the receiver.

PRINCIPAL FEATURES

THE IC-756PROII is a 12V operated radio covering USB, LSB, CW, RTTY, AM and FM modes. The receiver tunes continuously from 30kHz to 60MHz with the transmitter enabled only within the amateur bands and a little more on either side. Individual buttons select the bands with a triple band stacking register employed which is useful if you operate frequently on three modes, eg SSB, CW and RTTY. One of three last used frequency / mode combinations is returned for each press of the band key.

The smooth-action tuning knob tunes in 10Hz steps at 5kHz per knob revolution with auto speed-up on fast sustained tuning. Auto speed-up can be disabled if desired. Faster tuning rates for rapid frequency changes and slower rates for precision tuning are also provided. 101 memory channels are included with the usual facilities and frequency and memory channel can be entered directly. A memo-pad feature allows frequencies to be quickly stored and recalled by a simple key press, on the basis of last-in, first-out. RIT and transmitter independent tuning operate over a range of ±9.99kHz and various scan modes are implemented. Comprehensive switching manages access to the VFOs and split frequency operation. For repeater use, separate splits are programmable on HF and 50MHz and there is also a CTCSS tone encoder and decoder for repeater access or tone squelch operation.

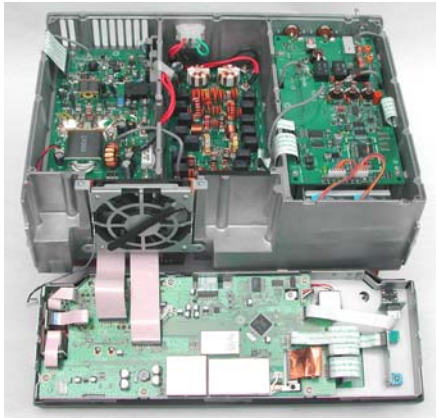
The receiver front-end configuration may be optimised to suit different requirements with two selectable preamplifiers, three levels of signal attenuation and a combined RF gain / all mode squelch control. Preamp 1 has a gain of about 10dB for use on all frequencies above 1.6MHz and preamp 2 has a gain of about 16dB, principally intended for use on 24MHz and above. This higher gain preamp also functions down to 1.6MHz and can be useful with low output receive antennas such as small loops and Beverages on 160m. Both normal and reverse sidebands are selectable on CW and the pitch is adjustable over the range 300 - 900Hz to suit personal preferences. A front panel pushbutton selects between two antenna sockets and also enables external receiver antenna. The last used antenna / external receive antenna combinations are stored with the band stores. An auto ATU is built in, matching up to 3:1 VSWR and covers all bands including 50MHz. Tuning settings every 100kHz are stored to enable rapid and accurate reselection.

The transmitter power is variable from about 2 - 100W on all bands and the analogue meter indicates power output, SWR, compression or ALC level. The meter functions can also be displayed in digital bargraph format on the LCD panel. An IF DSP speech processor is provided with three bandwidth settings, treble and bass adjust, VOX and a transmit signal monitor. Full and semi break-in is available on CW with a front panel control for adjustable delay. It is good to see this as a front panel control; so many radios relegate this to the back panel or as a menu-controlled item.

The rear panel carries the usual interfaces, common to all Icom radios, for control of linears, ATUs, data terminals etc. The standard Icom CI-V serial computer interface is provided with data transfer rates from 300 to 19200 baud, which also allows transceiving with other Icom radios. Two key jacks are fitted, the jack on the front panel for a keying paddle to control the internal keyer, and the jack on the rear panel for a straight key or external keyer. A transverter jack is also provided which outputs about -20dBm on transmit and this function is now separate from the receiver input antenna connector.

All features and full installation and oper-

Top view with covers removed showing PA, filters and ATU.



Covers removed and front panel hinged down.

* The Willows, Paice Lane, Medstead, Alton, Hants GU34 5PR.

ating instructions are included in the comprehensive 85-page manual, which includes circuit schematics.

SIGNAL PROCESSING

UNLIKE THE original IC-756 which used conventional crystal / ceramic IF filters, the PRO and PROII versions achieve all channel selectivity using IF DSP. The radio is a triple conversion superhet with a first IF of 64.455MHz, a second IF of 455kHz with fairly broad (15kHz) selectivity and a third conversion to 36kHz to feed the DSP. The 32-bit floating point DSP is interfaced to the analogue circuitry through very high resolution 24-bit A/D and D/A converters which are calibrated each time the radio is turned on. The DSP provides all the IF filtering, demodulation and audio processing functions. The channel filtering is impressive, providing 41 different passband widths on CW and SSB from 50Hz to 3600Hz with shape factors superior to any crystal filters. There are 32 passband widths selectable on RTTY (50 - 2700Hz) and three each on AM (3, 6, 9kHz) and FM (7, 10, 15kHz). Three separate bandwidths are immediately available for each mode selectable by a simple push of a front panel key, from the available menu of bandwidths. In addition, the PROII has two selectable filter profiles on CW and SSB modes, a sharp profile with a flat passband and a soft profile with a more rounded passband. Icom claims that the sharp profile on SSB gives better audio quality, whereas the soft profiles improves weak signal readability. On CW, the soft filter claims improved pile-up handling characteristics with a wider skirt bandwidth and is much like mechanical or crystal filters without any ringing. See the measurements section for further details.

The DSP also provides the twin passband tuning function, which enables the filter sides to be both independently moved and narrowed. The AGC is also implemented by the DSP with three separate time constants selectable from the front panel. These three values may be set from a menu of 13 different values (0.1 to 6s) and are set separately for all modes except FM. Two separate notch functions are provided in this transceiver, both using the DSP. A particularly effective manually-tuned IF notch with a depth of 70dB is included within the AGC loop and hence does not result in desensitising with strong carriers. An auto-notch is implemented at AF and will automatically attenuate several beat notes, even if they are moving.

An adjustable DSP noise reduction system is included and there is also a conventional (not DSP) IF noise blanker for pulse type interference such as car ignition. Both of these features have been enhanced in the PROII, with an improved noise reduction algorithm and an adjustable level for the noise blanker.

Rear panel view.

The modulated transmit signal is also generated by the DSP with adjustable bass and treble microphone equalisation and adjustable compressor.

OTHER GOODIES

THE IC-756PROII probably has more built-in functions than any other radio and these are useful additions, not just gimmicks. A dual-watch facility is incorporated via a second receiver. The two receivers use separate first mixers and synthesisers and share a common signal path for all RF, IF and AF circuitry. Hence the second receiver will use the same IF bandwidth and mode and must be broadly within the same band or, for the higher frequencies, on adjacent bands. A balance control sets the gain of the two signal paths via PIN diode attenuators following the mixers. A single tuning control is used, assignable to either receiver and both receive VFO frequencies are continuously displayed together with the separate selected memories (active or not). A quick dual-watch function equalises the frequency of both receivers. Whilst not quite so convenient to use as the dual receivers with two tuning knobs, it is nevertheless quite effective and results in a cheaper unit.

The IC-756PROII includes a number of features aimed at the data user. RTTY uses FSK with selectable mark frequencies, shifts, sidebands and polarity, and requires a logic level input on transmit. For use with AFSK terminal units, AmTOR, PSK31, SSTV etc, voice modes are used. On all the voice modes, a long push of the mode key selects data and this mutes the microphone. In addition to the comprehensive selection of IF channel filters, selectable narrow bandwidth audio filters can also be enabled on RTTY mode including a twin peak filter sharply tuned to the 2125 / 2295Hz mark and space tones. A tuning indicator is also provided and a 45 baud 170Hz shift RTTY demodulator and decoder for displaying the received data directly on the display panel. To ensure excellent frequency stability and accuracy, particularly on the narrow data modes, a highly stable temperature-compensated POC reference oscillator is built-in accurate to 0.5PPM over the full temperature range.

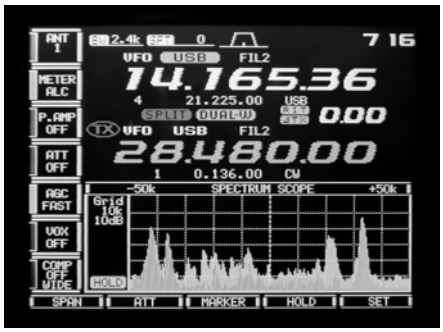
The radio includes a full message keyer with some useful features for contest operation on CW. The keyer operates over a wide range of speeds with adjustable weighting and a variety of keying paddle arrangements. Four memories will each store up to 55 characters with a provision to send automatically incrementing serial numbers and auto-repeat after a time delay. The message stores are programmed in text from front panel pushbuttons, not using the keying paddle.

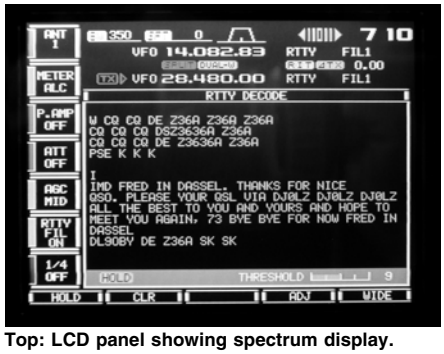
The IC-756PROII also includes a digital voice recorder with four memory channels on receive and four on transmit. Each receive memory store is limited to a maximum message length of 15 sec and a total of 90 sec for the transmit stores. This is useful for repeated CQ calls in long contests and other fixed contest messages. The transmit stores can be tagged with labels up to 20 characters long for easy identification on the display panel. Continuous recording of the receiver audio is possible, and playback of the last 15 seconds but this needs resetting every 30 minutes. As an optional extra a voice synthesiser module can be installed.

The CW and voice keyers can both be controlled from an external four-key keypad connected via the microphone socket. This is not available from Icom as an accessory but is simple to construct and is described in the manual.

LCD DISPLAY PANEL

THE FRONT PANEL display uses a five-inch colour TFT LCD panel. In the PROII, eight different formats are provided in terms of styles and background colours to suit individual preferences and there are seven different font styles. Associated with the display are seven buttons down the side and five function keys along the bottom. These





Top: LCD panel showing spectrum display. Above: LCD panel showing RTTY decoder display.

buttons and keys are assigned functions according to context, eg mode etc. The top half of the panel indicates all the frequencies, modes, split and dual-watch status, IF filters etc at all times. A graphical representation of IF bandwidth is also portrayed, responding also to PBT settings. The 24-hour clock time is also displayed and a timer with programmable on / off times may also be enabled.

The bottom part of the display has a number of functions. It can show the spectrum on either side of the receive frequency with a selectable span from ±12.5 to ±100kHz. The current spectrum trace is shown in one colour with a background trace for peak hold in a different colour. Peak hold can be useful for monitoring transient openings on 50MHz. The transmit frequency is indicated for split operation or the sub receiver frequency for dual watch. The sensitivity has been improved significantly with the PROII version. A section of the memory bank can be displayed showing up to 13 consecutive locations. Alphanumeric names can be assigned for easy reference and it is a simple matter to scroll through, locate and select channels. This section of display also shows the set up and message stores for the voice and CW keyers and decoded RTTY messages.

This radio has a host of user-programmable settings. These are easily accessed and set, without constant reference to the manual, by the simple presentation in words and the assignable keys provided on the display. This same approach allows the memory keyer, scanning options and other functions to be set up in a very user-friendly way.

CONSTRUCTION

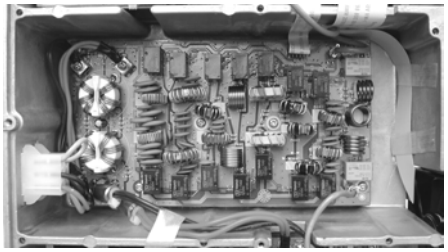
THE IC-756PROII measures 340W x 111H x 285Dmm and weighs about 9.6kg. The construction is very sturdy indeed and excellently screened, based on a die-cast multi-partitioned chassis. A 7.5cm diameter speaker faces upwards through the top and seems of reasonable quality. An internal axial fan, only 0.5 inch thick, provides cooling and this only operates when the radio is hot.

MEASUREMENTS

THE FULL SET of measurements when powered from a 13.8V supply is given in the table. Additional comments and notable differences to the PRO version are as follows.

Receiver Measurements

The sensitivity without the preamp is about 1 - 2dB improved over the PRO version but still slightly less than the original IC-756. With the higher gain preamp in circuit,



Close-up of low pass filter unit.

preamp 2, the sensitivity is about 3dB better than with preamp 1. Note that no preamp is selectable on 136kHz. The S-meter reading is independent of mode. The rejection of images, IFs and spurii was exceptionally good, in excess of 100dB in most cases. AGC decay times were as specified and although the initial AGC attack time was fast, it took around 200ms to settle the last dB.

The filter bandwidths shown in the table opposite are just a small selection from the filters available. The shape factors and steep skirts are really excellent even with bandwidths down to 50Hz and the narrower bandwidth filter skirts are significantly improved over the PRO version. This is where DSP scores, these figures are unattainable with conventional IF filters. The soft bandwidth CW filters have wider skirts but the soft bandwidth SSB filters have a narrowed passband.

The third order intercept has been improved substantially over the PRO and together with the lower noise floor, this gives some 3 - 6dB improvement in dynamic range just meeting an excellent 100dB at best in SSB bandwidths. The close-in dynamic range, reciprocal mixing and in-band intermodulation measurements are similar to the PRO. The set's measured effective selectivity curve on USB is shown in **Fig 1**.

Transmitter Measurements

The power output figures in the table were measured with the ATU out of circuit. The ATU introduced an additional loss of about 10%. The CW rise and fall times were fairly sharp and there was about 30% character shortening at 40WPM with full break-in. There was no character shortening on semi break-in. The rise and fall times are settable to 2, 4, 6 or 8ms but were only checked on 4ms.

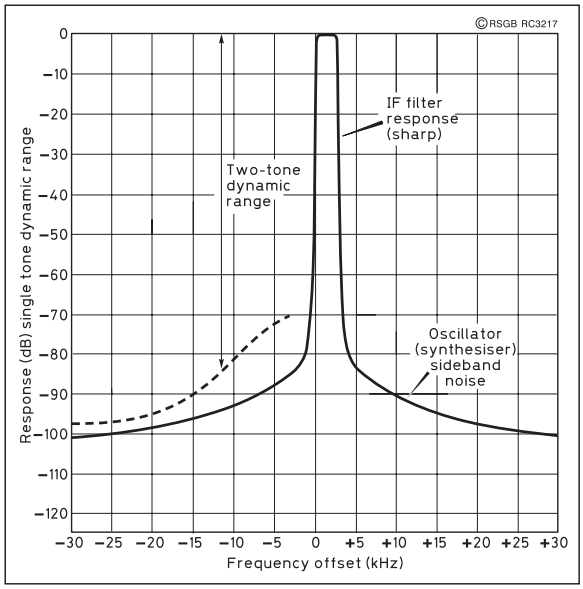


Fig 1: Effective selectivity curve on USB.

ON THE AIR PERFORMANCE

THE FIRST THING you will see when you turn on this radio is the start-up screen saying that the DSP is calibrating. This takes 10 seconds and you can add your callsign or other short message to the start-up screen.

Overall I found the radio an excellent performer, easy to use after initial familiarisation, with all the features that anyone could possibly want and well implemented. The filtering features were really excellent, the IF filter performance, PBT and notches all performed extremely well. I preferred the sharp filter setting on SSB in all cases, the fidelity was improved, and to rely on the PBT for narrowing if necessary. On CW there appeared to be little difference in practice between the sharp and soft filter settings.

The receive performance was very good on all modes although some strong signal problems were still observed on 40m with the preamp switched in circuit. The performance extended well down into the VLF region and sounded reasonable on medium wave broadcast AM. The audio gave good communications quality through the internal speaker. The built-in RTTY decoder performed effectively as did the voice recorder, memory keyer and spectrum display. The transmit performance was good overall and CW break-in effective.

The default setting for the LCD panel gave a rather dim display in a bright environment. Increasing the brightness to maximum and adjusting the contrast gives a much better result in this situation. The viewing angle is very good for an LCD. I am particularly pleased that this transceiver gave me my very last two DXCC countries - VP6DI on Ducie Island and P5/4L4FN in North Korea. Now I have them all.

CONCLUSIONS

THE IC-756PROII improves on an already well-respected design for HF and 50MHz. With probably more features than any other radio, a very good electrical performance and being easy to use, this radio should continue to prove a popular choice. It is currently available for around £2495.

ACKNOWLEDGEMENTS

I WOULD LIKE to thank Martin Lynch & Sons for the loan of the equipment.

ICOM IC-756PROII MEASURED PERFORMANCE

RECEIVER MEASUREMENTS

	SENSITIVITY SSB 10dBs+n:n		INPUT FOR S9	
FREQ	PREAMP 1 IN	PREAMP OUT	PREAMP 1 IN	PREAMP OUT
136kHz	-	4.0µV (-95dBm)	-	630µV
1.8MHz	0.18µV (-122dBm)	0.35µV (-116dBm)	18µV	50µV
3.5MHz	0.14µV (-124dBm)	0.32µV (-117dBm)	14µV	45µV
7MHz	0.14µV (-124dBm)	0.32µV (-117dBm)	13µV	40µV
10MHz	0.14µV (-124dBm)	0.28µV (-118dBm)	13µV	40µV
14MHz	0.14µV (-124dBm)	0.32µV (-117dBm)	14µV	45µV
18MHz	0.16µV (-123dBm)	0.35µV (-116dBm)	14µV	45µV
21MHz	0.16µV (-123dBm)	0.35µV (-116dBm)	16µV	45µV
24MHz	0.16µV (-123dBm)	0.35µV (-116dBm)	16µV	45µV
28MHz	0.16µV (-123dBm)	0.35µV (-116dBm)	18µV	50µV
50MHz	0.22µV (-120dBm)	0.63µV (-111dBm)	20µV	63µV

S-READING	INPUT LEVEL SSB	
(7MHz)	PREAMP 1 IN	PREAMP OUT
S1	1.1µV	3.5µV
S3	1.8µV	5.6µV
S5	3.2µV	10µV
S7	6.3µV	20µV
S9	13µV	40µV
S9+20	160µV	500µV
S9+40	1.3mV	4mV
S9+60	10mV	32mV

FREQUENCY OFFSET	RECIPROCAL MIXING FOR 3dB NOISE	BLOCKING PREAMP 1 IN	BLOCKING PREAMP OUT
3kHz	83dB	-36dBm	-26dBm
5kHz	86dB	-36dBm	-26dBm
10kHz	92dB	-33dBm	-23dBm
15kHz	96dB	-24dBm	-13dBm
20kHz	98dB	-13dBm	-3dBm
30kHz	101dB	-4dBm	+6dBm
50kHz	106dB	-4dBm	+6dBm
100kHz	110dB	-4dBm	+6dBm
200kHz	113dB	-4dBm	+6dBm

	SHARP IF BANDWIDTH		SOFT IF BANDWIDTH	
FILTER	-6dB	-60dB	-6dB	-60dB
10kHz	10.8kHz	16.6kHz	-	-
6kHz	6.6kHz	10.8kHz	-	-
2.4kHz	2525Hz	3540Hz	2400Hz	3530Hz
500Hz	515Hz	720Hz	542Hz	850Hz
250Hz	253Hz	356Hz	263Hz	453Hz
100Hz	107Hz	194Hz	113Hz	234Hz
50Hz	64Hz	136Hz	64Hz	159Hz

	INTERMODULATION (50kHz Tone Spacing)			
	PREAMP 1 IN		PREAMP OUT	
Freq	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range
136kHz	-	-	+16dBm	80dB
1.8MHz	+8.5dBm	93dB	+17dBm	95dB
3.5MHz	+9dBm	95dB	+17dBm	96dB
7MHz	+10dBm	96dB	+20dBm	98dB
14MHz	+12.5dBm	97dB	+23dBm	100dB
21MHz	+14dBm	98dB	+23.5dBm	99dB
28MHz	+13dBm	97dB	+21dBm	98dB
50MHz	+7dBm	91dB	+16.5dBm	91dB

	CLOSE-IN INTERMODULATION ON 7MHz BAND			
	PREAMP 1 IN		PREAMP OUT	
Spacing	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range
3kHz	-28dBm	70dB	-19dBm	71dB
5kHz	-25dBm	72dB	-16dBm	73dB
7kHz	-20dBm	75dB	-12dBm	76dB
10kHz	-10dBm	82dB	-1dBm	83dB
15kHz	+1dBm	90dB	+10dBm	91dB
20kHz	+13dBm	98dB	+22dBm	99dB
30kHz	+10dBm	96dB	+20dBm	98dB
40kHz	+10dBm	96dB	+20dBm	98dB
50kHz	+10dBm	96dB	+20dBm	98dB

AM sensitivity (28MHz): 1µV for 10dBs+n:n at 30% mod depth
FM sensitivity (28MHz): 0.22µV for 12dB SINAD 3kHz pk deviation
AGC threshold: 0.7µV
100dB above AGC threshold for +1dB audio output
AGC attack time: see text
AGC decay time: see text
Max audio before clipping: 1.5W into 8Ω, 2W at 10% distortion
In-band intermodulation products: better than -50dB

Carrier suppression: 80dB
Sideband suppression: 70dB @ 1kHz
Transmitter AF distortion: approx 1%
Microphone input sensitivity: 2mV for full output
SSB T/R switch speed: mute-TX 12ms, TX-mute 1ms, mute-RX 20ms, RX-mute 1ms

TRANSMITTER MEASUREMENTS

FREQ	CW POWER OUTPUT	SSB (PEP) POWER OUTPUT	HARMONICS	INTERMODULATION PRODUCTS 3rd order	5th order
1.8MHz	102W	101W	-66dB	-30 (-24)dB	-38 (-32)dB
3.5MHz	105W	104W	-66dB	-42 (-36)dB	-51 (-45)dB
7MHz	106W	105W	-70dB	-38 (-32)dB	-48 (-42)dB
10MHz	106W	104W	-66dB	-38 (-32)dB	-42 (-36)dB
14MHz	106W	104W	-63dB	-30 (-24)dB	-36 (-30)dB
18MHz	106W	104W	-66dB	-36 (-30)dB	-40 (-34)dB
21MHz	105W	104W	-64dB	-38 (-32)dB	-41 (-35)dB
24MHz	105W	104W	-70dB	-31 (-25)dB	-39 (-33)dB
28MHz	105W	103W	-70dB	-28 (-22)dB	-40 (-34)dB
50MHz	97W	95W	-70dB	-30 (-24)dB	-40 (-34)dB

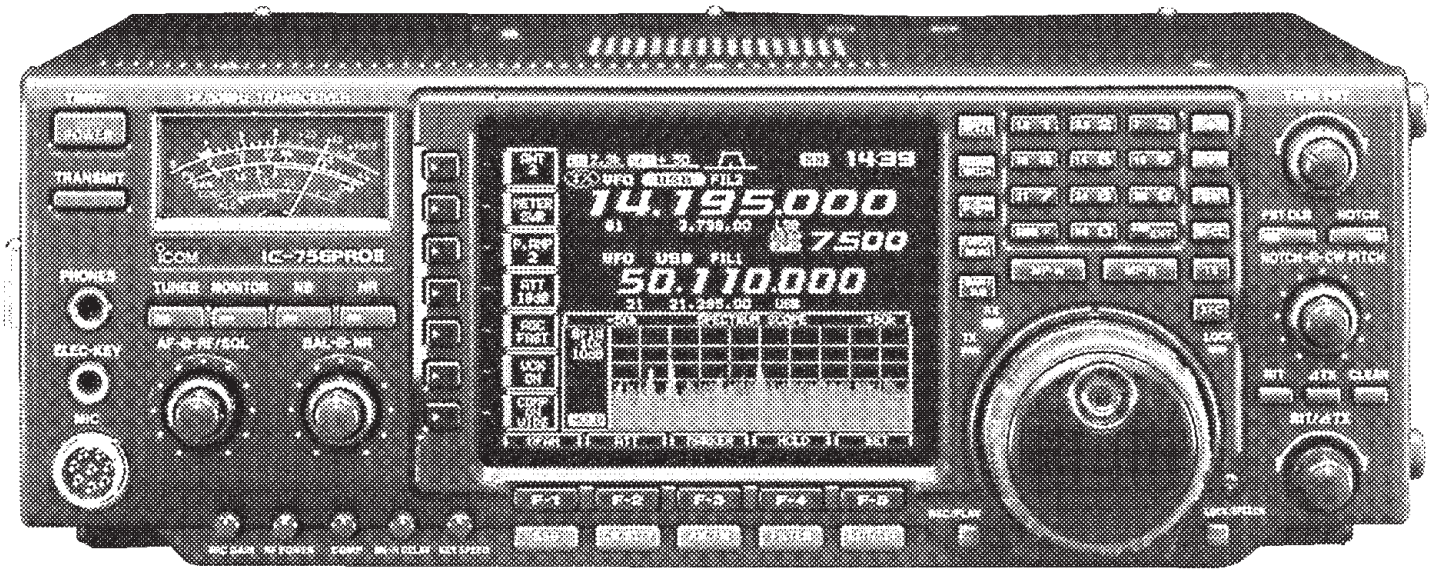
Intermodulation product levels are quoted with respect to PEP, figures in brackets are with respect to either tone.

NOTE: All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on SSB with receiver preamp 1 switched in and with 2.4kHz bandwidth sharp filter selected.

Peter Hart only wanted

TWO MORE CONTACTS

to complete his *DXCC Country List*



- hardly surprising that he found them using a NEW IC-756 Pro MkII

The IC-756 Pro achieved a fantastic reputation among Ham enthusiasts offering a wide selection of features including 32-bit floating point DSP, 24 bit AD/DA converter, 4.9 inch colour TFT display, Twin PBT, dual watch function and much, much more.

The IC-756 Pro II, which contains all of the great, features that made the original so popular and contains notable improvements on its predecessor.

These include:

- ***Improved Receiver Performance*** - The receiver circuit from the Band Pass Filter stage to the Mixer stage has been upgraded. Furthermore the Automatic Gain Control has been improved for superior performance. These two improvements have led to a wider dynamic range, and a reduction of third order distortion.
- ***The Filter Shape is now selectable*** - The digital IF filter shape is now selectable from soft or sharp, the shape can be changed while receiving a signal. Although this is a digital unit, the response can be changed to sound like that of an analog filter. Operation can be tailored to suit the band conditions during use.
- ***One Touch Record/Playback button*** - A 'One-Touch' record/playback function has been added. One of the four Rx digital voice memories can be recorded/played back from any screen at the push of a button. Going to the digital voice memory screen is not necessary, and record/playback can be done instantly even in the bandscope screen.
- ***Control Function*** - By connecting a control device to the mic-connector, it is possible to externally control the four voice memories (Tx) and all four of the memory keyers. Going to each function screen is not necessary, so it is possible to operate the unit from many screens. This is an advantage during contest operation.
- ***Increased Performance of SSB Data Mode*** - Even in SSB mode, when the IF filter bandwidth has been set to less than 500 Hz, the BPF function switches on and filtering equivalent to CW filtering is possible. Also, the * dial tuning function allows for precise tuning. This is very effective for PSK 31 mode operation.
- ***USB Now Standard in CW Mode*** - While receiving in CW, the IC-756PRO was fixed in LSB mode. In the IC-756PROII, receiving in USB also is now possible.

Other improvements include -

- Changed keyboard lettering and colour
- The S-meter background is changed to white for improved readability
- Noise Blanker performance has been increased (0-100 level adjustment range has been added)
- 8 new screen layouts with 7 font styles
- SSB/CW Synchronous Shift Function added

Features retained from the IC-756PRO

- 32-bit Floating Point DSP
- 4.9 in. Color TFT display
- Twin PBT, Manual/Auto Notch and Noise
- Reduction Functions
- Real-time Spectrum Scope
- RTTY Onscreen Demodulator and Decoder
- 100W Output with Full Duty Cycle
- Microphone Equalizer
- CI-V Capability for PC Control
- Optional Voice Synthesizer *(*UT-102 required)*
- Mode: USB, LSB, CW, RTTY, AM, FM
- Memory Channels: 101
- Frequency Resolution: 1Hz
- Dimensions:.....340 x 111 x 285mm
- Weight:.....9.6kg

Options and Accessories

- **AH-2b** Mobile whip & bracket
- **AH-4** 100W HF+ 50MHz automatic antenna tuner
- **CT-17** CI-V converter
- **IC-PW1** HF+ 50MHz 1kW linear amplifier
- **PS-125** DC power supply *(25A max. output power)*
- **OPC-025** DC lead
- **SM-20** Deluxe desktop microphone
- **SP-20** External speaker
- **SP-21** Base-station loudspeaker
- **UT-102** Voice synthesiser unit

Own one today with ***NO DEPOSIT*** & ***NOTHING*** to ***PAY*** for a ***WHOLE SIX MONTHS. INTEREST FREE.***

call the sales team on 0208 566 1120 or email sales@hamradio.co.uk

OKAY?

ML&S martin lynch & sons

Suppliers of Communications Equipment

tel: 0208 566 1120

fax: 0208 566 1207

website: www.hamradio.co.uk

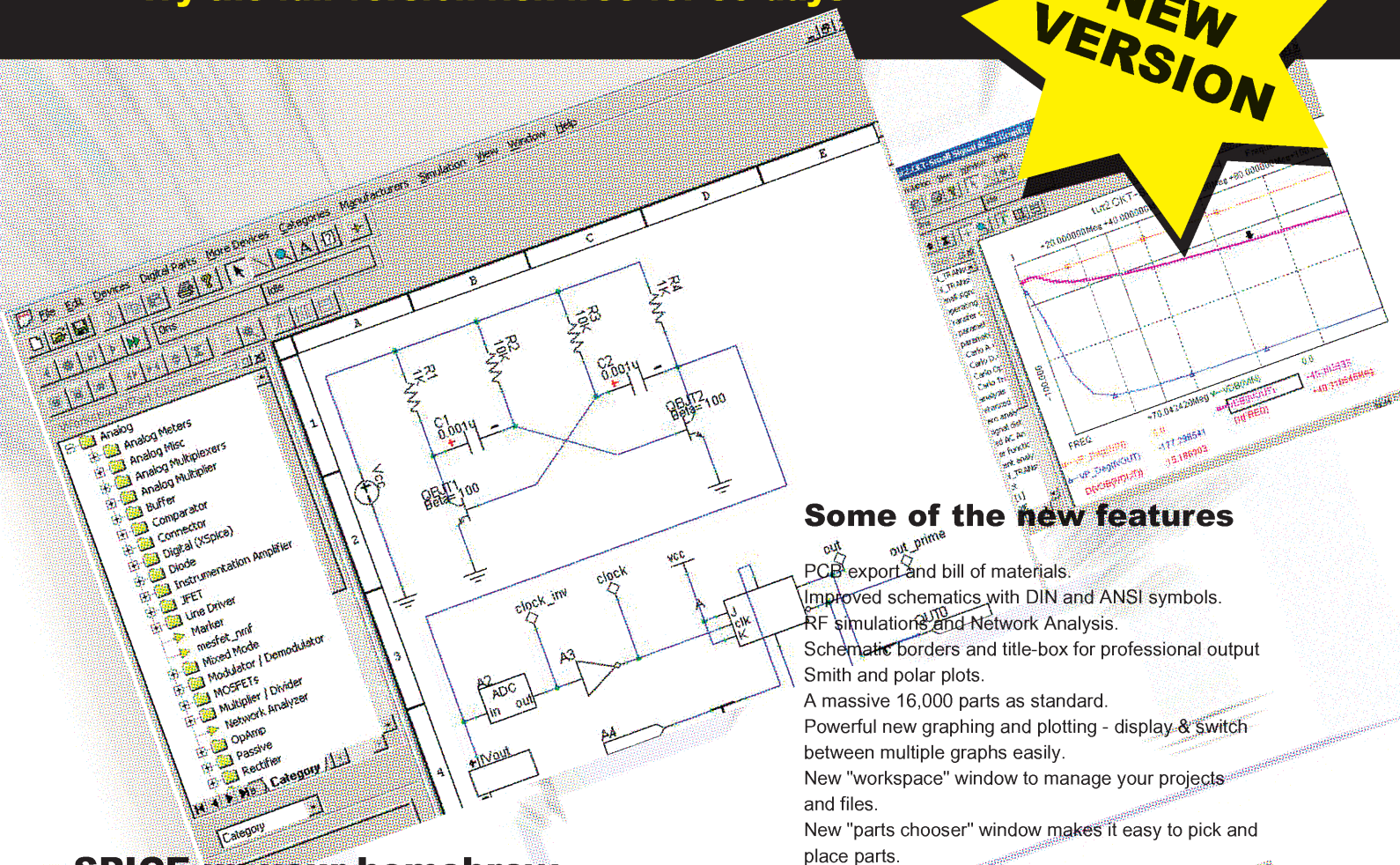
email: sales@hamradio.co.uk

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

B² Spice AD v4

Try the full version risk free for 30 days

NEW VERSION



SPICE up your homebrew

B² Spice's ease of use and above all, accuracy, is why it is used by dozens of universities and thousands of professional designers in the UK, US and Europe. **The new version includes RF and network simulation as well as PCB export facilities.** It's the ideal software design tool for Radio Amateurs.

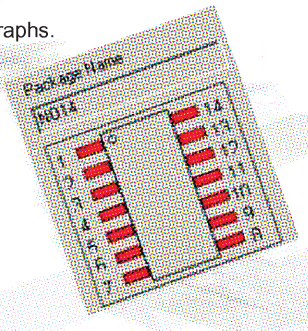
More features and simulation options than ever before

Sinusoidal, constant, periodic pulse, exponential, RF, single frequency, FM, AM, DC voltage, AC voltage, VCO, Vcc, piecewise linear, polynomial / arbitrary source, voltage-controlled voltage, voltage-controlled current, current-controlled voltage, current-controlled current, lossy and ideal transmission line, MESFET, uniform RC, current and voltage controlled switches are all available.

Fully mixed mode, single / dual parameter DC sweep, AC sweep, transient analysis, small signal transfer function, Fourier analysis, AC & DC sensitivity, Smith charts, pole zero, Monte Carlo analysis, noise, distortion operating point, temperature change, as well as generating component faults.

Some of the new features

PCB export and bill of materials.
Improved schematics with DIN and ANSI symbols.
RF simulations and Network Analysis.
Schematic borders and title-box for professional output
Smith and polar plots.
A massive 16,000 parts as standard.
Powerful new graphing and plotting - display & switch between multiple graphs easily.
New "workspace" window to manage your projects and files.
New "parts chooser" window makes it easy to pick and place parts.
Combined digital and analogue graphs.
Even faster simulations.
Unlimited undo / redo.
Many new simulation models.
Create new parts .
Create and edit symbols.
Create new PCB layout parts.
New powerful schematic editor.



There are NO limits

B² Spice sets no limit on the design size or number of parts, it can be as large or complex as you want. High quality graphics ensure that your results are easy to understand and interpret and everything can be customised to suit your requirements. B² Spice is a design tool where the end result behaves just like the simulation.

30 Day no risk trial with free ongoing technical support. If it doesn't do what you want, then simply return it.

From just **£159** ex VAT for the standard version.
Professional full featured version **£229** ex VAT.
All libraries included - no hidden extra costs.

Tel: 01603 872331

RD Research

Research House, Norwich Road, Eastgate
Norwich. NR10 4HA. Fax: 01603 879010
Email info@looking.co.uk **www.spice-software.com**

VISA MasterCard

Also order on-line through GREY MATTER

www.greymatter.com/mcm/rdresearch

Newcomers' News

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

A FEW WEEKS ago I started a new Foundation Licence course and was demonstrating a 'homebrew' receiver to the group when a GW (Wales) station was heard working a Foundation Licence holder. Some of the class had just been asking what sort of reception they could expect on the bands when the GW gave the newcomer a hearty welcome and congratulated him on becoming active (QRV) on the HF (high frequency) bands. I couldn't have organised it better!

The students in my group included two 11-year olds and one slightly more mature gentleman who is enjoying amateur radio in his retirement. After just 12 hours in the classroom, spread over three Saturdays, all 10 candidates completed the course and passed the assessments. We had to have one resit of the written exam which just goes to show the Foundation Licences are not 'given away', they have to be earned.

EXAMS TO CHANGE

YOU WILL NO DOUBT have read elsewhere in *RadCom* about the changes to amateur radio exams after December this year. In case anyone has missed it, from January 2003 anyone wishing to take the Intermediate exam, formerly the Novice Radio Amateurs Examination (NRAE), will need to have passed the Foundation assessments and from January 2004 anyone wishing to sit the full RAE will need to have passed the Intermediate assessments.

These changes will mean that in future no-one will be able to gain a full licence without ever touching a radio, which is quite possible at the moment. Perhaps more importantly, the impact in the short term is that there will only be three more sittings for each of the current exams: June, September and December 2002 for the NRAE and December 2002, May and December 2003 for the Full RAE.

So if you have been studying for the current NRAE syllabus and have been putting off taking the exam you need to act fairly quickly. The June exam entry date has already passed but you could still make the September or December dates. Remember though that you must have completed an approved course *before* you sit the exam. Details of registered instructors can be obtained from RSGB headquarters or contact the Senior Novice Instructor for your county as listed in the *RSGB Yearbook*.

HIGHEST OR LOWEST?

HAVING SUNG the praises of the Radio Amateurs Exam (RAE) practice software *QRAE* I was surprised to have found an error in it. To be entirely correct, the error cropped up when helping out Adrian Clancy, M3IFY / 2E1IFY, with his RAE studies and I followed it up.

A number of questions came up about the 'critical frequency' and try as we might we could not figure out why he (we) kept getting them wrong. Digging into the *RAE Manual* we confirmed that the critical frequency is the *highest* frequency that is reflected back from the ionosphere when transmitted vertically. All the *QRAE* questions were giving the correct answer as the *lowest* frequency.

I contacted Murray Ward, G3KZB, who wrote the software and he confirmed that the error had slipped through and agreed to correct it as soon as possible. Apparently his proof reader, his cousin, has been sacked!

For those who have yet to discover *QRAE*. details of how to obtain a copy free of charge can be found in the March edition of 'Newcomers News'.

HUMBLE PIE!

NO SOONER HAD the April *RadCom* hit the doormat than e-mails came shooting me down in flames! Regular readers will recall that I said I had never met anyone who could read Morse code faster than they could send it. Well, I was proved wrong.

Senior Novice Instructor for Somerset and avid low power (QRP) operator, George Davis, G3ICO, reminded me that we have met and he cannot send anything like as fast as he can receive. "I can receive at QSO standard up to 30 words per minute, but my sending speed would be absolute rubbish, even with a paddle and a keyer. I like to think my brain is deteriorating slower than my arthritic joints, others may disagree!"

My second 'ticking off' came from Mac McPheat, G4OEC, who reported that he has been using Morse for almost 50 years in and out of the amateur field. He continued, "In 1963 I sat in the shack of *HMS Mercury* and copied 40WPM, writing the words on a typewriter, but today I cannot transmit readable CW at that speed even using an electronic keyer."

My sincere apologies go to both stations, two very worthy exceptions to the rule!

NEW LEAFLETS

WHILST VISITING RSGB Headquarters recently I came across a couple of new promotional leaflets designed to attract newcomers to the hobby.

Your way into amateur radio comprises four sides of A4, all in colour, giving a very brief introduction to the hobby, the RSGB and the Radiocommunications Agency.

Amateur radio - 21st century technology is also four colourful sides of A4 but this time folded to pocket size. The leaflet includes a design for a crystal set, some famous radio amateurs and a very brief history of radio.

Also from RSGB HQ is a new range of posters available to promote amateur radio. Full-size (A2) posters are available for only 50p each (to cover P&P) from www.rsgb.org/shop or you can download and print your own A4-size posters from www.rsgb.org/posters

If you are planning to publicise amateur radio at any public event you should ensure that you have some copies of these leaflets to hand out, they may be the first step for newcomers to take up the hobby. Copies can be obtained from RSGB Headquarters. ♦

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

Down To Earth

The RSGB Jubilee Contest 8 / 9 June 2002

By Dave Lawley, G4BUO *

RADIO AMATEURS will be celebrating HM the Queen's Golden Jubilee in a number of ways. The commemorative GQ, MQ and 2Q prefixes will be in use throughout June, and the special station GB50 will be active from Windsor Castle from 29 May to 9 June. In addition, for this year only, a new contest has been added to the calendar, based around contacts with stations in the British Commonwealth. This is the RSGB Jubilee Contest which will take place on the weekend of **8 / 9 June**, and the purpose of this article is to give an introduction to contesting and to encourage RSGB members to have a go in the Jubilee Contest.

CONTESTS ARE FUN!

THE MAIN AIM of any amateur radio contest is to make as many contacts as possible in the time available. This does not mean that everyone active in a contest is competing for the top spot. In any contest you will come across a number of stations who are clearly intent on winning, but the majority of contacts will come from participants who have a different goal in mind. I like to think of amateur radio contests as a little like the London Marathon, where there are serious athletes competing to win but the great majority of the field is made up of those entering for fun, who might be competing against a friend, or against their own 'personal best' time. You can approach a contest less like a marathon and more like a fun-run, where you operate for a while and pick up as many new countries as possible, or just see how far you can work. In this contest a certificate will be given to every entrant who contacts at least 50 different band-call-areas, and this represents a goal that everyone should be able to aim at.

SINGLE OR MULTI-OP

IN THE Jubilee Contest (as in most others), as well as single-operator sections where you must do all the operating and logging yourself, there is a multi-operator section and this can be a very good way of learning about contesting. It may enable you to use better antennas and equipment than are available at your home station, and it allows operating and logging duties to be spread among several people. It can be organised as a club event and usually means that varying levels of contesting expertise are available, with the seasoned contesters passing on their experience to new starters.

READ THE RULES!

THE FIRST STEP when considering having a go in any contest is to make sure you know the rules, as these can vary widely from one event to another. You may be tuning across the bands and hear a contest in progress but it is never a good idea to jump straight in and try making some QSOs: always see if you can find the rules first.

Fig 2: The main logging window of the *SDJ* program by EI5DI, showing Summary Score Window, Country (VE3) Worked / Wanted Window, Logging Window and QSO Rate Window.

The Jubilee Contest will take place from **1000UTC** on **Saturday 8 June** to **1000UTC Sunday 9 June**, but *don't* wait until the day of the contest to check the rules! They are printed on page 53 of the January 2002 *RadCom* and are also reproduced on the RSGB HF Contests Committee website (see WWW. below). This site also contains a 'Contesting Guide' which gives a lot of practical advice to beginners in contesting.

You'll see from the rules that the contest is based around contacts with stations in the Commonwealth. A map of Commonwealth countries is shown in **Fig 1**. Unlike the CW-only Commonwealth Contest ('BERU') which takes place in March each year, this new contest also allows stations *outside* the Commonwealth to participate, by contacting Commonwealth stations only. A feature borrowed from the BERU contest is that you may not contact stations in your own Commonwealth call area. This helps to emphasise the DX nature of the contest and prevents it being dominated by inter-G contacts.

The majority of Commonwealth activity is expected to come from the UK, Canada, New Zealand and Australia. As in

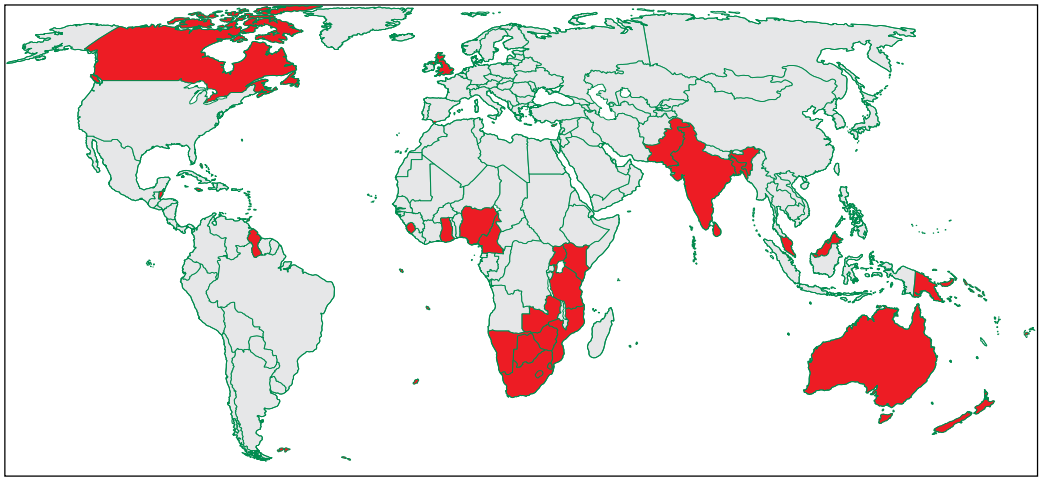


Fig 1: Commonwealth countries and call areas - shown in red here - are the multipliers in the Jubilee Contest. Many Commonwealth countries are too small to be shown on a map of this scale but don't forget that such places as Malta, 9H; Cyprus, 5B4; the UK Bases on Cyprus, ZC4; and Gibraltar, ZB2, all count.

* *Carramore, Coldharbour Road, Penshurst, Tonbridge, Kent TN11 8EX; e-mail: g4buo@compuserve.com*

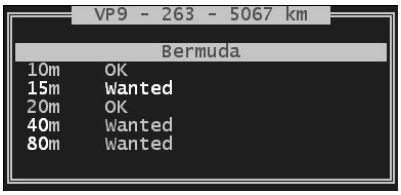


Fig 3: *SDJ's* Country (VP9) Worked / Wanted Window. The header shows the bearing and distance from the UK to Bermuda. It indicates that we're currently logging on 15m, and that VP9 is needed as a multiplier on 15, 40 and 80m.

many contests, the scoring system includes *multipliers*, which means in this case that your final score is made up of the points for contacts on each band (5 points per contact) multiplied by the number of different call areas contacted on each band. The concept of Commonwealth call areas is also borrowed from the BERU contest, and means for example that VE1, VE2, VE3 etc all count as separate multipliers. There is a full list of call areas on page 53 of January *RadCom*. Just like BERU, all UK prefixes are treated as a single call area so that all parts of the UK compete on an equal footing.

To qualify for the commemorative certificate you need to contact at least 50 different band-call-areas. For example, if you contact VK2 on 10 and 20m and 9H1 on 15, 20 and 80m that is five band-call-areas. Note from the rules that call areas count once per band, regardless of mode. This means that you can choose to enter the contest CW-only, or phone-only, or you can make a mixture of phone and CW contacts.

MAKING A GOOD SCORE

WHETHER YOU decide to operate for the full 24 hours or just for a few hours, the way for a G station to build a good contest score will be by a combination of calling CQ and 'search and pounce' operating. When CQing, you can expect to be called by a few Commonwealth stations but mainly by stations in the rest of the world, who can only contact Commonwealth stations in this contest. 'Search and pounce' means tuning the bands and calling any CQing station that you have not already worked. While tuning, you will be likely to come across potential new multipliers and it is generally worth taking some time to make sure to contact a new multiplier, because of its greater contribution to the score. Also, if you are only working to gain the commemorative certificate, you will be likely to achieve this goal more quickly by 'search and pounce' than by CQing.

The contest exchange, which must form part of every contact, is the RS(T) report and a serial number starting from 001. If this is your very first attempt at contesting, it is worth while spending the first few minutes of the contest just listening to the pattern of operating. At first, contest operating can seem hectic and confusing, but in fact the very best contest operators have a precise and efficient technique, sending no more information than is necessary. On CW, don't send faster than your comfortable operating speed. The better operators will reduce their sending speed when called by someone who is sending slower. On SSB, make sure to use standard phonetics to send your callsign.

LOGGING

JUST LIKE many areas of the hobby, contest operating has been transformed in the last 10 years by the advent of the computer. This definitely does *not* mean that you *have* to be equipped with a PC in order to take part in a contest. Logging on paper is perfectly acceptable and many of us did it for many years. Perhaps the hardest part of paper logging, during the contest, is to keep an accurate record of the callsigns you have contacted on each band on a 'dupe sheet', so that when operating 'search and pounce' you don't call someone that you have already contacted.

If, on the other hand, you already have a computer in the shack and especially if you already use a program to keep your station log, then there are great benefits in using a dedicated contest logging program.

For several years *SD*, written by Paul O'Kane, EI5DI, has included full support for all RSGB HF contests. For the Jubilee Contest, Paul has made available a special version called *SDJ* which is Freeware, downloadable from his website. *SDJ* will keep your log, let you find out if you have worked someone already on a band, *and* give you multiplier information. **Fig 2** and **Fig 3** shown two of the *SDJ* screens. When the contest is over a separate program called *SDCHECK* prepares the entry file which can be sent on disk or by e-mail. For newcomers to contesting *SD* is undoubtedly the best starting point for computer logging.

There are other options for computer logging: both *CTJ* and *YPlog* have support for the contest built-in. Thanks to the efforts of GW3NJW, G4FON and G4VXE, the *TR, N1MM* and *Writelog* programs can be configured to work in this contest, and details are on the RSGB HF Contests Committee website.

Having said that you should not leave it until the day of a contest to familiarise yourself with the rules, it is even *more* important not to wait until the beginning of the contest to learn how to drive a computer logging program! Make sure to download the software well in advance and spend some time making sure it is correctly configured for your station. While software authors are usually very helpful, they do not appreciate getting last minute "help me please" requests on the morning of the contest. Once you have set up the software, try entering a few dummy QSOs and then make sure you know how to edit the details in case the callsign, serial number or band have been logged incorrectly. For CW contesters the PC is especially useful as the logging software can be set up to send callsigns and contact details as well as CQ calls. This requires a simple interface to the computer's parallel or serial port which, again, should be built and tested well in advance of the contest.

While paper logs are fine from entrants without computers, we do insist that if you used a computer for logging, you send the appropriate files either on disk or by e-mail. For *SDJ*, the correct files to send are the .log file, which contains the QSO information, and the .sum file. This contest will be checked on computer and the committee has a band of helpers who are happy to key in handwritten logs, but there is nothing more soul-destroying than keying in QSO data that you know is already held on a computer somewhere.

