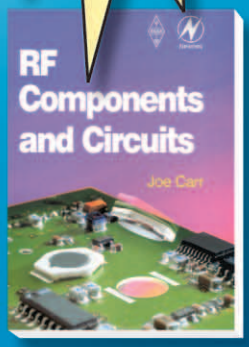
PIC-A-STAR - Major New Project Starts This Month

0802

www.rsgb.org

RadCom

OUT NOW! see p52



£3.95 Vol 78 No 8 ♦ August 2002 ...dio Society of Great Britain Members' Magazine

The GB50 Amateur Radio Experience - Full Report Inside

The LDG Z11 Automatic ATU Kit Reviewed

WATERS & STANTON

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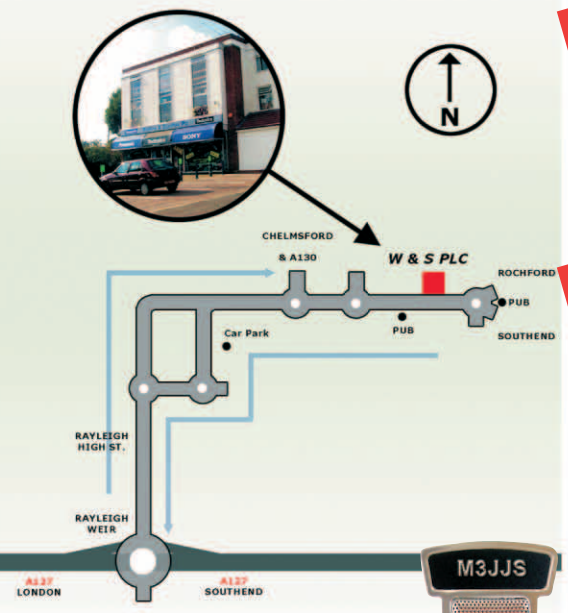

HEIL CLASSIC MIC

- Dual element mic inserts
- "Studio One" insert
  Plus HC-4, HC5 or iC element
- Soft-touch back panel switch
- Removable base
- Complete with your callsign
- Requires CC-1-I adaptor
- Includes base stand

£259.95 B

Outside the Heil Classic microphone is an exact replica of the 1930's RCA 74B type broadcast microphone. Inside it has the benefit of two of the most modern inserts - the Heil Studio One and a choice of one other Heil communuications elements.

SPECIAL OFFER

RADIO LOCKED CLOCK

Model RCWC

£14.95

Carr. £2.75

This fabulous wall clock is offered at a very special price. 25cm diameter and the time is atomic standard! Limited stocks.

Yupiteru Wideband Scanner

MVT-3300EX 68MHz-1GHz!

SAVE £20

£129

Carr. £6

Built-in descrambler

This receiver offers FM and AM reception over the range 68MHz - 1GHz in the bands: 68 - 180MHz, 320 - 470MHz and 808 - 1000MHz. With frequency steps of 5, 6.25, 10, 12.5 & 25kHz it is ideal for all services. The built-in descrambler even allows decoding of some encrypted transmissions.

FT-1000MP MKV FIELD £2299

NEW

YAESU

Available Autumn

YAESU FT-897 £TBA

NEW

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

Available Autumn

Super Antennas USA YP-2 Portable Yagi

Weighs 7lbs
Packs down to 3ft
Covers 6m - 20m
Mono band configure

£399.95

carr. £6.00

This amazing design has quick telescopic boom and elements plus screw-in loading coils. Takes only minutes to assemble for any one band. Support on 1.5" mast. Includes carry bag. Limited numbers available now.

Goes in aircraft cabin

Fits in car boot!

YAESU

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

3 YEARS FREE WARRANTY

SPECIAL OFFER

FREE HEIL GOLD LINE MICROPHONE

£2899 carr.£9

FT-847 160m - 70cm ALL MODE

3 YEARS FREE WARRANTY

£1149 carr.£9

FT-100 D 160m - 70cm ALL MODE

SAVE

£899 carr.£6

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

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

£1099 carr.£9

FT-817 'SPECIAL OFFER' £595 C

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

INCLUDES AC CHARGER
AND 1 AMP
Ni-cad PACK

NEW HEIL PRO-SET PLUS

£199.95 B

The PRO-SET PLUS is for contest and DX operators. Dual microphone inserts and acoustically tuned chambers for the speakers. A speaker reversal switch places the signal in the centre of your head or creates a spatial widening sound field. The headset is also the ultimate in comfort with full adjustments possible.

KENWOOD

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

3 YEARS FREE WARRANTY

+FREE HEIL HM-10 MIC

£1695 carr.£9

TS-570DG 160m - 10m All Mode

3 YEARS FREE WARRANTY

£849 carr.£9

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

£1349 carr.£9

SGC

SGC SG-2020 £699 A

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

NEW SG-2020 ADSP now available £899 carriage £9.00

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

FREE SG-239 ATU (£299)
WITH SG2020
IN MAY, JUNE OR JULY

ICOM

IC-756 PRO II £2495 C

NEW

IN STOCK NOW!

This is Icom's new Flagship.

IC-7400 160m - 2m ALL-MODE

NEW

IN STOCK NOW!

£1499 carr.£9

IC-706IIG 160m - 70cm ALL MODE

3 YEARS FREE WARRANTY

£849 carr.£9

IC-718 100W HF £649 C

YAESU

VL1000 £3699 D

HF + 6m Linear Amplifier + PSU 1kW

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WON'T BE UNDERSOLD DISCOUNT CUSTOMER SERVICE THE ONLY THING WE

PRICE MATCH

YAESU

FT-1500M 2m FM Mobile £159 C

SPECIAL OFFER

'SAVE £70'

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

KENWOOD

TM-D700E 2m + 70cm FM £449 C

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

TM-G707E 2m + 70cm FM £289 C

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

TM-V7E 2m + 70cm FM £359 C

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

ICOM

IC-207H 2m + 70cm FM £279 C

A great budget class radio for VHF & UHF use.

IC-2800H 2m + 70cm FM £419 C

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

IC-2100H 2m FM Mobile £229 C

Rugged design with switched receive filters 12.5/25kHz

IC-910 2m + 70cm All Mode £1299 C

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

YAESU

FT-7100 2m/70cm Mobile £299 C

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).

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

WITH EXTRA WIDE RX COVERAGE

- 144-146MHz 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.

SGC

STEALTH ANTENNA KITS £489 C

Comprises of SG237 Auto Coupler, wires and ropes for quick hf antenna.

£50 CASHBACK UNTIL END OF JULY

LINEAR AMPLIFIERS UK

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

YAESU

YAESU VX5R BLACK OR SILVER £239 B

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

YAESU VX1R 2m/70cm £149 B

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

W-25SM 25AMP SWITCH-MODE POWER SUPPLY

THE QUIET ONE

£79.95 Carr. £6.00

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

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

NEW

£299 Carr. £6.00

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

HOCKLEY STORE SECOND HAND LIST

HF Transceivers		ALS-600XCE	£899.00
DR-M03SX	£159.00	FL-3 x2	£99.00
IC-575A	£399.00	Drae VHF	£25.00
MFJ-9020	£115.00	AT-2000	£65.00
MX-21S	£189.00	Pro-set 5	£99.00
LINC-10	£149.00	MK-702	£49.00
VHF/UHF Base/Mobile Transceiver		AMT-3	£50.00
2001 x4	£119.00	FAX-1	£125.00
6001	£145.00	NIR-10	£199.00
7003 x2	£125.00	NTR-1	£99.00
TR-751E	£349.00	KAM Plus x2	£199.00
MFJ-9406X	£149.00	MFJ-411	£45.00
FT-290R II x4	£249.00	MFJ-418	£49.00
FT-690R II	£299.00	MFJ-452	£49.00
FT-736R	£749.00	MFJ-564B	£45.00
FT-790R II	£249.00	MFJ-989C	£215.00
FT-3000M	£249.00	MFJ-1020A	£65.00
VHF/UHF Hand Held Transceiver		MFJ-1278	£175.00
AT-400	£115.00	MFJ-1278BX	£225.00
DJ-180	£89.00	MFJ-1289M	£49.00
ICT7E	£199.00	MFJ-1610	£4.00
FT-41R x2	£99.00	MFJ-8621	£129.00
Shortwave Receivers		3000A +	£289.00
IC-R72	£399.00	Micro-RF	£69.00
NRD-345G	£349.00	Model 40	£225.00
NRD-525	£529.00	Pico-2	£149.00
NRD-535	£625.00	P-335	£39.00
Scanners Mobile/Base		DSP-9+	£129.00
Pro-2004	£175.00	AT-100	£59.00
Scanners Hand Held		WMM-1	£49.00
AR-1500	£115.00	FC-707	£109.00
AR-8000 x2	£199.00	FL-2025	£99.00
AR-108	£49.00	FRT-7700	£45.00
SAB-2005	£39.00	**Miscellaneous**	
VR-500	£179.00	AE-2850	£50.00
MVT-9000 II	£249.00	UK-75-ST	£60.00
Station Accessories		GPS-12CX	£179.00
PK-900	£299.00	GPS-II Plus	£149.00

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

SUPER ANTENNAS USA

'Amazing' MP-1 Variable Antenna

7MHz - 430MHz! 150 Watts

Use Portable, Mobile, Home or even balcony!

SLIDE TO CHANGE BANDS!!

It's sweeping America as the most versatile antenna for any location. Kit includes telescopi 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!!

£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

WATERS & STANTON

Freephone Orders 08000 73 73 88

DISCOUNT CUSTOMER SERVICE THE ONLY THING WE WON'T

PRICE MATCH

Get in Front with HUSTLER

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

5BTV

£209.95
Carr. £9.00

4BTV

£169.95
Carr. £9.00

HUSTLER

BASE STATION ANTENNAS

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

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

HUSTLER Mobile Antennas

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

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

Lower mast sections

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

WATSON

CAPTURE THAT FREQUENCY!

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

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

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

SPY CATCHERS

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

WR-5001 £99.95 WR-5002 £159.95

LDG USA

LDG AT-11MP Auto ATU £269.95 A

1.8MHz - 30MHz 150W

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

CS-600 2-way Coax Switch £12.95 A

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

B1-2K Balun £25.95 A

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

B4-2K Balun £34.95 B

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

REM-BAL4 Remote Balun £49.95 B

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

WATSON

WEP-300B EARPIECES £2.95 A

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

WSA-1 PSK-31 Adaptor £39.95 B

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

YS-130 ROTATORS £79.95 B

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

REVEX L-20 15W DUMMY LOAD £21.95 A

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

MASPRO VHF/UHF YAGIS

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

Take a look at our prices!

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

To compare with dBi figures, add 2.4dB

WATSON

QS-112 SPEAKER MIC £16.95 A

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

SPM-102 SPEAKER MIC £9.95 A

Incredible value!

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

Limited stocks.

WM-308 BASE MIC £59.95 B

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

WCT-321 LAPEL TALKER £19.95 A

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

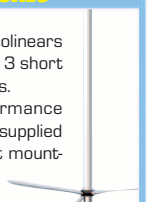
AVAIR VSWR POWER METERS

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

AV-200	1.8 - 200MHz 5/20/200/400W	£49.95 B
AV-400	140 - 525MHz 5/20/200/400W	£49.95 B
AV-600	1.8 - 525MHz 5/20/200/400W	£69.95 B

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

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.

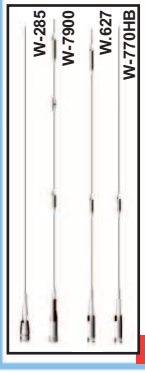
Dual Band 2m/70cms

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

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

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

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Details of the Society's volunteer officers can be found in the RSGB Yearbook 2002

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RRM CONTACT DETAILS

AS REPORTED PREVIOUSLY in *RadCom*, three new RSGB Regional Managers (RRMs) have been co-opted in recent months. Their contact details are as follows:

Region 5: West Midlands Roy Clarke, G8AYD, Beechfields, 3 Beechfields Way, Newport, Shropshire TF10 8QA; e-mail: m0rly@rsgb.org.uk

Region 9: London & Thames Valley Alan Ross, G1SQB, 84 Benhurst Avenue, Elm Park, Hornchurch, Essex RM12 4QT; e-mail: g1sqb@rsgb.org.uk

Region 13: East Midlands Bryn Llewellyn, G4DEZ, Eastfield Cottage, Mavis Enderby, Nr Spilsby, Lincs PE23 4EJ; e-mail: g4dez@rsgb.org.uk

WRC-03 GOES TO GENEVA

LAST MONTH WE reported (*RadCom* July page 6) that Venezuela had withdrawn its invitation for the World Radio Conference in 2003 and that therefore the location of the conference was uncertain. Since we went to press it has been announced that WRC-03 has been rescheduled in Geneva and that it will now take place between 9 June and 4 July 2003.

MESSAGE TO CLUB SECRETARIES

RSGB PRESIDENT Bob Whelan, G3PJT, sends the following message to club secretaries, chairs, event organisers etc. "I, as President, am always very pleased to be asked to come to club meetings and events. But there are only so many free evenings and weekends. Can I please ask you to give me as much notice as possible? Don't assume that because I usually turn up for an event I will in fact come. But if you are in my diary with a formal invite then I will always appear unless there are extenuating circumstances. Thanks."

HF CONVENTION - NEW VENUE!

WE EXPLAINED LAST month (*RadCom* July pages 12/13) that the venue of the RSGB International HF Convention has had to change this year. We are now pleased to announce that the HF Convention will take place at the **Savill Court Hotel and Conference Centre,** in **Egham, Surrey** (about 1 mile from the Beaumont Conference Centre in Old Windsor, where the Convention has been held for several years.) The dates remain the same as scheduled: **11 - 13 October**.

The world's premier HF, IOTA and LF event features a packed weekend of IOTA lectures, DXpedition lectures, Open Forums and Major Technical lectures. The 'South Sandwich and South Georgia' DXpedition and several other major DXpeditions from 2002 will be reported. The event also features DXCC card checking and a lecture on the 'Logbook of the World'. This year there will be no fewer than *three* demonstration stations: 'State of the Art', 'Low Cost' and 136kHz. And much, much more!

The Savill Court Hotel and Conference Centre is a fine three star hotel set in 22 secluded acres of lawn and woodland. It borders on to Windsor Great Park and the famous Savill Garden. Reached by a rhododendron-lined driveway, you encounter the splendid Jacobean style red and white brickwork, leaded mullion windows and tall twisting chimneys of Savill Court set amongst sweeping lawns and graceful cedar trees. Savill Court has a well deserved international reputation for its conference and banqueting facilities and offers *en suite* facilities in all rooms and non-smoking rooms. All in all an excellent new venue for HFC2002. Regular visitors to the Convention should note that the hotel has a limited bedroom capacity (this year) but does offer an overflow facility into a nearby hotel. Rooms on site at the Savill Court will be allocated on a first-come, first-served basis, with preference to those staying two nights, so early booking is advised.

Day visitors are very welcome and admission is just £6 per day (or £10 for the whole weekend). A series of packages are available which include one or two nights accommodation for one or two people, admission to the Convention, the IOTA Buffet on the Friday night and the 'DX Dinner' on the Saturday night. For further details see www.rsgb.org/shop or call 0870 904 7373.

The splendid Savill Court Hotel and Conference Centre.

AROS TALKS

AMATEUR RADIO Observation Service (AROS) Coordinator Barry Scarisbrick, G4ACK, will be giving talks on the work of AROS at the **Highfield ARC** in **Cardiff** on **3 August** (details from Steve, GW6CUR, 029 20634613), at the **Norfolk** ARC on **7 August** (details Peter, G3ASQ, QTHR) and at the **Keighley** ARS on **15 August** (details Ian, M1BGY, tel: 01274 723951).

RSGB QSL BUREAU NEWS

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

G5RP TROPHY: NOMINATIONS WANTED

A REMINDER THAT there's still time to send in your nominations for the G5RP Trophy. This is an annual award made to encourage newcomers to HF DXing. It is awarded for making recent rapid progress in DXing, which only newcomers have the scope to do. However, the award is not limited to youngsters or the newly-licensed - the DX bug can bite at any age and after many years of experience.

Dominic Smith, M0BLF, receives last year's G5RP Trophy from 2001 President Don Beattie, G3BJ.

Seasoned HF DXers are able to reward and encourage newcomers by nominating an up-and-coming DXer for this award. Your nominations for the 2002 - 2003 award are needed now.

The trophy is awarded jointly by the Vale of White Horse Radio Society and the RSGB HF Committee, and will be presented at the RSGB International HF and IOTA Convention.

Nominations should be sent by post to Colin Thomas, G3PSM (QTHR), or c/o RSGB HF Committee at RSGB HQ, or by e-mail to: hf.chairman@rsgb.org.uk, to arrive not later than **31 August**.

RSGB RUNS FIRST UK DF EVENT TO IARU RULES

THE INAUGURAL UK Direction Finding competition to the IARU rules on 22 June was less well attended than the organisers had hoped, but there was no doubt that those who were there had an excellent day.

The photograph below shows RSGB Board Member responsible for Sport Radio (Geoff Dover, G4AFJ) setting RSGB President Bob Whelan, G3PJT, off at the start. Bob bravely decided (or was he coerced?) to have a go and astounded everyone by coming first in the M60 category. Competitors join the M60 age group on 1 January in the year they attain their 60th birthday and Bob reaches the big 60 this year. In this category competitors have to find three of the five transmitters that are deployed around the wood. Bob found one and got back inside the two hour time limit to come out on top.

Geoff Dover, G4AFJ, waves off RSGB President Bob Whelan, G3PJT, at the start.

Afterwards he said, "What a great day in the country. I have just been looking at my map and can see how I might have put in a better performance. I can see how ARDF might have great potential for kids - a bit like hide and seek with radios".

The other competitors also enjoyed their day out at Kinver Million near Stourbridge. According to David Deane, G3ZOI, "The competition was brilliant, brilliant, brilliant, I would definitely want to do it again, when's the next one?!" - and this from a man who lost his glasses half way round (but happily found them again).

A veteran of Top Band DFing, Roy Emeny, had this to say: "Thank you all for an excellent day. It is clear that I have one or two new skills to learn but despite that it was tremendous fun. Well worth the 400 mile round trip. If you decide to run another one you can definitely count me in."

Watch the website at http://www.ardf.btinternet.co.uk for news of developments and details of future events.

VHF AWARD NEWS

AT LAST A month that hasn't revolved around 50MHz! June brought an interesting mixed bag with claims for 70, 144, 432MHz and of course 50MHz, as well as the first 'Jubilee Award' claim.

Ivan Dobnik, S51DI, becomes the first Slovenian amateur to claim an RSGB award and he did this in some style, tendering a multi-part claim for 70MHz which gains him a certificate and stickers for 35 squares / 10 countries. In addition Ivan becomes the first to claim a VHF 'Jubilee Award' which has been endorsed for 70MHz.

Heath Rees, GW3HWR (SA), gains a certificate and sticker for 40 squares / 10 countries at 144MHz. Heath comments about: "The frustrating period waiting for confirmation of 'squares' . . . easier to get long distance confirmation . . . getting cards for 'ordinary' contacts around the UK is proving very slow." Well, from my perspective I've found 144MHz lacking activity and QSLs quite slow also, so come on, let's do something about it!

Ted Agar, G8AZA (YO), gains a 'Standard Award' for 432MHz.

From Harold Groves, G3UYM (SG), a successful claim for a Microwave Distance award for the 24GHz band. This took place during the RSGB Millimetre bands contest in April between Broadway Hill in Worcestershire and Winter Hill in Lancashire, a distance of 182km.

Finally this month, the 50MHz successes! Gordon Wyatt, GW8ASA (CF), sent a very large bundle of cards which culminated in him gaining a certificate for 250 squares and a handful of stickers for the minor increments. John Ridd, G8BQX (TN), gains awards for 120 Countries (2-way) and for 550 Squares. David Jarrett, G4DCJ (PE) gains a Jubilee Award endorsed for 50MHz.

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 www.argonet.co.uk/users/tonyg6ttl/awards/awards.htm (also linked from www.rsgb.org) Queries may also be sent by e-mail to vhf.awards@rsgb.org.uk

Summary of Award Recipients for June

50MHz: 25 Squares: GW8ASA. 50, 75, 100, 125, 150, 175, 200, 225 & 250 Squares: GW8ASA. 550S: G8BQX.

120 Countries: G8BQX

70MHz: 20 Squares 4 Countries: S51DI. 25/6, 30/8, 35/8, 35/10 S51DI.

144MHz: 40 Squares / 10 Countries: GW3HWR.

432MHz: Standard Award: G8AZA.

Microwave Distance: 24GHz: 100km: G3UYM/P. 150km: G3UYM/P.

Jubilee Award: S51DI, G4DCJ.

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FT1000 Mark V Field

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

Building on the tremendous success of the 200-Watt FT-1000D and MARK-V FT-1000MP Elite-Class HF Transceivers, the MARK-V Field brings leading-edge technology to you in a 100-Watt self-contained transceiver design.

I. 200 WATTS PEP TRANSMITTER OUTPUT

Conservatively Designed 200W MOSFET Final Amp

The MARK-V utilizes a pair of Philips BLF147 Power MOSFETs in a 30-Volt, push-pull configuration. These 300-Watt (150-Watt x 2) transistors are run well below their maximum ratings, ensuring high reliability and excellent signal purity. The Low-Pass Filter network effectively suppresses harmonic energy while efficiently delivering at least 200 Watts to the antenna jack.

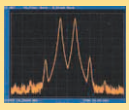
High-Speed Automatic Antenna Tuner

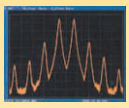
The basic circuitry from the widely-acclaimed Automatic Antenna Tuner of the FT-1000MP has been beefed up for operation at the 200-Watt level for incorporation in the MARK-V. Constructed on a glass-epoxy circuit board for maximum efficiency, the ATU's dedicated microprocessor utilizes a complex analysis algorithm which permits lightning quick matching of impedance mismatches. The result: more power delivered to the antenna, and less time wasted in tuning!

Revolutionary Heat Sink for Contest and DX-pedition Environments

Providing 200W of momentary output from a compact transceiver enclosure is easy; creating an HF powerhouse that will pump out full power for days at a time is tough! Yaesu's engineers, seeking to fulfill the needs of both contest and DX-pedition operators, have crafted an all-new, highly-efficient "T-configuration" heat sink for the MARK-V, providing double the heat- dissipating surface area and 2.5 times the cooling capacity of the heat sink on the FT-1000D! When the going gets tough, the thermostatically-controlled cross-flow fan engages at 40 °C dueling the heat across the dissipating fins and away from the case. This revolutionary new heat sink design ensures that the MARK-V will not let you down, even under the aggressive operating circumstances of an expedition to a rare tropical island!

II. CLASS-A PA OPERATION





Uniquely-Pure Signal Quality

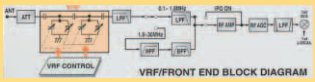
The MARK-V is the first commercially-designed Amateur transceiver to provide Class-A operation for its power amplifier. When engaged by the front panel's [CLASS A] switch, the PA bias is changed dramatically, and the MARK-V then puts out a 75-Watt signal envelope of astounding purity. During Class-A operation, 3rd-order Intermodulation Distortion (IMD) drops from a typical value of-31 dB to -50 dB or better, and 5th- and higher-order IMD (the kind which contributes to "splatter" reports) will drop to the -80 dB range! And while the MARK-V's Class-A feature does not directly affect your linearamplifier's performance, the extremely clean drive to your linear will result in dramatically cleaner overall signal reproduction.

III. IDBT: INTERLOCKED DIGITAL BANDWIDTH TRACKING SYSTEM

Interlocked Digital Bandwidth Alignment Technique

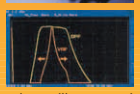
The MARK-V introduces a unique and formidable interference-fighting system with the development of IDBT, whereby the bandwidth of the Digital Signal Processing filter is automatically locked to be the same as the net bandwidth of the analogue IF filters. Engaging the IDBT, the operator experiences a sudden sharpening of the shape factor of the receiver's filter system. The analogue IF, which utilizes cascaded crystal and/or mechanical filters, includes both IF WIDTH and IF SHIFT controls, which allow modification of the IF passband width and centre frequency. With IDBT, the DSP filter is automatically re-programmed so as to match the custom bandwidth you just set, and the DSP filter then contributes a filtering slope which resembles a sheer cliff! The results? The incredible selectivity of an all-DSP system with the protection of the DSP afforded by the extensive IF analog filtering. What's more, the potential for AGC "pumping" caused by different analogue and digital bandwidths is eliminated; thus, the need for separate analog and DSP AGC systems is also gone, eliminating the very real danger of annoying cross-AGC artifacts which can seriously degrade receiver performance. New to the 455 kHz analogue IF is a IO-Pole Collins ® Mechanical SSB Filter, providing outstanding voice signal reproduction along with enhanced skirt selectivity compared to the FT-1000MP's 8-pole filter. The IDBT function is controlled by an allocation of up to 60 kbytes of ROM in the Main CPU, while the DSP performance utilizes I Mbyte of EEPROM! This perfect blending of the analogue and digital worlds brings you the most crunch-proof receiver filtering ever!

IV. VARIABLE RF FRONT END FILTER



VRF Preselector Filtering Protects Receiver Front End

Extending the protection afforded the sensitive front-end components of the receiver, Yaesu's engineers have developed the VRF module: a High-Q input "Preselector" filter ahead of all active devices in the front end, including the main bandpass filters! Particularly in multi-operator contest or DX-pedition environments, where large low-band antennas may be in close proximity, a receiver operating (for example) on 20 meters can suffer intermodulation interference from on-site 40- and 80-meter signals, compounded by extremely strong 7 MHz broadcast signals. The VRF circuit provides narrow-band selectivity which prevents this unwanted signal voltage from hitting the input side of the bandpass filter switching diodes, where 2nd-order IMD is most often created in an HF receiver. Tuning of the VRF is simple: just turn the VRF/MEM CH knob, and peak the background noise or signal strength! The VRF is stoutly designed, with large (10 mm x 10 mm) coils yielding high Q, and precision tuning capacitors ensuring that performance does not degrade over time. A total of 31 tuning memories per band allow very quick QSY, and the use of high-quality, shielded relays for VRF selection ensures that nothing in the VRF can itself contribute IMD.



Receiver Front End Highlights

The MARK-V adopts the low-noise front end design of the FT-1000MP. Two low-noise Junction FET preamplifiers are provided, one in a "tuned" configuration with optimized gain and noise figure independently for the high and low bands, with the other "flat" preamp providing a wide, uniform-gain response. The first mixer utilizes a quad of SST-310 Junction FETs in a doubly-balanced circuit, resulting in wide dynamic range. Eleven and pass filter networks provide input protection for the front end, working in concert with the VRF to provide the best-ever 2nd-order IMD prevention in an Amateur transceiver.

V. ENHANCED ERGONOMICS: MULTI-FUNCTION SHUTTLE JOG DIAL

Quick Access to VRF and IDBT via Shuttle Jog Tuning Ring

The immensely-popular Shuttle Jog tuning ring, which is concentric with the Main Tuning Knob, has a new look in the MARK-V: it now includes the activation switches for the VRF (left side) and IDBT (right side) features, so the operator does not have to move his hand position to activate these important circuits during contest or pile-up situations! Superb Ergonomics Across the Front Panel Both the Main and Sub VFO Tuning Knobs are larger, allowing silky-smooth tuning even if you have large fingers! The right side of the front panel contains the adjustment controls for the VRF, IDBT, NOTCH, and CLARIFIER, conveniently grouped so you can get at them quickly. For contest or DX-pedition use, you cannot afford to lose even milliseconds in search of a frequently-used control.And the mosl popular EDSP functions from the FT-1000MP are now much easier to use! The CW Audio Peaking Filter (with bandwidths of 60, 120, and 240 Hz) and the four-position EDSP Noise Reduction (NR) feature are conveniently located just to the left of the Main Tuning Dial, for quick, convenient push-button access. Right next to the APF and NR controls are the three EDSP response Contour selections, which enhance signal-to-noise ratio by matching the DSP freq. response to the unique shape of the incoming signal envelope.

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SPECIFICATIONS

RX Frequency Range:	100 kHz ~ 30 MHz
TX Frequency ranges:	160 ~ 10m amateur bands only
Freq. Stability:	<± 0.5 ppm (after 1 min. @ 25 °C) ± 0.25 ppm (after 1 min. @ 25 °C, w/TCXO-6)
Operating Temperature Range:	-10 °C ~ +50 °C
Emission Modes:	LSB, USB, CW, AFSK, FSK, AM, FM
Frequency Steps:	0.625/11.25/2.5/5/10 Hz for SSB, CW, RTTY & Packet; 100 Hz for AM & FM
Antenna Impedance:	16.6-150 Ohms, unbalanced (Tuner ON, TX only)
Supply Voltage:	30 VDC and 13.8 VDC (FP-29)
Power Consumption (approx.):	13.8 VDC 30 VDC
RX (no signal) 2.3 A	RX (signal) 2.7 A TX(200W) 2.2 A 14.5 A
Dimensions (WHD):	410x135x347 mm 16"x 5.3"x 13.7"
Weight (approx.):	14 kg. (31 lbs.)

TRANSMITTER

Power Output:	adjustable up to 200 watts (50 watts AM Carrier)
Duty Cycle:	100% @ 100 watts, 50% @ 200W (FM & RTTY, 3-minute TX)
Modulation Types:	
SSB:	J3E Balanced, Filtered Carrier
AM:	A3E Low level (early stage)
FM:	F3E Variable Reactance
AFSK:	J1D, J2D Audio Frequency Shift Keying
Maximum FM Deviation:	±2.5 kHz
FSK Shift Frequencies:	170, 425 and 850 Hz
Packet Shift Frequencies:	200, 1000 Hz
Harmonic radiation:	at least 60dB below peak output
SSB carrier suppression:	at least 40dB below peak output
Undesired sideband suppression:	at least 55dB below peak output
Audio response (SSB):	not more than than -6dB from 400 to 2600 Hz
3rd-order IMD:	-31dB @ 100 watts PEP, or better
Microphone impedance:	500 to 600 Ohm

RECEIVER

Circuit type:	quad-conversion superheterodyne (triple conversion for FM)	
Intermediate Frequencies:	Main RX	Sub RX
	70.455 MHz	47.21 MHz
	8.215 MHz	455 kHz
	455 kHz	

Sensitivity Modes	0.5 - 1.8MHz	1.8 - 30MHz
SSB, CW (2.0 kHz)	2 uV	0.16 uV
AM (6 kHz)	13 uV	2 uV
FM	-	0.6 uV

(with preamp on, IDBT on, SSB/CW/AM for 10 dB S/N, FM for 12 dB SINAD, 0 dB~ = 1 ~V)

Selectivity (-6 / -60 dB):

Band Width	Modes	Min -6dB BW	Max -60 dB BW
2.4 kHz	all except FM	2.2 kHz	4.2 kHz
2.0 kHz	all exc. AM, FM	1.8 kHz	3.6 kHz
500 Hz	CW, RTTY, Packet	500 Hz	1.8 kHz
250 Hz	CW, RTTY.Packet	250 Hz	700 Hz
-	AM (Wide)	4 kHz	14 kHz
	FM	8 kHz	19 kHz

IF rejection (1.8 ~ 30 MHz):	80 dB or better (Main RX) 60 dB or better (Sub RX)
Image rejection: (1.8 ~ 30 MHz):	80 dB or better (Main) 50 dB or better (Sub)
Maximum Audio Output:	2.0 W into 4 Ohms with <10 % THD
Audio output impedance:	4 to 8 Ohm

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Front Cover:

HRH Prince Philip is presented with a commemorative GB50 Morse key in recognition of his 50 years' patronage of the Society. See report on the Golden Anniversary special event station GB50 and 'Amateur Radio Experience' exhibition at Windsor Castle on page 12.

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August 2002

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RadCom NEWS

ILLW 2002

OVER THE LAST few years the International Lighthouse / Lightship Weekend has grown in popularity. Last year there were 348 lighthouse / lightship stations active from 46 countries. This year, the event takes place from 0001UTC on Saturday **17 August** until 2359UTC on Sunday **18 August**. Already over 100 entries in 27 countries have been received by VK2CE at the official website for the event at vk2ce.com/illw

You are invited to join in the fun by establishing a station at a lighthouse, lightship or maritime beacon. This is *not* a contest, rather it is a weekend to enjoy playing radio with your friends and to meet new people. Further information can be obtained from Mike Dalrymple, GM4SUC, by e-mail: gm4suc@compuserve.com

● MEMBERS OF THE Dundee ARC will operate GB2NCL air from North Carr Lightship on 17 / 18 August as part of the International Lighthouse / Lightship Weekend.

● THE SCARBOROUGH Special Events Group will operate as GB2SCA from the lamp room at the top of Scarborough Lighthouse. The group offers a 'help-line' (tel: 07881 542 532) active during the weekend for Intermediate or Foundation Licensees having difficulty locating the frequency in use.

● GB4HL AND GB1HL will be active from Hurst Castle in the Solent.

Maritime Close-Down Video

A VIDEO CALLED *QRT500* was made to commemorate the 1997 closure of Morse signalling on 500kHz from UK coast stations. It has already sold over 1000 copies. The video covers the history of the service and the official transcript from the *Titanic* distress signals is shown (courtesy of the National Record Office). It also features the actual closing down sequence with support messages coming in from around the world. The video costs £8.49 (post free in UK) and full details can be found at www.discoveryfilms.co.uk

New Call Flying High

WHEN JOHN O'TOOLE, G7UYT, took his Morse test at Martin Lynch & Sons recently, he had a special reason for wanting his new callsign on a specific day: it was exactly a year to the day since he lost his new born son, Liam Michael. Because John is very much involved with the Helicopter Emergency Medical Services, the callsign he applied for - and obtained - was M3HEM. John wishes to thank everyone who made it possible for him to obtain his new M3 callsign, including his wife, Debra, and his family, instructor Peter, G0RIU, examiner George Eddowes, G3NOH, who put him so much at ease, and staff at ML&S, RSGB HQ and the Radio Licensing Centre for their cooperation.

John O'Toole, G7UYT / M3HEM, with the London Air Ambulance helicopter.

GB4FUN Visit Pays Dividends

TONY, MW0BXJ, of the North Wales Radio Rally Club, reports that six boys from Rydal School in Colwyn Bay took the Foundation Licence course as a direct result of the visit to the school by the RSGB's GB4FUN mobile amateur radio demonstration vehicle (see *RadCom* May 2002 pages 6 / 7). Tony took the course at the school on Monday evenings. Five of the six boys took the exam on 1 July and all passed. Interestingly, the five includes a pair of twins, Mark and Gareth Studley, and Tony wonders if this is a first for the Foundation Licence? In addition, there were three more persons who registered for the Foundation course at the North Wales Radio Rally Club's HQ.

Stolen Equipment

TEST EQUIPMENT has been stolen from a white Land Rover. It includes: Anritsu Spectrum analyser model no MS610B ser no MT 34984, Avo model 8 with carrying case ser no 0029689, Bird thruline power meter model no 43 with carrying case and inserts ser no139, Fluke 23 multimeter ser no 48640964, Fluke digital oscilloscope model no PM 3082 ser no DM 535001, Marconi test set Model 2955A Ser no1332221/001, Narda coupler 0.5 - 1GHz model no 3020A ser no 32425, Quartzlock frquency standard model no 2AX ser no 159, and Racal-Dana frequency counter model no 1998 ser no 2175. Information please to: Alan.Phillips@ntl.com

'Getting the Most Out of the Radio Spectrum'

THE ABOVE IS the title of a conference sponsored by the Radiocommunications Agency to be held in London on 24 / 25 October. As the demand for radio spectrum increases, there is a need to understand more about its physical engineering limitations. How and where are we limited, and how can engineering make more effective use of this limited natural resource? These issues will be addressed at the conference, and it will generate pointers as to where we may look to advances in understanding and technology to help us accommodate more information in the same space. With a wide range of technical papers we will look at the issues from several angles, from what spectrum may be best used for in future, to how new technology can change the usage of the spectrum as we now know it. Keynote speakers will comment on particular issues.

Andy Talbot, G4JNT, is presenting a paper on behalf of the RSGB, entitled 'Amateur Use of Novel Signalling Methods at Low Frequencies', which will summarise the use made by radio amateurs of their 73 and 137kHz allocations, with regard to very low bandwidth signalling methods. It will explain how signalling has developed in a very few years from basic Slow CW received on waterfall plots, to new data modes such as Jason and WOLF, custom designed to match particular characteristics such as the short lived band openings on the trans-Atlantic and Pacific paths. As part of the investigations into the LF path characteristics over these links, several discoveries were made into the nature of skywave propagation at these frequencies, an area which had hitherto been mostly ignored in earlier commercial work. To paraphrase a reviewer of the abstract, "[This is] an area of interesting research at increasingly unused frequencies [which may] help to characterise these frequencies and expand their potential use".

Peter Chadwick, G3RZP, has also submitted a paper which has been accepted for a poster presentation at the conference.

Although the conference is aimed at a professional audience, RSGB members with a particular interest would be welcome. The website www.iee.org/Events/e24oct02.cfm will contain the latest details as they become available. A conference brochure may be requested from Ed Maycock at the IEE on tel: 020 7344 5422 or e-mail: emaycock@iee.org.uk

Dundee *Titanic* Exhibition

GB2MGY WILL be on the air from the Dundee *Titanic* Exhibition at Shed No 25, Victoria Dock, between 10 and 18 August. This will be the largest exhibition of *Titanic* memorabilia ever assembled and it is estimated that some 50,000 people will attend the event. Further information is at www.titanic-in-dundee.co.uk while Donald Black, GM0PIV, e-mail: gm0piv@thersgb.net will provide details on the special event station.

PC Program for Morse Reader

WHEN THE MFJ-461 pocket Morse Reader was reviewed in *RadCom* (May 2002, p32) there wasn't a program available for connection of the decoder to a computer. Godfrey Manning, G4GLM, has now written such a program and it is available free of charge either direct from him (QTHR) or from Waters & Stanton, if you send a ready-formatted floppy and return mailing facilities. The program is written in BBC Basic for Windows.

C&G Reports

REPORTS ON THE May 2002 Radio Amateurs Examination and June 2002 Novice Radio Amateurs Examination have been released by City & Guilds. They can be read at www.kippax.demon.co.uk/c-and-g/ or can be obtained on request by sending an SASE to the Amateur Radio Department at RSGB HQ.

Epsom Rally '03

FOLLOWING ON from the success of the Epsom Rally in June, the organising team, led by Paul Berkeley, M0CJX, has plenty of plans for next year's event. Paul reports that he has done a special deal with Epsom for committee rooms and invites any club or organisation that wishes to hold meetings or its AGM at Epsom to contact him for details. The rally will be held on **Sunday 22 June 2003**, and the rooms are available on 21 and / or 22 June 2003. Paul can be contacted at m0cjx@lineone.net

British Wireless for Blind Fund Appeal for Radio Amateurs

Time to Prepare for 'Transmission 2002' Fund-Raiser

TRANSMISSION is the name of the annual fund-raising event by radio amateurs for the British Wireless for the Blind Fund (BWBF), a registered charity. This year it takes place over the weekend of **14 / 15 September**, but *now* is the time for you or your club to start planning your activity. The idea of the event is to obtain sponsorship for the number of contacts made over the weekend. The money raised helps BWBF to provide specially-adapted audio equipment to UK registered blind people who are in need - free of charge and for life.

To encourage you, BWBF has arranged with sponsors to provide a number of attractive prizes for individuals and radio clubs. Free QSL cards are also available.

The Cray Valley Radio Society operated GB2FB during 'Transmission 2001'. Left to right: Bob, BRS32525; Mike, G3LSX; Garry, M0HFR; 2E0COR's wife; Ralph, 2E0COR, and Wilf, G0WLF.

For full details, or to receive sponsorship forms, please write to BWBF, Gabriel House, 34 New Rd, Chatham, Kent ME4 4QR; tel: 01634 832501 or e-mail: fiona@blind.org.uk

Last year the leading club was the Cray Valley Radio Society (see above), which raised £2167 for the British Wireless for the Blind Fund The leading individual was Robert 'Gus' Guscott, M5GUS, of Truro, Cornwall, who raised £215.

'The Human Race'

'THE HUMAN RACE' is a unique new TV documentary series which will feature amateur radio in a big way. Two radio amateurs will compete against one another in a race around the planet, one going east and the other west. Radio amateurs will be asked to participate by transporting the racers from place to place. The two teams will be tracked using GPS (Global Positioning System) and APRS (Automatic Position Reporting System), with a constantly updated website enabling amateurs and others to follow the progress of the race. Both teams will be followed by TV production crews. The race begins in Kansas City, Missouri, in June 2003 and will conclude when the two teams meet one another at a point roughly half way around the world in December next year. The producer of the programme is William Desjardins, W1ZY.

Foundation Licence Book Available for Blind

SPOKEN VERSIONS of *Foundation Licence Now* by Alan Betts, G0HIQ, are now available for blind persons, with the permission of the RSGB. Copies are available from Alan, GM4FLX, or Kelvin, M0AID, on six C60s, four C90s, five audio CDs, or one digital CD for a nominal charge of £2.50 per tape or disk. Requests should be sent to either GM4FLX or M0AID (both QTHR) or by e-mail: alan@qti.org.uk or kelvin@qti.org.uk The operation is being run on a not-for-profit basis and is a purely radio amateur effort. If you know any blind person who might like to become a licensed radio amateur and who would like to have the spoken edition of the book, the team would like to hear from you or from your blind friend directly.

Garex Back in Business

ONE OF THE oldest-established (1963) amateur radio companies, Garex, is now back in private ownership and in the process of revitalisation. Garex will supply VHF / UHF accessories, ex-PMR equipment, antennas, and ATV products. Look for Garex at rallies in the South-West and South Wales. For further information see www.garex.co.uk The company can be contacted at PO Box 52, Exeter EX4 5FD.

● MEMBERS OF the Itchen Valley ARC (Chandlers Ford, Hants) will be operating as GB2HE at the Hobbies Extravaganza, Royal Victoria Country Park, Netley on 17 / 18 August.