FULL, INTERMEDIATE *AND* FOUNDATION

THIS HAS BEEN a brief summary of some aspects of contesting for beginners, with special reference to the Jubilee Contest. Stations from all around the world will be looking to contact Commonwealth stations during this contest, and UK amateurs may use the special GQ, MQ and 2Q prefixes in this contest if they wish, which will be an added attraction. The contest should be a good opportunity to work some DX and it should provide an opportunity for newcomers to contesting to give this aspect of the hobby a try.

As well as the awards for working 50 band call areas, there are certificates to be awarded to the top three Foundation and Intermediate licensees, another goal for some to aim at. If, having had a go in the Jubilee Contest, you want to find out more, there are many contesting resources on the Internet including a discussion group for UK contesters, and you should find contesters a friendly bunch who are happy to share advice and opinions with new starters. ♦

WWW.

RSGB HF Contest Committee	**www.rsgbhfcc.org**
***SD* and *SDJ* logging software**	**www.ei5di.com**
Contesting website, discussion groups	**www.contesting.com**
UK contest reflector	**lists.contesting.com/mailman/listinfo/uk-contest**
LA9HW contest calendar/rules	**home.online.no/~janalme/hammain.html**
***CTJ* contest logger**	**www.qsl.net/g4zvj**
VE6YP logging software	**members.shaw.ca/ve6yp/**
N1MM logging software	**pages.cthome.net/n1mm/**
***Writelog* for Windows logging software**	**www.writelog.com**
***TR-LOG* logging software**	**www.qth.com/tr**

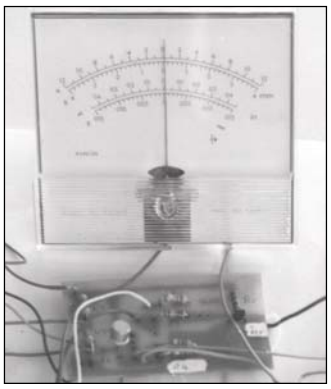
Down To Earth

A Flexible Voltage Reference

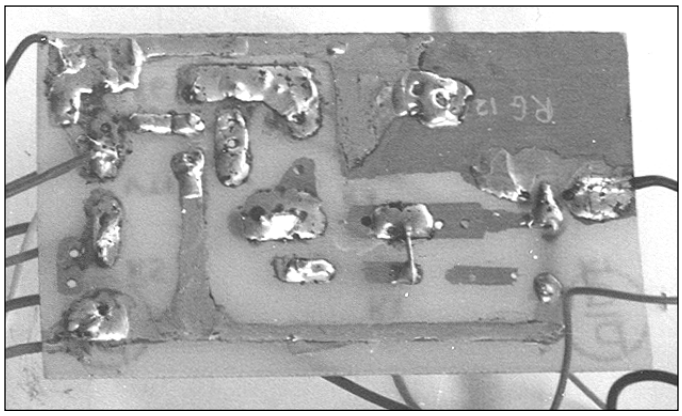
Reg Gibbs, GM3SVE, presents a circuit from which a little current may be drawn*

SOME TIME AGO, while testing a receiver, I was using several voltmeters. Out of curiosity, I decided to measure the same voltage point with different meters, only to discover that no two meters gave the same answer. The meters ranged in origin from 1943 up to my latest digital meter.

Using my many voltmeters, all giving different results, was reminiscent of the 1920s song "... you can't tell the time in a clock shop", and was not conducive to reliable testing. Although different voltmeters *are* expected to give different results to some extent, due to the way in which they load the circuit under test, I thought it was a very good excuse to develop a voltage reference circuit.



The assembled circuit with the centre-zero meter.



Underside of the circuit board. The design is quite suitable for construction on matrix board, because the layout is not critical.

It is based on laboratory methods used over many years, and currently forms part of most A-level Physics courses.

BAND-GAP DEVICES

NOWADAYS, several semiconductor voltage reference devices work on the band-gap principle [1]. This circuit uses one of these devices as the primary reference. It is a GEC type, the REF500, and is trimmed during manufacture to give a voltage of 5.00V. There are other references at different voltages that will serve just as well as the one chosen in this case, although the component values in the circuit will require changing.

The circuit diagram is given in **Fig 1**.

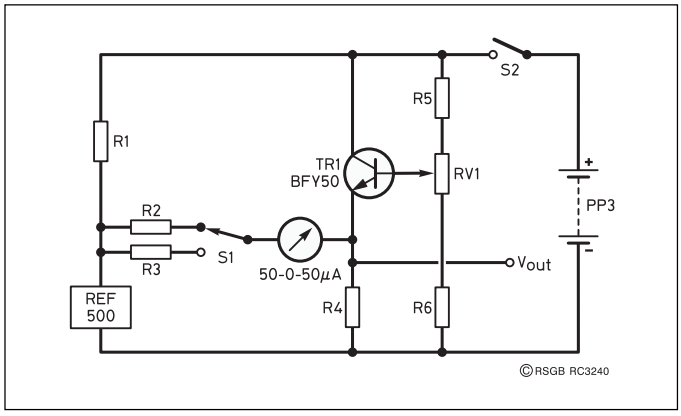


Fig 1: Circuit diagram of the voltage reference.

CIRCUIT DESCRIPTION

MOST VOLTAGE reference sources are not suitable for applications where some current must be drawn at the reference voltage. In this system, a secondary voltage is derived from the band-gap device when zero current is being drawn, and it is this secondary voltage which is then used as a voltage source capable of supplying a milliamp or so (eg for meter calibration). The current used to drive the external load is drawn from an emitter follower and is compared with the reference voltage by a separate meter circuit.

R1 biases the band-gap reference to its specified operating current. TR1 operates as an emitter follower, its base voltage being set by the combination of R5, RV1 and R6. Because around 0.7V is dropped between the base and the emitter, the emitter voltage 'follows' any changes in base voltage within 0.7V. The meter is a 50 - 0 - 50µA centre-zero type, having switchable current-limiting resistors, R2 and R3, in series with it. The circuit operates from a single 9V PP3 battery.

** Col-Dene, Shieldhill Road, Reddingmuirhead, Falkirk, Stirlingshire FK2 0DU.*

IN USE

WHEN SWITCHING on, R2 *must* be in circuit (using S1). [*A likely consequence of not having R2 in circuit at switch-on is that the meter needle may exhibit the dramatic eye-catching action of wrapping itself around the end-stop* - Ed.] Adjusting RV1 will reduce the meter current to zero. Switching R3 into circuit, (with S1), you will probably find that the current is not quite zero, and further adjustment of RV1 is needed.

At this point, there is no indicated flow of current in the meter circuit, and the output of the emitter follower will equal that of the primary reference. Any small current drawn from the V_{out} connection is then provided from the emitter of the transistor, and *not* from the band-gap reference circuit. If the meter reading varies while on load, RV1 may be readjusted to reduce the current to zero again.

REFERENCE

[1] 'In Practice', *RadCom* Oct 2001, p39. ♦

COMPONENTS LIST

Resistors - all ¼W except where stated otherwise

R1	2.7kΩ
R2	100kΩ
R3	10kΩ
R4	47Ω ½W
R5	4.7kΩ
R6	330Ω
RV1	500Ω linear

Miscellaneous

REF500	GEC band-gap voltage reference (5V)
S1	SPCO (SPDT) switch (Maplin FH05F)
S2	SPST switch (Maplin FH97F)
TR1	BFY50 npn transistor
	Meter, 50 - 0 - 50mA FSD
	PP3 battery & clip

The Story of AC4YN - A Radio Adventure in Tibet, 1936

The author of this article, Roger Croston, is not a radio amateur, but knew Evan Nepean well and is a friend of his family. Lieutenant-Colonel Sir Evan Yorke Nepean Bt, G5YN, became a Silent Key in March 2002 (see RadCom *May 2002 page 10) but the story of his adventures in Tibet in 1936 - incidentally becoming one of the few Westerners to be admitted to what was a 'closed' society - deserves retelling. The following story is based on personal interviews carried out by Roger Croston with Sir Evan in 2000 and 2001.*

Right: Lt Evan Nepean at Gyantse, Tibet, in 1936.

Below: Coolies carrying the 120lb charging engine.

ON 31 JULY 1936, Lieutenant Evan Nepean, a subaltern in the Peshawar District Signals on the North West Frontier of India, set off from Gangtok, Sikkim, on a grand adventure. He had been posted as one of two radio operators accompanying the British Political Mission to Lhasa under the leadership of Basil (later Sir Basil) Gould.

The mission was to include the second wireless operator Lieutenant Sidney Dagg, Hugh Richardson, Dr Bill Morgan, Brigadier Philip Neame VC, Freddy Spencer-Chapman and Rai Bahadur Norbhu. With the death of Hugh Richardson in 2001, Sir Evan Nepean was, at the age of 92, the last surviving member of the mission. [Before being annexed by China in 1950, Tibet was an independent nation state. Tibet was ruled by the Dalai Lama but in 1933 the 13th Dalai Lama had died and his reincarnation had not been identified by 1936 - *Ed*.]

The Tibetan government had invited the mission with two objectives: for the British to help to persuade the Tashi Lama [regarded as second in importance to the Dalai Lama - *Ed*], who had fled the country in 1923, to return to Lhasa. It was hoped to escort him back to the capital without him having a Chinese army escort. The second objective was to review the Tibetan army and advise on its improvement.

Communications from India to Tibet were rudimentary to say the least, with mounted postal runners delivering mail to Lhasa, which was also on the end of a telegraph line. Should the mission travel beyond Lhasa there would be no communications for diplomatic traffic, hence transportable wireless equipment was taken. This was also to be used to 'outface' the Chinese who already had a transmitter in Lhasa.

Evan Nepean operating the radio equipment from near Gyantse.

ACROSS THE HIMALAYAS

THE RESPONSIBILITY for procuring radio equipment was Lt Sidney Dagg's, who had it specially built so it could be broken down, in those early days of radio, into loads weighing less than 80lb. Nepean was sent to Simla to gain experience with the army group with whom they would be in contact. From Simla he travelled to Calcutta to meet Dagg and travelled from there to Siliguri, thence up the Teesta valley to Gangtok. The route taken is shown in **Fig 1**.

From Gangtok to Lhasa, the expedition travelled by foot. The mission, down to the last servant, was 50 strong with 25 pack animals; ponies and yaks. The heaviest load was the battery-charging engine at 120lb. Four coolies laboriously carried it on bamboo poles and they also carried 80 gallons of aviation spirit to power it. The two signals officers were also responsible for looking after a public address system and cine projectors and even borrowed a 35mm projector from the Maharaja of Sikkim to take with them. In addition, some of Frank Smythe's radio equipment from a recent Everest expedition was borrowed from store in Kalimpong. Two boxes were dropped in a river during the march, but although some of the equipment was ruined, most responded well to being dried out.

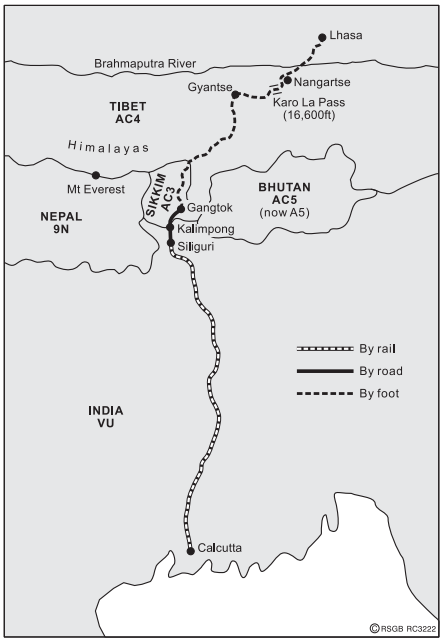


Fig 1: The route taken by Evan Nepean to Lhasa.

On each stage of the journey the receiver was set up to listen to news broadcasts from the BBC, and signals were transmitted back to India. As the altitude increased the charging engine developed less power due to oxygen shortage and at 10,000ft it no longer ran. (Months later a pair of variable-speed carburettors arrived in Lhasa and the problem was cured).

Arriving in Gyantse in Tibet (at 13,100ft) on 12 August, the party was joined by Richardson and Morgan who were already stationed there. Dagg returned to Calcutta to build a hand-cranked charging machine, which he brought to Lhasa on 23 September. As there was no means of powering any batteries the mission proceeded without Nepean to Lhasa, where they arrived on 24 August. Evan arrived with the wireless set 13 days later when it was known that power was available from the city's 220V hydroelectric plant. This had been built with incredible skill by Ringang, a Tibetan who as a boy had been sent to school in Rugby.

AC4YN ON THE AIR

THE MISSION LIVED in the Dekyi Lingka garden where Nepean set up a tent, which he shared with the radio transmitter and receiver and made the first transmission at 1.00pm on 8 September. The aerial was

supported on a 40ft mast. Regular contact was maintained with India on a wavelength of 30 metres using the mission's callsign VUQ. Contact was also made with many amateurs on the 20m band and Nepean's amateur callsign of AC4YN became much sought after world-wide - AC4 being the prefix for Tibet and, as there was no licensing authority, Nepean appended the last two letters of his British callsign, G5YN. Nepean could not spend too much time on the air with amateurs because he also had to join in a great number of business and social activities. They attended and gave many official parties; there were visits to the Potala palace, the three huge monasteries of Sera, Drepung and Ganden, the cathedral and various temples. Visits were also made to the mint and the Norbhu Linka. On other occasions, he helped with filming and became skilful with a 16mm cine camera, and also played football as a member of the 'Mission Marmets' team versus Lhasa United.

On 7 September the mission reviewed the Tibetan troops near to the Trapchi (the arsenal), where they were received by a guard of honour, the Kashag and the Prime Minister who had never yet inspected the army. During the review, to which almost the whole population of Lhasa had turned out, the mission and Tibetan officials were accommodated in tents, in one of which sat the Chinese wireless official whom the British ignored. The mission's diary records "He has not called on us, so we do not officially meet." The Chinese later protested to the Tibetan government about the rival British radio, but the complaint went unheeded. On 27 October, Nepean and other mission members went to the bazaar, ostensibly to photograph the roofs of Lhasa, but actually to view the Chinese radio aerial so as to estimate what wavelength it worked on. Nevertheless, during their stay they never heard it transmit.

Nepean and Dagg also operated the loudspeaker system, the gramophone player and the cine projector, which entailed hours of work in preparation. These caused tremendous excitement amongst the Tibetans, and the Regent in particular was amused to hear his own voice booming out over the loudspeakers. What the citizens enjoyed most was watching films taken by the mission in Lhasa of themselves and their friends on the screen.

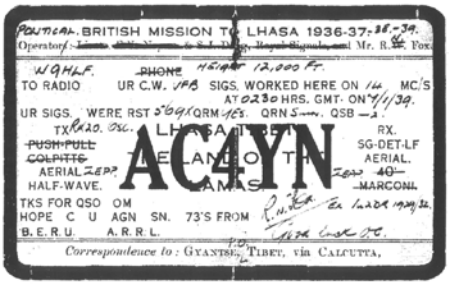
On 2 November, the mission held the opening meet of the Lhasa Vale Hunt - Mr Gould's Hounds - which was started by Nepean who chased Gould, both on ponies, who laid out a paper chase. The diary records, "The Tibetans couldn't understand what we had lost. They also had a tiresome habit of sweeping up any odd bits of paper they find." It was such a success that it was decided to hunt twice a week. On the 12th Nepean laid out a cunning trail - on one occasion it led through a herd of camels, property of the late Dalai Lama, and ponies were known to have an intense dislike of camels!

Evan was active as AC4YN for about three months but, in December 1936, he was commanded to return to India. He later wrote: "All too soon, the time came when I had to leave Lhasa, the mission and all the good friends I had made up there. There was trouble on the North West Frontier and my commanding officer demanded my return to the regiment." Despite Gould's protestations, Nepean had to go and he packed his belongings in Lhasa at 5.00am on 14 December in a temperature of 14 °F (-10 °C). He travelled light, doing double stages and was accompanied by Nurgal his Pathan servant and two pack animals. They were escorted by Chapman as far as Nangartse, where they arrived on the 16th. Chapman wrote "All gaze at Nepean's yellow fur-lined Afghan coat" - the very same coat which, as can be seen in the photograph (right), he was still wearing some 65 years later.

He set off for Gyantse, a two days' journey away, the following morning. "I went over the 16,600ft Karo La. In winter, it is very cold at those heights, and a strong wind blows all day raising dust storms. If the Tibetans have to travel in the winter, they do so at night when the wind drops."

● *After Evan Nepean had left Lhasa, a former Royal Signals officer, Reg Fox, was sent from Calcutta to keep the official radio link in operation. He also operated on the amateur bands as AC4YN. Reg stayed on in Lhasa after the main body of the British Political Mission was closed in 1937 and eventually married a Tibetan girl. He continued to be active as AC4YN for a number of years.*

The Potala Palace in Lhasa, the home of the Dalai Lama until the Chinese invaded in 1950 and forced the Tibetan government into exile.



The AC4YN QSL card, used by Evan Nepean, Sidney Dagg and, later, by Reg Fox. (Reproduced with thanks to Brig Johnny Clinch CBE, G3MJK).

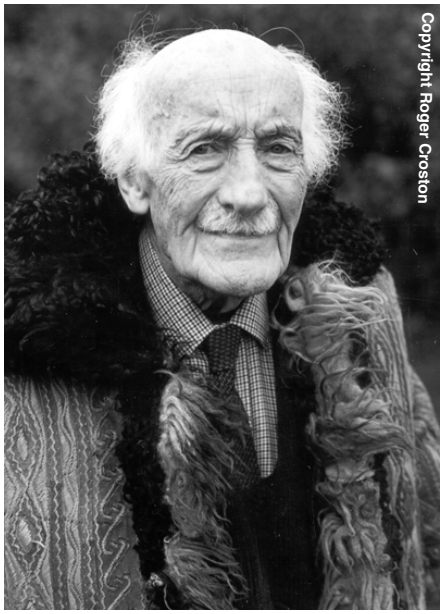
REFERENCES

Lhasa the Holy City, Freddy Spencer-Chapman, Chatto and Windus, 1938.

'The AC4YN Story - a Tibetan Adventure, Circa 1936 - 1937', Lt Col (Ret) Sir Evan Nepean Bt, G5YN, *73 Magazine*, August 1982.

● *Roger Croston has kindly donated the author's fee for this article to the UK Tibet Relief Fund, a registered charity for Tibetan refugees. (Further donations from readers would be welcomed, please contact the editor for details.)* ♦

The tent in the Dekyi Lingka garden in Lhasa that was Evan Nepean's home, and the location for his AC4YN activity.



Sir Evan Nepean in October 2000, wearing the yellow Afghan coat from 1936.

Book Review

RSGB IOTA DIRECTORY - 11th EDITION
Edited by Roger Balister, G3KMA

THE RSGB Islands on the Air, or IOTA, programme is one of the big growth areas of amateur radio. If you are at all active on the HF bands, you cannot fail to have witnessed IOTA operations in progress. If you want to find out what all the fuss is about, you *must* get hold of a copy of the *IOTA Directory*. The latest version, the 11th edition, has just been published, and it takes up where the last one left off. All the IOTA island groups that have ever been activated are numbered in the new *Directory*. There were 58 new island groups (then un-numbered) introduced in the previous *Directory*, so if you are at all involved in the IOTA programme you will need the new book for this complete and up-to-date listing.

A gargantuan amount of work has gone into the production of the new *Directory*, with a five-fold increase in the number of islands listed. Now virtually every qualifying island in the world of any size - tens of thousands of them! - is listed under its group name.

But the *IOTA Directory* is not just a listing of islands and island groups, although that does take up the bulk of this volume. In addition, the rules of how to apply for the various IOTA awards are explained in a clear and concise fashion, and there's a very useful two-page set of 'FAQs' which newcomers to the IOTA programme will find particularly helpful. New in this edition is a listing of almost all the operations over the years that have taken place from more than 500 of the rarest IOTA groups. It details for each such group, by continent, the callsigns recorded as accepted on the central IOTA database of members' records.

The *Directory* includes full-colour reports on several spectacular IOTA DXpeditions, including those to the high Arctic islands of Asiatic Russia, the last-numbered IOTA island group in China, and a number of 'new ones' in Indonesia. Indeed, the *IOTA Directory* editor and RSGB IOTA Manager, Roger Balister, G3KMA, comments on the tremendous explosion in IOTA activity in the Far East, saying "Amazingly, many [Far East] DXpedition teams have numbered 10 to 20 people, mostly of an age below 30."

IOTA is more than just an awards programme. While not as 'big' as DXCC, IOTA nevertheless makes a major contribution to the HF scene and plays an important role in keeping band activity at high levels at a time when many are talking of the demise of amateur radio. It provides an interesting new challenge to those who have already 'done it all' in DX terms. IOTA activity also provides self-training in operating skills and establishing portable stations in difficult conditions - vital in times of civil emergency. Finally, IOTA encourages young people by appealing to their interest in outdoor pursuits such as camping and rock-climbing, all with the goal of establishing a portable radio station.

As Roger Balister says, "IOTA strengthens the hands-on operational side of amateur radio by creating an interest, providing a challenge, appealing to the young. . . At the end of the day it is the operational side of amateur radio that will keep the hobby alive - LF, HF, VHF and above, DXing, contesting and IOTA." If you want to be part of the action, you must get a copy of this book.

IOTA Directory 11th Edition, RSGB.
128 pages, A4
ISBN 1-872309-81-X
Members' price: £8.49
Non-members' price: £9.99

***PIC BASIC: An Introduction*, by Eric Edwards & Neil (Jasper) Roberts.**
Reviewed by Ed Chicken, MBE, G3BIK

THIS BOOK presupposes that you are already familiar with hands-on electronics or radio, but are now keen to add DIY PIC technology to your field of involvement. The authors have achieved their objective, which was to take the sting out of the PIC's tail in a way that is relatively painless to both mind and pocket.

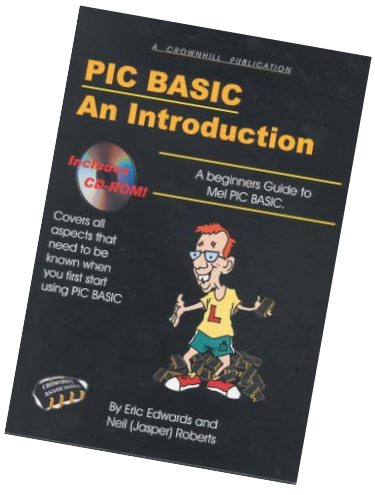
It is to be thoroughly recommended , but be advised that a sense of humour is needed to smile at the numerous printing errors reminiscent of the days when newsprinting first became automated eg 'imPORT Ant' and 'PORT Able'. Also deserving of a wry smile are technical inaccuracies in the drafting of some component symbols and legends in the circuit diagrams, and in the seemingly free interchange of terms such as program, programme, source code, and code. None of these is life-threatening, and no serious errors were found in the programs, circuits, or text.

Written around the popular re-programmable PIC16F84 (the 555 or 741 of the PIC world), it offers an interesting variety of simple project-circuits, each with its own program. PICBASIC is used for the programming of the PIC, and clear step-by-step guidance is given on how to do this in association with your own PC and the recommended parallel-port PIC-Programmer hardware and software. The English-language format of PICBASIC makes it easy to copy-type the programs into the computer but, surprisingly, the interconnection between programmer and PIC is somewhat glossed over. A free CD-ROM gives related data sheets, and even more project-programs in both PICBASIC and Hex codes to simplify further the transfer of programs to PIC via the PC. The CD does, however, include (correctly) the use of some PICBASIC codes that are not listed on page 146 of the book.

A PC with an accessible LPT port is needed for the projects, plus about £50 worth of PIC-programmer, for which full information is given. Constructional details are *not* included for the electronic circuits, which are all well-suited to the use of solderless experimental breadboard such as Pluglock.

[From the same publisher, *Experimenting with the PICBASIC PRO Compiler*, by Les Johnson.]

PIC BASIC: An Introduction, Crownhill Publications.
158 pages, A5
ISBN 1-903719-02-X
Members' price: £x.xx
Non-members' price: £x.xx



RADIO WORLD

42 BROOK LANE, GREAT WYRLEY, WALSALL, WEST MIDLANDS WS6 6BQ

WE ARE 5 MINS AWAY FROM J11 M6

MAIN DEALERS FOR ALINCO, ICOM, YAESU & KENWOOD

Manufacturers warranty on all new equipment

WANTED
USED EQUIPMENT
PX WELCOME
BEST PRICES PAID!

YAESU

ROTATORS

G-1000DXC Rotator 1100kg/cm CE c/w control box & 25m cable. RRP £599.00. RWP **£509.00**

G-2800SDX Rotator HD 0.2 degree CE c/w control box. 1 remaining. RRP £1229.00. RWP **£999.00**

G450C Rotator light duty CE c/w control box & 25m cable. RRP £379.00. RWP **£325.00**

G650C Rotator medium duty CE c/w control box & 25m cable. RRP £499.00. RWP **£425.00**

OPTIONS

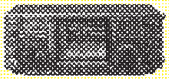
GC-038B	Mast Clamp (brown)	OUR PRICE £25.00
GC-038G	Mast clamp (green)	OUR PRICE £25.00
GC-048	Mast clamp for G-28000SDX	OUR PRICE £39.00
GS-050	Stay bearing (small type)	OUR PRICE £29.00
GS-065	Stay bearing (medium type)	OUR PRICE £45.00


G-450C


G-1000DXC


G-650C

IC-756 PROII

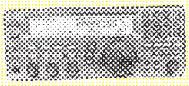


Icom's flagship. Colour screen, 32 bit processor. Absolutely fabulous.

£BEST UK PRICE

ICOM

IC-R8500



Probably the best wide band receiver available, coverage from 0.1-2GHz. Many 'top-end' features, 2 years warranty.

£1199.00

IC-2800

Dual band mobile, colour display. Full duplex, inc. CTCSS, 50W output. Detachable front. List price £449.00

£395.00

NEW IC-7400

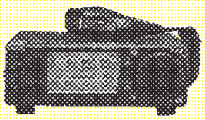
Icom's latest HF/VHF with built-in tuner. 100 watts 32 bit, a DX machine for all frequencies.

£BEST UK PRICE

IC-706 MKII G

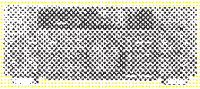
Smallest DSP radio on the market. HF, 6m/2m/ 70cm. Detachable front.

£849.00



KENWOOD

TS-870S



Kenwood's top HF radio, DSP & IF. No need for filters, transmit Tx audio, fully adjustable, broadcast audio on SSB. A CW's operators dream. Plus Rx antenna tuner.

BARGAIN AT **£1299.00**

TS-50S

The first and still one of the best little mobile radios, dedicated for HF users. Don't miss out! Brand new with UK warranty.

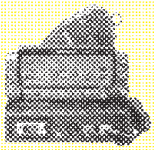
£599.00

TS-570DG

Still the only HF monoband mobile radio with DSP and ATU built-in for under £1000.00.

OUR PRICE **£829.00**

TM-D700E



The latest dual bander, dual display, built-in TNC, APRS locating system, alpha-numeric.

OUR PRICE **£429.00**

TM-G707

Dual band, detachable front, clear display. No squinting! Bullet proof front end.

List price £319.00

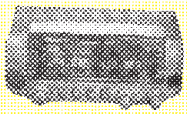
OUR PRICE **£279.00**

TS-2000

All mode multibander HF/6m/2m/70cm optional 23cm, DSP, built-in keyer, large amber coloured backlit LCD.

OUR PRICE **£1649.00**

TM-DV7E



Cool blue display, dualband, packet ready, detachable front. List price £419.00.

OUR PRICE **£379.00**

TH-D7E

The world's first handle with built-in TNC, plus APRS, CTCSS searching system, metallic silver finish. List price £309.95.

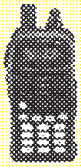
OUR PRICE **£299.00**

TH-F7E

The new dual band handy radio from Kenwood.

£259.00

TH-G71E



Dualband handie, reliable and rugged. List price £279.00.

OUR PRICE **£210.00**

while stocks last

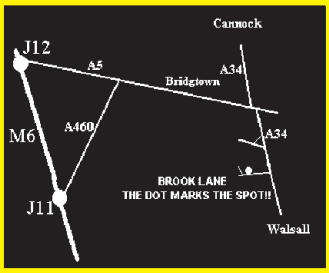
PRICE MATCH

Up to 5% extra discount may be available on selected items

TELEPHONE SALES ON:

01922 414796

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



Tel Sales & Service:
01922 414796
Fax: 01922 417829

There is NO CHARGE for using credit cards

USED EQUIPMENT PRICE LIST

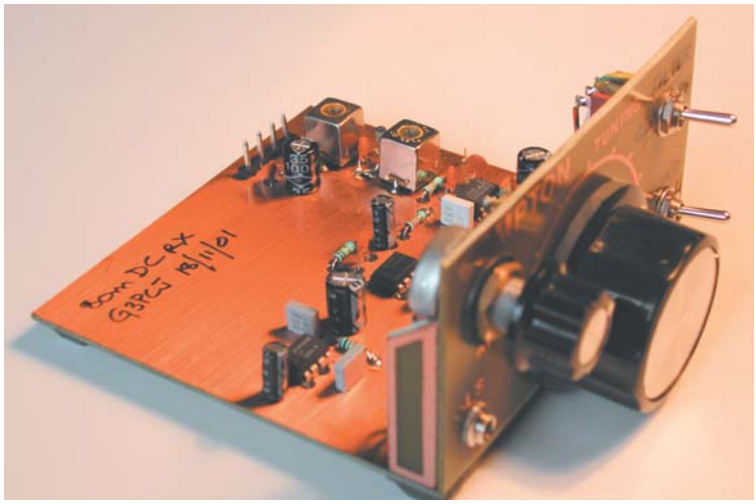
Make	Model	Description	Price
ADI	AR-146	2m FM 50W MOBILE	£130.00
AKD	4001 4m	TRANSCEIVER	£130.00
AKD	6001 6m	FM TRANSCEIVER	£135.00
ALINCO	DJ-580E	2/70CM HANDY TRANSCEIVER	£140.00
ALINCO	DJ-G1	HANDY TRANSCEIVER	£120.00
ALINCO	DJ-G5EY	DUAL BAND HANDY	£199.00
ALINCO	DJ-X1	RECEIVER	£90.00
ALINCO	DJ-X10	WIDE BAND RECEIVER	£275.00
ALINCO	DR-140	2M MOBILE TRANSCEIVER	£120.00
ALINCO	DR-150E	2M 50W MOBILE TRANSCEIVER	£140.00
ALINCO	DR-M06	6M FM TRANSCEIVER	£160.00
ALINCO	DR-M065X	6M 10Watt MOBILE TRANSCEIVER	£140.00
ALINCO	EDX-1	ATU	£140.00
AOR	AR-1500	HANDY SCANNER 0-1500M /72	£99.00
AOR	AR-3000	WIDE RECEIVER	£350.00
AOR	AR-3000A	WIDE RECEIVER	£475.00
AOR	AR-3030	HF / VHF RECEIVER Inc converter VHF	£450.00
AOR	AR-3030	HF RECEIVER	£399.00
AOR	AR-7030	TOP RECEIVER	£550.00
AOR	AR-7030+	HF RECEIVER (With AM Filter,Optical Encoder)	£650.00
AOR	AR-8000	WIDE BAND RECEIVER	£199.00
AOR	AR-8200 mk1	WIDE BAND RECEIVER	£230.00
AZDEN	PCS-4000	2M TRANSCEIVER	£99.00
BNOS	AMPLIFIER	432-10-50 70CM 50Watt	£99.00
CAPLO	SPL-3000	ANTENNA TUNING UNIT	£199.00
DAIWA	CNW-419	ATU	£190.00
DAIWA	CNW-518	1KW AUTO ATU	£199.00
DAIWA	NS-660P	SWR &PWR MTR	£40.00
DAIWA	CN-540	SWR &PWR MTR	£30.00
DAIWA	CN-630	SWR &PWR MTR	£40.00
DATONG	FL3	FILTER	£75.00
DATONG	FL-2	FILTER	£60.00
DRAKE	MN7	ATU 300 WATT INPUT	£140.00
DRAKE	R7	HF RECEIVER	£550.00
DRAKE	R-8E	HF RECEIVER	£499.00
DRAKE	SW-2	HF RECEIVER	£299.00
DRAKE	SW-8	WORLD BAND RECEIVER	£375.00
DRESSLER	D200	2M MAINS AMPLIFIER 400Watt	£399.00
FAIRHAVEN	RD-500	WIDE BAND RECEIVER	£575.00
ICOM	AT-150	AUTO ATU	£175.00
ICOM	AT-500	AUTO ATU	£275.00
ICOM	IC-2000H	2/70 MOBILE TRANSCEIVER	£170.00
ICOM	IC-2100H	2M MOBILE TRANSCEIVER	£150.00
ICOM	IC-251	2m MULTIMODE TRANSCEIVER	£295.00
ICOM	IC-275E	25W TRANSCEIVER	£525.00
ICOM	IC-275H	2M MULTIMODE 100W TRANSCEIVER	£575.00
ICOM	IC-290H	2M MULTIMODE MOBILE TRANSCEIVER	£250.00
ICOM	IC-2KL	AUTOMATIC LINEAR AMPLIFIER + PSU	£999.00
ICOM	IC-3230H	2-70CM MOBILE TRANSCEIVER	£160.00
ICOM	IC-471E	70CM BASE MULITMODE TRANSCEIVER	£299.00
ICOM	IC-490E	70cms MULTIMODE MOBILE TRANSCEIVER	£265.00
ICOM	IC-728	HF TRANSCEIVER	£399.00
ICOM	IC-730	HF TRANSCEIVER MINT!	£400.00
ICOM	IC-735	HF TRANSCEIVER	£400.00
ICOM	IC-737	HF BASE BUILT IN ATU 100W	£595.00
ICOM	IC-737	HF inc ATU BASE STATION TRANSCEIVER	£575.00
ICOM	IC-746	TRANSCEIVER	£899.00
ICOM	IC-756	HF / 6m All Band Transceiver	£999.00
ICOM	IC-756PRO	ICOM TRANSCEIVER	£1,699.00
ICOM	IC-765	HF BASE TRANSCEIVER	£800.00
ICOM	IC-775DSP	HF 200W BASE STATION TRANSCEIVER	£1,499.00
ICOM	IC-820	2-70CM BASE STATION 50Watt	£599.00
ICOM	IC-821H	VHF / UHF MULTIMODE TRANSCEIVER	£699.00
ICOM	IC-910	2/70 CM BASE TRANSCEIVER + 23CM UNIT	£1,100.00
ICOM	IC-R2	HANDY SCANNER	£99.00
ICOM	IC-R3	SCANNER + TV	£299.00
ICOM	IC-R7000	RECEIVER MINT! CONDITION	£550.00
ICOM	IC-R72	RECEIVER	£399.00
ICOM	IC-R75	HF / 6m RECEIVER	£475.00
ICOM	IC-T81E	QUAD BAND HANDY 2m/6m/23cm/70cm	£250.00
ICOM	IC-T8E	HANDY TRANSCEIVER	£175.00
ICOM	IC-W21E	HANDY TRANSCEIVER	£199.00
ICOM	PCR-1000	COMPUTER SCANNER	£200.00
ICOM	PS-1520A	POWER SUPPLY FITS ALL ICOM	£110.00
ICOM	PS-85	POWER SUPPLY	£175.00
ICOM	R-75	HF RECEIVER	£400.00
ICOM	SP-20	SPEAKER	£120.00
ICOM	SP-21	LOUDSPEAKER, BOXED	£55.00
ICOM	T-7E	2/70CM HANDY TRANSCEIVER	£170.00
ICOM	T-8E	2/70CM 6M HANDY TRANSCEIVER	£185.00
ICOM	UT-84	TONE SQUELCH UNIT	£25.00
ICOM	IC-2SET	2M HANDY	£89.00
ICOM	IC-R71E	RECEIVER	£399.00
JRC	JST-245DSP	HF 50MHz 1500w AC BASE TRANSCEIVER	£1,295.00
JRC	NRD-535	HF RECEIVER	£600.00
KANTRONICS	KAM PLUS	TNC	£220.00
KENWOOD	DFC-230	FREQUENCY CONTROLLER	£70.00
KENWOOD	PS-20	10A POWER SUPPLY FITS TR-9130 ETC	£55.00
KENWOOD	PS-430	POWER SUPPLY	£100.00
KENWOOD	PS-50	POWER SUPPLY	£145.00
KENWOOD	R-5000	RECEIVER	£499.00
KENWOOD	SP-950	LOUDSPEAKER	£90.00
KENWOOD	SW-2000	SWR METER	£60.00
KENWOOD	TH-22E	2M HANDY TRANSCEIVER	£89.00
KENWOOD	TH-25E	HANDY TRANSCEIVER	£49.00
KENWOOD	TH-47E	HANDY TRANSCEIVER	£100.00
KENWOOD	TH-75E	2/70 HANDY TRANSCEIVER	£125.00
KENWOOD	TH-78E	2/70CM HANDY TRANSCEIVER	£175.00
KENWOOD	TH-79E	HANDY TRANSCEIVER	£189.00
KENWOOD	TL-922	HF LINEAR AMP 1Kw (AS NEW!)	£899.00
KENWOOD	TM-231E	2M MOBILE TRANSCEIVER	£120.00
KENWOOD	TM-241E	2M MOBILE TRANSCEIVER	£120.00
KENWOOD	TM-251E	MOBILE TRANSCEIVER	£140.00
KENWOOD	TM-255E	2m MULTI-MODE MOBILE TRANSCEIVER	£400.00
KENWOOD	TM-455E	70CM MULTIMODE MOBILE TRANSCEIVER	£495.00
KENWOOD	TM-733	2/70 MOBILE TRANSCEIVER	£225.00
KENWOOD	TR-751E	2M MULTIMODE TRANSCEIVER	£350.00
KENWOOD	TR-851E	70CM MULTIMODE MOBILE TRANSCEIVER	£395.00
KENWOOD	TS-120	HF SOLID STATE MOBILE	£225.00
KENWOOD	TS-450S	HF TRANSCEIVER	£499.00
KENWOOD	TS-450SAT	HF BUILT IN ATU EXCELLENT TRANSCEIVER	£575.00
KENWOOD	TS-530SP	HF MAINS 100Watt TRANSCEIVER	£275.00
KENWOOD	TS-680	HF 6M MOBILE/BASE TRANSCEIVER	£400.00
KENWOOD	TS-690SAT	HF 6M Inc ATU	£650.00
KENWOOD	TS-711E	SM BASE STATION TRANSCEIVER	£399.00
KENWOOD	TS-790E	2/70CM BASE STATION TRANSCEIVER	£699.00
KENWOOD	TS-790E	2m / 70cm MULTIMODE BASE TRANSCEIVER	£799.00
KENWOOD	TS-811E	70cms MULTIMODE BASE TRANSCEIVER	£399.00
KENWOOD	TS-830S	HF TRANSCEIVER	£325.00
KENWOOD	TS-850SAT	HF TRANSCEIVER MINT!	£800.00
KENWOOD	TS-870SAT	HF/DSP-IF-100W BUILT IN ATU TRANSCEIVER	£999.00
KENWOOD	TS-950SD	HF/ 150W DSP BASE TRANSCEIVER	£1,100.00
KENWOOD	TSB-2000	LATEST KENWOOD - COMPUTER CONTROLED	£1,299.00
KENWOOD	VFO-120		£50.00
KENWOOD	VFO-180	EXTERNAL VFO	£75.00
KENWOOD	VS-1	VOICE SYTHESISER	£30.00
KENWOOD	VS-2	VOICE SYTHESISER	£30.00
KENWOOD	YG-455 CN-1	270Hz CW CRYSTAL FILTER	£100.00
KENWOOD	YK-88A-1	AM FILTER	£40.00
KENWOOD	YK-88C-1	500Hz CW NARROW FILTER	£40.00
KENWOOD	YK-88CN1	270Hz CW FILTER 8.83MHz IF	£40.00
KENWOOD	YK-88S-1	2.4KHz SSB NARROW FILTER 8.83MHz IF	£40.00
KENWOOD	YK-88SN	1.8K SSB FILTER (TS-440 /R5000)	£40.00
KENWOOD	YK-88SN-1	1.8KHz SSB NARROW FILTER 8.83MHz IF	£40.00
KENWOOD	PS-430	POWER SUPPLY	£120.00
LINEAR AMP	CHALLENGER II	CHALLENGER AMPLIFIER 11 2kW	£1,400.00
LOWE	HF-150	SW RECEIVER	£150.00
LOWE	HF-250	INCLUDES REMOTE CONTROL	£300.00
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

Walford Electronics 'Compton'

Reviewed by *RadCom's* 'Newcomers' News' columnist Steve Hartley, G0FUW*

BUILDING a receiver is probably one of the most rewarding projects that an amateur can complete.

To hear the first signals coming out of the loudspeaker or headphones from a circuit you have put together yourself gives some idea of how the radio pioneers must have felt. The only real difference is that we now have some 100 years of experience to build on, those guys were starting from scratch!



I am often asked what to recommend for newcomers to the hobby, especially those on courses leading up to the Novice Radio Amateurs' Examination, and I always recommend a receiver project first. The next question quickly follows, "Which one?", and that is where I get stuck.

There are so many designs for receivers, crystal sets, direct conversion, superheterodyne, single band, multi-band and so on. For the complete beginner the best route is undoubtedly to go for a kit, which narrows the choice a little. There are several kit suppliers who all offer a number of receivers and one of those is Walford Electronics, run by Tim Walford, G3PCJ. This review looks in detail at one of the latest in his 'Somerset' range of kits, the Compton.

THE SOMERSET RANGE

THE WALFORD Electronics range of radio kits includes transmitters, receivers, transceivers, accessories and test equipment. All the transmitters and receivers are named after cities, towns and villages in Somerset where Tim lives and works.

For the benefit of those who have not seen any of the Somerset range they use a very distinctive 'open' style of construction, where the printed circuit board (PCB) is supported by four rubber feet and the front panel is soldered directly to the base / PCB. This leaves the builder to decide whether or not to box up the finished project. The photographs show the style well.

All the kits come with all the necessary parts and a comprehensive set of instructions and should anything go wrong Tim provides a good back-up service with advice and spare parts always available.

THE COMPTON RECEIVER

THE COMPTON is a relatively simple direct conversion receiver for the 3.5MHz (80m) amateur band (**Fig 1**). It is intended to be a step up from a very basic receiver, perhaps a first attempt at a 'serious' radio construction project. It is aimed at those who have tried some simple electronic construction or newcomers working under the supervision of a more experienced mentor. It could also make an interesting club project with a number of members working under the watchful eye of a 'construction supervisor'.

To get the kit working you need a soldering iron and some solder, a pair of side cutters, a pair of wire strippers, a 12-volt power supply or battery, a loudspeaker or pair of headphones and a suitable antenna. A good supply of hook-up wire is supplied with the kit. A DC voltmeter or multi-meter is also useful for carrying out the tests between some of the stages of construction.

The circuit employs the popular direct conversion technique where the local oscillator runs at the same frequency as the wanted signal, the two are mixed together in a balanced mixer / product detector circuit to demodulate the single sideband (SSB) or continuous wave (CW) Morse code signals. This results in two audio signals, the sum and the difference. For CW that means you will be able to tune the desired signal in two places and you can use whichever has the least interference from other signals. For SSB signals there is only one correct tuning position. Receiving both sidebands is a small price to pay for the simplicity of the circuit compared with a superheterodyne design.

This design uses a band pass filter for input tuning and three integrated circuits to act as product detector, audio frequency filter and audio frequency amplifier. The audio filter has two switchable bandwidths for SSB and CW reception. The local oscillator uses two ceramic resonators with a large variable capacitor to 'pull' their resonant frequency. The block diagram shows the line-up.

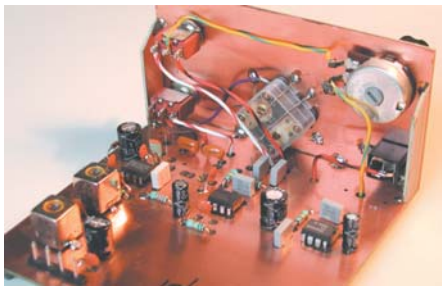
Once complete the receiver can be used with another kit, the 'Dundon' CW transmitter, to form a simple low power (QRP) station or it can be modified with other Walford kits to form a three-band direct conversion receiver or even a 3.5MHz superheterodyne receiver. Whilst this gives some flexibility I would have liked to see a companion voice transmitter to make a nice first transceiver for the Foundation Licence holder.

FIRST IMPRESSIONS

THE PARTS ARRIVED in sealed polythene envelopes with the semiconductors safety housed in a small 'anti-static' bag.

A good quality double-sided printed circuit board (PCB) was found to be lacquered to prevent any tarnishing that might hinder neat soldering, a nice touch. There was no silk screen-printing to show where the parts fitted but the technique used in the construction meant that that was no real problem. The holes where component leads pass through the PCB were countersunk on the top earth plane except for those where a topside earth connection was required.

The instructions run to some 10 pages and include a circuit diagram, general construction advice and step-by-step construction and setting up details. A section entitled



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

Direct Conversion Receiver Kit

'Getting the most out of the Compton' gives advice on using the receiver with various antennas and matching units etc.

Hardware is also included in the kit with a couple of knobs, switches and sockets. All in all the pack was found to contain a comprehensive kit of parts and instructions.

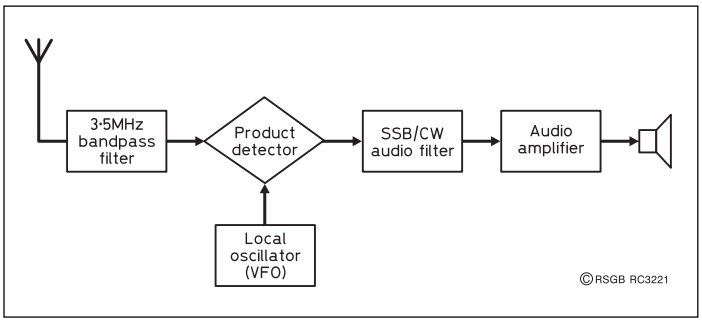


Fig 1: Block diagram of the Compton direct conversion receiver.

CONSTRUCTION

FOLLOWING TIM'S advice in the instructions rather than getting stuck into the soldering straight away, I read through all the instructions first. I have to confess that I did find them a bit hard going in some places, not because of the content, but because of the layout. The various sections contain some excellent hints and tips but there are one or two very large blocks of text with little 'white space' and I did feel that someone with less patience might miss some important points.

The text in the step-by-step construction section is less dense with the detailed steps and parts list is broken down into six blocks. After most of the construction blocks there are a few short tests to ensure that all is well. For example, after the DC supply parts are fitted there is a test for a 6-volt feed. The instruction helpfully point out that "if it is only about 0.5 volts D1 (a 6v2 Zener) is the wrong way round!"

There are several test point holes provided on the PCB but I did wonder why test points did not have Vero-pins fitted to enable the probes to be attached without turning the project over. A small criticism perhaps, because in my case all the steps went without a hitch and despite the absence of any specific pins all the tests worked out just as the instruction said they should.

I find this step-by-step, 'build and test' method really helps to get projects working quickly. Any errors or poor solder joints are revealed before progressing to the next stage and there should be every confidence that when the last stage is complete the project will work first time. Some kits I have built encourage you to populate the whole PCB before testing with power on. Whilst that may be quicker it can take much longer to find any mistakes.

The final stage of construction involves the fitting of the front panel and the associated hardware and I was somewhat sceptical over the novel method used to secure the main tuning capacitor.

However, my concerns were unfounded and the two wire straps used to hold the capacitor in place proved to be an excellent and easy method.

SETTING UP

VERY LITTLE IS required in the way of aligning the receiver as the ceramic resonators are guaranteed to be on the required frequency and the only adjustments available are to the input tuning and the swing of the variable capacitor.

Following the instructions I found the resonators covered 3.493 to 3.565MHz (Low) and 3.630 to 3.695MHz (High) giving reasonable chunks of both the CW and SSB sections of the band.

The input tuning was found to be quite tight and initial settings were done 'off-air' allowing fully-readable signals to be heard in both modes. Final adjustment was done with a signal generator and an AC voltmeter across the loudspeaker control to give the best compromise between the two sections of the band.

EVALUATION

THE ACID TEST for any receiver is to see if it can hear anything on the bands. I used the receiver to listen around the band over a couple of days and was very impressed by its performance.

The ceramic resonators make for a very stable variable frequency oscillator (VFO), so much so that I was able to use the receiver to listen to some lengthy 'rag-chewing' without having to retune.

The CW audio filter was found to be quite effective in reducing noise on the band but as Adrian, 2E1IFY / M3IFY, one of my RAE students, observed, "it actually sounds better without the filter". There is no doubt that the filter works but I agree with Adrian that the more 'hollow' sound in the 'narrow' position is a little less easy on the ear. That said, any half-decent filter will have the same effect, reducing the audio bandwidth to about 1kHz or less, so the comment is actually a complement, rather than a criticism!

I used an old car stereo loudspeaker and the little audio amplifier IC gave lots of output. There was very little evidence of broadcast interference, which can be a problem with some direct conversion designs.

CONCLUSION

HAVING BUILT a good number of direct conversion receivers I have to say that this is one of the best I have come across. It was easy to build and worked first time, if you don't count the first attempt when I connected the supply leads up the wrong way round! The receiver survived my mistake and gave a good account of itself on the band.

It is by no means a 'professional' communications receiver but it is a step up from a tuned radio frequency set and provides a very usable amateur receiver at a reasonable price.

The Compton kit costs £38 from Walford Electronics, Upton Bridge Farm, Long Sutton, Somerset, TA10 9NJ. A large stamped addressed envelope will bring you a full catalogue of the Somerset range of kits and, for those with Internet access, further details can be found at www.users.globalnet.co.uk/~walfor/

RESPONSE FROM WALFORD

I gave Tim Walford sight of this review before submitting it to the editor, and this was his response:

"I had not included Vero-pins in the kit as I feel they are unnecessary. I use off-cuts of resistor legs. I will add a word in the instructions about using pieces of stiff wire for the test points.

"The instructions are a tough one to get just right. Those for the 'Chedzoy' receiver, which is aimed at real beginners, are more detailed than those for the Compton, which is intended to be a 'second step'. I also do not think you should tell builders everything to the point where it becomes 'building by numbers' and I try to encourage them to examine the circuit and think a bit more about what they are doing.

"I have taken the point about a voice transmitter on board and by the time this goes to print a prototype double sideband suppressed carrier transmitter should be up and running. I hope to market the complete transceiver for around £80." ♦

in practice

IAN WHITE, G3SEK

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

RF POWER ATTENUATORS

I WANT TO MAKE an attenuator to reduce the 100W output of my transceiver down to 10W. How do I calculate the resistances needed, and where can I find RF power resistors in those values?

THE CALCULATION isn't difficult, but it is tedious, so let's skip the formulae [1] and go straight to a computer program. G4PMK's useful *BASIC* program called *ATT* was first mentioned in the July 2000 column, which also included some pre-calculated tables of typical resistor values. However, to design practical RF power attenuators you're going to need the program itself, for reasons that will soon become clear. Since modern versions of *Windows* no longer have a *BASIC* interpreter, I've now provided a ready-to-run program on the 'In Practice' website (see WWW.).

There are many attenuator design programs that will calculate idealised resistor values for attenuators in both the T- and the π-configuration (**Fig 1**). The nice feature about *ATT* is that it also works out the performance of a more practical attenuator, using resistors of the nearest standard values. In addition, it calculates the power dissipation in each resistor, which is essential for the design of power attenuators. All this information is presented on one screen, so you can easily compare different design options.

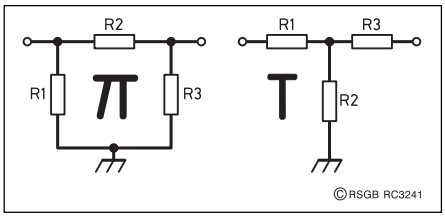


Fig 1: π and T configurations for resistive attenuators.

When you start ATT.EXE in a DOS window, the first question is whether you want to use standard resistor values in the E12 series (multipliers of 1.0, 1.2, 1.5...) or the E24 series (1.0, 1.1, 1.2, 1.3, 1.5...). The answer to that is easy: E12, because RF power resistors are only available in the most common values, and we're about to find that even some of those are missing from the catalogues. The next question is how much attenuation you require, in decibels. In this case we need to reduce 100W by a factor of 10, so that's exactly 10dB (**Table 1** gives some other common ratios). Then you need to enter the input power - 100W - which allows the program to calculate the power dissipation in each resistor. Finally, *ATT* asks you to confirm that the system impedance is 50Ω.

Required output power (W)	Attenuation (dB, approx, for 100W input)
50	3
25	6
20	7
10	10
5	13
2.5	16
2	17
1	20

Table 1: Typical attenuation values (dB) required to achieve a given power output from a 100W transmitter.

The results screen appears immediately: **Fig 2**. First of all, note the power dissipations in the three resistors, for 100W input and 10W output. The total power dissipation - the RF power thrown away in the attenuator - adds up to the difference between the input and output power levels, namely 90W. It's also interesting to note that the power dissipations of R1, R2 and R3 are the same for both the T- and the π-configuration.

Using this information and the component catalogues, you have to choose the attenuator configuration, and which resistors to order. This is made easier by the fairly recent introduction of low-inductance power film resistors in the familiar TO-220 power transistor package, and other larger bolt-down packages. These resistors are insulated from the mounting tab, but the tab does need to be bolted down to an effective heatsink in order to transport the heat away. For example, a "50W" TO-220 resistor will only dissipate that much power on a heatsink that is capable of holding the tab temperature down to 25°C. This is extremely difficult to achieve in practice, so the power rating is considerably lower in more realistic situations. For example, if the heatsink can only hold the tab temperature down to 60°C, the power dissipation is reduced to about 30W. The rating of the bare resistor with no heatsink is only 2.25W, so don't even think of using these components without a heatsink!

Unfortunately, these resistors are not well characterised for high-frequency use. The manufacturers describe them as "non-inductive" but that, of course, is an exaggeration. Any electronic component has some inductance, and at a high enough frequency the reactance will make a difference. On enquiring further, the data sheets say that the inductance is "less than 0.1μH" which is almost equally useless as a design guide. However, knowing that the resistive film is a flat sheet connecting the two leads of the TO-220 package, you can make good estimates using standard formulae for the inductances of flat strips and wires. If the package is connected with zero external lead length, the total inductance will be only a few tens of nanohenrys. No data are given on the shunt capacitance between the resistor and the chassis when the tab is bolted down, but this you can easily measure; it's

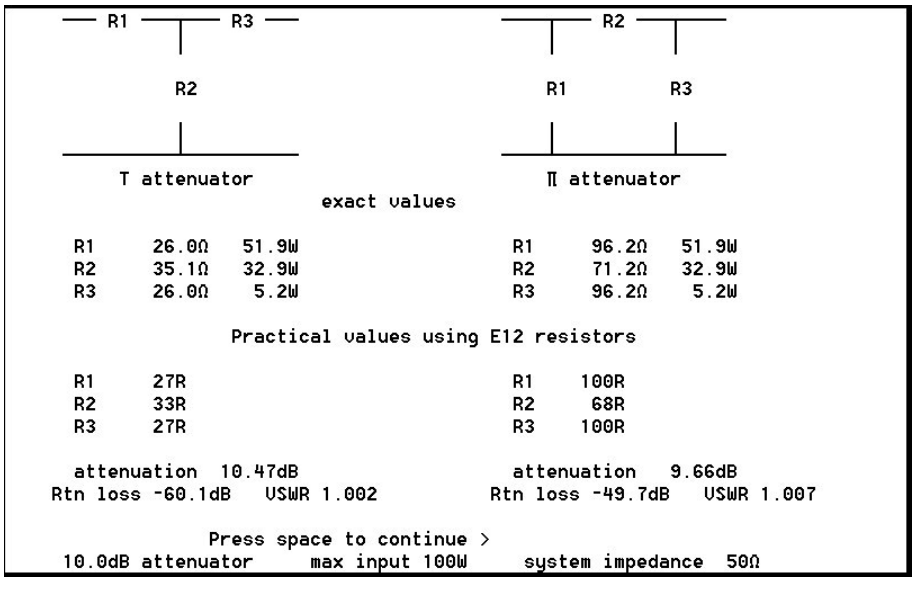


Fig 2: Output of the *ATT* program for a 100W 10dB attenuator. The article explains how to choose practical resistor values.

a few picofarads at most. These results mean that the parasitic inductance and capacitance are not important at HF, and I've used the same resistors successfully as high as 144MHz.

Now let's look in more detail at the choices offered by Fig 2. The π-configuration looks the more promising because two of the values, R1 and R3, are very close to the standard value of 100Ω. R2 is ideally 71Ω, so the standard value of 68Ω would be close enough - but there's no 68Ω in any of the catalogues (see WWW.). This is where you have to be creative. How about making 66Ω from two 33Ω resistors in series? No, there are no 33Ω resistors in the catalogues. Two 150Ω in parallel? Sorry, none of those listed either. The best you can practically manage for R2 is 47Ω + 22Ω, which is pretty close to 71Ω.

For this particular example, the π-configuration fits the available resistor values better than the T-configuration, and the π is generally preferable because it allows the ends of two resistors to be grounded to the chassis. However, there are occasions when the T is better, either because it offers more convenient component values or because it allows better screening between the input and the output, which is desirable for high values of attenuation [2]. Don't close your mind to either option.

So we now have a reasonable design for our 10dB attenuator. R1 = 100Ω, R2 = 47Ω + 22Ω, R3 = 100Ω. Since these TO-220 resistors are available in 50W and 20W ratings with little difference in price, and there has to be some de-rating of the actual power dissipation, it probably makes good sense to choose 50W for everything. Have you noticed the problem? For 100W RF input, the power dissipation in R1 is 51.9W, so unless R1 is mounted on an infinite heatsink we're exceeding the power dissipation of this component. There are much larger film resistors in the component catalogues, but they still require very large heatsinks to avoid severe de-rating. Maybe it's time to think again...

Did you really mean 100W of RF, key-down forever? No, of course you didn't. You actually meant 100W PEP while transmitting, and zero while receiving. When transmitting on CW/SSB the duty cycle of these modes means that the average power (which is what affects the temperature of the resistors) is lower still. The only people who even approach a solid, continuous 100W would be practitioners of the FM monologue and extremely slow typists on FM/PSK keyboard modes. In other words, you can probably get away with the 50W resistor for R1.

Construction can be something like **Fig 3**. This is a good layout for high-frequency performance because it minimises the lead lengths. What you don't see, of course, is the large lump of metal behind the resistors to carry the waste heat away - but it has to be there.

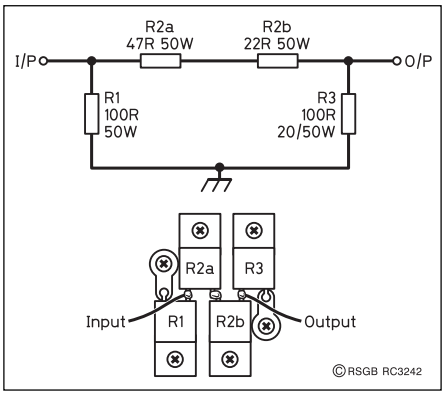


Fig 3: Practical component values for Fig 2, and a good high-frequency layout with very short leads. Note that a large heatsink is needed to dissipate up to 90W of power.

So what do you do if you can't find any combination of available resistors that's even reasonably close? If you've looked at both the T- and the π-configuration, and exhausted all possibilities of resistors in series or parallel, your best strategy is to divide the attenuator into two cascaded stages, and try various amounts of attenuation until you find one that *will* fit the available resistors. Then make up the rest of the attenuation (the difference in dB) with another stage. The ATT program makes it very quick and easy to explore the options. It doesn't matter that the individual stages are not nice round numbers of dB - only the total matters, and even that can be 'negotiable'. Equally, it doesn't matter if one stage works out best as a T and the other as a π.

Another trick you can try at the lower-power end of an attenuator chain is to use ordinary wire-ended resistors. Metal film resistors in 2W and 3W sizes are available in the full E12 range of values. In practice, you will need to use these resistors in paralleled bundles, for a number of reasons. First, to achieve the required power dissipation. Second, to reduce the effective inductance - the resistive element consists of a helix of a few turns (in other words, a small inductor), but you can get the total inductance down to a tolerable level, even for 144MHz, by connecting several higher-value resistors in parallel. Third, by connecting a number of *unequal* higher-value resistors in parallel you can fill in the gaps between standard E12 values. However, there are practical limits on the number of wire-ended resistors you can connect in parallel. You need to leave sufficient room for cooling air to circulate between them, yet you also need to avoid using long leads which introduce extra inductance. In practice, you probably can't use more than about five resistors in a bundle, so the total dissipation is limited to 10 - 15W. That means you should concentrate your design efforts on finding good ways to use the TO-220 resistors in the input end of the attenuator, where you need the power dissipation, and then think about using resistor bundles at the output end.

BLU-TACK SWARF CATCHER

THE ITEM IN the September 2001column about the trouble caused by a tiny speck of solder prompted this handy idea from EI2IH.

"I RECENTLY had to drill the back panel of a transceiver and, forewarned by your article, gave some thought about avoiding a similar problem. What I did eventually was to take a large lump of Blu-Tack and stick it on the inside of the back panel behind where the hole had to be drilled. This trapped any swarf particles and saved lots of masking-off or careful vacuuming afterwards."

That's a very good idea. It complements the three other uses for Blu-Tack that have been described in earlier columns. One (November 1995), was to stick a nut temporarily on the end of a long screwdriver or a ruler, in order to manoeuvre the nut into some inaccessible location and start it onto the end of a screw. Once the nut has started, it easily comes loose from the Blu-Tack. The second (April 1996), was to use a thin sheet of Blu-Tack to make a 'dental impression' of a complex component pin-out on a hand-made PC board, so that you can then scribe it through onto the board for drilling. The third (September 1994), was to use it as a removable sealant for such things as rotator cables. Although Coax-Seal putty (from Waters & Stanton) is better for critical applications, Blu-Tack works surprisingly well outdoors, and is more likely to be there when you need it.

REFERENCES

[1] Full formulae for attenuator resistance values and power dissipations are given in Chapter 12 of *The VHF/UHF DX Book* (RSGB Bookshop). You can also extract them from the BASIC source code for the *ATT* program (see 'WWW.' below).

[2] The December 1997 column included a practical design for a 30dB power attenuator using the T-configuration. ♦

WWW.

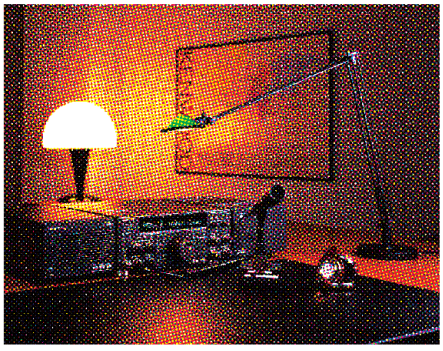
ATT.EXE and ATT.BAS are downloadable from the 'In Practice' web site: www.ifwtech.co.uk/g3sek/in-prac/index.htm

Online catalogues for the resistors mentioned in this column include: www.farnell.com/uk

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.

KENWOOD



The Digital Flagship

"YOUR SIGNAL'S 59, LOVELY AUDIO!"

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

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

HF ALL-MODE TRANSCEIVER TS-870S

Available from all official Kenwood amateur radio dealers. For full details of our dealer network and all Kenwood amateur products contact your local dealer or Kenwood Electronics UK Ltd. 01923 655284.
E-mail: comms@kenwood-electronics.co.uk

INTEREST FREE credit IS BACK! NOTHING to PA

ML&S are the APPROVED LONDON STOCKISTS for all W&S CATALOGUE PRODUCTS

V5/G4DMA Windhoek and KL7/G4DMA Anchorage Alaska

Dear lads, just a vote of thanks for looking after my bespoke and untimely requirements when I invaded your shop just hours before you were due to go to Blackpool 2 weeks ago.

I was on route from Alaska to Namibia to do some voluntary teaching and technical work for Raleigh International and needed a vertical for 6m and a good bridge for our HF commercial station.

The 5/8th over 5/8th and Bridge you supplied did great - Using at FT817 at 2.5W (I bought this from you en route to somewhere else earlier this year!) into this simple array worked around 20 Europeans from what was a desert valley surrounded by mountains to 6500 ft, some 30Kms south of Windhoek all via FAI ! believe. Thanks for the coffee and great service (again)

Laurence Howell G4DMA in absentia...

SPECIAL OFFERS

For the **ULTIMATE STATION** *we have teamed up with* BlackHorse Finance *to offer the following* **SPECIAL PACKAGE DEALS!**

- *FT-1000MP Mk5* with all filters fitted
- SP8 Speaker
- MD200 Deluxe Desk Microphone
- *Plus* the Quadra Amplifier

for only £999.00 DEPOSIT & 60 payments of £133.00

- *IC-756 Pro2 Plus* IC-910H *(with 23cms and DSP modules)*
- SM-8 Microphone *(with dual leads)*
- 2 x SP21 speakers
- 2 x IC-PS125 matching power supplies

for only £825.00 DEPOSIT & 48 payments of £118.35

- *TS-2000X (with DRU3A and 23cms)*
- Matching Speaker
- Matching PSU
- MC-60A Desk Microphone

- Full spec PC pre loaded with ARCP-2000 to control the Radio and PSK31 sofware. Supplied with all necessary connections

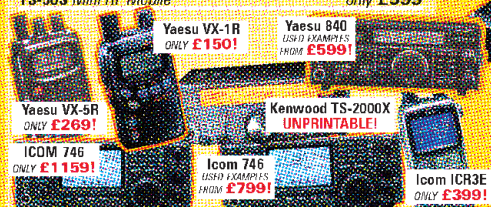
for only £999.00 DEPOSIT & 48 payments of £78.44

Come on and see us with **YAESU, ICOM & KENWOOD** *at the* **EPSOM RADIO RALLY** *on the* **16th JUNE**

BARGAIN CORNER

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* -	£299
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		£599
The very latest TMD-700 *from* Kenwood	*only*	£429.00
Yaesu VX1R	*at only*	£150.00
Yaesu VX5R	*at only*	£269.00
Icom ICR3E	*at only*	£399.00
Kenwood TS-2000X		*UNPRINTABLE!!!*
Yaesu FT-1500 *+DTMF mic ideal for internet linking*		£159.95
TS-50S *Mini HF Mobile*	*only*	£599



FINANCE EXAMPLE TS870s *at* £1379
PAYMENT ILLUSTRATION:
ZERO DEPOSIT: 36 payments of £41.25
TOTAL AMOUNT PAYABLE: £2155.32 APR:12.9%
if paid in 6 months 0% APR
ML&S is a licenced credit broker. *Finance offered*

YAESU FT1000MP MK5

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

FREE MD200 THIS MONTH ONLY

ML&S £2899

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £125.86

YAESU QUADRA VL1000

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

ML&S £3999

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £173.62

YAESU FT847

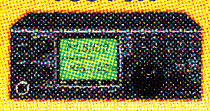
This is a well established radio and was the original multi band base station. With Yaesu's constant upgrade policy the current batches are far better than early versions and it is still the only radio to offer 4 metres all mode operation. A shack in a box for only *£1199.00*

RRP £1699 **ML&S £1199**

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £52.06

ICOM IC910H



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

Options include: DSP and 23cms

ML&S £1299 STD UNIT

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £56.40

YAESU FTV1000

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

ML&S £799

CALL FOR A DEAL

YAESU FT840 FM

now with FM!

This is an excellent starter radio with no frills. If you want easy operation and good performance then this is a good choice. At only £599.00 this radio has been a popular choice for new M3's

RRP £799 **ML&S £599**

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £26.01

YAESU FT817

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

new low price

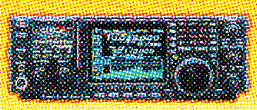
This is a radio that every radio ham should own. As well as being an excellent portable radio this makes an ideal second receiver for the shack. Supplied as a package at only £850.00 you are ready to sample the delights of QRP operation.

ML&S £750

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £32.50

ICOM IC756 PRO MK I



LAST CHANCE TO GRAB ONE OF THE OLD PROS!!
- to grab one of these radios at this price!!!!

ML&S £1699

call for availability AND A DEAL

YAESU FT920AFC

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

ML&S £1149

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £49.88

YAESU FT100D

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

ML&S £899

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £39.3

YAESU VR-5000

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

ML&S £599

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £26.01

ICOM IC-7400

NEW ICOM RADIO!

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

ML&S £1499

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £65.08

YAESU VX5RS

Our best selling hand held ever! Giving 5 Watts on 2/70 & 6 metres. 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

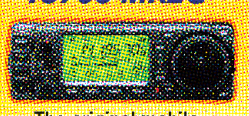
YAESU FT-7100

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

ML&S £299

SUPER LOW PRICE!

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 £849

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £36.86

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 DOO

Y for 6 MONTHS!

martin lynch & sons

Suppliers of Communications

ML&S

KENWOOD TS2000E

zero DEPOSIT

ALSO AVAILABLE: 23cm version CALL FOR DEAL!

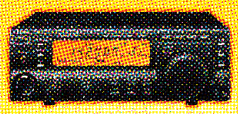
This radio has set a new bench mark for all in one radios. Offering all bands,built in TNC,built in ATU this is a real communications station. You can chat on your local 2 meter repeater while tuning around HF for that elusive DX station on HF. You can also monitor the DX cluster and see the DX popping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

ML&S £1649 STD UNIT

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £71.59

KENWOOD TS50S



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

zero DEPOSIT

ML&S £619

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £26.87

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

KENWOOD B2000

zero DEPOSIT

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

ML&S £1599

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £69.42

KENWOOD TMD700E

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

zero DEPOSIT

ML&S £449

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £19.49

KENWOOD TS570DGE

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

zero DEPOSIT

ML&S £849

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £36.86

KENWOOD TMG707

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

ML&S £299

KENWOOD TS870S

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

zero DEPOSIT

ML&S £1379

ZERO DEPOSIT - NOTHING to pay for 6 months then pay in full interest free or

36 * £59.87

KENWOOD THD7E

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

ML&S £299

ML&S CD ROM Catalogue will be available in the next few months! *CALL TO ORDER YOUR COPY*

- NEW ICOM mobile ***IC2725***

*....News just in...*ICOM have a new Dual band Mobile, the ***IC-2725***. *Details to be announced.*

- YAESU have the New ***FT-1000MP MkV Field*** arriving soon at £2295.00 *Call for a leaflet.*
- YAESU also have a new Handheld the ***VX-7R*** a waterproof version of the VX-5R all the features of the VX-5 in a rugged waterproof case. *Call for details.*

Well, its a bit quiet on the KENWOOD front at the moment but we know some new gear is on the horizon. *Keep an eye on www.hamradio.co.uk for details.*

FT1000 Mark V Field

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

Order Yours TODAY

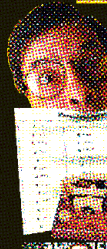
- High Efficiency Cooling system
- Conservative 100 Watt Low Distortion Final Amplifier Design
- High Speed Automatic Antenna Tuning System
- Dual Receive With Independent AGC Systems
- Enhanced Digital Signal Processing
- Selectable SSB Pattern Contour Filters
- Industry-Leading RF Front End Design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

ML&S £2295

0% deposit NOTHING to pay for 6 months then pay in full interest free or

36 * £99.64

MORSE TESTS at Martin Lynch & Sons



ML&S provide the facility for Morse tests ON DEMAND on the morning of the last Saturday of every month *(except December)*. We offer the **5 WORD per MINUTE MORSE TEST** and the **Foundation Morse Assessment**. This is a unique opportunity to take your morse test in a relaxed environment 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 "FIVE WPM MAN" Rod G7BZV seen here with three of the MORSE EXAMINERS, George G3NOH, Robin G0VJI & Wayne G0JJQ.

IC-756 Pro Mk2

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

FEATURING: *• Improved receiver • Selectable filter shape • Digital Voice record/playback • Enhanced SSB data mode performance • SSB & CW synchronous shift • and lots more*

ML&S £2495

0% deposit NOTHING to pay for 6 months then pay in full interest free or

36 * £108.32

IC-7400

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. Only £1499

Have a trade in? We pay TOP MONEY

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

0208 566 1120

128, 140-142 Northfield Avenue • Ealing • London W13 9SB

website: www.hamradio.co.uk

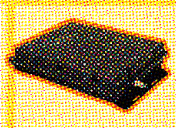
email: sales@hamradio.co.uk

fax: 0208 566 1207

CALL US 6 DAYS A WEEK • MON-SAT 9.30-5.30

MD200A8X

The new "Old Style" microphone from Yaesu. The audio is very punchy with top class clarity. A superb match for any Yaesu Base radio. This microphone has room for a second insert which is switchable.



SGC SMART TUNERS

we have the full range of these unique tuners in stock with an SG230 and 20 foot of wire you are ready to operate top band to ten. The SGC tuners start at **£259.00** with different types to suit specific needs. Give us a call with your requirements.

SAMLEX SEC1223

Back in stock! The best selling original 23 amp switch mode power supply. Only **£99.95** - accept no substitute!!!!!!

MFJ Products IN STOCK

MFJ 949 our N°1 selling manual	£149.95
MFJ 969 our N°1 selling manual	£189.95
MFJ 945 "Mobile ATU"	£109.95
MFJ 269 Antenna Analyser	£329.95

CUSHCRAFT Products IN STOCK

Cushcraft A3S	at £459.00
Cushcraft R8	at £469.00
Cushcraft MA-5B	at £299.00

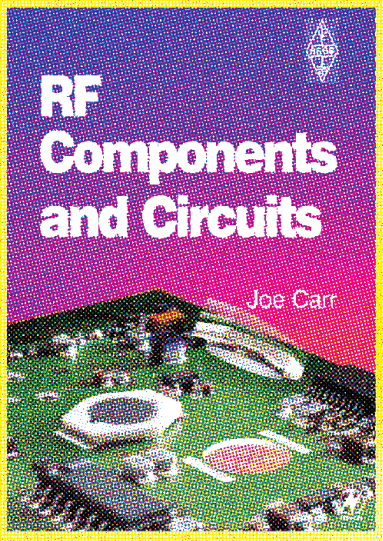
MYDEL MULTITRAP

At 66 ft long covering 80/40/20/15&10 mtr this ever popular antenna is back in stock .....at £79.00

THE MYDEL MEGA TRAP

at 104 ft long cover 160/80&40 metres .....at only £99.00

RSGB BOOKS



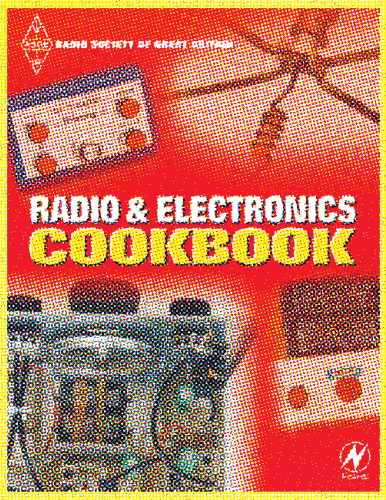
R F Components and Circuits

For those who are interested in RF design, this is the first RSGB book on the subject written by the legendary author Joe Carr. This book is written in an easy to understand style with the minimum of theory whilst offering a comprehensive introduction to the design and understanding of RF circuits. Developed from a highly popular series in *Electronics World* magazine, *RF Components and Circuits* covers the practicalities of designing and building circuits, including fault-finding and use of test equipment.

The late Joe Carr was one of the world's leading writers on electronics and radio, and an authority on the design and use of RF systems. Whether you are looking for a complete self-study course in RF technology, a concise reference text to dip into or a course text that is readable and straightforward, Joe Carr's book has the solution.

ONLY £19.12 + p&p (£22.50 non-members)

Radio & Electronics Cookbook



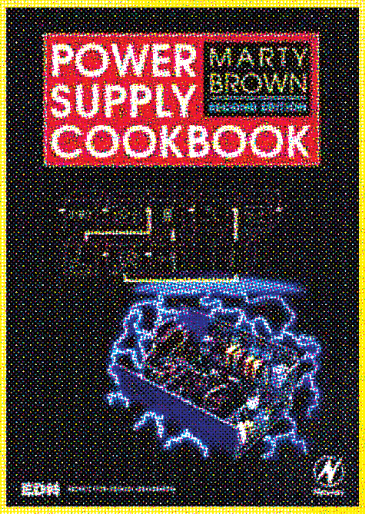
This is a collection of the very best weekend projects from the popular Radio Society of Great Britain magazine D-I-Y RADIO.

- A wealth of ready-to-build electronics projects
- Simple Receivers, Transmitters, Antennas & Peripherals
- Projects for HF, VHF and UHF

The Electronics and Radio Cookbook is a unique collection of electronics projects, ideal for all electronics enthusiasts and experimenters. The simple step-by step instructions also make this book ideal for DIY enthusiasts and radio amateurs seeking to build up their electronics skills and knowledge.

The circuits themselves provide a wealth of quick, rewarding construction projects ranging from radio receivers and amplifiers to test equipment, a moisture meter, a desk microphone, a water level alarm, and Christmas tree LEDs.

ONLY £14.44 + p&p (£16.99 non-members)



Power Supply Cookbook

2nd edition - By Marty Brown

The Power Supply Cookbook, Second Edition provides an easy-to-follow, step-by-step design framework for a wide variety of power supplies. With this book, anyone with a basic knowledge of electronics can create a very complicated power supply design in less than one day.

With the common industry design approaches presented in each section, this unique book allows the reader to design linear, switching, and quasi-resonant switching power supplies in an organized fashion.

Formerly complicated design topics such as magnetics, feedback loop compensation design, and EMI/RFI control are all described in simple language and design steps. This book also details easy-to-modify design examples that provide the reader with a design template useful for creating a variety of power supplies.

ONLY £21.24 + p&p - £24.99 (non-members)

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

A project for newcomers to the PIC micro-controller, by Ed Chicken, MBE, G3BIK *

This article - a hands-on introduction to using a PIC - guides the subject beginner through the apparent minefield surrounding its programming and use. Introductory programs are given, but many more can be found on the 'RadCom Plus' area of the RSGB members-only website.

FEAR NOT the PICs any more. They are with us to be used and enjoyed as much as the familiar 555 and 741 ICs. And be assured, this article does not seek to teach you about programming, neither does it expect you to be knowledgeable on that subject already. Quite the contrary, it offers hours of fun and interest at very modest cost, using a few simple PIC-based projects where the programming has already been done for you. The programs are loosely related or applicable to amateur radio and DIY electronics. All that is required of you is access to a computer with Windows 95 or higher, and about £20 - £30 to play with.

The PC need not be an up-market model, but it must have an accessible serial port. Internet access and a printer would be useful, but are not essential. Assembly work has been kept to an absolute minimum, needing only a small screwdriver and maybe a few soldered wire joints. The PIC involved comes already installed on a small PCB, is battery powered, and ready to be put into action.

ABOUT PICS IN GENERAL

BUT WHAT HAVE PICs to do with amateur radio or electronics, you might ask? Well, radio and electronics are today a marriage in heaven. Some radios are even controlled direct from and by a PC without a tuning knob in sight, and where you have electronic control, PICs are almost sure to be involved.

PICs cannot be avoided or ignored these days, because they are used in just about every aspect of electronics application from radio communications to control of domestic equipment.

PIC stands for Peripheral Interface Controller, but I prefer to look upon it as meaning Programmable Integrated Circuit, because a PIC is just that. The type of PIC used for this project has what is known as 'flash' memory, can be re-programmed over and over again, even while still in the printed circuit board, using only the computer and your fingers on the keyboard. It really is as simple as that!

All very well you say, but will those such as I actually be able to program a PIC and to make it do something for me? Have faith, of course you can, because the mini-project described here requires no knowledge of PIC programming, and could be carried out without so much as a soldering iron! No kidding, once you've acquired the few electronic items needed and made a few connections with your screwdriver, things can be made to happen simply by copy-typing the programs into your PC. The computer then automatically programs the PIC for you, and things begin to happen!

ABOUT THIS PARTICULAR PIC

THE ARTICLE IS BASED on the use of the commercially-available Picaxe28 starter-pack with a PIC on a printed circuit board. This is a readily available registered trade-name low-cost educational item, such as is being used in many UK schools and colleges as an introduction to micro-controller technology. It is self-contained, ready to go, and comprises a 50mm (2inch) square PCB on which there is a well-known type of PIC plus all components needed for it to function. The circuit is battery-powered by four AA dry-cells (not supplied), and comes complete with battery-housing, connecting cables for linking to the computer and to the PIC's input and output pins, plus a CD with comprehensive user-literature and easy-to-use PIC-programming software for the PC. All for less than £20 delivered, at the time of writing.

ABOUT THE PIC PROJECTS

USING A PIEZO-sounder, the simplest program lets you sound the CQ signal to get you started, then to more adventurous messages such as "73 de G3BIK" (or your own callsign), or to any other CW message of your own choosing. You do not need to know the Morse code, because I have listed here the entire code in a way that lets you output Morse messages simply by typing in the given numerals! What's more, you are shown how to modify the sending speed very easily should you so wish. But it's not all about sending Morse code, because I have included one well-known Puddy-Tat tune together with enough information to help set up your own tunes!

As an optional extra, at a modest increase in cost, you are shown how to produce text-messages for display on a Liquid Crystal Display unit.

Then, if that's not enough, the user literature supplied with the starter pack shows you how to drive things such as relays, motors, radio-control actuators and 7-segment displays, even to the point of using light-dependent resistors and infra-red beams.

Remember, the programming has all been done for you, and there is no mechanical construction involved. Apart from the PIC module which you have to buy, and a few odds and ends such as a piezo-sounder and terminal strip which you may already have, all you need initially is a small screwdriver and perhaps a soldering iron. But even then, the

* *Ivy Thorn Cottage, Hepscott, Morpeth, Northumberland NE61 6LQ. E-mail:chick@chickene.freeserve.co.uk*

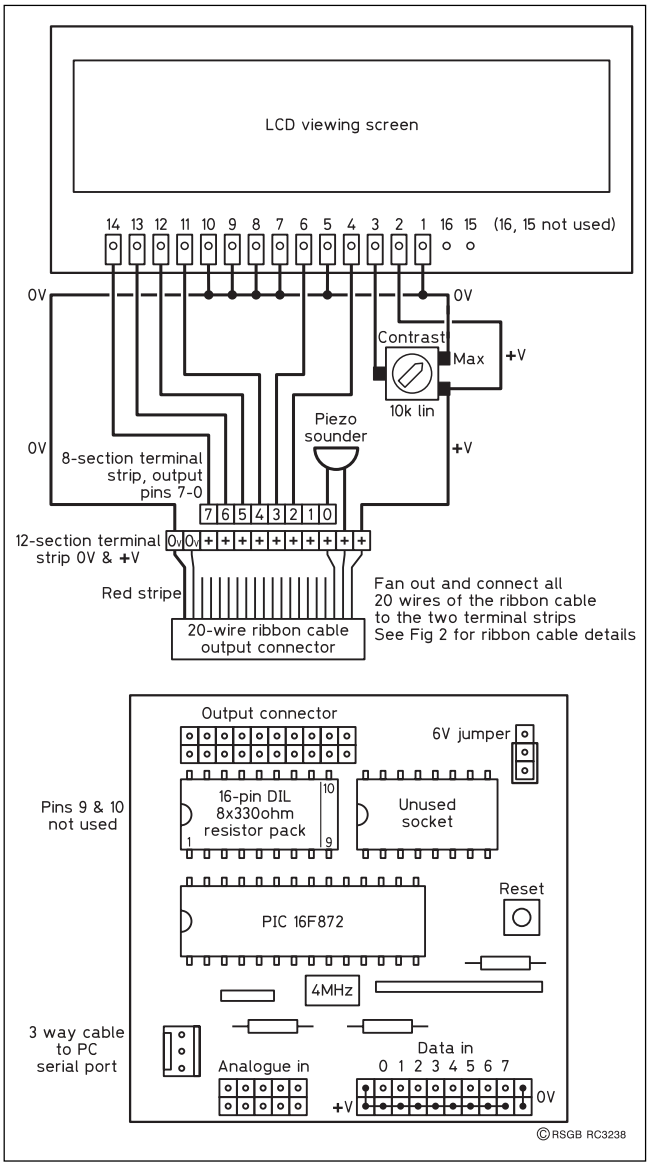


Fig 1: The Picaxe28 as used for Morse, music and text. If you are using Morse and music without an LCD module, connect only the piezo-sounder to the terminal strips. Even when wired as shown for LCD text with sound, the Morse and music programs can be run independently without the display. The Picaxe28 PCB is illustrated superficially only, and is not to scale. It measures approx 50 x 50mm.

soldering iron is only needed for a few wire connections. You do, of course, need access to a personal computer as described above.

PREPARING THE PICAXE28 FOR USE

FIG 1 ILLUSTRATES the Picaxe28 PCB, at the heart of which is the 16F872 PIC in its 28-pin DIL socket. This PIC has four analogue input pins, eight digital data input pins, and eight digital output pins. For this article, only the output pins will be used, but the user literature shows you how to use the others, should you so wish. Also shown are the connections to the LCD display module. The program for driving this can be found on the RSGB members-only website.

PIC TO COMPUTER

The PCB connects to a serial port on the PC using the supplied three-wire cable, and it is via this cable that the PIC can be programmed with what you have copy-typed on the PC keyboard. At one end of this cable is a small connector which plugs onto the PCB. At the PC end is a standard nine-way serial connector. Note that if the only accessible serial port on your PC is 25-way, the supplied connector could easily be converted from nine-way to 25-way by using an adaptor. These can be bought quite cheaply from computer stores.

OUTPUT PINS

The eight output pins of the PIC itself are each capable of supplying a few milliamps of current sufficient to power, for example, an LED or a sounder. But to actuate or drive any external device which requires more than this, the PCB includes an additional Darlington-driver IC of type ULN2803A for that purpose. For this article, however, the 18-pin Darlington-driver IC is removed and replaced by a 16-pin 8x330Ω DIL resistor pack. Be sure to match pin 1 of the DIL resistor pack with pin 1 of the vacated socket, leaving pins 9 and 10 unused.

Access to the output pins of the PIC is then made via a multi-pin fixed-plug on the PCB, using either one of the two (supplied) open-ended 20-way flat-ribbon connector cables. These two cables are identical. For cable details, refer to **Fig 2**.

For simplicity of connection to the open-ended wires of the ribbon-cable, two strips of electrical screw-type 2A terminal blocks are used. An eight-way strip is used for the output pins 0-7, and a 12-way strip for the 0V and +V connections. The two terminal strips on the cable can be fastened back-to-back with elastic bands. For connecting details of terminal strip to ribbon cable, see Fig 2.

To attach the terminal strips to the cable, the open end of the ribbon-cable must be fanned out to free about 75mm (3inches) of the wire-leads, which must then be stripped back to expose a few millimetres of the inner-wire conductors. Each conductor wire is then secured into one section of the terminal strips as shown in Fig 2.

An identity label should be made, showing pin numbers and +V and 0V. The label should be fixed to the cable at the terminal strips. Suitable self-adhesive labels can be found spare in most video-tape boxes!

PIEZO-SOUNDER

The piezo-sounder on the output ribbon cable connects between the pin 0 screw-terminal and a +V terminal.

RESET BUTTON

On the Picaxe28 PCB, the square 'Reset' push-button switch resets the PIC back to the start line of its last stored program. This applies even if the battery has been disconnected and reconnected.

PROGRAMMING THE PIC

THE PROGRAMS have already been written for you. They do, however, need to be transferred to the PIC , but that is done by the computer with a little help from your fingertips, using the Programming Editor software supplied with the Picaxe28. But first, a one-paragraph explanation about the programming of a PIC. This will be quite painless and it is only for information, not for actual use.

Before a PIC can do anything, it must be programmed. The PIC on the Picaxe28 board has been pre-arranged such that it can be programmed *in situ* on the PCB , using only the

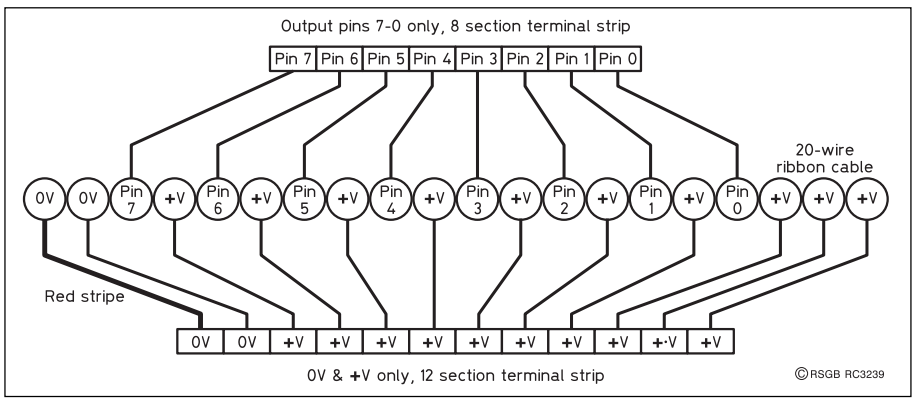


Fig 2: Terminal-strip connections to the output ribbon cable.

computer and its keyboard. A form of the well-known BASIC programming language is used. This is in plain language text, numbers and keyboard symbols, which are used to make up commands. These are individual instructions to the PIC telling it what to do and when. The commands are then listed and acted upon in sequence by the PIC, from the start to finish of what is called a program. The program is given a name (eg Morse:). This master program can call up sub-programs, each of which is also given its own name (eg dots:). The Picaxe28 recognises only 39 different commands for programming its PIC but, even so, just a few of them are used here. So endeth the lesson.

It must be said, however, that it is almost standard practice when publishing programs to add a comment alongside each command-line of the program, which briefly describes the purpose of that command. This has deliberately been avoided here, because such comments do not form part of the program. Remember, you do not need to know any of the commands for these PIC programs, but they are fully explained in the user literature, should you wish to examine them further.

It is now time to load into your computer the supplied Programming Editor software, then you can begin copy-typing the programs one at a time, being careful with the spacings, spellings, and symbols. But don't worry, because if you have a typing error it will be highlighted when you try to download (transfer) a program from PC to PIC, and will await your remedial attention.

Save each program into the PC as you proceed, and give it a name of your choice eg CQ.bas

The programs consist only of those text lines within the boxes. Each must be copy-typed, from left to right, line by line, top to bottom.

After having copy-typed a program into the computer, it must then be downloaded into the PIC so that it can begin to perform its task. To do the download, simply press the F5 keyon the keyboard.

If the program download was successful, a screen message will say OK, and the PIC will go through its paces immediately. If not, it will highlight the problem line or lines on the screen for your attention. A press of the Reset button on the PCB makes the PIC re-run the last installed program.

You could then, if you so wished, disconnect the Picaxe28 from the PC and carry it off elsewhere to demonstrate its party tricks to the family! The very act of reconnecting the battery starts it off, as will pressing the Reset button. Yes, the program is now stored in memory within the PIC, and there it will remain until eventually reprogrammed, even with the battery unconnected.

Once you have mastered these programs, have a serious browse of the user literature, all well-endowed with yet more easy programs to copy-type and enjoy. You will soon realise that you have only just scratched the surface of what is still there awaiting your pleasure. ♦

RSGB members-only website **www.rsgb.org/membersonly/**

COMPONENTS LIST

giving the quantity, type and supplier

1	Picaxe28 Starter Pack	1
4	2A 12-way electrical screw-terminal strip	1, 2 ,3
1	Piezo sounder, wire ended	1, 2, 3
1	16-pin 8 x 330Ω DIL resistor array	1, 2
1	(optional) LCD 16 x 2 module without back-light PC1602F-B	1, 2
1	(optional) preset resistor 10kΩ linear carbon	1, 2, 3
2	metres (optional) hook-up wire	
4	AA dry cells	

SUPPLIERS

1 Revolution Education Ltd, Enfield, Middlesex. Tel: 020 8350 1315. **www.rev-ed.co.uk**
2 ESR Electronic Components, Cullercoats, Tyne & Wear. Tel: 0191 251 4363. **www.esr.co.uk**
3 Your local electronics supplier.

PROGRAM 1 - SOUND 'CQ' IN MORSE

CAUSES PIN 0 TO OUTPUT sound which repeatedly bleeps CQ in Morse code. A piezo-sounder is connected between terminal 0 and +V. Copy-type the program to the PC, left to right, line by line , top to bottom. Then press the F5 key to download the program into the PIC, and to start its run. To re-run , press the Reset button on the PCB.

```
CQmorse:
let b1=100              wait 1              sound b0,(b1,30)          pause 100
sound b0,(b1,10)        pause 100           sound b0,(b1,30)          pause 100
sound b0,(b1,10)        pause 300           sound b0,(b1,30)          pause 100
sound b0,(b1,30)        pause 100           sound b0,(b1,10)          pause 100
sound b0,(b1,30)        pause 300           goto CQmorse
```

To change the Morse speed, faster or slower:
First change each 10 (the dit value in tens of milliseconds) to 5 for faster or 15 for slower.

Then change each 100 to your *new* dit value x 10, eg 50 or 150.
Then change each 30 to your *new* dit value x 3, eg 15 or 45.

Then change each 300, to your *new* dit value x 30, eg 150 or 450.
Then press F5 to reload the revised program into the PIC.

PROGRAM 2 - SOUND '73 DE G3BIK' IN MORSE

FURTHER DEMONSTRATES the use of the PIC as a tone generator by causing pin 0 to output sound in Morse code. A piezo-sounder is connected between the output terminal 0 and +V. Copy-type the program to the PC, from left to right, line by line, top to bottom. Then press the F5 key to download the program into the PIC, and to start its run. To re-run, press the Reset button on the PCB. You might even be persuaded to try amending the on-screen program to send your own call-sign, or perhaps 'CQ' instead of '73'?

```
morse:
let b1 = 100            wait 1              gosub dashes2       gosub dots3
pause 300               gosub dots3         gosub dashes2       pause 600
gosub dash1             gosub dots2         pause 300           gosub dot1
pause 600               gosub dashes2       gosub dot1          pause 300
gosub dots3             gosub dashes2       pause 300           gosub letterB
pause 300               gosub dots2         pause 300           gosub letterK
end
dot1:
sound 0, (b1,10)        pause 100           return
dots2:
for b0 = 1 to 2         sound 0, (b1,10)    pause 100           next b0
return
dots3:
for b0 = 1 to 3         sound 0, (b1,10)    pause 100           next b0
return
dash1:
sound 0, (b1,30)        pause 100           return
dashes2:
for b0 = 1 to 2         sound 0, (b1,30)    pause 100           next b0
return
dashes3:
for b0 = 1 to 3         sound 0, (b1,30)    pause 100           next b0
return
letterB:
sound 0, (b1,30)        pause 100           sound 0, (b1,10)    pause 100
sound 0, (b1,10)        pause 100           sound 0, (b1,10)    pause 100
return
letterK:
sound 0, (b1,30)        pause 100           sound 0, (b1,10)    pause 100
sound 0, (b1,30)        return
```

EPSOM RALLY

RADIO & ELECTRONICS FAIR

JOHN SURTEES
will be talking to visitors about his racing years together with some of his motorcycle collection

.... do you remember the days when a

RADIO RALLY was **FULL** of **RADIO?**

***FUNNILY ENOUGH* - SO DO WE!**

Not only will you find major players like Yaesu, Icom & Kenwood, but premier dealers and all the small stands that make your visit worthwhile. The new **EPSOM RALLY radio & electronics fair** *is supported by the* ***RSGB*** *and will be the new benchmark for rallies in the South of England.*

- *Bring & Buy Stand*
- *Radio Car Boot (pre-book only)*
- *Technical groups include* **Repeater Management, ATV & Letcher Line Demos** *etc*
- **Famous YAESU RAFFLE** *to be held during the show*
- *FREE admission for students & children*

Lots to do and see including music by **KEN MACINTOSH & his BAND**

After all that hard work reward yourself with a light meal or snack in either the seated café/bar (upstairs) or in the snack bar (on the ground floor). We don't mind if you have 40 winks!

The show has been organised by **RADIO FAIRS** who are totally committed to offering UK & Overseas radio amateurs the very best in Ham Radio Rallies.

BRING and BUY

for more details see:
www.hamradio.co.uk
or www.epsomrally.co.uk

SUNDAY 16 JUNE 2002

ML&S martin lynch & sons
Suppliers of Communications Equipment

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

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

Epsom Radio and 16 June - A New Event

UP GOES THE CRY: "Oh no, not another rally!" - but this one may just prove to be something very different. The organisers, headed by Paul Berkeley, M0CJX, are five licensed amateurs who believe in the hobby and in its development. Their goal is to stage an event that will have a broad appeal both to amateurs and to non-amateurs who may be drawn into the hobby.

Their aims are:

- To provide an event to replace Sandown on a long-term basis,
- To further the art and to provide a day of fun for the attendees,
- To encourage non-radio amateurs to attend the rally, especially the younger generation,
- To promote Morse testing by way of free entry to the rally.

ENTRANCE & PARKING

The entrance fee is £3 (*free* for students and children). One major objective is to keep queuing times to a minimum, and visitors can pre-pay for tickets at outside booths before entering the hall. The booths will be open from 9.00am. The doors will be open from 10.00am to 5.00pm. Disabled visitors will be allowed access at 9.45am.

The organisers are giving away up to 1000 tickets to schools, colleges and youth groups to encourage new people to come into the hobby. So, bring along your kids and get them hooked into the world's greatest hobby. As part of the schools programme, the organisers have undertaken to advertise the hobby and the event by way of a mail-drop to many schools in the south-east. The pack will include RSGB leaflets, the event synopsis and free tickets. The demonstrations on the day will dovetail into this activity.

Public parking is free of charge with enough space for at least 1000 cars in the immediate area. A special area will be reserved for the disabled. Talk-in (callsign GB2ERT) on 2m will be managed by the Coulsdon ATS.

Signposting will be prominent throughout the Epsom area. Brown traffic signposts will direct clients to the grandstand. Those calling the talk-in station will be asked to follow the "Epsom Downs Racecourse" signs. Banners will be posted outside the racecourse compound.

MORSE TESTING

Morse testing will be carried out by George Eddowes, G3NOH, and his team, who will be conducting both 5WPM tests and Foundation Morse Assessments. The former cost £15 and candidates will need to bring two photographs, while the latter cost £5 and candidates should bring their B licence Validation Document (no photo is required). The testing facility will be set up in one of the private rooms. *Anyone taking the Morse test (pass or fail) will get a refund of his or her rally entry fee on production of his or her Morse test receipt.*

SPECIAL ATTRACTIONS

ILink Demonstration

Terry, G4CDY, will be demonstrating how anybody with a normal 2m transceiver can access a local Ilink gateway and talk to stations all over the world. This will be done live, via his link on 145.2875MHz sited in Purley. The Ilink system will also be shown working through a computer connected directly to the Internet. Information about other Internet linking protocols such as eQSO and IRLP will be on display. It is hoped to have informal discussions about peoples' experience of Internet linking and future suggestions of system enhancements.

Lecher Line Demonstration

Maurice, G4DDY, and the Surrey Radio Contact Club will demonstrate and display various methods of measurement of radio frequencies over the ages. This will include a Lecher line, BC221, cavity etc.

Special Event Station GB2ERF

A special events station will be set up and run by Wimbledon ARC on the HF Bands, the purpose of which is to allow *new amateurs* and *unlicensed members of the public* to hold supervised QSOs in the hope of strengthening interest in the hobby. Qualified staff will be on hand to encourage participants. The callsign will be GB2ERF and the station will be active in the 80, 40 and 20m bands.

Ken Mackintosh

World famous jazz musician Ken Mackintosh will be along with his band. As well as being a true professional, he is also an enthusiastic 'amateur', with the callsign M0COR, and is a member of the Mitcham & District ARS. The internationally-known saxophonist and bandleader formed his own orchestra as early as 1948 and ever since has been bringing pleasure to people with his distinctive sound. Nowadays he does the occasional appearance for special events such as this. Ken and his band will be playing near the restaurant area periodically throughout the day. Be sure to not to miss them.