● G0TKV notes that his callsign is being used without his permission in Internet chat rooms, and warns other members to be aware of this possibility.

THE GB50 AMATEUR RADIO

29 May – 9 June 2002

by Don Field, G3XTT, and Bob Treacher, BRS32525

GB50 was probably the highest-profile special event station ever to be activated from the UK. As well as achieving 24,727 QSOs in 145 DXCC entities, several hundred visitors to Windsor Castle each day - around 3000 people altogether - took time out to visit the 'Amateur Radio Experience' and GB50 station, while almost 300 visitors passed a Greetings Message over the air. Many visiting amateurs from around Europe, Japan, the USA etc took the opportunity to operate the station.

YOU'RE GOING TO put on a special event station, both to demonstrate amateur radio and to have fun working stations throughout the world. What would be your dream situation? Obviously a unique setting; maybe a fairytale castle that attracts visitors from throughout the world. Of course, the station would have to be exceptionally well equipped, with all the latest gear and decent antennas. And you'd want a very special callsign, to attract the pile-ups. Welcome to GB50 (Golf Bravo Fifty)!

"GREAT MINDS . . ."

THE QUEEN'S Golden Jubilee was obviously a unique occasion, which would be celebrated throughout the UK, and indeed the Commonwealth as a whole, in many different ways. Not surprising, then, that it occurred to a number of amateur radio organisations that they should find their own way of celebrating the Jubilee. Two clubs had the same thought, to operate from Windsor Castle, one of the Queen's official residences. One of these was the Cray Valley Radio Society, which had set up and run the very successful M2000A station at Greenwich for the millennium celebrations. The other was the Burnham Beeches Radio Club, based near Windsor, which had operated special event stations from the Castle during the Silver Jubilee celebrations in 1977 and again more recently. Given the scale of activity which would be required to mount a significant operation from the Castle, the two clubs joined forces and brought in national resources from the RSGB. Of course, other radio clubs around the country also made their contribution, by operating special event stations in their own regions.

Organising any sort of special event station is quite a task, but with the special considerations relating to the Castle (access, security, appearance etc) the job was huge. This is where the Cray Valley club's experience with M2000A was invaluable, as there was the basis of a project plan which could be used again (with suitable modifications). A number of site visits had to be made, to agree a suitable location for the station and to conduct EMC tests (can you imagine the problems arising from TVI when the Queen might be watching her favourite soap opera?!) Sponsors would have to be found, as the likely costs (not only for equipment and publicity material, but also the hire of a marquee large enough to accommodate the station, an amateur radio exhibition and visiting members of the public) would be beyond the scope of the clubs concerned. And, of course, there was the technical planning of the station itself, including radios, a state-of-the-art computer logging system, and antenna systems. Last, but by no means least, it was important to make the world aware of what was happening, which involved features in *RadCom*, a high quality website, and announcements to the amateur radio press as well as to the non-radio press.

A visitor enjoys sending and receiving a Greetings Message.

Setting up: one of the two trailer towers being erected against a stormy sky. On top, a Force 12 18 / 24MHz Yagi.

VISITING GB50

SO JUST WHAT did visitors find when they visited GB50? Firstly, on buying their tickets to the Castle, they were given a leaflet about GB50 and what was on display. On passing through the archway on to the North Ter-

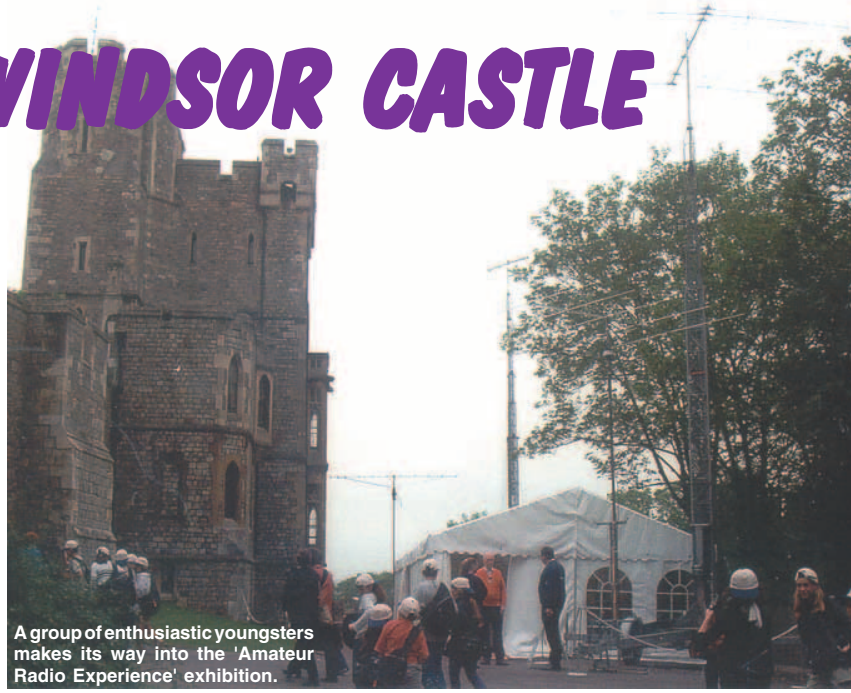
THE GB50 VISITOR'S BOOK

Extracts from comments made by members of the public in the GB50 visitor's book:

"Talked to someone in [Washington] DC - it was swell!"
"Unique experience, I talked to someone in Chicago, and we greeted each other, really global."
"Wow, what a way to meet people."
"Great station."
"Lots of fun, thanks for letting me join in."
"Congratulations on an excellent display, guaranteed to educate and inform."
"Nice equipment - excellent technology."
"Very good presentation of the hobby."
"The best amateur radio display this side of the Atlantic!"
"Very interesting, especially the Morse code."
"Great effort, I will definitely seek further information on amateur radio."

EXPERIENCE AT WINDSOR CASTLE

Stephanie on the mic, with Mark, M0DXR, supervising operations.



A group of enthusiastic youngsters makes its way into the 'Amateur Radio Experience' exhibition.

Bob, BRS32525, and Richard, G3UGF, with two young Americans.

race, they would spot the marquee and the C3-SS Yagi, and be invited by a member of the Burnham Beeches Radio Club or RSGB teams to step inside. Once inside, they were able to follow a series of panels explaining something about amateur radio and its history, right from the earliest days of Marconi's experiments. There was also a display of equipment through the ages, from Marconi's day to a WWII HRO receiver, through to a modern TS-2000 transceiver kindly loaned by Kenwood. There was also a video playing, showing the girls of Harrogate Ladies' College in communication with the International Space Station. At all times there were members of RSGB staff and volunteers from the Burnham Beeches Radio Club on hand to explain further and to talk to any potential recruits to our hobby, explaining, for example, how to set about gaining the Foundation Licence.

At the far end of the marquee was the GB50 station itself. Five operating positions, covering HF (20, 15, 10m), WARC (30, 17, 12m), the low bands (80, 40m), 6 and 2 metres. All the equipment was from the current Icom range, kindly loaned by Icom UK. Each station had a modern laptop for logging (linked to a central server via an Ethernet), with a flat screen display that could easily be seen by visitors. On a separate table was an APRS demonstration, and also a large screen showing all current QSOs being made by GB50, together with country and, of course, some summary data of contacts and countries to date, etc. Even for the uninitiated, all this created the impression of a modern hobby which had come a long way from the image of Tony Hancock or the untidy racks of equipment that many visitors may have associated with amateur radio.

One of the challenges of mounting a demonstration station is to avoid the situation where visitors see nothing but the backs of the operators who appear to be engaged in some sort of ritual, with strange abbreviations and terminology. At all times there were volunteers from the Cray Valley Radio Society and elsewhere who were on hand to explain exactly what was happening. At least two of the stations were likely to be on SSB rather than CW, with contacts being audible on a loudspeaker for the benefit of visitors. In addition, those visitors who wanted to were encouraged to sit in front of the microphone and exchange a Greetings Message with the station being worked. This proved remarkably popular, though it was noticeable that, on the whole, it was the younger generation who were willing to do so, while their parents looked on! Of course, many visiting amateurs also stopped by, and took the opportunity to make contacts from GB50, often back to their homeland.

THE ROYAL VISIT

FOR THE TEAM of volunteers, quite apart from the buzz of the pile-ups and the pleasure of sharing our hobby with hundreds of visitors each day, the highlight was the visit by His Royal Highness the Duke of Edinburgh. Prince Philip has been Patron of the

RSGB President Bob Whelan, G3PJT, explains the display of historic amateur radio equipment to Prince Philip.

The Duke of Edinburgh shares a joke with the girls from Harrogate Ladies' College.

RSGB for 50 years, and has supported the Society and the hobby on numerous occasions. Yet again he showed his interest with an informal visit to the station, when he chatted knowledgeably with many of the volunteers, and listened in on several contacts. And, of course, the venue itself was a constant reminder of just how special this event was, with uniformed guardsmen marching past the station each time the guard was changed, and the Royal Standard on the flagpole whenever the Queen was in residence.

One of the GB50 'guest operators': this is Kaeko, JF6MIT, a director of JARL, with Justin, G4TSH.

A Golden Jubilee Greetings Message from the Duke of Edinburgh was transmitted by GB50 to various Commonwealth countries, including Malaysia, Kenya, Malta, Cyprus, South Africa and Gibraltar. The message read: "As Patron of the Radio Society of Great Britain, I am delighted that it has been able to set up the GB50 Special Event Station on the North Terrace of Windsor Castle overlooking the Thames and the town of Windsor. It is in a very appropriate position to receive messages of good wishes from amateur radio enthusiasts to the Queen in her Jubilee year. I know that the Queen very much appreciates this special contact with people throughout the Commonwealth, and the rest of the world, and she has asked me to send you all her warm thanks for your support and affection at this time. I hope that all your contacts with GB50 over the next 10 days will be five and nine. 73, Philip."

In response, messages were received from a number of amateurs in Commonwealth countries. Ted Alleyne, 5Z4NU, Chairman of ARSK, said: "We in Kenya always remember that 50 years ago the Queen acceded to the throne while visiting the Treetops safari lodge near Nyeri, and on the occasion of the Golden Jubilee, the Amateur Radio Society of Kenya offers its congratulations to all concerned in GB50 and wish you all an enjoyable and very successful operation." Sangat Singh, 9M2SS, said: "I am delighted to be able to have this QSO on the occasion of Her Majesty the Queen's Jubilee celebrations. We are proud to be a part of the Commonwealth and share the common legacy."

Is this the new face of amateur radio in the UK? Simon, RS177448, with Emma, 2E1HWN.

Before the royal visitor left, RSGB President Bob Whelan, G3PJT, presented Prince Philip with a commemorative GB50 Morse key in recognition of his 50 years patronage of the RSGB.

Some of the other visitors proved interesting too. The visitor from New Zealand who works in the coastguard service and proved an expert at Morse code. Those who remembered the old equipment in the display from their service in WWII. Radio amateurs whose interest had lapsed, but was rekindled by their visit.

PILE-UP TIME

BEFORE AND AFTER the public hours, the team of operators was able to focus on working 'pile-up style', to allow amateurs from around the world to get into the GB50 log. At such times GB50 QSO rates were often well over 200 per hour. Indeed, the location proved to be exceptionally good for HF propagation. The North Terrace is high above the rest of Windsor, with an excellent take-off to both the USA and Japan.

Sadly, 10m propagation was patchy for most of the time that GB50 was active, but the lower bands played well. The team was amazed to work well over 6000 stations on 15m, but the real success was 6m, where over 50 DXCC entities were worked in the 12 days of operation. Best DX was PY5CC (GG54), but other DX included CN8, CT3, EH9, JX, JY, OD5, 4X4 and 5B4.

The only real problem we encountered was some local noise, from sources unknown, which meant that GB50 may have seemed a little 'deaf' at times. We can only apologise.

GOALS ACHIEVED

THE FINAL QSO took place at 8.00pm on 9 June. GB50 made 24,727 QSOs in 145 DXCC entities - a little over 2000 contacts a day. Nearly 6000 of these QSOs were with Great Britain and the Commonwealth.

All the goals which the team set out beforehand were met in full, both in terms of contacts made, and also in the number of visitors to the station. Their visit can only have helped to raise the awareness of amateur radio and its continuing role in the world today.

Manning such an event for 15 hours a day for 12 days continuously is very resource intensive, and thanks are due to everyone who gave up their time to be available. One even travelled over from California to be part of the action. Equipment and software worked flawlessly and in all respects GB50 was an exemplar of what such a demonstration station ought to be. ♦

GB50 QSOs . . . by band:	
80m	461
40m	4124
30m	1463
20m	4167
17m	3921
15m	6790
12m	1408
10m	1174
6m	849
2m	370
. . . and by mode:	
CW	12,221
SSB	12,214
FM	126
RTTY	113
PSK	53

WWW.

GB50 website: www.gb50.com
Golden Jubilee: www.goldenjubilee.gov.uk

Marconi Centenary Contest 2001

by Bob Whelan, G3PJT*

THE OFFER OF prizes and the international significance of the Marconi centenary in December 2001 seemed to have really caught the imagination of many people. The contest attracted 59 entries from the UK, and with 51 prizes on offer nearly everyone received a prize. Although conditions on HF were quite reasonable, the conditions on the lower bands were relatively poor. As QSOs from 160 through to 2 metres counted, some contestants made VE contacts on 6m as well as on HF.

Appropriately, the overall UK winner with 400 VE QSOs was Dave Cree, G3TBK. "Appropriately", yes, because Dave works for Marconi! The top prize, a Marconi Centenary coin in silver was presented to Dave by Neil Sutcliffe of Marconi in Coventry in June. Dave was well clear of G4RCG, 322, and myself on 312.

The distribution of prizes ensured that each section had a fair chance to win something. An excellent effort from G4ELZ in leading the QRP section would have placed him third and a prize winner in the Single Operator Low Power 100W section!

The most popular section, Single Operator Low Power (100W) attracted most of the entrants, with 24 entries, followed by 16 in the Single Operator High Power class. The format of the RAC Winter Contest is in many respects well suited to stations with modest stations, as it is mixed mode and well suited to a casual approach of hunting around for Canadian stations, of which there were plenty on offer.

Some entrants found it difficult to break through the pile-ups of US stations to work the rarer VE call areas such as VY0 and VY1, which are quite unusual if not rare call areas. A plea for more CQing by the operators of such stations - you are rarer than you think!

Special event calls GB2LD at the Marconi Lizard Wireless Station, and GB100WT (M0RCA) were both active and attracted a good deal of attention.

* c/o RSGB HQ; e-mail: g3pjt@rsgb.org.uk

Dave Cree, G3TBK, was recently presented with his prizes, a silver Marconi Centenary coin and certificate. Left to right: Neil Sutcliffe, Chief Human Resources Officer, Marconi; Peter Ormond, International Projects Manager, Marconi; Dave Cree, G3TBK; Ian Richardson, Field Team Leader, Marconi; RSGB President Bob Whelan, G3PJT.

SOAPBOX

G0MTN: "Great activity from Canada and the UK." **G3UFY:** ". . . Heard VY0RAC a number of times at good strength but he was always calling someone else. Never found him CQing." **G3VQO:** "It seemed the perfect contest to end a year in which I was privileged to spend a short spell as guest operator at VE1VAS - the Marconi site at Glace Bay, NS. I awoke to a covering of snow to put me in the feel of a Canadian winter." **G4ELZ:** "Many thanks for sponsoring a great contest." **G4RCG:** "Great contest, really enjoyed it, first time that I have tried it and will be back next year." **GB100WT:** "The GB100WT callsign used was specially issued to M0RCA for Marconi Centenary events. A very enjoyable time was had by all operators." **GM0CLN:** "I managed three QSOs (VE1YX, VE1MR, VY2SS) on 50MHz too (20W with same antenna!)" **GW4BLE:** "100 Canadian-only contacts seemed appropriate for the centenary."

FINAL THOUGHTS

FROM TIME TO TIME such celebratory contests have a place in the contest calendar. The idea of sponsorship was a new one and will be repeated occasionally when the event merits it.

The idea of piggy backing on an existing contest caused minimal problems and served to publicise the RAC Winter Contest. It is the intention of several entrants to have a go in this year's RAC contest which will be on 28 December (sufficiently clear of Hogmanay for the GM entrants, I hope).

ACKNOWLEDGEMENTS

THE TEN-FOLD increase in UK activity stimulated much more European activity in the RAC Winter Contest, which has caused some delay in getting the results out.

Thanks are due to Radio Amateurs of Canada for their enthusiastic support for the MCC and to Dave Shipman, VE7CFD, and Bob Nash, VE3KZ, for their work in getting these UK results out as fast as possible.

And finally we all thank Marconi plc for its generous donation of the two silver coins, 50 books, and 50 £2 coins, which made this contest a fitting memorial to one of the greatest events and personalities of the 20th century. ♦

Marconi Centenary Contest, December 2001

UK Entrants

Single Operator - All Band High Power

Call	VE QSOs	Prizes
G3TBK	400	GRAND PRIZE
G4RCG	322	Prize
G3PJT	314	Prize
G4BUO	291	Prize
MM5AHO	286	Prize
G3ORY	188	Prize
G3UFY	153	Prize
G4FAL	151	Prize
G3SJJ	97	Prize
GW3SFC	61	Prize
GM4SID	51	Prize
G3TXF	45	Prize
G4TSH	44	Prize
G4BGW	39	Prize
G3ZDD	12	Prize
MM0BQI	10	

Single Operator All Band - Low Power (100W)

Call	VE QSOs	Prizes
GI0KVQ	149	Prize 1st in class
G4IIY	117	Prize
GW4BLE	101	Prize
G0MTN	98	Prize
G4LQI	96	Prize
G3IAF	77	Prize
G4IUF	71	Prize
G3LIK	63	Prize
GI0NQC	54	Prize
G4AYO	51	Prize
M0BKV	49	Prize
G3RSD	42	Prize
M0COP	40	Prize
G0GWK	39	Prize
G3YOG	30	Prize

Single Operator All Band - Low Power (100W) cont.

Call	VE QSOs	Prizes
GW0ETF	26	Prize
G4OGB	23	Prize
G2BFO	21	Prize
G3WNS	19	Prize
G3VQO	18	Prize
G4ZJN	16	Prize
GU4GG	13	
G3WP	11	
M0BSW	3	

Single Operator All Band QRP

Call	VE QSOs	Prizes
G4ELZ	110	Prize 1st in class
G0OGN	43	Prize

Single Operator - Single Band

	Call	VE QSOs	Prizes
144	G7RAU	-	
28	G0VOK	29	Prize
28	G0VQR	29	Prize
28	M0AQM	14	Prize
28	G4LZZ	10	
28	G3XYX	3	
21	GM0CLN	29	Prize
14	GM3CFS	72	Prize 1st in class
14	G3TVU/M	20	Prize
7	GB2LD	30	Prize
3.5	G4CZB	11	Prize

Multi-Operator

Call	VE QSOs	Prizes
G3SAD	131	Prize 1st in class
GB100WT	89	Prize
G0WRC	82	Prize
G3VAO	74	Prize
G3HIU/P	58	Prize

Checklog

Call	VE QSOs
M0EEE/P	3

Q u a l i t y • I n n o

ALINCO

ALINCO DX-70TH

Fully Featured Portable HF+6mtr Transceiver

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

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

~~£699.00~~ SPECIAL £599.00

ALINCO DX77E HF Transceiver 'GREAT VALUE'

The DX-77 is a design achievement that puts a HF desktop transceiver within your reach! And this is no 'bare bones' radio, nor is it a converted 'channelised' adaptation. The DX-77 was designed from the beginning to be a quality Amateur Radio, full of features to enhance its performance and your enjoyment.

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

~~£599.00~~ SPECIAL £499.00

EDX2

Auto Tuner

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

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

£289.00

HFM-1

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

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

£59.95

ALINCO DR-605E Dual Band Mobile

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

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

£299.95

DJ-X3

Ultra modern scanning receiver

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

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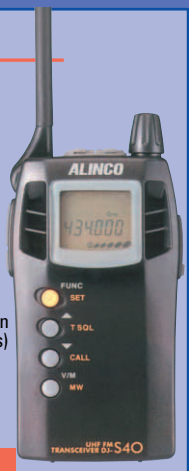
- Additional features, including anti-theft alarm and experimental mosquito repelling tone!
- Huge selection of accessories available



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PIC-A-STAR:

a Software Transmitter And Receiver

*Part one of a major new series by Peter Rhodes, BSc, G3XJP **

THIS IS A detailed construction project aimed at those of modest experience who would like to enhance both their craft and technology skills.

At the outset - like me - it may well be that you don't have the skills or knowledge to build this project. By the end, you will have. That is, as I see it, the whole idea.

By design, this is a project without end. From *my* perspective, it is the basis for years of happy building to come - and is my first investment in a new core transceiver platform in some 25 years. A glance at the photo tells you why I needed a new one.

From *your* perspective, it is a source of ideas for improving an existing transceiver - not least, upgrading the back-end with a powerful Digital Signal Processing (DSP) capability. There are also some craft techniques for handling small-size high-function components. So, there is something in this for all, with an eye on the self-education requirement of their licence.

SUMMARY

THE HEART of PIC-A-STAR is the DSP module. This provides both the back-end receiver functionality, as well as SSB / CW generation on transmit. The bottom line is absolutely superb audio quality on both transmit and receive. If you want to test the former, come on the home-brew net frequency (see photo) any day around lunchtime where you will find at least one STAR in operation most days. If you want to test the latter then you will just have to make one.

Being implemented by software, it provides the opportunity to address both absolute performance as well as the delights of operational convenience - at zero incremental cost. This is precisely the basis for future developments, but the fundamental functionality together with some bells and even the odd whistle has been in daily use here for about nine months. This is the project on offer - but by the time you get there it *will* have moved on.

PIC-A-STAR is explicitly designed to be upgraded over the web, so there will no incremental DSP enhancement costs.

POSITIONING DSP

YOU MIGHT reasonably expect the author of a DSP project to have some serious knowledge in the field. So would I! Actually, in many ways, it is important to get this published before I acquire more than enough to be merely dangerous.

If, like me, you are at least in your late 50s, it is unlikely that DSP theory featured even in a formal engineering education. And if, equally like me, you have never worked in the engineering profession then you could reasonably start from the position that DSP is some kind of black magic which you could never understand in a life-time of trying. You might well be correct in this assumption because some of the theory is indeed very heavy.

But my personal discovery was that you don't need to understand DSP at other than a superficial level to be able to build it at home and to use it.

From a position of not being able to spell DSP, it took me two weeks to get my first DSP receiver working. The attraction is that everything since then has been incremental and I have not been off-air for a single day. Design mistakes - and there have been many - have cost me my time but never any money - which is about perfect for a hobby. So this lends itself to a learn-as-you-go approach. In other words, unlike conversational French, you don't have to learn a lot before you can even get started.

SKILLS AND FACILITIES

A REQUIREMENT of all my projects is that they can be built on the kitchen table with no access to professional facilities. Otherwise, it would not be *amateur* radio.

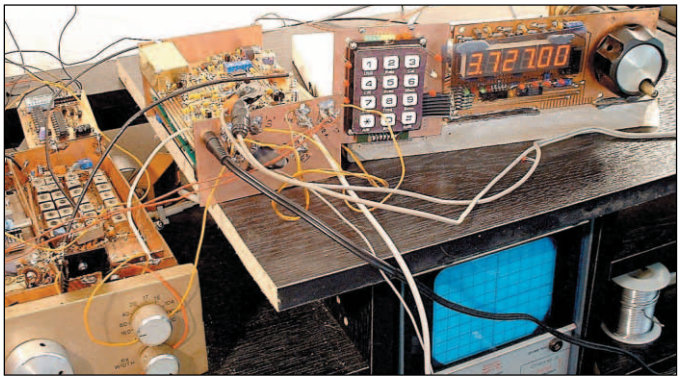
This one is no exception - though I have had to acquire new skills and hone them to the point of repeatability in order to build some of the hardware. This is all part of the adventure, part of the fun.

A simple (and inexpensive) technique for making precision PCBs will be covered - which includes mounting a 48-pin chip with a mere 0.5mm interval between pins. And you get to practise on a really easy one of 128 pins by 0.8mm first. If the prospect of this puts you off, I really can't help. If it sparks a 'can-do' spirit of adventure then we are in business.

INSPIRATION

THREE THINGS made this project possible. In the order in which I found them:-

- *The Scientist and Engineer's Guide to Digital Signal Processing*, by Steven W Smith. This book is a little gem. If you flick through quickly, you will see copious examples and illustrations. What you do *not* see are lots of equations and impenetrable notation. I need just one quote:- "[this book] … is written for those who want to use DSP as a tool, not a new career." My kind of book!
- The Analog Devices website (see WWW). This contains a wealth of both theoretical and practical information - and specifically the electronic version of the above book. Most valuable to me were lots of DSP code examples for the ADSP-218x processors. The first incarnation of STAR was built by six of us on the ADSP-2181 EZLITE evaluation board which had become somewhat of a standard over the years. Then over one fateful weekend when this project was 'finished', its price went from $90 to $275 - which spurred the challenge to home-brew a compatible and reproducible DSP board.
- DSP-10, a 2m DSP transceiver project published by *QST* in September - November 1999 - and reviewed in *RadCom*, Feb 2000. Although featured for VHF / UHF applications, the DSP core is totally universal. This project was designed by Bob Larkin, W7PUA (see WWW), and I am indebted to Bob not only for the inspiration for this project, but for a significant amount of advice and help - including some code written specifically for PIC-A-



Early integration testing. Bottom left is my Third Method transceiver (borrowed front-end and PA), top right is Pic 'N' Mix DDS still on its original breadboard (injection and controls) - and in the middle is the new DSP module. Note that Pic 'N' Mix provides *all* the transceiver controls, leading to a clean and compact front panel.

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

STAR. Above all, Bob showed it can be done and whenever I get into problems, his material is the first place I look for clarification and understanding.

INTEGRATING PIC-A-STAR

THE DSP MODULE - designed to combine with the Tx / Rx RF stages of your choice - operates at a final IF of 15kHz as shown in **Fig 1**. This is a high enough frequency to make it immune from image responses, yet low enough to be affordable. And it is *not* a DSP audio add-on - which, coming after the product detector, will always struggle.

RF STAGES

Your HF IF can be derived from any reasonable transceiver front-end. My Third Method Transceiver (*RadCom* June - October, 1996) and G3TSO's Modular Transceiver *(RadCom* October - November, 1988) have both been tested as representative - and there are lots of them out there. CDG2000 looks like a powerful approach and its front-end could well be my next increment. The choice will substantially determine the overall receiver strong-signal handling capability - but not the intrinsic benefits of downstream DSP.

IF STAGES

In principle (and possibly in practice), you could modify an existing IF board so that its product detector produced a 15kHz output instead of straight audio but I don't recommend it in the long run. To cut a long story short, this design includes an IF board built for the job.

Details of this follow later, but it needs only a modest roofing filter (at any HF IF of your choosing) since all the serious filtering is implemented in DSP.

CONVERSION INJECTION

You won't be surprised to see Pic 'N' Mix (*RadCom* January - May, 1999) used as the injection source to mix from RF to your chosen HF IF. This is not mandatory, but my records show 281 of them out there, so it is a non-trivial population.

COMMAND AND CONTROL

You need the ability to command the DSP for all the functions normally associated with front-panel controls. You may be somewhat surprised to see Pic 'N' Mix used for this purpose as well.

A small adapter board is used to fit a more versatile and powerful PIC - which not only controls all the original DDS capability, but extends the existing keypad, display and tuning knob to control *all* the transceiver features.

Although highly recommended, use of Pic 'N' Mix is not mandatory. As an alternative, you can use your PC to load and control the transceiver - and a *BASIC* utility is provided to achieve this.

PIC-A-STAR FEATURES IN BRIEF

- SSB and CW detection and generation
- a bank of high-performance Rx filters
- impulse noise blanking
- non-coherent noise reduction
- auto-notch heterodyne removal
- variable AGC decay time
- synthetic stereo reception
- adjustable RF clipping on transmit
- very fast VOX and QSK operation
- the flexibility to change! ♦

WWW.

Analog Devices www.analog.com

Bob Larkin, W7PUA www.proaxis.com/~boblark/dsp10.htm

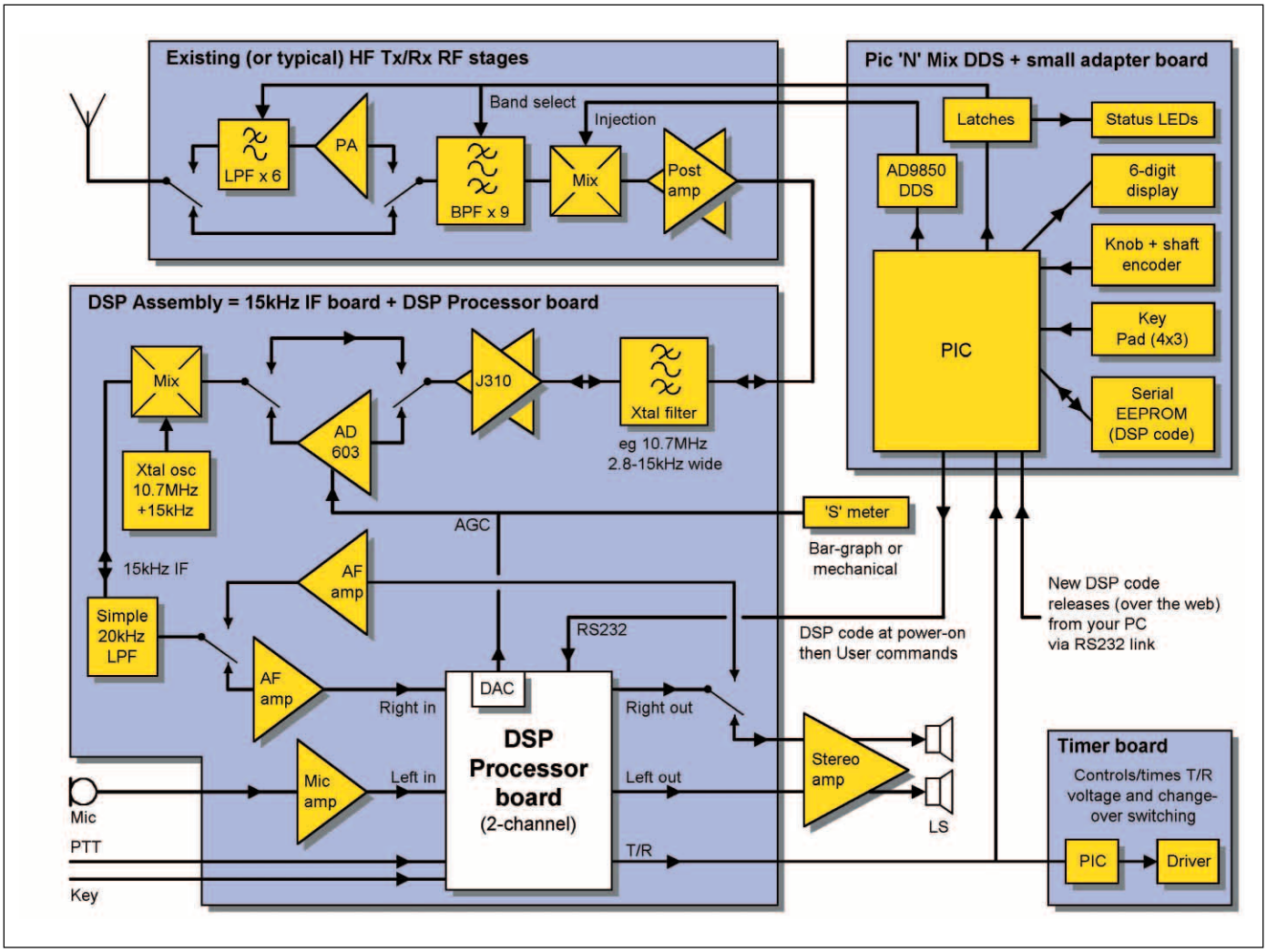


Fig 1: A typical transceiver incorporating PIC-A-STAR at a final IF of 15kHz. See text for a discussion of the major hardware elements.

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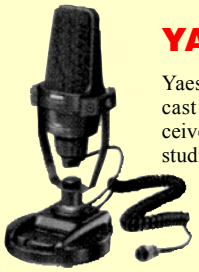

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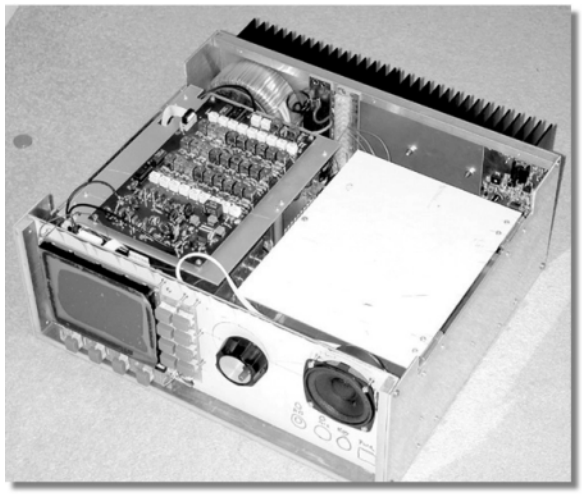
THE CDG2000 HF TRANSCEIVER

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

THE POST-MIXER amplifier follows the front-end and, apart from amplifying the signal to overcome the losses in the front-end caused by the filters and the mixer, provides the main filtering for SSB and CW signals.

The circuit is shown in **Fig 14**. The 9MHz signal from the front-end at 50Ω is matched by T1 and applied to a quad FET amplifier stage TR1 to 4, providing about 14dB gain at a very low noise figure. The output at about 200Ω is matched to the filters by T2 (to 50Ω) and then to the filters by C9,10 and L1 (to 500Ω) which is then routed via RLY2 and RLY1 which are switched along with RLY4 and RLY3 by TR5 to TR8. The output is matched to 50Ω by the L-network L2, C19 and 20. The relay contacts are DC-wetted, as in the front-end. This is essential to keep the relays functioning correctly at low signal levels. The effect of

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



The CDG2000, as built by G8KBB, having only one knob and 12 pushbuttons, reflecting the computer bias of the design.

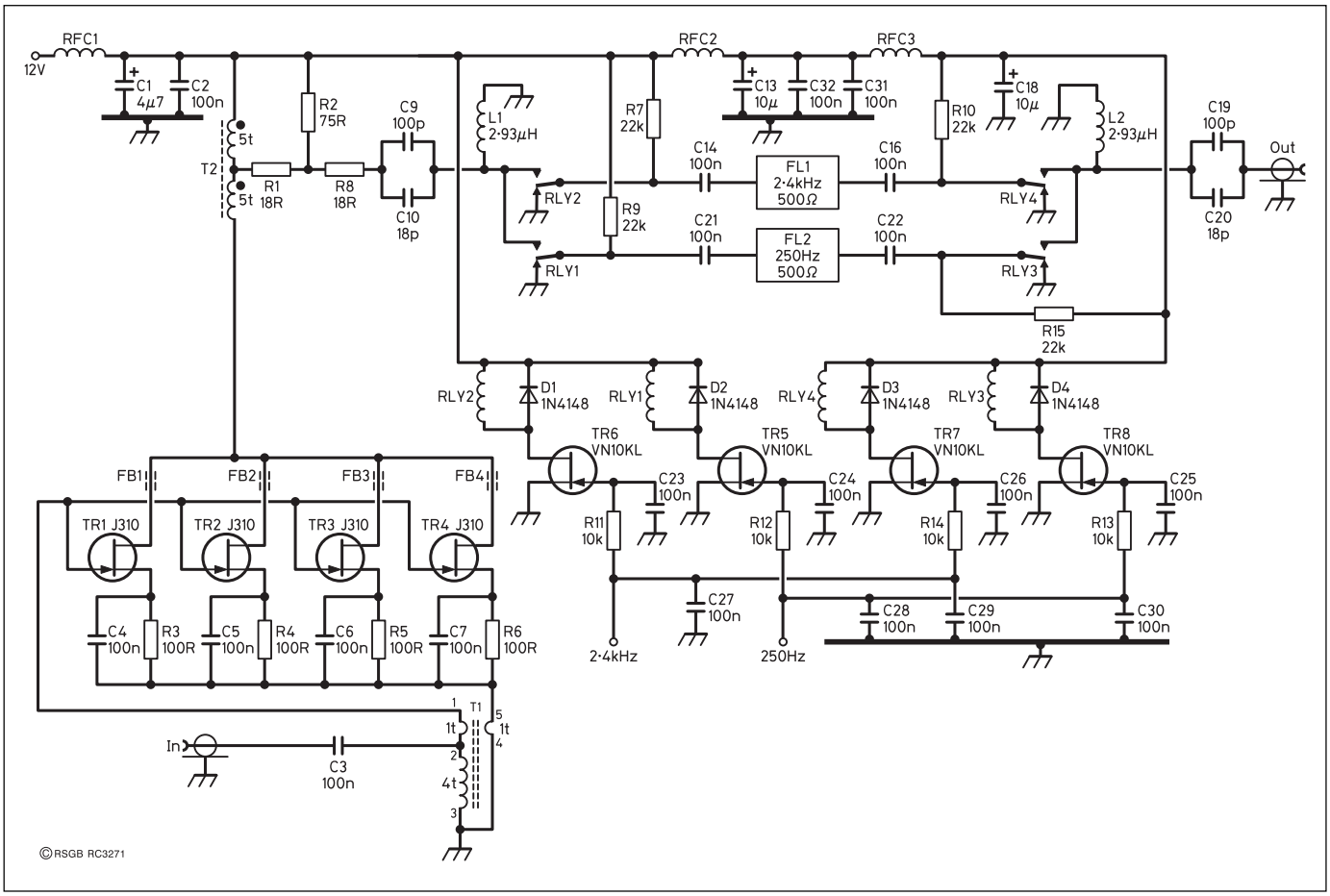
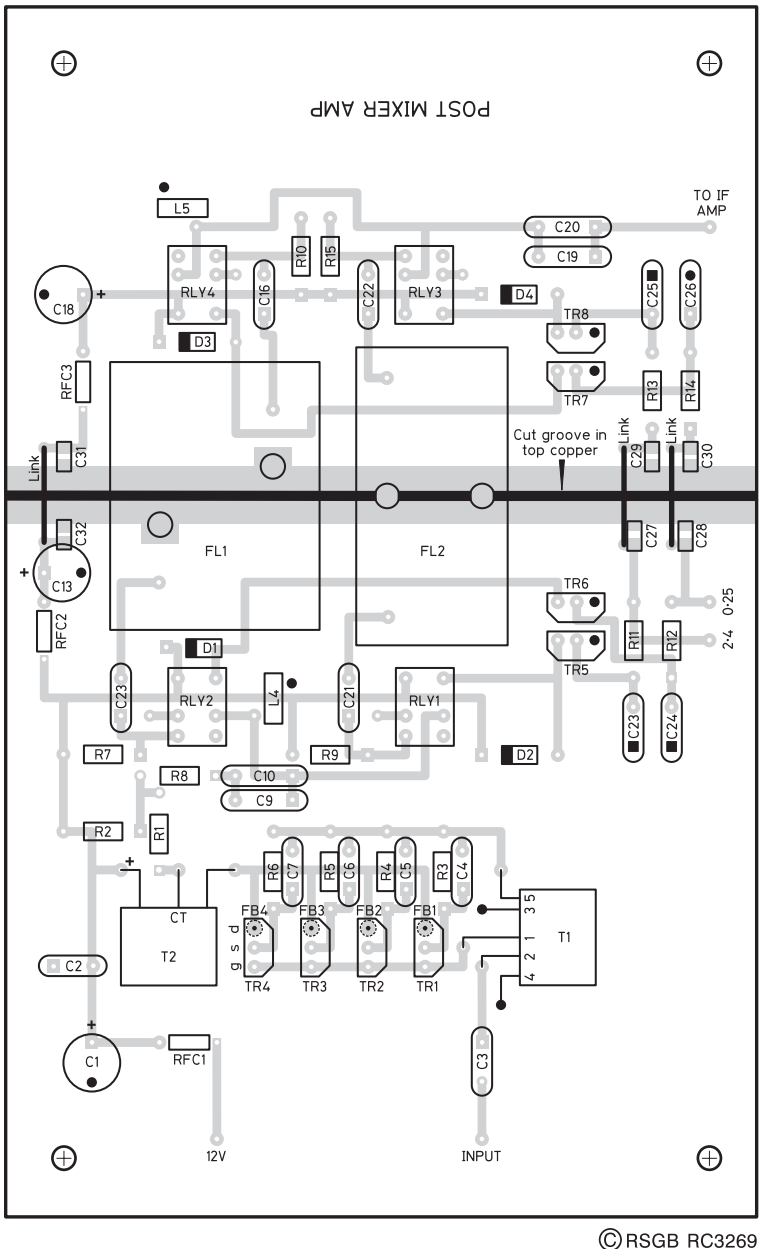


Fig 14: The post-mixer amplifier circuit.



NOTES

C27 - C32 are SMC and mounted on the track side

FB1 - FB4 on the legs of FETs TR1 - TR4

Fig 15: The component placement on the post-mixer amplifier PCB.

the four FETs is to raise the transconductance and, when combined with the heavy feedback, the effect is a high IP3 and a low noise figure. The reason for the 50Ω intermediate transformation after the FET amplifier before the filters is to provide a 50Ω break point for testing.

At the moment, the overall IP3 performance of the whole receiver in CW is limited by the performance of this stage, the IP3 of which is not quite as good as that of the front-end. The problem is that the quad FET amplifier should show a very high IP3 - and, indeed, tests by many builders have shown this to be true. What we believe is happening, however, is that the non-linear input impedance of the filter degrades the IP3. In tests, we found an amplifier output IP3 of +27dBm, implying an input IP3 of +13dBm. The effect of this is to degrade performance when the signals reaching the post-mixer amplifier are large. Remember that there is a high-quality roofing filter on the front-end board. This means that the effect of poor IP3 is minimal in SSB and would only show itself in CW mode. Here, the overall performance of the receiver would be degraded to around +22dBm for a signal within the passband of the roofing filter (ie about 1kHz away). As Harold Johnson, W4ZCB, pointed out, most signals on the bands are not clean enough to make the receiver a limiting factor in this case.