WAB

The Worked All Britain (WAB) group will be holding its AGM in one of the private rooms from 12.00 noon onwards. More details can be obtained on the day from the WAB stand.

Electronics Fair for the South East

THE VENUE

The Epsom Radio and Electronics Fair will be held in Epsom Downs Racecourse Grandstand on 16 June from 10.00am until 5.00pm. It will be a one-day event and will consist of private and trade stalls with added attractions throughout the day. Epsom Downs is an excellent venue, as it is easy to get to from any direction. Dr Robert Whelan, President of the RSGB, will open this event. There are also over 60 meeting rooms for hire, all of which are very well appointed.

REFRESHMENTS

There is a seated café / bar upstairs where refreshments and light meals will be available (see above). Downstairs there is also a snack bar.

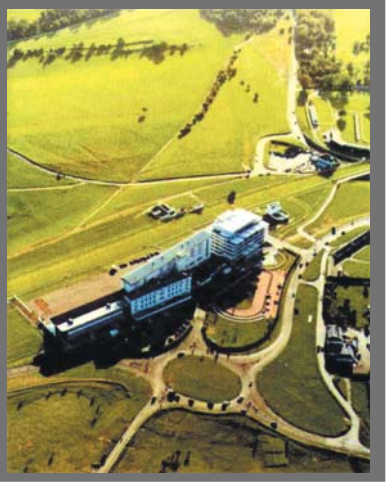
THE ORGANISERS

The rally is being organised by Radio Fairs. The committee is: Paul Berkeley, M0CJX (chairman and publicity), tel: 01737 279108; e-mail: m0cjx@lineone.net; Jon Weller, G0GNA (schools and education); Brian Cannon G8DIU (traders and OEMs); Martin Charman, G4FKK (stations and website); Andrew Maish, G4ADM (finance).

TRADE STALLS AND BRING & BUY

The grandstand offers enough room for 300 tables. Many of the larger retailers and manufacturers are in attendance including the RSGB, Martin Lynch & Sons, Icom, Yaesu, Kenwood, the RA etc. There is wide representation across the industry, including radio, electronics and computer firms. Some outdoor pitches will also be available: to obtain a booking form visit the website at www.epsomrally.co.uk Tables are available for charity organisations on the day and these are *free of charge*. The Fair is being supported by many radio clubs who have taken tables and have also pledged their support by helping on the day. At the rear of the grandstand is hard-standing for the car boot sale with enough space for up to 40 cars or light vans (all pitches must be pre-booked).

The bring and buy sale where individuals can sell their own items on the day is always very popular. This will be organised by the Echelford Radio Society with other radio clubs in support. It will be situated in the central area of the trading floor.



Chairman's statement:

"I hope we have done enough to provide the sort of event that has a broad appeal. Judging by the support we have received from traders, the RSGB and the public in general so far, it looks as if the event will be repeated next year. If it is successful, we will add to the entertainment programme and strengthen the education ethos next year. Our aim is simple: we want to make the difference and have fun. I would like to thank my committee and the other people for their hard work and dedication throughout."

Paul Berkeley, M0CJX.

For further information and bookings, tel: 01737 279108; e-mail: m0cjx@lineone.net or see the website at www.epsomrally.co.uk

PRODUCT NEWS

COME ALONG to the Epsom Radio and Electronics Fair to view the latest products from **Icom, Yaesu** and **Kenwood,** new **RSGB Books** (advertised throughout this issue of *RadCom*) and the latest offerings from dealers such as **Martin Lynch & Sons.**

Martin will be showing the huge range of **Maldol** HF, VHF and UHF mobile and base station antennas. This includes separate monoband HF mobile 'whips' for all bands from 80 to 10 metres, dual-band 2m / 70cm whips, a triple-band 6m / 2m / 70cm antenna (shown right), plus plus gutter mounts, magnetic mounts and every accessory you can imagine.

Also at Epsom will be **Vargarda Antennas.** Made in Vårgårda in Sweden, there are models for 10, 6, 2m and 70cm. All feature rugged construction, eg the 50MHz 5-ele Yagi has no joints in the boom or elements, and the driven element is of welded construction. All the antennas have cable baluns.

Thanks to the strong pound, Vargarda Antennas are very reasonably priced, ranging from just over £30 to £133 (plus P&P) for the big 50MHz 5-ele. If you can't get along to Epsom, give Richard Bown a call on 01952 502550 for further details.

A big array of Vargarda Antennas at G8JVM.

QUEEN ELIZABETH GOLDEN JUBILEE QSL CARDS

The RSGB has produced these special commemorative cards to celebrate the Queen's Golden Jubilee. The cards have been luxuriously finished with special colour inks to create an exceptional and memorable card.

The design enables them to be overprinted on your own inkjet printer with your callsign.These cards can also be used in conjunction with the special GQ (MQ, 2Q) callsigns allowed in June to celebrate this Golden Jubilee.

Special price for members ONLY £9.99 for 400 cards

(Overprinting with your own callsign can also be arranged for only £25.99 extra)

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

Vine Antenna Products

The Vine, Llandrinio, Powys SY22 6SH. Tel: 01691 831111 Fax: 01691 831386 Email : info@vinecom.co.uk - Web Page: www.vinecom.co.uk. - Callers welcome by appointment please.

And now for something completely different. No, maybe *different* is the wrong word. Stand by for something that is *revolutionary* . . . . .

Here it is - a dipole, or 2 or 3 element yagi that can be tuned remotely from the shack for any frequency between 14 and 54 MHz (yes ANY frequency, with no gaps). This antenna has stepper motors on the boom which vary the length of copper tape tracks inside the fibreglass element housings. If you like, you can maximise the yagi for gain, or alternatively maximise it for front-to-back ratio, from the shack using the desk-top controller. The antenna length may also be adjusted by an optional transceiver interface which changes the elements as you change the frequency or band. No more setting the antenna for "Broadband" or "Phone" settings. Optimise it where you want it to be! Of course this is a dream for BC SWL's too. If you want a yagi to listen to Radio Costa Rica's broadcast on 15039 kHz, just implement it in a few seconds without even leaving the shack. Other user benefits include 3 second beam reversal, and bidirectional mode. Contact us for more details of the SteppIR antenna range.

Vine now stocks OPTIBEAM from Germany

We are delighted to be appointed UK dealer for this excellent range of trapless optimised multi-band yagis from Germany. There are models from just 4 elements, up to a big 16 element yagi on a 33ft boom. Mechanical construction is particularly excellent. All fittings are stainless steel, and mechanical details have been implemented in the most thorough way. Prices start at just £315. Contact us for more details for the *Mercedes-Benz* of multi-element HF antennas

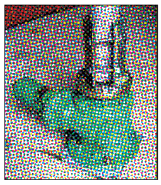
ACOM 1000 *HF+6m* Amplifier

- Up to 1kW output
- 160-6m inc WARC
- Matches up to 3:1 SWR loads
- Easy-Tune aid
- Fully protected
- LCD Display inc PEP metering
- Mil-spec quality

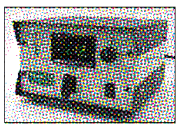
This amplifier, and the automatic 2000A, were described by Peter Hart in March 2001 RadCom as "**highly recommended**", and "**beautifully constructed and engineered**". ACOM 1000 is £1,595, ACOM 2000A £3,995.

STOP PRESS - ACOM 1006 (6m-up to 1000W o/p) - SPECIAL PRICE - £1,195

Rotators & Filters



PST rotators have a worm-wheel which drives the final gear directly, unlike other worm-drive units that drive planetary gears. This gives a **non-reversible brake, and enormous torque.** All gears are in ball or roller bearings in an oil-bath. No other amateur rotators come near this quality of engineering. Control units are all digital-readout and have preset control. Priced from £399 (medium duty HF) to £1095 (EME + 80m yagis!) there is a model for everyone. PST 2051 and the preset controller - £529 - are pictured here.....



PST have recently introduced a range of **elevation rotators** for 90 and 180 degrees travel, as well as a control unit with direct RS-232C output for computer control, and a speech synthesiser for operators with a visual impairment. It is the only **talking rotator** in the world!

I.F. Filters from International Radio make a good radio really superb!. Models are available for nearly all transeivers. Still available - kits to improve the **FT1000MP (and FT1000MP MkV).** For **just £54.95.**

FORCE 12 SALE!

C-19XR TRAPLESS TRIBANDER. Full-size, trapless elements for no-compromise, instant cracking of pile-ups. 3el on 20m and 15m, 5el on 10m. 19ft boom. Rugged construction combined with low wind-resistance makes this a winner. **Normally £979, was £879 - C-19XR is only £779** while stock last.

New - HF mini-beams

Now in production. The Vine **MX-10** minibeam for 10 metres is ready to go. Other bands will follow. The MX-10 has max ele length of just 14 feet and a turning radius of only 8 feet. This isn't a coil loaded compromise, but has good gain, front-to-back ratio, and 700 kHz bandwidth @ less than 1.5:1 VSWR. We put up a dipole at the same height. The MX-10 was at least 2 s-units (10dB) louder in the beamed direction. What's more, the dipole was stronger than the MX-10 when we offered the DX station the back of the beam. That's how it should be. At only £89, it's going to be a winner!

Also from Vine

Tennadyne HF log-yagis * Cubex HF/VHF/UHF Quads * TE Systems VHF/UHF amplifiers * GAP Vertical Antennas * M² VHF/UHF antennas * Eagle 6/4/2m antennas + lots more . . . . . check out www.vinecom.co.uk now!

Technical Topics

PAT HAWKER, G3VA
37 Dovercourt Road, London SE22 8SS

THE ROLE OF HOME CONSTRUCTION

FOR MANY YEARS, the percentage of home construction within the hobby has been falling and, for many amateurs, is now approaching zero. While in some ways regrettable, it seems an inevitable consequence of modern technology. As noted several decades ago, there have always been only two really compelling reasons – at least as far as the majority of us are concerned – for building rather than buying. The first is when one cannot buy exactly what one wants (and for many years this covered practically the whole gamut of HF and VHF equipment). The second is when one believes that it is possible to build the item more cheaply than the market price, to such an extent that this outweighs the nagging fear that one may never get it to work as well as a factory unit of comparable specification. A possible third is the enormous personal satisfaction to be gained from 'rolling your own', whether or not the resulting equipment is of equivalent performance to a factory-built unit.

While it is true that in some respects it is much easier to build equipment based on ICs and other solid-state devices, the trend towards ever-more-complex circuitry - integration of separate receivers, transmitters into transceivers, frequency synthesis, digital signal processing, automatic tuning units etc, means that the days when a reasonably effective station could be home-built in a matter of weeks have largely disappeared, except for simple QRP rigs. Today, a major project, especially if to one's own design, can take months or even years.

It was much simpler to build station equipment when this comprised a number of separate units - receivers, transmitters and auxiliary units. However, as Ray Moore, ex-K1DBR, suggested in the 1970s, "The individual [non-professional] amateur can no more hope to beat the professional designer at his own game than he could hope to build a better and cheaper family sedan in his backyard… nevertheless, the catch is that the professional's game is *not* to design the ultimate performance set, but to design a mass-market, multi-band, multi-mode, decorator-styled transceiver that can sell at a popular price."

Since then, factory designers have aimed at ever-more complex designs with more and more facilities - often primarily sales gimmicks but, at least to some extent, with overall improved performance. Yet, as Colin Horrabin, G3SBI, Dave Roberts, G8KBB, and George Fare, G3OGQ, show with their new 'CDG2000' design (starting in this issue), it is still possible for amateurs with professional expertise to come up with a reproducible design capable of out-performing virtually any factory-built HF transceiver aimed at the amateur radio market. The drawback remains that, as the designers accept, this is a project intended only for the experienced constructor. The advantage is that it is a modular system designed so that, as even-newer techniques become available (and affordable), they can be readily incorporated into the transceiver, enhancing performance or improving operability.

It would be nice, but almost certainly wrong, to believe that this series of articles will encourage as many amateurs to take up the challenge of construction as did, for example, the G2DAF [valve] receiver of the early 1960s which was attempted, mostly successfully, by some 500 – 1000 constructors. Many of the sets remained in operation for years - possibly a few are still in use some 40 years later. Most, however, must have been replaced by the ubiquitous, solid-state or hybrid transceivers on the grounds of operator convenience. Ted Edwards, G8HLJ (43 Hoose Court, Market Street, Hoylake, Wirral CH42 5AB), has virtually completed the construction of a G2DAF Mk2 receiver, but lacks the 453.5 and 456.5kHz sideband crystals. New crystals would be extremely costly – surely some member has some suitable spare crystals?

The publication of the CDG2000 series of articles should appeal not only to experienced constructors. What it can do, even for newcomers, is to provide an insight into modern design in a depth unlikely to be equalled by reading through the operating manuals of factory designs - or even the space-limited 'TT'! The dearth of home construction should not imply that amateurs need no longer be interested in the design aspects of the equipment they use. We should all endeavour to keep abreast of what is happening in radio communications technology, even if we now rarely build or modify our own equipment.

In this connection, I like to think that 'TT' still provides a useful forum for introducing new ideas and new technologies, as well as reminding readers of past practices. As David Mackenzie, GM4HJQ, has been kind enough to put it: "One of the beauties of 'TT' is how it sparks off the exchange of information." Hopefully, at least some readers find that 'TT' makes them think afresh, and then delve more deeply into the why and wherefore.

GM4HJQ has, for example, recently drawn my attention to an entirely new approach towards integrating a complete hand-held military (SINCGARS) transceiver on a single chip by utilising large numbers of tiny VHF micro-metal resonators/filters. These micro-electro-mechanical systems (MEMS) overcome the classic frequency limitation (about 500kHz) of established mechanical filters. They make possible the incorporation of many front-end, single-channel signal-frequency filters and stable, low-noise oscillators with resonant MEMS inductors having a Q of 10,000 or so. More information will be given in a future 'TT' on this significant development that is resulting in an integrated MEMS-BiCMOS transceiver based on Very Large Scale Mechanical Integration merging 46,413 transistors with 9286 micro-mechanical devices using an embedded micro-machining technique.

That the building or modification of modern high-performance equipment is still possible, if only by a small minority of amateurs, is again evidenced by interesting reports received recently from Dick Rollema,

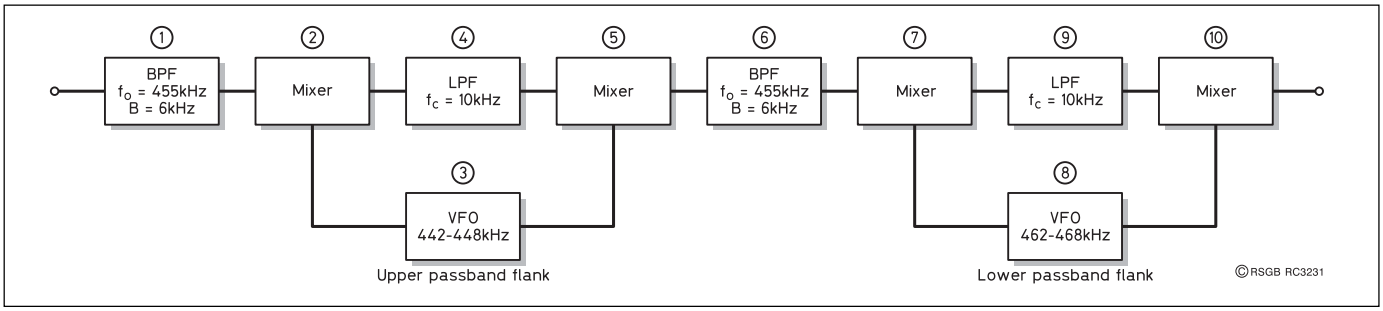


Fig 1: Block schematic of PA0SE's 'sliding-doors' continuously-variable IF selectivity filter providing an excellent shape factor down to -80dB as a symmetrical or USB or LSB filter based on the 1960s filter fitted in the Rohde & Schwarz EK07-80 receiver noted in 'TT', December 1969. Further details of PA0SE's filter, including the LPF filters, etc, will be included in a forthcoming 'TT'.

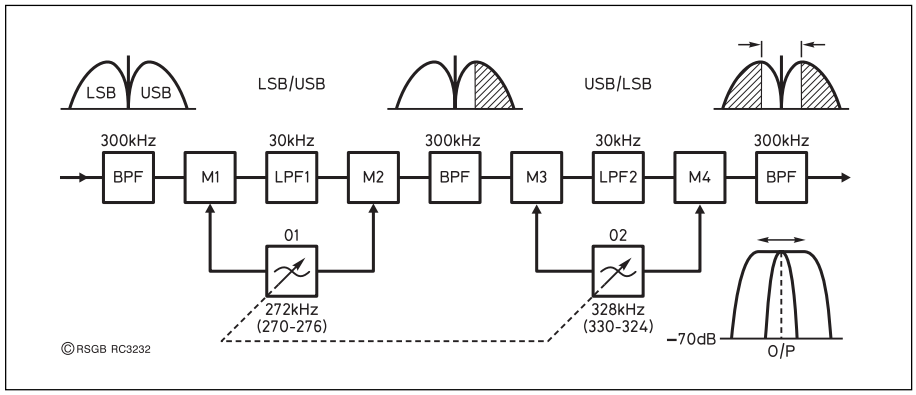


Fig2: Basic principles of the 1969 Rohde & Schwarz EK07-80 filter which used two 30kHz low-pass filters in conjunction with ganged oscillators tuning in opposite directions to provide symmetrical bandpass filters variable from about ±150Hz to about ±6kHz with similar slope at all settings down to –70dB and described by *EBU Review* as coming extraordinarily close to the "ideal receiver" with square-wave [brick-wall] characteristics. While the use of multiple mixers could give rise to linearity problems, such a filter overcomes the drawbacks still experienced with DSP filters.

PA0SE, and from Nyall Davies, G8IBR.

PA0SE has implemented in his new HF transceiver, still under construction, a 'sliding doors' variable-selectivity IF filter (**Fig 1).** This uses two high-slope 10kHz low-pass filters, in a modified form of the multi-mixer system originally developed by Rohde & Schwarz for their EK07-80 receiver as described in 'TT' back in December, 1969 (more briefly in 'TT' June 1991): **Fig 2.** The PA0SE filter, unlike the R/S original, can be adjusted to provide a LSB, USB or symmetrical response, each of continuously-variable bandwidth without degrading the shape factor even at the narrow CW settings. To the best of my knowledge this is the first time such a high-performance, continuously-variable IF filter has been designed into an amateur HF transceiver.

G8IBR has completed a high-performance HF receiver utilising a frequency-synthesiser based on the 'Pic 'n' Mix' concept of Peter Rhodes, G3XJP (*RadCom* January - May, 1999), with a specification including: noise figure 10dB; IP3 >20dBm; image rejection 80dB; reciprocal mixing better than 100dB at 10kHz. The stability is governed by a crystal-controlled oscillator.

Again, I hope to return to both these projects when space permits.

JUNK BOX 'SPECTRUM ANALYSER'

DESMOND H VANCE, GI3XZM, has for many years used a simple, improvised piece of test gear that he finds indispensable. He jokingly refers to this as his "junk box spectrum analyser", although it utilises a multimeter rather than a CRO display and is not frequency-selective. He writes: "The function of this device is to give a rough indication of the purity of the output of any oscillator or single-ended RF power amplifier while monitoring the output level. Such circuits sometimes have an asymmetrical output with one voltage peak higher than the other. Not always, but sometimes, this is important. When we try to measure an asymmetrical RF waveform using a single diode probe (as often the case), we obtain a value for either the positive or the negative peak, depending on the polarity of the diode.

"There are several consequences.

- The reading will be inaccurate, perhaps grossly.
- If the reading is not what we expected, we may waste time trying to adjust or alter the circuit to achieve a 'correct' reading, unaware that we have chosen one of two inaccurate readings.
- A spectrum analyser would show the signal to have harmonic content (principally second harmonic), possibly to a significant degree.

"The fairly common voltage-doubler probe (peak-to-peak reading) gives a better indication of the fundamental output, but it does not provide warning of harmonic content. A probe that measures the positive and negative peaks *separately* yields more useful information:

- by adding the two readings we have the peak-to-peak output, a reasonable indication of the (required) fundamental;
- if the readings agree (single-ended circuits, remember) we are likely to have a fairly clean sine wave; if not, we have been warned;
- comparison of the sum and difference readings of the two peaks can be used to give a rough estimate of second harmonic content, as shown in **Fig 3**.

"No exhaustive tests have ever been made on this simple device, although I have been guided by it for about 20 years! Initially, I built an oscillator (about 5MHz) with two outputs, one partially filtered, and then increased the feedback until my method suggested a second harmonic output of about -22dB and -28dB. Ian Kyle, GI8AYZ, measured the outputs on an HP spectrum analyser and (from memory) found things to be about 3dB worse than I had estimated from my readings. This still puzzles me because I believed I was 'measuring' total even-order harmonic-content and therefore obtaining a conservative figure. I would stress that I make no claim to expertise in this field, although I still find the device of practical use. Perhaps readers might like to comment?"

GI3XZM notes my suggestion ('TT' December 2001, p62) that dissatisfaction with 'the modern easy-to-use black-box concept' is linked to the growth of QRP operation. He writes: "While I much enjoy QRP and have the highest regard for the encouragement given by G3RJV and the G QRP Club, I have long thought that there must be a place for a form of similar 'sister' club. This would be committed to simple home-built equipment,

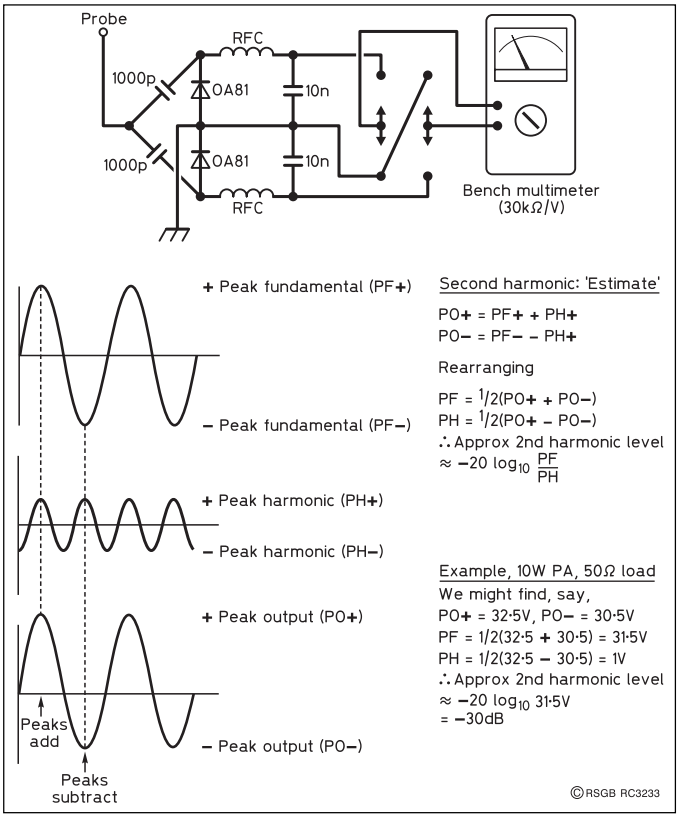


Fig 3: GI3XZM's 'Junk box spectrum analyser' or, perhaps more accurately, a simple RF wave analyser useful for estimating the degree of second harmonic content in the output of an oscillator or amplifier.

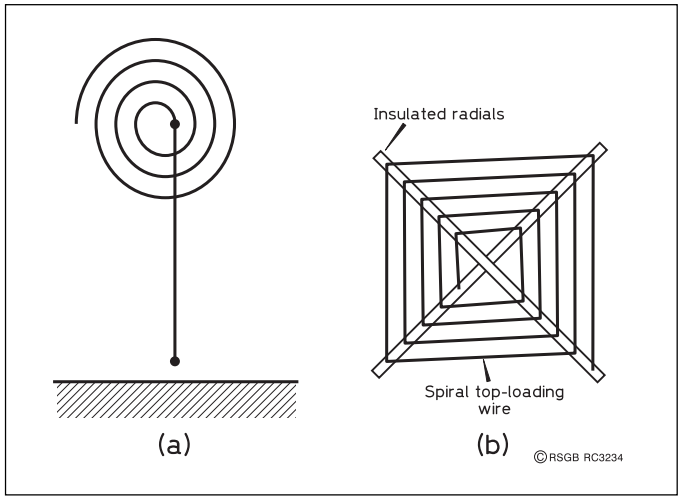


Fig 4: (a) Basic form of the spiral top-loaded antenna. (b) Practical form of using insulated cross-arms on which to wind the spiral inductance loading.

but without the 5W limit, although hopefully power moderation would prevail!"

SPIRAL TOP-LOADED LF ANTENNAS

THE LF BAND AT 136kHz is proving a fruitful incentive for experimental work on antennas, much of which can also be applied to 1.8MHz or even 3.5MHz. Alan Melia, G3NYK, writes a thank-you letter for the stimulation provided by 'TT' over many decades, enclosing details of a series of most interesting and rewarding experiments that he has carried out with Finbar O'Connor, EI0CF, a keen LF experimenter and professional operator at the Malin Head coast station. The work was based on a 'TT' item published in November 1974 (briefly revisited in May 1988) stemming from professional papers in *IEEE Trans on Ant &Prop,* May 1973, and the *Canadian Broadcasting Engineering Journal,* June 1974. These introduced the 'spiral top-loaded antenna (STLA)', **Fig 4**, as a single-mast substitute for an inverted-L antenna for VLF or MF applications. The top-loading wire of the STLA is wound as a single unbroken wire in a spiral, using, for example, an X-shaped insulated boom at the top of the vertical radiator.

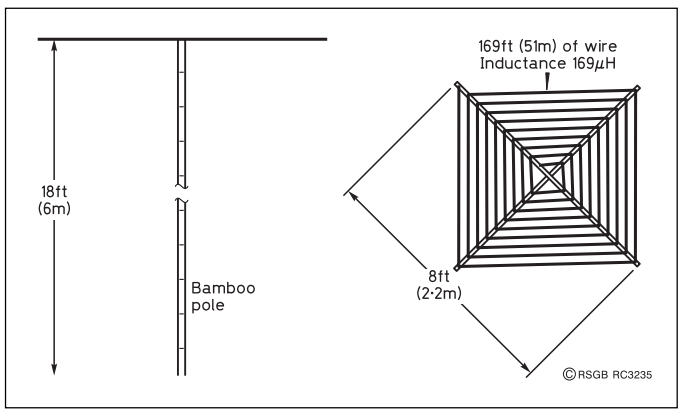


Fig 5: Basic STLA as erected at EI0CF for use at 136kHz.

The first experiments at EI0CF followed the basic STLA configuration using an 18ft (6m) bamboo mast with a 30ft downlead to the operating position and 189ft (51m) of wire wound on two 8ft cross-pieces (representing an inductance of some 169μH), **Fig 5**. Then a top-capacitance hat (**Fig 6**) was added. With some 100W, EI0CF made contacts with the UK and his signals were copied by G3NYK (Ipswich) at a distance of 700km. A most satisfactory result for an antenna no higher than about 22ft to the top of the capacitance-hat and capable of being erected in a 60ft-square garden.

Then, in a second series of experiments, a 'double-spiral' was formed by first winding a spiral inductor to the limit of the cross-arms clipped to the lower side, then continuing the same winding sense on top of the cross-arms back towards the centre (inductance 705μH). This facilitated adding various forms of capacitance top-loading wires - models A, B, C and D as shown in **Fig 7**. The antenna was destroyed by winter gales before detailed field strength measurements were completed (the Atlantic laps onto EI0CF's land on the west coast of Ireland, and his site is thus susceptible to Atlantic gales). Before then, EI0CF's 136kHz signals from Model D (umbrella type capacitance loading in the form of a bow-tie) were easily copied by G3NYK in daytime.

While the antenna was erected at and used by EI0CF, G3NYK provided a simple bridge design capable of quick and easy measurements, discussing the various modifications and then trying to model the results. His website (**www.alan.melia.btinternet.co.uk**) contains a detailed write-up and illustrations of these interesting experiments.

In his report, G3NYK writes: "Is there an advantage to be gained using this type of [STLA plus extra capacitance loading] antenna? To my mind, the greatest advantage is that, in a limited area of 'real estate', we were able to construct a relatively small antenna which only required a loading coil of about 2mH to resonate at 137kHz. This size of coil is considerably easier to construct than the 5-6mH coil that would be required by a strapped 3.5MHz dipole or a 126ft end-fed wire. Also, because it requires less wire, the coil losses should be considerably reduced. The series of experiments has also demonstrated the effect, flagged up by G3AQC, that when there is no more to be gained in reduced ground losses by running more radials or ground spikes, increasing the capacitance top-loading to cover fresh ground can be very productive. This effect can be seen on all types of vertical, inverted-L and T antennas. Thus if you have 100Ω loss resistance with 300pF,

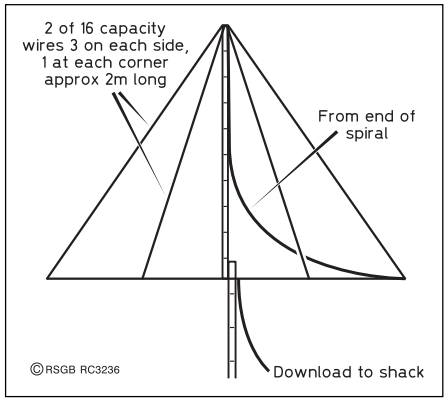


Fig 6: The original capacitance hat added to the basic STLA.

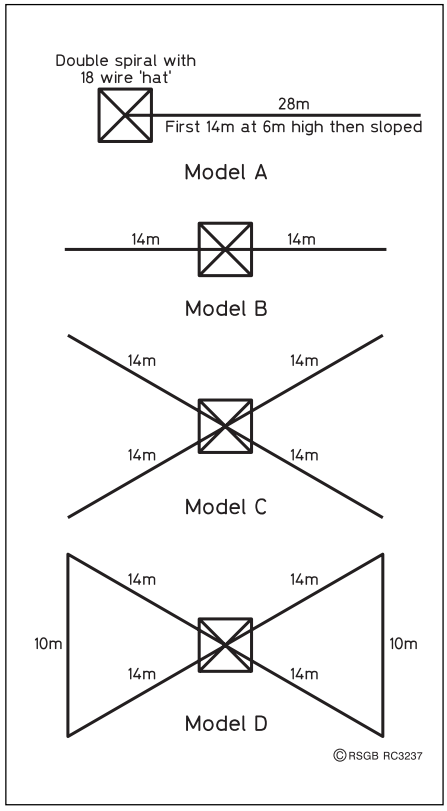


Fig 7: Various forms of top capacitance loading used with the 'double-spiral' described in the text to form Models A, B, C and D. Detailed measurements of ground losses can be found on G3NYK's web site (see text).

you could reduce this to 50Ω by increasing the capacitance to 600pF. It does support the old adage of 'filling the sky with wire'!"

EARLY EDDYSTONE PRODUCT DETECTOR

I TEND TO ASSOCIATE the frequency-changer (mixer) form of product detector with the 1950s or 1960s. However, Graeme Wormald, G3GGL, has brought to my notice an article on the little-known WWII Eddystone Model 400B LF/MF receiver in *Lighthouse,* Issue 71, February 2002, pp36-39. Model 400B was one of the series of communications receivers comprising Models 358, 358X, 400 and 400X (the X denoting the inclusion of a dual-gate crystal filter). While the 358 covered 90kHz to 31MHz with an IF of 465kHz, the 400 was LF / MF only, 130 to 2200kHz with an IF of 110kHz. It seems likely that the 400 models were designed specifically for use in the RAF Air / Sea Rescue service (confirmation of this would be welcome).

The 400 model was described by Eddystone as a 'double superhet' with a second IF of 1kHz. It added: "The second frequency-changer circuit has a mean oscillating frequency of 110kc/s, which can be varied above and below this to produce an audio frequency of up to 1000 c/s". In more current terminology, this set would be considered a single-conversion superhet with a CW product detector (**Fig 8**) of the type widely used later for SSB!

HIGH-GAIN PREAMPLIFIER

JACK PATERSON, in the June 2001 issue (p466) of *Electronics World*, shows how a general purpose, self-biasing pre-amp with a medium power MOSFET (VN10KM) input

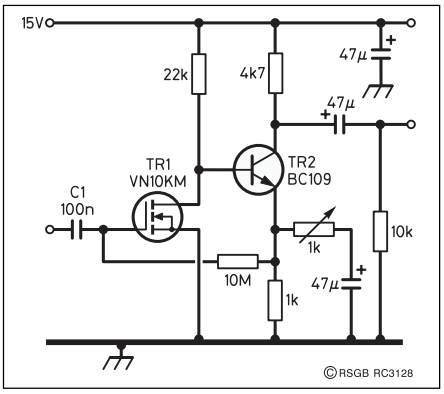


Fig 9: High-gain general purpose pre-amplifier using medium-power MOSFET and BC109. (Source: Jack Paterson, *Electronics World*)

device can provide medium to high gain (300 to 400 adjustable or -50 to72dB), a high input impedance (about 10MΩ) and a bandwidth of 10Hz to 100kHz: **Fig 9**. It should prove suitable for many audio applications. Output voltage can be up to 8V p-p. A 2N7000 could be used instead of the VN10KM.

HERE & THERE

TWO MORE PIONEERS of radio communication have departed. Dr John Pierce of Bell Telephones died 2 April 2002, aged 92. With engineer-turned-space-fiction writer, Arthur C Clarke (happily still with us), he shared the title of 'Father of the communications satellite', forecasting the possibilities and leading the teams responsible for the first communications satellites Echo and Telstar and much else. Dr Rudolf Hell, inventor of the electromechanical Hellschreiber in the early 1930s, died in Kiel on 11 March, 2002, aged 100 years. One had thought that the QRM-resistant Hellschreiber-mode had run it course, but is presently again enjoying a revival as a popular software system on the amateur bands. Dr Hell was responsible for many other mechanical, cryptographic and electronic inventions.

DESPITE THE ALMOST universal belief that we had passed the peak of Solar Cycle 23 during 2000, it is clear that this cycle has again taken the form of a double-hump. *QST.* admitting, like most of us, that it had got it wrong, has commented that the "2001-2002 season was the most spectacular in the history of the six-metre band. It is possible that more DX was worked on this band by more amateurs between mid-October and late-January than had ever been worked before". My DK0WCY log shows that the solar flux stayed above 200 throughout December 2001, reaching 275 on a couple of days. Not a record peak, but one that has provided excellent conditions on the HF bands!

A VOTE IN the European Parliament in April foreshadows that all electrical and electronic equipment sold in Britain after 2005 will have to be recycled at the manufacturer's expense. Under new European legislation, householders will not be allowed to throw away unwanted electrical or electronic goods but will have to sort them out ready for collection and recycling. It is forecast that prices are likely to rise by up to 5%.

THE 639-PAGE BIOGRAPHY *Schonland: Scientist and Soldier*, by Brian Austin, G0GSF, has been given an enthusiastic full-page review in the prestigious science journal *Nature* (4 April 2002). An article by him, 'Lightning and the Ionosphere: Some Reflections from an Earlier Era', appears in the URSI *Radio Science Bulletin* (No 300, March 2002, pp6 - 11). It shows how B F J Schonland (1896 - 1972) was investigating the interaction between lightning and the ionosphere some 60 years ago. This interaction is currently undergoing a revival of scientific interest as a result of the discovery within the last decade of so-called red sprites, blue jets and elves. All are optical phenomena occuring above the tops of cumulo-nimbus clouds, typical of thunderstorms, but seemingly having their roots in the lightning activity taking place beneath them. Recent evidence suggests that sprites may actually emanate even higher up, within the ionosphere, and that they link up with lightning to provide a momentary short-circuit between the ionosphere and the earth beneath. "Such ideas seem astounding and, if true, their implications could be profound." Brian Austin shows how reports of upward-striking lightning date back many years to the work of Scottish physicist C T R Wilson (1869 - 1959), who interested Schonland in such phenomena. Pioneering studies of the interaction between lightning and the ionosphere were made in lightning-prone Australia and South Africa in the 1930s. ♦

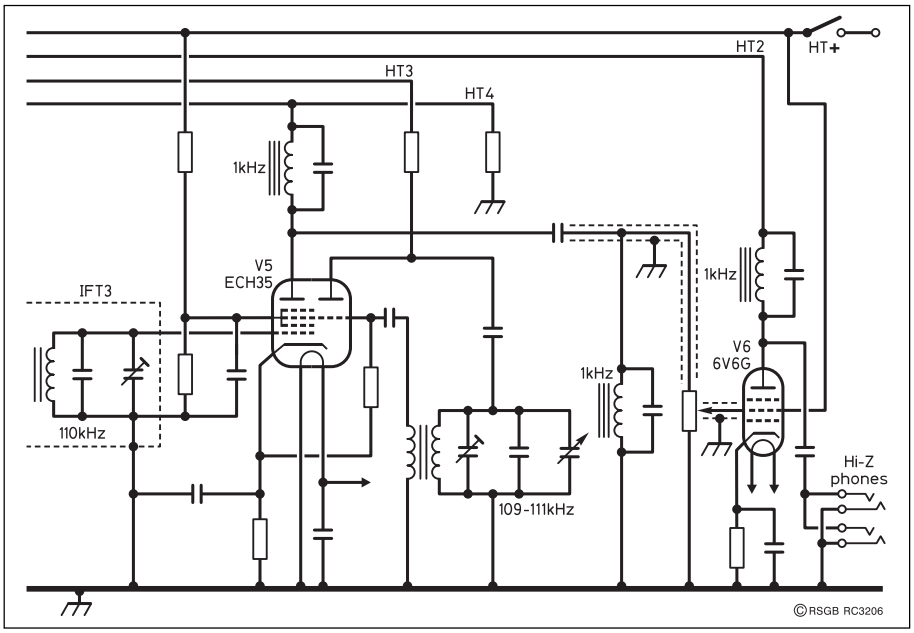


Fig 8: Outline of an early form of CW product detector as fitted to the Eddystone WW2 Model 400 which covered only 130-2200kHz with an IF of 110kHz and described by the firm as a "double superhet" with a "second IF" of 1kHz. Models 400 and 400X are believed to have been used by the RAF in their Air/Sea Rescue Service.

WATERS & STANTON

IC-756PRO II

- Receive: USB, LSB, CW, RTTY, AM, FM
- 300kHz - 60MHz,
- Transmit: (UK ham bands)
- 160 - 6m, 100-5W (all modes accept AM) (40-5W AM carrier)
- 5in TFT colour LCD
- Real-time spectrum scope
- Low distortion, RF digital speech compressor
- Built-in RTTY demodulator/dual peak APF
- Auto ATU built-in (1.8-54MHz)
- Power requirement: 13.8V DC
- Current consumption: Tx max 23A, Rx max 2.7A
- Audio: 2.0W (8 Ohms)
- Size: 340 x 111 x 285mm • Weight: 9.6kg

THE 3 PLACES TO GO!

IC-718

- Receive: USB, LSB, CW, RTTY (FSK), AM
- 300kHz - 29.999MHz,
- Transmit: (UK ham bands)
- 160 - 10m, 5-100W (SSB, CW, RTTY) 2-40W (AM carrier)
- Memory channels 101 (99 regular, 2 scan edges)
- Two VFO's for split frequency operation
- Low distortion, speech compressor
- Built-in electronic keyer - variable dot/dash ratio, pitch and key speed
- Noise reduction
- Automatic Notch Filter
- Noise Blanker - level adjustable
- IF shift feature
- DSP (optional)
- Two scan modes
- Built-in SWR metering
- Large amber LCD
- Antenna connector SO-239
- Power requirement: 13.8V DC
- Current consumption: Tx max 20A
- Current consumption: Rx max 2.0A
- Audio: 2.0W (8 Ohms)
- Size: 240 x 95 x 239mm
- Weight: 3.8kg

1 MAIN STORE: 22 MAIN RD, HOCKLEY, ESSEX, SS5 4QS. TEL: 01702 206835 • FAX: 01702 205843 • E-MAIL: sales@wsplc.com

2 MIDLANDS STORE: BENTLEY BRIDGE, CHESTERFIELD RD, MATLOCK, DERBYSHIRE, DE43 5LE. TEL: 01629 582380

3 SCOTTISH STORE: 20 WOODSIDE WAY, GLENROTHES, FIFE, KY7 5DF. TEL: 01592 756962

ICOM

Raynet Exercise

David Townsend, GOWVA*, Kent County Raynet Controller, Joint Thanet Raynet Controller, describes how the use of SSTV during a Raynet exercise added another dimension of great benefit to the council emergency planning department.

EXERCISE RO-RO was originally planned to be a local council exercise with the purpose of testing both the local council's emergency planning department and the emergency plan for the Ramsgate New Port (ferry terminal). Raynet's involvement came about after a discussion with the County's Emergency Planning Officer at a previous Kent County Controller's meeting regarding Thanet Raynet's tests with SSTV.

I have always been amazed by the use of mobile telephone during exercises, as although they are a very useful tool, a danger of complacence can arise. During any major incident this technology could be one of the first to fail, for this reason they were (from a Raynet perspective) banned. After all, if we cannot set up a professional system that would enable us to communicate not only with audio but in this case also visually, what use would we be in a real emergency?

Although we did not know the scope of the exercise, we knew that we would need access to Ramsgate New Port, so a meeting was arranged several weeks in advance. They very kindly offered us free movement within the port and this turned out to be invaluable during the exercise.

SCENARIO

RAYNET WENT into this exercise unaware of the scenario, indeed we were unaware of our role other than to use SSTV. It transpired that the scenario was that a lorry containing chemicals had slid down a wet unloading ramp while the ferry was discharging, overturned, and after several other incidents produced a toxic cloud, which threatened the residents of Thanet.

EQUIPMENT

THE DECISION TO use the KISS approach was taken at a very early stage by the technical working group within Thanet Raynet. We wanted to prove not only that we could achieve our objective, but also with minimal training and equipment.

From left to right, operating the SSTV, camera, and radio are Shane, M1AJU, and Stuart, 2E1GTF, while Derek, G0DFI, ran the SSTV repeater. The County's EPO Stephen Scully is keeping a keen eye on them.

After several tests with various equipment and software we decided to use the Kenwood TH-D7E, its companion the VC-H1 and a relatively low-spec laptop computer running *Chroma Pix* for the SSTV pictures.

For the audio system, rather than set up another talk-through station, and for several other reasons, we decided to use one of our local repeaters, GB3EK, which is located in Margate.

This was chosen, not only for its location but also because in a real situation this repeater would be an ideal first-use system, as it is fitted with a battery back-up facility which would provide several hours of use should we have a district / county power grid failure. This would give good communications not only around Thanet but also further afield until such a time that Raynet had set up its own communication system.

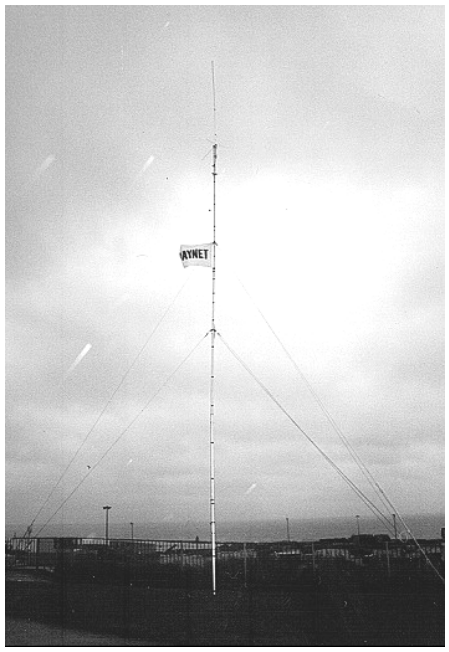
The system was first tested using simplex frequencies. Once any technical issues were overcome a single cross-band repeater was set up to see if we encountered any picture degradation. This proved to work satisfactorily and the number was increased one at a time until in total four repeaters were used with no loss of picture quality.

Series of actual SSTV images received during the exercise. From top to bottom: general view of Ramsgate New Port ferry terminal; the ferry about to dock; the ferry discharging its 'real' cargo; the ferry's loading ramp (now considered to be discharging its 'imaginary' lorry); the imaginary toxic cloud moves out to sea.

* E-mail: David.Townsend@eurotunnel.com

Ro-Ro

The complete transmit and receive SSTV system: the Kenwood TH-D7E, VC-H1, TNC and laptop.



The SSTV repeater located on the east cliff just above the Royal Harbour, Ramsgate.

THE EXERCISE

THE DAY HAD arrived. It was a cold and wet November day and the weather forecast proved to be accurate, with wind from the SSE gusting force eight with heavy rain at times. This indeed made a change from the weather normally experienced during exercises. If we could set-up and produce good results in these conditions, that would be a good result in itself.

The only communications we had received prior to the exercise stated that the exercise was 'fluid'; the emergency response team located at Thanet District Council office and at the Ramsgate New Port would be left to decide when we would be required. Should they fail to realise this by 0830 the Thanet District Council's Emergency Planning Officer would intervene and advise them not only of our availability but the assistance that we could offer.

Eventually we received the call out at 0915. The primary call-out team was notified, and by 0925 we had arrived at Thanet District Council offices. However, a small technical problem at the office in which we were located meant that we had no mains power; this delayed our start by some 10 minutes. Eventually the problem was traced back to the power sockets not being connected to the internal building's mains ring. Once an alternative supply was located, control was operational at 0935.

By 0945 the SSTV repeater was up and running. The repeater located on the cliff-top just above the harbour enabled the SSTV operators located within the harbour area below to run on very low power levels, therefore enabling the maximum possible operational period. The communications established for the exercise are shown in **Fig 1**.

At 1000, the secondary call-out team comprising of members from Medway Raynet were put on standby. However, due to the nature of this exercise and the manning requirements, they participated only as observers.

After a brief discussion with the Emergency Planning Officer, it was agreed that small groups from the emergency response team would visit our control; they would then instruct us as to the images they required. In all we transmitted 50-plus images from Ramsgate harbour into Thanet District Council offices during the three-hour operation. These images related to certain incidents as the scenario unfolded.

Once the ferry had moored and finished discharging its 'real' cargo, the next stage of the exercise would begin. As the lorry approached the bottom of the ramp, it overturned causing the chemicals to spill. After several other events the leaking chemicals caused a toxic cloud to from. Concern was raised that the cloud might threaten local residents.

At approximately 1300 the exercise wound down, we were invited back to Thanet District Council's offices for lunch prior to the exercise debrief.

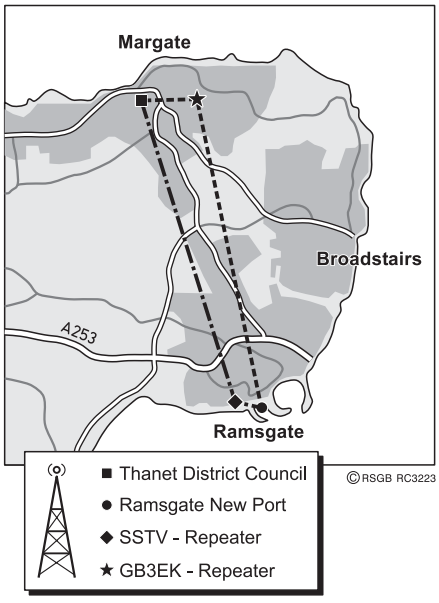


Fig 1: Communications map for Exercise 'Ro-Ro'.

DEBRIEF

ALL THROUGH THE exercise, I received comments regarding Raynet; these comments were a reflection on how far Raynet has moved on, technology-wise. I received the impression that the famous *Hancock* sketch still lives on as many people's perspective of amateur radio.

I am not in a position to comment on the exercise other than as it related to Raynet. Those comments were all very favourable with one common theme: they all agreed that "a picture paints a thousand words". For this reason, it was suggested that in future exercises, or indeed in live situations, when Raynet uses SSTV an LCD projector should be used so that the received pictures could be displayed on the main wall.

THE FUTURE

SINCE THE EXERCISE, the news has spread throughout the local emergency services and emergency planning community, with requests either for further information or a demonstration. As a result of the exercise we were invited to demonstrate SSTV to all the district Emergency Planning Officers in Kent with another date, yet to be decided, arranged to demonstrate SSTV to the emergency services in Kent. The plan is to feed in two SSTV signals, each having its own repeater. These will then feed one main repeater which in turn will feed County Hall in Maidstone. In preparation for this the Raynet groups held a county SSTV exercise on 17 February.

The county has also formed an SSTV Working Group with the aims of researching software, hardware and then standardising the system, so that all groups within the county are operating using one system.

We will shortly be starting an FSTV and ATV working group, with the aim of building upon the SSTV system so that we will be able to offer the User Services various other options should they require this technology.

I would like to thank the RSGB, RA, Kent Repeater Group and the Ramsgate New Port not only for their assistance and advice regarding permits, licensing issues and access to repeaters, but also for their positive approach and professional attitude, for without such assistance our participation in the exercise would have not been possible. ♦

Members' Advertisements

RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged pro rata. Trade or business ads, even from members, will not be accepted. Traders who wish to use this facility must send a signed declaration that the items for sale are part of, or intended for, their own personal amateur station. The RSGB reserves the right to refuse ads, and accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into. Licensed members are asked to use their callsigns and QTHR, provided their addresses in the current edition of the RSGB Yearbook are correct. RS members will have to provide their names and addresses or telephone numbers. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition of *RadCom.*

The closing date for copy is the first day of the month prior to publication, eg the deadline for the March issue is 1 February.

Warning: *Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the cash paid.*

EXCHANGE

FIFTY-five years accumulation, radios, televisions, test equipment, CRTs, valves, transistors, components, books, magazines, exchange for veteran or Edwardian car. 020 8958 4710 (Edgware).

FOR SALE

YAESU FT-840 with FM board and 6kHz AM board installed, £400. Matching FC-10 auto-ATU, £150. All mint cond and boxed. If bought together, £500. Buyer pays carriage. G3EGS, 0121 414 0443 (Birmingham).
E-mail: rbobc@btinternet.com

12V SPCO PCB-mount relays, 10A rating. Pack of 25, £20. Seven-segment LED displays 10 x 20mm, pack of 25, £6. GW4IIA, QTHR, 01547 528 278 (day) (Mid Wales).