CONSTRUCTION

THIS BOARD is probably the easiest one in the transceiver to construct, and

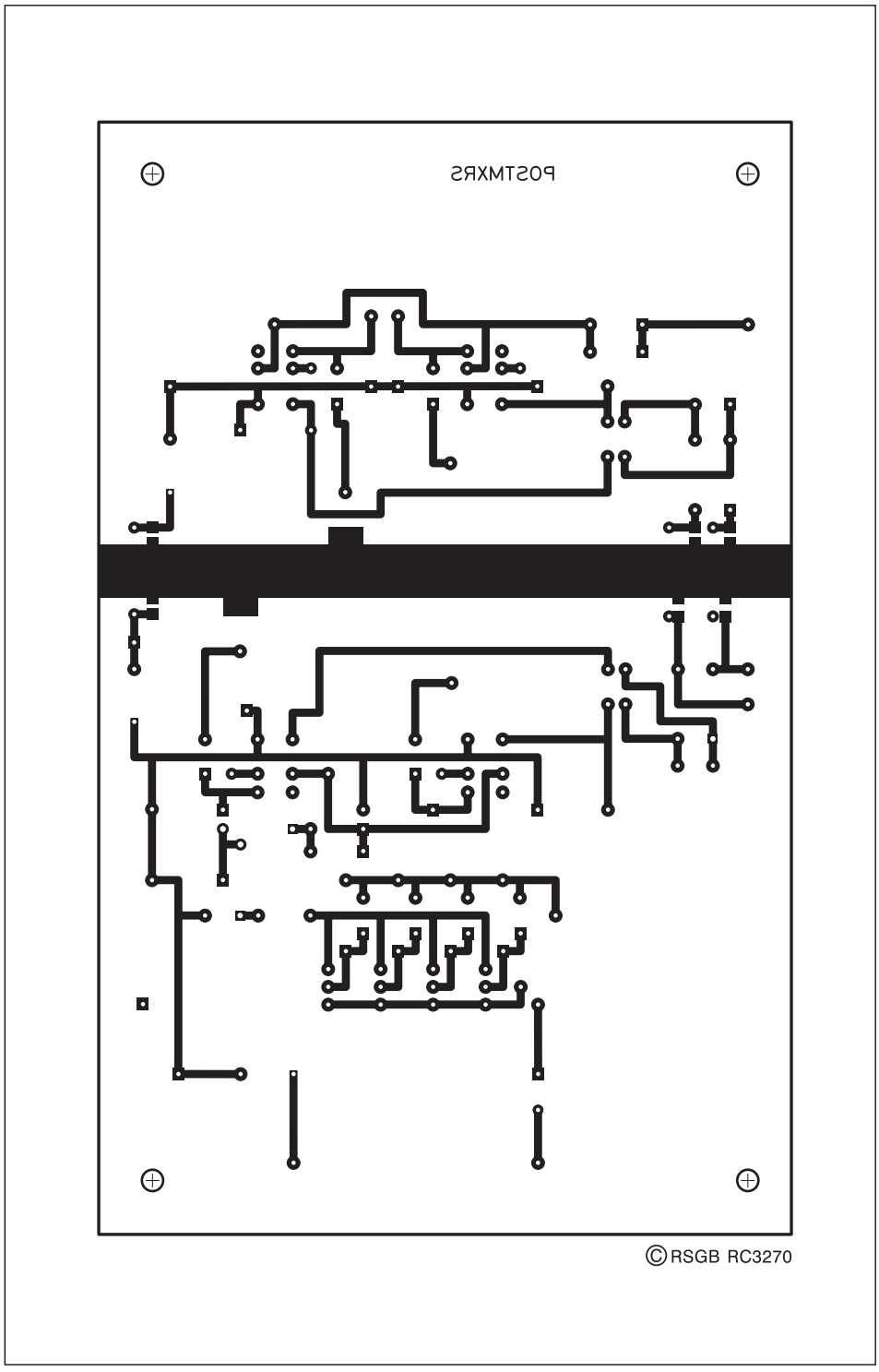


Fig 16: The tracking of the post-mixer amplifier PCB as seen through the board from the component side.

should pose no problems. The component layout is shown in **Fig 15** and the track layout in **Fig 16**. There are only six surface-mounted components, which are mounted on the track side, and should be fitted first. The only other problems which are likely to arise are with the transformers T1 and T2.

T1 and T2 are constructed on Amidon balun cores BN-61-202, although BN-61-302 is an acceptable alternative. T2 is wound with 5 turns bifilar at about 5 turns per inch (25mm). Note the phasing of the winding. T1 has a secondary of one turn. Coaxial braid can be used for this with the primary wound through it, or brass tubes can be fitted through each hole, connected together at one end and to ground and sources at the other as shown on the circuit diagram. Braid from RG174 (or, if available, its silver-plated equivalent) is ideal. The turns on L1 and L2 should occupy about 270° of the toroid. A ferrite bead is slipped over the drain leg of each J310 before soldering to the track. The ferrite bead material is not critical; type 43 will do fine.

TESTING

CHECK THE OPERATION of the relays with an ohmmeter by applying 12V to the relevant control pin to the PCB. A signal at 9MHz should then be traced through the board and should emerge with about 10dB amplification when the SSB filter is selected. We tested the front-end board together with this one at this stage by connecting the two boards together and applying a 0dBm signal from a signal generator to the LO input of the mixer, grounding a relevant pin of IC3 (Fig 11, July) to switch the

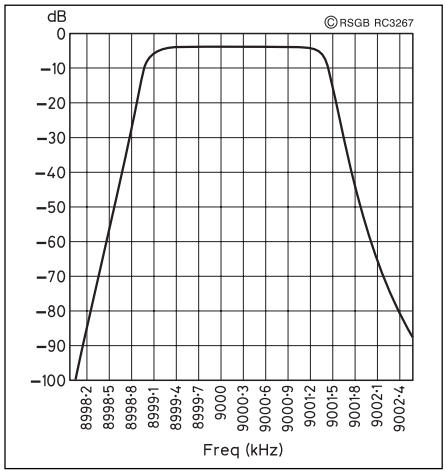


Fig 17: Insertion loss of the 2.5kHz filter.

band. Connecting an antenna to the front-end and the output of the post-mixer board to a receiver tuned to 9MHz should enable signals to be heard at the excellent performance of which this front-end is capable. 7MHz signals, for example, in the evening, will be a revelation. If you can tear yourself away at this stage, the rest of the receiver can be constructed!

The typical performance of the filters is detailed in **Fig 17** and **Fig 18**. This was measured by connecting a digital power meter to the output of the post-mixer amplifier unit and a signal generator to the input and recording the level every 100Hz or so. The overall performance summary for one of the units was as follows:

Amplifier gain (dB) 14.2
2.4kHz filter insertion loss (dB) 4.4
250Hz filter insertion loss (dB) 11.0

91H250 for the narrow filter. Testing on the prototypes yielded a very high IP3 for both filters, with the CW filter surprisingly good at over +45dBm. These are no longer manufactured, although JAB [9] may still have limited supplies of the wide filter. A search of the Internet revealed two sources of 9MHz filters, the first was found at Ten-Tec (see WWW.). These ladder filters are available at several 6dB bandwidths, namely 2400, 1800, 500 and 250Hz. The input and output impedances are both 200Ω compared with 500Ω for the IQD filters, and the matching networks will have to be changed. We tried the model 220 for 2400Hz and model 217 for 500Hz. The insertion loss is 2.2dB for the 2400Hz filter and 7.5dB for the narrow. These losses are lower than those of the IQD filters by about 2dB, but the intercept point is not as good. Also, the centre frequency was slightly higher than 9MHz, and did not match the band-pass of the roofing filters. The obvious conclusion is that if these filters are used, similar filters (type 220) could also be used for the roofing filters on the front-end board, although this would seriously degrade the IP3 capability of the receiver. The second source was found at International Radio Corporation. This firm manufactures replacement filters for most amateur radios and are claimed to have a performance superior to those originally supplied. We would suggest the use of reference 2310 for the wide filter and

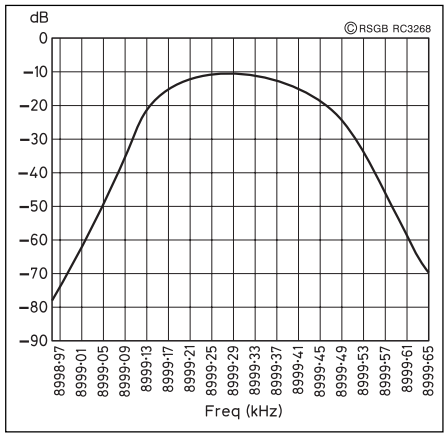


Fig 18:Performance plot of the 250Hz filter.

reference 2304 for the narrow. These filters have the same Z_{in} / Z_{out} as the IQD filters originally used, and should need no change to the design. Failing the use of commercial filters, home-made filters can be used. As a start, the roofing filters used in the front-end can be copied and modified to cover the relevant passband. International Radio Corporation also supply kits for 9MHz filters, and we have obtained two of these with satisfactory, if not outstanding, results. These are reference 350 and 351 which are each four-pole. Two of these can be wired in series to produce eight-pole filters. The Z_{in} / Z_{out} is 200, and some slight modification to the matching circuits would have to be made. The cost of the kits is roughly half that of manufactured filters. If DSP is to be incorporated, the CW filter is perhaps not essential, but is still desirable.

COMPONENTS

THE PROTOTYPES used filters manufactured by IQD, type 90H2.4B for the wide filter and

WWW.

Ten-Tec **www.tentec.com**
International Radio Corporation **www.qth.com/inrad**

REFERENCE

[9] JAB, PO Box 5774, Birmingham B44 8PJ. Tel: 0121 682 7045. ♦

COMPONENTS LIST FOR THE POST-MIXER AMPLIFIER

Capacitors

100n multi-layer ceramic	C2,3,4,5,6,7,14,16, C21,22,23,24,25,26
18p polystyrene	C10,20
100p polystyrene	C9,19
100n surface-mount 0805 NPO (COG)	C27,28,29,30,31,32
4µ7 16V tantalum	C1
10µ 16V tantalum	C13,18

Resistors 0.25W metal film 1% MF25 series

18R	R1,8
100R	R3,4,5,6
75R	R2
10k	R11,12,13,14
22k	R7,9,10,15

Relays

SPCO RS 345 038	RLY1,2,3,4

Inductors

Ferrite bead,type 43	FB1,2,3,4
Ferrite bead with 5 turns 30SWG enamelled	RFC1,2,3
2.93µH, 32 turns 30SWG enamelled on T37-6 toroid	L1,2
4:1 transformer, 5 turns bifilar on Amidon BN-61-202	T2
Transformer, **primary**: 5 turns 0.315mm enamelled, tap 4 turns from ground; **secondary**: 1 turn coax braid on BN-61-202	T1

Semiconductors

J310	TR1,2,3,4
VN10KL	TR5,6,7,8
1N4148	D1,2,3,4

Filters (see text)

IQD crystal filter 90H2.4B	FL1
IQD crystal filter 91H250	FL2

NEXT MONTH: the authors describe the IF unit, having a low noise figure at its input, and allowing control of its operating parameters.

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IC-756PROII

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

The Next Generation!

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6M5L	50 MHz 5 element	10.31	3.6	£119.95
6M5LDX	50 MHz 5 el. Long Yagi	11.75	6.0	£165.95
6M7LDX	50 MHz 7 el. Long Yagi	13.31	9.6	£249.95
6 Metre Lightweight (Economy Range)				
TR 6-3	50 MHz 3 el. economy	8.00		£75.00
TR 6-5	50 MHz 5 el. economy	10.20	3.6	£99.95
2 Metre Yagis		(dBi)	(Metres)	
2M5L	144 MHz 5 element	12.24	2.5	£85.00
2M7L	144 MHz 7 element	14.19	4.4	£99.95
4 Metre Yagi				
4M3L	70 MHz 3 element	8.7	1.48	£85.00
28MHz Yagis				
10M3L	28 MHz 3 element	7.41	3.0	£129.95
10M4LDX	28 MHz 4 el Long Yagi	9.42	5.4	£189.95
21MHz Yagis				
15M3L	21MHz 3 element	8.21	4.4	£225.00
15M4LDX	21MHz 4 el. Long Yagi	10.60	8.2	£255.00
18MHz Yagis				
17M3L	18 MHz 3 element Yagi			TBA
14MHz Yagis				
20M2L	14 MHz 2 element Yagi	6.37	3.0	£179.95
Log Periodic Yagis				
LP270	144 - 440 MHz	9.50	1.4	£110.00
LP1300	105 - 1300 MHz	11-13	1.5	£129.00
LP 1830	18 - 30 MHz	7.80	3.0	£399.00
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V6M	50MHz 1/2 Wave Vert	2.2	3.75	£59.95
2M258	144MHz 2 x 5/8 Colinear	8.5	3.2	£69.95
Baluns				
CB 18-52	18 - 52 Mhz 50 Ohm Balun			£12.95

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SY27-4	4 element 26 - 30 Mhz	9.6dB	£79.95
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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
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R6000	Vertical 14 - 50 MHz		£299.95
R8	Vertical 7 - 50 MHz		£469.95
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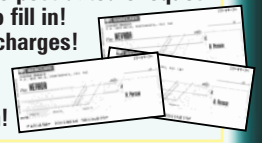

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Now with:
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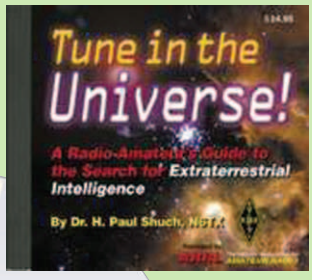

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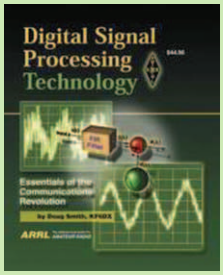

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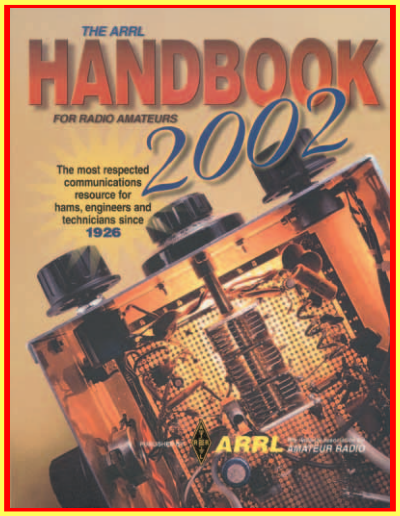

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We asked members when renewing their membership to include a donation to help to continue to finance the GB4FUN mobile amateur radio demonstration vehicle. The following is the list of those members who have kindly sent in a donation by the deadline date for this issue. All donations, no matter how small, are gratefully received, but special thanks are due to the GB4FUN 'Big Hitters' who have sent in larger sums. Contributions continue to be wanted: if you would like to help, please send your donation to 'GB4FUN', c/o RSGB HQ.

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RadCom Helplines FOR MEMBERS

● Dennis, G3ADZ, urgently requires a loan or photocopy of the service manual for the **Midland (LMR) radio type 70-1066**. Expenses will be refunded. G3ADZ, QTHR. Tel: 01394 275 820 or e-mail: g3adz@dhaylock.fsnet.co.uk

● Clive, M0BGA, has a manual for the **Racal MA79G/H universal drive unit**, but all the diagrams are missing. Can anyone supply a complete manual or copies of the diagrams only? All costs will be met. M0BGA, not QTHR. Tel: 01637 875 848 or e-mail: m0bga@thersgb.net

● **CQ Roy Tingay**, formerly working on the *Hudson Deep* out of Auckland, New Zealand, who later came to the UK in 1963. If you know of Roy's whereabouts, please e-mail Gayna@telpacific.com.au

● Richard, VA7MJR, used a **G-whip mobile antenna** when he was licensed as G4CVP. Having relocated, he has lost the **base mount**, and hopes that someone may have such an item which is no longer required. VA7MJR, e-mail: clockmann@island.net

● Keith, G3RHR, would be very grateful for any information and circuit diagrams for the **Telequipment D61 oscilloscope** and for the **Sony personal component system PMC-D40L**. All costs will be met. G3RHR, QTHR. Tel: 01423 868 139 or e-mail: g3rhr@lonetel.net.uk

● Roy, G4OPR,is seeking any information about the ex-government valve **CV6819**. Various reliable sources have failed. G4OPR, QTHR.

● Dick, G4HXH, would like a copy of the assembly instructions and circuit of the **Cirkit FET Dip Oscillator MkII**. G4HXH, QTHR. Tel: 01279 656 149 or e-mail: g4hxh@thersgb.net

● Bob, G4GEE, would like to hear from anyone who knew **G F Steven**, **GM5BA**, who presented his QSL card (shown here) to a friend in 1938. G4GEE, QTHR, or e-mail: rjn@dmu.ac.uk

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

WHATEVER NEXT

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

OVER THE years, speech processing has been used (with varying degrees of success) to improve the intelligibility of SSB. However, SSB has never been made to sound quite like the audio of an AM transmitter. Basically there are two reasons why:

Tuning

Although it is possible to transmit SSB with a reduced carrier, so that a demodulator can be made to lock onto the signal when it is being received and accurately re-insert the carrier (R3E, as opposed to J3E), practically no-one in the world of amateur radio does. This results in received audio not sounding completely natural because it is almost invariably shifted slightly high or low in frequency.

Filter pass-band

The suppressed carrier of the transmitted signal is something like 300Hz outside the pass-band of the transmitted audio. This is intentionally so, because (a) frequencies below 300Hz are not essential to the intelligibility, and (b) it becomes increasingly difficult to suppress the carrier as it gets closer to the audio pass-band. **Fig 1** shows why. The problem is that, for natural-sounding audio, these low frequencies are required, as they contain most of the sound's 'energy' (as opposed to the sound's 'intelligibility', which is contained higher in the frequency spectrum). In an AM transmitter the audio might well be tailored to roll-off at low frequencies, but this is not the same as the sudden cut-off that an SSB filter introduces.

As Izumi Soma, KH6JA, reported at this year's Dayton Hamvention, external adapters have been proposed for some time that would improve the audio fidelity, but JA1ENG and JA1AEA/K6EAE have now used modern digital techniques to advance the process. Furthermore, they were able to demonstrate their system.

As Jim Suzuki, JA1AEA, put from the outset, hi-fi SSB is not the same as FM broadcast quality, it is "good sounding audio". Furthermore, for good sounding audio, you must have a good transmitter and a good receiver. The problem here is that most commercial SSB equipment employs crystal filters that are not suited to this purpose, because their pass-band ripple is significant. We commonly regard an SSB filter as having a shape rather like the filter shown in Fig 1, but, as **Fig 2** demonstrates, it is highly likely that the pass-band is anything but 'flat'. This compromise in performance is brought about by the fact that SSB filters are often optimised for skirt selectivity, rather than flatness of response. JA1EAE likened the pass-band of a filter to a mirror – when a mirror is flat you get an accurate reflection of an image, but if it is distorted you get an inaccurate reflection. He went on to say that the best type of receiver on which to monitor a hi-fi SSB transmission was a Direct Conversion, as it has no crystal filter. In fact this applies equally should you wish to monitor your own 'ordinary' SSB, as the monitor function of most commercial transceivers samples the audio *before* it has been through the balanced modulator and the crystal filter (after which it is likely to sound quite different).

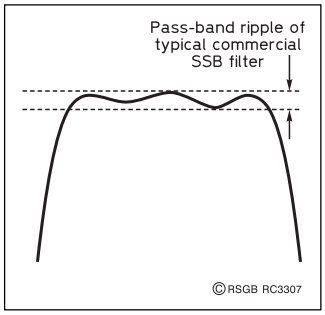


Fig 2: Although we commonly regard SSB filters as having a 'flat' response within their pass-band, they are more likely to have significant ripple.

The detail of the proposed system (shown in **Fig 3**) is that you take the audio you wish to transmit and shift it higher in frequency. Working with a filter bandwidth of 2.7kHz, audio frequencies from about 50Hz to 2750Hz were found to be the ideal, so clearly it is necessary to shift the audio about 250Hz higher before transmitting it through the filter (which actually passes 300Hz-3000Hz). A certain amount of audio tailoring is also applied, to boost the low and high frequencies. In the receiver another frequency shifter is used to subtract 250Hz from the audio, to bring it back to the original range.

Demonstrations of hi-fi SSB through a variety of commercial transceivers (with differing crystal filter characteristics) brought it home to me that there were large differences in response – with some sounding much better than others. It was also stated that, in most instances, it had been found necessary to modify the equipment to make the system sound good, so hi-fi SSB was not likely to be within the scope of everyone.

JA1AEA concluded by say-

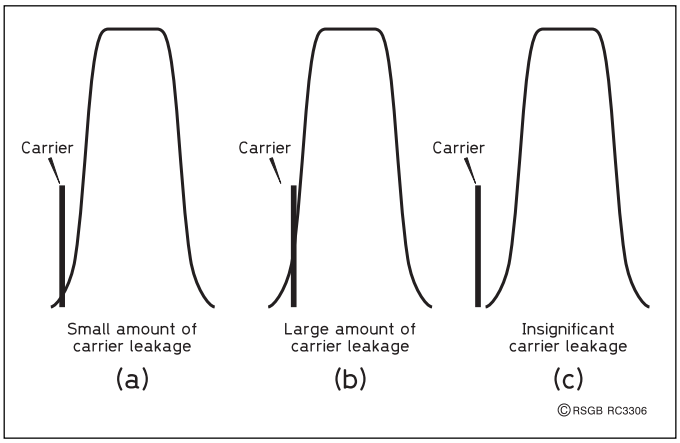


Fig 1: A typical SSB filter has sloping sides. These slopes are steep, but *not* vertical. If we want greater LF response (a) we have the problem of carrier leakage. What's more, if we want maximum LF response (b) we end up with an even bigger carrier leakage problem. On the other hand, if we want maximum carrier suppression (c) we have the problem of not being able to pass audio frequencies below 300Hz through the filter.

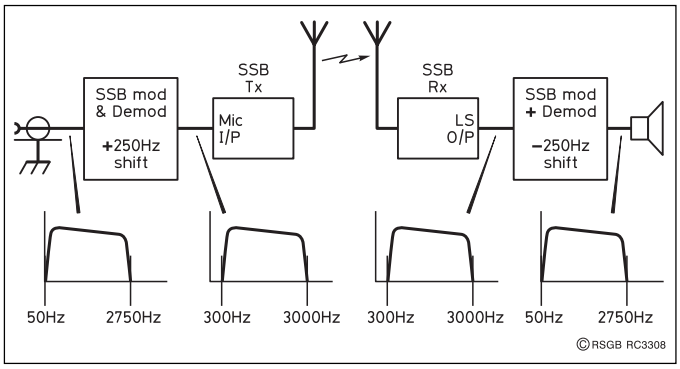


Fig 3: Pitch-shifters are used to add about 250Hz to the audio from the microphone, before it is fed into the transmitter. On receive, a similar pitch-shifter is used to subtract 250Hz from the received audio. Phasing SSB modulators and demodulators were used for the demonstrations given at Dayton, but audio shifters can also be implemented using a PC sound card.

The AOR AR7030 communications receiver.

ing that it was easy to overload the input audio amplifier and that it was important not to overdrive the balanced modulator. Now where have I heard *that* before?

DRM UPDATE

LAST MONTH I wrote what I thought were going to be my final words for a while on Digital Radio Mondiale, but then it was brought to my attention that two broadcasters have now commenced long-term DRM tests on short-waves.

Radio Netherlands is transmitting on various frequencies from its site at Bonaire in the Dutch Antilles (just north of Venezuela). Programmes are in a variety of languages and are beamed at Europe. Meanwhile, German broadcaster Deutsche Welle is transmitting from its site at Sines in south-western Portugal. Some transmissions are simulcast, others straight DRM.

Of course it is not yet possible to nip down the shops and buy a DRM receiver, but it is possible to listen to DRM if you have a suitable receiver and a sufficiently powerful PC, by feeding the received audio stream into the computer's sound card and running suitable software. The software can be purchased from the Fraunhofer Institut, which was at the heart of creating the DRM standard. Their Internet site shows a photo of a PC next to an AOR AR7030 (see photo above), which is a low-noise receiver with high dynamic range and multiple bandwidth filter options.

SEEING RED

IN MAY I wrote about the Blu-ray, a CD-sized medium that has found favour with several large companies. The Press Release stated that Blu-ray "could be made to be compatible with DVDs", to which I added, "…it would be unwise (of the manufacturers) not to do so". Later it became clear that Blu-ray would not read conventional DVDs, as there is an incompatibility caused by the frequency of the laser light being different between the two systems. Within a couple of months, physics professor Tsai Din Ping at the National Taiwan University had led a group of researchers in developing a recordable optical disc capable of packing-in 100GB. Running off the same red laser pick-up heads used in a typical disc player, it *is* compatible with today's CD and DVD technology.

To achieve the 100GB density, the research team used near-field optics - where the distance used for the interaction of the laser and medium is shorter than the wavelength of light used to make the recording marks on the disc. Two layers are added to the disc to achieve the near-field effect. The first is a transparent dielectric spacing layer, about 20-40nm thick, which keeps the distance constant in the near field. The second is an active layer, which interacts with the focus point of the laser to generate the near-field effect and then transfer the mark to the recording layer.

Using a standard 12cm disc, the researchers drew down the mark size to about 100nm (400nm for DVDs and 900nm for CDs). The Enhanced Versatile Disc (EVD) as it has been called is basically compatible with the Advanced Versatile Disc (AVD) that the Chinese have been developing, apparently because they don't like the idea of paying royalties to the developers of other formats.

In Taiwan, Tsai says that his prototype is ready to hit the market today but, in China, Wang Shyh-Yeu, the R&D Director at disc maker Ritek Corp, says that he doubts the market is ready. He says that Ritek should work on polishing the signal-to-noise characteristics on discs in the 40GB to 60GB range, which would still far outstrip today's 9.4GB maximum capacity for a dual-sided, dual-layer DVDs. "The next two years will be very important for this technology," Wang said. "If we can get through the big breakthroughs we need, this will be a threat to Blu-ray."

During that time, however, Tsai will be prodding his team to push the limits of density even further. Ritek and Taiwan's National Science Council are funding the research until February 2003. "Our goal is to make an even smaller mark size that will still be stable within the near field." Tsai said, adding "One hundred gigabytes is not the limit; it is just the beginning. Our goal is a terabit."

So now it looks as though there might well be a 'Battle Royal' of the post-DVD formats – something which the VHS/Betamax experience tells me we really don't need.

MORE FREE MANUALS

LAST MAY I mentioned an experiment that I had conducted to determine whether I could find downloadable instruction manuals for a variety of amateur radio products. The results meant that the experiment was worthwhile, but it certainly wasn't possible to unearth manuals for everything.

Whilst at Dayton, I picked-up a handout that gave the URL for an FTP site for Kenwood manuals, but when I got home and checked it I discovered that it contained the same manuals as the site I had mentioned previously. However, this spurred me on to see if I could find some Yaesu manuals, which I had not managed to do last time. This time I was more successful, as the site of AA1DO contains several. The files are in an uncommon format (.MAX, rather than .PDF), but a free viewer is downloadable.

Another well-known and highly-regarded brand of equipment is Heathkit, and here my search showed-up a site that contained the circuit diagrams for a host of Heathkit models. Whilst on the subject of elderly equipment, K4XL's BAMA (Boat Anchor Manual Archive) site contained the manuals for a host of different brands. Once again the file format is uncommon, but a viewer is downloadable. ♦

WWW.

Radio Netherlands DRM	**www.rnw.nl/realradio/html/drm_latest.html**
Fraunhöfer Institut (DRM software)	**www.iis.fhg.de/dab/products/drmreceiver/index.html**
AOR 7030	**www.aoruk.com/ar7030.htm**
100GB recordable CD	**www.cdrinfo.com/Sections/News/Details.asp?RelatedID=2333** **www.cdrinfo.com/Sections/News/Details.asp?RelatedID=2344** **www.cdrinfo.com/Sections/News/Details.asp?RelatedID=2345**
Yaesu manuals:	**www.aa1do.com/hammanuals.htm**
Heathkit circuit daigrams:	**www.circuitarchive.co.uk/heath.htm**
Boat Anchor Manual Archive:	**bama.sbc.edu/**

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.

8Q7ZZ - CRYSTAL CLEAR DX GROUP'S DXPEDITION TO MALDIVES 2002

by DXpedition leader Mark Haynes, M0DXR*

I CLEARLY REMEMBER the time when I had the initial thought of organising a DXpedition. It was during a school geography lesson last April, just over a month after arriving home from D68C when I completely lost interest in what the teacher was saying (quite rare, of course), and I realised that I had the DXpeditioning bug. The D68C team did warn me whilst in the Comoros that this was likely to happen - thanks guys! I was privileged to be invited to take part in the D68C DXpedition as a youngster and it was a wonderful experience. So, I was trying to think about what could be done next.

THE NEXT GENERATION

8Q7ZZ IS A follow-on from D68C in the sense that one of the aims is to promote HF DXing and amateur radio for newcomers and youngsters. With the Foundation Licence now in full throttle there is much scope for an increasing amateur population of the younger generation. This is very important for the hobby, as the new youngsters ensure that there is a future for amateur radio.

Before long, the Crystal Clear DX Group was formed and I set out to establish a good productive team with a wide variety of skills and operating preferences. I felt that an international team would also demonstrate the good social side of the hobby. The DXpedition team is comprised primarily of the younger generation, myself at 18 years of age being the leader. Other members are Robert, M0TTT (age 15); Fabian, DJ1YFK (age 18); and one adult Tony, EA2AIJ. We have all discussed what we aim to do, everything from antenna projects to operating procedures and have as a result come up with the following aims:

- To promote HF operating and DXing for newcomers and youngsters;
- To show that it is possible for a team of youngsters to organise and run a successful DXpedition and to encourage future operations;
- To allow the opportunity for top DXers to make as many band / mode slot contacts with the Maldives as possible.

* 34 Pear Tree Mead, Harlow, Essex CM18 7BY; e-mail: m0dxr@qsl.net

2 x Yaesu FT-900	Loaned by the RSGB IOTA Committee
1 x Icom IC-756PROII	Loaned by Icom (UK)
1 x SRW 'Loundenboomer' amplifier	Loaned by G4JVG
1 x Cushcraft A3S tribander	Loaned by Five Star DXers Association
1 x Cushcraft A3WS + 30m tribander	Loaned by Five Star DXers Association
1 x Trident 5-ele monoband 6m Yagi	Donated by UKSMG
1 x Carolina Windom 160 special	Donated by Waters & Stanton plc
Telescopic section masts	Loaned by Five Star DXers Association/G0OPB

Table 1: Crystal Clear DX Group's equipment to be used at 8Q7ZZ.

Above and below left: Lohifushi in the Maldives, site of the 8Q7ZZ DXpedition.

ON THE AIR

THE TEAM departs London on 28 July and plans to be on the air on the evening of the 29th or early morning of the 30th. We will be active on all HF bands and 6m until 10 August. We will stay at the Lohifushi Island Resort in North Male' Atoll (the same island that *RadCom* editor G4JVG operated from as 8Q7SL in January - February).

8Q7ZZ will have two stations running 24 hours a day with a third catering for 6m. The third station will run in CQ 'beacon mode' on 6m and when we have an opening the station will become operational. The third station may also run on HF if required.

The equipment we are taking is shown in **Table 1**.

All of the equipment in Table 1, plus all the other bits and pieces will travel with us on the aircraft. The airline we will fly with, Monarch Airlines, has agreed an increased weight allowance for the expedition, which is a great help.

The Crystal Clear DX Group feels that communications with the amateur public is most important before departure. In order for you to have a good idea where to find us, we aim to operate on the frequencies shown in **Table 2**. The table can be used in conjunction with the propagation predictions on our website [2] for the best time to contact 8Q7ZZ at certain times of day.

8Q7ZZ will QSL to all received cards either via the bureau or direct (with sufficient postage costs included). The QSL manager is Phil Whitchurch, G3SWH, who always does a fantastic job - thanks Phil!

Lots of DX clubs such as CDXC, GM DX Club, RSGB HF DXpedition Fund, German DX Foundation and Northern California DX Foundation have also made a contribution to the expedition and we are most grateful. Individual sponsorship has been received from G3WGV, DL7AKC, JA3AER, G3TMA, G3KZR, G0OPB and W3EF.

On behalf of the team I would also like to express thanks to Neville Cheadle, G3NUG, for his help and support and also to Steve Telenius-Lowe, G4JVG, for sparing the time to conduct a site survey while on holiday on Lohifushi and collecting information to help with logistics. Also, thanks to all our sponsors: a full list can be found on our website (see below).

FURTHER READING

DXPEDITIONING Behind the Scenes, edited by Neville Cheadle, G3NUG, and Steve Telenius-Lowe, G4JVG. Members' price £14.41 plus P&P, available from RSGB Sales. ♦

MHz	CW	SSB	RTTY	FM	PSK31
3.5	3505	3795	3570	-	-
7	7005	7055	7035	-	-
10.1	10106	-	-	-	-
14	14025	14195	14085	-	14070
18	18075	18145	-	-	-
21	21025	21295	21085	-	21070
24.8	24895	24945	-	-	-
28	28025	28495	28075	29580	28070
50	50110	50110	-	-	-
(beacon)					

Table 2: 8Q7ZZ preferred operating frequencies.

WWW.

8Q7ZZ website: www.8q7zz.com

Down To Earth

Newcomers' News

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

ONCE AGAIN you have kept the postman busy with news, views and photos. Please keep it coming, your input is always most welcome. As I write this month's column I am making final preparations for our next Foundation Licence (FL) course here in Bath in conjunction with the Council's Emergency Planning Team. More news on that next time.

SPANNING THE AGES

MY LAST FL course had a good spread of ages but Alan Ralph, G8XLH, beat me by tutoring a class ranging from 10 to 74 years of age at the Peterborough and District ARC. All his latest batch of eight students passed the assessments, albeit with one resit.

Alan reports that whilst the students were very happy he was not. Not only had he to take the classes with a rather painful fractured toe, but following the course he had to call out the recovery service to free the steering lock on his car. The dedication of these tutors!

MORSE SPEED

IN THE April *Newcomers News* column I said that I did not know anyone who could receive Morse code faster than they could send it. Dr Cliff Ayling, G4HSU, wrote from Lewes to offer a brief explanation of why this should be.

First of all Cliff stresses the importance of being able to receive before you practice transmitting. If you don't know what the characters *should* sound like you could get into some terrible habits and be completely unaware of them until the examiner passes his judgement!

The point about the speed is related to the way the brain processes signals, Cliff suggests. When decoding, the brain has to receive the electrical impulses from the ear and convert them from Morse to letters or numbers and the decoding cannot take place until the characters are received. This process is slowed down further if the brain then has to send electrical impulses to the hand to write the letters and numbers on paper.

On transmit there is a similar process but the message to be sent is already 'stored' in the brain and it is possible for the brain to read ahead and have the electric impulses ready to send to the hand on the key much faster. Kind of like a buffer memory in a computer.

Thanks for the explanation, Cliff, but it doesn't explain why some amateurs can in fact receive faster than they can send (see June *Newcomers* News). Something to ponder over.

G4FON LOOP

THE MINIATURE loop described by Ray Goff, G4FON, in the May *Newcomers News* has attracted lots of attention. Ray has been receiving a steady steam of enquiries about the loop and its construction since the column was published.

I used the antenna to illustrate how a newcomers might build a complete low power (QRP) station in my talk at the Yeovil ARC QRP Convention back in April. I was very pleased to hear that several of those in attendance had already built one from the original *SPRAT* article and all sang its praises.

It is also worth mentioning that several of the traders at the Yeovil club's bash had the necessary components for building the loop, so I guess a visit to a local rally might be a good idea.

John Lloyd, M5JLL / G8FBB, asked me to point out to potential builders of the loop that it has a very narrow bandwidth and that if you stray too far from the resonant frequency performance drops off dramatically.

This is not down to poor construction but is a characteristic of this type of antenna. The loop can of course be re-tuned to any part of the bands with the trimmers at the top. A good point to note all the same, thanks John.

Loop builders may also like to check out the patented design by Ben Edginton, G0CWT (see July *RadCom* page 11). Ben's design appears to be much larger than the G4FON loop and the feed point uses twin ferrites, rather than the single toroid, but it may suit your circumstances. Certainly worth a look.

NEWCOMERS HELP OUT

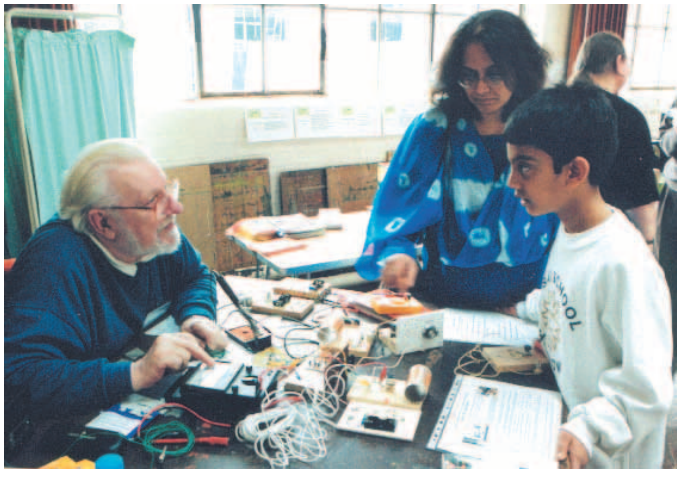
DONALD LAMB, G0ACK, often keeps us informed of news from the Radio Society of Harrow. This time he has reported the success of their 'Open Day', which was organised as part of National Science Week.

The club opened its doors to the public and a number of radio students and ex-students helped to make the day a huge success. The club laid on a terrific display including a replica Marconi transmitter *ca* 1895, some broadcast receivers from the 1930s, a Drake transceiver donated by the late King Hussein of Jordan, JY1 [who went to school at Harrow - *Ed*], and a modern slow scan television (SSTV) station. The RSGB 'flagship' van, GB4FUN, was parked outside the main display hall and attracted many visitors, some even managed to pass greetings messages over the amateur bands.

About half the membership provided some kind of assistance for the day including Vince, now 2E0VEV, who was awaiting his NRAE results at the time. Vince took great delight in showing visitors some of the training material from the Intermediate training course and acted as a great ambassador for the hobby. Well done all!

COMPTON COMPETITION

TIM WALFORD, G3PCJ, has kindly donated the Compton 80m receiver that I built and reviewed in the June edition of *RadCom* as a competition prize. If you would like to win the receiver, please send a photocopy of the first page from your first logbook showing the very first entry and a note about how you became interested in amateur radio to the *RadCom* editor at RSGB headquarters. The editor will pull out the lucky winner on **Friday 30 August** and they will receive the Compton. By entering the competition you must agree to have your 'newcomers' story reported through this column. ♦



Vince, 2E0VEV, explains what the Intermediate training course is all about (see 'Newcomers Help Out').

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

Down To Earth

A Two-Component CW Filter

Improve your CW reception with this simple circuit by Fraser Robertson, G4BJM *

I'M GENERALLY not in favour of add-on audio filters, preferring to use the receiver's filtering to set the required bandwidth. However, this little passive filter does contribute towards operating comfort by cleaning up the audio. Many rigs suffer from audible hiss, clicks, thumps, hum, and poor sidetone, to varying degrees. This filter is pretty much a cure-all for those problems but, being low-Q, can be left in-line all the time. You can hear what's going on around the frequency, but the chosen pitch stands out from the crowd. In its simplest form the filter consists of just two components connected in line with the headphone lead, so it makes an ideal project for the beginner.

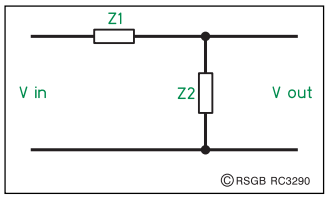


Fig 1: The potential divider circuit.

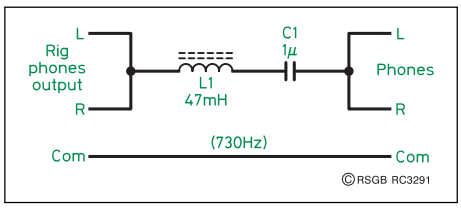


Fig 2: Circuit diagram of the two-component CW filter.

HOW IT WORKS

THE FILTER comprises a single series-tuned circuit, which is chosen to resonate at the desired frequency. Most people are familiar with the use of parallel-tuned circuits, used for example as traps in aerial systems. A parallel-tuned circuit gives maximum impedance across it at resonance, thereby effectively disconnecting parts of the aerial at the traps' resonant frequencies. Conversely, a series-tuned circuit gives minimum impedance at resonance, with its impedance rising either side of resonance.


The completed deluxe filter.

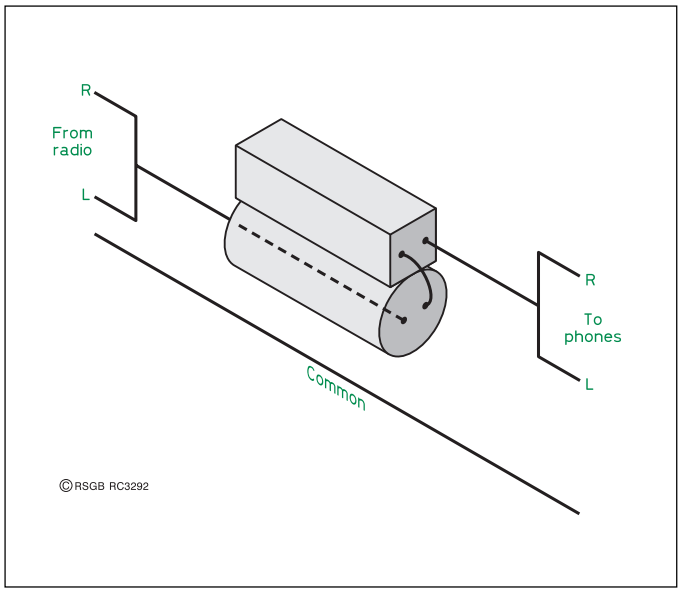


Fig 3: The wiring diagram.

This is the effect exploited here, see **Fig 1**. Z1 and Z2 are impedances forming a potential divider. The output voltage is given by the formula:

$$V_{out} = \frac{Z2}{Z1 + Z2} \times V_{in} \qquad (1)$$

Therefore, as we increase Z1, the output voltage falls. If Z1 represents our series resonant circuit, and Z2 our headphones, it follows that maximum transfer occurs at resonance, and attenuation increases as we move away from resonance. The filter circuit is shown in **Fig 2**.

COMPONENTS

THE INDUCTOR IS a small Toko 10RB series, 47mH in value. The capacitor is a miniature polyester type, with its value chosen to suit the preferred signal/sidetone pitch. A 1µF capacitor will resonate in this circuit at around 730Hz. By padding this with another parallel capacitor, alternative centre frequencies can be set as follows: 100nF (ie 1.1µF total) for 700Hz, 270nF for 650Hz and 470nF for 600Hz. Other frequencies can be calculated using the formula:

$$C(\mu F) = 540{,}000 \times \left(\frac{1}{f}\right)^2 \qquad (2)$$

where f is the frequency in Hertz.

HEADPHONES

I USE CHEAP Walkman-style 32Ω headphones, with left and right channels connected in parallel to give a total resistance of 16Ω mono. If you are using 8Ω headphones, the filter attenuation will be higher, and the bandwidth narrower (look back at equation (1)).

The headphone socket of most rigs is stereo, with the mono output fed to both left and right connectors via resistors (typically 100Ω), which give attenuation and short-circuit protection. I connect left and right together, thus halv-

* *g4bjm@qsl.net*

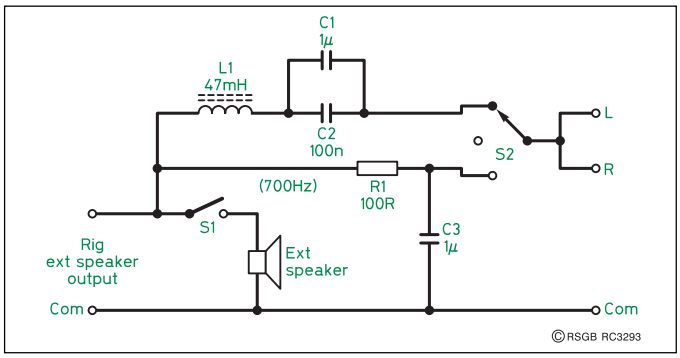


Fig 4: Circuit diagram of the deluxe version of the filter.

ing the resistance, since the filter itself gives some attenuation due to the resistance of the inductor (about 50Ω). Also, reducing the source impedance increases the Q and, hence, the selectivity of the filter. The 3dB bandwidth is 350Hz for a 700Hz centre frequency, (my preferred pitch). *Note:* the above connections do not apply to rigs like the Yaesu FT-1000, which have a true stereo headphone output [main- and sub-receiver outputs fed to individual ears - *Ed*], so a stereo version of the filter would be needed.

CONSTRUCTION

THE FILTER IS very small, and mine is just wired in-line with an extension lead, since Walkman headphone leads are a tad on the short side for my liking. This has a stereo quarter-inch jack plug on one end and a 3.5mm stereo in-line socket on the other end. The components are simply soldered in series with the cable, then covered with insulating tape or heat-shrink sleeving, see **Fig 3**. Note that the common line stays intact and provides some strain relief. Alternatively, the filter could be included inside a home-made receiver.

DELUXE VERSION

A DELUXE VERSION of the filter, with a few more components is shown in **Fig 4**. This filter plugs into the external speaker socket on the back of the radio. Since this has a low output impedance, the filter Q is higher, giving a 200Hz 3dB bandwidth for a 700Hz centre frequency. The filter is built in a small plastic box mounted under the desk front, so the headphone lead doesn't get in the way of things. No circuit board is needed - the filter components are just wired between the switches and connectors. S1 switches an external speaker on or off, while S2 switches the headphones to either unfiltered, off or filtered. I find it very handy to be able to switch the speaker and headphones on and off independently. R1 attenuates the headphone signal to give a similar overall volume with the filter in or out. C3 and R1 give a 3dB rolloff at 1.6kHz to stop any hiss from the radio getting to the headphones when the filter is switched out.

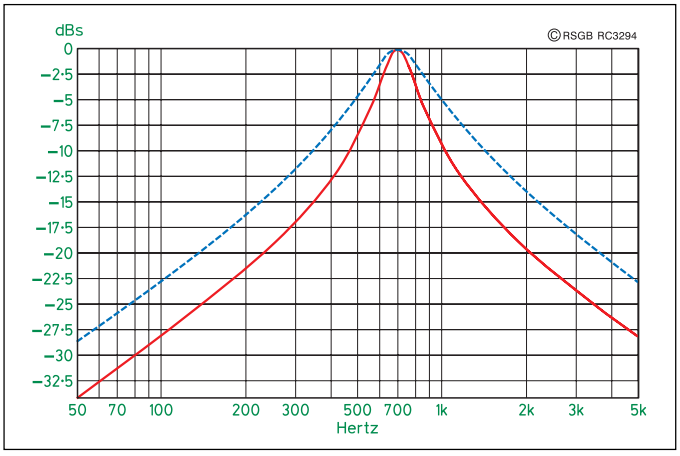
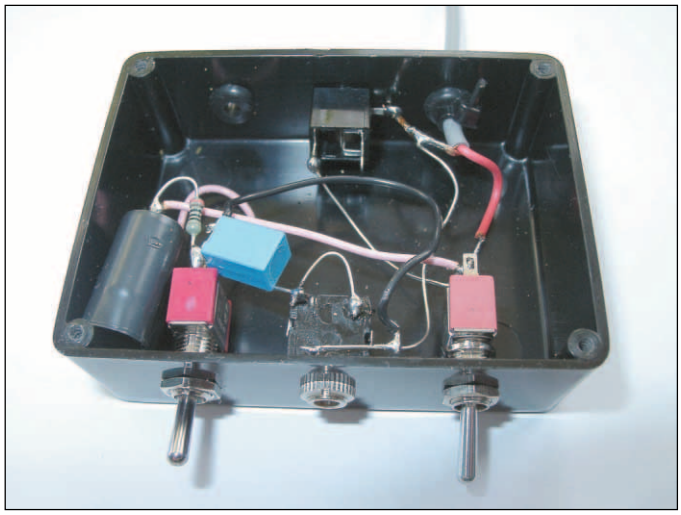


Fig 5: Filter selectivity curves - see text.

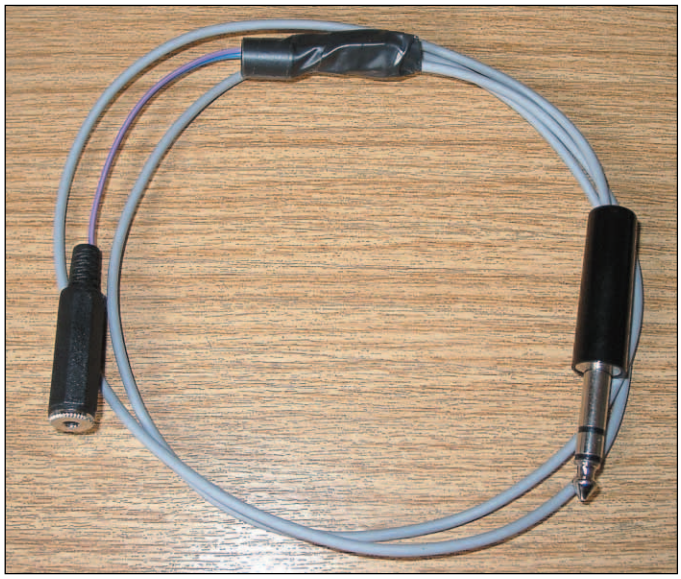


Inside the deluxe version. The filter components are taped together, bottom left of box.

Fig 5 shows the difference in selectivity obtained when using the rig's speaker output (red solid curve) compared to the headphone output (blue broken curve). The plot refers to a range of 50Hz to 5kHz, filter centre frequency 700Hz, into a load of 16Ω.

HAVE A GO!

CONSTRUCTION projects don't come much easier than this, and the filter will work first time – there's virtually nothing to go wrong. ♦



The prototype in-line filter.

COMPONENTS LIST

R1	100R low wattage, Farnell 333-566 or RS 149-644	S1	Miniature SPST toggle, Farnell 148-705 or RS 330-963
C1, C3	1µ0 miniature polyester, Farnell 149-846 or RS 118-038	S2	Miniature SPDT toggle with centre-off position, Farnell 152-268 or RS 330-979
C2	miniature polyester to suit desired pitch, see text. Farnell 143-680 or RS 115-023 (100n)	Small plastic enclosure, stereo / mono jack plugs and sockets as required.	
L1	Toko 10RB series, 47mH, Farnell 148-876 or RS 228-365.	*Note:* Private individuals can now place orders with Farnell or RS via the Internet [see 'In Practice', p56 – *Ed*].	

Down To Earth

The Early M5FUN - Having Fun

14 Year Old Jonathan Constable, M5FUN,* Describes His Early Years as a Radio Amateur

SOME PEOPLE will have worked me as 'just an other contact' and some will have had longer conversations. Those in the latter category might have an idea of some of the fun I have had from the hobby.

I haven't had my M5 callsign since I first became licensed; I started in the hobby as a Novice [now Intermediate licence - *Ed*] Class B. My callsign was 2E1GOM and as a beginner in the hobby I remember making mistakes, but also the friendliness of my local amateurs. When I got my callsign in April 1998, I had no equipment apart from an Icom handheld, which had been a present to me for passing the exam. My father, who is also licensed, was talking to a friend on 2 metres when a station broke in to say that he had a spare aerial that I could have to help start me off. This just shows that you never know who's listening and what might come of a short conversation.

Another incident that springs to mind is that due to my only being 10 years old when first licensed, I couldn't pronounce foreign words very well and when I was operating under supervision on 2 metres FM, I couldn't pronounce the QTH of a French station that I worked. I remember that the French person was in Dieppe and when I told my mother where I had worked, I said that I had contacted a person in "Dippy"! That was a while ago now, but it still brings back memories.

In March 1999, I passed the 5WPM Morse code test and three months later Novices were allowed to use 80 and 2 metres with 10 watts of power. This was a great improvement and was very much needed, as having only 70cm and a part of 10m with only 3W did make the hobby rather trying. Contrary to that thought, though, I made some great contacts on 10 metres by just persevering and it is great feeling to work a station through a pile-up on low power rather than running 100 watts and managing to contact most stations with relative ease.

Jonathan deep in concentration during the *CQ* World Wide DX SSB contest last October.

FIRST CONTESTS

IN THE MIDDLE of July I was introduced to contesting by a club that was taking part in an RSGB contest. I enjoyed the friendly competitiveness that is linked closely with it, and I experienced 144MHz SSB for the first time. From then on I was 'hooked'. Having persuaded my parents to let me put up a small Yagi, I spent my free days and evenings scanning 2m for new squares and countries.

It was around this time that I received a telephone call from Derek, G0NFA (who I had met when I was at RSGB HQ being interviewed for the Young Amateur of the Year competition), inviting me to his portable station a few miles away in Dallington. This was a type of mini-DXpedition and took the form of a radio 'weekend break'. At Dallington I watched Derek and Bill, M0BTZ, operate and heard them work what I thought was impossible. I learnt many new tricks for operating, which I hope also to be able to pass on to newcomers. I experienced Meteor Scatter, and was amazed how these signals were so different from the ordinary. This gave me the desire to have those capabilities at my own QTH.

Until December 2000 I remained a Novice, but in September 2000 it all changed as I enlisted in the Brighton College RAE course. This led to me taking the RAE and passing, gaining the privileges of an M5 licence. With the option of obtaining a personal callsign, after a fair bit of thought I decided that I would have 'M5FUN'. This is because I wanted a call that would stand out and also my local radio group, the QRZ Amateur Radio Group of Sussex, based in Herstmonceux, was very keen on taking amateur radio to the public, which is in fact why it was formed. With my callsign they could say at events "amateur radio is FUN" [this was precisely the same thinking that led to the RSGB mobile demonstration van becoming GB4FUN! - *Ed*].

With my M5 call and a little more power - but still only 25 watts - I started to take contesting more seriously, with the intention of seeing just how much power was really needed. Being at school, money wasn't available from a job, therefore whatever I bought had to be carefully chosen. I had been contesting before I got my M5 callsign but only really to give away a few points and to try to work new squares. Now I thought that I would try to see how my results compared and how I could improve my station cheaply but effectively.

One particular contest that I had enjoyed under my 2E0 callsign was the *Practical Wireless* contest, unfortunately the foot and mouth disease suspended it in 2001. In the previous one, I had come 33rd using only a small 9-element antenna.

INTERNATIONAL FRIENDSHIP

WHEN I WAS only 10 I was very lucky to have the opportunity to represent the hobby on national television. I was asked to appear on the Channel 4 morning programme *The Big Breakfast*. This was a chance for me to show the general public what the hobby is really about. I had a slot that was five to 10 minutes long and in my section of time I had to explain that the hobby involved talking with other people and that there was a technical aspect to it. I also had the chance to tell the public just how much I had benefited from the hobby, for example how it had improved my geographical knowledge and my ability to speak more clearly. The talk also showed how radio amateurs are really ambassadors for interna-

* *9 Ridgeway Close, Heathfield, East Sussex TN21 8NS.*

tional friendship. The short talk and live demonstration of a contact has made several people I know look on amateur radio with a different view.

As a Novice Class A licensee, most of my time was used for 'hunting' new squares and countries on 2m, but I also spent time on the HF bands that I was allocated. This proved to be great fun as I worked several new countries and discovered even more about propagation, especially on 10m. My main reason for going on HF, though, was that I had a friend at my secondary school whose father was licensed and who had just bought an HF radio. My friend was half interested and wanted to listen to me operating. Through this, he questioned what I did and what it meant and this ended with him becoming so engrossed with the hobby that in September 2001 he took his Novice examination and passed.

Many people who work the HF bands or who have experienced good conditions on VHF / UHF may have thought that foreigners who don't speak fluent English are a nuisance. However, in my opinion those people may not have tried to speak another language on the air, so they don't realise just how great are the difficulties. It may just be my impression at the moment because I'm still at school, but I think it is a pleasure to speak to somebody in a different country in their own language, especially if they don't speak very good English. You don't have to speak the language very well, but it is nice to have a pleasant conversation in their language. I can remember that before I became fairly fluent in French that I used to have broken French and mixed English contacts with French stations. It was only a few months ago that I worked a French operator who was extremely surprised when I replied to him in French for a five-minute QSO. It doesn't take much to learn the few usual words for a QSO and there are even sections of radio books that supply the basic language and translations. It is difficult to learn a foreign language I know, and A licensees also know that we all had to learn the Morse code, the international language, to go on HF. Most can remember the agony of trying to break the '10WPM barrier', and also the struggle of translating into English. If you apply this view then you can understand the difficulty overseas stations have speaking English, so go on, give it a try and surprise yourself.

CQWW

MY BEST CONTEST so far was not on VHF, but last year, when I feel I tested my skills to the limit in the *CQ* World Wide SSB contest. This contest ran for 48 hours but I was on the air for about 14, due to operating from home. What amazed me was the sheer number of amateurs, countries active and the same friendliness that came from the amateurs giving points away and those that were seriously entering. Although 99% of all contests are like this, this was the biggest one I had ever experienced.

When I was on I was working around two stations per minute, and the self-organisation by amateurs was stunning. Instead of large crowds of amateurs wanting to work those wanted multipliers, there was self-discipline whilst amateurs were waiting. The time and consideration that went into setting up the stations must have been well worth its while as some amateurs were working up to five stations per minute. Although I was only a small station in the event, it was still nice to be worked just for the points by participants, as well as renewing several acquaintances with old friends. This was a contest which I found was a pleasure to operate in and it is an event that I certainly will be entering again. I would encourage anybody with the capabilities to enter it; it is all fun!

CLUB EVENTS

I HAVE ALWAYS tried to take an active part in club life and I have taken part in many special event stations for various causes. I have also participated in national events like the windmills and museums weekends, providing coverage for a few hours or so at the club station. As well as these types of events, I have helped the QRZ club with its fund-raising charity events, such as for the Eastbourne lifeboats and for Sam Osbourne, who has a paralysing disease. These events provide excitement, laughter and a lot of contacts.

In May 2001 I had the chance to help the QRZ Amateur Radio Group of Sussex create their new club shack. Whilst running events for occasions like the total solar eclipse, some members had noticed a disused building in the grounds. The grounds belonged to Herstmonceux Castle who rented it to the Science Centre. On investigating, we met the leading groundsman who introduced us to the Head of the Castle. We told him what we proposed to do, including taking amateur radio to the public, and were met with "what can we do to help you, when can you start your display?" and various other offers of help. This was a great start and in June, the club proceeded to clear the room of disused junk which the previous owner had left; and also clear the 90 x 90ft of ground available to us. This was a mammoth task and it wasn't until mid-July that it was properly cleared and the building painted. The clubroom is about 15ft square and it is a perfect small clubroom for display purposes. As the club found out, the site was perfect for operation on all bands, particularly 144MHz and 50MHz. With a tower to get above the trees it is possible to work very long distances on 144MHz and 50MHz with reasonable propagation, due to the location being on a hill with a good take-off in all directions. Over time the club has been donated various pieces of equipment and furniture, which has turned what was once a disused building into a place of experimentation and operation. Being with the club when it received its permission has given me a real joy to be part of the team that helped to make it what it is.

M5FUN, June 2002, on the key.

Probably the largest and most important event that I took part in occurred in November 2001 when the QRZ group organised a 48-hour event to show the United Kingdom's support and appreciation to the American amateurs who provided emergency communications and rescue workers after the terrorist attacks on September 11. As a result of the event and the response by amateurs from all round the world, it is currently being decided whether there will be an 'international friendship' event with an award scheme for contacting the station.

I have described a little about my early time as a radio amateur and I am sure I will have many more pleasant years to come. I hope that this has given you some idea of what it has been like for me as a young amateur. If you are not licensed already, I hope it has inspired you to take the plunge into amateur radio. Thinking about it, I have several friends who are interested and even now are considering taking the Foundation Licence. . .

If I haven't worked you already, I look forward to working you soon. I hope you've enjoyed reading about my experiences.

Have FUN! ♦

Making a Ceramic Coil Former

*All you need to know to make your own ceramic coil formers, by Ted Garrott, G0LMJ **

A CERAMIC article is made by forming it in clay and then firing (heating) to a high temperature. It then takes on the appearance of unglazed porcelain. Ceramic material has the following characteristics that make it suitable for use in electrical and electronic components.

- it can be produced in any shape;
- electrical insulation is excellent at all frequencies;
- it has low dielectric loss;
- it can be used at high temperatures without losing strength.

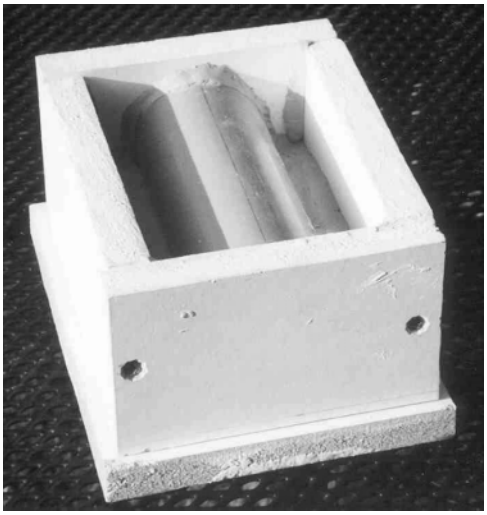
Ceramics are not used by amateurs as the material is not available on the commercial market.

** Lynden, Clappers Lane, Earnley, Chichester W Sussex PO20 7JJ.*

As the use of a kiln was available to me, I decided to make a ceramic coil former for my balanced-line antenna tuning unit. This tuning unit was described in the July and August issues of *RadCom* in 1998.

SLIP-CASTING

MANY METHODS of forming clay into various shapes can be used and, after initial experiments, I decided to use a procedure called 'slip-casting'. Here, a plaster mould is filled with slip (liquid clay). The porous plaster removes water from the slip and a layer of clay forms on the inside of the mould. When the surplus slip is poured out, this layer of clay remains, thus forming a hollow object in the shape of the mould. The mould, which is in two halves, may then be split and the clay model removed. This principle is now described in detail.



The model is set in the mould on a clay support and the first pour of plaster can be made.

MAKING THE MOULD

THE method of making the mould is shown in **Fig 1**. A box is made out of the plastic coated-board, the sides being screwed together. A model of the ceramic article is supported in the box with pieces of clay and the clay smoothed out along the model centre line. This is shown in the photograph, above right. The model should be non-absorbent. I used a plastic tube, but wood may be used if it is given two coats of primer. The model may be solid (not hollow).

Fine casting plaster is poured in the top of the mould; when the plaster has set the mould bottom and the clay is removed. The exposed plaster around the model is given three coats of soft soap and water (1:1 ratio). The whole mould, with the model still in place, is turned upside down and the other half filled with plaster. When the plaster is set, the mould

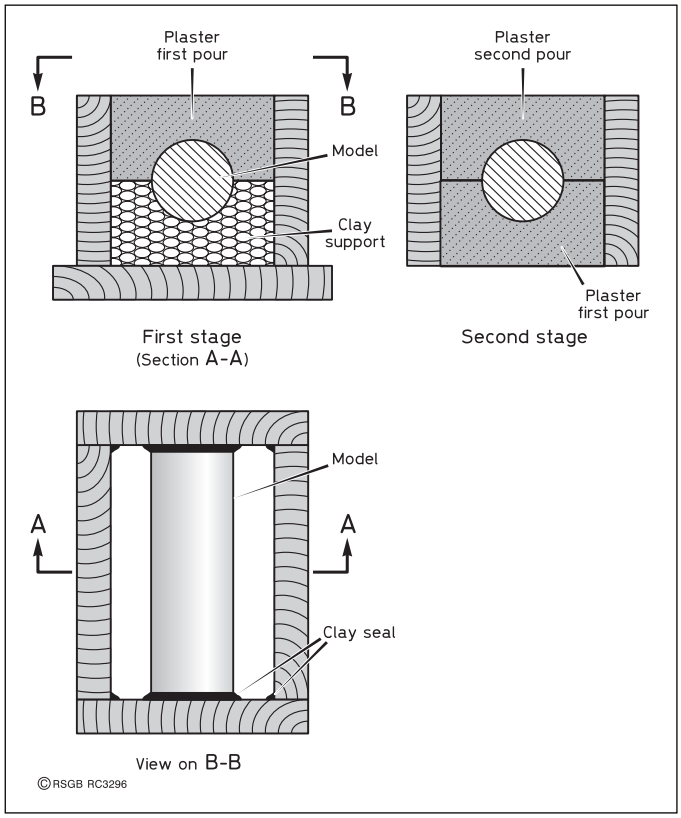
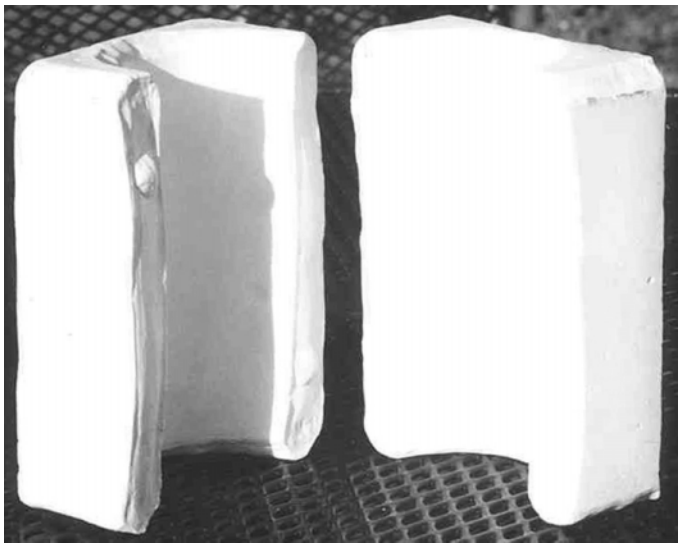


Fig 1: Method of making the plaster mould.



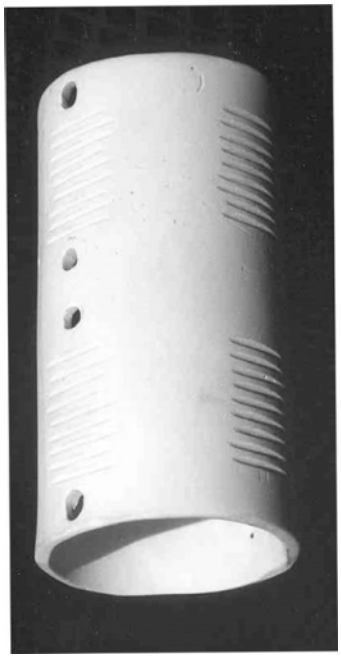
The plaster mould in two halves.

box is removed, the mould halves separated and the model removed. The photograph in the bottom corner of the previous page shows this.

MAKING THE SLIP

I USED an industrial porcelain clay. The slip is made using dry powdered clay mixed with water and a deflocculant: The deflocculant separates the clay particles and keeps them in suspension so that the clay is fluid. Experiment showed that a slip density of 33oz/pint was suitable. This slip was made from 21.67oz of dry powdered clay and 11.33oz of water, 2.6g of sodium dispex (the deflocculant) was added. I calculated that 1.25 pints of slip would be plenty and increased the quantities accordingly.

The clay as supplied was rolled out with a domestic wooden (not glass) rolling pin into slabs about 4mm thick and dried in a domestic oven at a temperature of 100ºC. The dry clay was then crushed to a powder using a rolling pin. A face mask was used to avoid inhaling clay dust. The clay as delivered will contain 22% water, so 1lb of wet clay will yield only 0.78lb of dry clay. The deflocculant was added to the warmed water and thoroughly mixed in a plastic bowl. The clay powder was gradually added and mixed in. It was necessary to use a hand-held electric kitchen mixer towards the end to get a smooth mix. The slip was left for 24 hours and then mixed again. All materials were weighed using domestic kitchen scales with an LCD display.



The coil former before firing. All holes have been drilled and wire guide-grooves cut.

POURING THE SLIP

THE TWO HALVES of the mould were held together with elastic bands and the mould mounted upright on a piece of plastic-coated board as shown in **Fig 2**. A fillet of clay around the bottom of the mould prevented leakage. The mould was filled with slip and left for one hour. The slip needed topping up during this period. The liquid slip was then poured out. This left a clay layer about 5mm thick on the inside of the mould.

When the clay was seen to shrink away from the mould, the bottom board was removed and the clay trimmed neatly at teach end with a hobby knife. The time to separate the mould needs a bit of judgment, but it should be done when the clay is clearly stiff enough not to distort too much.

DRYING THE CLAY TUBE

THIS MUST be done slowly to avoid cracking or distortion. I took a week to dry mine and controlled the drying rate by keeping a plastic bag over the clay most of the time. Early in the drying it is possible to square off the ends of the tube with a sharp hobby knife. The clay is dry when it has the same colour as a sample piece of clay taken from the drying oven.

The dry clay is rather fragile and must be treated gently. At this stage I drilled all necessary holes and cut grooves to position the coil windings. The grooves were cut using an 'Abrafile' tension file, which was just the right diameter for the 1.25mm wire. Very careful setting-out was required for these grooves. The photograph to the left shows the tube at this stage.

FIRING

THE CLAY TUBE was fired in an electric kiln fitted with an electronic controller. The temperature was increased at 40ºC per hour to about 600ºC with the ventilation bungs removed. This slow heat build-up allows chemically-combined water to escape as it changes into steam. The organic matter in the clay also decomposes. The ventilation bungs were then replaced and the temperature allowed to rise at a fast rate to 1210ºC. The kiln was then switched off and, when the temperature reached 200ºC, the kiln lid was raised, and the tube removed when cool enough to handle.

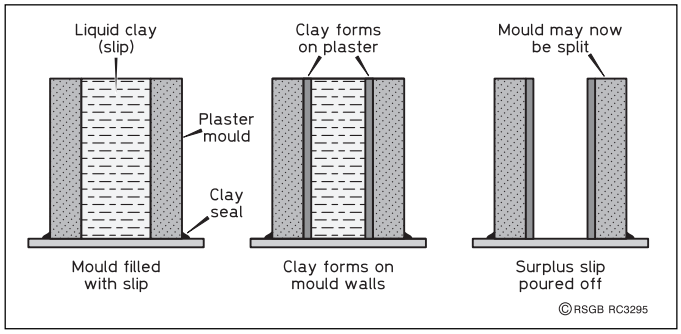


Fig 2: The principle of slip-casting.

SHRINKAGE

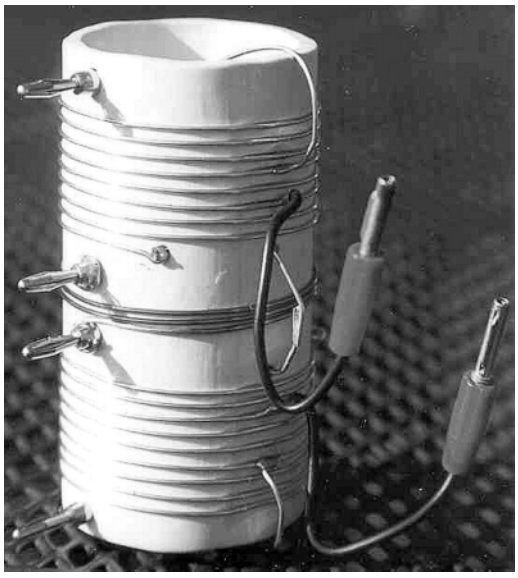
THE CLAY will shrink during drying and firing. I found that the shrinkage during firing was 8% and the total shrinkage from the model stage to the end of firing was 12%.

Photograph No 4 shows the plug-in ceramic former with all windings in place. The plugs were glued in with Araldite.

Slip-casting is one of many ways that can be used to shape clay and I recommend that anyone wishing to take up the challenge should read books on the subject first.

KILNS

AN electric kiln with a programmable electronic controller is best. My wife uses one for china painting. The kiln was made available to me after negotiation. Even a small kiln will cost over £500, so it is best to make enquiries amongst friends or the local colleges, where one may be available for firings at little more than the cost of electricity.



The ceramic coil former with all wire and plugs fitted.

BIBLIOGRAPHY

MANY BOOKS are available at public libraries under the subject heading 'Pottery'. I consulted a number of them and eventually bought the following: *The Potters Manual* by Kenneth Clark and *Slip-casting* by Sasha Wardell.

SUPPLIERS

BOTH THESE BOOKS give lists of suppliers. I located my suppliers from the *Yellow Pages*: Clayman, Morells Barn, Park Lane, Lagness, Chichester, West Sussex PO20 6LR, tel: 01243 265 845. This company was most helpful in all respects and obtained the industrial porcelain clay from Valentine Clays of Stoke-on-Trent ST1 6BA, Tel 01782 271 200. ♦

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N TYPE for RG58 ..... **£2.50**
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N TYPE to SO239 ..... **£3.00**

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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**

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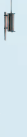
VR5000 5 BAND VERTICAL FREQ: 10-15-20-40-80 Mtrs GAIN: 3.5dBd HEIGHT: 4.00m RADIAL LENGTH: 2.30m (included) POWER: 500 Watts **£169.95**

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**
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(All HF verticals require grounding if optional radials arenot purchased to obtain a good VSWR)

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(picture for reference only)

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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**

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LDG Electronics Z11 Automatic Antenna Tuner Kit

Reviewed by Tony Lymer, GM0DHD*

CHOOSING THE antenna system for an amateur radio station is always a compromise. Not many radio amateurs have an ideal location, sufficient space and understanding family members and neighbours plus the money and time to erect their ideal antenna farm. For many, the relatively low profile of an end fed, 'long wire' antenna seems attractive, especially when it offers operation on all bands from 160 to 10m. The W3EDP antenna is one example of a design that dates from the thirties, and was developed empirically, rather than designed theoretically. It consists of an 84 foot (25.6m) long wire, which is tuned against a 17 foot (5.18m) counterpoise, on most bands [1], [2]. In those days, the convention of a 50Ω output impedance for transmitters had not been established. The antenna was often coupled directly to the output tank circuit of the final transmitter valve. Nowadays, with electromagnetic compatibility (EMC) in mind, a 50Ω output impedance allows the antenna, or antenna tuning unit (ATU) to load a high order low-pass filter with the correct impedance. This attenuates transmitter harmonics so that they don't interfere with other radio services. The advantages are clear, however: high impedance antennas like the W3EDP need to be matched to the, frequently chosen, 50Ω impedance of the feeder between the transmitter and the antenna itself. Access to my long wire antenna is on the opposite side of the house to the radio station. This meant going to another room, to adjust the ATU, every time I wanted to change band. To solve this problem, I bought the Z11 automatic antenna tuner.

DESCRIPTION

THE ATU IS a low-pass L-match circuit, with fixed capacitors and fixed inductors switched, using latching relays, in various combinations to match a wide range of impedances. It has its own SWR bridge with a simple indicator on the front panel using three LEDs. A green lamp lights for SWR <1.5 and a red lamp for SWR >3. Various combinations of green, red and amber lamps

are used for intermediate values of SWR. The adjustment of the inductor and capacitor values is usually done automatically, controlled by a PIC (single chip computer), when RF is present. As the relays are latching types, the last setting is 'remembered' if power is removed. There is no frequency counter, so there can be no memory of previous matches at other frequencies, or with other antennas. Manual control of all elements is available, but it takes longer to make the adjustment, and in most cases, is unnecessary. The matching sequence is started when the unit measures an SWR >3 or when the 'tune' button is pressed. It takes a maximum of five seconds of trial and error adjustment to reach a match.

The maximum inductance value is around 20µH, and the maximum capacitance is 2700pF. These two parameters limit the range of impedances that can be matched, especially at the lower frequencies. The step sizes are roughly 10pF and 0.11µH. The components form an approximate binary sequence: 10pF, 20pF, 39pF, 82pF and so on, up to 1360pF.

The Z11 is similar in design to LDG's AT-11 and RT-11 products, except for the power rating and minimum power required for tuning. The assembled tuner is a compact 9W x 5D x 1Hin overall. It weighs about 1 pound. During the tuning sequence, the unit requires 11 to 14V at about 0.3 amps, but after tuning, the current drops to about 8mA. The power requirement can be met by two 110mAH, 7.2V nicad batteries in series. There are no connections to the rig apart from the RF cable. This means that the ATU is compatible with any transmitter that can provide the minimum 0.1 watt for tuning - but the unit is not suitable for short-wave listeners because of this requirement. The maximum power rating is 30 watts continuous.

CONSTRUCTION

CONSTRUCTION WAS straightforward, as the instructions are clearly written, and there are plenty of good-quality colour photographs inside the instruction manual. It began with winding the inductors on T50-2 toroidal formers. Loading the resistors and capacitors comes next. Some of them are in SIPs (single in-line packages), and this speeds up the construction process, as eight components are loaded at once. All of the components were through-hole rather than surface mount. The relays were probably one of the trickiest parts as they have six very flexible pins. They seemed likely to bend and not go through the holes during loading. However, this task was soon completed without incident and required but a little patience.

The circuit board was of high quality, all of the components were supplied, and only one component did not fit exactly. This was a high voltage ceramic capacitor. The lead spacing was greater than the hole spacing on the board. I formed the leads with long-nose pliers and continued. The PIC and relay driver chips were easier to install than I expected.

On test, I noticed that one of the front panel LEDs did not light. I used a test meter to check the voltages on the diode, and it flickered on. I had not soldered one of the leads. I just re-soldered it without dismantling the front panel PCB, although this might have been difficult. This was the only problem I had in the construction of the kit.

It can be difficult to rate the difficulty of construction for a kit, but I had no real problems. I have recently built an MFJ Cub, and the Z11 took about twice as long as the Cub, but it wasn't any more difficult, there were just more components. In addition to the usual hand-tools the following were required: voltmeter 0 - 2.5V, 50Ω load (5 watts power dissipation), super glue (to fix two cores together for the largest inductor), and RTV (silicone adhesive) to fix the inductors

* 16,Gerson Park, Broxburn, West Lothian EH52 6PL.

to the PCB. Access to a five-watt power output transmitter was also needed for alignment purposes.

The design of the unit was to a very high standard, although I have some minor criticisms. The board was not grounded to the input and output SO239 connectors, except through the chassis. The chassis had been painted, so a low resistance connection was not guaranteed. I added a link between the board ground and the solder tag on the RF connectors using de-soldering braid. Similarly, there was no external grounding point for a counterpoise or earth wire. I enlarged a convenient hole in the rear panel, and fitted a 4mm screw with the head end inside the case (where can you get metric sized butterfly nuts?) I connected my long-wire antenna to the SO239 socket using a 4mm wander plug.

PERFORMANCE

MEASURING THE performance of an ATU is not very easy because the function of the ATU is to transform the antenna impedance into 50Ω. Therefore the measurement of output power needs to be at a non-standard impedance level and accurate measuring equipment is not easily available. In addition, the ATU does this over a wide range of impedances and at a large number of different frequencies. So, a lot of measurements need to be made.

Having considered the alternatives, I decided to measure the antenna current and to compare the Z11 with other ATUs at the same frequency, with the same antenna, a W3EDP. In this case the counterpoise was connected on all bands. The three comparison ATUs were a Heathkit HFT-9A (a T-match network), an L-match made with a very high quality roller inductor and air dielectric capacitor, and a homebuilt L/Pi match ATU made with six turns of 0.1-inch diameter semi-rigid coaxial cable on a 60mm diameter former. The coil was resonated by shorting unwanted turns with a wire link connected with a crocodile clip. The two capacitors in this ATU were air dielectric types with about 50pF maximum capacitance. The unit was adjusted as an L-match on all bands except 24 and 28MHz. On these bands a further capacitance of about 15pF was required, at the transmitter end of the coil, to match the antenna properly. All ATUs were adjusted for minimum reflected power, and then small adjustments were made for highest antenna current. The automatic settings of the Z11 were used without manual intervention.

On the bands from 1.8MHz to 21 MHz, the Z11 was within a dB or so of the best of the other ATUs, and was *the* best on 80m and 40m. On 24MHz and 28MHz the other ATUs were all better than the Z11. On 28MHz, in particular, all were between 3 and 6dB better than the Z11. It should be stressed that these findings are only valid for this particular antenna. The L-match circuit is most inefficient with high impedance antennas, like the W3EDP at 28MHz. In fact, the homebuilt L-match ATU was unable to match the antenna without an additional capacitor, converting it into a pi-network. This was probably because the minimum capacitance of the variable capacitor, and stray capacitance of the wiring, was too large.

The antenna current measurements were taken by inserting a current transformer with 10 turn secondary and the primary made from a single turn of 50Ω coaxial cable in series with the antenna wire. The shield of the coax was grounded at *one* end to form an electro-statically-shielded winding. The core was made from two large ferrite beads, of type 43 material, taped together to form a 'binocular' core. The transformer was connected to an Agilent E4416A power meter and 8482A sensor. Around 0.5Ω is placed in series with the antenna with this arrangement, and this should have a negligible effect on the antenna current. The currents vary considerably from band to band. So, the graph in **Fig 1** depicts the ratio of the power measured, at the current transformer, with each ATU, expressed in dB relative to the Z11.

PORTABLE OPERATION

MANY PURCHASERS OF the Z11 have bought them to use alongside their FT-817 transceivers in a portable environment. The construction of the Z11 is suitable for portable operation provided the unit is kept dry, and is supplied from an external battery. I would recommend that the inductor cores be glued to the PC assembly with RTV, as stated in the manual, otherwise the wires will eventually break. The case is quite strong, but some protection for the front panel controls would be desirable during transit. For a whip or short wire antenna, the available inductance sets the minimum antenna length. 20µH resonates with 25.8pF at 7MHz. An unloaded whip of 8 feet long has around this capacitance [3], depending on the surroundings. A properly resonated whip should be easily accommodated however, even on 80m. I tried to tune up an 8ft wire on 40m, but found that it was not possible. However, a 10ft long wire did tune up without any problems.

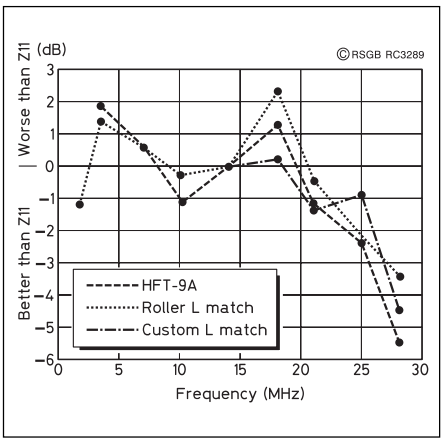

Fig 1: Comparison of the LDG Z11 automatic ATU with three other ATUs, as described in text.

The tuner may be able to match a wide range of antennas, but it cannot transform an inefficient antenna into an efficient one. A short whip antenna requires a ground plane or radial system to make it efficient. Operating without some form of counterpoise or earth connection is likely to compromise the antenna efficiency. Moxon also states that, in his opinion, it may be better to use the whip to support a low horizontal dipole, rather than use it as an antenna in its own right.

LIVING WITH THE Z11

THERE ISN'T REALLY a lot to say about operating with the Z11. I leave mine in auto-tune mode, and it re-tunes when I change bands. There are about three seconds of relay noise, but nothing startling. I can't actually see the unit from my operating position, but I do monitor the SWR at the transmitter and I am aware if it isn't as low as it might be. In general, the unit works effectively. It has become a permanent part of the station. For me, the convenience it affords was worth the effort of building the kit.