AEA PK-12 with PakRatt Windows 2.1, £85. 23cm tvtr, £120, contains UEK-3 converter, DF8QK tvtr BFQ34, LMW 1296TT6 PA 6 watts, PSU housing. PTFE chimney for 4CX250B, £10. Ceramic chimney for same, £8. 3CX100A5 water-cooling jacket, £20. New Eimac 3CPN10A5, £15. New pair BLW96, £60. New BFQ34, £15. New 2N5591, £15. New TRW 2N3866s, £1 each. 00 351 282 788 266 (Portugal).
E-mail: marment@mail.telepac.pt

ALPHA 78 amplifier 10-160m with three spare Eimac 3CX400A7 valves. 1kW DC input no time limit. Offers or exchange good solid-state HF amp. AOR-7030 rcvr, £475, hardly used from new. Also seeking QRP and satellite equipment. 01925 225 067 (Newton-le-Willows).
E-mail: kmahon@conectfree.co.uk

ALTRON four-section tower complete, one new winch, Jaybeam 3-ele beam 10-15-20m, buyer to collect, £500 ono. G4WYG, QTHR, 01322 613 296 (Hextable).
E-mail: g4wyg@milnet.uk.net

ALTRON SM-30 tiltover slimline mast with winch, (soil post mounting), 15ft retracted, buyer to arrange collection, £160. Adrian, G4ROA, QTHR, 024 7641 2201 (Coventry).
E-mail: g4roa@aol.com

AMERITRON AL-811 amplifier as new, £375. Kenwood station monitor SM-220, £150. GP3 vertical antenna covers WARC bands, £50. Lexmark 3200 inkjet printer plus spare cartridge, £25. Prefer buyer to collect, amp and monitor still in line, antenna dismantled. G0NRO, 01252 373 257 (Aldershot).
E-mail: w.dimmock@ntlworld.com

AMERITRON AL-811 HF linear amplifier 600W, as new, never used, valves still in original packaging, £600, buyer collects. 07979 733 640 (Lincolnshire coast).
E-mail: casailles@aol.com

AMERITRON ATR-30 1500W tuner, as new, £400. Yaesu FT-790 MkII, £225. Kenwood TM-733 2/70 dual band mobile, £195. Paul, G4CCZ, 01932 342 927 (Woodham).
E-mail: g4ccz@6metres.com

BUTTERNUT HF5B 'Butterfly' antenna, 2-ele triband mini-beam, £50 ono. John, GW4TJQ, 029 2061 4383 (Cardiff).
E-mail: janddwallis@beeb.net

COMMODORE 1901 monitor, exc cond with original packing. Uses composite and RGB video modes, £100 ono. Commodore MPS-801 printer, hardly used, exc cond, £40 ono. Pye Rambler B&W TV, ideal for computer use with text-only display, £30 ono. G4KZZ, 01723 890 786 (Scarborough).
E-mail: nigel@hunmanby13.freeserve.co.uk

CUSHCRAFT A3S 3-ele beam 10/15/20m. New and boxed unopened, a snip at £280, carriage extra. 01286 831 340 (Caernarfon).

CUSHCRAFT A3S Tri-bander 10-15-20m, brand new in original carton, only opened to check contents. Today's price £459, will accept £250 ono. G3FEV, QTHR, 01706 211 339 (Lancs).

CONGRATULATIONS

to the following
whom our records show as having reached
50 or 60 years' continuous RSGB membership this month:

50 years		*60 years*	
G3HRN	Mr D L Wright	G2FRI	Mr T J Swain
G3IGV	Mr J W Birkbeck	G4LW	Mr L Huntley
G3IKL	Mr R T Craxton	G6NB	Mr D N Biltcliffe
G3INA	Mr R G Robinson		
G3ITH	Mr R D Franklin		
G3KTN	Mr J F Brown		
G3TEV	Mr M J Mills		
G3VDL	Mr J A St Leger		

CUSHCRAFT MA5V vertical 10-80m, £160. Cushcraft 154CD 4-ele beam, £220. Kenwood IF-232C interface unit, £50. All unused and boxed. G3UUI, 01702 600 580 (Southend on Sea).

CUSHCRAFT R-7000 vertical 10-40m, only 6 months' use, boxed, £175. Hy-gain 3-ele 20m monoband Yagi 203BAS will retune to 17m. TL-922 linear amp, mint cond, full o/p sensible offers for both please. 01352 771 520 (Mold).
E-mail: jhj@gw3tmp64.freeserve.co.uk

DRAKE WH7 wattmeter £50. MN75 with B1000 balun, £110. Eddystone round L/S S688E, £65. National HRO L/S fair, £45. Eddystone EP17R panadaptor, good, £120. KW electronics L/S, £15. Dummy load, £10. Drake dummy load, £15. Raven Research RR1110-16 16-way multi-coupler for HF rcvrs, £120. JRC NRD525 rcvr nice, £325. All carriage paid. 01743 884 858 (Shrewsbury).

EXPLORER HF linear, £550. Daiwa CNW-419 ATU, £95. Welz C150 dummy load, £30. Kenwood low-pass filter, £20. Alan, G4YYD, 0161 797 7893 (Bury).

FDK Multi 750E 2m FM/SSB mobile, £200. Yaesu FT-290R, £225. Icom IC-725 100W all-mode, £300. Trio TR-7200G FM, £25. Cordless answer phone, £25. Cordless phone, £20. Extra handset, £10, see www.sharpguide.co.uk for details. 01536 711 625 (Kettering).
E-mail: john@nn14.co.uk

FT-290 MkII plus 25W amplifier, h/book, mic etc, good cond, owned from new, £225. Cash secures, willing to travel, London area and home counties. Klaus, G7RTI, 01494 438 978 (High Wycombe).
E-mail: g7rti@thersgb.net

FT-50R dual-bander brand new, £130. New 1800 mAh batteries FT-50R, £25. Kenwood PB-34 battery brand new, £25. Spkr/mics Yaesu MH-12, MH-18, Kenwood SMC-32. FT-101, fan £20. Heil desk mic stand, new, £13. Meters, Revex W-520, £30. Welz SP-425 twin meters, remote sensor, boxed, as new, £60. MFJ-949 ATU, £75. Blackstar 600MHz counter, £65. FC-3002 3GHz RF-finder CI-V, AOR com input, boxed, as new, £50. Leader LDM-851 digital multimeter, boxed, as new, £20. Coax switches, £10. Duplexers, £15. Yaesu G-400 rotator, boxed as new, £150. GS065 bearing, brand new, £30. Front panels, TS-950SDX, £30. IC-728, IC-575, £15. Service mans, ICR-7000, FRG-7700, TS-180S, £20. FT-708R h/held, spkr/mic, case, £40. SR-200 VHF 200W amp, £165. Mizuho PL7 QRP amp, £40. Sandpiper HF vertical, £50. Alinco SU-4000 rotator, £75. FM-1000s, 70MHz, £30. MC-85 desk mic, £50. 01953 884 305 or 07970 214 039 (Norfolk).

FT-817 HF/VHF/UHF all-mode tcvr nicads spare NiMH 1700mAh charger, mic PS-817 carry case, miracle whip, all boxed as new, one month old, £825 ono inc carriage & insurance. G0GPO, QTHR, 01227 711 261 (Canterbury).

HEIL Goldine mic type GM4 as new, £60. Icom SM-8 base mic, £50. Cobwebb aerial 20-10m assembled, not used, £100. Cushcraft vertical MA5V assembled, not used, £120. Tokyo hi-power ATU model HC-400L, good cond, £50. All ono, collect or carriage. 01992 632 434 (Waltham Cross).

HELIAX Andrews LDF4-50 professional ½in foam dielectric 50-ohm coax. Two lengths, 20m plus special N terminations. Suitable for UHF or microwave use. Bargain, £60 plus carriage. 01792 290 770 (Swansea).
E-mail: philip@gw4hat.demon.co.uk

IC-275H, £600. IC-275A inc 100W Microwave Modules linear, £500. IC-207H dual-band mobile inc magmount, dual-band antenna, mobile mount and remote head, ext lead, £200. FT-290 Mkl, soft case, Nicads, charger, £150. IC-32E and IC-32AT with repeater mods, spkr mics, 800mAh batteries, spare battery, desk charger, magmount and dual-band antenna, £250. 01754 820 038 (Skegness).
E-mail: tony.jarvis@rsgb.org.uk

ICOM IC-2KL solid-state linear amp, matching PSU. Icom AT-500 auto-ATU 1kW PEP, sensible offers. GW4WJO, 01407 762 330 (Holyhead).

ICOM IC-765 HF tcvr. Overhauled April 02, mans, up/down scanner, mic, box etc. Vgc owned from new by non-smoker. Will give 3-month warranty, £800 ono. Vacuum variable capacitors, rollercoasters, various QRO parts, phone/e-mail for details. 01777 248 080 or 07968 085 670 (Nottingham).
E-mail: g0oil@zoom.co.uk

INDEX Labs QRP Plus tcvr, £225. Trio TS-711E 2m multimode base, £245. Cushcraft R7000, £150. Altron 45ft wall-mount lattice tower with head unit and winches, £125. High-power 7MHz traps, £20. 01803 392 969 (Paignton).

KENWOOD TR-9000 2m multimode, inc BO9, PSU, spkr, £150. Yaesu FT-690 MkII 6m c/w 40W PA, £175. Yaesu FRG-100 HR rcvr, £200 ono. Dave, 01227 283 543.

KENWOOD TS-530S HF tcvr with leads, LAC-895 antenna coupler, mic and MFJ-422BX electronic keyer paddle, shown working, spare valves, man, £250. Trio 599 HF tx separate rx. Tx on 10, 15, 20, 40, 80m, 100W. Rx on 160-10m amateur bands, plus 2m. Matching Trio loudspeaker, man, spares, SSB, AM, CW, £150. Prefer collect, G0NID, QTHR, 0161 610 3882 (Manchester).

KENWOOD TS-940S tcvr, no mic, property York Radio Club, £450. Gareth Foster, G1DRG, QTHR, 01904 421 392 (York).
E-mail: g1drg@arrl.net

KENWOOD TS-950SD 150W DSP, SP-950 spkr, MC-60A desk mic, SM-230 station monitor, all boxed, all mans exc cond, £1600. GW4IIA, QTHR, 01547 528 278 (day) (Mid Wales).

LINEAR Amp UK Explorer 1200 160-10m inc WARC, vgc, prefer buyer inspects, tests and collects, delivery possible at cost, £800. 01751 476 380 (Pickering).
E-mail: phil.catterall@ntlworld.com

LINEAR Amp UK Explorer 1200, WARC soft start, vgc, £850. Buyer collects or pays carriage. Could swap above for FT-1000MP DC with cash adjust. G4CKH, 01502 740 965 (Lowestoft).
E-mail: graeme@g4ckh.fsnet.co.uk

MFJ-1786 10-28MHz magnetic loop antenna, control unit, vgc, never used outdoors, £160. Revex 30A PSU, £40. Buyers collect. G3ZJF, QTHR, 01727 811 851 (St Albans).

MIZUHO 14MHz h/held, excellent, £110. Kenwood HF rcvr, gwo, £100. Wanted (exchange) early Racal manpack and TA-944 linear. John, 01963 240 319 (Castle Cary).

MODERN weather satellite receiving equipment for geostationary and orbiting satellites, please send for full list. G3JAU, 01202 514 078 (Bournemouth).

QRP freq crystals 1.8432, 3.560, 3.570, 7.075, 7.030MHz, £5 each. Valves QVO6-40 (2) £5 each. QQVO3-10 (4) £3 each. 8136 (2) used, OK, £7 each. G2FQP, QTHR, 01179 570 929.

RADCOM journals 1977-2001 all bound, available due to recent death of G2BDV. Any offers or interest phone 01252 674 421 (Surrey).
E-mail: j.davies@ntlworld.com

ROTATOR very heavy duty Hy-gain Rotobrake model 400, high torque for large antenna, installation operating man. Free boot load of five-core control and low-loss coax cables for purchaser. Inspect and collect £150 ono. GW3BAZ, QTHR, 029 2075 7556 (Cardiff).

SHURE 444 mic, old but works well, £20 plus postage or collect. GW3BAZ, QTHR, 029 2075 7556 (Cardiff).

SILENT key sale, Hi-mound HK-708 Morse key, £15. Kent keyer with iambic paddle, £60. Standard C510A h/held, £95. Kenwood TR-751E, £290. Daiwa PS-304 12V supply, £70. Osker block 200B SWR meter, £20. Hanson AT-210 meter, £10. Maplin M5020A meter, £10. Toyo T200 dummy load, £20. AVO 7, £50. BNOS 432MHz 100W linear, £200. Icom 751 plus Heil spkr, £300. 01508 570 278 (Norwich).
E-mail: g3ldi@amsat.org

SILENT key sale, late G3TQE. Aluminium 2-section 60ft tower wind-up tiltover, base plate version with Daiwa rotator, £350. FT-101ZD, £200. Yaesu FT-3000 2m, £190. Self brew 20A PSU, £30. Welz SP-200 SWR, £20. Trio oscilloscope, £30. AVO 8, £20. Contact G3TRB, 01905 775 206 (Worcester).

SILENT key sale, Yaesu FT-726 multimode 2m & 70cm, £295. FT-101ZD HF tcvr, £245. FC-902 ATU 500W, £120. YO-100 HF scope, £95. Merlin Wizard 13.8V 40A PSU. Kit Howes CTN150 HF ATU, £35. All good condition. 01953 604 019 (Wymondham).
E-mail: bob.preston@ntlworld.com

SILENT key sale. Icom IC-756 HF/6m tcvr, £725. SGS-230 remote ATU, £225. Daiwa CN620A SWR meter, £20. FT-221 2m tcvr mains all-mode, £100. PK-232 packet controller, £110. Bencher paddle, chrome, £50. Daiwa regulated PSU 30A, £45. AVO model 8 MkV, leather case, leads, £25. Tradiper transistor GDO, 440kHz-28MHz, £15. Welz 15W 50-ohm dummy load, £5. 01737 553 043 (Croydon).

SONY ICF-76000 rcvr FM/LW/MW/SW PLL synthesised AM/FM/SSB small portable, high performance with mains PSU. G4OAC, QTHR, 01706 650 174 (Rochdale).
E-mail: bob.hayter_2000@yahoo.co.uk

SWR-PWR meter Watson 620 1.6-530MHz, £65. PSU 20A, two meters, £48. ATU 30-300W cross-needle, 2 coax balanced or end-fed, £65. Artificial ground MFJ-931, £45. 024 7672 1925 (Coventry).
E-mail: john.g0gul@ntlworld.com

TRIO TL-922 linear, £700 collected. Ten-Tec Omni VI, £900. G2QT, QTHR, 01303 814 194 (Ashford).

TS-950SDX, £1450. SM-230 scope, £250. SP-950, £80. MC-85, £65. All boxed, A1 condition. Eimac 3-500Z valves, boxed £75 each. Icom AT-160 auto-ATU, £140. IC-728, £325. FT-50R & case, 2 high capacity batteries, all brand new unused, £160. Yaesu remote antenna switch, £75. Other remote switches, £30. Kenwood 20A PSU as new, £95. G-400 rotator, boxed, £150. Wanted IC-781, IC-765, IC-775 or similar. 01953 884 305 or 07970 214 039 (Norfolk) .

TWO boxes teleprinter rolls, Morse keys PO brass, £45. RAF type 'D', £65. HK-707, £15. HK-708, £15. Clansman, £35. Kent, £35. AVO 8, £20. 01494 530 018 (High Wycombe).

YAESU 101ZD, £150. Yaesu FT-2700 2/70 including duplexer, £120. Yaesu FT-77, FC-700 FP-700, mic, £300. Kenwood TH-7SE 2/70, includes spkr mic, £120. Altron 30 tower winch cage Kenpro 400RC rotator, £250. Microwave Modules 432/50, £50. Microwave Modules 144/30LS, £20. Tokyo HL30U, £20. Daiwa CN460 SWR/PWR 2/70, £30. Tiny-2 TNC, £35. Dual-band vertical 2/70 ant, £18. PG mobile whip 160, £15. Channelmaster rotator head bearing controller, £15. 0121 603 2735 (Birmingham).
E-mail: dmb.31@virgin.net

YAESU FC-902 ATU and man, SP-901 spkr, both exc cond, boxed, £100 for the two plus £12 postage. Need the space. Dick, G0DIC, (Boston).
E-mail: rafixter@lineone.net

YAESU FT-101, gwo c/w mic and two spare 6JS6C PA valves. Sell for £60 or prefer swap for HF general coverage rcvr. Tony, G0MQG, 01603 744 197 after 6pm (Norwich).
E-mail: tony122@fsmail.net

YAESU FT-101ZD fitted CW filter, fan, mic, h/book, exc cond, working order, £195. Prefer buyer collect, carriage extra, G4KGF, QTHR, 01892 824 371 (Tunbridge Wells).
E-mail: george_brooks@lineone.net

YAESU FT-2500M 2m 50W tcvr, CTCSS, mic, manual, mobile mount, boxed as new, never used mobile, £120. 023 9226 5101 (Waterlooville).
E-mail: lears@tesco.net

YAESU FT-290 MkII complete with clip-on FL-2025 amplifier, as new in original box, £250. Also Yaesu FT-690 MkII complete with clip-on FL6020 amplifier, as new in original box, £250. Paul, G4CCZ, 01932 342 927 (Woodham).
E-mail: g4ccz@6metres.com

YAESU FT-290R 2m all mode tcvr, £120. 2m 9-ele Yagi, new, £15. Homebrew HF ATU, £15. G4VSJ, QTHR, 01455 209 382 (Lutterworth).

YAESU FT-290R 2m all-mode, portable, boxed, instructions, mobile mount, can be seen working, £170. M1AVW, 01904 468 568 (York).
E-mail: russell.hedges@btinternet.com

YAESU FT-7 tcvr 5-HF bands, £150. Yaesu FT-290 Mkl multimode tcvr, £130. Tcvr F/M 29 MHz, 40 channels, £20. All vgc, unmarked, inspect or carriage extra. 0191 455 2223 (South Shields).

YAESU FT-726R 2m/6m/70cm amps, 6m & 2m SWR/PWR meters, 2m & 6m aerials plus rotators for both bands, house purchase forces sale, £750 ono. G1PDC, 01494 773 401 (Chesham).
E-mail: pcourtney@remecaritech.com

YAESU FT-736R tcvr, 2m, 70cm, 6m, tone squelch, CW filter, keyer unit, any trial, boxed man, £550 or vno. 01243 783 605 (Chichester).
E-mail:mrvyncol@aol.com

YAESU FT-817, soft case, AX Walkabout, as new, 5 hours use, £599. Mirage B5016G, 2m 160W linear as new, £150. PYE 70cm 200W + 4CX250B linear, vgc, £140. SEM Transmatch with 160m, as new, £60. Kenwood TH-75E, dual-band h/held, speaker/mic, nicads, charger, gwo, £50. Microwave Modules 2m to 4m (70MHz) tvtr , rare, £150. All no offers, carriage extra. G4JXK, QTHR, 01460 55045 after 6pm (Ilminster).

YAESU FT-840 with FM. CFA loop 9 bands 15m feeder, bench PSU, mans, vgc, £480 + carriage. 01455 449 602 (Hinckley).

YAESU FT-890 plus Tokyo HC-400L ATU, £650. Heathkit HW8, construction man and h/book, £125. RigSat RX2 rcvr and dipole kit, £75, buyer to collect. Tony, 01253 697 569 (Lancs).

YAESU FT-90R VHF/UHF dual-band FM tcvr. Little used, vgc, £275. John, G4IYU, 01922 410 020 (Cannock).
E-mail: jahibbert@qinetiq.com

YAESU FT-990AC c/w all filters and voice chip, £700. MFJ-784B DSP filter, £120. FT-290R MkI, £120. MM 2m-70cm tvtr sat version with input attenuator, £70. MM 28-2m receive converter, £25. 01623 642 719 (Mansfield).

YAESU FT-990AC HF tcvr, gc rcvr, 100W, narrow filters, fist mic. Immaculate, boxed with man etc, £575. AOR AR-3000A base scanning rcvr, 100kHz – 2036 MHz, SSB CW AM NBFM WBFM. Immaculate, boxed with whip, man, PSU, £375. Rick, G4BLT, not QTHR, 01924 255 515 (Wakefield).
E-mail: g4blt@wdrs.org.uk

YAESU G-400RC rotator complete , boxed and unused, £150 ono. Also Lowe FX-1 absorption wavemeter unused, £25 ono. John, GW4TJQ, 029 2061 4383 (Cardiff).
E-mail: wallis.wallis@ntlworld.net

YAESU G-650 rotator, 5-band Cuschcraft MA5B mini-beam, Mosley TW33M 12/17/30, Tennamast 35ft standard mast. 01937 844 755 (Wetherby).
E-mail: m0vag@btopenworld.com

YAESU VX1-R dual-band 144/432MHz h/held, £100. G4HLX, QTHR, 01367 710 503 (Stanford in the Vale). E-mail; ntaylor@breathemail.net

WANTED

EARLY crystal and valve wireless wanted, anything to do with early wireless is of great interest especially Marconi items. Also looking for top-end valve comms rcvr, also early AM tx by Johnson, Collins, Hallicrafters other US makers. G4ERU, QTHR, 01202 510 400 (Bournemouth).

WANTED for sentimental reasons Marconi Atlanta or Apollo rcvr, ex Merchant Navy, stupidly sold mine years ago. GI1PTE, 028 4175 2085 (Warrenpoint NI).
E-mail: cooper.stuart@btinternet.com

£100 offered for an R1155 rcvr in gc. BC-348 also wanted, and any suitable for repair or spares. 029 2076 1813 (Cardiff).
E-mail: gw3umd@gw3umd.fsnet.co.uk

CW filter required for Yaesu FT-77 tcvr. Part number believed to be H110207. Same filter said to be used in FT-101ZD. 01743 850 341 (Shrewsbury).
E-mail: dave.crake@btinternet.com

DATONG AD370 active antenna, complete and working for 84-year-old pensioner SWL. 0191 526 7902 (Hetton).

DISABLED fan of old days seeks QSL cards, log books etc. Also *CQ* pre-1975, British magazines pre-1960 and yachting books by Chichester, Pye, Allcard, Rose etc. Mike, 8 Windsor Road, Reydon, Southwold, Suffolk, IP18 6PQ.

DRAKE T-4XC, Drake R-4C 1500Hz filter, Drake R-4C noise blanker. Drake SC-6 6m converter, Codar AT5 and PSU, Codar T28, any Collins 'S' Line. Paul, G4CCZ, 01932 342 927 (Woodham).
E-mail: g4ccz@6metres.com

EDDYSTONE 870 or 870A, EB35, EC10 or variant, need not work, but exterior must be in perfect cosmetic condition. 01744 731 452 (St Helens).
E-mail: rogerm0bwp@aol.com

PANDA Cub 1.8 - 28MHz, 50W AM/CW tx, or similar homebrew, for restoration project. Do you have one gathering dust in your shack/garage? Steve Ireland, VK6VZ/G3ZZD, PO Box 55, Glen Forrest, WA 6071, Australia.
E-mail sire@iinet.net.au

RACAL RA17 first VFO, RHS chassis panel, mains transformer, control knobs, handles, escutcheon clips, adaptors, cabinet. Anything Racal considered. WHY? 01637 875 848 (Newquay).

ROHDE & Schwarz or similar HF rcvr, 1- and 3-phase 50/60Hz power analyser and/or distortion meter/analyser. GW0ALR, 01267 237 078 (Carmarthen).
E-mail: adrian@amgenerators.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

STRUMECH standard duty P60 or BP60 in v good un-corroded cond. Specifically this model required, for more details see www.daveevans.org.uk

TELEVISION rcvr, early 405-line preferably single channel, round tube, WHY? RSGB h/book first edition. *Bulletin*s 1932/3. Thanks, Ken, G3XSJ, 01453 845 013 (7-9pm) or 07867 926 101.
E-mail: kenbrooks@iee.org

UNWANTED radio equipment suitable for use in training youth organisation (Cadets). Limited ability to collect, G4WMT, 01405 817 447 (Doncaster).
E-mail: ericg4wmt@teloo4u.net

WANTED external VFO for FT-101, can collect central Scotland. John, GM8MLH, QTHR, 01838 200 304 (Dalmally).

WANTED for restoration project 1960s-style moving coil meter. Scale marked Japan S-meter TS2 size 60mm square, barrel diameter 52mm, as used with electronics and other kits. Dennis, G4IAD, QTHR, 01942 817 556 (Bolton).

WOULD appreciate loan of h/book for HP4815A RF vector impedance meter for copying, quick return. 01691 830 277 (Oswestry).
E-mail: stan@idlew.freeserve.co.uk

Rallies & Events

1 - 4 JUNE 2002

SCARBOROUGH SPECIAL EVENTS GROUP - HM The Queen's Golden Jubilee. Special event station GQ0OOO, with souvenir official QSL card. Also Intermediate Class demonstration station 2Q0OOO, in support of International QRP Day on 17 June. 40m SSB/CW, 2m & 70cm SSB/FM. Roy, G4SSH, g4ssh@netscapeonline.co.uk

2 JUNE 2002

DOVER RC Rally & Boot Fair - Whitfield Village Hall, nr Dover. OT 10am. Ian, G3ROO, (QTHR), g3roo@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

8 JUNE 2002

SIGNALS / SUPPORT HELICOPTER FORCE Special Event - 21 Signal Regiment, Azimghur Barracks, Colerne Airfield, nr Chippenham, Wilts. GB21SHF activated for 58th anniversary of D-Day. 01225 745 286.

9 JUNE 2002

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

GREAT LUMLEY AR & ES - coach trip to the Elvaston Rally. Tickets £16. Coach leaves Community Centre, Great Lumley, at 8am. Open to non-members. Tickets from the secretary, Nancy Bone, 0191 477 0036, 0191 274 4274 or 07990 760 920. E-mail g7uur@glares.fsnet.co.uk

15 / 16 JUNE 2002

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

RAF WADDINGTON ARC WICKENBY AIR MUSEUM GB0WAM special event station - Lincoln Airport, Langworth, Lincs. M0DBY, 01673 838 333.

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]

The Members' Ads order form is now published here. If members do not wish to cut the form out of the magazine, photocopies will be accepted, as will recent copies of the form from previous months, or recent copies of the 'carrier' sheet. *As a last resort*, members may also send in their advertisements on separate sheets of paper, but if you choose to do this, you *must* supply an accurate word count - and, of course, the correct fee in the normal manner. Style 2 advertisements, which are clearly separated from each other by dividing lines (see Wanted, above left), should be clearly marked as such, and an extra £2.50 added.

RSGB MEMBERS' ADS ORDER FORM

Application form for one For Sale, Exchange or Wanted advertisement. Do not mix classifications on this form; separate applications must be made.

Please ensure you read and understand the conditions of acceptance of these subsidised Members' Advertisements, printed at the top of the Members' Ads page of the current *RadCom*.

FOR SALE ☐
EXCHANGE ☐
WANTED ☐
Tick one box

I enclose a cheque/PO for £ ..... or please charge to my credit account below

CARD No EXPIRY DATE

Issue No (Switch only) . . . . . .

Signed: . . . . . *Date:* . . . . . .

FREE ENTRIES TOWN PHONE E-MAIL

RATES: UP TO 20 WORDS £5.50; 21-40, £6.50; 41-60, £7.50

16 JUNE 2002

BRITISH AMATEUR TELEVISION CLUB BGM and Rally - Shuttleworth Trust, Old Warden, Beds. Admission free, LEC, TS, exhibits. [www.batc.org.uk]

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]

EAST SUFFOLK WIRELESS REVIVAL (Ipswich Rally) - New venue: Ransome's Sports & Social Club, Sidegate Avenue, Ipswich. OT 9.30am. CBS, B&B, TS, MA, CP, C (breakfasts from 8am), TI on S22. Iain, G0OZS, 01206 396 419 or John, G3XDY, 01473 717 830. [www.btinternet.com/~thomassg/eswr2002.htm]

LEEDS & DARS Biannual Outdoor Rally & Car Boot Sale - Yarnbury Rugby Club, Brownberrie Lane, Horsforth, Leeds. CBS, CP free. J A Mortimer, M0JAM, 01943 874 650.

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]

17 JUNE 2002

SCARBOROUGH SPECIAL EVENTS GROUP International QRP Day - Special event station GQ0OOO, with souvenir official QSL card. Also Intermediate Class demonstration station 2Q0OOO on QRP frequencies. 40m SSB/CW, 2m & 70cm SSB/FM. Roy, G4SSH, g4ssh@netscapeonline.co.uk

22 JUNE 2002

RSGB ARDF Competition on 2m under IARU rules, to be held near Stourbridge. Entries to and information from G3ORI, 01384 377 008. Further details on website. [www.ardf.btinternet.co.uk/index.html]

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.

24 - 28 JUNE 2002

ROYAL SIGNALS ARS and RAFARS Special Event - GB21SHF. 01225 745 286.

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 RC Rally - held in the new stand at York racecourse. OT 10.30am. CP free. TI on 2m & 70cm. yorkradiorally@btopenworld.com [www.john.g4fuo@btinternet.co.uk/rally.htm]

13 JULY 2002

CORNISH RAC Radio & Computer Rally - Penair School, Truro. OT 10.30. TS, B&B, MT, CP free, C, TI. Ken, G0FIC, ken@jtarry.freeserve.co.uk or John, G4LJY, g4ljy@hotmail.com

WESSEX RG special event station GB5NF - Neston Fete, 10 miles NE of Bath. OT 12 noon. HF, VHF, UHF, various modes, inc PSK31. [www.g4sknradio.freeserve.co.uk/gb5nf.htm]

20 / 21 JULY 2002

USS SALEM RC, K1USN, Annual Worldwide Museum Ships Weekend runs from 0000UTC Saturday until 2400UTC on Sunday. Bob, W1QWT, w1qwt@arrl.net

21 JULY 2002

HULL & DARS 9th Humber Bridge Radio Rally - Cottingham High School. OT 10.30am. C, TI on S22. Leigh, G0UBY, leigh@sydney.karoo.co.uk or Jon, G7DBL, 01482 493 425.

McMICHAEL RALLY & BOOT SALE - Reading Rugby Football Club, Sonning Lane (B4446, just off A4) near Reading, Berkshire. OT 9am. CP, CBS, C, LB, TI on S22. First Aid post. Dave, G4XDU, 01628 625 720 or g4xdu@amsat.org [http://go.to/mcmichaelrally]

TIVERTON SOUTH WEST RC (Mid Devon) Rally - Pannier Market, Tiverton. OT 09.45/10am, £1. TS, B&B, C, CP. club@g4tsw.freeserve.co.uk [www.g4tsw.freeserve.co.uk]

26 - 28 JULY 2002

AMSAT-UK COLLOQUIUM - University of Surrey, Guildford. [www.uk.amsat.org]

RADIO AMATEURS OF CANADA National Convention - Vernon, British Columbia, Canada. The largest amateur radio event for the last five years in Canada. [www.rac2002.org/]

28 JULY 2002

COLCHESTER RA Amateur Radio Rally & Computer Fair - St Helena School, Sheepen Road, Colchester. CBS, B&B, C, TS, TI via GB3CO on S22, CP free. Ron, G4JIE, 01206 826 387 or ron@g4jie.freeserve.co.uk [www.g3co.ccom.co.uk]

LEEDS & DARS Biannual Outdoor Rally & Car Boot Sale - Yarnbury Rugby Club, Brownberrie Lane, Horsforth, Leeds. CBS, CP free. J A Mortimer, M0JAM, 01943 874 650.

RUGBY ATS Radio Rally - BP Truck Stop on A5, 2 miles north of M1 jn 18. 01455 552 449 or rally@rugby-ats.co.uk

Due to the unprecedented number of rallies and special event stations during the months of June and July, space constraints have obliged us to omit all events after the end of July. We hope to return to the normal format next month.

GB calls

These callsigns are valid for use from the date given, but the period of operation may vary from 1 – 28 days before or after the event date. Operating details are provided in an abbreviated form as follows:

T = 160m; L = 80 or 40m; H = HF bands (30 - 10m); V = 6 and / or 4m; 2 = 2m; 7 = 70cm; S = satellite and P = packet.

Please send operational details of your special event station to the *RadCom* office at least five weeks before publication.

The QSL Bureau sub-managers for special event station callsigns are as follows:

GBxAAA-MZZ - Mike Evans, 322 Heol Gwyrosydd, Penlan, Swansea SA5 7BR, e-mail mw0cna@ntlworld.com

GBxNAA-ZZZ - Graham Ridgeway, 37 Highfield Gardens, Blackburn BB2 3SN, e-mail m5aav@zetnet.co.uk

Will organisers of special event stations please ensure that they lodge plenty of envelopes with their sub-managers?

1 Jun GB2ECR: Elvaston Castle Rally. Elvaston Village, Derby. TLHV27 (G4JGA)
GB2HAM: Harrington Air Museum. Nr Rothwell, Northants. LH27 (G4ZPL)
GB2QE: Queen Elizabeth. Bromsgrove, Worcs. TLHV27 (M5DRW)
GB2SIM: St Ives Mansion. Harden, W. Yorks. TLH (G4JJS)
GB4GJ: Golden Jubilee. Tydesley, Manchester. LH2 (G0KEV)
GB5ER: Elizabeth Regina. Fareham, Hants. TLH (G0RPK)
GB5ER: Elizabeth Regina. Fareham, Hants. LH (G4ZMP)
GB5ER: Elizabeth Regina. Fareham, Hants. TLH (G0VIX)
GB5GJ: Golden Jubilee. Nr Kettering, Northants. LH27 (G4ZPL)
GB5QJ: Queen's Jubilee. LHV27 (G0NEI)
GB8ER: Elizabeth Regina. Withernsea, East Yorks. TLHV27 (M5EXY)

2 Jun GB2DTR: Doncaster Transport Rally. Doncaster. LH27 (G4AWT)
GB2SC: Sea Cadets. Taplow, Bucks. (G0FFL)

3 Jun GB0NTC: National Trust Charlecote. Warwick. LH2 (G0MRH)
GB4FAA: Fleet Air Arm. Neyland, Pembs. TLHV2 (GW4XQK)
GB5OQ: 50 Queen. Sudbury, Suffolk. LH (G0IBZ)

7 Jun GB0RAF: Royal Air Force. Elvaston Castle, Derby. LH2P (M0CBN)
GB4YOU: Youlbury Scout & Guide Radio. Oxford. TLH27P (G0RJX)
GB4YOU: Youlbury Scout & Guide Radio. Oxford. TLH27P (G0REL)
GB5SI: Summer Isles. Tanera Mor, Summer Isles. LHV2 (MM0BQI)

8 Jun GB2LL: Langford Lodge. Crumlin, Co. Antrim. LHV2 (GI0OUM)
GB4WJF: Wickham Jubilee Fete. West Wickham, Kent. LH27 (G0TLK)

9 Jun GB2ECR: Elvaston Castle Rally. Elvaston Village, Derby. LHV27 (G0IYZ)

11 Jun GB0CVM: Commercial Vehicle Museum. Leyland, Lancs. LH27 (G3UCA)

14 Jun GB0DAM: Doncaster Air Museum. Doncaster. LH2 (M0CBN)
GB2SH: Saltash Heritage. Saltash, Cornwall. LH2 (M0BHG)

15 Jun GB0GC: Grantham Carnival. Grantham, Lincs. LH (G0RCI)
GB0MOH: Museum of Harlow. Harlow, Essex. LHV27P (M5IMI)
GB0NMS: North Mundham School. Chichester, W. Sussex. LH2 (G0WBR)
GB0QB: Quarry Bank. Wilmslow, Cheshire. (M0AFF)
GB0WAM: Wickenbury Air Museum. Langworth, Lincolnshire. LH2 (M0DBY)
GB0WES: Bowes Museum. Barnard Castle, Co. Durham. L27P (G0NSK)
GB0WHM: Weston Helicopter Museum. Weston-Super-Mare, Somerset. LH2 (G0ATD)
GB1QB: Quarry Bank. Wilmslow, Cheshire. V27 (M1DDO)
GB2CSO: Composite Signals Organisation. Scarborough. LH2 (G4SSH)
GB2EMA: East Midlands Airport. Nr. Castle Donnington, Derbys. LHV27 (G0DAM)
GB2HRM: Heckington Railway Museum. Heckington, Lincs. LH27 (G3ZUC)
GB2HTM: Helena Thompson Museum. Workington, Cumbria. H2 (G0OMB)
GB2HVM: Horsforth Village Museum. Horsforth, Leeds. LH (G0WRT)
GB2LSM: Long Shop Museum. Leiston, Suffolk. LH2 (G0FSP)
GB2MMA: Maritime Museum Appledore. Appledore, N Devon. LH2 (M0BRB)
GB2MOF: Museum of Flight. E. Fortune, E. Lothian. LH (GM4UYZ)
GB2MRL: Museum of Rural Life. Milton Keynes, MK12 5EL. LH2 (M0BUP)
GB2PPS: Papplewick Pumping Station. Papplewick, Notts. LH2 (G0UYQ)
GB2RVM: Redbourn Village Museum. Redbourn, Herts. TLH2 (G3VJO)
GB2SDP: Snibston Discovery Park. Coalville, Leicestershire. TLHV27P (G3KWY)
GB2TIN: Tin (Geevor Tin Mine Museum). Penzance, Cornwall. LHV2 (G3UUZ)
GB2WBM: Whitehaven Beacon Museum. Cumbria, CA28. H2 (M0CRM)
GB4RME: Royal Marines Eastney. Eastney, Portsmouth. TLH2 (G0DHZ)
GB5HTM: Holsworthy Town Museum. Holsworthy, Devon. 27 (G1GZI)

16 Jun GB2ERF: Epsom Radio Fair. Epsom, Surrey. H (M0CJX)
GB2ERT: Epsom Radio Talk-in. Epsom, Surrey. H (M0CJX)
GB2KIM: Kelham Island Museum. Alma St, Sheffield. LH27 (G4FAL)
GB2RJ: Royal Jubilee. Market Rasen, Lincs. H (G0MNI)
GB4NBS: Newbury Boot Sale. Newbury, Berks. 2 (M0CUK)
GB4SWR: Suffolk Wireless Revival. Ipswich. 27 (G4YQC)
GB6IR: Ipswich Radio. Ipswich. TLH (M0BXT)

21 Jun GB2CJC: Clanfield Jubilee Carnival. Clanfield, Hampshire. TLH2P (G0DHZ)
GB4MCC: Methodist Church Clifton. Rotherham. LH2 (G4GET)

22 Jun GB2VSC: Vallance Southern Counties. Charlwood, Surrey. LH27 (G3KAU)
GB4HPS: Heaton Primary School. Heaton, Bradford. LH2 (M5AEH)

29 Jun GB0BRC: Bredhurst Radio Club. Gillingham, Kent. LH2 (M0AAK)
GB0VMW: Vintage & Military Wireless. Berkeley, Glos. TL2 (G0TBI)
GB4FOL: Festival of Leisure. Swadlincote, Derbyshire. LH (G4CRT)

30 Jun GB4BPM: Bromley Pageant of Motoring. Bromley, Kent. LH2 (G0CRH)

SILENT KEYS

WE REGRET to record the passing of the following radio

5Z4FZ	Mr A G Britchford	12/02/02
G0OBU	Mr K Fallon	19/02/02
G0WHW	Mr M Friedman	22/03/02
G2BDV	Mr I Brotherton	31/03/02
G3AUA	Mr H B Morton	19/04/02
G3DEP	Mr H T Parsons	26/02/02
G3MIH	Mr B Sutton	17/03/02
G3PGM	Mr E Davies	12/03/02
G3PRS	Mr R J G Stevens	28/03/02
G3TEJ	Mr M C Dighton	02/04/02
G3TXP	Mr L Duffy	27/03/02
G3UPV	Mr M Rutty	18/03/02
G3YUN	Mr J Easthough	26/03/02
G4GUB	Mr M E Catesby	28/03/02
G4LEZ	Mr I T Ambrose	
G4MOU	Mr A Oates	08/03/02
G5LL	Mr A H Lunn	17/04/02
G6AQZ	Mr B Whitcombe	22/04/02
G6QI	Mr R Walker	24/03/02
G6TNH	Mr G Taylor	23/04/02
G7GRA	Mr D G Cooke	07/03/02
G8CPH	Mr M J Watson	06/12/01
G8MLF	Mr A Douglas	08/04/02
G8TJF	Mr G M Swetman	12/03/02
GM0JKF	Mr M J Thorogood	29/03/02
GM3YCG	Mr S Spence	02/03/02
M5RON	Mr R Newby	30/03/02
MD0ADD	Mr V G Wilson	
RS183077	Mr A McLean	03/12/01
RS90500	Mr F G Furniss	

Club & Regional NEWS

Region 1: Scotland West & Western Isles

MID LANARK ARS
23, Mini-convention at Summerlee Heritage Centre, Coatbridge. John, GM4VPA QTHR.

Region 2: Scotland East & the Highlands

ABERDEEN ARS
7, Junk sale. Tel: 01224 896142.
COCKENZIE & PORT SETON ARC
16, *PW* 144MHz QRP contest. 19, C&PSARC 10m contest. Bob, GM4UYZ, 01875 811723.
LOTHIANS RS
12, AGM. 26, BBQ. Peter, 0131 446 0155.

Region 3: North West

FYLDE ARS
13, Night out on air or 'foxhunt'. 27, Discuss next six month's programme. Ken, G3RFH, 01253 407952
MID CHESHIRE ARS
5, VHF on air night. 19, Activity night. 26, Equipment testing for VHF NFD. Niall, G0VOK, 01606 871413.
STOCKPORT RS
4, Surplus equipment sale, auctioneer Barrie, G6GUT / M3BLT. 18, Aviation night: Airbus A320, Nigel Roscoe, G0RXA. David, M1ANT, 0161 4567832.
THORNTON CLEVELEYS ARS
3, 'Setting up an operating station (pt 1)', Ian, G3ZRZ. 10, BBQ at G4FRK QTH. 17, Auction. 24, Technical forum. Jack, G4BFH, jack@jduddington.fsnet.co.uk

Region 4: North East

GOOLE R & ES
7, DF hunt preparation at *Barnes Wallis Inn.* 14, ARDF 144MHz DF hunt. 21, Social evening at *Black Swan*, Asselby. 28, Content planning at *Black Swan*. Richard, G0GLZ, 07867 862169.
GRIMSBY ARS
6, Talk & demo on computers. Brian, G4DXB, 01472 231383.
HALIFAX & DARS
18, Annual BBQ at Rishworth School. R E Nolson, G0PMU, 01274 600297.
HORNSEA ARS
5, 'Foxhunt'. 12, Activity night. 26, VHF NFD preparation. Andy, G0VRM, 07050 287279.
RIPON & DARS
6, Space Communications, Richard Horton, G3XWH. 20, Mag review and aerial topics. 27, Video night. George, M0CVV, www.riponanddars.org.uk

Region 5: West Midlands

BROMSGROVE ARS
11, Details of DF hunt 3, on air. 25, DF hunt 3. Angus, G8DEC, 01257 875573.
CHELTENHAM ARS
7, Surplus equipment sale. Derek, G3NKS, 01242 241099.
GLOUCESTER AR & ES
3, /P VHF from escarpment site. 10, Workshop, HF on air. 17, Midsummer outdoors event. 24, Workshop, HF on air. Tony, 01452 618930 office hours.
KIDDERMINSTER & DARS
4, 'Foxhunt' DF competition. Tony, G1OZB, 01299 400172.
MAXPAK
10, *UI-View* information night. G4GSB, 01952 585447, milesclifford@aol.com
MID-WARWICKSHIRE ARS
11, Visit and lunch, Bidford-on-Avon, /M operation by the River Avon. 25, ARDF 145MHz evening 'foxhunt'. Bernard, M1AUK, 01926 420913.
MOORLANDS & DARS
16, Bring and buy sale. Paul, M5DAD, 01782 542944.
SANDWELL RC
28, Morse tests. John, G4AAL.
STRATFORD UPON AVON & DRS
1/2, NFD. 3, NT Charlecote, Ron, G0MRH. 10, VHF DF 'foxhunt'. 24, BBQ, on air. David, 01926 642858 or 07816 550075.
TELFORD & DARS
1, NFD at Bridgnorth. 5, On air. 12, DF competition 2E1DJM 'fox'. 15/16, Museums event at Tile Museum, Ironbridge. 22, 2m ARDF near Stourbridge. 26, VHF NFD planning. Mike, G3JKX, 01952 299677.

Region 6: North Wales

DRAGON ARC
3, Discussion night. 17, Members' recent construction projects. Stewart, GW0ETF, 01248 362229.
NORTH WALES RRC
14, Half century in radio, Robert Russell, GW3HUJ. Ted, GW0DSJ, 01745 336939.

Region 7: South Wales

SWANSEA ARS
20, 'Treasure hunt', socialising in a local hostelry. Roger, GW4HSH, 01792 404 422.

Region 8: Northern Ireland

No club details received.

Region 9: London & Thames Valley

BRACKNELL ARC
12, 'Tribulations of an RSGB newsreader', R Powers, G8CKN. John, G3NCN, johnellerton@beeb.net
COULSDON ATS
10, DF hunt. Steve, G7SYO, 01737 354271.
CRYSTAL PALACE & DRS
7, Club project. Bob, G3OOU, 01737 552170.
EDGWARE & DARS
13, Surplus equipment sale. 27, VHF NFD briefing. David, G5HY, 020 89549180 (eve).
GUILDFORD & DRS
14, 'LF' (TBC). 28, Newlands Corner: radio night out. Nigel, G0ADA, 01483 824665.
MAIDENHEAD & DARC
6, 'Safety in and out of the shack', Dick, M0CGN. 18, WWII German radio technology, Richard, G4PRI. John, G3TWG, 01628 525275.
NEWBURY & DARS
16, 16th annual boot sale. 26, Internet-repeater linking, G4HLF. Mark, M0CUK, 01635 36444.
RS OF HARROW
7, Informal. 14, 'How I became a radio amateur', 15/16, Special event station GB2DHH. 21, Informal. 22, Field day. Jim, G0AOT, 01895 476933.
READING & DARC
13, 'Radio navigation', Des, G8FIF, and Robin, G4IWS. Pete, G8FRC, 0118 969 5697.
SILVERTHORN RADIO CLUB
28, On air. David, G0KHC, 020 85042831.
SOUTHGATE ARC
13, Experiences in the Lighthouse Service, Doug Rands. Mike, M0ASA, 020 83660698.
SURREY RCC
10, Construction contest. Ray, G4FFY, 0208 6447589.
SUTTON & CHEAM RS
20, Junk sale. John, G0BWV, 020 86449945.
VERULAM ARC
15/16, Redbourn Museum special event. 24, Bring & Buy tabletop sale. Walter, G3PMF, 01923 262180.
WIMBLEDON & DARS
14, 'Desert Island Radio', Reg, M1EEK. 28, Members' evening, summer camp briefing. Jim, G4WYJ, 01737 356745.

Region 10: South & South East

ANDOVER RAC
4, 144MHz training for VHF NFD. 18, MFJ Antenna Analyser teach-in, Stan, G4MOE. Terry, G8ALR, 01980 629346.
CROWBOROUGH & DARS
1/2, 'Aspidistra' special event GB4ASP from King's Standing. 27, Computers in amateur radio. Eric, G3TXZ, 01892 654633.
FAREHAM & DISTRICT ARS
5, On air. 12, Introduction to club project: Morse tutor, G7HEP. 19, Club project construction. 26, Club EGM. Steve, G7HEP, 01329 663673.
FARNBOROUGH & DRS
12, Brainstorm Q&A evening. 26, Time delay reflectometers, John, G3OQB. Norman, G0VYR, 01483 835320.
HARWELL ARS
11, PSK31, Colin Potter, G6FQZ. John, M3LNU, 01235 223250.
HASTINGS E & RC
19, Pan-European optical highway, Prof Mahoney. R C Gornall, G7DME, 01424 444466.
HORNDEAN & DARC
15/16, GB4RME Royal Marines Museum, Eastney. 22/23, GB2CJC Clanfield Carnival. 25, 'Milestones Museum', Gary Wragg. Stuart, G0FYX, 023 92472846.
ITCHEN VALLEY ARC
8/9, Jubilee Contest. 14, 'How we won the war with a penny and a six gun', SWL Kieran. 22,

G0IVR/P, Clere School, Newbury. 28, 'Treasure hunt', G4EOW. Mike, G6AIQ, mamjh@yahoo.com

MID SUSSEX ARS

7, Lewes visit (TBC). 14, Windmill anniversary evening. 21, Valance Byways preparation. 22/23, Club demos at Valance Byways, Gatwick. 28, Club event video evening, G3XTH. 30, BBQ, Mike, G0GNV. Geoff, G6MJW, 01273 845103.

OXFORD & DARS

13, Loop antennas and QRP power meter, Ray Goff, G4FON. 27, Summer social. Dave, G3BLS, 01865 247311.

SOUTHDOWN ARS

10, Emergency Comms, Ian Hodgson (EPO), Foundation Licence Course. John, G3DQY, 01424 414319.

SWINDON & DARC

6, 'The work of the RA', John Weedon. 13, AGM. 20, Update on ATV, Paul, G8YMM. 27, APRS, Guy, G7BWP. Den, M0ACM, 01793 822705.

THREE COUNTIES ARC

13, 'Foxhunt' annual direction finding contest. Damian, KammDP@btinternet.com

TROWBRIDGE & DARC

5, Ten-minute talks. Ian, G0GRI, 01225 864698, eves/weekends.

WORTHING & DARC

5, The Internet, an Upgrade. 12, Contests update. 19, The FT-817. 26, Discussion evening. Roy, G4GPX, 01903 753893.

Region 11: South West & Channel Islands

APPLEDORE & DARC

15/16, Museum on air event, Appledore Maritime Museum, GB2MMA. 17, Discussion on museum on air event. Brian, M0BRB, 01237 473251.

BLACKMORE VALE ARS

4, On air night. 11, 'Dayton Convention', Gary Fingerhut, G0ENW. 18, On air. 26, WAB. Tony, G0GFL, tel: 01258 860741.