I can now QSY between bands, more or less, instantaneously. I am sure this has lead to better operating habits and more contacts. I now start at the 10m band and check each band until I find several reasonably strong signals. Then, I spend time monitoring that band to assess conditions. Before buying this unit I tended to work on a single band, because it took so long to tune the remote ATU. Overall, I was pleased with my purchase. I would encourage potential purchasers to view the assembly manual and photographs on the LDG Electronics website (see below).

The kit was supplied by Hands Electronics, Tegryn, Llanfyrnach, Pembrokeshire SA35 0BL and costs £149 for the kit. An assembled version is available for £169.

REFERENCES

[1] 'An unorthodox antenna', Yardley Beers, W3AWH, *QST* March 1936 pp32 - 33.

[2] *Practical Wire Antennas*, John Heys, G3BDQ (out of print).

[3] *HF Antennas for all Locations*, L A Moxon, G6XN, p210 (currently being reprinted. Available soon from RSGB Sales.) ♦

WWW.

LDG Electronics www.ldgelectronics.com
Hands Electronics www.rf-kits.demon.co.uk/run.htm

Amateur Radio Courses - Autumn 2002

Details of Radio Amateurs Examination (RAE), Novice Radio Amateurs Examination (NRAE) - leading to an Intermediate Licence - Morse code and Foundation Licence courses starting this autumn (see also January and February 2002 *RadCom* page 6 for a longer list of amateur radio clubs that have said they are offering Foundation Licence Courses).

Region 1: Scotland West & Western Isles

Paisley (YMCA) Amateur Radio Club, Paisley, **Renfrewshire**, offers **Foundation Licence** courses. The contact is club secretary Jim, GM3UWX, e-mail: gm3uwx@hotmail.com

Region 2: Scotland East & the Highlands

Livingston DARS will be running **RAE, Foundation** and **Morse** courses from the end of August. Courses are aimed towards **Intermediate** exam in December. Beginners classes start December for the May 2003 exam. Foundation course runs over 5 - 7 weeks on club nights: Tue 6.30-9.30pm. Morse classes every club night: **Morse Assessments** and **5WPM tests** available on demand. Contact Billy Jenkins, MM0WKJ, by e-mail:b.jenkins@indigovision.com or tel: 0131 475 7242 or 07860 776 844.

Region 4: North East

The **East Cleveland** Amateur Radio Club (New Marske Institute Club, Gurney Street**, New Marske, Redcar**) will run a **Foundation Licence** course in the autumn. Course and exam for the **Intermediate** licence and tutorial sessions and **full RAE** exam also available. Meetings Fri (September-May), 7.00-9.00pm. Details from Alistair Mackay, G4OLK, tel: 01642 475671, or e-mail: alistair.mackay@talk21.com

Region 7: South Wales

Highfields ARC, Highfields Day Centre, Allensbank Road, **Heath, Cardiff**, runs **Foundation** courses throughout the year and **Morse Assessments** for Class B licence holders. Details from the Senior Instructor Rob Llannon, GW6ZHM, tel: 029 20625314.

Region 9: London & Thames Valley

Newbury & DARS will hold a **Foundation Licence** Course at Newtown Village Hall, **Newtown**, near Newbury on Sat 28 September and Sun 29 September, at 9.30am-5.00pm both days. Cost is £15.00 (inc RSGB registration fee), tea and coffee provided. Closing date for registration is **Mon 16 September**. Further courses will be run, details at www.nadars.org.uk **Morse Assessment** sessions for Class Bs also available. Contact: Alan Davidson, G4PSU, tel: 01635 861155 (evenings) or e-mail: alan@davidson2000.freeserve.co.uk

Region 10: South & South East

Andy Digby, G0JLX, is registered as a **Novice RAE (Intermediate Licence)** course provider. He is also offering to teach the **full RAE** and / or **Morse code**. He lives in the **Bishop's Waltham** area of **Hampshire**. Courses available on Saturdays only. Please contact Andy by phone (mobile): 07768 282880; fax: 08701 205954; or e-mail instructor@ASEL.demon.co.uk

The **Itchen Valley** ARC, in the **Chandlers Ford** area of Hants offers **Foundation** courses: the next is scheduled for 5, 11 and 12 October. The club also offers the **RAE examination** in December. Details from Sheila Williams, e-mail: sheila.williams@tiscali.co.uk

Region 11: South West & Channel Islands

Steve Hartley, G0FUW, runs **Foundation Licence, Intermediate Licence** and **full RAE** classes in **Bath** starting in September and aiming for the December Novice RAE and May 2003 full RAE. Classes one evening per week, 7.00 - 9.00pm and only cost is for books, training materials and exam fees (classroom hire kindly sponsored by RSGB Bristol Group). Details from Steve, G0FUW, tel: 01225 464394 or e-mail: hartley_steve@hotmail.com

Region 12: East & East Anglia

An **RAE course** will be held in **Orpington**, Kent, at Newstead Wood Girls School, Avebury Road, Orpington, on Monday evenings 7.30-9.30pm commencing 16 September and leading to May 2003 exam (held on site). Enrolment through Bromley Adult Education College, Widmore Centre, Widmore Road, **Bromley**; tel: 0208 460 0020 who will also be able to answer any queries.

The **Peterborough** & DRC currently runs **Foundation** courses once a month. **Morse Assessments** also available. Location is Southfields Community Centre, Southfields Avenue, **Stanground, Peterborough**. Details from Tracey, M1DZF / M0XTM, tel: 01733 753477.

*A further list will be published next month. If you or your club wish to send in details please note that the deadline for this page is **7 August**.*

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technical feedback

Crossed Field Antennas

THE REVIEW OF THE Hately Antenna Technology Crossed Field Loop antennas (RadCom, May 2002) has created a lot of interest and feedback. We suspected as much, for the Crossed Field Antenna (CFA), as patented by Maurice Hately, GM3HAT, and others, is still very much a controversial design, its detractors saying it can't work, and its protagonists saying that it does work, but in a completely different manner from other antenna designs.

The two letters published below were written in response to the review (May 2002, page 28), the 'Antennas' column by Peter Dodd, G3LDO (June, page 84), the 'Antennas' column, quoting Peter Martinez, G3PLX (July, page 84), and the letter from Peter Martinez ('The Last Word', July, page 97).

From Dave Kimber, G8HQP:

The review of the CFA (*RadCom,* May 2002) seems to have stimulated a lot of confusion about electromagnetism. G3LDO (reporting comments from K4ERO in June) claims that the CFA can't work because of superposition, and seems to say that E, M and EM are three distinct phenomena. If this explanation were true then conventional antennas would fail for the same reason. In 'The Last Word' (July 2002), G3PLX suggests superposition, or the lack of it, as a possible test of the CFA; he seems to be confusing beat frequencies with sum and difference products created by non-linearity. Superposition is true (because Maxwell's equations are linear) but not really relevant to this discussion.

Under normal circumstances, the induced field created by a changing field is in quadrature phase and so gives rise to reactance. The Poynting vector field will rotate around in small loops, so there will be no net energy flow outwards. In order to generate radiation, or equivalently to get a radiation resistance, the phase has to be shifted. In a conventional antenna this phase shift arises from retardation - the field from each infinitesimal element takes a finite time to reach the field from the other elements. Hence the radiation resistance and bandwidth are low for small antennas because there is less distance and so less phase shift. Mutual impedance between two elements modifies the situation, but does not create radiation resistance in the absence of retardation where there was none to start with.

If it were possible to create radiation resistance simply by phasing two elements, then by swapping the connections to one of them the resistance would become negative and we would be able to extract power from a purely passive structure. This violates energy conservation. However, if there were some ohmic resistance already in the structure then it might be possible to use this to help get the E and H fields in the right phase. I guess this is how the TEM cell works (G3LDO, July) - but note that this is very inefficient as a radiator.

So does the CFA phasing unit contain a resistor or lossy components? If so, this might explain how it works but it would limit the efficiency. The CFA would still be useful, but I can understand why the manufacturer might be nervous about this being revealed - people would think that it was simply a resistively loaded antenna and nothing clever at all.

I don't know whether the CFA works. The explanations offered for it don't seem to hold water. On the other hand, the criticisms of it are frequently based on misunderstandings of electromagnetism. Radiation really is a parasitic effect on near fields!

From Maurice Hately, GM3HAT:

May I please explain to G3PLX (and other readers) that he is misunderstanding what we are doing in the Crossed Field Antennas. We make the two separate fields E and H interact and change from being two *Near Fields* to being a single *Radiation Field* and fly away with the power.

Near Fields expand out around their stimulator for a quarter of a cycle (separately) but during the next quarter cycle have to fall back to the wire or the plate which created them. From a short piece of wire they occur sequentially, not synchronously. They are impermanent in nature and cannot carry energy away, only store it. However, a Radiation Field is a complete wave system and has a free and permanent lifestyle travelling hundreds or thousands of miles as expanding wavefronts containing trillions of photons taking energy to find an absorber, such as another amateur's receiving aerial.

Now quantum physicists call the two separate Near Fields 'Virtual Photons' because of their impermanent nature. With a Crossed Field Antenna we are making 'Real Photons', ie a Radiation Field. These photons have a permanent existence, flying out across space to hit an absorber and either transfer the energy as a tiny bit of heat, or die away in outer space having expanded towards infinity.

If you look at page 326 of [1] this process is explained from the Quantum Electron Dynamics point of view. The virtual photons (trillions of them) have only half a spin each. The E and H put together with the perfect synchronism and the correct twist, *add* to form a photon with a total spin of 1 which is correct for a photon. Thus trillions of crossed fields take away the total power as radio photons. The same page also calculates the distance that the virtual photons can travel during their quarter cycle before they must fall back to their stimulating wire or plate, forming the aerial inductance, or capacitance. The lifetime distance of the virtual photons is just the distance lambda/2pi which is exactly the distance we calculated for the working zone around a half wave dipole regarded as a CFA [2].

So readers of our earlier articles would have been helped if we had better expressed the Poynting Vector Synthesis as an *additive* effect. Perhaps the reader thought it was multiplicative because the vectors are said to be a 'cross product'. Perhaps we will express the interaction as a cross-sum in future. The field energies *add* when all the six criteria for the successful CFA interactions are correct; and complete interaction is achieved when both field-energies leave the zone mated together. If the effect is partial, due to an amplitude error in the magnetic field, then some of the over-large H field will be left behind to fall back and return as wire self-inductance (or *vice versa* if E was in error). They do not multiply. They *add*: one half spin plus one half spin equals a simple photon with spin 1. The effect is not *multiplicative* so the experiment suggested will not succeed. This is a good thing actually, because if the interaction zone around the antenna was non-linear as you are supposing, then modulated carriers would distort on going through a Crossed Field Antenna, also making illegal harmonics, which I can assure you they do not.

When we were being trained in science, much was made of the difference between a compound and a mixture. Here we are dealing with synthesis of two separate energy potentials into one compound Poynting Vector by right angled addition but not by multiplication. It is more akin to a marriage rather than a chemical synthesis.

When you achieve the action, power is drawn to both stimulators, and a low SWR appears: a very pleasing and satisfying condition from a device less than 3% of a wavelength in size. See discussions in www.AntenneX.com or in Yahoo group 'x-field'.

I hope this is now more easily understood.

References:

[1] *Modern Physics*, F J Blatt, McGraw-Hill 1992, p326.

[2] 'CFA Working Assumptions', Hately, Kabbary, Stewart, *Electronics World* Dec 1990 p1094 - 9.

[3] Correction to [2] above, M C Hately: letter to editor, *Electronics World* Dec 1992 p1007.

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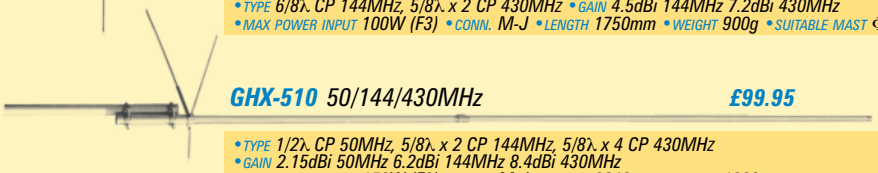

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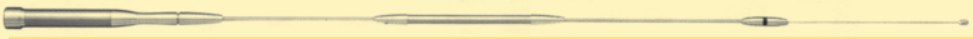

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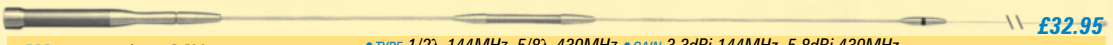

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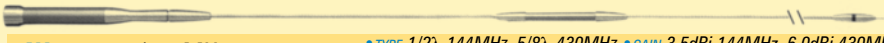

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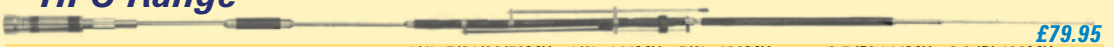

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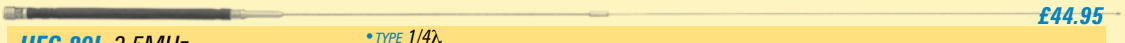

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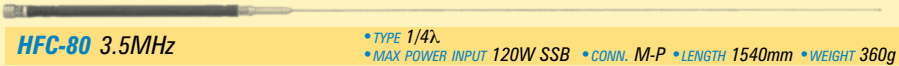

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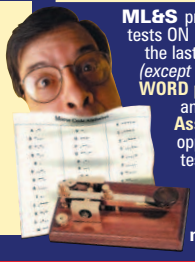

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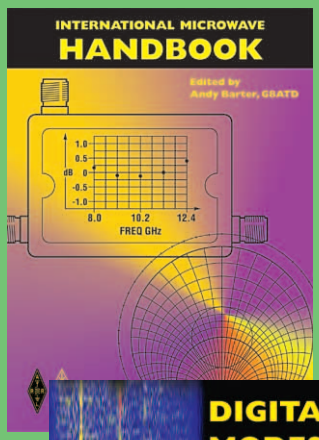

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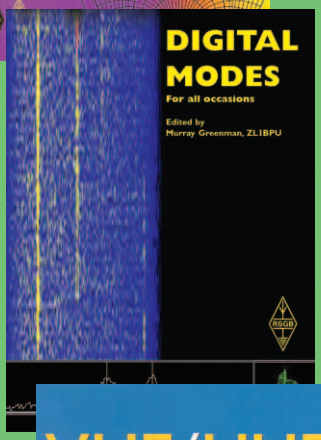

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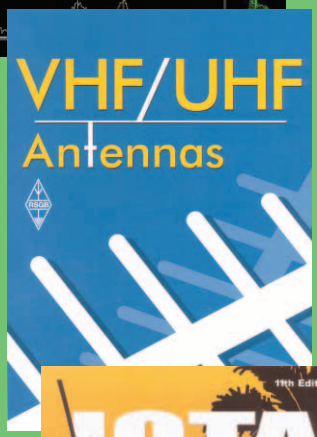

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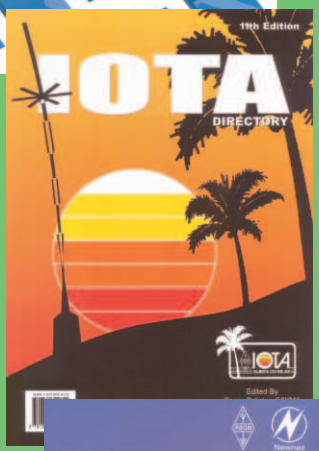

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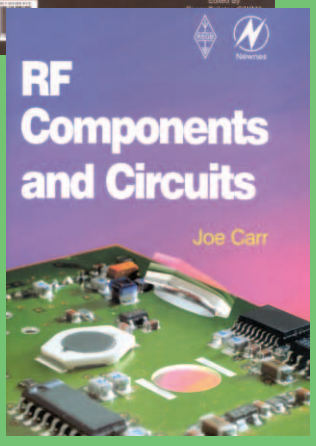

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For those who are interested in RF design, this is the first RSGB book on the subject written by the legendary author Joe Carr. This book is written in an easy to understand style with the minimum of theory whilst offering a comprehensive introduction 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.

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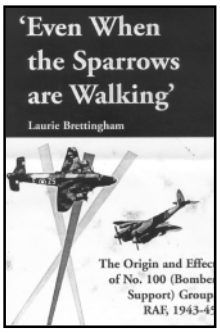
Book Review



EVEN WHEN THE SPARROWS ARE WALKING - The Origin and Effect of No 100 (Bomber Support) Group, RAF, 1943 - 45
By Laurie Brettingham
Reviewed by Pat Hawker, G3VA

IN *RADIO COMMUNICATION,* August 1997, I reviewed the book *Royal Air Force Beam Benders - No 80 (Signals) Wing 1940 - 1945* that described in a very readable manner the role in WWII of the specialist RAF 80 Wing. This RAF Wing, working closely with the Telecommunications Research Establishment (TRE), intercepted and charted the German navigational beams and then secretly 'bent' them to decoy the bombers away from their intended targets. This task was primarily concerned with the defence of the UK. By mid-1941, the time came to consider a more active 'attack' role, leading eventually to the setting up of the large 100 Group.

This new book, by the same author, is the natural successor. It deals in detail with the extensive operations of the 100 Bomber Support Group (incorporating 80 Wing) set up in 1943 to support the main RAF bomber force during its almost nightly raids deep into hostile territory. The Group, comprising a number of squadrons and ground units, countered the increasingly efficient German ground and airborne radar, radio directed night fighters, and radar controlled anti-aircraft guns. With its HQ at Bylaugh Hall, Norfolk, it was under the command of Air Vice Marshal E B Addison. The young and highly-talented [Sir] Martin Ryle, G3CY, of TRE (later Astronomer Royal) became Scientific Liaison Officer and was responsible for the introduction to 100 Group of a wide variety of radio and electronic countermeasures developed at TRE by G3CY and the large team of civilian scientists and engineers.

The book provides a fascinating (readably technical) outline of the electronic and radio countermeasures designed to jam or confuse the German air defence radars such as Freya, Wuerzburg, Wasserman, Mammut, Elefamt-Russel, Jagdschloss or to disrupt the German ground-to-air R/T systems. Countermeasures included systems such as Jostle, Carpet, Mandrel, Piperack, Grocer, Moonshine, Shiver etc. An early form of airborne jammer (Tinsel) comprised a carbon microphone in the engine bay of a Wellington aircraft connected to a T1154 transmitter, but soon the airborne and ground systems became increasingly complex.

There are many personal reminiscences of the 'Special Operators' who flew the dangerous missions that provided electronic intelligence on enemy radar characteristics and their radio control systems, as well as of those who operated the 'nasty noise' generating equipment. The Group co-operated closely with the RAF Y (intercept) service at West Kingswood, etc. There were many Canadian aircrews and American ECM personnel involved. The need for 'radio silence' in the early stages of a raid was needed to defeat the efficient German intercept and monitoring services.

Scrutiny of the text reveals that a number of radio amateurs were involved (eg Vic Flowers, G8QM; George Morley, G0OXH etc) although callsigns are not given. The 100 Group squadrons suffered grievously but also downed enemy aircraft; their main contribution was in the significant reduction of losses suffered by the main bomber force. For many of the Special Operators the innards of their 'black boxes' were a mystery.

The book shows how successful efforts were made to disrupt the VHF, HF and MF R/T links between the German ground controllers and their night fighters. In the final months, the enemy was forced to use the German medium-wave broadcast transmitters to direct their fighters. Brief mention is made of 'Operation Dartboard' for which the Air Ministry utilised the 600kW 'Aspidistra' transmitter at Crowborough and BBC transmitters at Moorside Edge and Droitwich in some extremely sophisticated radio games to disrupt and confuse the German night fighters.

Chapter 8 includes 'post mortem' investigations carried out in the immediate post-war period to determine the effects of the various countermeasures. As printed on an invitation to a VE-Day party at Bylaugh Hall in May 1945, "We saw the powers of darkness put to flight, We saw the morning break."

The strength of this new book is its ability to bring home to readers, whether or not they personally experienced WWII, vivid, if often light-hearted, memories of the daily lives and nightly perils facing those young flyers. Their dangerous flights, often in weather conditions when "even the sparrows are walking", enabled many more of the main bomber crews to return to their bases and live, at least, to fly again. A book that is not only interesting but deserves to be read.

336 pages, 235 x 155 mm, soft covers, with illustrations. Published 2001. Members' price £12.74 (plus P&P) available from RSGB Sales.

SIMPLE AND FUN ANTENNAS FOR HAMS
by Chuck Hutchinson, K8CH, and Dean Straw, N6BV
Reviewed by RSGB HQ Staff

THIS ARRL publication does exactly what is says on the cover - it describes numerous amateur antennas that are both simple and fun to build. Covering HF, VHF and UHF, *Simple and Fun HF Antennas for Hams* opens with two chapters intended for newly-licensed amateurs: 'Your First VHF Antenna' and 'Your First HF Antenna'. The VHF one is a 2m ground plane and the book shows how such an antenna can be installed indoors, outdoors, and how it can be camouflaged.

'Your First HF Antenna' describes a dipole and the advantages and disadvantages of installing a dipole as an inverted-V (or 'drooping dipole')

The book continues with 'Facts Abut Transmission Lines', including essential information on how to install a PL259 plug - correctly! - and tips on weather-sealing coax.

Simple and Fun HF Antennas for Hams goes on to describe numerous designs for antennas, including both omnidirectional and beam antennas for HF and VHF / UHF. Many of these designs (inverted-L, HF, 6m and 2m Yagis), will be familiar enough to most amateurs, but even those of many years' experience should discover quite a few designs which are new to them.

Simple and Fun HF Antennas for Hams is absolutely ideal as a first practical antenna book for the new amateur, and will also provide the not-so-new amateur with dozens of ideas which are just waiting to be tried out!

211pages, 275 x 208mm, soft covers, with numerous diagrams and photographs. Published by ARRI, 2002. Members' price £14.44 (plus P&P), available from RSGB Sales.

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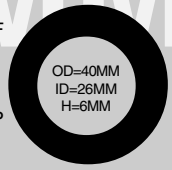

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REACTANCE AND RESONANCE IN ANTENNAS

HOW DOES REACTANCE in an antenna affect its efficiency as a radiator? Some books tell me that resonance is to be the aim - does resonance give an 'amplification factor' to an antenna?

THERE IS NO NEED for an antenna to be resonant, from the viewpoint of its effectiveness as a radiator of RF. Look at a half-wave dipole, for example: even if it is quite a lot longer or shorter than the resonant length, its effectiveness (measured in terms of distant field strength) changes hardly at all. To make a fair comparison, you naturally need to feed the same RF power into it, regardless of its length - and that's where the bandwidth limitations come from. The impedance at the antenna's feedpoint changes quite rapidly with length or frequency, and will produce almost equally large changes in the load impedance presented to the transmitter. So 'antenna bandwidth' is really a *transmitter* problem - the antenna itself doesn't mind whether it's resonant or not.

Looking at this in more detail, **Fig 1** shows the behaviour of a centre-fed dipole exactly 15m long, so that the half-wave resonance will be close to 10MHz. Fig 1 shows what happens to the broadside gain (G), feedpoint resistance (R) and feedpoint reactance (X) when we change the operating frequency from 7.5MHz up to 12.5MHz. The first thing to notice is that the gain varies by only 0.4dB across the entire range - that's less than one-tenth of an S-point for a frequency variation of ±25%! The changes in gain come from relatively small changes in the shape of the radiation pattern, but all these changes are progressive. There is *no* sudden change in antenna performance at resonance.

Fig 1 shows that feedpoint resistance varies much more slowly than the reactance. Thus the reactance is the major effect upon system bandwidth. The 'resonant frequency' of the antenna is where X passes through zero, so that the feedpoint impedance (R ± jX) becomes a pure resistance. This 15.0m-long dipole is exactly a half-wavelength at 10.0MHz, but resonance in free space occurs at about 9.7MHz, about 3% lower in frequency. That is completely normal - resonance occurs a few percent below the frequency at which a dipole is a half-wavelength. In other words, if you want to make a 'half-wave' dipole resonant at a certain frequency, you need to cut it a few percent short.

This shortening is a fundamental property of a dipole in free space, but the resonant length is also affected by such factors as wire diameter, end termination and the proximity of ground. The well-known practical formula for the length of a 'half-wave' dipole is:

L (ft) = 468 / *f* (MHz)

If you work out what a true half-wavelength is, the constant in the formula would be 491.8, so the 'standard' formula has a built-in shortening factor of about 5%. However, 468 / *f* is still only a starting-point for practical experimentation, because it depends on exactly how the antenna is made, and then upon the surroundings in which it's installed. The formula 468 / *f* only applies exactly to 7MHz wire dipoles in a specific location: the alley behind the old ARRL Headquarters building. All other construction methods and locations are subject to some cut-and-try!

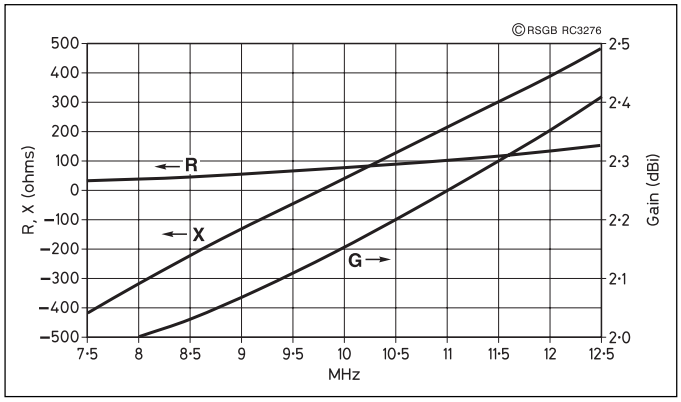

Fig 1: Gain, resistance and reactance of a 15m-long dipole in free space. By far the biggest variation is in the feedpoint reactance.

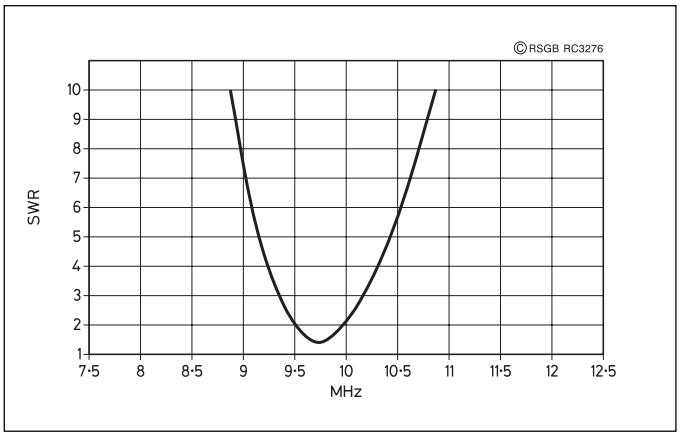

Fig 2: SWR curve for the same dipole as Fig 1.

Returning to Fig 1, the R and X values can also be transformed into SWR in a 50Ω system, using the formulae explained in the May 2002 column [1]:

$$|\rho|^2 = \frac{(R - Z_0)^2 + X^2}{(R + Z_0)^2 + X^2}$$

$$SWR = \frac{1 + |\rho|}{1 - |\rho|}$$

Fig 2 plots the SWR data against frequency, at the antenna feedpoint. The dip in SWR is almost entirely due to the reactance swinging rapidly through zero as the frequency is changed. The minimum SWR is not 1, because when the reactance is exactly zero the SWR is determined by the radiation resistance of the dipole, which is close to 70Ω; therefore the minimum SWR is about 70 / 50 = 1.4 [2].

When a low-loss 50Ω transmission line is connected to the feedpoint, almost the same SWR will be observed at the transmitter end. Now the limitation in system bandwidth is really exposed. It is not the antenna, which really doesn't care whether it's resonant or not. The true bandwidth limitation comes from the inability of the transmitter to deliver power into the unfavourable impedances that it sees when you move away from the antenna's resonant frequency. This is a problem with all solid-state power amplifiers that are designed to operate into a 50Ω resistive load and have no tuning and loading controls, but even traditional valve PAs need a tweak of the tuning and loading controls when moving up and down the band.

Solid-state transmitters also usually have an 'SWR shutdown' feature intended to prevent damage to the PA transistors from attempting to operate them into unfavourable load impedances. This is usually done by taking a detected RF signal from the 'reflected power' sensor of a built-in SWR bridge at the output of the PA, and feeding this back into the transmitter's ALC (Automatic Level Control) circuits to reduce the RF drive to the PA (**Fig 3**). The signal from the 'reflected' port of the SWR bridge depends partly on the SWR and partly on the power level, so the protection system becomes less tolerant of SWR as you increase the power. In addition there are quite large differences between transceivers, depending on the power and

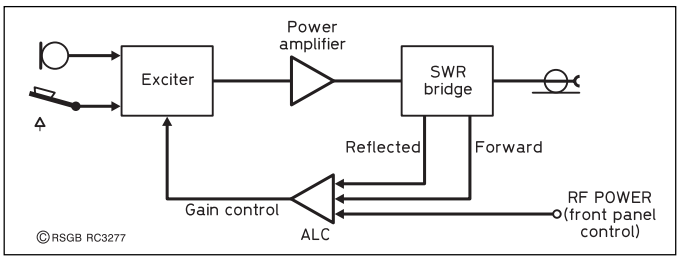

Fig 3: Outline of a typical solid-state PA protection system using the 'reflected power' signal from its built-in SWR bridge.

SWR levels at which the protection system cuts in. Some rigs start to reduce power sharply at SWRs as low as 1.5, which can be a serious nuisance, while others more sensibly hold back until the mismatch is much worse.

As noted in the March 2002 column, the ideal solution to limitations in bandwidth due to load variations is a matching network (ATU) at the antenna itself. With the right network, you can then use the same bit of wire on any band, though you (or a computer) will have to readjust the network as you change frequency. If you can't put the matching network right at the antenna, then the next best solution for coax-fed antennas is to choose an antenna that has a reasonably flat SWR curve across the band, and use low-loss coax that can tolerate being operated at moderate SWRs. The auto-ATU in many modern transceivers will handle moderate SWRs very comfortably, and with a full-size dipole you can zoom up and down the band without having to think about the SWR curve. But try that with a compact loaded antenna on 80m or 160m and you'll soon come unstuck - outside a very narrow frequency range it becomes impossible to match the antenna at all, without changing either the length of the wire or the loading inductance.

One final comment is about the accuracy of the various SWR bridges in the transmitter and in the downstream ATU. When you adjust your ATU for minimum SWR using its own internal bridge, it's quite possible that the SWR bridge in your transmitter still shows some residual reading. Try not to worry about this - but if it nags at you, check the readings on both bridges when terminated in an accurate dummy load. Sometimes it's possible to adjust either or both of the bridges for a better null in the 'reflected' reading. I'll come back to the internal workings of SWR bridges in a future column.

COMPONENT SUPPLIERS UPDATED

HERE ARE SOME updates about electronic component suppliers.

GOOD NEWS - RS Components once again has a system for accepting orders from private individuals, with payment by credit / debit card. You might not have noticed that the Electromail retail operation quietly disappeared a few years ago and, for a while, RS didn't have any good way to accept orders from private individuals. Now they do, though it's very much biased towards their website in order to keep administrative costs down.

The RS website is excellent. It's very easy to find the components you want, and assemble an order in your virtual shopping basket. The first time you use the site, you'll need to click 'Register' and fill in the forms to give your name, delivery and e-mail addresses, and choose a username and login password for future use. Having done that, you can browse the website to find and order the components you need. If you haven't used web ordering before, don't worry, you're not committing yourself to anything at this stage. When you're ready to 'check out', you'll see a security-encrypted form that asks for your credit / debit card number, and a Delivery Point Code which you leave blank because you don't have one. Also note that RS add delivery charges of £4.60 for orders under £30, and £2.95 for orders between £30 and £50 (all those figures are before VAT). Alternatively, if you have access to a recent RS catalogue or CD-ROM, you can assemble your order in the normal way and place it by phone on 01536 444 079. (NB: this is not the normal order line that account customers use; if you try to use that number, you'll be politely turned away.)

For private orders, these arrangements put RS back on a better footing with their most direct competitor, Farnell Components. The Farnell web catalogue is less easy to use than the RS one, but prices are very similar and there is no extra charge for orders above £10 (before VAT). Perhaps more important, Farnell treats all its customers alike - everybody uses the same ordering service and there are absolutely no issues about 'status'.

The third of the 'Big Three' distributors is Maplin Electronics but, as noted on the 'In Practice' website, Maplin's stock of electronic components seems to be shrinking as they reposition themselves closer to the consumer electronics market.

Another component supplier well worth considering is Rapid Electronics of Colchester (01206 751 166, and see WWW.). They are happy to accept credit / debit card orders from private individuals and their catalogue costs £3. Rapid Electronics stock a broad range of electronics components - not as much choice as the 'Big Three' but often at much lower prices. Check out the kits of resistors and capacitors, which offer quite good value as a way of getting stocked up with a range of basic bits. I can't imagine how anyone does electronics without at least having a range of 0.25W resistors from 10Ω to 1MΩ right there on hand!

28V RELAYS ON 12V

THE RELAY speed-up circuit featured in the April 2002 column has found other uses. Grant Hodgson, G8UBN, of GH Engineering, writes:

"AS YOU POINT out, the relay speed-up circuit provides 'double the supply voltage for the first few milliseconds'. This leads to a second use for this circuit, which is to allow 24 / 28V RF relays to be used with a +12V supply. These relays are often available on the surplus market, and invariably 28V relays are far cheaper than 12V relays. [And some more specialised types are only available surplus for 24 or 28V - *G3SEK*.] There are many different ways of doubling the voltage, some being quite complex involving a second DC switching relay, but the K1KP speed-up circuit is by far the simplest.

"The vast majority of relays with a 24V or 28V coil only need this voltage in order to generate enough magnetic force to move the switch mechanism; once it has settled, it will stay in that state with a much lower 'holding' voltage, which is sometimes as low as 8V and invariably less than 12V. The circuit you described does this job admirably; I built one up in 10 minutes and it was able to switch a 28V relay conveniently and reliably from a 12V PSU. It won't speed up the switching time of a 28V relay, so a TX / RX sequencer will still be required, but it does allow 28V relays to be used easily from a standard 12V supply."

NOTES AND REFERENCES

[1] This formula corrects some typographical errors in the May 2002 column. Also there was an error in the formula $|Z| = \sqrt{(R^2 + X^2)}$. The + sign is correct.

[2] The simple formula SWR = R / 50 applies *only* at the spot frequency where the reactance X is zero and the antenna is resonant. When X is non-zero, you need to know the values of both R and X, and then apply the more complicated formulae relating them to |ρ| and SWR. ♦

www.

The full 'In Practice' list of electronic and other component suppliers:
www.ifwtech.co.uk/g3sek/in-prac/components.htm
RS Components: rswww.com (yes, that's correct - http://rswww.com)
Farnell Components: www.farnell.com/uk
Rapid Electronics: www.rapidelectronics.co.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.

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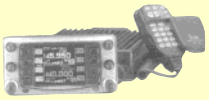

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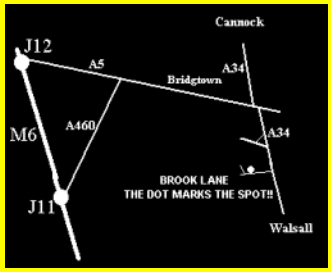

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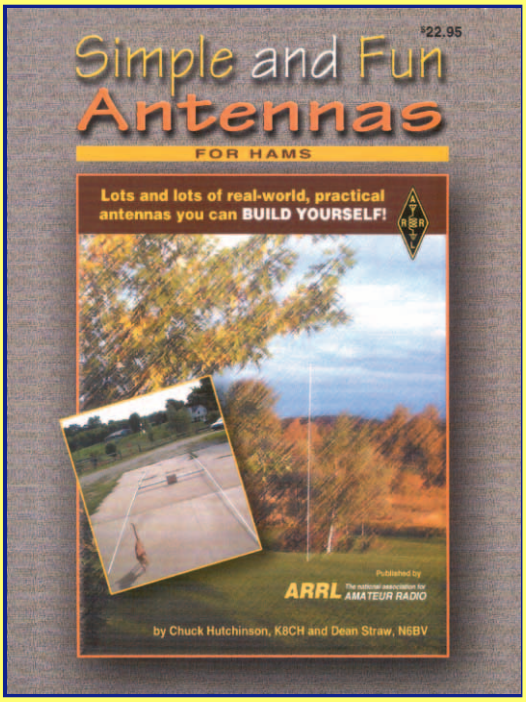

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Technical Topics

PAT HAWKER, G3VA
37 Dovercourt Road, London SE22 8SS

SMT, SOLDERING & INTERMITTENTS

THE APRIL 'TT' item on using surface mount technology (pp61/62), based on articles by VK3EM and N4UAU, attracted several comments and seems to have been regarded as providing useful advice on handling these tiny components and devices.

Sebastian Linfort, G0CPP, writes: "I found the article full of good advice, but I would add the following points:

"A medium-power (25W or more) *thermostatically-controlled iron* is greatly to be preferred to a conventional low-power iron. A low-power iron can quickly fall below the temperature at which the flux is active. This means that the constructor tends to spend a long time rubbing the component with the iron to get the solder to run. Soon the component becomes 'cooked' and useless. Remember that a good joint is made in two seconds, a bad joint takes longer. For the iron, I prefer a conical-shaped tip. These have enough metal behind the point to conduct the heat. Eschew tips with a long thin shank.

"The size of the components I have been working with is a 1206 chip for the resistors and capacitors. This means 0.12in by 0.6in (3 by 1.5mm). The IC has a lead spacing of one-twentieth of an inch. I find a 0.5mm tip fine for these.

"May I recommend the publication *A Practical Introduction to Surface Mount Devices*, by Bill Mooney, published by Babani Electronics Books (ISBN 0-85934-411-8). It is full of useful advice and provides designs and board artwork for a number of simple 'starter' projects."

ART OF SOLDERING

There is no doubt that the key to both home-construction and home-repair of current technology lies in perfecting one's soldering ability [something which has always eluded me]. A full-page article 'The Art of Soldering' (*QST,* February 2001, p72) emphasises that "The secret of good soldering is to use the right amount of heat. Many people… use too little heat, dabbing at the joint to be soldered and making little solder blobs that cause unintended short circuits."

The *QST* checklist assumes that solder with a flux core is used to solder a typical PC board connection such as an IC pin:

- Prepare the joint. Clean all conductors thoroughly with fine steel wool or a plastic scrubbing pad. Do the circuit board at the beginning of assembly and individual parts such as resistors and capacitors immediately before soldering. Some parts (such as ICs and surface-mount components) cannot be easily cleaned; don't worry unless they are exceptionally dirty.
- Prepare the tool. It should be hot enough to melt solder applied to its tip quickly (half a second when dry, instantly when wet with solder). Apply a little solder directly to the tip so that the surface is shiny. This process is called 'tinning' the tool. The solder coating helps conduct heat from the tip to the joint.
- Place the tip in contact with one side of the joint. If you can place the tip on the underside of the joint, do so. With the tool below the joint, convection helps transfer heat to the joint.
- Place the solder against the joint directly opposite the soldering tool. It should melt within a second for normal PC connections, within two seconds for most other connections. If it takes longer to melt, there is not enough heat for the job at hand.
- Keep the tool against the joint until the solder flows freely throughout the joint. When it flows freely, solder tends to form concave shapes between the conductors. With insufficient heat solder does not flow freely, it forms convex shapes – blobs. Once solder shape changes from convex to concave, remove the tool from the joint.
- Let the joint cool without movement at room temperature. It usually takes no more than a few seconds. If the joint is moved before it is cool, it may take on a dull, satin look that is characteristic of a 'cold' solder. Reheat cold joints until the solder flows freely and hold them still until cool.
- When the iron is set aside, or if it loses its shiny appearance, wipe away any dirt with a wet cloth or sponge. If it remains dull after cleaning, tin it again. If a copper tip becomes pitted, file it smooth and bright and then tin it *immediately* with solder. Modern soldering iron tips are nickel or iron clad and should not be filed. Keep soldering tools in good condition by keeping the tips well tinned with solder. Do not run them at full temperature for long periods when not in use.

  Soldering equipment gets *hot!* Be careful. Treat a soldering burn as you would any other. Handling lead or breathing soldering fumes is hazardous. Properly ventilate the work area. If you can smell fumes, you are breathing them. Wash your hands after soldering, especially before handling food. Minimise direct contact with flux and flux solvents.

'THIRD HAND' CLAMPS

THE USE OF insulated clamps or vices when soldering is a well-established technique. **Fig 1** shows two methods of adapting wooden clothes pegs to provide a useful 'third hand'. **(a)** Comes from a 1962 Rider publication *Useful Electronic Shop Hints*, and is recommended for small delicate work. **(b)** Is my own version, using the more common European clothes peg which I devised for use with my 'Helping Hands with Magnifier' as available from a number of UK distributors etc (eg Waters & Stanton, H-601). Normally, these use crocodile clips to hold wires or small parts in place (also forming a useful heat sink), but there are occasions when a firmer, insulated grip is needed. I find the existing (adjustable) clips will firmly grip the peg which, in turn, can provide a tight grip on a small PCB etc by tightening the screw. Yet another device is the use of long-nosed pliers with a strong elastic band wound round the handles.

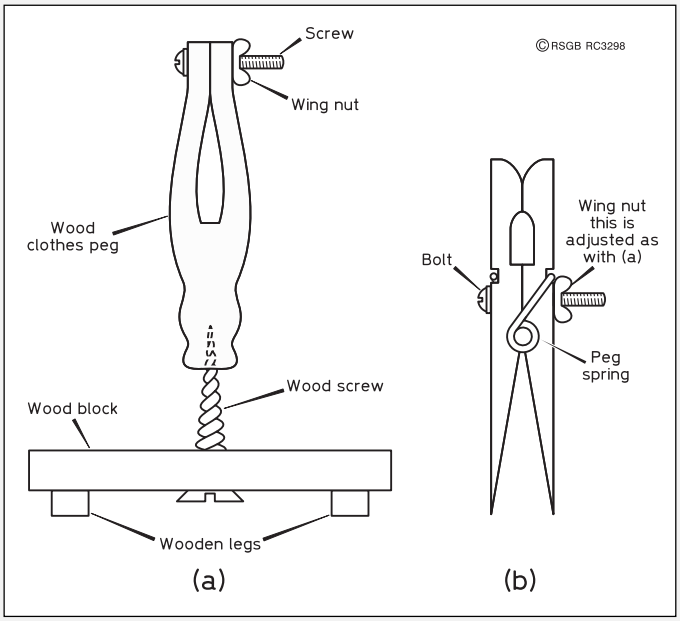


Fig 1: Clothes pegs can be simply converted into general-purpose clamps to provide a 'third hand'. (a) Self-standing mounted on a wooden base. (b) Typical spring peg drilled to accommodate a bolt and terminal-type nut.