BRISTOL RSGB GROUP

24, Wine and cheese social evening. Martyn, G3RFX, 0117 973 6419.

CORNISH RAC

6, General Meeting. 10, Computer section. John G4LJY, 01872 863849.

NORTH BRISTOL ARC

28, 'The Foundation Licence - Dispelling the Myths', *RadCom* 'Newcomers News' columnist Steve Hartley, G0FUW. Dick, G0XAY, g0xay@aol.com

SOUTH BRISTOL ARC

3, Jubilee Open Day. 5, Summer bring & buy sale. 12, Computer clinic. 19, 5WPM Morse practice. 26, Preparation for Longleat & VHF NFD. Len, G4RZY, 01275 834282.

TORBAY ARS

21, The RSGB, Peter Kirby, G0TWW, RSGB General Manager. John, G3RMA, 01803 556425.

WEST SOMERSET ARC

4, 'Foxhunt'. Jean, G0SZO, 01984 633060.

YEOVIL ARC

6, BC 348 communications receiver, G7LNJ. 13, 'Foxhunt' on 2m, M1WOB 'fox'. 20, BC 348 communications receiver, G7LNJ. 27, On air. Derek, M1WOB, 01935 414452.

Region 12: East & East Anglia

BRAINTREE AR & CCC

3, The weather, Brian Baker. 17, Aerial clinic. Keith, M0CLO, 01376 347736.

CAMBRIDGE & DARC

7, Testing Epiphyte transceiver boards. 14, Identifying and using surface mount components, Sid, G6FKS. 21, Informal. 28, 'Foxhunt' DF evening. Ron, G3KBR, 01223 501712.

CHELMSFORD ARS

11, Constructors' contest. David Bradley, M0BQC, 01245 602838.

COLCHESTER RA

20, PIC-based frequency source, Peter Onion, G0DZB. Andy, M1MOD, 01206 735122.

EAST KENT RS

17, RSGB Amateur Radio Observation Service, Barry Scarisbrick, G4ACK. 22, Annual summer BBQ. Paul, G3VJF, 01227 365384.

Region	RSGB Regional Manager
1. Scotland West & Western Isles	Gordon Hunter, GM3ULP
2. Scotland East & the Highlands	Billy Jenkins, MM0WKJ
3. North West	Kath Wilson, M1CNY / M3CNY
4. North East	Geoff Darby, G7GJU / M3GJU
5. West Midlands	Roy Clarke, G8AYD / M0RLY
6. North Wales	Liz Cabban, GW0ETU
7. South Wales	Simon Lloyd Hughes, GW0NVN
8. Northern Ireland	Jeff Smith, MI0AEX
9. London & Thames Valley	Alan Ross, G1SQB
10. South & South East	Ivan Rosevear, G3GKC
11. South West & Channel Islands	Dick Atterbury, G4NQI
12. East & East Anglia	Malcolm Salmon, G3XVV
13. East Midlands	Vacant

RSGB Regional Managers as of 1 May 2002.

FELIXSTOWE & DARS

1/2, Foundation Course. 10, ATV repeater. 24, EMC, Dave, G3XSA. Paul, G4YQC, 01394 273507.

GREAT YARMOUTH RC

14, NFD debrief. 22, Preparations for VHF and Low Power Field Day. A D Besford, G3NHU.

HARWICH ARIG

12, 'Auroras', Paul Whiting, G4YQC. Eugene, G4FTP, 01206 826633.

IPSWICH RADIO CLUB

5, '160m DX from a small garden', Phil Ashton, G3XAP. 6/7, Special event station at Suffolk Show. 19, Club net & activity from Otley. Keith, G7CIY, 01394 420226.

MAIDSTONE YMCA ARS

7, AGM. 14, Next year's calendar. Andy, M0CST, 01622 661035.

MEDWAY ARTS

7, Vintage Radio Part 2. Pauline, 2E1HRY, pauline.odle@blueyonder.co.uk

NORFOLK ARC

5, Informal Morse practice and instruction. 12, Members' 'foxhunting' rigs and techniques. 19, Informal Morse practice and instruction. 26, 'Foxhunt'. Peter, G3ASQ (QTHR).

RAF AIR DEFENCE RADAR MUSEUM RAF NEATISHEAD

22, Annual 'Friends of the Museum' meeting. GB2RAF operational. Terry, G4PSH, 01692 582064.

SUDBURY & DISTRICT RA

11, 'Training for the Foundation Licence and Morse Assessment', Frank Howe, G3FIJ. Bryan, G1TWY, 01787 247893.

Region 13: East Midlands

LINCOLN SW CLUB

5, Sports night at Golden Eagle. 15/16 Special event at Aviation Heritage Centre. 19, Hamfest discussion. 26, On air. 29 Special event Kettlethorpe Hall. John, G1TSL, 01522 793751.

LOUGHBOROUGH & DARC

4, 2m DF. 11, 'Soldering', Steve, G7BMM, and Ian, G8SNF. 18, On air. 25, Vintage radio. Chris, G1ETZ, 01509 504319.

MELTON MOWBRAY ARS

21, Annual 'foxhunt'. Geoff, G3STG, 01664 480733.

NORTHAMPTON RC

6, Introduction to PSK31, M0CTC. 13, Members' forum / construction evening 4:1 balun. 20, Table-top sale. 27, Amateur Radio Observation Service, Barry Scarisbrick, G4ACK, with buffet. Norman, G0GBZ, 01327 349188.

RAF WADDINGTON ARC

13, HF mobile 1960s to 90s, Bob, G3VCA. 15/16, 29/30, Wickenby Air Museum special event station. Bob, G3VCA, 01522 528708

SHEFFORD & DARS

6, Lancaster bomber navigation and radio equipment, Norman Groom of Pitstone Museum. 13, VHF NFD planning. 20, Visit to Pitstone Museum. 27, Flying at RAF Henlow. Derek, G4JLP, 01462 851722.

SOUTH NORMANTON, ALFRETON & DARC

3, Golden Jubilee Celebrations. 17, Junk sale. 24, Night on air (outdoors). Lyn, M0BMY, 01773 520 353.

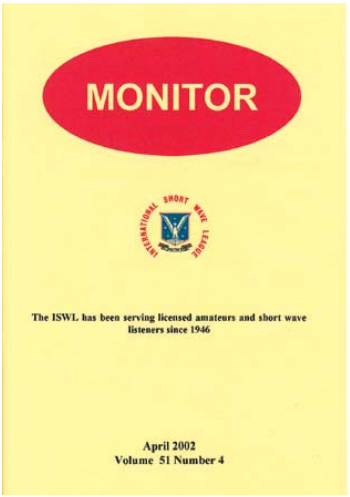
Items for club news should be sent to the *RadCom* Office at HQ to arrive by the 26th of the month, ie approximately a month before publication (eg 26 January for the March Issue). News items should be sent in writing (fax, letter or e-mail gb2rs@rsgb.org.uk) by the club secretary or the person responsible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

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

ABOVE AND BEYOND THE CALL OF DUTY

STUART ELVIN from Barnsley has the Foundation Licence and **Finningley Amateur Radio Society** to thank for his new-found freedom. Stuart is an avid SWL but suffers from agoraphobia which meant that he could not get out to take an amateur radio course. Help was at hand, however, when Eric Prince, G3KPU; Peter Myles, G3UWT, and Howard Jones, G3SFO, undertook a 100-mile trip over two days in order to give Stuart 12 hours of tuition at his own home. Stuart passed the exam and has just received the callsign M3SRE. He is now looking forward to making new friends via radio.

Eric, who is chairman of the Finningley group, said that the club was only too happy to have been able to help Stuart achieve this milestone in his life. Courses run by the Finningley Amateur Radio Society have led to 26 Foundation course passes and a further 12 VHF licensees taking the Morse Assessment in order to take out M3 licences.



The ISWL magazine, *Monitor*, now includes photos of QSLs etc printed in colour. ISWL caters for all sectors of the short-wave hobby, including licensed amateurs, SWLs, broadcast band listeners and DXers, those interested in data communications etc. For further information please contact the hon sec, John Raynes, G0BWG, QTHR.

A FULL HOUSE

DAVID WALKER, G3BLS, Hon Secretary of the **Oxford and District Amateur Radio Society,** writes to say that all members of the club are now members of the RSGB in their own right. Consequently the club copy of *RadCom* is now donated to the Central West Gate Library in Oxford each month, where it is available in the reading room dedicated to newspapers and magazines. A gummed label is attached giving contact details should any reader wish to find out more about amateur radio locally.

This is an excellent idea that other RSGB-Affiliated Societies may wish to take up.

ORCADIAN GATHERING

COLIN BAYLISS, GM3WKZ, sent in this photo of a gathering of hams in the Orkney Islands at the **GB3OC Repeater Group** AGM. The 2m repeater is a useful means of keeping a far-flung amateur radio community in contact. Operating in the far north presents difficulties in keeping aerials intact because of the very high winds. The compensation is the very low noise level on the HF bands and auroral propagation on VHF.

Left to right: Jim Moar, GM4EFR, treasurer; Colin Mair, GM7NUQ, chairman; George Flett, GM0HQG, repeater keeper; Colin Bayliss, GM3WKZ committee member; Bob Macleod, GM4DZX, QSL bureau sub-manager; Donnie Grieve, GM0HTH; Alan Flett, GM0HTT, committee member; and Clive Penna, GM3POI, committee member (and well-known contester and DXer).

HAM RADIO FAMILY

EIGHT-YEAR OLD Victoria Reay recently became the latest member of her family to take out an amateur radio licence. She was the youngest of 14 students at the recent Foundation Licence course held by the **Bredhurst Receiving and Transmitting Society** based in Gillingham, Kent. Victoria, now M3VLR, is the sister of 11-year old Rebecca Reay, M3JSA, who had taken an earlier Foundation Licence course at the club. The sisters' father is Brian Reay, G8OSN, while their mother holds the callsign G6MXR. Now Victoria's twin sister, Michaela, having finally decided that "amateur radio is cool", plans to do the next Foundation course. When Michaela holds a callsign, the whole Reay family will be licensed radio amateurs. Victoria says she is now looking forward to progress to the Intermediate licence and eventually to take the full RAE.

Bredhurst Receiving and Transmitting Society Foundation Course Lead Instructor Charles Darley, G4VSZ, reports that 13 of the 14 candidates passed the recent course, the oldest student being Louis Wellington, at over 70 years of age.

Victoria, M3VLR, and Rebecca, M3JSA, Reay take to the air.

ANTENNA WORKSHOP - OPEN TO ALL

HORNSEA AMATEUR RADIO CLUB is holding its fourth 'antenna workshop' at Manor Farm, Bewholme, Driffield, East Yorks between **29 August** and **5 September**, where you will be able to operate using a large selection of antennas, from verticals to rhombics. There is no entrance fee, but *you must book*. Details from G4YTV (QTHR), tel: 01964 562498 or e-mail: g4ytv@aol.com

"I SPELL FOR YOU: LIMA LIMA ALFA NOVEMBER . . ."

CALLED OUT to restart the car of Foundation Licence Lead Instructor Dewi Roberts, GW0ABL, Llanfairpwllgwyngyllgogerychwyrndrobwllllantysiliogogogoch AA man Dave Wilson was persuaded to go for his first amateur radio licence. A keen SWL for many years, Dave now holds the callsign MW3DAA and with 10 watts has already made contacts with Canada, USA and Taiwan.

Dave's is the first Foundation Licence held on the Isle of Anglesey and it is hoped that many more will follow. Dave is to take his 5WPM Morse test soon and has already started an Intermediate licence course at the **Dragon Amateur Radio Society**. Further details of courses can be obtained from Stewart Rolfe, the Dragon ARC secretary, tel: 01248 362229, or from Dewi Roberts, tel: 01248 713647.

Geoff Spencer, GW4DRR, chairman of the Dragon ARC, presenting Dave Wilson, with his Foundation Licence pass slip.

VHF/UHF

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

AFTER several months of rewarding activity there were fewer reports this time. On 50MHz, the F_2-layer propagation ceased but other DX was around. Some auroral propagation was reported and, in spite of low British activity, there were some tropospheric openings.

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, (NP), (BS) etc refers to the postcode area and (GN38), for example, is the Maidenhead grid.

WHAT IS A QSO?

ON PAGE 84 IN the January *RadCom* I included comments from Bryn Llewellyn, G4DEZ, who suggested that if both callsigns were not exchanged, a QSO was invalid. He was referring to non-contest operation during a DX opening on 6m. However, a few readers disagree strongly with his views.

There is no guidance on this topic in the *RSGB Yearbook* but in the 'Operating a Station' chapter in an old *ARRL Handbook*, under the heading, 'Snagging the Rare Ones', the advice is, "Make your calls short, snappy and distinct. No need to repeat his call (he knows it very well; all he needs to know is that you are calling him), but send your own call a couple of times."

I fully agree: if the DX station picks out your call and you send him a report which he acknowledges giving you a report, that's a valid QSO in my log. It's sensible operating practice during brief openings or pile-ups, so to imply that it is cheating is "beyond the pale", as one critic put it.

GEOMAGNETIC AND SOLAR ACTIVITY

IN THE 30 DAYS to 16 April the average daily 10.7cm solar radio flux was 193.4 units, slightly up on the previous period. It varied from a 'low' of 166 on 26 March to a maximum of 226 on 13 April. 37 new sunspot regions were recorded. The daily sunspot areas in millionths of the Sun's visible disc were considerably up on those in the previous period with five days over 2000, the maximum being 2400 on 15 April. On only nine days were the areas below 1000. The middle latitude A-index was quiet on 23 days and the maximum occurred on 24 March when it reached 29 and the 3-hourly K-index reached 5.

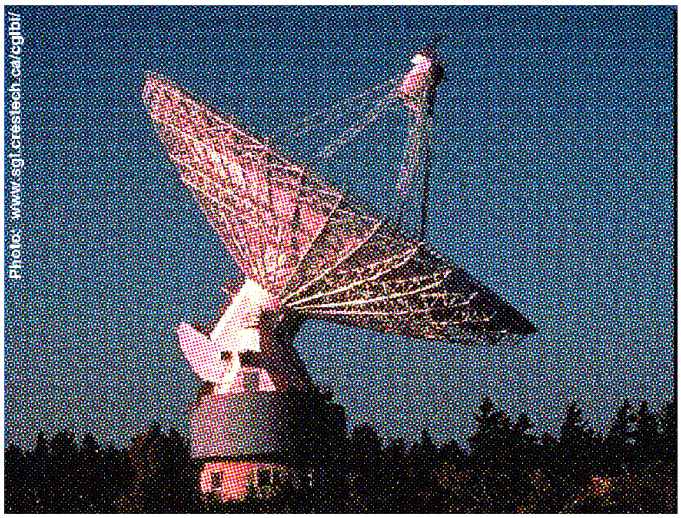
PROPAGATION

IN THE FEBRUARY issue of *SunMag* the first article defines the Mount Wilson magnetic classification of sunspot groups. Another article covers the successful launch of NASA's HESSI - High Energy Solar Spectroscopic Imager - spacecraft to begin a two to three year mission to observe the most powerful explosions in the solar system. "Scientists will use HESSI to study mysterious fundamental basics of solar flares" and will observe over 1000 of them.

There are the usual tables of daily solar, geomagnetic, particle and sunspot group data, an eight-page list of all the sunspot groups in February 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 I acknowledge with thanks the receipt of the December 2001 issue of *The Six and Ten Report*.

JERSEY VENTURE

AT THE END of March Conrad Farlow, G0RUZ, and Martin Platt, G4XUM, mounted a successful DXpedition to Jersey. The site was the club station of the Jersey Amateur Radio Society, GJ3DVC, at La Moye (IN89VE) the shack being an old WWII German signal station. They had



The huge radio astronomy antenna at Algonquin Park Observatory, Ontario, Canada, that has been used in the past for amateur EME work.

144MHz TRANS-ATLANTIC?

THIS STORY STARTED on 20 March when Bernd Gapinski, DK3XT, forwarded a message from Alex Dutkewych, N2PIG. Alex said that three weeks earlier he set up a high power (QRO) 2m and 70cm station in eastern Newfoundland at GN38MB to attempt to contact his wife, Debra, VA3PIG, in Europe. The following week they travelled to the Irish Republic and set up a similar station at IO41VS.

Alex returned to Canada and activated his station on Saturday 16 March. He writes, "In the last five days Debra and I have been communicating across the Atlantic Ocean at an approximate great circle distance of 3000km on 2m using WSJT! St Patrick's Day, Sunday, we managed an exchange of callsigns. On Tuesday we completed a full exchange in less than four hours! Today, in the early morning, we exchanged salutations: 'God bless America' from Newfoundland and a partial 'Greetings from Ireland'." Alex signed his e-mail as P/VO1/N2PIG but did not mention the callsign that Debra used.

I e-mailed Alex requesting fuller details as to the suggested propagation mode, the frequency (QRG) used, and asking if any other stations monitored the tests? I asked for any photographs of the stations but have not received a reply. The actual distance (QRB) is 3044km.

In a subsequent e-mail to the editor, David Farn, G4HRY (CV), advised that the amplifier used in Ireland was a Discovery model, with a GS31 tube, loaned by the Linear Amp UK company and that he now owns the PA. On the packaging a UPS waybill shows it was sent by Debra Dutkewych of the Dutkewych 2002 2m Trans-Atlantic DXpedition from the Great Southern Hotel, Shannon, Co Clare. As David remarked, "So they did have the power capability!"

Just before compiling this I checked both Alex's and Debra's details on QRZ.COM but there is no reference yet to their DXpedition. In his e-mail Alex wrote, "Full details of the event will be available in a website, which we are soon to construct" but I have not found one.

Alex wrote about the event, "It was a few years in the dreaming, planning and training for this DXpedition" and it must have involved considerable expense. So let us hope that they will be able to satisfy the Irish Radio Transmitters Society that they fulfilled the requirements to claim the coveted Brendan Trophies if they apply.

a considerable delay in setting up the antennas so the first contact was at 0630 on 24 March with S51AT on high speed CW (HSCW) meteor scatter (MS).

To summarise their results on 2m, GJ0RUZ completed 10 MS QSOs, nine on CW and one using WSJT: 28 EME QSOs, three on skeds the rest random and 54 SSB tropo contacts. A full report is on Conrad's website - see the list. The station comprised an IC-746 transceiver, MGF1801 cavity preamp with 4-pole bandpass filter, a VHF Discovery PA loaned by the sponsors Linear Amp UK and two 4.6 wavelength Yagi antennas. Thanks are due to Chris, PA2CHR, for the power splitters, Bernd, DF2ZC, who provided the elevation rotator, the members of the JARS and especially to Joe Bette-Bennett, GJ0NYG, who helped organise things, assemble antennas and took the photographs.

ANTENNA NOTES

ALMOST EVERY serious VHF operator is keenly interested in antenna design and there is plenty of software available to help design the best Yagi for a given boomlength. When it comes to stacking and baying them, though, the data become a little confusing. David Hilleard, G4CQM, designs VHF antennas professionally but, unlike some, he is willing to share his data with fellow amateurs.

He has established an interactive website - see the list - which offers Javascript calculation options. He told me that it covers stacking and baying information, design of stubs etc, so have a look.

MOONBOUNCE

THERE IS PLENTY of EME news from British operators in the April *432 and Above EME News*. From France, Graham Daubney, F/G0VBA (JO04), has built a 432MHz feed for his 4m dish and is hearing the bigger stations. He was on 23cm in a recent sked weekend and completed with SM2CEW, G4CCH, W5LUA and OZ6OL.

Simon Freeman, G3LQR (JO02), is making slow progress on his GS35b PA for 23cm. His new 70cm PA uses an RCA 4661 tube and runs nicely at full power but he is working on his antenna array to improve it. His 4.2m dish survived some big winter storms and he has been using it on 13cm.

Peter Blair, G3LTF (IO91), tried out his 23cm system on 21 March, having made a number of changes, and worked OZ6OL and G4CCH: echoes were good especially on SSB. In the contest on 70cm on the 23rd he completed with SM2CEW, VK3UM, VK4AFL, JA6AHB, DL1YMK, F6KHM and WA6PY for initial number 355. Next day brought PA0AVS no 356, F2TU, UA3PTW, UT3LL, DK3WG, YO2IS, SM3AKW, K0RZ, WA4NJP, K1FO, RA3LE, DJ3FI and G4YTL no 357. He was also QRV on 13cm.

David Dibley, G4RGK (IO91), has repaired all the damage to his 70cm array and was QRV in the *DUBUS*/REF contest. With 350W output he completed with HB9Q, K1FO, OH2DG, OE5EYM, SM2CEW, G4YTL, K2UYH, K0RZ, DL9KR, SM3AKW and F6KHM. I assume that the QSOs mentioned in the preceding paragraphs were all on CW.

For several reasons Howard Ling, G4CCH (IO93), abandoned plans to try out JT44 mode on 23cm in the 13/14 April weekend. On the 13th he completed with W2UHI*, N2IQ*, K9KFR*, F6HKM* also on SSB for number 166. Next day brought IK2MMB and F6KHM.

METEOR SCATTER

FROM 'DOWN UNDER' comes news of what is believed to be the first VK/ZL 2m *random* MS QSO using WSJT (FSK441) mode. It took place on 13 April between Rex Moncur, VK7MO, in Hobart, Tasmania and Bob MacQuarrie, ZL3TY, in Greymouth on the west coast of South Island, New Zealand. The QRB is 1950km.

On 7 June there is the peak of the Arietids shower with a ZHR of around 55. The OH5IY software suggests a peak around 1600. The radiant is above a mid-UK horizon 0100-1730. The geometry of the Zeta Perseids is similar to the above and the peak should be around 1530 on the 9th with a ZHR of 50. This shower is accessible 0200-1930.

LOCATOR SQUARES TABLE

Starting date: 1-1-1979

Call	MHz: 50	70	144	430	1296	Total
G3XDY	-	34	251	175	123	583
G3IMV	813	20	616	125	53	1627
GJ4ICD	780	1	267	121	79	1248
G4TIF	509	28	235	112	-	884
G4YTL	-	53	524	111	-	688
G6TTL	220	-	133	90	27	470
G1SWH	350	42	240	81	30	743
G0EVT	506	14	309	77	16	922
G0XDI	228	-	254	67	-	549
G8HGN	283	-	167	62	-	512
G6TOK	351	32	135	56	29	603
G3FIJ	273	29	107	50	23	482
G4DEZ	536	15	96	38	22	707
G4ZHI	86	10	256	32	-	384
G0ISW	215	1	85	22	-	323
G4APJ	169	-	51	22	-	242
G0FYD	609	1	283	20	-	913
G1UGH	280	-	130	17	-	427
G7CLY	244	-	248	16	-	508
G4FUJ	74	19	25	5	5	126
G0JHC	940	26	49	4	-	1018
G1EFL	230	-	67	2	-	299
M1DUD	196	1	31	1	-	229
GW7SMV	643	-	207	-	-	850
G4OBK	417	14	57	-	-	488
G7KHF	434	-	-	-	-	434
GU8AJE	338	13	32	-	-	383
GW3EJR	289	-	-	-	-	289
GM4VVX	186	-	100	-	-	286
G3FPK	30	-	246	-	-	276
GM6MEN	166	-	-	-	-	166
G4OUT	-	23	107	-	-	130
M5PLY	120	-	-	-	-	120
M1DRK	113	-	-	-	-	113
EA7IT	-	-	102	-	-	102

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Next deadline is 18 June. Band of the month 430MHz.

BAND REPORTS

50MHz

David Whitaker, BRS25429 (IO93), heard his first auroral signals of the year on the band on 25 March in a 15min period from 1640. He copied GM7PBB (IO68), GM4WJA (IO87), MM0AMW (IO75) and MM0BJG (IO67).

Spaceweather.com posted an auroral warning message on 16 April concerning a full-halo coronal mass ejection that erupted from the Sun at 0400 the previous day. This CME swept past Earth on the 17th causing a geomagnetic disturbance that began at 1100. David reported an auroral event that started around 1615. He heard stations in DL, EI, ES, G, GM, GW, LA, OH, OZ, PA and SM in 19 grids, ODX being KP20 and KO29.

Jim Rabbitts, GM8LFB (IO88), heard beacon ZS6TWB (KG46) for the first time on 13 April, 1330-1345 then heard ZS6DXB working Italians. He copied the VK6RSX beacon on three occasions in the F_2 season, the last time being on 17 March, 1000-1010. His station comprises a TR-9000, RN Electronics transverter, 25W to a 3-ele Yagi 6m AGL.

Ron Stone, GW3YDX, worked 28 JAs on 25 February from around 1045 and many have already sent their QSLs. He runs an IC-746 and Acom 1000 PA to a home-brew 8-ele DL6WU Yagi on a 28ft boom, 40ft AGL. In March Jamie Ashford, GW7SMV (NP), worked TT8DX (JJ88) on the 12th and 7P8Z* (KG30 for a new grid and country), ZS4NS (KG32), ZR6DXB and ZS6XJ (KG33) on the 16th. A small aurora on the 24th brought GM7PBB and from Africa on the 27th V51/ZS4NS (JG78) and V51LK (JH90) both new grids, then on the 28th ZS6Y (KG33) and three other ZSs.

Ted Collins, G4UPS (EX), reports pretty poor conditions from 14 March. That day he worked ZS6WB (KG44) and heard some ZS beacons. While he was off in the afternoon of the 16th 7P8Z worked 24 Gs and 6 GWs. He heard VR2LC* at 0811 on the 17th. Tropo was excellent on the 23rd when his daily morning sked with G3CCH brought RST599 reports. Weak auroral signals from GI and GM were copied on the afternoon of the 24th. Thereafter the only item of interest up to 15 April was a telephone call from G3HBR to say that G3FPQ had worked KH6SX on 50.110MHz around 1000. Neither Brian nor Ted could hear the KH6, though.

On the QSL front, Ted has received his S92JHF card but the operator does not collect cards. ZS4TX did have N7RO as his QSL manager but Bernie now says to QSL direct (QTHR) or via the bureau.

Referring to the 'BeaconNet' article in the May *RadCom*, pages 38-40, Ev Tupis, W2EV reports, "Some of our experimenters are in the process of establishing a presence on 50.291MHz USB +1.5kHz PSK31 audio."

70MHz

Phil Catterall, G4OBK (YO), is new to the band and was QRV in the contest on 14 April making 38 QSOs, ODX being G4RFR (BH) at 393km and G6EED/P (TA) at 392km. His points per QSO averaged 242. Phil runs an FT-847 with an amplifier giving 75W to a 5-ele Yagi 25 metres AGL.

David Dodds, GM4WLL, operated /P from IO85NR in the contest and was amazed at the level of activity. In two hours he made 23 QSOs, ODX being G4RFR at 555km. Ten QSOs were over 400km and 16 over 300km. He worked G, GD and GM stations in 11 grids, "... and went home well chuffed!"

Brian Williams, GW0GHF (CF), happily reports that, "... four metre interest has mushroomed." The much-missed *Four Metres News* that Derek Thom, G3NKS, used to publish has now been resurrected by Steve Bryan, G7VHG (e-mail g7vhg@mail.com) and he puts a good signal into South Wales from Swindon with his 50W and 4-ele Yagi. There are now three regular SSB nets around 70.196MHz, participants including G6EED in Taunton, G7VHG and Brian. Bob Gibbons, GW0AIY (SA) is also QRV on 4m as are GW1SXT (NP) and GW6CUR (CF).

144MHz

Ken Punshon, G4APJ (BL), has been listening with WSJT (FSK441) recently and has heard DK1KO (JO53), IC8FAX (JN70), F1FIH (JN23), HA1FV (JN87) and an SM. He has also been out /P in activity evenings though 5W is insufficient power and a new site is being sought. GW7SMV worked EA1CRK (IN73) on 22 March, DL1EJA (JO31) next day and ON1VS (JO21) and ON7CL (JO20) on 11 April.

On 28 March Bryn Llewellyn, G4DEZ (JO03), worked about 40 Scandinavians, ODX being SM7MXO (JO77) at 1047km. He heard G4LOH (IO94) and G8LZG (IO93) but they only worked a few stations. G4KWQ (IO92) listened in for over three hours and heard nothing till midnight when he exchanged RS55 reports with an OZ who was S9+30dB with Bryn. In another opening on 14 April he contacted over 20 continental stations at up to 700km. He finds the calling frequency full of DL, F, ON and PA stations but *very few* Gs.

430MHz UP

Pierre Metenier, F4CKV (JN16) is looking for skeds on 70cm. He runs an IC-706MkIIG at 100W to a 21-ele Yagi 17m AGL. His e-mail route is f4ckv@radioamateur.org and he is also QRV on 2m. G4APJ is experimenting with JT44 mode on 70cm and has "half completed" with GW8ASA (IO81) over a difficult path. Ken hoped to listen during the EME contest on the 21/22 April weekend.

GM4WLL went out portable to IO85RU in bad weather for a couple of hours on 17 March but conditions on 70cm and 23cm were absolutely abysmal. However a sked with PA0WWM* on 23cm was successful at RST559 for his ODX so far at over 600km. He made just two contacts on 23cm and four on 70cm. PE1HWO (JO21) reported good tropo on 2m, 70cm and 23cm on 7 April with the Angus beacon, GB3ANG, loud on each band. André runs 15W to a 65-ele long Yagi 20m ASL on 23cm.

DEADLINES

THAT'S IT FOR this month. The copy deadline for August is **18 June** and for September it's **16 July**. My CompuServe ID is g3fpk and the telephone answering and fax machine is on 020 8763 9457. ♦

WWW.

Zarlink	**http://www.zarlink.com**
Metelics (Diode info)	**http://www.metelics.com**
National Instruments	**http://www.ni.com**
Mini Circuits	**http://www.Mini-Circuits.com**
GJ0RUZ report	**http://www.g0ruz.net**
G4CQM antenna info	**http://www.antennadesiner.co.uk**

CONTEST

TIM KIRBY, G4VXE
11a Vansittart Road,
Windsor SL4 5BZ
E-mail:tim@ukgateway.net

JUNE LOOKS LIKE being a busy one for contesters. The first weekend of the month brings NFD. We're hoping for a bumper entry after the cancellation of the event last year. I'm hearing rumours of well-known groups operating from unusual locations. So, support your local club, even if you're not a regular CW operator. The seasoned operators will be pleased to show you how an NFD station operates. Assistance is always very welcome with the station setup, knock-down, not to mention making the tea!

The RSGB's Jubilee Contest, which you can read about on pages 36 / 37 this month looks like being an exciting new challenge. Many letters and e-mails I've received recently have suggested that the RSGB should include more SSB events in the contest calendar. Even as a dedicated CW operator, I'm inclined to agree that it makes sense - particularly for newcomers! So, if you're keen to try your hand at contesting, but don't fancy CW, think about spending some time in either the Jubilee Contest or the IOTA Contest [in July - *Ed*], both of which have plenty to offer the SSB operator.

CQ Contest Survey

THANKS to Roger, G3SXW, for pointing out the *CQ* Contest Survey 2002. John Dorr, K1AR, has put the survey together. If you participate in the *CQ* contests, or actually, even if you don't, this is an ideal opportunity for you to send some feedback to the organisers of the world's leading international contests. There are, I know, some of you who do not enjoy contesting and you may find the questionnaire of interest as well. You can find the questionnaire at http://www.hamgallery.com/survey/

A business meeting in Orlando recently provided the opportunity for a very enjoyable dinner gathering of contesters and DXers. Left to right: K1AR, G3SXW, G3TXF (standing), G4VXE, VE3EJ, K1DG and N5TJ.

2nd 70MHz Contest, 2001

DESPITE A slightly reduced entry this year, several entrants reported the contest had good activity. Band conditions seemed average once again, although Andy, GD0TEP, and Robert, GD4GNH, operating GD0EMG managed to complete an MS contact with S51DI just before midday.

Congratulations to all of the section winners and runners up.

Lee Volante, G0MTN

2nd 70MHz Contest, 2001

Pos	Call	Score	Loc	QSO	Power	Ant	Best DX	Dist
Multi-Operator								
1	GD0EMG*	15900	IO74QD	53	160	2 x 8	S51DI	1673
2	GW5NF/P*	3958	IO81KR	24	100	5	GM4ZUK/P	580
Single Op Fixed								
1	G4AEQ*	8160	IO93PE	44	160	2 x 6	GM4ZUK/P	433
2	G0GCI*	4101	JO01ED	24	100	8	GD0EMG	474
3	G4JTJ	3508	IO92SD	26	60	6	GM4ZUK/P	549
4	G3MEH	3039	IO91QS	27	160	2 x 5	GD0EMG	377
5	G0ODQ*	2924	IO91NQ	23	20	5	GM4ZUK/P	594
6	G4SJH	2692	IO91PI	23	85	3	GD0EMG	407
7	G1KHX	1345	IO81MI	9	90	5	GD0EMG	330
8	G4XRV	1254	IO91QR	16	15	5	GD0EMG	379
9	G4OUT	1186	IO92AT	9	10	3	GD0EMG	230
Single Op Other								
1	GM4ZUK/P*	8002	IO86RW	20	70	5	G3TCU/P	647
2	G3UUT/P*	4960	IO92XD	34	100	6	GM4ZUK/P	557
3	GW8ASA/P	4109	IO81FP	30	50	3	G4DEZ	370
4	G0WJR/P	3619	IO83RO	22	15	5	GM4ZUK/P	371
5	G3TCU/P	2662	IO91QF	18	5	3	GM4ZUK/P	647

Check log received from S51DI.

70MHz Trophy, 2001

THE TEMPORARY RULES restricting portable operation had a considerable effect on this contest, where the proportion of portable stations is usually very high. The Five Bells Group still managed to top the multi-op section from their fixed location. But it was GD4GNH operating GD0EMG and representing the Northern Lights who takes the trophy this year. There was some reasonable Es propagation during the day with S51DI making 12 QSOs giving him the second highest number of points before applying the multipliers.

Check logs gratefully received from G6FBB/P, G4WVD/P and G3VQO/P.

Pete Lindsay, G4CLA

70MHz Trophy, 2001

Multi Op

Pos	Call	Loc	QSOs	Mults	Points	Total	Best DX	Dist	Power	Ant	Club
1*	G4SIV	IO92WS	64	50	13538	676900	S52SK	1357	160	2x9	Five Bells CG
2*	G4ZAP	IO81SG	51	42	9535	400470	GM4ODA/P	1028	160	2x6	A1 Contest Group
3	G4CWH	IO85XG	37	30	10363	310890	G3BPM	489	150	5/5	

Single Op

Pos	Call	Loc	QSOs	Mults	Points	Total	Best DX	Dist	Power	Anrt	Club
1*	GD0EMG	IO74QD	77	56	24581	1376536	S52SK	1692	160	2 x 8	Northern Lights
2*	G4AEQ	IO93PE	59	47	12285	577395	S51DI	1394	160	2x6	
3	G4ZTR	JO01KW	42	37	9558	353646	S51DI	1239	75	8	Colchester CG
4	G3MEH	IO91QS	55	41	8043	329763	GM4ODA/P	969	100	2x5	
5	G0ODQ	IO91NQ	41	32	6300	201600	GM4ODA/P	978	40	5	
6	S51DI	JN76VL	12	14	13982	195748	GM4ODA/P	1902	100	8	
7	G3LVP	IO81WV	41	32	5692	182144	EI4VWY	478	150	7	
8	G0GCI	JO01ED	32	29	5908	171332	GM4ODA/P	1042	100	8	
9	G3TCU	IO91QE	34	30	5164	154920	G4CWH	464	150	6	
10	G3BPM	IO80OV	31	16	6094	97504	EI4VWY	512	50	8	
*11	G3FIJ	JO01KV	15	14	2125	29750	GD0EMG	445	10	4	
12	G4XRV	IO91QR	15	14	1834	25676	G4CWH	406	20	5	
13	GM4DIJ	IO85IW	8	9	1123	10107	G4SIV	407	50	4	

70MHz CW, 2001

ACTIVITY THIS year was extremely poor with a number of regulars being noticeable by their absence. In complete contrast, a number of entrants commented that tropospheric conditions were good with the beacons at reasonable strengths. During a sporadic E opening, S51DI managed to work five stations which had a major effect on the results.One or two soapbox comments: "Good opening, but only a few stations heard / worked. PA failure after third QSO" (S51DI). "Saved by brief Es opening to S51! Hard slog rest of time. No GU, GI, GD, GW heard" (G3UKV).Congratulations go to: Martin, G3UKV, for his third straight win; Ivan, S51DI, who as runner-up came very close; and the Flight Refuelling ARS, which won the multi-operator section.

Roger Dixon, G4BVY

70MHz CW, 2001

Single Operator Fixed (SF)

Callsign		QSOs	Score	Mult	Total	Locator	Power	Ant	ODX Call	ODX km
1*	G3UKV	13	3800	13	49400	IO82RR	50	5 ele	S51DI	1486
2*	S51DI	5	6452	6	38712	JN76VL	100	8 ele	EI3IO	1732
3	G3TCU	11	1456	10	14560	IO91QE	150	6 ele	EI3IO	438
4	GM4DIJ	5	2403	6	14418	IO85IW	50	4 ele	S51DI	1686
5	G3NKS	8	1331	10	13310	IO81XU	100	6 ele	GM4DIJ	461

Multi Operator Fixed (M)

Callsign		QSOs	Score	Mult	Total	Locator	Power	Ant	ODX Call	ODX km
1*	G4RFR	8	1351	7	8365	IO90AS	90	2 * 12 ele		EI3IO 394

Check logs acknowledged with thanks from G4XRV/P and G3VQO/P.

144MHz UK Cumulatives, 2001

THE START of this year's event was blighted both by the effects of the foot and mouth outbreak on portable operation, and also by confusion over the requirement to exchange postcode multipliers in the rules. The published rules in *RadCom* contained an error that was corrected in the website version, but sadly this revision had not reached all of the participants in time. Every affected log was checked and entrants were credited with the postcode multiplier where available. The entrants who raised this discrepancy as an issue did not lose any places in rank order as a result of the confusion.

Some logs were re-scored by the adjudicator as there were several different interpretations of the rules in evidence, in some cases the same entrant used different rules for different sessions! Conditions into continental Europe were enhanced for the first couple of sessions, which may have distracted some of the more southerly stations from building a bigger score. For 2002 there is a major revision to the cumulative contest format, with monthly activity nights coordinated with the popular NAC events.

Steve Redfern, G4AEQ

144MHz Cumulatives, 2001

Pos	Call	Loc	Pwr	Ant	13.8.01 QSOs	13.8.01 Norm	28.8.01 QSOs	28.8.01 Norm	12.9.01 QSOs	12.9.01 Norm	27.9.01 QSOs	27.9.01 Norm	19.10.01 QSOs	19.10.01 Norm	Total Norm
Multi-Operator Open															
1	G4ZAP*	IO81SG	400	2x12Y+17Y	80	1000	74	1000	0	0	64	1000	69	1000	3000
Single Operator Fixed															
1	G8FBG*	IO91SG	400	2x10Y	0	0	0	0	50	1000	68	1000	76	1000	3000
2	G3MEH*	IO91QS	400	2x10Y	73	1000	65	908	37	512	48	479	54	532	2440
3	M5FUN*	JO00DX	25	12Y	68	858	58	1000	17	134	34	303	41	385	2243
4	G0GCI	JO01ED	150	2x9Y	50	730	54	695	33	359	38	376	0	0	1801
5	G8ZRE	IO83NE	80	8XY	24	292	37	680	23	272	22	154	28	201	1244
6	G1KHX	IO81MI	80	9Y	21	203	33	414	18	177	41	243	28	175	860
7	G0DVJ	JO01MX	50	5Y	34	264	33	260	0	0	21	96	29	161	685
8	M0COP	IO92BK	100	8Y	19	186	0	0	16	147	15	72	24	150	483
9	GW4HBK	IO81KP	200	9Y	12	100	21	232	0	0	14	57	0	0	389
10	G4XPE	IO92GU	25	10Y	9	46	13	88	0	0	10	29	14	57	191
11	2E1GUA*	JO01FS	10	13Y	12	59	16	59	6	20	14	44	13	41	162
12	PE1EWR*	JO11SL	80	10Y	0	0	23	154	0	0	0	0	0	0	154
13	G0OSY	IO82WO	10	4Q	10	42	0	0	0	0	0	0	0	0	42
Single Operator Open															
1	GW8ASA/P*	IO81GN	50	5Y	0	0	0	0	40	1000	54	1000	63	1000	3000

*Certificate Winner

1st 1.8MHz Contest, 2002

THE NUMBER OF entrants in the First 1.8MHz Contest this year was exactly the same as last year's in both the UK and non-UK sections, but higher than the 2nd 1.8MHz contest last year. Clive Penna, GM3POI, wins the Somerset Trophy closely pursued by David Cree, G3TBK, and Edwin Taylor, GU3SQX. Two of them lost no points in adjudication which is a worthy performance considering their high scores. Many congratulations!

The majority of logs arrived via e-mail or on floppy disks and most of those were in *SD* which scores this contest correctly. Some of the other contest programs were crediting Netherlands station codes as UK postcodes. Non-UK stations are reminded that only contacts with UK stations can be counted.

There were many suggestions for changes to this contest and a couple of pleas to the HFCC to please do not drop this contest. All your comments have been passed to the HFCC for its consideration. Please mark your contest diary for the 2nd event on 16 / 17 November 2002.

Sid Will, GM4SID

1st 1.8MHz Contest, 2002

UK Stations

Pos	Call	QSOs	Bonus	Pts	Equip
1	GM3POI*	207	80	1021	4G1
2	G3TBK	189	74	929	4C27
3	GU3SQX*	187	73	926	4C24
4	G4BJM	182	74	908	4C22
5	G3SJJ	184	77	902	4C25
6	G0CKP	170	72	854	
7	G4TSH/P*	152	67	791	4C22
8	G3VYI*	145	62	745	3G14
9	G3GLL*	131	62	703	4G15
10	G3KLH	134	63	698	4C23
11	G0JQN	128	59	673	4G1
12	G4RCG	125	61	669	4C26
13	G4ERP	130	60	658	4W13
14	G4OGB*	117	60	651	3C23
15	G3RSD	118	58	636	3C23
16	G4CZB*	123	53	634	4C23
17	G3YEC	112	53	589	3C12
18	M0AJT*	106	51	573	3C24
19	G4CWH	116	54	569	4W14
20	G2HLU	107	51	568	4C12
21	G3ZGC	102	53	552	4W13
22	G3YAJ	103	55	544	3C2
23	GW3NJW	95	46	526	4C22
24	G0VQR	86	48	490	3C2
25	G3UFY	78	43	438	4G1
26	MM0CCC	70	41	393	3C2
27	G3GMS	64	35	364	3G12
28	G3LIK	51	39	340	3G1
29	MM0BPS	66	39	335	4G1
30	G3JJG	62	34	324	4W10
31	G3GMM	60	31	316	3C2
32	G3MA	50	39	307	3G1
33	GM3UM	51	32	305	3G1
34	G3SET	55	31	304	3G13
35	G4BUO*	40	27	255	4W15
36	G0MTN	41	26	245	3C22
37	G3ZDD	35	21	175	3W1

Overseas Section

Pos	Call	QSOs	Bonus	Pts	Equip
1	OM5RW	64	42	393	4G1
2	YL2PQ	58	39	361	4C2
3	LY2OX	49	34	314	
4	DJ5AA	47	32	304	3G1
5	OH4MFA	47	32	301	4G1
6	LY2BW	52	35	293	
7	OK1AYY	41	30	273	
8	OK2HZ	40	29	265	
9	DJ9WH	43	27	264	
10	OM7CW	32	26	215	
11	EI7GY	37	25	212	3Q1
12	9H1ZA	35	22	199	
13	ON6TJ	28	22	194	3Q1
14	DL4JYT	29	22	181	3C2
15	OK1DOL	23	19	156	
16	DL4KUG	23	18	151	3C2
17	SP9KRT	19	16	129	3Q1
18	YU1RA	16	15	123	3C2
19	SP4GHL	17	16	115	
20	OK1DKM	15	14	107	3W1
21	LZ3AB	13	11	91	4Q1
22	EW6DO	10	10	80	
23	SM6IQD	11	10	67	3W1
24	SQ4MP	5	5	40	3G1

*= Error-free log.

CONTEST CALENDAR

HF Contests

Date	Time	Mode	Contest	Bands	Exchange
1-2 June	1500-1500	CW	RSGB National Field Day	1.8 to 28	RST+Serial
8-9 June	*0000-2400*	*DIGI*	*ANARTSRTTY*	*3.5 to 28*	*RST+Time+CQZone*
8-9 June	1000-1000	CW/SSB	RSGB Jubilee	3.5 to 28	RST+Serial
15-16 June	*0000-2400*	*CW*	*All Asia CW*	*1.8 to 28*	*RST+Age*
22-23 June	*1400-1400*	*CW*	*Marconi Memorial*	*1.8 to 28*	*RST+Serial*
22-23 June	*1800-1800*	*SSB*	*His Majesty King of Spain Contest*	*1.8 to 28*	*RST+Serial*

VHF Contests

Date	Time	Mode	Contest	Bands	Exchange
1-2 June	1400-1400	ALL	RSGB 50MHZ Trophy	50	RST+Serial+Locator
2 June	1100-1500	ALL	RSGB 50MHZ Backpackers	50	RST+Serial+Locator
4 June	2000-2230*	ALL	RSGB 144MHz Activity	144	RST+Serial+Locator
11 June	2000-2230*	ALL	RSGB 432MHz Activity	144	RST+Serial+Locator
16 June	*0900-1600*	*ALL*	Practical Wireless *144MHz QRP*	*144*	*RST+Serial+Locator*
16 June	0900-1300	ALL	RSGB 144MHz Backpackers	144	RST+Serial+Locator
18 June	2000-2230*	ALL	RSGB 1.3/2.3GHz Activity	1.3/2.3	RST+Serial+Locator
25 June	2000-2230*	ALL	RSGB 50MHz Activity	50	RST+Serial+Locator

* = LOCAL time.

Microwave Contests

Date	Time	Mode	Contest	Bands	Exchange
9 June	0900-2000	ALL	RSGB 24GHz up	24GHz up	
23 June	0900-2000	ALL	RSGB 10GHz Cumulative	10GHz	

The full rules of RSGB HF, VHF/UHF and Microwave contests were published in the RSGB Contesting Guide in January 2002 *RadCom*. Brief rules for non-RSGB contests, which are listed in italics above, can often be found in the 'HF' and 'VHF/UHF' columns. The HF and VHF Contest Committees both have websites from which comprehensive details are available. These are www.rsgbhfcc.org and www.blacksheep.org/vhfcc RSGB Microwave Contest rules can be found on the Internet at: http://www.g3pho.free-online.co.uk/microwaves/calendar2002.html

HF HF HF HF

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

THE BIG NEWS, which was announced just after last month's column went to press, is that operations from North Korea by P5/4L4FN will be acceptable for DXCC credit. A press release from the ARRL states:

"Since early November 2001, Mr Edisher (Ed) Giorgadze, 4L4FN, a Georgian citizen employed by the United Nations World Food Program, has been active as P5/4L4FN in Pyongyang, DPRK. DXCC Rule 7 states 'Any Amateur Radio operation should take place only with the complete approval and understanding of appropriate administration officials.' The rule continues, 'In any case, credit will be given for contacts where adequate evidence of authorization by appropriate authorities exists.' The ARRL has now received adequate evidence that the operation by Mr Giorgadze is being conducted with the knowledge and approval of telecommunications officials in Pyongyang. At the present time, this approval is limited to SSB operation. The ARRL Awards Committee has met and concurred that the operation should be accredited. As a result, we are pleased to announce that effective immediately, the DXCC Branch will accept SSB contacts with P5/4L4FN for DXCC credit. Contacts with P5/4L4FN dating back to early November, 2001 will count for this Entity."

QSL cards for SSB contacts made with Ed, P5/4L4FN, from North Korea are now being accepted for DXCC credit.

DX NEWS

ON6BV WRITES THAT the South Flanders DX Activity Group should be active on 1 and 2 June from the Pegasus Bridge Memorial Museum in **Ranville (Normandy)** to commemorate the 58th anniversary of the D-day landings and the taking of the Pegasus Bridge by troops of the British 6th Airborne Division. They will sign F/ON6JUN/P.

RSGB member Gino, IZ1EEX, reports that he has been authorised to operate mobile from **Monaco**. He hopes to be active on Saturday afternoons around 14250kHz, signing 3A/IZ1EEX/M with an FT-100 and ATAS-100 antenna. QSL via F5VHM.

Jacques, FR5ZU, is once again heading to **Tromelin Island** (AF-031). He will be working there from 5 June to 5 July, and hopes to be active on all HF bands, SSB and RTTY, in his spare time.

There are 10 special stations active from **Japan** during the FIFA World Cup, until 30 June. The callsigns are 8M1C, 8N1C, 8J1C, 8J2C, 8N3C, 8J3C, 8J6C, 8J7C, 8J8C and 8J0C. The '2002 Suffix-C' award is available for working one or more of these stations. No QSL cards necessary, but list date, band and mode to JARL Award Desk, 1-14-5, Sugamo, Toshima-ku, Tokyo 170-8073, Japan. The fee is eight IRCs or $8 US. You can request any three of the following endorsements: single band, single mode, QRP / QRPp or satellite. Any questions can be sent to oper@jarl.or.jp

Paul Pai, BV4FH, says the CTARL is planning this year's **Pratas Island** BQ9P DXpedition for June. At the time of writing they were still arranging flights, but were aiming to start around 3 or 4 June.

Bruce, AC4G / V73CW, reports that plans are falling into place for a **Wake Island** operation sometime around June or July 2002. He expects to use AC4G/KH9 on all bands with much more operating time than his last operation. A 50-50 mix of SSB and CW is expected.

John, WZ8D, will be heading back to Abaco Island, **Bahamas**. Although this is primarily a VHF effort, John will operate the HF bands when the VHF bands are closed.

KA3HSW and his son and will be in the **Dominican Republic** on a missions trip from 15 to 27 June. He is hoping to take a rig along and to operate as HI8/KA3HSW. There is a possibility of RTTY operation.

Fred, G3LUZ, reports that he has been receiving QSL cards for VP8LUZ. He knows nothing about this station.

Les, GM3ITN, will sign VP8ITN from Saunders Island in the Falklands starting 15 June for about one week.

QTH Corner

FR5ZU/T Jacques Quillet, FR5ZU, 1 cite Meteorologique, Le Chaudron, 97490 Sainte Clotilde, Reunion Island.
HC8N Randy Becnel, W5UE, PO Box 170, Kiln, MS 39556-0170, USA (new manager).
K1B (SSB cards) Roman Thomas, PO Box 2059, Moscow, 101000, Russia.
K1B (other modes) Dr Hrane Milosevic, YT1AD, 36206 Vitanovac, Yugoslavia.
VP8ITN Les Hamilton, GM3ITN, Halls Land Hardgate, Clydebank, Glasgow G81 6NR.

IOTA ACTIVITY

ALFREDO, IK7JWK, and the 'Salento DX Team' will activate **Zannone Island** (EU-045) with the special callsign IB0A from 20 to 24 June. QSL to I0YKN.

Dimitris, SV2CCA; Chris, SV2DGH; and Giannis, SV2FPU, will be on from **Alonissos Island** (EU-072) from 2 to 16 June as J48ALO. They plan to be on 80 to 10 metres, SSB and CW. QSL to SV2DGH.

JO1EPY/6 will be active from **Tokara Arc Kuchinoshima** (AS-049) from 8 to 10 June. Look for him on 10, 12, 15, 17 and 40m SSB and CW. QSL direct or via the bureau.

JI1PLF/1, 7N1GMK/1 and 7L4PVR/1 will operate from **Hachijo Island** (AS-043) from 7 to 10 June. They will be on all HF bands on the normal IOTA frequencies on CW, SSB and RTTY. QSL direct or via the bureau.

Yves, F6CTL, will head for **French Polynesia** on 20 June. Alain, F2HE, will join him as they make stops on **Rurutu Island** (OC-050) and **Tubuai Island** (OC-152), in the Austral Islands. Yves will operate mostly on SSB, while Alain will be mostly on CW. They may also visit **Rangiroa Island**

(OC-066). They will use either FO/home calls or FO5RH.

AWARDS

FIRST OF ALL, congratulations to Roger, G3LQP, and John, G3LZQ, both of whom have recently completed the prestigious 5-Band Worked All Zones award. This is a tough one to get and I believe only 20 UK stations have reached the full 200 zones (an award can be claimed once the 150 zone level is reached).

Egbert, ON4CAS, reports that a new Internet-based forum has been set up for award hunters, where they can discuss award hunting and related issues. The URL appears in WWW.

TABLES

ROBIN, M5AEF, reports that his activities with 1 watt netted him several nice contacts, but none more so than Jack, ZL4WAD, worked over the North Pole (19,000km path) on 17 metres CW.

Interest in the annual tables continues to grow, and some high scores have already been reached. It is particularly encouraging to see such high data modes (RTTY, PSK, etc) scores, and this month the table has been ranked by them.

CONTESTS

RESULTS OF LAST year's *CQ* WPX CW Contest appear in the table. Hopefully you will get chance to see these before this year's contest. Congratulations especially to GW7X (operated by GW3NJW) who was world 5th on 40m, to ZC4DW, a regular entrant to our annual tables, who was world 3rd, low-power, all-band, and to M5X (G3KKQ) who was world 7th on 80m.

The FISTS CW Club Straight Key Week runs from 16 to 22 June and is open to all amateurs, not just FISTS members. This is not a contest, but an activity period to encourage contacts using a straight key. Exchange RST, Name, QTH, FISTS Nr (Non-Members send NM) and Day Number. Please note that Sunday is Day 1, Monday Day 2, and so on up to Saturday Day 7. This allows duplication of working the same station on different days. Entries go to: FISTS Contest Manager, Keith Farthing, M0CLO, 86 Coldnailhurst Avenue, Braintree, Essex CM7 5PY (e-mail: keithm0clo@hotmail.com) who can also provide further details on request.

UK results from last year's CQ-M Contest include (Section, Score, asterisk indicates low power): *G4OGB SOMB-CW 123,324, G4RCG SOMB- CW 47,212, G3TXF SOMB-CW 17,157, G3UFY SOMB-CW 16017, *GM4SID SOMB-CW 13,770, *GW3NJW SO-21-CW 21,600, *M0SDX SOMB-MIX 447,630, G4PIQ SOMB-MIX 17,952, *GM3CFS SO-14-MIX 24345, *G0RGH MOMB 83,032 (ops: G0RGH, G0DVJ, G4YJQ, M0CGE, G7HOW).

Just two UK entries appear in the results of last year's Holyland Contest: GM3CFS (Mix mode) with 6090 points and G3XPO (SSB) with 6206 points.

CROATIAN TELEGRAPHY CLUB

9A3FO WRITES WITH details about the foundation of the Croatian Telegraphy Club (CTC), aimed at amateurs throughout the world whose main mode of operation is CW. All are welcome to join. There is no charge for e-mail applications, but postal applications should be accompanied by $1 or 1 IRC to cover return postal costs. Quote callsign and date of birth. Applications go to Croatian Telegraphy Club, Franjevacka 5, 42220 Novi Marof, Croatia (e-mail:

9-BAND TABLES No 42 - MIXED MODE

CALL	1.8	3.5	7	10	14	18	21	24	28	TOTAL
G3KMA	252	301	327	319	334	329	335	321	331	2849
G4BWP	246	305	333	320	334	328	334	313	324	2837
G3XTT	232	278	316	283	332	313	330	294	311	2689
G3GIQ	152	246	303	264	333	316	332	303	327	2576
GW3JXN	183	256	293	284	327	317	316	293	300	2569
G4OBK	170	225	277	280	327	302	316	298	298	2493
G3SED	233	260	292	274	311	286	292	259	285	2492
G3TXF	129	234	294	278	327	285	322	264	301	2434
G3TBK	119	231	275	247	327	292	314	277	287	2369
G3LAS	105	198	244	248	313	299	313	291	295	2306
G3YVH	125	154	254	276	318	310	304	272	278	2291
G3IFB	62	222	288	237	326	248	305	244	287	2219
G3VJP	107	182	256	190	326	276	313	245	286	2181
GM3PPE	148	210	254	264	316	247	274	229	224	2166
G3KMQ	59	210	264	206	324	240	281	248	242	2074
G4PTJ	40	176	218	169	322	263	316	251	299	2054
G3IGW	129	198	315	237	288	246	257	128	234	2032
G3VKW	48	163	228	116	325	205	319	224	305	1933
G5LP	67	224	281	208	310	193	280	133	233	1929
G0JHC	1	29	151	234	260	287	302	279	303	1846
G3NOF	5	126	131	0	332	298	330	263	305	1790
M5ACC	34	112	205	177	275	227	260	212	257	1759
G4XRX	8	77	172	154	294	233	300	205	262	1705
M0AWX	45	115	138	0	277	219	263	204	225	1486
G4NXG/M	25	58	137	0	288	208	280	190	251	1437
G4OWT	2	44	151	77	302	55	288	59	257	1235
GM4OBK	43	97	134	77	163	117	157	127	188	1103
G0LRX	1	95	124	0	233	53	251	52	227	1036
G4FVK	40	79	103	57	187	104	185	72	166	993
M0CNP	10	67	108	8	190	68	155	49	118	773
AVERAGE	**94**	**172**	**229**	**183**	**297**	**239**	**287**	**220**	**267**	**1989**

CW ONLY

G3KMA	246	281	324	319	333	322	331	307	322	2785
G3XTT	222	248	304	283	304	289	301	268	282	2501
G4BWP	216	221	290	319	296	302	287	280	249	2460
GW3JXN	180	224	279	284	309	302	303	269	273	2423
G3TXF	129	227	292	278	322	283	317	263	288	2399
G0NXX	172	235	282	292	298	289	275	266	264	2373
G4OBK	160	205	269	280	306	288	289	276	278	2351
G3SED	232	243	286	274	283	252	251	215	223	2259
G3SXW	96	204	261	257	316	274	299	247	279	2233
G3YVH	124	150	250	276	309	297	288	256	258	2208
G3NOH	49	124	208	257	301	283	294	248	261	2025
G5LP	104	118	217	248	269	268	276	251	254	2005
G3VJP	106	147	245	190	298	253	285	221	251	1996
G3LAS	93	104	204	233	260	253	268	239	240	1894
G4PTJ	37	113	188	169	246	229	269	224	252	1727
G3VKW	41	90	173	114	230	153	252	171	200	1424
G4OWT	0	43	116	77	221	38	222	44	188	949
GM4OBK	36	79	117	77	138	99	137	109	138	930
AVERAGE	**125**	**170**	**239**	**235**	**280**	**249**	**275**	**231**	**250**	**2052**

Prepared by G3GIQ (HenryLewis@compuserve.com). Next deadline: 8 July.

COUNTRIES WORKED 2002

(sorted this month by datamodes totals)

CALL	CW	SSB	DATA	MIXED
G0ARF	0	0	120	120
G3JFS	126	115	108	180
G3LHJ	130	64	101	164
GU0SUP	0	0	96	96
MM0BQI	22	41	89	108
G0URR	0	0	81	81
ZC4DW	85	36	77	106
ZC4BS	134	153	70	188
M0BZK	0	95	59	110
G4OBK	97	38	56	119
G3XTT	31	16	46	71
G4UCJ	155	0	44	156
G3URA	0	0	42	42
M5AFA	0	0	32	32
M0CNP	3	123	26	123
G4DDL	34	16	8	43
G4PTJ	176	194	0	240
G0NXX	215	0	0	215
G3SXW	175	0	0	175
M0AWX	0	165	0	165
G4WXZ	105	111	0	158
G3YVH	126	69	0	156
G4IRN	152	0	0	152
G3SED	125	67	0	143
G0GFQ	0	139	0	139
ZC4VG	122	11	0	133
MU0FAL	113	79	0	119
GM4ELV QRP	72	69	0	93
M0CAL	2	83	0	83
G4IDL	46	34	0	67
G4FVK	24	49	0	58
M5AEF QRP	41	50	0	58
M5PLY	-	-	-	188
MU3DHI	-	-	-	98
G4YWY/M	-	-	-	75

The three members of the ZC4 Eastern Sovereign Base gang, who are sending in their scores regularly for the tables.

Results of the 2001 CQ WPX CW Contest

Call (operator)	Band(s)	Score
G3TXF	A	1,491,368
G5LP	A	1,350,162
G3MXJ	A	716,870
G3TMA	A	487,060
G4BJM	A	409,500
GM4OBK	A	124,176
G4OBK	A	14,014
*G4IIY	A	1,970,394
*GM4SID	A	1,593,090
*G3YDD (G3ZRJ)	A	989,460
*G3KKP	A	774,312
*G3OOU	A	668,108
*G3RSD	A	350,568
*MU0FAL	A	188,945
*G3VQO	A	162,675
*GM0CLN	A	43,824
*G6QQ	A	17,864
MU2K (G3SQX)	28	265,230
G3UFY	28	82,350
M0C (G0CKP)	21	1,507,872
*GM3CFS	21	514,855
*2E0ROB/P	21	379,456
GW7X (GW3NJW)	7	1,883,700
*G3TJE	7	297,182
*GW3KJN	7	104,896
*M5X (G3KKQ)	3.5	206,584

*indicates low power (100 watts)

QRP

G0DCK	21	190,060
GW0VSW	14	130,140
G3LHJ	14	85,440

Multi-Single

M2A (G3RIR G4EOF G4MJS G3ORY G0TPH)		7,341,285
M3S (G0WAT G4DDX)		816,205

9a3fo@hi.hinet.hr). The aims of CTC are to promote the use of CW, to teach new telegraphy operators and to increase the number of CW operators on the amateur bands. CTC will, from time to time, organise activity periods and contests.

TOP 50 DXPEDITIONS

GIL, F5NOD, HAS put together an interesting website with statistics regarding the major DXpeditions that have taken place over the years. It makes fascinating reading, although he is still collecting data. Do take a look (the URL appears in WWW. below).

LICENSING ABROAD

OWEN, G4ASX, WRITES that he has recently retired to Cyprus, and has applied for a full 5B4 licence (in the short-term he is operating through the normal CEPT common licence arrangements). To his surprise, to complete his application he has been asked to produce "Certificates of good character from the UK and Cyprus police". I have no idea whether Cyprus is unique in this respect, but is worth bearing in mind and if you are likely to find yourself in a similar situation to Owen it may be as well to be prepared!

DX SPOTS DATABASE

ROD ELLIOTT, VE3IRF, has collected the DX spots from the OH2AQ Web Cluster since January 1997. The collection (from January 1997 up to March 2002) is available at the *425 DX News* website, along with downloadable software to enable you to work with the spots database.

THANKS

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

WWW.

425 DX News: www.425dxn.org/dxspots/
Award Hunters' forum: http://users.pandora.be/egbert.hertsen/awardlist.htm
D-day activity: www.qsl.net/on6jun
F5NOD DXpeditions page: http://www.qsl.net/f5nod/topdxexpe.html
FR5ZU: http://perso.wanadoo.fr/jacques.quillet/index.html
VP8ITN: www.website.lioneone.net/~gm3itn

HF F-Layer **Propagation Predictions** for **June 2002**

	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	28.0MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** Europe							
Moscow	56	75.....1588	87421111 5788	587766657787	678887778887	467777667765	....
*** Asia							
Yakutsk	....	....	3211 1.113554	776666677777	457777776554	223454443232	....
Tokyo	....	.........1...	.....143..	.....24552.	.....1343..	.....22..	
Singapore	.........156.	6881	28873	....26 8863	257732	.....32..	
Hyderabad	22	2677	5.....37888	564212689988	336555688885	.2455446665.	
Tel Aviv	7.....677	87.....5888	9861..148999	998765578899	573766783487	34.88778.275	.2.55445..42
*** Oceania							
Wellington	....	....	....	....	....	....	....
Perth	312	.....13.5	5	7	4	..223.....	
Sydney	.........14..	.....35..	.....221.	....22326.	.....5.	...22....2.	
Honolulu	....	....	..221.....	...22.....	....	....	
W. Samoa	....	....	...1.....	...221.....	....	....	
*** Africa							
Mauritius	1.........	5.....1676	2.....5776	17772	.....3774.	.....3651.	.....2...
Johannesburg	67.....66	88.....4999	56.....8998	29984	..621127985.	..75335886..	..6666676...
Ibadan	....	43.....333	884.....3888	8884112 57898	669877889998	447866779976	225655567764
Nairobi	....	4.....333	63.....1556	771....15777	575211257887	266654678886	..345656743.
Canary Isles	76.....377	886.....1788	8873...16888	888753458899	768887788999	436888888986	...2....33..
*** S. America							
Buenos Aires	32........	883.....17	886.....37	877.....68	877.....788	656..1..2788	.....22.3653
Rio de Janeiro	....	66.....26	771.....57	771.....267	883.2...2899	76..42225888	32224753
Lima	....	65.....3	664.....16	5551.....26	77772....188	5366.2..1377	.....33.
Caracas	....	1	221.....2	4552.....24	225521..1145	..2332112353	....2....32.
*** N. America							
Guatemala	....	11.....	332.....1	3231.....2	1.1.....12	1	....
New Orleans	....	1.....	221.....	454.....2	654..5555578	332..2356775	22332
Washington	1	31.....1	663.....14	78723....267	532.21..2678	22.....675	....
Quebec	4.........	84.....17	641.....26	21.211.12356	322334335665	2...22223443	.....2..
Anchorage	....	....	....	322121111223	445322345665	223...223443	....
Vancouver	....	....	....	.1.....	223....23665	2222	....
San Francisco	.....1.....	.1.....	.1.....	.1.....	333.....23	2	....

Key: Each number in the table represents the expected *circuit reliability*, eg '1' represents reliability between 1 and 19% of days, '2' between 20 and 29% of days etc. No signal is expected when a '.' is shown. **Black** is shown when the signal strength is expected to be low to very low; **blue** when it is expected to be fair and **red** when the signal is expected to be strong.

The RSGB Propagation Studies Committee provides propagation predictions on the Internet at www.g4fkh.demon.co.uk The page is updated monthly. The provisional mean sunspot number for April 2002 issued by the Sunspot Data Centre, Brussels, was 120.4. The maximum daily sunspot number was 162 on 12 April and the minimum was 71 on 28 April. The predicted smoothed sunspot numbers for June, July and August are respectively: (SIDC classical method – Waldmeier's standard) 103, 101, 99 (combined method) 91, 85, 80.

Antennas

PETER DODD, G3LDO
37 The Ridings, East Preston, West Sussex, BN16 2TW
E-mail: g3ldo@ukonline.co.uk

The plastic tube centre insulator for the GB2CPM multiband dipole

I WORK AS a part-time volunteer at Amberley industrial museum near Arundel. This museum [1] has an excellent vintage radio exhibition and GB2CPM is an operational amateur station associated with this exhibition. The existing G5RV antenna developed a fault so this seemed a good opportunity to test the multiband dipole described in the April edition of 'Antennas'. There was a spare coax feeder to the existing mast but no materials to hand such as insulators and antenna wire. A considerable amount of construction work had been undertaken during the winter months and I found some high-pressure blue plastic water pipe that seemed to fit the bill. This pipe is very tough and light and was used to make the centre insulator, end insulators and all the spacers.

For the antenna elements I used scrap telephone wire - the material that is used to make a telephone connection between a nearby distribution pole and a house. This material is excellent for antennas and comprises two plastic insulated copper-clad steel wires. The two insulated wires can be pulled apart to make a single wire but his must be done under tension otherwise it gets into a messy tangle.

The GB2CPM multiband dipole, configured as an inverted-V on the 7, 10, 14 and 18MHz bands and each dipole can be tuned without any noticeable interaction. All the other operators are very pleased with it.

THE CFA ANTENNA

I HAVE BEEN asked if the Crossed Field Antenna (CFA) is a solution to operating from a very restricted QTH. I have never used one of these antennas, however, the CFA was reviewed in the May *RadCom* by Steve Nichols, G0KYA. The 40m version was the only one that performed well; however, this was fixed near the top of a 6m high mast and fed via 14m of coax. This begs the question of how would this compare with simple antenna comprising 14m of wire fixed to a 6m mast? Furthermore, I have no difficulty working EU and DX stations when operating mobile with an antenna 1.4m long.

The CFA theory represents a radical departure from conventional antenna theory. Progress in science evolves by new theories being independently tested to reproduce original claims, and for this to happen full details of any apparatus must be made available. With the CFA antenna this has not been done and I understand G0KYA was allowed to proceed with the review on condition that he did not reveal details of the new feed arrangements within the CFL which are the subject of a new patent. Several years ago I attended a lecture on the CFA antenna. It involved a lot of Maxwell equations and Poynting vectors and seemed to me more an exercise in obfuscation rather than elucidation.

You might like to consider the following, which is based on concepts we all understand. What follows is an edited extract from [2] by John Stanley, K4ERO, a broadcast engineering consultant. Empty space is a medium through which energy can be transmitted and any small volume of space can be considered as a multi-port network. As such, it has zero gain and no attenuation. Furthermore, it is perfectly linear and does not have a low power threshold or a saturation level. The implications of this linearity is that space can provide a medium through which any number of EM waves can propagate without mutual interaction. Light from the sun, radio waves and heat waves can all simultaneously pass through the square metre of space without interaction. A simple experimental demonstration of this is simply to cross two beams of light from two flashlights. Each beam passes through the other with no effects whatsoever. (So much for the Star Wars light-sabre duels!)

If there were interactions, as opposed to simple vector addition, we would be unable to send radio signals when the medium was saturated with sunlight. Also, just as a saturated amplifier produces intermodulation products, all of the light frequencies present in sunlight would mix together to produce a multitude of lower frequencies that would fill up the radio spectrum with noise.

The ability of space to contain a seemingly infinite number of EM waves also applies to electric and magnetic fields, which are not coupled as they are in the case of an EM wave. Furthermore, linearity guarantees that any combination of E and H fields may be contained in a given volume with no interaction whatsoever.

Any voltage or current pattern in a linear network is additive to any other voltage or current pattern, a phenomenon known as Superposition Theorem. NEC antenna analysis and other analysis related to antennas depend utterly on the validity of superposition. NEC, for example, calculates the net effect of many small current elements, each one producing an E field at a distant point. The sum of all these fields is the net field. The fact that NEC does work for so many types of antennas seems further proof of the validity of the superposition theory and, therefore, of the linearity of space. Since virtually all of EM theory uses superposition as a basis of its analysis, we cannot even imagine its falsity without overthrowing the whole of the theory.

EM radiation is produced directly by the acceleration of charge (RF currents) [3], and not through the production of E and H fields. Near fields are a parasitic effect, not an intermediate step in EM wave production. The theory of the CFA antenna suggests that the E and the H fields are generated separately and then combine in space to produce the EM wave, in other words, an interaction. This is not simple vector addition and such an E and H field metamorphosis in space would violate the principle of superposition. ♦

WWW.

[1] Amberley Museum: www.amberleymuseum.co.uk
[2] John Stanley, K4ERO http://members.aol.com/jnrstanley/mainpres.htm
[3] Peter Dodd, G3LDO (Radiation from an antenna) http://web.ukonline.co.uk/g3ldo

SWL

BOB TREACHER, BRS32525
93 Elibank Road, Eltham, SE9 1QJ.
E-Mail: brs32525@compuserve.com

AT ABOUT THE time you receive this, I will be preparing for the biggest amateur radio event in the British Isles since M2000A, and before that, GB2LO in 1968.

I am Team Leader for the GB50 special event station that will be active from the grounds of Windsor Castle from 29 May - 9 June. As well as five top-of-the-range transmitting stations supplied by Icom (UK), there will be a large 'Meet and Greet' area with displays charting amateur radio back to the early 1900s, and details of the new Foundation Licence.

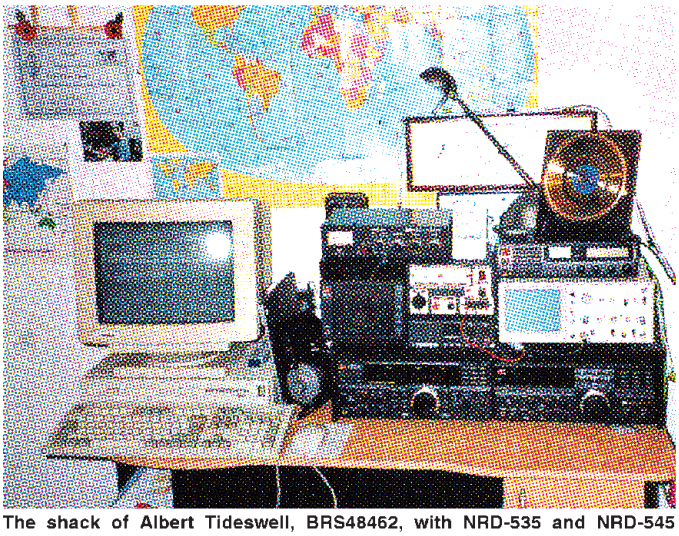
The stations will be manned from 0600 - 2100UTC daily. There will be activity on all bands from 3.5 - 144MHz, both SSB and CW, and there will even be some PSK31 activity on several bands. The stations will feature some top-class operators who will be operating in 'SWL friendly' mode, ie giving the callsign after every one or two QSOs. There will be special QSL cards: I am handling all the SWL QSL cards and our licensed colleagues can QSL to Owen, G4DFI. There is an award scheme, too: details are on the GB50 website.

I hope listeners are able to hear the station, and I look forward to meeting a number of SWLs during the event.

3.5MHz - ANOTHER VIEW

EDDI, DK3UZ, commented on my recent description of the 3.5MHz band. I must say that I cannot disagree with his comments, so they are provided here for your benefit.

"The 3.5MHz band suffers heavily from D-layer absorption during daytime, so only groundwave propagation is possible on this band while the sun X-rays the 'local' ionosphere. During the day, the band is next to dead but near dusk, local and domestic traffic becomes possible, expanding to continental conditions once the sun has sunk below the horizon seen from an altitude of about 60km.



The shack of Albert Tideswell, BRS48462, with NRD-535 and NRD-545 receivers.

When the solar flux is high enough 3.5MHz at night yields almost world-wide propagation. Maximum distances can be worked along the so-called grey line, ie the terminator."

SWL QSL LIBRARY

PETER, ONL5923, has started a collection of QSL-cards from short wave listeners. The aim is to get an idea of where there are short wave listeners around the world and to build an interesting collection.

'The QSL Collection', based in Austria, has already agreed to help Peter, and he has asked British SWLs to send their QSL card via the bureau. Peter also hopes that licensed amateurs who used to be SWLs will also send their SWL cards.

Peter's is a novel idea and I wish him luck with it. It will be interesting to hear from him in the future to find out how his collection is progressing. The idea made me think. As QSL Manager for various DXpeditions, including D68C, I can probably boast the biggest SWL card collection in the world - with over 2000 SWL QSL cards in my possession!

DX NEWS

DAVID WHITAKER, BRS25429, now has 128 DXCC entities confirmed on 50MHz thanks to VR2XMT and UK9AA. He witnessed a 50MHz aurora towards the end of March - hearing GM7PBB in IO68, GM4WJA in IO87, and MM0AMW in IO75. He remarked that it was strange to hear auroral signals again, following all the explosive F2 propagation that he had been hearing since last October.

For any listeners that might be radio officers, I have been advised that the Radio Officers' Association now has a website (see WWW. below).

Robert Small, BRS8841, is back this month and provides an interesting view of the bands. Since he wrote last, VP6DI had provided All-Time country No 349 (including deletions). 5U1A gave him his first new country on 1.8MHz for many months, while XR0X and PW0T provided him with new ones on 3.5MHz SSB and CW. 7MHz gave Robert YA5T, TI9M and J68ID.

He considered 14MHz had been poor. Although there was plenty to be heard, there was no really choice DX on offer to provide Robert with a 'new one'. On the other hand, 24MHz received Robert's 'gold star' as he heard three new ones during the month: H40, PW0T, and, perhaps surprisingly, ZF2NT. As well as these new ones, Robert also heard S9LA, TI9M, 9J2BO, H44MS and JY4NE.

Simon, RS177448, reported a great month with a number of new DXCC entities to take him nearer to 200 heard. His QSL collection is starting to grow, and he is beginning to learn some CW.

The DXpeditions to San Felix (XR0X) and Ducie Island (VP6DI) meant that the bands were well worth watching in March. VP6DI only seems to have been heard on 21MHz, but the XR0 was heard on most bands.

I was lucky enough to hear North Korea (4L4FN/P5) on 23 March for entity number 334 All Time, meaning I only need Banaba (T33) for the 'full set'. The bands were relatively 'flat' after the XR0 and the VP6 closed down, but the HS trip to XW stirred the bands up again in mid-April. At the time of penning this column, the DX world was waiting for the Mellish Reef DXpedition to start up.

NOT REALLY A NEWCOMER

JIM ROBERTS, RS187873, wrote for the first time. He lives at Pateley Bridge in North Yorkshire. Although he has been in radio for most of his life, he has only recently joined the Society. His first SWLing was in looking for stations on a cabin radio while crossing the oceans. He had an Eddystone receiver, purchased as a kit, which the Radio Officer helped him construct. Jim now has several kit radios, including a Howes four-band HF receiver with a digital frequency counter, and Lake ATU and noise reduction filter. He had recently finished constructing a shortwave receiver that he designed himself. He enjoys tuning the bands and sent interesting extracts from his log. ♦

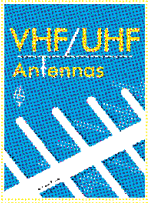
WWW.

GB50	www.gb50.com
The QSL Collection	www.qsl.at
Radio Officers' Association	www.roassn.org

RSGB

ANTENNA BOOKS

VUAN	VHF/UHF Antennas - *NEW*	£13.99	**£11.89**
ATK2	Antenna Toolkit II	£24.99	**£21.24**
TAFE	The Antenna File	£18.99	**£16.14**
BKYA	Backyard Antennas	£18.99	**£16.14**
NACO	HF Antenna Collection	£9.99	**£8.49**
HFAL	HF Antennas for all Locations	£7.99	**£6.79**
PAFN	Practical Antennas for Novices	£7.99	**£6.79**
TAEG	The Antenna Experimenters Guide	£17.99	**£15.29**



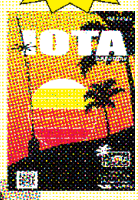
OTHER PUBLISHERS

YAAC	ARRL Yagi Antenna Classics	£14.99	**£12.74**
ACV2	ARRL Antenna Compendium Volume 2	£12.99	**£11.04**
ACV3	ARRL Antenna Compendium Volume 3	£12.99	**£11.04**
ACV5	ARRL Antenna Compendium Volume 5	£17.99	**£15.29**
ACV6	ARRL Antenna Compendium Volume 6	£19.99	**£16.99**
ANTB	ARRL Antenna Book 19th Edition	£27.99	**£23.79**
STAR	ARRL Stealth Amateur Radio	£12.99	**£11.04**
VACS	ARRL Vertical Antenna Classics	£12.99	**£11.04**
MWAC	ARRL More Wire Antenna Classics	£12.99	**£11.04**
WACS	ARRL Wire Antenna Classics	£12.99	**£11.04**
YAGI	ARRL Physical Design of Yagi Antennas	£12.99	**£11.04**

IOTA

ID11	IOTA Directory 11th Ed.	£9.99	**£8.49**

NEW



MUG		**£4.99**

T SHIRTS

ITSHM	M	**£9.99**
ITSHL	L	**£9.99**
ITSHXL	XL	**£9.99**
ITSHXXL	XXL	**£9.99**

POLO SHIRTS

ITPL	L	**£9.99**
ITPXL	XL	**£9.99**
ITPXXL	XXL	**£9.99**

(There is no members discount on IOTA goods)

MAPS

LOCE	Locator Map of Europe Wall (folded)	£1.99	**£1.69**
LOCD	Locator of Europe (A4 card for desk)	£2.99	**£2.54**

RADCOM

RC5363	RadCom 1953-63 Set CD-ROMs	£29.99	**£25.49**
RC6469	RadCom 1964-69 Set CD-ROMs	£29.99	**£25.49**
RC7075	RadCom 1970-75 Set CD-ROMs	£29.99	**£25.49**
RC7680	RadCom 1976-80 Set CD-ROMs	£29.99	**£25.49**
RC8185	RadCom 1981-85 Set CD-ROMs	£29.99	**£25.49**
RC8690	RadCom 1986-90 Set CD-ROMs	£29.99	**£25.49**
RC9195	RadCom 1991-95 Set CD-ROMs	£29.99	**£25.49**
RC96	RadCom 1996 CD-ROM	£19.99	**£16.99**
RC97	RadCom 1997 CD-ROM	£19.99	**£16.99**
RC98	RadCom 1998 CD-ROM	£19.99	**£16.99**
RC99	RadCom 1999 CD-ROM	£19.99	**£16.99**
RC00	RadCom 2000 CD-ROM	£19.99	**£16.99**
RC01	RadCom 2001 CD-ROM - *NEW*	£19.99	**£16.99**
EAZI	RadCom Easibinder		**£7.99**

VHF/UHF

YGVU	Guide to VHF/UHF	£8.99	**£7.64**
VHFH	VHF Contesting Handbook		**£4.25**
VHFM	VHF/UHF Handbook	£19.99	**£16.99**

OTHER PUBLISHERS

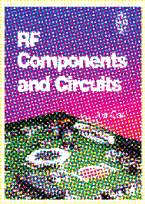
VHDX	DIR VHF/UHF DX Book	£19.99	**£16.99**

EMC

RFCC RAGE	RF Components and Circuits - *NEW* Guide to EMC	£22.50	**£19.12**
		£19.99	**£16.99**

OTHER PUBLISHERS

RFIB	ARRL Radio Frequency Interference Book	£17.99	**£15.29**



GENERAL TECHNICAL

DMFO	Digital Modes for all occasions - *NEW*	£16.99	**£14.44**
RHPB	Radio Communication Handbook	£29.99	**£25.49**
PMRC	PMR Conversion Handbook	£16.99	**£14.44**
TEC1	RSGB Technical Compendium	£17.99	**£15.29**
RECB	Radio & Electronics Cookbook	£16.99	**£14.44**
RDRB	Radio Data Reference Book	£14.99	**£12.74**
TTSB	Technical Topics Scrapbook 1985-89	£9.99	**£8.49**
TTSB2	Technical Topics Scrapbook 1990-94	£13.99	**£11.89**
TTSB3	Technical Topics Scrapbook 1995-99	£14.99	**£12.74**
SET	Technical Topics Set	£34.99	**£29.99**

OTHER PUBLISHERS

DSPT	ARRL Digital Signal Processing Technology	£34.99	**£29.74**
PSCB	Power Supply Cookbook - *NEW*	£24.99	**£21.24**
AH02	ARRL 2002 Handbook - *NEW*	£27.99	**£23.99**
HFDH2	ARRL HF Digital Handbook. 2nd Ed. *NEW*	£12.99	**£11.04**
LPCM	ARRL Low Power Communications	£12.99	**£11.04**
SSDD	ARRL Solid State Design	£12.99	**£11.04**
DENK	ARRL W1FB's Design Notebook	£18.99	**£16.14**

HISTORY

TCRC	Perera's Morse Key Collectors CD	£12.99	**£11.04**
FOHY	Amateur Radio - First 100 years	£49.99	**£42.49**

OTHER PUBLISHERS

RIRB	RW Reflections in a rose bowl	£15.99	**£13.59**

CALL BOOKS

CB02	RSGB Yearbook 2002	£15.99	**£13.59**

OTHER PUBLISHERS

BHCD	Buckmaster Ham Call CD-ROM	£41.99	**£35.69**

MEMBERS PRICES SHOWN IN RED

www.rsgb.org/shop

Radio Society of Great Britain, Lambda House,

All items are subject to Post & Packing - £1.50 for 1 item - £2.95 for 2 or more

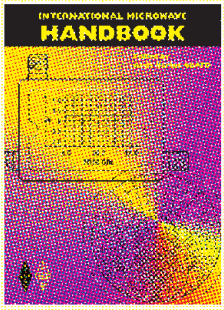
SHOP

MICROWAVES

IMHB	International Microwave Handbook - *NEW*	£24.99	£21.24
MHB3	Microwave Handbook - Bands & Equipment *(Members Only - special price 40% off)*	£18.99	£11.39
MLOP	Microwave Lectures & Other Papers	£13.99	£11.89
	Microwave Newsletter - inc postage	£11.15	£9.50

ARRL

UMEM	UHF/Microwave Experimenter's Manual	£17.99	£15.29
MWPM	UHF/Microwave Project Manual Vol. 1	£17.99	£15.29
MWP2	UHF/Microwave Project Manual Vol. 2	£12.99	£11.04



SATELLITE - ARRL

TUNI	Tune in the Universe	£22.99	£19.54
SRHB	Space Radio Hand	£2.99	£2.54
ANTH5	Satellite Anthology	£10.99	£9.34
SATH	Satellite Handbook	£18.99	£16.14
WSHB	The Weather Satellite Handbook	£17.99	£15.29

SUNDRIES

BCAP	Luxury Baseball Cap RSGB	£4.99
DLLB	Callsign Lapel Badge - Deluxe	£4.50
CSLB	Callsign Lapel Badge - Standard	£4.00
RSGB	RSGB Lapel Badge - Standard	£2.99
TBLU	RSGB Tie - Dk. Blue / RedDiamond	£7.99
TCRE	RSGB Tie - Single Diamond	£7.99
TRED	RSGB Silk Tie - Burgundy / Stripe	£12.99
PORDL	POLO SHIRT Poly/Cotton Red L	£9.99
PORDXL	POLO SHIRT Poly/Cotton Red XL	£9.99
PORDXXL	POLO SHIRT Poly/Cotton Red XXL	£9.99
PONYL	POLO SHIRT Poly/Cotton Blue L	£9.99
PONYXL	POLO SHIRT Poly/Cotton Blue XL	£9.99
PONYXXL	POLO SHIRT Poly/Cotton XXL	£9.99

(The above items are only available to members)

OPERATING AIDS

MOHB	Mobile Handbook	£13.99	£11.89
AROM	Amateur Radio Operating Manual	£24.99	£21.24
PREG	Prefix Guide	£8.99	£7.64
YFAS	Your First Amateur Station	£7.99	£6.79
YGTP	Your Guide to Propagation	£9.99	£8.49
HFAR	HF Amateur Radio	£13.99	£11.89

OTHER PUBLISHERS

DXCC	ARRL DXCC Countries List	£3.99	£3.39
DOTE	ARRL DXing on the Edge	£27.99	£23.79
HIKI	ARRL Hints & Kinks - *New* 15th Ed	£10.99	£9.34
LDXG	ARRL ON4UN's Low Band Dx-ing	£26.99	£22.94

QST MAGAZINE - ARRL

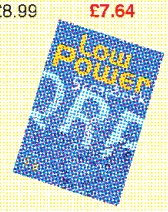
PE00	QST, NCJ, QEX CD - *NEW*	£16.99	£14.44
QST1	QST 1 Year Sub - Air Mail		£44.00
QST2	QST 2 Yrs. Sub - Air Mail		£84.00
QST3	QST 3 Yrs. Sub - Air Mail		£118.50
QSTC	QST 1 Year CD		£28.00
QSTC2	QST 2 Year CD		£52.50
QST3	QST 3 Year CD		£74.50

QRP (LOW POWER)

LPSB	Low Power Scrapbook	£12.99	£11.04
GQRP	G-QRP Club Circuit Handbook	£9.99	£8.49
LEHB	The LF Experimenters Handbook	£18.99	£16.14

OTHER PUBLISHERS

QRPP	ARRL QRP Power	£12.99	£11.04
QRPN	ARRL W1FB's QRP Notebook	£8.99	£7.64



MORSE CODE

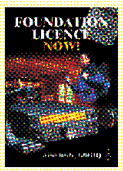
IMCD	Instant Morse CD-ROM	£14.99	£12.74
MCRA	Morse Code for Radio Amateurs	£4.99	£4.24

ARRL

MCEL	Morse Code The Essential Language	£8.99	£7.64
IMTC	Your Introduction to Morse Code (2 tapes)	£9.99	£8.49
INMC	Your introduction to Morse Code (CD)	£9.99	£8.49

TRAINING

FNOW	Foundation Licence Now! - *NEW*	£3.99	£3.39
AREX	Amateur Radio Explained	£9.99	£8.49
STN3	Novice Licence Student's Notebook	£4.99	£4.24
RAE2	Radio Amateurs' Examination Manual	£14.99	£12.74
REVN	RAE Revision Notes	£5.00	£4.25
NOVQ	Revision Questions for the Novice RAE	£5.99	£5.09
TFNL	Training for the Novice Licence Instructor's Manual	£9.99	£8.49



OTHER PUBLISHERS

BNHC	ARRL Best of New Ham Companion	£9.99	£8.49
WKSH	RS Novice RAE - Additional Worksheets	£6.00	£5.10
QARM	RP Radio Amateurs' Question & Answers	£14.00	£11.90
ECTP	RP RAE End of Course Test Papers	£13.99	£11.89

LOG BOOKS & LOG SHEETS

LBRX	Value Log Book Receiving	£4.99	£4.24
LBAR	Value Log Book Transmitting	£4.99	£4.24

SPECIAL MODES

PRPR	Packet Radio Primer	£9.99	£8.49

OTHER PUBLISHERS

ATMM	APRS Tracks, Maps & Mobiles	£12.99	£11.04
PSMS	ARRL Packet, Speed & More Speed	£11.99	£10.19

or Tel: 0870 904 7373

Cranborne Road, Potters Bar, Herts EN6 3JE

All major credit cards accepted.

YAESU

Choice of the World's top DX'ers

FT-1000MP MKV FIELD

NEW

INTERNAL POWER SUPPLY

The Yaesu FT-1000MP Mk V has become the benchmark standard for HF transceivers, and has been used by more top DXpeditions than any other model. Now you can share this top performance at a very special price with the new "Field" model. This gives you all the superb features of its bigger brother, but with 3dB reduction in power output, making it the same power output as most other radios. But you will be ahead of the pack with the unequalled receiver performance and the ability to operate under extreme conditions and still pull out the weak signals. We think Yaesu have pulled off a master stroke here offering all the MARK V features plus "internal" switch - mode power supply to bring top quality performance within the reach of many more customers.

WATERS & STANTON

WATERS & STANTON PLC. FREEPHONE ORDER LINE: 08000 73 73 88.
MAIN STORE: 22 MAIN RD, HOCKLEY, ESSEX, SS5 4QS. TEL: 01702 206835 e-mail: sales@wsplc.com
MIDLANDS STORE: BENTLEY BRIDGE, CHESTERFIELD RD, MATLOCK, DERBYSHIRE, DE43 5LE. TEL: 01629 582380
SCOTTISH STORE: 20 WOODSIDE WAY, GLENROTHES, FIFE, KY7 5DF. TEL: 01592 756962

REPEATERS

MARK LEWIS, GW7KDU
14 Hornbeam Close, St Mellons, Cardiff CF3 0JA. E-mail: rmc-wales@net.ntl.com

IN APRIL 2002 the Repeater Management Committee (RMC) Manager for Scotland, Colin Dalziel, GM8LBC, was presented with an RSGB certificate for long service to the Society. Colin joined what was then called the Repeater Working Group in 1978 and during his 24 years of service has seen many developments in the field of amateur radio repeaters, Internet linking being the most recent of these.

In addition to his work as Regional Manager for Scotland, Colin has taken on the jobs of proposals manager and also RMC webmaster. As proposals manager, Colin checks each repeater application that has been passed to him by the other RMC regional managers and prepares it for submission to the Radiocommunications Agency (RA). Each application is turned into a professional quality document that includes the technical specification of the repeater together with coverage maps and licensing details. Accurate records of each in progress application are kept on a spreadsheet that can be examined on RMCweb at anytime. Details of submission dates to the RA and also clearance dates can also be found on the website.

The RMCweb is regularly updated by Colin to ensure that the information on the site is as accurate as possible and it must be one of the most current radio-related Internet sites in the world. He includes coverage maps for individual repeaters as well as ones of the whole of the UK showing the general locations of repeaters on a per-channel basis. If all this work wasn't enough for Colin, he also from time to time redesigns the whole site, changing its look and feel. During the last quarterly RMC meeting Carlos Eavis, G0AKI, presented Colin with the certificate marking his hard work for the RSGB and RMC. RMCweb can be found at [1].

Colin Dalziel, GM8LBC, receives the RSGB long-service certificate from Carlos Eavis, G0AKI.

INTERNET-LINKED REPEATERS REVIEW

THE Radiocommunications Agency is (at the time of writing) carrying out a review of repeater / Internet linking. Some of the questions that the Agency is seeking answers to include:

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

Submissions have been requested to be received by the end of April and it is hoped that the results of the review will appear on the RA website as soon as possible.

LATEST CLEARED REPEATERS

No voice repeaters have been cleared since the last edition of this column.

Outstanding voice repeater proposals submitted for licensing are:

Callsign	Type	Process Stage	Proposed Keeper
GB3BK	70cm Site change, Reading, Berks	PU	G8DOR
GB3BZ	New 70cm Wide split, Braintree, Essex	PU	G0DEC
GB3CH	Site Change, East Cornwall	PU	G1RXR
GB3IB	New 70cm Wide split Weston-super-Mare	PU	G4SZM
GB3IE	New 70cm Wide split Plymouth	PU	G7DQC
GB3IT	New 70cm Wide split Tamworth	PU	G6NHG
GB3MG	70cm Site change Bridgend, Mid Glam	RIS	GW3RVG
GB3ND	New 70cm Bideford, Devon	RIS	G4SOF
GB3SY	70cm Site change, Barnsley	RIS	G4LUE

CTCSS

SOME COMMENTS have been received by the RMC regarding the implementation of CTCSS access on all UK repeaters. Some people fear that 1750Hz access will be removed. The plan is that all new UK repeaters should be accessible using CTCSS by 2004. This will not necessarily replace the traditional tone burst and both systems can co-exist on a repeater after the implementation date. Repeater keepers will decide whether to continue to support tone burst access in addition to the RA requirement for CTCSS. RMC expect that in most cases CTCSS and tone burst will be available as they do on many repeaters today.

NEWSLETTERS

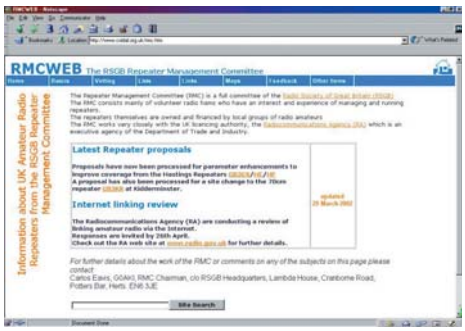
I HAVE recently received a copy of the Kent Repeater Group's (KRG) newsletter March 2002. There is a description of GB3NK's move last January from its old site in Wrotham to a new location in Erith. The group is currently evaluating the coverage from this site and would welcome reports. Their website address [2] is given in the panel.

John, G7RXS, Chairman of the Leicester Repeater Group (LRG) [3] sent me an e-mail version of the LRG newsletter, *LENS*. David, M0BKH, has included the group's engineering news. In this he describes a number of problems that it has had with feeders and antennas over the winter. The good news is these have been replaced with new equipment and that the repeaters have now been restored to full service.

ATV REPEATER NEWS

GRAHAM SHIRVILLE, G3VZV (RMC TV Specialist), reports that a new application for a 23cm ATV repeater has been processed for Hensbarrow Downs in Cornwall. The proposed callsign is GB3NQ. The keeper is G4WVD of the Mid Cornwall Beacon and Repeater Group and coverage should include St Austell, Newquay and Bodmin.

Graham also has good news for a long-standing application for an ATV repeater in Northern Ireland: GB3TX (Belfast) has recently been cleared on 23cm and is hoped to be in operation shortly. ♦



From the RMC website, designed and edited by Colin, GM8LBC.

WWW.

[1] RMCweb: http://www.coldal.co.uk/rmc
[2] KRG: http://www.krg.org.uk/
[3] LRG: http://homepages.stayfree.co.uk/lrg/

EMC

DAVID LAUDER, G0SNO
20 Sutherland Close, Barnet, Herts EN5 2JL.
E-mail: emc.radcom@rsgb.org.uk

DESPITE the recent news about the financial difficulties faced by ITV Digital, current UK government plans are that existing analogue TV broadcasts will be switched off in 2006 - 2010. After that, TV reception will require a digital terrestrial set-top box, digital satellite or cable TV services. Some of these developments could have EMC implications for radio amateurs.

DIGITAL TV BOXES

AT THE BEGINNING of April, compact and relatively low-cost converter boxes for digital terrestrial TV went on sale (see WWW.). The price was £99.95, although this may be reduced in future. These boxes are aimed mainly at the 'free to air' digital services although they can also take a subscription card. The decoded digital TV signal is available as PAL composite video, RGB video or S-VHS video outputs. There is no provision to re-modulate the decoded digital signal back to RF so in practice, they need a TV set with a SCART socket or other baseband video input.

There are several potential amateur radio EMC issues related to these devices. First, when used with a TV only (no video recorder) the converter box is used to receive both analogue and digital and the TV's tuner and receiver are redundant. Secondly, if a high pass filter is needed at the aerial input of the converter box to reject amateur transmissions, it needs to have minimal loss in the passband as in many installations, there isn't much digital signal to spare. Thirdly, the use of a SCART connection could reduce immunity to some bands such as 3.5MHz. Fourthly, the power supply is in the mains plug and is very small so it may be a switch-mode power supply with potential for RF emissions even in standby mode.

Being a digital service, you have either got it or you haven't! The same would apply to interference, if it gets into the digital receiver part. One problem with diagnosing such interference is that the same symptom (loss of picture) can be caused by lack of signal or by interference from any source whether from a transmitter or an arcing gas boiler thermostat.

I haven't had a chance to test one of these boxes yet but, in the meantime, if anyone has any problems, I would be interested to receive details.

A digital TV set-top converter box.

56K MODEMS

TWO MEMBERS have reported that the 56K modems on computers used by them or their family disconnect at the slightest hint of RF on the HF bands. This raises the question of whether all 56K modems currently on sale (including those built into computer main boards) comply with EN55024 for RF immunity.

In any case, 56K modems are very fussy about background noise or any audio frequency interference on the phone line. For RF to affect them, it would need to be detected by some non-linear device such as diode junctions in the modem or in some other equipment connected to the phone line. It is also possible for RF to be detected by a non-linearity in a corroded joint on the phone line although, in practice, this would probably cause crackling which would cause the modem to disconnect even with no RF present.

The BT plug-in RFI filter (product code A17871), mentioned in this column in the past, not only appears to be unobtainable at the moment, but it was never intended for use with a modem, particularly not a 56K modem.

US PHONE FILTERS

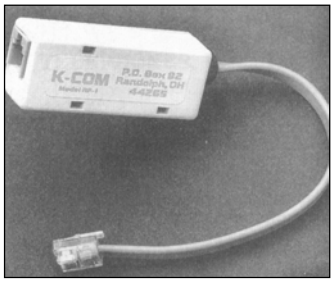
ALMOST ALL MODEMS have a US-type RJ11 phone socket at the actual modem, so in theory, a US telephone RFI filter could be plugged in between the modem and the line cord. You are not allowed to do this in the UK of course, unless the filter is approved under the RTTE Directive for use on the UK telephone network. In practice, it would probably work quite well with modems as these normally use only two wires. If used with UK telephones, however (via suitable RJ11 to UK plug adaptors), most phones wouldn't ring because there is no connection for the third 'ringer' wire through the filter.

For the benefit of members living in the US or planning to move there, K-COM of Randolph, Ohio (see WWW.) offers a model RF-1, Single-Line Modular Telephone Interference Filter (see photo). This product is classified to US and Canadian safety standards by Underwriters Laboratories Inc Communication Circuit Accessory 9P69.