INTERMITTENTS

Many amateurs using modern transceivers have virtually given up attempting home repairs, complaining at high serv-

icing costs when they find, often enough, that the troublesome intermittent fault turns out to be a question of finding and rectifying a 'dry joint'. For the professional service engineer this can be a time-consuming task, with service charges ticking up to an alarming extent. Factory dip-soldering producing dry joints remains a common cause of intermittent faults that develop some years later.

Intermittents can, for the service engineer, be difficult to trace and then uncertain in repair. In 'The Problem of Intermittent Faults' by Paul Smith (*Television,* May 2000. 420-421), written from the point of view of a service engineer dealing primarily with domestic TV sets, it is stressed that "One of the difficulties with an intermittent fault is being sure that it has been permanently cured. Just because it doesn't occur again during several days of soak testing could be merely a coincidence or because something has been disturbed during the repair process so far carried out. If you can find a way of instigating the fault before repair work commences, this will aid diagnosis and can be used afterwards as a check on whether the repair has been successful."

Paul Smith stresses that many intermittent faults have fairly obvious causes and do not present much of a problem: "The rest call for a lot of patience and resolve." He sets out the three classic approaches: vibration checks; heating; and cooling. Just as a bang on the side of a faulty rig will often cure (temporarily) an intermittent fault, so can it induce a fault. "Gentle tapping on the relevant PCB will sometimes – but not always – instigate the fault. Try to narrow down the area of search by using lighter and lighter taps. If vibration does cure or bring-on the fault, the most likely cause is a dry joint or a hairline crack in the printed circuit. A strong magnifying glass (eg x9) will aid diagnosis and can be useful for checking joints and track continuity.

A hairdryer, heat gun or soldering iron can quickly bring an appliance or component up to a temperature equivalent to that after running for several hours under normal conditions. Use of a shield can help direct the heat on to a particular area. Freezer spray, when used in conjunction with heat, can help to establish whether a component has a thermally-sensitive fault, sometimes narrowing the search to a particular component rather than a more general area. Note, however, that some semiconductor devices will not function correctly below a certain temperature; this can be misleading.

FAULTS WITH SMT

On surface-mount ICs, Paul Smith writes: "These are becoming increasingly common in all types of equipment. Poor soldering of the legs of a surface mounted IC to a PCB is a recurrent cause of intermittent faults. Inspection of the solder may not reveal any signs of deterioration, but gentle pressure on top of the IC can provide the required clue by curing the fault. After resoldering, check carefully for bridges between adjacent legs. If solder gets into the gap between the device's body and the PCB, it can be melted out by using desoldering braid at its edge."

While at least some amateurs would be prepared to attempt to trace an intermittent fault, fewer would tackle a modern transceiver that has broken down completely. Nevertheless, a few pointers may not be out of place. As noted by Nick Beer (*Television*, December 1997, pp100-102), tiny surface-mounted aluminium electrolytic capacitors can give rise to problems [tantalum types are more reliable]. These capacitors are liable to fail when equipment is a few years old, regardless of use. The traditional large electrolytics are chemical devices that dry out. "With an SMT electrolytic, what usually happens is that the device leaks its electrolyte. This results in loss of capacitance amounting to open-circuit. As with most electrolytic capacitor failures, an SMT type will often reform when heated, which can provide a useful clue when fault-finding. Unfortunately, the leakage can result in some nasty PCB damage."

Nick Beer continued: "If you find a [consumer] unit which is more than a couple of years old and uses [aluminium] SM electrolytics, they are probably faulty. Perhaps the most useful clue is the smell. Remove the covers and sniff around a board. If there is no obviously obnoxious smell, look for a 10μF or 22μF capacitor and heat one leg. The likelihood is that the resultant smell, best described as ammonia-like, will knock you back. There will also be a gentle hissing / crackling sound as the leakage boils.

"Some people may react strongly to the smell, but for most it has a fairly neutral effect, but it advisable to work in a well-ventilated space.

COMPONENT REPLACEMENT

"Because of component density in consumer equipment, replacement of a capacitor can be tricky. It is often necessary to remove several other components to enable the faulty one to be replaced. It is far better to do this than risk damage to the PCB or other devices. To remove an SM aluminium electrolytic capacitor, first use solder-braid to mop up as much solder as possible from each of its legs. Then, to free one leg, heat it while tilting the capacitor away from the iron. Do the same to the other leg. Finally, mop the lands clean. Use miniature pliers or tweezers to manoeuvre the capacitors – if you try to use your fingers they will get burnt… Once the leaking capacitor has been removed, the board beneath should be cleaned thoroughly with a suitable solvent. Attend to any obvious corrosion, paying particular attention to any through-the-board links under or near the capacitor. If you are in any doubt, link it out to be on the safe side. For those who are not familiar with through-the-board links, they appear as small dots or holes in the PCB, always in a print land. You can use an ohmmeter to check a link, by measuring the resistance between the relevant pads on each side of the board. Scrape the lacquer from the top and bottom pads if necessary."

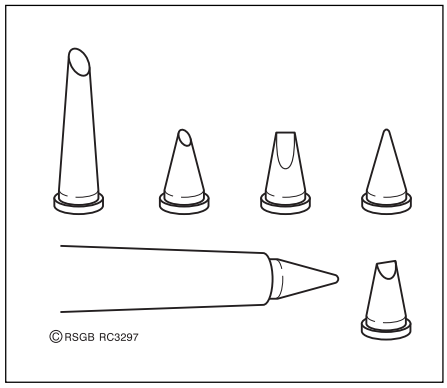


Fig 2: For SMD, Martin Melzer recommends the use of a temperature-controlled iron at 290°C with tips having minimal thermal resistance and good thermal coupling to the heater and short broad tips that are not too rounded but have sharp edges. These are the very short and sturdy tips for the 80W Weller temperature-controlled iron that heats up in 10 seconds. (Source: BCRA Cave Radio)

In the era of valve communications receivers, home maintenance was generally taken for granted with no separation between 'User' and 'Service' manuals! Even in the 1950s - 60s, the only 'absolutely necessary' test instruments were a good multimeter and a signal generator. Even the signal generator was often replaced by a simple signal (noise) injector; an improved dual-frequency (AF / RF) version of which was described by G4BXX in 'TT' August 1980, p754.

SOLDERING IRONS & TEMPERATURES

SINCE WRITING the above notes, I have come across, in the British Library, a five-page article 'Surface Mount Technology: Hand Soldering of Circuit Boards', by Martin Melzer (*BCRA Cave Radio & Electronics Group,* Journal 46, December 2001). This gives additional useful advice for anyone contemplating fairly extensive construction of boards based on hand-soldering of SMT and prepared to invest in appropriate tools, etc.

It is stressed that "Temperature is by far the most important factor for several reasons.

"*Surface tension* of molten metal increases with decreasing temperature. It is

primarily surface tension that prevents solder from forming shorts. Most SMD soldering relies not on using microscopically small tips, but on surface tension preventing the molten solder spreading.

"Solder oxidises - when the lead alloy is molten, the lead reacts with atmospheric oxygen and forms an oxide layer preventing the solder from flowing freely where it should. This process accelerates as the temperature increases. This is why we have flux.

"The flux - activated flux removes the oxide layers but, when too hot, it evaporates too quickly without having much effect."

The author notes that most solder alloys melt at 173°C and flux works above 260°C. "For most SMD work, a soldering iron temperature of 290°C is a good starting point. For really fancy work, try to lower it a bit. Never go above 300°C."

He advises the use of temperature-controlled irons: "Don't waste your time on an unregulated iron! But also important is the size and shape of the tip... Tiny (elongated) tips have high thermal resistance and you need to use very high temperatures, burning the solder and flux rapidly and creating joints of burnt flux and oxidised solder. For SMD you need short, broad tips preferably with sharp edges: **Fig 2**. My favourite iron is the 80W Weller WECP80. It gets up to the desired temperature in only 10s and has very short tips in good thermal contact with the heater… It's not exactly cheap. If you buy a different model, pay particular attention to the thermal design and check out the available tip shapes."

Rather than using cored solder, Martin Melzer advises the use of flux paste applied separately by means of a syringe. "Flux paste is a marvel. Use it once and wonder how you ever got along without it. Flux paste consists of a resin that is activated to make it more effective at lower temperatures. For lab use, it doesn't matter what type you use, buy any general-purpose flux paste packaged in a syringe." He notes that only two hands are needed if first you apply some solder to the tip of the iron, then put some flux paste on the PCB, and then solder the whole thing together.

POYNTING VECTOR SYNTHESIS & THE CFL

IN 'TT' AUGUST 1989, in an item 'New' Antenna?' I wrote: "With a century of antenna development behind us, it takes some courage to claim to have developed an antenna system that depends on doing something 'for the very first time in the history of radio-communications'. Indeed, anyone making such a claim has to expect that it will be received with a degree of scepticism, particularly when the system is claimed to overcome most of the disadvantages traditionally associated with electrically-short antennas.

"Maurice Hately, GM3HAT, and Fathi M Kabbary, GM3TDI, have certainly stirred things up by describing their new 'crossed-field antenna (CFA)' as exploiting 'for the very first time, radio waves that have been efficiently generated by direct synthesis of the Poynting Vector cross-product, by using separately-stimulated electric and magnetic fields cutting at right angles'. In effect, they claim that reversing the form of Maxwell's original equation has led to the realisation and development of a revolutionary new antenna system for which they have applied for patents in a number of countries.

"An article (with B G Stewart) 'Maxwell's Equations and the Crossed-Field Antenna' appeared in the March [1989] issue of *Electronics & Wireless World*. I, for one, found it virtually impossible to understand and it has since been savaged by a number of [professional] antenna specialists including Dr A G P Boswell, G3NOQ. My own ill-informed opinion is that it rather proves that if you can feed RF to any lump of metal in the sky it will radiate effectively on HF in good conditions. It may well be advisable to wait for the results of a carefully-controlled test before accepting that [the authors] are really generating radio waves in a unique and revolutionary manner. Meanwhile, they have certainly blinded me with science and Maxwell's equations."

Since 1989, there have been many presentations and many articles on the CFA in the professional and amateur journals. But, along with many others with greater insights into antenna design, I still remain to be convinced. In 1989, I decided that, pending professional agreement on the validity of the theory of this revolutionary antenna, I would refrain from further comment in 'TT'.

Some years later, Maurice Hately and Fathi Kabbary applied for British and US patents on another form of crossed-field antenna, the crossed-field-loop (CFL) which comprised two small loops (less than λ / 10 in circumference), in sufficiently close proximity to provide "interaction of the fields through Poynting Vector synthesis". A British Patent 9,718,311 was issued in August 1997, and US Patent 6,025,813 in February 2000. To obtain a patent, the idea (invention) has to be novel or an improvement on an existing patented design and there should not have been prior disclosure. It is important to note that you do not have to prove to the examiners that your invention actually works as described, or indeed at all! Remember the early patents for perpetual motion machines!

Both the CFA and CFL are described as using Poynting Vector synthesis, in which the antennas create radiation from out -of-phase voltages applied to a conductor plate and either a coil, or a second plate. "Electric and magnetic fields are made to cross each other at right angles with a precise amount of out-of-phase in the cycle. In the present invention the same principles are used, but instead of two out-of-phase voltages being applied to plates, out-of-phase currents are used in closely spaced wire conductors."

From the initial publication of details of the CFA in *EW + WW*, it has been pointed out by the experts that this interpretation is based on the fallacy that any part of an antenna can radiate in the far field a pure magnetic field or a pure electric field. It is why there is so much dislike in professional circles of the use of the term 'magnetic loop' in respect of the compact transmitting loop antenna.

The publication of the article 'The Hately Antenna Technology Crossed-Field Loop Antennas', by Steve Nichols, G0KYA (*RadCom*, May 2002), has stirred the pot again, resulting in much comment reaching 'TT'. For example Dr John Belrose, VE2CV, has produced a long technical note in which he stresses that "The theoretical concept of this class of (**C**old **F**usion) **A**ntenna is dead, or should be, but it will not lie down." [It may be recalled that at the time when the Crossed Field Antenna was first disclosed, the scientific world was reeling from the announcement by Professors Fleischmann and Pons that they had successfully achieved a method of cold fusion and so initiated a frenetic rash of world-wide research programmes, all of which proved ultimately unsuccessful.]

VE2CV states categorically: "It is fundamentally impossible to generate an outgoing (only) Poynting Vector, as the inventors would like. All radiating elements of an antenna system generate both E- and H-fields. Combining fields in the way the inventors would like could generate an out-going Poynting Vector, but the other fields are there, which will generate an in-going Poynting Vector." This view is echoed, in slightly different words, by other professional antenna engineers. VE2CV undertook an NEC modelling exercise which, as Dr Brian Austin, G0GSF puts it, "produced

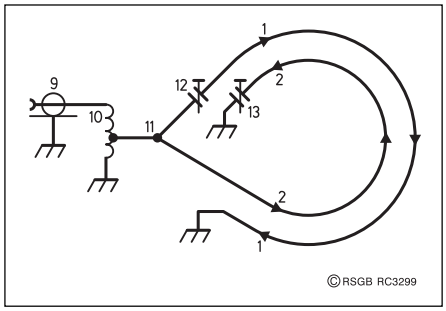


Fig 3: Circuit diagram of the CFL antenna as shown as Fig 7 in the publicly-available GB Patent 2,215,524 and US Patent 5,155,495. Conductors 1, 2 may be coaxial in close proximity. 9 is the coaxial feeder socket. 10 is a matching auto-transformer. Capacitors 12 and 13 are said to be adjusted to be 45° ahead of and behind resonance.

no surprises – the CFL just cannot radiate by itself."

How does this square with the fact that G0KYA was able to report from his tests: "As long as you don't expect a CFL to outperform a dipole or similar antenna you shouldn't be disappointed… As to *how* they work, I will leave that to the ongoing debate."

In the case of the CFL, the answer seems fairly straightforward and can be deduced from **Fig 3** reproduced from the publicly-available CFL patents. The unbalanced coaxial cable is shown feeding, via an autotransformer, what is basically a balanced structure, and this inevitably results in a reverse flow of RF current back down the *outside surface* of the braid of the cable. G0KYA noted that there was indeed some radiation from the feeder cable. On HF it does not take much radiation from a long vertical feeder to produce the results he obtained. Think of the 30ft vertical whip widely used on ships, etc.

More puzzling is how the loops and matching autotransformer (no details given in the patents) together provide a matched load to the cable, so achieving a low SWR over a broad bandwidth. It might be revealing to investigate the overall heat dissipated in the transformer and loops compared with the RF power fed to the antenna! In the July 'TT' I noted that even a length of cable terminated with a resistor can result in radiation from the outer surface of the cable braid. One wonders what would happen if an effective choke balun (eg many ferrite rings) were inserted at the end of the feeder cable to a CFL? Or to check the results with the CFL connected virtually directly to the output of the transmitter? As to the theory of 'cold fusion' Poynting Vector synthesis, I suggest it is a case of *Quod erat* ***non*** *demonstrandum!*

SOLAR CHARGING ON CLOUDY DAYS

SMALL SOLAR battery chargers, such as those marketed by Maplin Electronics, are intended to charge AA NiCd cells on sunny days. Malcolm Lisle, in *Electronics World*, April 2002 (correction July), indicates that, while the small solar panels work well in sunlight, on a cloudy day what happens is the output voltage doesn't fall much, the internal resistance increases.

He writes: "A 100mA, 4.5V panel has an internal resistance of 45Ω. On an overcast day, this internal resistance rises to, typically, 900Ω, reducing the output to 5mA, or, on an even duller day, to 4.5kΩ, reducing the output to 1mA (useless for charging anything).

"A bigger solar panel has a lower internal resistance. By using two larger 6V, 150mA panels, approximately the size of CD boxes, connected in parallel, currents of four or five

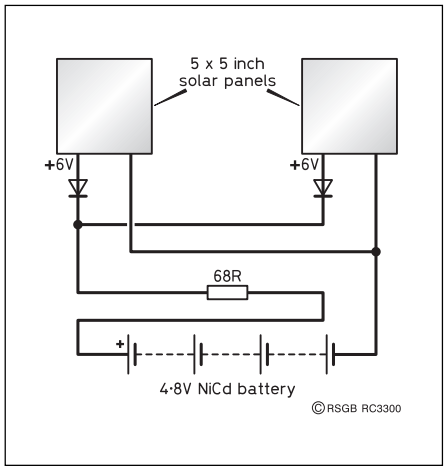


Fig 4: Use of paralleled small solar panels to provide much improved charging current on cloudy days. Presumably the use of more panels and protective diodes could further improve performance on overcast and dull days. (Source: *Electronics World*)

times as much may be generated under cloudy conditions. A typical overcast day can now produce 20mA, and even a relatively dull cloudy day produces 5mA – enough to be of some use. Placing the apparatus on the windowsill to get plenty of light, a set of four NiCd AA batteries can be charged over a few days in the typical British weather over about eight months of the year.

"In winter, daylight is not bright enough for the charger. When the sun comes out, two 150mA panels will produce 300mA, which would overcharge AA cells. This can be overcome by inserting a resistor to limit the current to 50mA: **Fig 4**. Reverse blocking diodes are fitted in series with each solar panel to avoid problems when one panel is in shade. This arrangement may appear to be wasteful of the capacity of solar panels, but greatly increases the number of days on which useful charging power can be produced in typical British weather."

EXTENDING TVRO ACTUATOR JACKS

STUART Jones, GW3XYZ, writes: "Satellite TV jacks offer a cheap way of pointing microwave dishes although, normally, angles of 90° are about the maximum attainable. This is sufficient for elevation, but not acceptable for azimuth where rotations of 0 to 180° or more may be required to track OSCAR 40. **Fig 5** shows how this can be achieved.

"The setting-up procedure is as follows: At the start of a session, the approximate position of AO-40 is checked, together with its expected direction of movement (usually East to West). With this advance data, the actuator pin is located in a hole (A, B or C) by manually rotating the dish and dropping it in. The dish is then electrically driven to its precise start position.

"Satellite TV actuator jacks offer some advantages for dish control:

1 Very little slack or 'lost motion'.
2 Very strong and self-locking.
3 Require low DC voltage, depending on required strength and speed, typically between 12 and 36VDC.
4 Much cheaper than amateur radio alternatives (12in about £35, 18in about £45).
5 Masts are supplied with internal limits and mounting brackets.

"The main disadvantage with such actuators is that the mast just provides pulses for position indication within a satellite receiver. I use separate pots, fed from an accurate voltage source. The analogue voltages so produced feed digital panel meters (DPMs) calibrated in degrees."

HERE & THERE

A NEW TYPE of consumer battery is to be marketed by Panasonic and Toshiba, initially in AA-size, intended primarily for use in digital cameras and other power-hungry portable equipment. These non-rechargeable, nickel-zinc batteries are claimed to outperform existing forms of alkaline batteries and to work better in low temperatures. Toshiba's 'GigaEnergy' cells use nickel oxyhydroxide for the positive electrode, a compound commonly used in rechargeable batteries. These AA-size batteries have reached the market in Japan and are priced some 50% higher than other alkaline cells, but are claimed to last up to five times longer in digital cameras. ♦

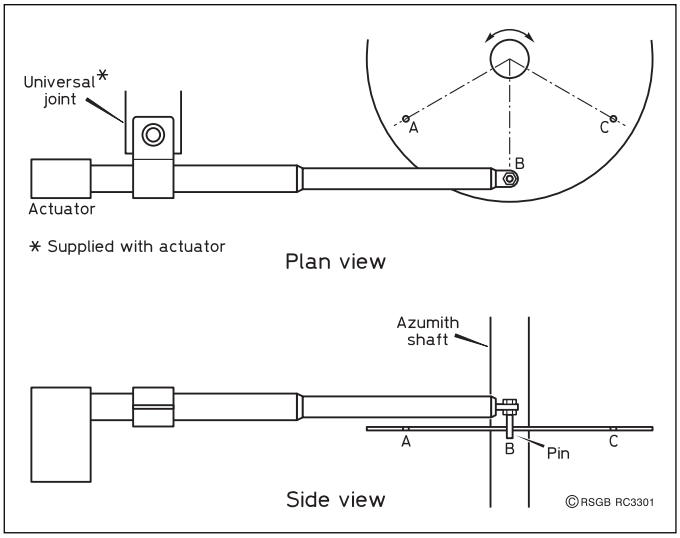
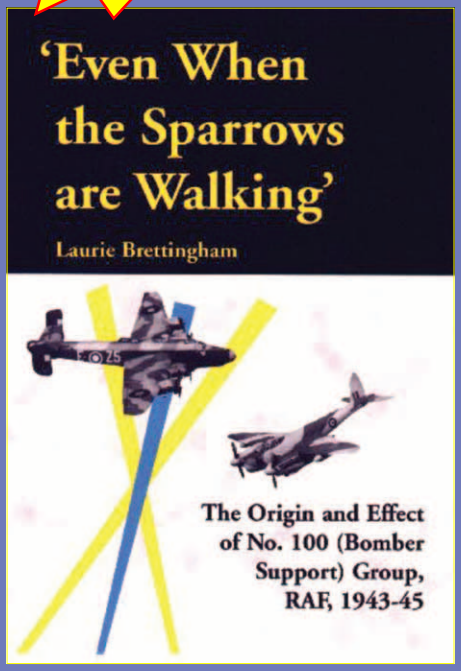


Fig 5:The arrangement used by GW3XYW to provide azimuth control for a 2.7m dish to extend the range of TVRO actuator jacks.

NEW

EVEN WHEN THE SPARROWS ARE WALKING

- The Origin and Effect of No 100 (Bomber Support) Group, RAF, 1943-45



This book deals in detail with the extensive operations of the 100 Bomber Support Group (incorporating 80 Wing) set up in 1943 to support the main RAF bomber force during its almost nightly raids deep into hostile territory. The Group, comprising a number of squadrons and ground units, countered the increasingly efficient German ground and airborne radar, radio directed night fighters, and radar controlled anti-aircraft guns.

Scrutiny of the text reveals that a number of radio amateurs were involved (eg Vic Flowers, G8QM; George Morley, G0OXH etc) although callsigns are not given.

The book provides a fascinating (readably technical) outline of the electronic and radio countermeasures designed to jam or confuse the German air defence radars such as Freya, Wuerzburg, Wasserman, Mammut, Elefamt-Russel, Jagdschloss or to disrupt the German ground-to-air R/T systems. Countermeasures included systems such as Jostle, Carpet, Mandrel, Piperack, Grocer, Moonshine, Shiver etc.

The strength of this new book is its ability to bring home to readers, whether or not they personally experienced WWII, vivid, if often light-hearted, memories of the daily lives and nightly perils facing those young flyers. Their dangerous flights, often in weather conditions when "even the sparrows are walking", enabled many more of the main bomber crews to return to their bases and live, at least, to fly again. A book that is not only interesting but deserves to be read.

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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
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- 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, ACOM 1006 (6m only) £1,295.
TO COME - ACOM 1.5kW manual tuning amplifiers for 160-10, and for 2m

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 with 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.

Mast and Towers

Did you know that we are authorised agents for Versatower and Tennamast? We are happy to discuss your operating preferences, neighbour and XYL constraints, and recommend the best antenna / rotator / mast system to suit your pocket. We've also assisted many amateurrs to progress insurance claims after a storm / accident damage. Call us - we can help.

New - HF mini-beams

From Germany, the Optibeam OB6-3M consists of a Moxon Rectangle for 20m, and yagis for 15 and 10m. Maximum performance is packed into a turning radius of only 14ft, with a 10ft boom. Optibeam's low-SWR feed system gives a VSWR of less than 1.6 to 1 at band edges. An external tuner also gives acceptable results on 17 and 12 metres.

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P60 Versatower, TA33 Emotator, all cables, £500. IC-740, Daiwa 30A PSU, £300. Mutek TVVF MkII 144MHz tvtr, £100. Landwehr 144MHz masthead preamp, like new, £100. VHF beams 2 x 17 Tonnas, 2 x 19 70cm Tonnas, several Jaybeam 144MHz power splitters, H100 cable, offers for lot: LDF250 1 x 160ft, 1 x 190ft, big bag connectors, offers? HF amplifier project, offers? 01452 415 590 9am-5pm (Gloucester).
E-mail: dougmellor@lineone.net

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E-mail: gzeromdz@thersgb.net

CUSHCRAFT X7 10/15/20m, £200. Cushcraft A3WS 12/17 + 30m extension, £125, both vgc. Peter, G3SJX, QTHR, 01420 562 914 (Alton).
E-mail: peter@g3sjx.freeserve.co.uk

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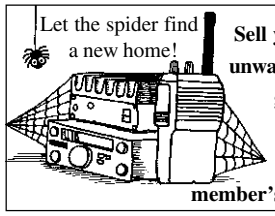

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CONGRATULATIONS

to the following whom our records show as having reached 50 years' continuous RSGB membership this month:

50 years

G3IER	Mr D G Martin
G3IGZ	Mr D W Bruce
RS21683	Mr J C P Sharp

Our congratulations also to Mr L V Westmoreland, who has completed 51 years' unbroken membership on 8 May 2002, and who was unfortunately omitted from previous lists.

Advance Voltstat const voltage transformer 230V/250W on base c/w 13A sockets (heavy - must be collected), £20. Twin PSU var 0-10V/30V/0.5A twice, fully metered, £30.
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E-mail: m0afj@aol.com

FT-900 AT good cond, boxed, £450. Bert, G3FVO, 01908 501 845 (Milton Keynes).

GARMIN GPS-45 ground position rcvr, nautical model, checked OK by manufacturers, full 75-page instruction man, bargain, £75 p/p. GW2HCJ, QTHR, 01766 770 637 (Porthmadog).

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E-mail: g3adz@dhaylock.fsnet.co.uk

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E-mail: g0mhq@aol.com

KENWOOD R-5000 rcvr, £300. Terry, 01664 562 044 (Melton Mowbray).
E-mail: terry@murphy12.fsnet.co.uk

KENWOOD THD-7E, £195. Rugby 60kHz locked frequency standard, £30. Yaesu G-600RC rotator, £75, buyer collects. 01922 473 492 (Walsall).

KENWOOD TM-241E 50W 2m mobile, £80 ono. M0CYZ, 01677 423 349 (N Yorks).

KENWOOD TS-140S, HF 100W, 12VDC, CW filters, gc, £225. Kenwood TS-140S, as above but modified for tvtr in-out and QRP, 15W max output, fair cond, £135. MML 144/100S, 2m linear, £90. MML, 144/28 tvtr, £25. Datong, ASP, £25. Datong clipper, £25. MFJ-DSP-784B, £90. Noise canceller, JPS, ANC-4, £75. Tvtr and Datongs suit constructors. Carr extra. G4CKH, 01502 740 965 (nr Lowestoft).
E-mail: graeme@g4ckh.fsnet.co.uk

KENWOOD TS-50S HF tcvr with AT-50 automatic antenna tuner and FF-501 low pass filter, as new, £600. 01206 307 509 (Brightlingsea).
E-mail: jwhite1331@aol.com

QUADRA amplifier 1kW Yaesu DX chaser, as new, boxed, £2895. Inspect if wanted. M0AXP, QTHR, 020 8748 4892 (London).
E-mail: faxholm@orchardsim.com

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SMC 54SL1 UHF tcvr unused, boxed, £20. Panasonic 24-pin printer vgc, offers? Philips colour monitor, offers? Tom, M1ACS, 0777 300 5209.
E-mail: tomgirdler@yahoo.com

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E-mail: g3ogq@aol.com

WINRADIO with software, unwanted gift, £375 ono. 01603 782 109 (Norwich).
E-mail: ivor4920@aol.com

YAESU FT-107M (160-10m) plus matching speaker and ATU, £300 (free trapped dipole). Racal RA17, £80. Butternut HF2V (80-40m) vertical, £100. AR40 rotator, £50. Steve, G6LRL, 01922 744 356 or 07944 576 465 (Walsall).

YAESU FT-480 2m FM/SSB, £120. Microset 13.5V 10A, £20. HP-209A oscillator 20Hz-2MHz, £15. Yaesu FRG-7700 SSB/AM, £95. Robin 4114 earthloop tester, £60. HH mixer desk, 8 channels, £80. Mans, offers: AVO valve data 19, Marconi Atlanta, CR150/3. Racal 121, Plessey PR1551C, SP600. 01684 295 189 (Tewkesbury).
E-mail: absnow@absnow.freeserve.co.uk

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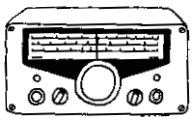

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EARLY crystal and valve wireless wanted: anything to do with early wireless is of great interest, especially Marconi items. Also looking for top-end valve comms rcvr. Also early AM transmitters by Johnson, Collins, Hallicrafters, other US makers. G4ERU, QTHR, 01202 510400 (Bournemouth).

ELECTRIC tiltover winch motor for 2-section Versatower, must have min capacity of 1200lb/545kg, gwo. GW3IEQ, 01286 831 340 (Caernarfon).

H/BOOK/MANUAL or copy for IC-700R solid-state comms rcvr. All costs honoured. Peter, G0RRF, 01933 400 662 (Wellingborough).

RADAR indicator type 182 or similar unit. Keith Strong, 20 Coolgardie Road, Ashford, Middx TW15 1ES, 01784 253 990.
E-mail: cstrong@cix.co.uk

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

SWC-1 remote coupler for HF use with Kenwood SW-200B meter, postage paid. Please contact M3EDD, 01332 513 706.
E-mail: stevelansdell@yahoo.com

WANTED Tannoy, Quad, Leak, Radford etc vintage hi-fi. Pay cash or swap for my Drake B-line set-up of R4B, T4XB, PSU, spkr, plus mans. Also hi-fi year books and JR149 and L53/5A spkrs wanted. 01245 381 961 (Chelmsford).

YAESU CPU 2500 2m FM tcvr, also Heathkit HW101 HF tcvr with man, in working cond, will consider terminal cases and Yaesu SP-901 speaker. Ray, G4OWY, 01305 777 691 (Weymouth) or 0794 7749731.
E-mail: g4owy@aol.com

Rallies & Events

28 JULY 2002

COLCHESTER RA Amateur Radio Rally & Computer Fair - St Helena School, Sheepen Road, Colchester. OT 10am, £1.50. CBS, B&B, C, MT, 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

4 AUGUST 2002

FENLAND RG Horncastle Summer Amateur Radio Rally - Horncastle Youth Centre, Cagthorpe, Horncastle, Lincs. OT 10.30am. C, MT (pre-book), TI on S22. Chris, G0PXB, 01526 860 320. [www.fenlandrepeater.org.uk]
LORN ARS Radio Rally - Benderloch Victory Halls, 8 miles north of Oban on A828. OT 10.30 for 11am. TI on HF and VHF. Shirley, GM0ERV, QTHR, 01631 566 518 or s.mclennan@freeuk.com or John, MM3MLH, QTHR, 01838 200 304.

9 AUGUST 2002

COCKENZIE & PORT SETON ARC 9th Annual Junk Night - Cockenzie & Port Seton Community Centre, South Seton Park, Port Seton, E Lothian. OT 6.30pm, £1. C, DF, WIN. All proceeds to British Heart Foundation. Bob, GM4UYZ, 01875 811 723 or bob.gm4uyz@btinternet.com

11 AUGUST 2002

FLIGHT REFUELLING ARS Hamfest - Cobham Sports and Social Sportsground, Merley, Wimborne, off the A31 (signposted). OT 10am, £2 - please have correct money ready. TS, CBS, MT (5WPM), LB, C, FAM, TI on S22 from 8am. Overnight camping on Saturday. Keith, G1VHG, 01202 577 937 or hamfest@frars.org.uk [www.frars.org.uk/hamfest]

17 / 18 AUGUST 2002

INTERNATIONAL LIGHTHOUSE / LIGHTSHIP WEEKEND - entry forms not necessary, but ensures that your entry is listed officially. Entry form from www.vk2ce.com/illw/index.html Runs from 0001 on Saturday until 2359UTC on Sunday. Exchange RS(T), QTH and ARLHS number of the light, obtainable from www.arlhs.com/awards/arlhs-numbers.html
SCARBOROUGH SPECIAL EVENTS GROUP - International Lighthouse / Lightship Weekend. Operation of GB2SCA from the lamp room at the top of Scarborough lighthouse. QSL card shows full colour photograph of the lighthouse. 40m SSB/CW, 2m & 70cm SSB/FM. Roy, G4SSH, g4ssh@netscapeonline.co.uk

18 AUGUST 2002

KING'S LYNN ARC 13th Great Eastern Radio Rally & Car Boot Sale - New venue: Fosters Sports & Social Club, Ferry Road, Clenchwarton. OT 8am, £1. TI on S22, C, LB, CP free. No dogs. George, G6AKC, 07719 874 128 (eve) or george@g6akc.freeserve.co.uk
WIGTOWNSHIRE ARC Lighthouse station GB2LCP - Corsewall Point Lighthouse. [www.qsl.net/gm4riv]

24 - 31 AUGUST 2002

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

25 AUGUST 2002

COLERAINE & DARS Radio & Computer Rally - Bohill Hotel, Cloyfin Road, Coleraine. OT 11.30am/12 noon. Peter, MI0CIB, 028 7035 1335 or Jim, GI4ORI, 028 7035 2393.
MILTON KEYNES ARS Rally - St Paul's School, Leaden Hall, Milton Keynes. OT 8am traders, 9am buyers, £1, TI on S22. Dave, M0BZK, 01908 501 310 or rally@bletchley.net [www.qsl.net/g3hiu/rally.html]
TORBAY ARS Communications Fair - Churston Ferrers Grammar School, Churston, Brixham. OT 10am, £2. TI, CP free, TS, B&B, MT, WIN. rally@tars.org.uk

26 AUGUST 2002

HUNTINGDONSHIRE ARS Amateur Radio Rally - Ernulf Community School, St Neots, near superstore on A428. OT 10am, £1.50. C, CBS, TI on S22. Peter, M5ABN, 01480 457 347 (6pm - 10pm) or peterherbert@aol.com

29 AUGUST - 5 SEPTEMBER 2002

HORNSEA ARC 4th Antenna Workshop - Manor Farm, Bewholme, Driffield, E Yorkshire. Free entry, but prior booking essential. G4YTV, QTHR, 01964 562 498 or g4ytv@aol.com

1 SEPTEMBER 2002

MID-SUSSEX ARS Amateur Radio & Computer Car Boot Sale - Marle Place, Burgess Hill. OT 10am. [www.msars.co.uk]
TELFORD & DARS Rally - Aerospace Museum, RAF Cosford, nr Wolverhampton, on A41 1 mile south of jn3 of M54. Admission free. TS, CBS, FM, DF, C, MT, FAM, CP free. TI on 2m and 70cm. 01952 299 677 or e-mail mstreet@g3jkx.freeserve.co.uk [www.telfordrally.org.uk]

7 SEPTEMBER 2002

WATERS & STANTON @ LOWE Open Day - Bentley Bridge, Chesterfield Road, Matlock. 01629 582 380.

8 SEPTEMBER 2002

LINCOLN SWC Hamfest - Lincolnshire Showground on A15, 5 miles north of Lincoln. OT 10.30am, £2, under-14s free. CP free, TI on 2m, CS by arrangement, C, TS, B&B, FM. Dave, 01522 878 481 or 07961 961 494.
SUFFOLK DATA GROUP Rally & Surplus Sale (Five Ss Rally) - Raceway Centre Green, Foxhall Stadium, nr Ipswich. OT 9.30am, £1. CBS, CP free, C, TI on S22. Peter, G8HUE, 01473 631 313. [www.antrina.net/hamradio/sdg-rally-2002-info,htm]

14 / 15 SEPTEMBER 2002

TRANSMISSION 2002 - 10th annual event to raise money for British Wireless for the Blind Fund. John 01634 832 501.

15 SEPTEMBER 2002

BARRY ARS Welsh Amateur Radio Show - Memorial Hall, Barry. George, GW0PUP, 029 2083 2253.
CRAWLEY ARC Microwave Round Table - details to follow.

20 / 21 SEPTEMBER 2002

LEICESTER Amateur Radio Show – Donington International Centre, Castle Donington, Leics. Geoff, G4AFJ, 01455 823 344, fax 01455 828 273 or g4afj@argonet.co.uk

4 - 6 OCTOBER 2002

WACRAL CONFERENCE and AGM 2002 - Torquay. Christian and radio activities are planned. Construction competition, JS, MT. Non-members welcome to attend by arrangement with the organiser Geoff, G4YJW, 01323 721 352 or geoff@g4yjw.freeserve.co.uk for the details.

6 OCTOBER 2002

GREAT LUMLEY AR & ES Rally - Great Lumley Community Centre, nr Chester-le-Street. OT 10.30am. TI on S22, TS, B&B, SIG, C, DF. [www.glares.fsnet.co.uk]
HORNSEA ARC Annual Rally - Floral Hall, Hornsea, E Yorkshire. OT 10.30am. G4YTV, QTHR, 01964 562 498 or g4ytv@aol.com

11 - 13 OCTOBER 2002

RSGB International HF & IOTA Convention HFC 2002 - Beaumont Conference Centre, Old Windsor. RSGB 0870 904 7373. [www.rsgb.org/hfc/]

13 OCTOBER 2002

NORTH WAKEFIELD RC Radio Rally & Computer Fair - Outwood Grange Secondary School, Potovens Lane, Outwood, Wakefield, W Yorkshire. Follow signs from M1 jn 41. CP free, TS, SIG, B&B, C. 01924 824 451. [www.nwrc.org]

19 OCTOBER 2002

WATERS & STANTON @ JAYCEE Open Day - 20 Woodside Way, Glenrothes, Fife. 01592 756 962.

20 OCTOBER 2002

BLACKWOOD & DARS Radio, Computer & Electronics Rally - Newport Centre, Newport, 1 mile from jn 25A of M4. OT 10.30/10.45am, £1.50. CP free, B&B, TI, TS, SIG, LB, C, DF, WIN, LEC. George, 01495 724 942 or Dave, GW4HBK, 01495 228 516.

26 OCTOBER 2002

CARRICKFERGUS ARG Rally - Downshire School, Downshire Road, Co Antrim. OT 12 noon. C. Billy, MI0CZF.

27 OCTOBER 2002

GALASHIELS & DARS Annual Rally - The Volunteer Hall, St John's Street, Galashiels. OT 10.45/11am. TS, B&B C. Jim, GM7LUN, 01896 850 245 or gm7lun@qsl.net

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The Members' Ads order form is now published here. If members do not wish to cut the form out of the magazine, photocopies will be accepted, as will recent copies of the form from previous months, or recent copies of the 'carrier' sheet. *As a last resort*, members may also send in their advertisements on separate sheets of paper, but if you choose to do this, you *must* supply an accurate word count - and, of course, the correct fee in the normal manner.

RSGB MEMBERS' ADS ORDER FORM

Application form for one For Sale, Exchange or Wanted advertisement. Do not mix classifications on this form; separate applications must be made.

Please ensure you read and understand the conditions of acceptance of these subsidised Members' Advertisements, printed at the top of the Members' Ads page of the current *RadCom*.

FOR SALE ☐
EXCHANGE ☐
WANTED ☐
Tick one box

I enclose a cheque/PO for £ ..... or please charge to my credit account below

CARD No EXPIRY DATE

Issue No (Switch only) . . . . . .

Signed: . . . . . *Date:* . . . . . .

FREE ENTRIES TOWN PHONE E-MAIL

RATES: UP TO 20 WORDS £5.50; 21-40, £6.50; 41-60, £7.50

KEY

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

2 NOVEMBER 2002

RAEN Annual General Meeting - National Space Centre, Leicester. Details from g_griffiths@compuserve.com

2 / 3 NOVEMBER 2002

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

3 NOVEMBER 2002

NORTH DEVON RADIO RALLY - G8MXI, QTHR, 01409 241 202.

10 NOVEMBER 2002

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

17 NOVEMBER 2002

COULSDON ATS CATS Bazaar - Andy, G0KZT, 01737 552 139 or andyg0kzt@hotmail.com
MIDLAND AMATEUR RADIO SOCIETY Radio & Computer Rally - Peter, G6DRN, 0121 443 1189.

23 / 24 NOVEMBER 2002

LONDON COMMUNICATION & COMPUTER SHOW - **New venue** - Wodson Park, Ware, Herts. RadioSport 01923 893 929. [www.radiosport.co.uk]

30 NOVEMBER 2002

ROCHDALE & DARS Traditional Radio Rally - John, G7OAI, 01706 376 204 (eve) or radars@mbc.co.uk

1 DECEMBER 2002

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

8 DECEMBER 2002

WEST MANCHESTER RADIO CLUB Red Rose Radio Rally - Stephen, G6BVN, 01942 888 900.

22 JUNE 2003

EPSOM RADIO & ELECTRONICS FAIR - Paul, M0CJX, m0cjx@lineone.net [www.epsomrally.co.uk]

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?

2 Aug GB4YOU: Youlbury Scout & Guide Radio. Oxford. TLH27P (G0REL)
GB4YOU: Youlbury Scout & Guide Radio. Oxford. TLH27P (G0RJX)

3 Aug GB0GDL: Glasson Dock Light. Nr Lancaster. LH27 (G3UCA)

10 Aug GB2MGY: Titanic original callsign. Dundee. LHV2 (GM3NHQ)

11 Aug GB0RID: Ridgewell War Time call sign. Ridgewell, Essex. L (G3MMA)

15 Aug GB0DCW: Dawlish Carnival Week. Dawlish, Devon. LH2 (G3LHJ)

16 Aug GB2APL: Anvil Point Lighthouse. Swanage, Dorset. TLH (G0WZK)
GB5RO: Radio Orkney. Birsay, Orkney Mainland. LH (GM0HTH)

17 Aug GB0BMB: Beaulieu Millennium Beacon. Beaulieu, Hampshire. LHV2 (G0LKG)
GB0NCI: National Coast Watch Inst.. St Ives, Cornwall. HV (G3NPB)
GB0PBL: Portland Bill Lighthouse. Portland, Dorset. LH27P (M5MKW)
GB0REL: Rathlin East Lighthouse. Rathlin Island, N. Ireland. LHV27 (GI0PGC)
GB2ELH: Eshaness Light House. Eshaness, Shetland Islands. LH (MM5PSL)
GB2HE: Hobbies Extravaganza. Netley, Southampton. LH2 (G0WIL)
GB2HE: Hobbies Extravaganza. Netley, Southampton. LH2 (G0VNI)
GB2LBN: Lighthouse Barns Ness. Dunbar, East Lothian. LH (GN4UYZ)
GB2LCP: Lighthouse Corsewall Point. Kirkcolm, Nr Stranraer. LHV27 (GM4LQS)
GB2LZL: Lizard Lighthouse. The Lizard, Cornwall. LHV2 (M0BMX)
GB2NCL: North Carr Lightship. Dundee. LH (GM3NHQ)
GB2NL: Neist Point Lighthouse. Glendale, Isle of Skye. LH (GM0NTL)
GB2PBL: Portland Bill Lighthouse. Portland, Dorset. LH27 (G4ZIY)
GB2PLH: Pakefield Lighthouse. Lowestoft, Suffolk. TLH (G3IWC)
GB2RFS: Ruthin Flower Show. Ruthin, Denbighshire. LH27P (GW4WSU)
GB2SCA: Scaborough Lighthouse. Scarborough, N Yorks. LH27 (G4SSH)
GB2TD: Trwyn Du. LH (GW0ETF)
GB4HL: Hurst Lighthouse. Keyhaven, Hampshire. LHV2 (G4GPD)

23 Aug GB2VTR: Vee Twin Rally. Shaftesbury, Dorset. LHV27 (G0GFL)
GB5FI: Flatholm Island. Bristol Channel, South Glam. TLHV2 (GW0ANA)

24 Aug GB4TCF: Town & Country Festival. Stoneleigh, Warks. TLHV27P (G4GHJ)

25 Aug GB2NJA: Society's callsign prefix. Brixham. LH2 (G3LHJ)

30 Aug GB0PC: Peterlee Carnival. Peterlee, Co Durham. TLHV27P (G0NSK)
GB4XF: Four by Four. Trentham, Staffs. L2 (G4PMY)
GB4YOU: Youlbury Scout & Guide Radio. Oxford. TLH27P (G0RJX)
GB4YOU: Youlbury Scout & Guide Radio. Oxford. TLH27P (G0REL)

SILENT KEYS

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

G2AGO	Mr J Moss	16/06/02
G2BRR	Mr R Rugg	22/05/02
G2CVA	Mr H Collard	12/02
G3CXI	Mr J Cooper	05/02
G3EDW	Mr P Golledge	02/06/02
G3ETX	Mr F Wilson	13/05/02
G3FJF	Mr O K J Stout	14/06/02
G3HES	Mr K Pugh	08/06/02
G3IQE	Mr J E Fuller	02/05/02
G3KHS	Mr T B Cutmore	29/05/02
G3VIV	Mr R H Hannaford	
G3XKA	Mr I J Cunningham	12/06/02
G3XQU	Dr A G Gray	25/05/02
G3ZVD	Mr W K Allen	18/05/02
G4BZQ	Mr J Richardson	03/06/02
G5DS	Mr J L Danks	27/05/02
G6ZLQ	Mr R C Bishop	28/07/01
G8POH	Mr M A Laing	04/06/02
GM3MIE	Mr R Brunskill	11/04/02

THE RSGB REGIONS AND DISTRICTS

Region 1	**Scotland West & the Western Isles**		**Gordon Hunter, GM3ULP**
District 11	MM0BHX	Central, City of Glasgow	
12	GM4GZQ	Lanarkshire, Renfrewshire	
13	MM0BRG	Ayrshire, Dumfries & Galloway	
14	GM3UWX	Dunbartonshire, Argyll & Bute, Western Isles	
Region 2	**Scotland East & the Highlands**		**Billy Jenkins, MM0WKJ**
District 21	GM3WKZ	Highlands	
22	MM1CNA	Aberdeenshire, Moray	
23	GM4ZNX	Angus, Perth & Kinross	
24	GM6CMQ	Fife, Lothian, Borders	
25	GM7GMC	Orkney	
26	GM7RKD	Shetland	
Region 3	**North West**		**Kath Wilson, M1CNY / M3CNY**
District 31	G4USW	Cumbria	
32	G1GNS	Lancashire	
33	G4YYB	Gtr Manchester	
34	G7OBW	Cheshire, Merseyside	
35	GD0TEP	Isle of Man	
Region 4	**North East**		**Geoff Darby, G7GJU / M3GJU**
District 41	M0ACV	Northumberland, Tyne & Wear, Cleveland, Co Durham	
42	G0VRM	North Yorkshire, East Yorkshire	
43	M1BGY	West Yorkshire	
44	G3PTV	South Yorkshire, NE Lincolnshire	
Region 5	**West Midlands**		**Roy Clarke, G8AYD / M0RLY**
	Position Vacant		
District 51	G3FZW	Shropshire, Staffordshire	
52	-	West Midlands	
53	G0JWJ	Hereford, Worcestershire	
54	-	Gloucestershire, Warwickshire	
Region 6	**North Wales**		**Liz Cabban, GW0ETU**
District 61	GW4GTE	Flintshire, Wrexham	
62	GW3RBM	Conwy, Denbigh	
63	GW0ABL	Gwynedd, Ynys Môn (Anglesey)	
64	GW0RJV	Powys	
Region 7	**South Wales**		**Simon Lloyd Hughes, GW0NVN**
District 71	-	Pembrokeshire	
72	GW7AGG	Ceredigion (Cardigan)	
73	GW4RVA	Carmarthenshire	
74	GW0VSW	Vale of Glamorgan, Cardiff, Newport, Swansea	
Region 8	**Northern Ireland**		**Jeff Smith, MI0AEX**
District 81	MI5JYK	N Belfast, Co Antrim	
82	GI6ATZ	S Belfast, Co Down	
83	GI8RLE	Co Armagh, Co Fermanagh	
84	GI4YWT	Co Londonderry, Co Tyrone	
Region 9	**London & Thames Valley**		**Alan Ross, G1SQB**
District 91	G3MCD	London north of the Thames	
92	G0SVN	Berks, South Bucks	
93	-	Herts, North Bucks	
94	M0CJX	Surrey, London south of the Thames	
Region 10	**South & South East**		**Ivan Rosevear, G3GKC**
District 101	M3JFM	Oxfordshire	
102	G0GRI	Wiltshire	
103	G4DRV	East Sussex, West Sussex	
104	G4KWX	Hampshire, Isle of Wight	
Region 11	**South West & Channel Islands**		**Richard Atterbury, G4NQI**
District 111	G3VWK	Cornwall	
112	-	Devon	
113	G0XAY	Somerset, Bristol	
114	G0KKL	Dorset	
115	GJ0JSY	Jersey	
116	GU4YOX	Guernsey	
Region 12	**East & East Anglia**		**Malcolm Salmon, G3XVV**
District 121	M0CNX	Cambridgeshire	
122	G4NZQ	Norfolk, Suffolk	
123	-	Essex	
124	G3ROO	Kent	
Region 13	**East Midlands**		**Bryn Llewellyn, G4DEZ**
District 131	-	Leicestershire & Rutland	
132	G3XZF	Lincolnshire, Nottinghamshire	
133	-	Derbyshire	
134	M0NTY	Bedfordshire, Northamptonshire	
Region 14	**Overseas**		

This listing shows the 14 RSGB Regions, as revised in January 2002, with their RSGB Regional Managers (RRMs) and, underneath each Region, the RSGB Districts with their Deputy RSGB Regional Managers (DRRMs), and the areas making up those Districts. The RSGB Regional Representation Scheme is designed to allow changes to the district boundaries as required in order to support the membership most effectively, therefore further changes to the districts shown above may take place in the future.

Breakdown of the RSGB Regions and Districts, with Regional and Deputy Regional Managers, as of 8 July 2002.

Club & Regional NEWS

Region 1: Scotland West & Western Isles

No club details received.

Region 2: Scotland East & the Highlands

COCKENZIE & PORT SETON ARC

9, 'Junk Night'. 17, 18, Lighthouse Weekend, Barnes Ness. Bob, GM4UYZ, 01875 811723.

Region 3: North West

THORNTON CLEVELEYS ARS

5, Cable & Wires, G4EZM. 12, CITB training & safety talk. 19, Construction discussion, on air. Jack, G4BFH, e-mail: jack@jduddington.fsnet.co.uk

Region 4: North East

GOOLE R&ES

2, Fund-raising at the Black Swan Inn. 9, On air at Barmby Tidal Barrage. 16, 'Treasure hunt' starting at Black Swan. 30, Talk at Courtyard Centre, Goole. Richard, G0GLZ, 07867 862169.

GRIMSBY ARS

1, Treasure hunt in Grimsby. Brian, G4DXB, 01472 231383.

GRIMSBY RED CROSS

1, Foundation Licence induction evening. 4, 11, Foundation Licence. Andy, G0VRM, 01482 643660.

HALIFAX & DARS

20, Talk & presentation on PSK31. R E Nolson, G0PMU, 01274 600297.

KEIGHLEY ARS

8, On air. 15, AROS, Barry Scarisbrick, G4ACK. 22, Presentation by Joe Kassner from USA or RSGB presentation, Ian, M1BGY (TBC). 29, Film show (TBA). Ian, M1BGY, 01274 723951.

Region 5: West Midlands

CHELTENHAM ARS

2, Building and operating the K2 and using balloon-supported antennas, Steve Rawlings, GW4ALG. Ivan, G4BGW, 01452 731956, ivan@g4bgw.freeserve.co.uk

COVENTRY ARS

2, BBQ & on air. 9, On air & CW practice portable night. 23, On air, CW Practice & TCF preparation.30, Quiz Night. John, M3AGM, johng8seq@ntlworld.com

GLOUCESTER AR & ES

5, Workshop, on air. 12, DF hunt briefing. 17, DF hunt. 26, /P VHF from escarpment site. Tony, 01452 618930 office hours.

KIDDERMINSTER & DARS

6, Preparation for SSB Field Day, talk on Contest Operating. Tony, G1OZB, 01299 400172

MID-WARWICKSHIRE ARS

3, Club Field Day and picnic at Draycote Water. 27, 145MHz foxhunt. Bernard, M1AUK, 01926 420913.

SALOP ARS

1, Junk sale. 8, Calibration evening. 25, Charity bike ride. 29, Telford Rally preparation. Wayne, M5WJF, m5wjf@qthr.freeserve.co.uk

SANDWELL RC

30, Morse Tests. John, G4AAL (QTHR).

TELFORD & DARS

7, Open evening, on air. 14, Preparation for Telford rally. 21, 28, M3 nights: help for new licensees and others. Mike, G3JKX, 01952 299677.

Region 6: North Wales

NORTH WALES RRC

16-18, Lighthouse Weekend on Great Orme, Llandudno. 24 - 31, Bardsey Island DXpedition. Ted, GW0DSJ, 01745 336939.

Region 7: South Wales

BARRY ARS

6, Planning for rally. 11, BBQ, on air at Nash Point. 13, Construction and use of club website, Paul Butt, GW0GVQ. 20, Preparation for GB5FI expedition to Flatholm Is. 27, Make contact with expedition team. Richard, GW4BVJ, 01656 658830.

Region 8: Northern Ireland

No club details received.

Region 9: London & Thames Valley

CHESHAM & DARS

7, General meeting. 14, Shack evening SSTV. 21, SSB Field Day planning. 28, On air, rig training. Terry, terence.thirlwell@eds.com

CHESHUNT & DARC

7, Members' forum. 21, PSK31, Dick, G3URA. Jim, G0JXN, 01992 468204.

COULSDON ATS

12, Club BBQ, hosted by Prue, G4RWW. Steve, G7SYO, 01737 354271.

EDGWARE & DARS

8, No meeting. 22, SSB field day briefing. David, G5HY, 01923 655284 (days) / 020 89549180 (eve).

MAIDENHEAD & DARC

1. BBQ. 20, Visit White Waltham airfield (TBC). John, G3TWG, 01628 525275.

RS OF HARROW

3, GB2DHH operating day. Jim, G0AOT, 01895 476 933 or 020 7278 6421.

READING & DARC

8, Mystery evening. Pete, G8FRC, 0118 969 5697.

SOUTHGATE ARC

8, BBQ. 22, 'Foxhunt' equipment tests. 26, 'Foxhunt'. Mike, M0ASA, 020 8366 0698.

SURREY RCC

5, Family evening talk & buffet. Ray, G4FFY, 020 8644 7589.

WIMBLEDON & DARS

9, Computer workshop, Gary, G7UVF. 30, 'Fix-It Night' (that kit you built that did not work). Jim, G4WYJ, 01737 356745.

Region 10: South & South East

BASINGSTOKE ARC

5, Saving Butterflies, the Reserves Office, Lynn Fomison. Peter, M1DGQ, 0118 983 6545.

CRAWLEY RC

28, BBQ. Derek Atter G3GRO 01293 520 424.

FARNBOROUGH & DRS

14, Earthing, Mike, G8ATK. 28, 'Time, part 2', Derek, G3HEJ. Norman, G0VYR, 01483 835320.

HASTINGS E & RC

21, The Enigma Encryption Machine, John Elgar Whinney. R C Gornall, G7DME, 01424 444466.

HORNDEAN & DARC

6, Club social. 27, Club meeting: please phone for details. Stuart, G0FYX, 023 92472846.

HORSHAM ARC

1, 'ELINT', Robin Humphries, M3RRH. David, G4JHI, 01403 252221.

ITCHEN VALLEY RC

17, 18, Hobbies exhibition, Royal Victoria Ctry Park, Netley. Mike, G6AIQ, mamjh@yahoo.com

MID SUSSEX ARS

2, 'Foxhunt', Mike G0GNV. 9, Motorised treasure hunt, Sue, G6YPY. 16, 'At home' with our president, Jack, G3JMB. 23, Shack ops & table top sale. 30, Boules at Newick. Geoff, G6MJW, 01273 845103.

OXFORD & DARS

8, History of RSGB, its Regional Structure and the new Licensing Structure, Ivan Rosevear, G3GKC, RSGB Regional Manager. Dave, G3BLS, 01865 247311.

SOUTHDOWN ARS

5, Computer housekeeping, John Kirby, G3JYG. John, G3DQY, 01424 414319.

TROWBRIDGE & DARC

7, Raynet & emergency planning mapping, 2E1EYI & G1HFY. Ian, G0GRI, 01225 864698, evenings / weekends.

WORTHING & DARC

7, Discussion evening. 14, Video. 21, BBQ. 28, Construction hints. Roy, G4GPX, 01903 753893.

Region 11: South West & Channel Islands

APPLEDORE & DARC

19, Talk on radio-related subject, Terry, G4CHD. Brian, M0BRB, 01237 473251.

BLACKMORE VALE ARS

6, VHF on air. 10, BBQ. 13, Datamodes demos. 20, 21, At Gillingham and Shaftesbury Show. 24 - 26 Shaftesbury's VeeTwin Rally. 27, WAB. Tony, G0GFL, 01258 860741.

BOURNEMOUTH RS

2, Construction and practice. 16, 'From RDF to RADAR', R Brett-Knowles, G3AAT. Chris, M5AGG, 01202 893126.

BRISTOL RSGB GROUP

26, 'Potted lectures'. Martyn, G3RFX, 0117 9736419.

CORNISH RAC

1, General meeting. 12, Com-

puter section, writing programs to CDs. John G4LJY, 01872 863849.

EXMOUTH ARC

14, Video. 28, 'Mechanics of Time'. Mike, G1GZG, 01395 274172.

SOUTH BRISTOL ARC

7, On air. 14, Amateur radio shareware. 21, Display of old domestic radios. 28, Choosing best cables and connectors. Len, G4RZY, 01275 834282.

TORBAY ARS

16, BBQ. 26, Communications Fair. Walt, G3HTX, 01803 663200.

WEST SOMERSET ARC

6, Designing a website, Bob, G1ONV. Jean, G0SZO, 01984 633060.

YEOVIL ARC

1, 'First Experiences on HF', M0WOB. 8, 'Falkland Islands', Brian Paul. 15, Newcomers' evening. 22, The AR88 comms receiver, M3LNJ. 29, On air. Derek, M1WOB, 01935 414452

Region 12: East & East Anglia

CHELMSFORD ARS

6, Table top sale. David Bradley, M0BQC, 01245 602838.

COLCHESTER RAC

1, 15, 29, Summer venue - Lexden Grange. Andy, M1MOD, 01206 735122.

HARWICH ARIG

14, Video. Eugene, G4FTP, 01206 826633

IPSWICH RADIO CLUB

7, On air at Otley. 21, Club net and activity. 28, On air at Otley. Keith, G7CIY, 01394 420226.

LOUGHTON & EPPING FOREST ARS

9, VHF on air. 23, Foundation License Course trial run. Marc, G0TOC, 07803 023501.

NORFOLK ARC

7, Amateur Radio Observation Service, Barry Scarisbrick, G4ACK. 14, Informal Morse practice and instruction. 21, Construction contest. 28, Informal Morse practice and instruction. Peter, G3ASQ (QTHR).

SUDBURY & DRA

6, BBQ with Dave, M0BMF. Bryan, G1TWY, 01787 247893.

Region 13: East Midlands

EAGLE RG

13, Computing, G7BUK. G0SWS, 01507 478590.

LINCOLN SW CLUB

7, On air. 21, Video. 28, Hamfest Discussion. John, G1TSL, 01522 793751.

SCUNTHORPE STEEL ARS

6, Programme planning. Alistair, M1ECF, 01427 872976.

SOUTH NOTTS ARC

28, SSB Field Day Preparation Meeting. Details: 01509 569679.

CHESHAM MORSE ASSESSMENT

THE CHESHAM & DARS is holding a Foundation Licence Morse Assessment session for Class B licensees who want to take out an M3 callsign on Wednesday 28 August. Tests will be held between 8.00 and 10.00pm at the White Hill Community Centre, White Hill, Chesham, Bucks, just a few minutes walk from Chesham underground station on the Metropolitan line. For further information on this session please contact Roger, G3MEH, tel: 01442 826651, e-mail g3meh@supanet.com

COLCHESTER HITS THE CENTURY

OVER 100 Foundation Licensees have now been created thanks to the Colchester Radio Amateurs. On 25 / 26 May a further 11 candidates completed the Foundation Licence course, with an additional five Class B licensees taking the Morse Assessment. This brings the total of potential M3s from Colchester courses to 103.

Region	RSGB Regional Manager
1. Scotland West & Western Isles	Gordon Hunter, GM3ULP
2. Scotland East & the Highlands	Billy Jenkins, MM0WKJ
3. North West	Kath Wilson, M1CNY / M3CNY
4. North East	Geoff Darby, G7GJU / M3GJU
5. West Midlands	Roy Clarke, G8AYD / M0RLY
6. North Wales	Liz Cabban, GW0ETU
7. South Wales	Simon Lloyd Hughes, GW0NVN
8. Northern Ireland	Jeff Smith, MI0AEX
9. London & Thames Valley	Alan Ross, G1SQB
10. South & South East	Ivan Rosevear, G3GKC
11. South West & Channel Islands	Dick Atterbury, G4NQI
12. East & East Anglia	Malcolm Salmon, G3XVV
13. East Midlands	Bryn Llewellyn, G4DEZ

RSGB Regional Managers as of 1 July 2002.

STOKE ON TRENT ARS RETURNS TO TRENTHAM GARDENS

PICTURE THE SCENE - it's 1964, your 80m whip is bolted on to the roof of a perfectly polished Humber or Anglia and you're attending a once-popular mobile rally. Well, the Stoke on Trent Amateur Radio Society, G3GBU, is re-kindling the past at Trentham Gardens, in Stoke on Trent, by returning there after an absence of 38 years, not quite with a mobile rally, but to man special event station GB4XF, as part of the National 4x4 Show, being held between 30 August and 1 September. Pride of place goes to an ex-Russian Military R161-A2M HF communications truck kindly loaned by G4PMY. The R161 transmitter will run up to 3kW but the ERP will be limited to legal levels for the event. The Stoke ARS will be operating on HF plus 6, 4 and 2 metres throughout the three-day event, which also includes competitions, trade stands and clubs, making it a good day out for the whole family.

SILVERTHORN RADIO CLUB

ON 9 MAY, HM Queen Elizabeth II accompanied by the HRH The Duke of Edinburgh, visited East London as part of their Golden Jubilee Tour. The tour started with a visit to Waltham Forest Town in Walthamstow. To mark the occasion, the Silverthorn Radio Club, which is also celebrating its Golden Jubilee this year, put on special event station GB4HRH from the radio shack of the college next to the Town Hall, which offered superb views of all the events and the Royal Party. During the day 101 contacts were made with over 13 countries, mainly on 40m SSB and CW, running 90W into a trap dipole.

The callsign was also used at the Silverthorn Radio Club on 17 May and also on Jubilee Day, 4 June from Broxbourne Meadows in Hertfordshire. For more details of the Silverthorn Radio Club, which meets in Chingford, NE London, contact Dave, G0KHC, on 020 8504 283, e-mail secretary@silverthornradioclub.org.uk or visit the website at http://www.silverthornradioclub.org.uk

"NOT A WALKOVER"

Left to right: Lead Instructor David G3UNA; Steve, M3HAL; Mike, M3SWE; Zahid, M3ZAZ; Archie, M3AYR, Sharon, M3SOM, and her husband, Assistant Instructor Nigel, M5GVY.

THE FIVE NEWEST members of the Ripon and District ARS recently attained passes in their Foundation Licence assessment: Steve, M3HAL; Mike, M3SWE; Zahid (aged 13), M3ZAZ; Archie, M3AYR; and Sharon, M3SOM. Sharon was then large with child and now has a bouncing baby boy, just in time for the next Foundation Licence course at RADARS! The latest course was conducted over four Saturdays and the fifth for the exam. Lead Instructor David Cutter, G3UNA, the Chairman of the Ripon and DARS, made use of the Power Point Presentation from the Bangor ARS website. "Nothing like the sample paper" was one comment, "not a walkover" was another. Sharon particularly liked doing the Morse Code; latest - mother and baby doing well.

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*.

G4MOJ LEGACY PRIZE DRAW

WHEN JEFF JEFFREYS, G4MOJ, died members of the Midland Amateur Radio Society were extremely surprised to learn that he had left most of his radio equipment to the general membership of the club. All current members - a total of 53 - were eligible for the draw of 43 prizes. The draw took place on 2 May and was coordinated by Stuart Granger, G4NSG, and John Dee, G4LRZ, who was Jeff's executor. The tickets for the draw were the address labels of all members and the club's president, Madge Palmer, G0JBK, drew the ticket for the first prize - a BC221 frequency meter. Other prizes included VHF / UHF transceivers, receivers and antennas.

Madge, G0JBK, president of the Midland Amateur Radio Society, draws the first winning ticket, held aloft by Stuart, G4NSG, the club's magazine editor and draw coordinator.

Chris Tredwell, G8CHW, of MARS comments that "if not unique, this act of kindness must rank as one of the finest within the hobby."

CARS DEMONSTRATES LOW POWER OPERATION

ON THE FIRST evening of Chelmsford's May Foundation course, Martyn, G1EFL / M3VAM, brought along an FT-817 and Miracle Whip indoor antenna. He tried it on 21MHz SSB and straight away got a contact with Madeira - not bad going with just 5 watts. This successfully demonstrated to the Foundation candidates that you can still get good contacts even with low power and a compact indoor antenna.

Martyn G1EFL / M3VAM, and Foundation candidate Mike Sullivan with the FT-817 and Miracle Whip.

To join a future Foundation course contact the secretary David Bradley, M0BQC, on 01245 602838, e-mail: cars@g0mwt.org.uk or visit the club's website at: www.g0mwt.org.uk/

ZOE SCORES 19 OUT OF 20

THE SOUTH Derbyshire and Ashby Woulds ARG has run a couple of Foundation courses now and many Morse Assessments. The last course included their youngest candidate, Zoe Sleming, age 9, and her mother, along with 10 Air cadets and three others. Not only did Zoe take great interest in the course, she succeeded in getting 19 out of 20 of the questions right. This effort and achievement deserved added recognition and award, so a certificate was presented by Lew Kirby, G4CRT, at a recent club meeting.

BARDSEY ISLAND DXPEDITION

MEMBERS OF THE North Wales Radio Rally Society are returning to Bardsey Island between 24 and 30 August for their third DXpedition. Bardsey Island is located 2.5 miles off the coast of the Lleyn Peninsula and a 21-mile sea journey from Pwllheli. It counts as EU-124 for the RSGB Islands on the Air awards.

This year's team is Tony, GW4PVU; Tony, M0WBXJ; Roger, MW0IDX; Richard, GW0VMW; Ted, GW0DSJ; Allen, MW3BXJ; Liz, GW0ETU, and Melfyn, GW1AKT. They will be operating as GW0NWR/P on all bands from 160 to 6 metres, SSB and CW, from the engine room of the Bardsey Island lighthouse. This year they are taking 'only' four HF stations and one 50MHz station, reducing the load that has to be manhandled on and off the island. The QSL manager is GW0DSJ.

Ted Shipton, GW0DSJ, reports, "Last year was very trying indeed, after setting up all the HF stations we found that during the night the engine room leaked and we spent an awful lot of time the following day drying out all the radios. This year we will be taking our umbrellas to keep the gear dry. Also last year we spent an extra five days on the island due to inclement weather, unable to get off due to 30ft seas and constant fog. We ran out of most of the goodies in life - drink, smokes and food. One of our operators ran out of his ticker medication, and was airlifted off the island. With all the gear packed and waterproofed ready for the off, and not knowing when we could get off the island, we spent five days twiddling our thumbs - will we go today or will we not?"

Last year around 3000 contacts were made all around the world; this would have been much higher, if 'Mr Murphy' had not taken a hand. This year Ted says they hope to do much better as they have learned lessons from the previous years.

A fuller account of the club's trials and tribulations on Bardsey Island last year 2001 can be found on the club's website at www.nwrrcw.org.uk

MUCKLEBURGH COLLECTION ON TV

ON 20 JUNE, Anglia TV's Helen McDermott visited the display at the Muckleburgh Collection and toured the shack of GB2MC, which is operated by members of the North Norfolk Amateur Radio Group. She interviewed the club Chairman, Dick Gallop, G0KNQ, on film and was shown the vintage collection of military radios. She also took part in a children's Morse display.

Some filming took place in the shack of a QSO with the Collection's callsign. The programme is one of the series 'A Date with Helen . . .' and was to be broadcast on Anglia TV at 1.05pm on 10 July. A bit of good publicity for the North Norfolk Amateur Radio Group, the hobby and the collection.

David Wilkins, G5HY, on the rails? On 5 / 6 May special event station GB2EVR was located at Warcop railway station on the Eden Valley Railway in Cumbria. The station was set up on the track, with an earth spike between the rails. Assisting were members of the Bishop Auckland Radio Amateur Club.

VHF/UHF

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

THE FIRST WEEK of June provided extensive Sporadic E (Es) propagation. These are usually daily events on 50MHz but this year there were several excellent periods for 144MHz operators, too. There was a TEP-type opening to South America on 50MHz and late May produced some auroral activity on the VHFs.

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, (LP), (TD) etc refers to the postcode area and (GG66), for example, is the Maidenhead grid.

PUBLICATIONS

ISSUE 1/2002 OF the quarterly *DUBUS Magazine* starts with a bi-lingual English/German article describing 'A very high dynamic range LNA for 144MHz' by Peter Hoefsloot, PA3BIY. His design employs pHMET technology using an ATF-54143 E-pHEMT device - the 'E' indicating 'Enhanced'. He achieved a measured gain of 23dB, 0.25dB noise figure, a third order input intercept point of 2.5dBm, 12dB input return loss and >25dB output return loss. Full layout, circuit diagrams and performance graphs are featured.

There are the regular EME, 6m, tropo, aurora, Es and MS news columns. The EME column includes the first part of an excellent 'Startup EME 432MHz' contribution by Bernd Wilde, DL7APV. The UK agent for *DUBUS* is Roger Blackwell, G4PMK (QTHR), whose e-mail address is dubus@marsport.demon.co.uk

The May edition of *Six News*, the quarterly journal of the UK Six Metre Group, includes a report on the group's AGM held during the 6 April VHF event at the Reaseheath Agricultural College. Clive Davies's, G4FVP, regular 'What's on Six' column includes a very interesting section on last winter's transpolar QSOs in the Northern Hemisphere. The PA1SIX website - see the list - has a section covering this type of Spread-F phenomenon, as well as lots of useful 6m information. Chris Deacon, G4IFX, edits *Six News* and Dave Toombs, G8FXM (QTHR), handles membership subscriptions. His e-mail address is secretary@uksmg.org and there is a website - see the list.

GEOMAGNETIC AND SOLAR ACTIVITY

THE SOLAR RADIO flux continues to decline so it would seem that we have passed the second peak of Cycle 23. Data from the Space Environment Center (SEC) for the 30 days to 18 June show that the peak value of the 10.7cm radio flux was 189 on 24 May, the minimum being 131 on 14 June. The average was 164.5 and 47 new sunspot regions were recorded.

The geomagnetic data show that the middle latitude A-index at Fredericksburg reached a storm level of 52 on 23 May and a sub-storm value of 22 on the 27th. On 22 days it was in the quiet region of up to 10. The high latitude data for College, Alaska, were not recorded for the week beginning 21May.

The April issue of *SunMag* includes an interesting piece on the developments in forecasting future solar storms. As we all know, solar storms, culminating in coronal mass ejections (CMEs), can have a significant effect on the Earth environment, such as auroral events and disruption to communications. This is a joint research programme based at the National Space Science and Technology Center (NSSTC) in Huntsville, Alabama in collaboration with scientists at the University of Huntsville.

There are the usual tables of solar, geomagnetic and particle data and nine pages of sunspot group information. *SunMag* is compiled and published by Neil Clarke, G0CAS (QTHR), whose e-mail address is neil@g0cas.demon.co.uk and he has a website - see the list. I acknowledge with thanks receipt of the February edition of *The Six and Ten Report*, which is an activity of the RSGB Propagation Studies Committee (PSC) - see the list for website details.

WSJT *ET AL*

DAVID HILTON-JONES, G4YTL (MK), writes, "I am amazed and appalled by the rubbish being talked about JT44 on e-mail reflectors. We should be rejoicing in the advent of a new technique that has had a dramatic impact on activity and will perhaps bring on to the radio those who abandoned it in favour of playing with computers".

On the first page of the *Terms, Provisions and Limitations Booklet BR68* it states, "1(1) The Licensee shall use the Station for the purpose of self-training in communication by radio telecommunications, which use (without limiting the generality of the foregoing) includes technical investigations". So aren't experiments with this relatively new mode a perfect example of this?

Rather than knock the mode, shouldn't we consider some kind of award to Joe Taylor, K1JT, for his brilliant contribution to amateur radio communication? I am quite happy to include WSJT-type QSOs in claims for the tables since they do not involve any form of man-made relay such as a repeater.

Philip Town, G0ISW (IO84), is a typical user of the mode. He writes, "May has seen lots of MS action here using the latest version, 2.01 of WSJT software. This new version has the existing FSK441 MS mode and a new JT44 mode. JT44 is for use for both EME and troposcatter working and is claimed to be far more efficient than CW for EME, even allowing single Yagi stations to work via the Moon". If you have any comments on this topic please let me have them.

BEACON NOTES

FRANK EVANS, GW8AWM, is the keeper of the Bristol beacon GB3BSL on 432.934MHz and when he went to tweak its frequency recently found it was operating at much reduced power due to a blown PA. It had been transmitting about 1W rather than 25W. He repaired it and it now has a much improved, super cool PA: it was back in full service on 17 June. He also looks after GB3USK on 1296.875MHz at the same site, IO81QJ. He has also corrected a small keyer problem when they would both occasionally stop sending their callsigns.

Brian Williams, GW0GHF (CF), reports that the 4m beacon signing GW3MHW in Powys has now QSYd to its former QRG of 70.052MHz. However, it is not a 'proper' listed beacon so, if it is a personal one, it should be on 70.030MHz, as is a new one, G4JNT (IO90IV), which is usually S4-7 in Llandough. Brian says that the FSK is poor, there being only a few Hertz separation between the tones and it's on top of the Slovenian beacon S55ZMB.

METEOR SCATTER

THE PERSEIDS METEOR shower is *the* event for MS enthusiasts in August. And the OH5IY *MSSOFT* program suite suggests that the main peak will be around 1700 on the 12th with a zenithal hourly rate (ZHR) of 119 followed by a secondary one of 105 about six hours later. The current software can be downloaded from his website - see the list.

For those wanting the latest MS Database maintained by the VHF-DX-Group DL-West, Guy Junkersfeld, DL8EBW, advises that version 1.85 is now available for download from their

home page - see the list. There are two zipped files; ms185.zip, which unzips to a text file of about 203KB with 2917 callsigns and information, and ms185_WSJT.zip which unzips to about 43KB with 2367 calls and info.

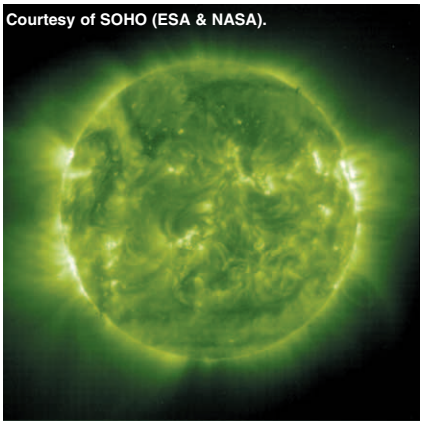
MOONBOUNCE

PETER BLAIR, G3LTF (IO91), was QRV on 18 May on 70cm and worked DF3RU, F2TU, UA3PTW, K9SLQ for initial no. 358 and IN3AGI. On 23cm he worked I0UGB, ZS6AXT, IK2MMB, JA6AHB, IK3COJ, G4CCH and W2UHI, presumably all CW QSOs? He now has a new low backlash gear train on his dish and reckons it to be within 0.5º with the Moon following system. This news from the June *432 and Above Newsletter*.

Howard Ling, G4CCH (IO93), was on 23cm for the ARI Italian Contest over the 18/19 May weekend. On the 18th he completed with JA6AHB*, I0UGB*, F2TU*, ZS6AXT*, IK3COJ*, G3LTF*, IK2MMB*, DF4PV*, OZ6OL*, W2UHI*, DF4PV again, W7BBM, SM3AKW*, GM4ISM*, OZ4MM* and HB9BCD*. The following day he worked I0UGB*, PA3DZL*, F2TU, W7SZ*, SM2CEW*, HB9BCD*, K2UYH* and W7GBI*, closing down at 2300. The 20 scoring QSOs were worth 263 points. On 8 June DL8OBU* was initial no. 169.

Howard was QRV again on 23cm over the 15/16 June weekend completing with JA6AHB*, F1ANH*, DL8OBU*, W2UHI*, W7BBM, W2UHI and IK2MMB*. Next day he worked F6ETI*, IK3COJ*, GW3XYW* also on SSB, OH2DG*, DF4PV*, K0YW*, W7BBM, N2UO* for initial no. 170 and VE6NA*.

The best August weekend is the 3/4 one when London latitude stations will have about 31.5 hours of Moon time. The declination varies from +18.10º to +23.23º and the 144/432MHz sky temperature range is 406/28K to 515/39K. The signal degradation referred to perigee varies from -1.56dB to -1.25dB and the Sun offset at Saturday midnight is -61º.



Courtesy of SOHO (ESA & NASA).

***SOHO* Extreme ultraviolet Imaging Telescope (EIT) full-field Fe XII 195 Å image of the sun at 1024UTC on 24 June, from NASA Goddard Space Flight Center.**

AURORA NEWS

THERE WAS AN intense aurora on 23 May when the K-index reached 7 in the late afternoon/early evening period. Dave Butler, G4ASR (IO81), reports more contacts to the south and south-east than usual. The event started at 1620 and ended very abruptly at 1747. His first QSO was with GM0CLN on 2m, then he made seven contacts on 6m with G and GW stations, ODX being LB1NI (JO59) at 1218km. Then at 1659 it was back to 2m to work another 17 stations in DL, F, HB9 and ON, ODX being OK2VWB (JN99) at 1510km, all on CW. Optimum beam heading (QTE) was 75º.

Andrew Soltysik, G4KWQ (IO92), switched on at 1635 to find the event in full swing and he worked 26 stations on 2m till fade-out at 1748. These included OE5KE (JN78), HA5UK (JN97), HA5OV (JN97 and ODX at 1608km), 9A2RD (JN65), OK1PFR (JO80) and OK1VT (JN79). He runs an FT-847, 400W to two 12-ele M² Yagis 40ft AGL. Bob Harrison, G8HGN (CM), caught the tail end of the aurora working DG5BKM (JO31), ON7CL (JO20) and PA6HHT (JO22) on 2m.

Colin Smith, GM0CLN (IO85), also operated in this event between 1624 and 1745 completing 26 CW QSOs on 2m with stations in DL, F, G, GM, LA, OK1, PA and SM6, ODX being OK1PFR at 1448km. While some QTEs were 90º most were 75º. He runs 100W to a 14-ele Yagi at only 8ft AGL.

SPORADIC E

THE TONE IS set on 6m by Ted Collins's, G4UPS (EX), daily report for the 22 May through 17 June period which runs to six A4 pages. He records good Es propagation on 22, 23, 26 and 27 May to Scandinavia, the Balkans and mid-Europe. Things really hotted up from 1 June until the 12th with most every country with 6m available from Iberia in the west to Israel in the east and Finland in the north to North Africa in the south. Other good days were the 14th, 16th and 17th. On 3 June he heard a new beacon, HB9SIX (JN47KM) at S9 on 50.0585MHz.

Tony Crake, G0OVA, was QRV in the RSGB Trophy Contest over the 1/2 June weekend and between 1533 and 1915 worked into LZ, SP8, SV8, YO and YT. After the contest on the 2nd he contacted ER3ZZ (KN47) and SV5BYR (KM46) for new countries, plus a couple of YOs. JX7DFA (IQ50) was another new country on the 4th.

Robin Burrows-Ellis, M1DUD (IP), continues to turn in terrific results with his maximum of 2W. But in the 21-25 May period in strong morning openings he worked 47 stations using just 200 *milliwatts*, ODX being 9H1ET (JM75) at 2079km on the 26th. In the Trophy contest he made 92 contacts into 10 new grids working SV2DCD, SV8DTD and UT1YV.

Steve White, G3ZVW (NL), highlights CNs 8LI and 2DX (IM63) on 5 June, OJ0VR, ES8/RZ1AK (KO18), YI9OM* (LM23) and I1NAI/8 (JM79VR an almost entirely 'wet' grid) on the 7th. The 9th brought A45XR* (LL93), ZC4ODW* (KM65), OD5/OK1MU* (KM73), 4Z4KX* (KM71), 4X4IX (KM72), UX7U* (KO50) and 4Z4DX (KM72).

G8HGN made good use of the many Es openings adding 26 grids to his tally. To pick out some of the May highlights, 4Z5AO (KM72) and HV5PUL (JN61) on the 21st, SM3VAC (JP83) and OH3KTL (KP02) on the 22nd, US0YA (KN28) on the 23rd and OH6HFX (KP14) and SP8VJV (KN09) on the 27th. June brought Bob nine QSOs on the 1st including LZ2ZY (KN13), T93Y (JN93), UR6F (KN45), SV8DTD (KM39), Z36W (KN11) and IF9/I2AND (JM67). On the 6th, LA1NG (JP66) and YO6AWR (KN25) and next day OJ0VR (JP90). Five contacts on the 8th included OD5/IW0GXY (KM73), EH9IB (IM85), EH9AI (IM75) and EH4BHK (IN80).

David Dodds came down the spectrum for a change and operated in the six hour, single operator section of the Trophy event as GM4WLL/P (IO85NR). He completed 133 QSOs with stations in 20 countries and 61 grids for a claimed score of over 17 million points. ODX was Z36W at 2387km and his 10 best QSOs were all over 2100km.

Running 10W to a 3-ele Yagi, Mike Kerry, GW1SXT (NP), was QRV on 1 June and completed with YO5BWD (KN37), IW5ECW (JN52), IK1NAO (JN35), S51DI (JN76), 9A5Y, EH7GTF (IM87), EH6TC (JM08), CT1HZE (IM57), SP4MPB (KO03) and SQ9ACH.

Next to 4m and Derek, G8TOK (JO01), reports exceptionally good conditions. The Es season started on 23 May since when he has worked S53X, S57UUD and S57ORO (JN65), S51DI, S52SK (JN76) and S54M (JN86). He reports that the S5s have been working into EI and GM. The highlight was on 5 June when he heard two 'English' stations chatting on 70.185MHz. After a few minutes one signed 5B/G1JJE so he broke in, was replied to with a "QRZ?" only for conditions to drop out, so no QSO. A subsequent e-mail from Norman confirmed that he was chatting with 5B/G3SZG. He told Derek that the local water company in Cyprus uses 70.150 and 70.200MHz for data transmitting so they can't hear British Isles stations using 'our' calling frequency: The 5Bs use 70.185MHz.

Dez, ZC4DW (KM65WB), heard S51DI on 70.210MHz at 1730 on 27 May but by the time he had sorted out the transmit side, propagation had died so no QSO. The QRB is 1947km.

Brian Mawhinney, GI3KSO (IO64), heard the 5B4CY beacon at S3 for over an hour during the evening of 8 June, a QRB of 3740km.