There is a choice of optimised performance ranges: 0.5 - 3.0MHz, 3.0 - 30MHz, 26 - 60MHz or 100MHz. The 3 - 30MHz type is recommended for rejecting transmissions in the HF amateur bands. The RF-1 uses a patented design by Pete Krieger, WA8KZH who also wrote the 'Telephones' chapter in the ARRL book *Radio Frequency Interference, How to Find it and Fix it*. The K-COM website includes detailed technical information and application advice (for US telephone systems).

The price of the K-COM RF-1 filter is US $16.95, including shipping within the US. The cost of postage outside the US is not stated and, in addition to extra postage charges, UK purchasers should expect to be charged VAT by UK customs.

Another US company, the K-Y Filter Company of Davis, California (see WWW.) also sells a telephone RFI filter for the HF bands. It is also called the model RF-1 and the price is US $24.95 including shipping within the US.



The US K-COM model RF-1 telephone/modem RFI filter.

EMC IN LIGHTING

YORK EMC SERVICES Ltd, at the University of York, has recently completed a contract for the Radiocommunications Agency on *Development of Improved Test Methods for Assessing the EMC Emissions*

from Luminaires and Ancillary Devices. A copy of the 136-page final report is available on the RA website (see WWW.).

UK Government policy aims to promote use of higher-efficiency lighting technologies such as compact fluorescent lamps in the home and 'electronic ballasts' for conventional fluorescent tubes in the workplace. These and other lighting technologies include power transistors switching square waves at tens of kilohertz or more, but with the potential to generate harmonics up to HF or even VHF.

Although such lighting should benefit the environment by reducing energy consumption, there is a risk that it may increase pollution of the electromagnetic environment, unless interference emissions from lighting products are controlled adequately.

The York EMC Services' report includes a review of different lighting technologies, their potential for RF interference generation and the applicable EMC standards.

The report also analyses interference propagation and protection distances for various radio services including LW, MW and FM radio broadcasting, Digital Audio Broadcasting (DAB), analogue and digital TV broadcasting, Terrestrial Trunked Radio (TETRA) and 900MHz GSM mobile phones.

Appendices to the report contain comprehensive test results for 15 types of lighting equipment. Sample 1 is a low-voltage quartz halogen lighting assembly with 3 x 35-watt lamps, a 105-watt 'electronic transformer', and a pre-made wiring harness to connect the lamps. To allow a small ferrite-cored transformer to be used, this type of transformer uses electronic switching at typically 30 - 40kHz with an AC square-wave output to power the lamps.

The conducted emissions into the mains for Sample 1 have a peak around 20MHz, although these are still well within the applicable limits. Radiated emissions tests are not currently required for this type of product, but the report shows that, if such tests are performed, there may be significant radiated emissions from the cables to the lamps. Depending on the configuration of these cables, the radiated emissions at around 35MHz may exceed the generic radiated emission limit by a significant margin. It would be interesting to find out how much this type of lighting radiates below 30MHz, in the HF amateur bands.

Samples 6, 7 and 13 are three different types of fluorescent batten fitting, each with 2 x 58W tubes and an electronic ballast. The conducted emission plots show peaks at around 15MHz which approach the EN55015 limit but do not exceed it, although Sample 6, with a dimmable electronic ballast, comes close.

For VHF radiated emissions (a test not currently required), Sample 13 shows a particularly high level around 70MHz, with a broad peak up to 20dB above the generic radiated emission limit.

From the radio amateur's point of view, it appears that fluorescent light fittings with conventional long tubes and electronic ballasts are potentially a more significant interference source than compact fluorescent lamps, although less common in a domestic environment. Broad-band VHF noise at 70MHz and to a lesser extent at 50MHz could be significant. There could also be detectable radiated emissions in the 28MHz amateur band and below, although this has not been tested.

An important conclusion of the York EMC Services' report is that modern lighting technologies and techniques give rise to significant radiated emissions above 30MHz. The report recommends that a radiated emission test should be introduced to cover the range 30 - 300MHz for all lighting products incorporating electronic power supplies. In some cases, where additional electronics are included, tests up to 1GHz are recommended.

Due to the procedures involved in EMC standards-making, it will take many years before any such proposals are approved by the relevant committees and come into force for new products.

WWW.

Digital television adaptors	www.pacefreetoview.co.uk
K-Com telephone RFI filters	http://k-comfilters.com/index.asp
K-Y Filter Company (telephone RFI filters)	www.ky-filters.com/filters.htm
York EMC Services' lighting EMC report	www.radio.gov.uk/topics/research/topics/emc/8056cr2.pdf

CAR HEADLIGHTS

A NEW TYPE of car headlamp, the Xenon arc discharge lamp, is now being fitted to some luxury cars such as some BMW and Mercedes Benz models. It has a characteristic blue colour although this should not be confused with some conventional tungsten headlamp bulbs with a blue tint.

The Xenon arc discharge headlamp requires an electronic inverter to step up the 12V supply to a higher voltage to strike the arc. There are also possible RF emissions from the arc discharge.

At present, radiated RF emission limits for vehicles (and for most other equipment) do not go above 1GHz. I understand that some Xenon arc discharge car headlamps are fairly quiet up to 1GHz, but may radiate significant levels of RF noise in some ranges of frequencies above 1GHz.

There are several EMC issues here, such as the protection of radio astronomy, existing 1800MHz and future 3rd Generation mobile phone systems, not forgetting the 23cm and 13cm amateur bands. I would be interested to hear from any 1.3GHz or 2.4GHz DXers or EME (Earth-Moon-Earth) operators who have noticed RF noise in these bands from passing cars with Xenon arc discharge headlamps.

CAR PARKING RADAR

THANKS TO the member who sent me a copy of the 'Honest John' column in the Motoring section of the *Daily Telegraph*, 30 March 2002.

This includes a letter from a reader, known as I B, reporting that when his BMW 330Ci is locked, it causes interference to his digital (satellite) TV service, despite being 30ft from the dish, whereas his wife's Mercedes Benz does not. The reply from 'Honest John' is that there is an EC Directive about electronic interference and that either the car's immobiliser system or the dish / TV receiver does not comply.

Further investigation reveals that some new BMW models have parking distance control as standard with the option of a 'perimetric parking detector' where front and rear parking radar detectors remain on when the car is parked and a warning sounds if another vehicle gets too close while parking. If a harmonic from such a radar falls within a satellite broadcast band, this could explain the problem reported by I B. There are other possibilities, such as first IF breakthrough, however.

Another issue is whether the 'perimetric parking detector' might be triggered by nearby amateur radio transmissions in any band. I would be interested to hear from any member with a new BMW that has this option fitted. ♦

IARU

TIM HUGHES, G3GVV
10 Farm Lane, Tonbridge TN10 3DG.

THE 16TH Plenipotentiary Conference of the International Telecommunication Union (ITU) will be hosted by the Government of Morocco in Marrakech from Monday 23 September until Friday 18 October 2002. The meeting will be the first ITU Plenipotentiary Conference to be held in the new millennium and on the African continent since 1982. In the past 20 years, ITU Plenipotentiary Conferences have been held in Europe, Asia and the Americas. The Plenipotentiary Conference, held every four years, is the top policy-making body of the ITU. It sets the organisation's general policies, adopts four-year strategic and financial plans, and also elects the top executives of the organisation. It is a key event at which 189 countries that are members of the ITU will decide on ITU's future role, thereby determining its ability to influence and affect the telecoms issues world-wide (and this includes amateur radio).

The ITU Secretary General, Mr Yoshio Utsumi, has commented "This year, the Conference will take on an even more crucial role as it will focus on further reforms that will determine what role ITU will be playing in shaping the telecoms sector and meeting the changing needs of the telecoms marketplace in the next decade."

The global telecommunications industry, one of the world's largest industries, worth more that one trillion US dollars, would not be what it is today without the untiring efforts of the ITU's membership to harmonise their national policies world-wide, bridge technological differences, foster interconnectivity and interoperability of systems on a global scale; in other words, in making it possible for telecommunications services to be offered on a global basis.

This extended background information of the commercial aspects of telecommunications is included to indicate first the vast financial backing which this industry possesses, and second the continuing urgency for the amateur service to be defended and advocated by IARU representatives with wisdom, breadth of knowledge and time to work on our behalf.

WTDC

WTDC IS THE World Telecommunication Development Conference. It is the highest body of the ITU development sector and is held every four years. From 18 - 29 March 2002 it was held in Istanbul at the same venue which was used for WRC-2000. The IARU delegation consisted of Larry Price, W4RA, President of IARU, together with Hans Welens, ON6WQ, and Tafa Diop, 6W1KI, plus Jon Siverling, WB3ERA, of the ARRL staff, who served on the US delegation. 1150 delegates representing 152 member states of the ITU, as well as a large number of other organisations, were there. More than 20 other radio amateurs were present in their professional capacities, including Hugh Railton, ZL2MY, who now serves as Deputy Executive Director of APT in Bangkok. Fatih Yurdal, head of the Turkish Regulatory Authority, was elected chairman of the Conference; he is TA2MY and also served as chairman of WRC-2000. He is the only person to have served as chairman of two separate ITU World Conferences, and the ITU Secretary General recognised this with the award of the ITU Gold Medal.

Issues of importance to IARU included first, stressing the role of amateur services in disaster communications; second, the opportunity to meet African delegations - the Region 1 African specialists (Tafa Diop who is IARU Region 1 Vice Chairman, and Hans Welens who is IARU Region 1 STARS Chairman) were able to meet many delegates from African countries who were present at the Conference; and third, liaison with TRAC, the IARU Member Society for Turkey.

Wojciech Nietyksza, SP5FM, IARU Region 1 Executive Committee Member and Chairman of the External Relations Committee.

Louis van de Nadort, PA0LOU, Chairman of IARU Region 1.

A special portable amateur radio station had been set up, using the callsign TA1KA/ITU; this was visited by the Conference Chairman TA2MY and also by the Minister of Communications of Turkey.

During the weekend, the IARU delegation visited Izmit, the epicentre of the 1999 earthquake disaster, which killed an estimated 50,000 people; *en route*, several emergency operation centres were visited, each well equipped with amateur equipment and, more importantly, with radio amateurs who are available on a 24-hour, seven days a week, basis. Active training is under way to prepare more potential amateurs for the Turkish examinations to supplement the present approximately 650 licensees. ♦

ANDY TALBOT, G4JNT
15, Noble Road, Hedge End, Southampton SO30 0PH.
E-mail: data.radcom@rsgb.org.uk

WITH THE rapid growth in data on HF, perhaps it is time to rethink the bandplanning issues and where we should operate in the bands. Peter Martinez, G3PLX, has been thinking about this issue and he writes: "Traditionally, the HF amateur bands have been divided into SSB/voice at the top end and CW/digital at the bottom. In the early days, this was probably done so that operators on the different modes could find each other easily. By coincidence, it's always been the case that SSB is about 3kHz wide and CW/digital modes have always been much narrower. The popularity of PSK31, as the narrowest of the digital modes, has reinforced this idea that digital modes are narrow. Nowadays, the separation between voice and digital modes is not so much about concentrating activity where it can easily be found, but serves the purpose of minimising the interference which would be inevitable if modes of different widths were constrained to share the same part of the bands. However, the way things are at the moment, the wording of the bandplans is such that the division is between 'voice' and 'digital', not between 'wide' and 'narrow'.

"But what would happen if a digital mode became popular which was as wide as an SSB signal? The present bandplan rules would insist that such a mode operated in the digital sub-bands rather than the voice sub-bands. Is this reasonable? There's a good case for saying that we would want to separate two modes, not because one is voice and the other is digital, but because one is wide and the other is narrow. Put another way, for the purpose of promoting peaceful coexistence between groups of people who have to share the spectrum with each other, it makes sense to have modes of similar bandwidth sharing. What interference there is will be mutual and can therefore be minimised best by co-operation. Forcing wide and narrow modes to share the same space would result in interference which was *not* mutual and would thus cause conflict.

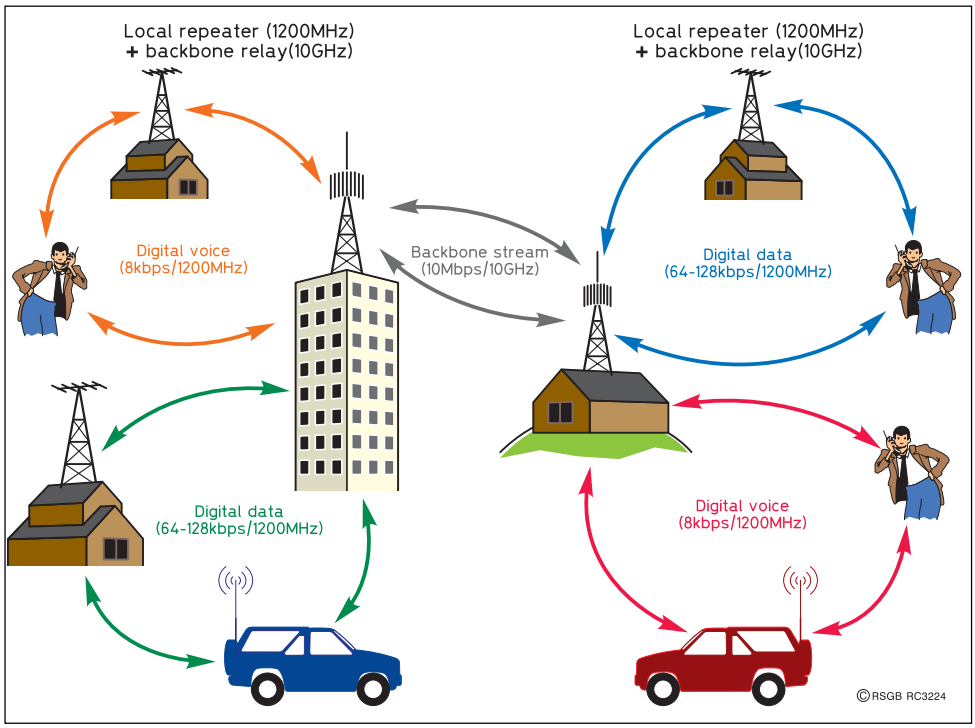
"This isn't a new idea. It works very well at the moment for SSTV sharing with SSB. What I am going to suggest is that maybe there's a good case for a change of emphasis, so that wide-band digital modes *also* share with SSB rather than with existing digital modes.

"Yes, all very well I hear you say, but is it likely that wide-band digital modes might become popular? I don't know, but I want to stimulate the debate because of signals I have been hearing recently on the 80m band here in Europe. The signals to which I refer (in the digital part of the band), are 2.4kHz wide. They consists of up to 18 separate 100-baud PSK signals spaced 133Hz apart, with the two stations transmitting alternate long / wide and short / narrow bursts in an ARQ format. The number of tones, and hence the occupied bandwidth, changes dynamically, presumably dependent on the band conditions at the time. These are amateur signals, not commercial, and I recognise the callsigns of the stations doing the experiments. They are associated with a well-known manufacturer of digital radio equipment. It would only take a marketing campaign by the company, and a firmware upgrade, and there could be hundreds of such signals on the amateur bands. A quick calculation shows that they could be transmitting up to about 3000b/s of data, so it's going to be the message-handling people that are likely to go for this mode for unattended working.

"What do we think? Should this kind of SSB-width digital mode share with the present narrow-band digital modes? Should it share with SSB? If we debate this now and share our views with the rest of the amateur community, we can help those who may wish to promote such modes to choose the best place for their activity."

D-STAR

A PRESS RELEASE from Icom, the amateur and commercial radio company, gives details of equipment it is developing for the next generation digital amateur radio network, called D-STAR. This project has been developed in conjunction with the Japan Amateur Radio League and is also supported by the Japanese Telecommunications Administration. D-STAR provides digitally-modulated voice and high-speed data access over the air, including pictures, and has a close affinity with the Internet. The system makes extensive use of the 1.2GHz band for local node and repeater access, carrying data at rates from ranging from 8KB/s digital voice to up to 128KB/s for high-speed data. Backbone links connecting repeaters operate at 10GHz, supporting a stream at up to 10MB/s. At the moment there appears to be only a limited amount of information on D-STAR on the web. A search on the keyword 'D-STAR' using Google, threw up only about fifteen hits. Presumably this situation will change as the proposal becomes more widely known and talked about. ♦



An outline of the D-STAR system, showing the different services available and how the various parts of the network are connected.

CLASSIFIED ADVERTISEMENTS

Classified advertisements 58p per word (VAT inc.) minimum 14 words £8.12. All classified advertisements must be prepaid. Please write clearly. No responsibility accepted for errors. Latest date for acceptance is 1st month prior to publication.

Cheques should be made payable to RSGB. Copy and payment to:

Jan Forde, Lambda House, Cranborne Rd, Potters Bar, Herts EN6 3JE.

Tel: 0870 904 7377 Fax: 0870 904 7378

E-mail: adsales@rsgb.org.uk

FOR SALE

AERIAL POLES 6.7m TELESCOPIC. These fibreglass poles make ideal supports for lightweight HF longwires or verticals. £17 inc. p&p. Details at http://www.qsl.net/g3cwi Cheques payable to Richard Newstead, 89 Victoria Road, Macclesfield, Cheshire SK10 3JA.

AERIAL WIRES - Medium PTFE/Silver Plated Copper £8. Heavy duty PVC Copper £17. All per 50m coil post paid. CWO - Larger quantities Pro rata. WESTLAKE, CLAWTON, HOLSWORTHY, DEVON.

ALUMINIUM TUBE. Heavy-duty (scaffold) tube approx. dimensions 20' long 2" dia. $^{11}/_{64}$" (4.5mm) wall thickness, 20' and 10' lengths available @ £1.80 + VAT per ft. C.W.O. Rusper Hire (Crawley)
01293 87 1621 office hours only.

FIBREGLASS TUBE High strength tube, square box, rod and other sections all from stock in 6m lengths. Engineered Composites, Chester. Tel: 01244 676000
www.engineered-composites.co.uk

FT1000D. Fully loaded. Mint condition £1500. Buyer must collect. FT50S. Mobile HF £450. Tel: 0115 9103998.
E-mail: william.bradbury@ntlworld.com

G2DYM TRAP-DIPOLE AERIALS, anti-TVI, anti-interference, information Large SAE:- G2DYM, Uplowman, Devon EX16 7PH.
01398 361215 Anytime.

FERRITE BEADS for current baluns/chokes/line isolators. Qty 50 £18.95 inc. Ferromagnetics P.O. Box 577, Mold, Flints CH7 1AH

ISOLATED INTERFACES. Fos PSK31-SSTV-RTTY-WSJT. Suitable for Soundboard Programs. See: www.g3liv.co.uk Info: johnny@melvin.com Phone: 0191 284 3028.

PROGRAMMED PROMS, PMR & MORE Details: www.atlantacomms.co.uk or SAE: Atlanta Communications (RC), PO Box 5, Chatteris, PE16 6JT

STRUMECH TOWER 44ft. A45 HF Tribander. Tail Twister rotator. Sell as whole or will split. Details 01928 788154 or 07836 328832 (Cheshire).

THE RF KIT CATALOGUE. Send 2 x 2nd class stamps or browse www.rf-kits.demon.co.uk. Hands Electronics, Tegryn, Llanfyrnach, Dyfed SA35 0BL
Tel: 01239 698427.

BRING & BUY

ADVERTISE OR AUCTION your surplus equipment at http://www.bringandbuy.cjb.net

COMPUTER SOFTWARE & HARDWARE

BBC BASIC FOR WINDOWS. Run BBC Micro programs on your PC, or write your own. BBC BASIC combines sophistication with simplicity. £29.99 including VAT fron G4BAU, QTHR. www.rtrussell.co.uk

SD - EI5DI's CONTEST LOGGERS. HF £25.00, VHF £25.00, both £39.00. Paul O'Kane, 36 Coolkill, Dublin 18. (00353 1295 3668) www.ei5di.com

SHACKLOG 5.5 - Probably the most popular UK written and UK supported logging software. £32.00. With IOTA add-ons £42.50. SASE + disk for demo copy. Alan Jubb, G3PMR, 30 West St., Gt Gransden, Sandy SG19 3AU. 01767 677913. www.shacklog.co.uk

QUALITY COMPUTER SYSTEMS (G3TKN) at very competitive prices. 10% discount to RSGB members.
See www.storm-computers.net for more details. Tel: 02920 400779.

HOLIDAY ACCOMMODATION

BED & BREAKFAST/FOOD. Scotland North coast. Cliff Top HF and Internet. GM4JYB Tel: 01847 851774. www.dunnethead.co.uk Email: briansparks@dunnethead.co.uk

HAM VACATION QTH GRAN CANARIA www.bbelporche.com

NORTH WALES, CARAVAN, BUNK HOUSE, CAMPING. Elevated site. Use of shack and beam antenna. Open all year. Rural setting. "Tynrhos", Mynytho, Pwllheli LL53 7PS (01758 740712).
tynrhosdiving@btinternet.com

PEMBROKESHIRE SEASIDE holiday home sleeps four from only £150 per week. See www.pembrokeshire.thersgb.net, or send for brochure to G3XDV, 10 Cornmead, Welwyn Garden City, AL8 7QR.

MISCELLANEOUS

CALL IN ON THE 'GOOD NEWS' CHRISTIAN NETS! Every Sunday at 8am on 3747kHz and around 7047kHz and 144.205 at 3pm sharing Christian fellowship over the air. Info from WACRAL, 51 Alma Road, Brixham, South Devon TQ5 8QR
Tel: 01803 854504

KINGS PATENT AGENCY LTD Patents - Trade Marks - Designs. Literature and fees on request. Tel: 020 7248 6161. www.kingspatent.co.uk

SAVE MONEY. Spending over £13 a month on Internet access? For just £12.98 a month you can avoid those call charges. Instant online sign-up. Visit NOW!
www.FutureServers.net/Save

VIDEO TAPE CONVERSIONS to and from all modes NTSC : SECAM : PALN : PALM Digital processing. Fast and economic service. Also 'cine' conversions. g4wmp@qsl.net
Phone 01932 846139.

QSL CARDS

FULL COLOUR QSL CARDS , plus our low cost, conventional cards. Personal designs our speciality. LSAE for samples:- The Standfast Press, South Drive, Inskip, Preston PR4 0UT.

G4TJB QSL CARDS printed to your specification, send large SAE for samples and full product list. Unit 6, Worle Industrial Centre, Coker Road, Worle, Weston-Super-Mare BS22 6BX. Tel/Fax: (01934) 512757

QSL CARDS OF QUALITY Specialising in personalised designs incorporating photographs. Large S.A.E. for samples to: Admiral Printers, 12 Faraday Court, Park Farm North, Wellingborough, Northants NN8 6XY.
Tel 01933 400883

CLASSIFIED continued

UX5U0 PRINT. Quality QSL cards. Low cost. From £20 for 1000. For samples and prices please send SAE to: Vlad, M0UNF, 43 Nine Acres Road, Cuxton, ME2 1EN.

WANTED

VALVES WANTED - NEW AND BOXED. KT66 GEC £35. KT88 GEC £60. EL34 Mullard £27. EL84 Mullard £4. EL37 Mullard £27, DA30, DO30, PX25, all at £120 each. PX4 Globe Shape £70, DA100 GEC £150. ECC83 Mullard £5. GZ32 and GZ34 Mullard £10. ECC32 and ECC33 Mullard £15, B65 Metal Base £8. 53KU Bulbous £8. Other types wanted. Please send a SAE for free list. Old valved radio and test equipment also wanted. COLOMOR (ELECTRONICS) LIMITED, Unit 5, Huffwood Trading Estate, Brookers Road, Billingshurst, West Sussex RH14 9RZ. Tel: +44 (0) 1403 786 559 Fax: +44 (0) 1403 786 560

TOO MUCH EARNING TOO LITTLE IN DEPOSIT ACCOUNTS?
NO ENTHUSIASM FOR EQUITIES AT THE MOMENT?

Argent

ARGENT CAN OFFER TWO WITH-PROFIT BONDS WITH ENHANCED BENEFITS FOR RSGB MEMBERS

STANDARD LIFE (as already announced) 103% invested
Minimum £10,000

CLERICAL MEDICAL - 102% invested
Minimum £5000 (£15,000 from permitted overseas countries)

DESIGNED TO DO A LITTLE BETTER THAN DEPOSITS WHILST MINIMISING RISK.
Please send Name, Address, Date of birth, Probable amount to:- Argent Broking Group, 8-9 Lovat Lane, London, EC3R 8DW. Tel: 020 7621 1133 (Fax: 020 7621 0203) You will be sent and information pack and an illustration which complies with the regulations (no salesman will badger you)

We are obliged by the regulating authorities to issue the following caveat:-
WARNING:- Please remember that the past performance is not a guide to future performance. The value of your investment and the income from it can fall as well as rise and you may not get back the amount originally invested. Tax assumptions may change if the law changes and the value of tax will depend upon your individual circumstances.

BUSINESS CARD SECTION

Advertisement Index

Next Advertisement Copy Date:
Display advertisement copy date for JULY 2002 is 31st MAY 2002

the last WORD

Program Source Code

You may have spotted references to my *BeSpeak* software in the April issue [on page 37 - *Ed*]. It automatically tracks the NCDXF / IARU beacons and logs signal strength using DSP. I've published it as freeware for amateur use, but won't be generally issuing the source code ('The Last Word' April 2002) for several reasons:

1. It takes many hours of work to produce quality software. *BeSpeak* took hundreds of hours over 30 months, fitted in between family and busy job. I'm content to spend the time as I learned programming skills and I hope it benefits the amateur radio community.

2. Freely available source code creates a strong risk of someone plagiarising my hard work, probably charging for it too. Worse, someone could alter the code to be malicious and issue it under the same file name, so I get the blame.

3. If, despite testing, a bug is found I can post an update to my website so users always have the latest version. If I issued the source this isn't practical as I don't have full control.

4. I agree others might have useful input to any software design. During *BeSpeak's* development I received suggestions from users, mostly incorporated. Fellow programmers freely gave me some assistance, duly acknowledged. If I developed something useful to fellow programmers I would publish relevant source code, using the specialist websites developed for this purpose. However, *BeSpeak* isn't in this category.

5. In larger projects a team approach works, but strict version control is needed to avoid bugs. This precludes an 'open' group unless someone can be sure of what is going on, or unless the software is so complex that it attracts only those that know exactly what they are doing.

6. In essence it is a matter of keeping control to avoid buggy software. I believe publishing as freeware is a satisfactory compromise for most amateur-written software. However, if I received a *bona fide* request for source code I might consider a specific release for a particular purpose. It all depends on the circumstances.

Alan Messenger, G0TLK

. . . So, Geert Jan de Groot, PE1HZG, wants open source code. I have just the answer! Did you know that a high proportion of amateurs, ie those with computers, probably have a structured language in their possession at no extra cost?

I refer to Javascript, an extension of HTML, itself the way in which Internet web pages are written. All recent web browsers will interpret Javascript and that includes homebrewed files on your local hard disk - there's no need to access the Internet at all. The RSGB Bookshop sold me *HTML Made Simple* and *Javascript Made Simple*, the best-value computing books that I have ever bought.

I have produced a self-installing disk of some of my offerings in Javascript and other languages. If M de Groot or any other reader would like a copy, please send me (QTHR) a 3.5in pre-formatted blank disk along with reply mailing facilities and state your area of interest.

Godfrey Manning, G4GLM

Welcome Back to the Fold

To whoever took my telephone call two weeks ago concerning Foundation Morse Assessments and sent me a back issue of *RadCom* - many thanks. I have now got most of my equipment back up and running on receive and took the Morse Assessment last Friday, courtesy of Megan Fleetwood, G0TMF, Hillcrest ARS, Dudley, West Midlands. I am now renewing my G8NWS callsign after a lapse of almost 10 years (the constant bad behaviour and repeater abuse finished me off) and have become M3NWS so that I may work low power HF, one thing that I have always been interested in since the AM days. I have become involved in Internet linking through G4CGB, a friend of many years, and my 15-year old son has finally become interested in the best hobby in the world and will be taking the Foundation Licence exams this summer as soon as he has completed his GCSEs. He has already completed all of the five test papers with passes, and that was just from me telling him what I was doing over the odd hours of the week getting my gear back up and running.

At one time in the late 70s / early 80s I taught the RAE at Ounsdale School, but had to give up due to working abroad. I was absolutely appalled at the drop-off of people taking up the hobby, and rest assured that I will be doing my utmost over the coming months to encourage as many as possible to enter the hobby. I have been a school governor for almost 15 years, and will discuss with the headteacher of the school the best way ahead of presenting this interest to the pupils of the school. Too many spend too much time in front of TV and computers.

Mike Caddick, G8NWS / M3NWS

Celebrating 45 Years of 'TT'

I would like to pay a tribute to Pat Hawker, G3VA, who has spent a lot of his life reading, studying, talking, writing and digesting all that technical information that every month, since April 1958, appears in *RadCom*. The amateur radio scene has changed a lot since 'TT' started: at that time if you wanted to do radio you had to build your own gear or use surplus stuff as the only finished products were the ones manufactured in US. Then we had Geloso in Italy and KW in UK that tried to help, but both closed down a long time ago. Operators now are more 'button pushers' than 'builders'.

For a magazine like *RadCom*, it is not easy to collect articles and make every reader happy. It is also not easy to decide what to publish. Well, I first 'met' 'Technical Topics' at the end of 1966, when I became an RSGB member, while working in UK. For the past 35 years I have always awaited my *RadCom* and the first pages I read have been, and still are, the ones of Pat, 'Technical Topics'.

Once 'satisfied', I go through some of the others, with priority to the technical ones. I am happy with *RadCom* and that I have continued to pay my membership dues these 35 years, even in difficult times, is thanks to G3VA's hard work.

Pat, thanks a lot for what I have enjoyed and learned and still enjoy and learn from your writing. I hope your 'pen' will last forever. I am sure there are many other friends, all over the world, that appreciate your work like me or even more.

Giancarlo (Gian) Moda, I7SWX, F5VGU

6m to µWave Convention a Hit

Having attended the '6m to Microwaves Convention', I felt that I must write to thank the RSGB and the various committees for the end product. A really worthwhile day. Great lectures and, for a microwave new boy like me, a chance to meet and talk to the experts. The illustrated talk on high voltage power supplies, by ['In Practice' columnist] Ian White, G3SEK, was outstanding. The content should be published soon for the edification of all those who, like me, thought they knew how to do it. Very enlightening, Ian, and thank you.

Mike Street, G3JKX

Encouragement, not Sarcasm

As a new amateur radio enthusiast, I took my Foundation course a few weeks ago, passing the exam and gaining my callsign MW3LIN, of which I am very proud. Unfortunately, I have not been on the air much as I have been listening in on our local repeater and heard some really awful comments from Full licence holders on how the M3s are "messing up the airwaves"!

I worked really hard to gain my callsign, not being very well up on electrics, antennas, radios etc, being only a mere woman. One M3 callsign, a woman, was told she was a "stupid woman" for forgetting to give her callsign! Please give us new licence holders the help and encouragement we need, not derogatory remarks and sarcasm. You all had to learn once.

Linda Chesters, MW3LIN

WATERS & STANTON

HEAD OFFICE 22 MAIN RD, HOCKLEY, ESSEX, SS5 4QS. **ENQUIRIES**

MIDLANDS + NORTH SHOP BENTLEY BRIDGE, CHESTERFIE

SCOTLAND + BORDERS SHOP 20, WOODSIDE WAY, GLEN

web: www.wsplc.com Freephone Orde

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

HYGAIN

HYGAIN ROTATORS BACK IN THE UK

CD45IIX	£399	C
HAMIVX	£499	C
T2XX	£649	C
FULL DETAILS AVAILABLE		

"FULL DETAILS AVAILABLE"

NOW IN STOCK

HYGAIN ANTENNAS

TH7DX	£799	D
THIDX	£995	D

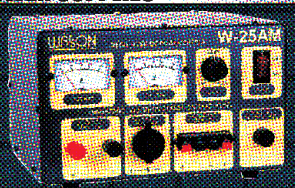
HEIL MICS + HEADSETS

APPOINTED BY HEIL AS UK DISTRIBUTOR

Proset-4	H'phone/boom mic	£129.95	B
Proset-5	H'phone/boom mic	£129.95	B
Pro-5-4	Single H'phone/mic	£119.95	B
Pro-5-5	Single H'phone/mic	£119.95	B
AD-1	Cables Y, K, or I	£16.95	A
HM-10-4	Stick mic	£76.95	B
HM-10-5	Stick mic	£76.96	B
CC-1	Cables Y, K, or I	£29.95	A
HC-4	Spare insert	£32.95	A
HC-5	Spare insert	£32.95	A

You can convert your mic to Heil by simply purchasing HC-4 or HC-5 insert.

POWER SUPPLIES £89.95 C



Watson power supplies guarantee the very best performance and value for money. Tried and tested, they have been submitted for independent laboratory testing for safety and electrical performance.

W-3A	3 Amp fixed supply	£22.95	B
W-5A	5 Amp fixed supply	£29.95	B
W-10AM	10 Amp variable supply	£59.95	C
W-25AM	25 Amp variable supply	£89.95	C
W-30AM	30 Amp variable supply	£119.95	C

W-25SM 25 Amp £69.95 B

BACK IN STOCK

Switched 230 / 115V AC input and fixed 13.8V output at 22 Amps continuous and 25 Amps peak. Over voltage and over current protected and fan cooled. Measures 180mm (W), 75mm (H) and 190mm (D) excluding terminals. Provided with detachable 13 Amp plug and cable.

CREATE JAPANESE ROTATORS

These are tough rotators that weigh almost twice as much as similar priced units and have great turning capacity. Made by Create of Japan, they will handle 4 element HF yagis with ease. Our own Create model has been on our roof for 12 years turning a 4 element HF beam. We wouldn't use anything else!

RC5-1 Standard control box, OK for 4-el Yagis - needs 7-core cable £349.95C

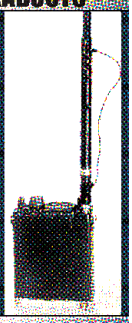
RC5-3 Control box features pre-set or manual control. Otherwise the same as RC5-1 above £449.95C

MC-2 Lower mast clamps £59.95 B

WATSON ATX WALKABOUTS

WALKABOUT PORTABLES

Multi & single telescopic whips. Covers 80m to 6m BNC. Ideal for FT-817 and similar QRP radios.



ATX Walkabout 80 - 6m	£69.95B
AT-80 Single band	£24.95B
AT-40 Single band	£24.95B
AT-20 Single band	£19.95A
AT-17 Single band	£19.95A
AT-15 Single band	£19.95A
AT-12 Single band	£19.95A
AT-10 Single band	£19.95A

CAROLINA WINDOMS

CW-80 Special

Just 66ft long yet covers 80m - 10m. It will out perform a G5RV and give lower angle of radiation because of the 10ft vertical section which is forced to radiate. It will handle 1.5kW.

£115 C

Other Models (all with low angle radiator aud):

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	£84.95 C

80-40-20m Mini Dipole

The "80 plus 2" Mini - Dipole was designed by our Director, Peter Waters, G3OJV. Just 52ft long, it uses linear loading - no tuned traps. It can be directly fed without ATU and also operates at 2.5:1 VSWR on 15m. Amazingly efficient, it handles 400 Watts and is balun fed. Erect it as an inverted V and it takes up less than 40ft of space. If you have a small garden, don't miss out on the LF bands anymore.

£79.95 Carr. £9.00

MFJ-986 ATU £349.95 C

3kW Differential 1.8 - 30MHz

One less knob to twiddle, but all the facilities of the MFJ-989C

MFJ-969 ATU £199.95 C

HF + 6m! 300W "T" Match ATU

It has a very accurate PEP meter built-in, (PP3 battery needed) Includes VSWR cross needle meter, dummy load and lovely roller coaster for critical adjustment. Handles coax, balanced an wire. Size 268 x 242 x 95mm.

MFJ-949E ATU £159.95 C

1.8 - 30MHz 300W "T" Match ATU

Our most popular ATU because it covers all HF bands and matches anything from coax to long wire to balanced feed. Take a look at the price and then consider that it even includes a dummy load plus power and VSWR meter. Measuring 280 x 190 x 83mm, it really is great value.

MFJ-914 • Auto ATU Extender £64.95 C

Match into that G5RV or similar

If your internal auto ATU is having trouble matching your G5RV or similar antenna, this should solve the problem. Just place it in series with the coax feed to the rear of your transceiver. Magic!

MFJ-416 £79.95 C

The easy way to learn CW

Unlike other tutors, this one sends true text and full length QSOs, just like the real test. The massive database avoids frequent repeats too! Will also send groups and displays the text.

MFJ-269 AND MFJ-259B

THE MOST ADVANCED ANTENNA ANALYSERS

MFJ-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-254 or MFJ-254N

1.5-150MHz 1.5kW £74.95

'N' version of above £79.95

MFJ-250C or MFJ-250CN

1.5 - 150MHz 300W £37.95

'N' version of above £44.95

Carr. £9.00

MFJ-962D ATU £289.95 C

1.8 - 30MHz 1.5kW "T" Match

For use with medium linears. Using the famous "T" Match design, this ATU will cope with any antenna whether it be coax, end fed wire or balanced feed. You can monitor your power (average or PEP 200W or 2kW max) and VSWR. Antenna switch selector is included for two antennas. Size 270 x 375 x 115mm.

MFJ-989C ATU £379.95 C

3kW 1.8- 30MHz "T" Match

This design has a roller coaster coil and a 4:1 balun to match balanced line. Ideal for coax, end fed wires and open wire feeder. Features PEP or RMS power measurement VSWR, antenna switch, bypass, built-in dummy load etc. Size 270 x 375 x 115mm.

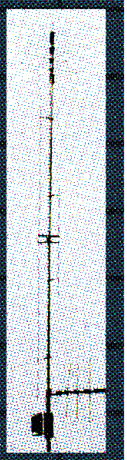
MFJ-1025 • Local Noise Canceller £159.95 C

Kills local noise, but lets signals through. Handles electrical noise, TV time-base etc. Short length of wire picks only local interference and cancels it out.

MFJ-1025 As MFJ-1025, but has active whip antenna for picking up noise signals (as illustrated above). £169.95 Carr. £8.00

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 C

HEAR SIGNALS BETTER

Designed to enhance the audio of your transceiver. MFJ President, Martin Jue suffers with deafness and said that this has put the enjoyment back into radio for him!

MFJ-461 • MORSE CODE READER £84.95 B

"BEST SELLER"

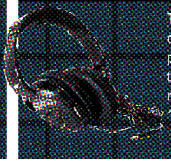
The MFJ-461 is a stand-alone pocket sized Morse code reader. Similar in size to the MFJ Morse tutors, all you do is hold it close to your receiver and it instantly displays CW on the 32 character high contrast LCD. It has automatic speed tracking, a serial port - if you wish to connect to a computer to display the text on a bigger screen. It can also be connected to your receivers audio if required. Truly pocket sized at 57 x 82.5 x 25.5mm and 156g.

MFJ-1704 • 4-way switch £69.95 B

DC - 500MHz 2.5kW

This is a heavy duty die-cast 4-way switch with SO-239 sockets, central earth position and built-in static discharge protector. Makes changing antennas a breeze!

MFJ-392 Mono Padded Communications Earphones £24.95 A



These are purpose designed communications padded headphones that are ideal for all the modern transceivers and receivers. Suits 3.5mm and 1/4" jacks - adaptor provided.

: 01702 206835/204965 FAX: 01702 205843
LD RD, MATLOCK, DERBYSHIRE, DE43 5LE ENQUIRIES: 01629 582380 FAX: 01629 580020
ROTHES, FIFE KY7 5DF ENQUIRIES: 01592 756962 FAX: 01592 610451 -CLOSED MONDAYS
er Line: 08000 73 73 88

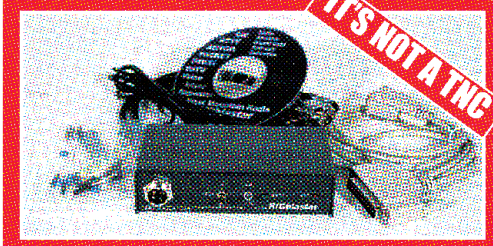
NON-T DISCOUNT... CUSTOMER SERVICE THE ONLY THING WE

RIGblaster a marriage of radio and computer

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



IT'S NOT A TNC

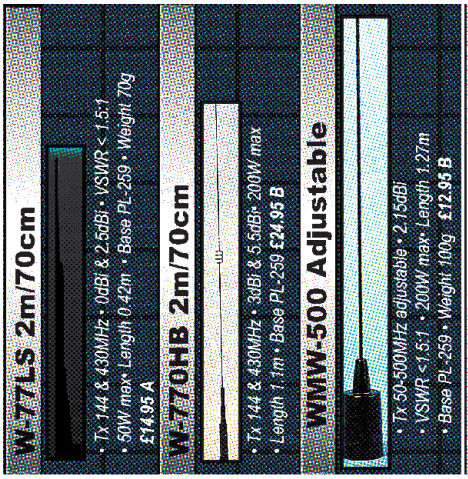
OVER 10,000 ON THE AIR

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

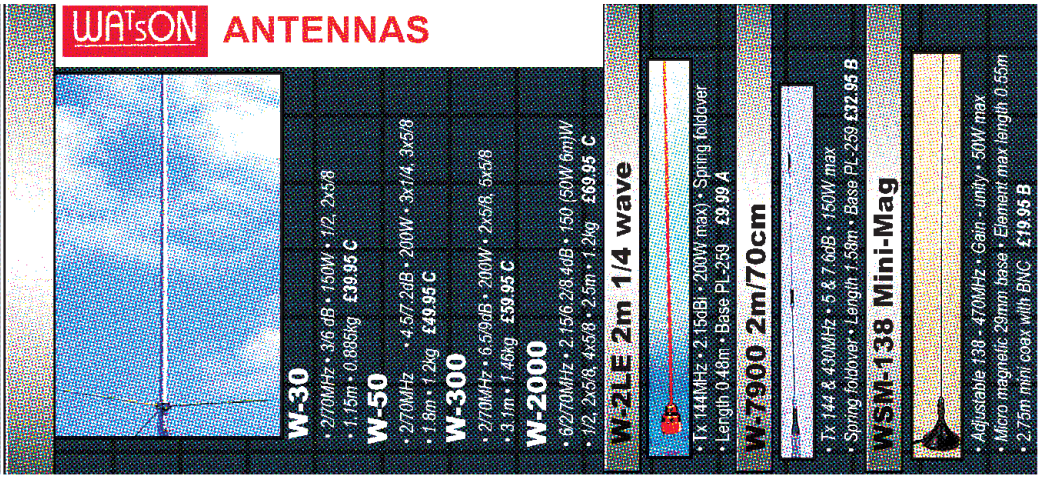
RIGblaster Plus	Auto mic switch 8-pin round (software and cables)	£139.95 B
RIGblaster M8	Auto mic switch 8-pin round (software and cables)	£109.95 B
RIGblaster M4	Auto mic switch 4-pin round (software and cables)	£109.95 B
RIGblaster RJ	Auto mic switch RJ45	£109.95 B
RIGblaster nomic 8p	8-pin mic (software & cables)	£62.95 B
RIGblaster nomic 4p	4-pin mic (software & cables)	£62.95 B
RIGblaster nomic RJ	RJ45 mic (software & cables)	£62.95 B



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**

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**



WATSON ANTENNAS

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
• 50/270MHz • 2.15/6.2/8.4dB • 150 (50W 6m)W
• 1/2, 2x5/8, 4x5/8 • 2.5m • 1.2kg **£69.95 C**

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 1.58m • Base PL-259 **£32.95 B**

WSM-138 Mini-Mag
• Adjustable 138 - 470MHz • Gain - unity • 50W max
• Micro magnetic 29mm base • Element max length 0.65m
• 2.75m mini coax with BNC **£19.95 B**

SGC NO COMPROMISE COMMUNICATIONS

SMARTUNER™-THE WORLD'S BEST SELLING COUPLERS

CLAIM YOUR £50 DISCOUNT IN MAY, JUNE OR JULY.

SG-230 SMARTUNER™

- 1.6 - 30MHz
- 3- 200 Watts
- 170 non-volatile memory addresses
- Tune time: 10ms
- Input: SO-239
- Output: High voltage terminal
- Supply: 12 - 14V 750mA approx. (optional 24V available)
- Fully weatherproof
- Size: 406 x 305 x 76mm

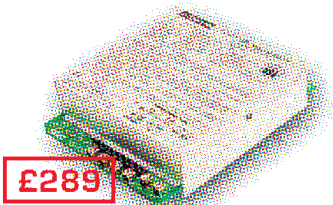
£359

SG-237 SMARTUNER™

- 1.8 - 60MHz
- 3- 100 Watts
- 170 non-volatile memory addresses
- Tune time: 10ms
- Input: SO-239
- Output: High Voltage terminal
- Supply: 12 - 14V 300mA approx.
- Fully weatherproof
- Size: 178 x 229 x 38mm

£369

SG-239 SMARTUNER™



- 1.8 - 30MHz
- 1.5 - 200W (PEP)
- 170 non-volatile memory addresses
- Instant tuning from memory (<10ms)
- Antenna: Min length 2.75m 3.5-30MHz
- Input impedance range 0.2- 5,000 Ohms
- Separate connections for antenna & ground
- DC supply 10-18.5V DC current 230mA
- Size: 190x 150 x 45mm
- Weight: 907g

£289

SG-231 SMARTUNER™

- Frequency 1MHz to 60MHz
- Power input 3 - 100W (PEP)
- 50W max CW
- VSWR: <1.4:1 (typical)
- 170 non-volatile memory addresses
- Antenna: Min length 2.4m 3.5-60MHz, Min length 7m 1-60MHz
- Input impedance range 45 - 55 Ohms
- Output: Ceramic terminal
- DC supply 13.6V DC 0.9A
- Fully weatherproof housing
- Size: 292 x 241 x 44mm
- Weight: 1.7kg

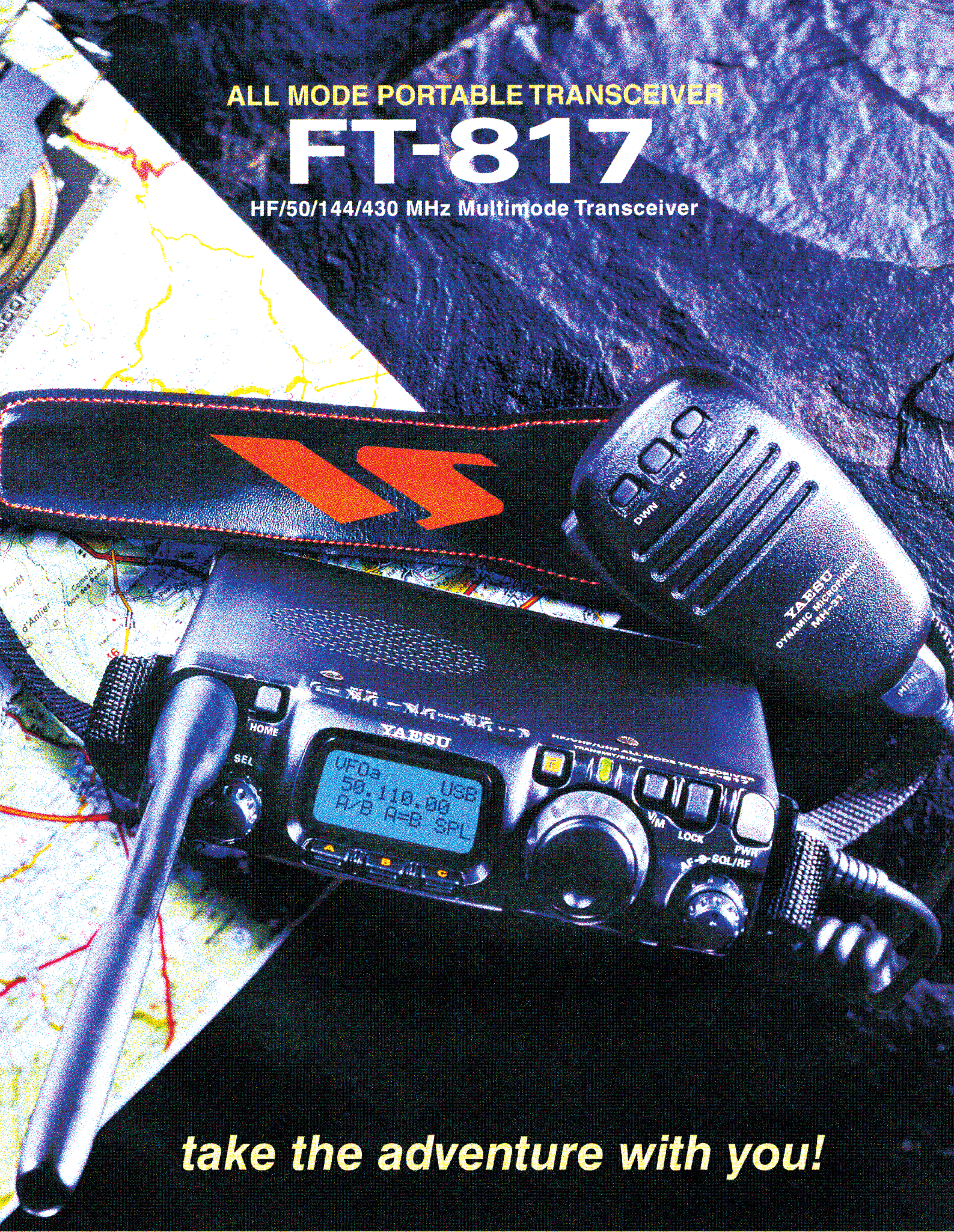
£399

SG-235 SMARTUNER™

- Frequency 1.8 to 30MHz
- Power input 3 - 500W (PEP) 200W max CW
- VSWR: <1.4:1 (typical)
- 170 non-volatile memory addresses
- Antenna: Min length 2.4m 3.5-30MHz, min length 7m 1.8-60MHz
- Input impedance range 45 - 55 Ohms
- Output: Ceramic terminal
- DC supply 13.8V DC 1.4A
- DC operating range: 10 to 17V
- Fully waterproof housing
- Size: 406 x 305 x 76mm
- Weight: 3.5kg

£1395

BUY ONE OF THESE TUNERS IN MAY, JUNE OR JULY & CLAIM AN INSTANT £50 DISCOUNT OFF THESE PRICES!



YAESU