Lastly to 2m, and Dave Edwards, G7RAU (IO90), made 10 QSOs with YO stations between 1708 and 1733 on 1 June, ODX being YO3IZI (KN34) at 2217km. The pile-up next day was huge and G special event stations hogging the calling frequency hampered operation. He writes, "Please teach operators what Es is and why people get grumpy when they call over the DX. 144.300MHz is not designated as a G special event chat channel." He completed another 43 QSOs between 1318 and 1805 with stations in HA, I0, 1, 2 and 5-8, YU, SV3CYM (KM08) at 2278km, SV6DBG (KM09) at 2117km and SV2DCD (KN00) at 2089km.

On the morning of the 3rd Es was very patchy with signals dropping from S9+40dB to weak in a brief time. He made five Italian QSOs from 0742-0818. There was a morning opening to Finland on the 4th but activity was low. Dave contacted OH3BYZ (KP21) at 2009km, OH1CO (KP10) at 1821km, OH5KE (KP30) at 2067km and OH5KCJ (KP30) at 2058km.

Ian McCabe, G0FYD (FY), worked IZ8DWL (JM88) on 2 June and CT1HZE (IM57) next day for two new grids. From Germany, DL8EBW (JO31), completed 16 QSOs between 1239 and 1423 on 2 June with stations in EA3, I0, I8, IT9 and 9H in grids JM68, 77, 78 and 88 and JN11, 61, 62 and 70. Guy was particularly pleased to work GU6AJE/MM in JM84, a completely 'wet' grid. G8HGN missed most of the 2 June event but managed five Is in JN70, 71 and 90.

Gabriel Sampol, EA6VQ (JM19), made 18 QSOs between 1414 and 1434 on 2 June with DL, OZ, PA, SM and SP stations in grids JN99, JO31, 33, 41-44, 53, 55, 60, 64, 65, 67, 82, 83, 93, 94 and KO12, ODX being SM6KJX (JO67) at 2104km. In an evening opening on the 8th he completed eight QSOs with LZ and YO stations in KN13, 24 and 34 and two further contacts next morning with a YO and an LZ. John Palfrey, EA7IT, copied beacons DB0KI (JO50) and DB0FAI (JN58) on 3 June, called CQ and was answered by OK1MCS (JN69) at 1158 for grid no. 103 on 2m.

LOCATOR SQUARES TABLE

Starting date: 1 1 1979

Callsign	50MHz	70MHz	144MHz	430MHz	1296MHz	Total
G3XDY	-	34	251	175	123	583
GJ4ICD	780	1	267	121	79	1248
G3IMV	813	20	616	125	53	1627
G1SWH	350	42	240	81	30	743
G8TOK	390	32	138	56	29	645
G6TTL	220	-	133	90	27	470
G3FIJ	273	29	107	50	23	482
G4DEZ	572	16	110	38	22	758
G0EVT	506	14	309	77	16	922
G4FUJ	78	19	24	6	5	132
G0JHC	1000	26	48	4	-	1078
G0FYD	676	1	285	20	-	982
G4TIF	509	28	235	112	-	884
GW7SMV	664	-	211	-	-	875
G4YTL	-	53	529	122	-	704
G8BCG	661	-	-	-	-	661
G0XDI	228	-	254	67	-	549
G8HGN	310	-	168	67	-	545
G7CLY	244	-	248	16	-	508
G4OBK	417	21	57	-	-	495
G7KHF	434	-	-	-	-	434
G1UGH	280	-	130	17	-	427
G4ZHI	101	10	259	33	-	403
GU6AJE	338	13	32	-	-	383
G0ISW	218	2	87	22	-	329
G1EFL	230	-	67	2	-	299
GW3EJR	289	-	-	-	-	289
GM4VVX	186	-	100	-	-	286
G3FPK	30	-	246	-	-	276
G4APJ	172	-	54	22	-	248
M1DUD	196	1	31	1	-	229
GM6MEN	186	-	-	-	-	186
G4OUT	-	23	107	-	-	130
M5PLY	120	-	-	-	-	120
M1DRK	113	-	-	-	-	113
EA7IT	-	-	103	-	-	103
G8RWG	-	-	30	-	-	30

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Next deadline is 13 August. Band of the month 1296MHz.

OTHER MODES

THERE WAS A TEP-type event on 6m in the evening of 7 June when G4UPS heard PY2VA* (GG66) working DLs, PY1RO*, PY5CC (GG54) and PY2DSC (GG66) but all were weak in IO70. G8HGN worked PY5CC at 1830 and PY2XB (GG66) at 1906, his first ever South Americans. Bob also heard LU8MB (FF57), PY2OF and PY2DSC. G3ZVW was in on the act and completed with PY2VA*, PY2XB, PY2DSC and PY5CC* between 1906 and 1918.

G7RAU reports incredible signals from PY5CC, PY2XB and others driving his receiver front end into overload. He tried a quick test with PY5CC on 144.300MHz but Peter only had FM. Dave says that, "If this happens again (on 6m) then *please* try to stir some PY stations to test on 2m. OK, a long shot but you will never know if you don't try." EA6VQ says the opening was a combination of Es and TEP as he was hearing almost all of Europe at the time and that the PYs were "average signals."

Dave has been having success with ionoscatter mode. There was no Es in IO91 on 2m on 6 June but he was detecting a constant signal from LY2AAM* (KO23) from 0800 and eventually made it with the group on 144.043MHz at 1130. The tone was rough sounding, almost auroral, at 419 and he also worked IK0BZY with the same tone. 9A2RD was 319-529 in QSB but sounded more like tropo. The peak was around 1230 when he worked HA5OV 519-529 with a very rough CW tone again. [Pedantic note: how can rough sounding auroral-type signals be T9? - *G3FPK*]. He says that the peak time for this mode is always around 1200 and suggests others might care to try this with stations over 1400km distant, or closer if they have elevation.

FINAL MISCELLANY

M1DUD will be camping in Norway in August and will have an FT-690 6m rig. In the last two weeks he will be signing LA/M5AEF/P on 18.080MHz CW and looking for cross band contacts on 50.225MHz.

Thanks to Paul Thompson, GM6MEN, who sent a list of members of the '7 Yard Club' (6 metres to you and me!) This is a long list of GMs who are QRV on the band. Tuesday night from 8.00pm *local* time is their activity period. Thanks also to Davey Thomas, G3AGA (TR), for an interesting report about 2m trans-Atlantic propagation on 2m and for several reflector postings on the topic from Ev Tupis, W2EV. Also to G4KGA for passing on some interesting news about reception of USA TV video in the 500MHz region via the Moon by Tony Mann in Perth, Western Australia.

The deadline for October is **13 August** and for the November issue the date is **10 September**. My telephone answering and fax machine is on 020 8763 9457 and the CompuServe ID is g3fpk ♦

WWW.

PA1SIX	http://home.planet.nl/~pa1six/pa1six.htm
UKSMG	http://www.uksmg.org
G0CAS (*SunMag*)	http://www.g0cas.demon.co.uk/main.htm
PSC	http://www.keele.ac.uk/depts/por/psc.htm
OH5IY MS s/w	http://www.saunalahti.fi/oh5iy
MS Database	http://www.rue.net/vhfdx/

CONTEST

TIM KIRBY, G4VXE
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E-mail: tim@g4vxe.com

THIS MONTH, we're delighted to be able to include the results of another very popular event in the RSGB Contest Calendar, SSB AFS. Looking down the list, it's marvellous to see certain clubs who generate so much activity – with C and even D teams. AFS, together with Club Calls and the Field Days are the main events in the HF calendar which directly involve club participation.

Recently, I was discussing the HF Contest Programme with HF Contests Committee Chairman Justin Snow, G4TSH. He was very much of the view that increasing the level of club participation in the HF Contest Calendar is desirable, particularly with a view to introducing newcomers to contesting. Justin described his vision that a small (or large) number of club members could get together at either the club station, or at a club member's house who has room to put up a reasonable antenna. Other members could assist with bringing along a laptop or computer expertise for logging the contest, together with operating support – and, who knows – perhaps even refreshment! At present, he felt that the programme was focused on events aimed primarily at individuals. If we are to involve more newcomers, we need to aim some events specifically at club-based events.

The challenge, of course, is to devise a programme of events, which can support this type of activity and the more traditional contests. We hope to bring you more ideas as to how this programme might be shaped in the near future. Following consultation and feedback, including the HF Convention in October, the rules and programme will be set for 2003.

CONTESTS THIS MONTH

DON'T FORGET RoPoCo 2 on **4 August**. This is a rather unusual concept, but lots of fun. For the first contact that you make, the exchange is RST, serial number and your postcode. In subsequent contacts, you send the postcode that you received on the previous contact. It's a contest with a twist and something a bit different. Perhaps it's not a contest for the absolute beginner, but the results of RoPoCo 1 show that age is no barrier to success, with 15-year old Robert, M0TTT, challenging many of the established leaders in the contest.

Another contest with a twist is the Worked All Europe CW event on **10 / 11 August**. This can be treated as a basic contest, but you can also have fun sending and receiving 'QTCs'. These are nothing to be frightened of, and as a European station, all you have to do is to receive the QTC from a non-European station. You can read more at http://www.sk3bg.se/contest/waedxc.htm

On VHF, the 70MHz Trophy on **11 August** is a great opportunity to make some excellent contacts on the band. Expeditions and contest stations make a good deal of effort to go to interesting locations. With the Perseids meteor shower around that time, some surprising contacts can be made. Last year, I was delighted to work EI4VWY in the far north-west of Ireland, using no more than 10W to a vertical antenna!

GETTING GOING ON 70MHz

WHEN I FIRST started VHF contests, if you wanted to operate on 70MHz, a transverter was the only option. Some might argue that it still is! But many people including myself, who own the Yaesu FT-847 have found it a convenient way to get on the band and participate in contests. It is very much a compromise, with the receiver definitely benefiting from an external preamp. In addition, the current required to generate 8 or 10W output is well over 15A! It is possible to adjust the RF gain on each band (thanks to Reg, G8VHI, for pointing this out to me). Making this adjustment requires access to a hidden menu on the rig. If you don't know how to do this, send me an e-mail and I will send you the details - and a disclaimer!

If you are serious about 70MHz, then you will need to use a beam, but to put a toe in the water, a dipole will work well. A friend from Cheltenham, Evan, G3CJ, has had great success using a large wire-loop on 70MHz and other VHF bands. So antennas should be no barrier to getting on the band in some shape or form. Do make the effort if you can. 70MHz is a really fascinating band and the serious participants in the contest will very much appreciate hearing some new callsigns on the band.

Evan, G3CJ, in Cheltenham used a large loop to great effect on 70MHz.

70MHz Cumulatives 2001

THIS IS A set of contests that most entrants seem to really enjoy. Entries are a fraction down on last year, but considering the impact of foot and mouth disease on the later stages of the contest, this is not a bad result. Robert Ferguson, GD4GNH, won the single operator section once again by a large margin from his superb 4m site, but second place was hotly contested between G3IKR and G3MEH. However, after careful checking, G3IKR came out of top, in spite of only managing to be active for three full sessions and one partial session.

Andy Cook, G4PIQ

70MHz Cumulatives 2001

Single Operator Fixed Section

Pos	Callsign	16-Jan	30-Jan	13-Feb	27-Feb	19-Mar	Norm	QSO	Loc	Pwr	Ant	km
1*	GD4GNH	13743	13747	15172	9721	7936	3000	219	74QD	160	5Y	474
2*	G3IKR	4236	0	4038	3754	3402	1124	133	82XF	140	4Y	510
3	G3MEH	5068	4094	4344	3513	2895	1095	169	91QS	100	2 x 5Y	574
4	G1OGY	4067	4086	4266	2356	3375	1019	124	01GR	100	5Y	441
5	G3TCU	3679	3766	3856	3136	2723	940	125	91QE	150	6Y	425
6	G0GCI	2508	2050	3865	2828	2622	877	89	01ED	100	4Y	474
7	G0ODQ	2787	2033	3486	2861	2154	796	119	91NQ	40	5Y	372
8	G8EFU	616	2448	2021	2011	2279	673	90	92BO	90	3Y	250
9	G3XPU	2794	2266	2882	0	1717	610	81	92HM	50	3Y	483
10	G1EHF	2833	1955	2796	0	1738	609	83	91LH	60	4Y	397
11*	G3FIJ	2852	2193	2255	1977	0	571	58	01KV	10	4Y	445
12	G4ZTR	0	0	0	4239	0	437	25	81UN	75	5Y	442
13	G4SJH	2255	0	1950	1262	0	423	53	91PI	45	3Y	407
14	G4OUT	1255	1417	1472	1317	0	336	48	92AT	10	3Y	230
15	G7NBE	541	1463	1222	1135	0	304	40	92GS	25	3Y	260

All Others Section

Pos	Callsign	17-Jan	31-Jan	14-Feb	28-Feb	14-Mar	Norm	QSO	Loc	Pwr	Ant	km
1*	G4RFR	6529	7128	7873	5915	4104	3000	177	90AS	160	12Y	672
2*	M0AFC/P	5535	6945	6018	0	0	2587	94	84SA	20	5Y	363
3	GW8ASA/P	4766	4907	6573	0	0	2254	97	81GN	50	3Y	326
4	G6FFB/P	1514	3152	4728	3395	0	1585	108	81UN	70	6Y	327
5*	G0WJR/P	2365	2618	3910	0	0	1227	64	91/83	15	2Y	352

*Certificate winner

Affiliated Societies SSB Contest 2002

SOME 200 STATIONS representing 84 teams took part in this year's SSB AFS contest in January. This is an increase of approximately 10% on the previous year. Making a welcome first appearance in AFS this year were several Foundation Licence holders. Some confusion had led to odd callsigns being used and the rather unique ME3 prefix caused several competitors to do a 'double-take' at the time.

Congratulations to the Lichfield ARS 'A' team, who had a comfortable lead of 770 points over the second-placed De Montfort University ARS, and who take the Fight Refueling ARS Trophy. However, the leading individual station was Andy, G4PIQ, who with 3120 points heads the third-placed Martlesham DX & Contest Group team effort and takes the RSGB Lichfield Trophy. Special mention should be made of Ron, GW3YDX, who came third in the individual listings with 3020 points. Ron was most unfortunate to suffer two power cuts during the contest and he managed only three hours and seven minutes of operating. One wonders what might have been. Mention should also be made of Roger, G0AOZ, who used a full-wave doublet to boost his 100-watt signal into 17th place in the individual listing.

Most people that made comments said that it was an enjoyable event and many references were made about the 'busy' nature of the band and the lack of space. Logging accuracy was fair, though a number of the competitors lost a significant proportion of their score to errors. No doubt the high activity and fast pace of the event is a significant factor in this.

Justin Snow, G4TSH

Individual Placings

Pos	Callsign	Score
1	G4PIQ *	3120
2	G3NLY *	3050
3	GW3YDX *	3020
	G3SJJ *	3020
5	G3NAS	2970
6	GW4BLE	2880
7	G4TSH/P	2850
8	G3ORY	2830
9	G3ZAY/P	2820
10	G4BUO	2810
11	G4ERP	2800
12	G3RIR	2790
13	G3ZVW	2720
14	G4FPH	2700
15	G3TBK	2660
16	G3WZT	2600
17	G0AOZ	2500
18	G5LP	2440
19	G3UEG	2420
20	G0VQR	2400
21	G3GWB/P	2380
22	G3RCV	2370
23	G4PDQ	2360
24	G4WBV	2350
25	G3NKS	2330
	G4LRP	2330
	G3RVM	2330
28	G3SVL	2290
	GW4CC	2290
30	G3VAO	2270
	G0MTN	2270
32	G3UFY	2240
33	G3VKW	2230
34	G3TA	2210
35	G3KLH	2190
36	G3WPH	2180
37	M0TTT/P	2170
38	G3XSV	2120
39	GW0GEI	2100
40	G4KZD	2080
41	G3SNN	2070
42	G3RSD	2060
43	G0LHZ	2020
44	G4CXT	2010
45	MW5EPA	2000
	G0IDA	2000
47	G3WUX	1990
48	G6UW	1970
	G3LUW	1970
50	M0CUK	1930
51	G3YSX	1920
	G4CES/P	1920
53	G3SET	1910
54	G4DBL/P	1880
55	G3NVO	1830
56	G5UM	1820
57	G0TQJ	1810
58	M5AIQ/P	1800
59	G4ENA	1750
	G3ZBU	1750
61	G3WHK	1710
62	G3CRS	1690
63	G3LET	1680
64	G3LHJ	1660
65	G3MA	1640
66	G3ASR	1600
67	G4WPD	1590
68	G0WAL	1580
69	G3KKQ	1570
	M0COP	1570
71	G2BKZ	1560
	G6PZ	1560
73	G0VNI	1550
74	G3ZGC	1540
75	GW3XEJ	1500
	G3LIK	1500
77	G3OLX	1490
78	G0VDZ	1470
79	G3VPW	1450
80	G0UHM	1410
81	G3XZG	1400
82	G4TPH	1380
83	G3LVP	1370
	G3KAF	1370
85	G0IIQ	1350
86	G3JJZ	1330
87	GM0CLN	1290
	G4EBK	1290
89	G0ICJ	1280
90	G4OGB	1270
91	M5IMI/P	1260
92	G4APA	1200
93	G0RAF	1180
94	MM0TSS	1170
95	G3MEH	1130
	G4EOW	1130
	G3TXF	1130
98	G4FBS	1110
99	G0VYR	1080
	G3HYH	1080
	G3TJE	1080
102	G4DFI	1060
103	GW0RYT	1040
	G6UT	1040
105	G4DDX	1030
	G0RXA	1030
	G4FFY	1030
108	G6HH	1020
109	M0BIN	1010
110	G4DPH	1000
111	GW3EIZ	990
	G4UEL	990
113	G3YAJ	970
114	M0ACL	960
115	G4FTP	940
116	GW3GUX	920
117	G3ZKN	910
	G4FUH	910
	G3SHF	910
120	MM0CCC	900
121	G3VEF	890
122	G3YYZ	880
	G3SNU	880
124	G3SZS	870
125	G4POF	860
126	ME3GOJ/P	850
	G4ELY	850
128	G3RFX	840
	MM0CPS	840
	M0AJT	840
	G0ASZ	840
	M0JAK	840
	GW0JEQ	840
134	GW4DRR	820
	G3HBZ	820
	G4PFM	820
137	G0NUZ	800
138	M0PTR	790
	G3YEC	790
140	G3VQO	780
141	M5EET	760
142	G0SCP	730
143	G3TDR	720
	M0BZU	720
145	M0AEJ	710
146	G3WWT	700
	G0UAI	700
148	G3WQK	690
	G0EYO	690
150	M5UGC	670
151	G0YYY	640
	G4AOP	640
	G4VTO	640
154	M0BEX	630
155	G4FCH	620
156	G3WRR	610
	G0VJG	610
158	G0WWD	600
159	G0GHK	590
160	GW0PRU	580
	G8TB	580
162	M0DAL	570
163	G4ELZ	560
164	G4SLE	520
165	G0UPU	510
	G0FDZ	510
167	G4BJM	500
168	G0MBQ	490
	2E0AVG/P	490
	G3OZY	490
171	M5ACR	480
172	G4LYU	470
173	GW2DLK	460
174	G3BIT	450
	M0APB	450
	G0WMG	450
177	MM0ANT	440
178	M0CAA	410
	M0CUR	410
180	M0CJP	390
181	G0WLF	380
	M3HOW	380
	G0AZM/P	380
	GM4DTH	380
	G0TYJ	380
186	G4KIT	370
187	G0THY	350
188	G3FYP	330
189	G4DJR	320
190	G3SXE	300
	M0AVN	300
192	G4YJQ	240
193	G4PTE	230
194	M3BLH	210
195	G0PQB	190
196	G0NQZ	180
	G4VXE	180
198	G3WVG	130
199	2E0AVH	80
200	M3HQX	50

* = certificate winners.

Affiliated Societies Contest (SSB), 2002

Club Placings

Pos	Team					Team Score
1	Lichfield ARS	A	G3NLY	G3SJJ	GW3YDX	9090
2	De Montfort University ARS	A	G3ORY	G3RIR	G4FPH	8320
3	Martlesham DX & Contest Group	A	G4PIQ	G5LP	G4CXT	7570
4	Cheltenham ARA	A	G4ERP	G4PDQ	G3NKS	7490
5	Cray Valley RS	A	G4BUO	G3RCV	G4DBL/P	7060
6	Hadley Wood Contest Group	A	G3ZVW	G4KZD	G0IDA	6800
7	Horsham ARC	A	G3WZT	G4LRP	G3ZBU	6680
8	Cambridge University Wireless Society	A	M5AIQ/P	G3ZAY/P	G6UW	6590
9	Newbury & Dist. ARS	A	G3RVM	G3KLH	M0CUK	6450
10	Contest Cambria	A	GW4BLE	MW5EPA	GW3XEJ	6380
11	Grimsby ARS	A	G3TBK	G3RSD	G0IIQ	6070
12	Cheltenham ARA	B	G3TA	G3SNN	G4ENA	6030
13	Echelford ARS	A	G4TSH/P	G4WPD	G3KKQ	6010
14	Bristol Contest Group	A	G4WBV	G3XSV	G3RFX	5310
15	Reading and District ARC	A	G0VQR	G0LHZ	G4ELY	5270
16	Wythall Radio Club	A	G0MTN	M0COP	G0ICJ	5120
17	RAFARS Cosford	A	G3VAO	G4CES/P	GW0JEQ	5030
18	RAFARS Waddington	A	G3SET	G0TQJ	G0RAF	4900
19	Newbury & Dist. ARS	B	G3NVO	G3ZGC	G4TPH	4750
20	Harlow & Dist. ARS	A	G3UEG	M5IMI/P	G6UT	4720
21	Harwell ARS	A	G0AOZ	G3VPW	M0CJP	4340
22	Crawley ARC	A	G3VKW	G3YSX		4150
23	Addiscombe ARC	A	G3UFY	M0BIN	ME3GOJ/P	4100
24	Horndean & Dist. ARC	A	G3LIK	G0UHM	G4FBS	4020
25	Dragon ARC	A	GW0GEI	GW3EIZ	GW4DRR	3910
26	Edgeware & District RS	A	G3WUX	G3ASR	G0PQB	3780
27	Southdown ARS	A	G3SVL	G0UAI	G3WQK	3680
28	Itchen Valley RC	A	G0VNI	G4EOW	M0ACL	3640
	Weston-Super-Mare RS	A	G6PZ	G3TJE	G4DPH	3640
30	Stockport RS	A	G3KAF	G4APA	G0RXA	3600
31	Torbay ARS	A	G3LHJ	G3SNU	G0NUZ	3340
32	Leicester RS	A	G5UM	G3HYH	G0AZM/P	3280
33	Flight Refuelling ARS	A	G0WAL	G4POF	G4PFM	3260
34	Sutton and Cheam Radio Society	A	G3WHK	G3OLX		3200
35	Stevenage & District ARS	A	G2BKZ	G4DDX	M0DAL	3160
36	Cheltenham ARA	C	G3LVP	G3ZKN	G3SZS	3150
37	Cockenzie & Port Seton ARC	A	GM0CLN	MM0CCC	MM0CPS	3030
38	Echelford ARS	B	G0VDZ	G3HBZ	G3TDR	3010
39	Cray Valley RS	B	G3JJZ	G4DFI	G0VJG	3000
40	Lichfield ARS	B	G3NAS			2970
41	Horsham ARC	B	G3LET	G3VQO	M0CUR	2870
42	Grimsby ARS	B	G4EBK	M0AJT	M0BZU	2850
43	Farnborough & dist. ARS	A	G0VYR	G4UEL	G0YYY	2710
44	Harwich Amateur Radio Interest Group	A	G4FTP	G3YYZ	G0SCP	2550
45	Chesham & Dist. ARS	A	G3XZG	G3MEH		2530
46	Glocester AR & Electronics Soc.	A	G3MA	M5EET		2400
47	Northampton Radio Club	A	G3GWB/P			2380
48	Swansea ARS	A	GW4CC			2290
49	Chiltern DX Club	A	G3WPH			2180
	RNARS Portsmouth	A	G3CRS	G3OZY		2180
	Scunthorpe Steel ARC	A	G4OGB	G4FUH		2180
52	De Montfort University ARS	B	M0TTT/P			2170
	Horndean & Dist. ARC	B	G0ASZ	M0JAK	G0MBQ	2170
54	Wythall Radio Club	B	M0AEJ	G0EYO	M5UGC	2070
55	RNARS Colchester	A	G3YAJ	G3YEC	G4PTE	1990
56	RAFARS Sussex	A	G3LUW			1970
57	Surrey Radio Contact Club	A	G4FFY	G8TB	G4DJR	1930
58	Torbay ARS	B	G4VTO	G0WWD	G4ELZ	1800
59	Stockport RS	B	G3SHF	M0BEX	M3HQX	1590
60	Lothians RS	A	MM0TSS	GM4DTH		1550
61	Three A's Contest Group	A	G3TXF	G4VXE	G3WVG	1440
62	Dragon ARC	B	GW3GUX	GW2DLK		1380
63	Worthing & District ARC	A	G4SLE	G0WMG	G4KIT	1340
64	Torbay ARS	C	G3BIT	M0APB	M0AVN	1200
65	Cray Valley RS	C	G0FDZ	G0WLF	G3SXE	1190
66	Contest Cambria	B	GW0RYT			1040
67	Southdown ARS	B	G4LYU	G0TYJ	G0NQZ	1030
68	Hastings Electronics & RS	A	G6HH			1020
69	Scarborough ARS	A	G4FCH	G3FYP		950
70	Fareham & Dist. ARC	A	G3VEF			890
71	Flight Refuelling ARS	B	M0PTR			790
72	Echelford ARS	C	G3WWT			700
73	RAFARS Waddington	B	G4AOP			640
74	Harwich Amateur Radio Interest Group	B	M3HOW	G4YJQ		620
75	Addiscombe ARC	B	G3WRR			610
76	Finningley ARS	A	G0GHK			590
77	Prudential ARS	A	GW0PRU			580
78	Horsham ARC	C	2E0AVG/P	2E0AVH		570
79	Cheltenham ARA	D	G0UPU			510
80	Mid Beds Contest Association	A	G4BJM			500
81	Reading and District ARC	B	M5ACR			480
82	Cockenzie & Port Seton ARC	B	MM0ANT			440
83	Harwell ARS	B	G0THY			350
84	Horndean & Dist. ARC	C	M0CAA	M3BLH		210

CONTEST CALENDAR

HF Contests

Date	Time	Mode	Contest	Bands	Exchange
3 August	*1000-2200*	*CW/SSB*	*EU HF Championship*	*1.8-28*	*RST+Year first licensed*
4 August	0700-0900	CW	RSGB RoPoCo 2	3.5	RST+SN+Postcode
10/11 Aug	*0000-2359*	*CW*	*Worked All Europe*	*3.5-28*	*RST+SN*
17 August	*0000-0800*	*RTTY*	*SARTG RTTY*	*3.5-28*	*RST+SN*
17 August	*1600-2400*	*RTTY*	*SARTG RTTY*	*3.5-28*	*RST+SN*
18 August	*0800-1600*	*RTTY*	*SARTG RTTY*	*3.5-28*	*RST+SN*
24/25 Aug	*1200-1200*	*CW*	*TOEC Grid*	*1.8-28*	*RST+Grid*

VHF Contests

Date	Time	Mode	Contest	Bands	Exchange
6 August	1900-2130	ALL	RSGB 144MHz Activity	144	RST+SN+Locator
11 August	0900-1500	ALL	RSGB 70MHz Trophy	70	RST+SN+Loc+Postcode
13 August	1900-2130	ALL	RSGB 432MHz Activity	432	RST+SN+Locator
20 August	1900-2130	ALL	RSGB 1.3/2.3Ghz Activity	1.3/2.3	RST+SN+Locator
27 August	1900-2130	ALL	RSGB 50MHz Activity	50	RST+SN+Locator

Microwave Contests

Date	Time	Mode	Contest	Bands	Exchange
11 August	0900-2000	ALL	RSGB All bands 1.2Ghz up	All	RST+SN+Locator
25 August	0900-2000	ALL	RSGB 10GHz Cumulative	10G	RST+SN+Locator

The full rules of RSGB HF, VHF/UHF and Microwave contests were published in the RSGB Contesting Guide in January 2002 *RadCom*. Brief rules for non-RSGB contests, which are listed in italics above, can often be found in the 'HF' and 'VHF/UHF' columns. The HF and VHF Contest Committees both have websites from which comprehensive details are available. These are www.rsgbhfcc.org and www.blacksheep.org/vhfcc RSGB Microwave Contest rules can be found on the Internet at: http://www.g3pho.free-online.co.uk/microwaves/calendar2002.html

144MHz CW, November 2001

AFTER TWO YEARS of dreadful conditions in this contest, 2001 marked an enormous turn around: at least for those people entering the 24-hour section of the event. Propagation on the Saturday was truly remarkable, with tropo extending right through the far side of Germany and into Poland, the Czech Republic and Slovakia. US5WU in KO20 was worked as best DX by some stations. The G-Force Contest Group, G4XBF/P, has been doing this contest for many years, but this was the first time they have experienced such excellent conditions.

Although superb, propagation was actually quite focussed. G4PIQ worked around 50 OK and OM stations (more than the number of UK stations worked!), but only 10 SP stations, whereas G4XBF/P about 100km further south had a quite different mix with 32 OKs, no OMs, but 22 SPs and many more German stations in the Berlin area. G4ZTR (who is located very close to G4PIQ) had a mix of QSOs very similar in structure to G4PIQ. If you plot these QSOs on a map it actually looks more like a reflection point than ducting, but tropo it certainly was.

By Sunday, conditions had unfortunately returned to normal, and entrants to the 6-hour contest were kicking themselves, but, nevertheless, it was good to see an increase in entries over last year. No-one in the 6-hour single operator section ran high power: G4RQI/P wanted to run 400W, but couldn't lift the 4kVA generator on his own so settled for 60W and still won the section. Jonathan Constable, M5FUN, achieved a very respectable result in his first CW contest.

All entries will be forwarded to ARI for inclusion in the Europe-wide Marconi contest results.

Andy Cook, G4PIQ

144MHz CW, November 2001

24 Hour Single Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best DX	km
1*	G4PIQ	164225	277	01MU	400	4 x 15Y + 2 x 9Y	US5WU	1626
2*	G4ZTR	74940	142	01KW	200	12Y	SP8UFT	1508
3	G4OUT	10337	33	92AT	40	12ZL	OK1AR	1063
4*	G3FIJ	9484	31	01KV	20	10Y	OK1KIM	887
5	GW4HBK	6715	23	81KP	200	9Y	DK5DQ	722
6	G3YMC	787	5	91PJ	10	Vert	G4HGI	268

24 Hour Multi Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best DX	km
1*	G4XBF/P	231123	380	00EW	400	2 x 17Y	US5WU	1679

6 Hour Multi Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best DX	km
1*	G0FBB	22612	65	01EI	400	2 x 17Y	OK1AR	888

6 Hour Single Operator

Pos	Callsign	Pts	QSOs	Loc	Pwr	Ant	Best DX	km
1*	G4RQI/P	12223	38	93PW	60	10Y	DK0BN	729
2*	G0TPH	10768	38	92IO	25	9Y	TM1Y	850
3	G0DVJ	6065	23	01MX	50	5Y	DF0TAU	603
4	G3JJZ	5964	28	01AJ	25	8Y	DK5DQ	503
5	M0XXX/P	5187	23	81UN	50	21Y	DL0KM	587
6	M0BPQ/P	4842	17	91XL	10	9Y	DF0CI	711
7	G4XPE	3050	14	92GU	25	10Y	DL0KM	554
8	M5FUN	2581	19	00DX	25	12Y	DJ5BV	469
9	G3VQO/P	135	3	90VV	50	Whip	G3JJZ	58

*Certificate Winners

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AS YOU will find below, there are relatively few expeditions scheduled for August. This isn't surprising. Band conditions in the northern hemisphere are usually at their worst this month and, in any case, anyone planning a summer expedition will probably have scheduled it to coincide with the RSGB IOTA contest in late July. At the time of writing, many more IOTA contest expeditions have been announced, in addition to those I mentioned last month, and it should be a great event. Perhaps what HF enthusiasts should do during August is to take care of any jobs around the house or shack that might otherwise have to be done later in the year. On present predictions, HF conditions should continue to be good this autumn, but will start to show significant declines during 2003. By 2004 we will be well down the solar cycle, which may come as a shock to those of you who have been licensed in the last few years. Put out of your head any thoughts of working the Pacific, or even the USA, on 10 metres for most of the time, and even 12, 15 and 17m will become shadows of what you have been used to. Look to 20, 30 and 40 metres to carry the majority of long-distance traffic.

Vlado, Z35M, writes that he is now working in **Albania**, and is likely to be there for several years. He will sign ZA/Z35M on all bands and modes, but points out that amateur allocations in Albania are limited, especially on the low bands (just 3750 - 3800KHz on 80 and 7040 - 7100KHz on 40m). Readers will recall (see January 'HF') that Vlado was claiming an in-year QSO record from his home location, so hopefully he will be similarly active from Albania, which has suffered from a drop in activity in recent years. Check Vlado's website for updates. QSLs go to his home address.

Marek, SP3GVX, operator of HF0POL in 1997 and 2000, recently joined the Hornsund Base staff on **Svalbard**. He will be stationed there for a year and plans to use the callsign JW0HU. QSL via SP3WVL.

Francois, VE2XO, will be on from **Togo** as 5V7XO from 25 to 31 August, mainly RTTY but also SSB on 10, 12, 15, 17 and 20m, always split frequency. He adds that besides his planned trips to Togo (5V) and **Benin** (TY) he will also go back to Guinea (3XY6A / 3XY8A) at the end of September. In late December and early January his work will take him to **Senegal** (6W) and **Mali** (TZ6XO). Francois is brand new to RTTY and says he enjoyed it so much on his last trip to Guinea that he will now spend 50% of his time on this mode. QSL via VE2XO.

Bob, K4RB, is in **Egypt** and now licensed as SU9US and will be active in most CW contests and selected SSB contests from his home in Cairo. QSL via K4DX (direct only). Alan, VK6BN, is now active as SU9BN from Sharm el Sheikh, Southern Sinai. He has been noted on both CW and PSK31 so far. QSL via EA7FTR.

Paolo, IK2QPR, will be active from Bora Bora (OC-067), **French Polynesia** from 10 to 14 August. He will sign FO/IK2QPR on 10 - 80 CW and SSB. QSL via his home call. Paulo also reports that as of 1 April he is no longer the QSL manager for EX8MLE, and as of 20 May he is no longer the QSL manager for EK3GM. EX8MLE cards should now go to EX8MLE's address in qrz.com and EK3GM cards to DK6CW. However, Paulo remains QSL manager for UN2O, UN7FW, UN9PQ, UN7JX, UN7OD, UN7OP, UK8OM, UK8IZ, UK8GH, EX2U, EX5T, EX7MA, EX7NK, EX8NP, EX8QB, EX7MK, UA0YAY, EU6MM and EW6GB.

There will be a DXpedition to **Myanmar** (formerly Burma) this month, signing XY3C, XY5T and XY7V, and operating from various locations, as follows: 2 - 8 August, Yangon, 80 - 10, one station; 9 - 22 August, Ngapali, 160 - 10, up to four stations; 16 - 19 August, Apaw-Ye Kyun (new IOTA, Arrakan Group), 80 - 10, 2 stations. Check the website for the latest information.

EA4DX plans to be on from HK0, **San Andres and Providencia**, between 20 and 30 August 20. Robert will be on Providencia (NA-049).

IOTA ACTIVITY

RN1AW, RX1AW, RA1ANP, RZ1AS and RW6HJV were due to be active as UE1CIG from the lighthouse on **Gogland Island** (EU-133, RRA 01-04, LH 0737) from 25 July to 1 August, including the IOTA Contest when they will use the call RI1CGG. QSL via RN1AW either direct or through the bureau.

Roberto, IH9/IK2XRJ, will be active, SSB only, 10 - 40m, from **Pantelleria** (AF-018) from 11 to 22 August.

Keith, GM4YXI, will be back in West Malaysia this month. He plans operation from 9 to 11 August from **Pulau Ketam** (IOTA AS-074), and from 16 to 19 August he will be on **Pulau Babi Besar** (AS-046). For both locations he plans 20, 17, 15, 12 and 10 CW and SSB with 100W and verticals. QSL via N3SL.

Takeshi, JI3DST/8, will operate from **Okushiri Island** (AS-147) between 26 July and 5 August, 40 - 10m. QSL, as always, via the bureau.

Paul, K9OT, and Peg, KB9LIE, will operate from **Miquelon** (NA-032), 11 to 19 August as FP/K9OT and FP/KB9LIE. Operations will be on 80 - 10 CW and SSB only; 160 will be attempted. This is a low-key vacation trip with 100 watts to wire and vertical antennas. QSL via their homecalls.

Andrew, VE8AE, was planning to be on **Resolution Island** (NA-130) between 28 July and 2 August and to be active as VY0AE.

Michael, OX3LG, expects to operate on all bands, SSB and CW, from **Kook Island** (NA-220), Greenland between 1 August and 1 October. QSL via OZ1ACB.

A group of operators from Indonesia plans to activate the **Masalembu Islands** (OC-NEW) from 29 July to 4 August. They should have two or three stations on SSB, CW and RTTY with a special callsign to be issued in late June. QSL via IZ8CCW. After their trip to Indonesia, the Italian members of the team will then operate from Bandar Seri Begawan, **Brunei** (OC-088) from 5 to 11 August. They plan to be active on all bands SSB, CW, RTTY, PSK31 and maybe SSTV.

BUREAU QSLING

AN ACTIVE QSL manager of my acquaintance has asked me to remind readers that bureau cards can be a long time coming. He has been receiving the occasional e-mail from people who are expecting return cards in a matter of weeks. The truth, of course, is that the bureau system saves us money on QSLing by the very fact that it waits for reasonable quantities

QTH Corner:

EA7FTR	Francisco Lianez, Asturias 23, 21110 Huelva, Spain.
IK2QPR	Paolo Fava, via Bertani 8, 46100 Mantova, Italy.
OZ1ACB	Allis Andersen, Kagsaavej 34, DK-2730 Herlev, Denmark.
RN1AW	Victor Tsarevsky, PO Box 114, Pushkin-8, 196608, Russia.
UX0FF	Nikolay Lavreka, PO Box 3, Izmail, 68600, Ukraine.
UX3FW	Yurij Kucherenko, PO Box 60, Izmail, 68600, Ukraine.
UT2FA	Serge Platonov, PO Box 44, Odessa, Ukraine.
YC9BU	Kadek Kariana SP, PO Box 106, Singaraja 81100, Bali, Indonesia.
Z35M	Vladimir Kovaceski, Z35M Box 10 , Struga 6330, Macedonia.


Photo: N0AX

VE7WO, N5KO, N6AN (ex-AA6RX) and G3XTT in front of the W6NL mountaintop contest QTH, which overlooks Monterey Bay and Silicon Valley.

of cards to any specific overseas bureau or UK QSL sub-manager before taking advantage of bulk postal rates. And of course, there are several steps in each leg of the chain: your national bureau to RSGB bureau (for example), to RSGB sub-manager, to QSL manager, back to RSGB bureau, back to your national bureau, back to your sub-manager (many national societies send out cards to a local manager, perhaps a local club), and finally back to you when enough cards have accumulated. A busy QSL manager may, for example, make arrangements with the RSGB to receive cards directly from them. In smaller countries, cards may go from the national society direct to members. So sometimes the system can work quickly, but in reality the return process can take anything up to 18 months or more, especially as many of the links in the chain are run by volunteers. On the whole, the system works remarkably well, but patience is undoubtedly a virtue!

Of course, cards can also disappear into black holes where the bureau system is concerned. For example, in Ghana last year, Fred, G4BWP, and I spent the best part of a day sorting cards which had arrived at the 'national bureau' there over a period of several years and never even been opened. And many of those cards were for visitors who had spent maybe just a couple of weeks in the country, done some operating, and returned home. Why had the envelopes never been opened? Simply because the national society there consists of just a few local amateurs (all working on a voluntary basis) who do their best to cope with correspondence from the IARU, licence negotiations with the local PTT, offering help to visiting amateurs, etc, with extremely limited time and funds at their disposal. A far cry from the full-time staff and facilities that we associate with the major countries. And Ghana has, by emerging-country standards, one of the more active national amateur radio societies.

AWARDS

THE SCOTIA (SCOTtish Island Award) is a new award for island hunters, activators and short-wave listeners. It has been created by Andre, GM3VLB (known to many as 5Z4KL), and his son Niall (recently VP8NJS in Antarctica). Andre has himself operated from over 130 islands (including 109 different Scottish ones). The SCOTIA has been set up specifically to encourage greater interest overseas in working Scottish islands. Scoring is partly by a three-tier points system rather than absolute number of islands, and partly by a flexible 'bonus points' system. Non-UK activators are also encouraged by an advantageous bonus scheme. Access to higher level awards is by a series of tartan 'stickers' (similar to the DXCC certificate). The SCOTIA programme is essentially non-profit-making - any eventual surplus will be re-invested in the island activation programme. Costs are being kept to the absolute minimum by making all the information available on the 'Isles of Scotia Activity' website (see WWW.). All details, including the various application forms, are available free of charge and can be downloaded and reproduced as often as desired - indeed, this is encouraged, as not everyone is on the Internet. QSL cards require verification by one independent person (who need not be an amateur) but need *not* be submitted. Congratulations are extended to the following world-wide 'firsts': Fred, DL4BBH, No.1 'hunter', Alex G(M)0DHZ No.1 'activator' and Pierre F-10095 No.1 SWL.

Victor, UU5JFY, sends details of the Formula 1 Award, for confirmed contacts (since 1 January 1980) with 20 of the 22 countries countries where Formula 1 races have been held since 1980. The countries are Argentina, Australia, Austria, Belgium, Brazil, Canada, France, Germany, Great Britain, Holland, Hungary, Italy, Japan, Malaysia, Mexico, Monaco, Portugal, San Marino, South Africa, Spain, Switzerland, USA. Send GCR list (ie log extract certified by a club official or two licensed amateurs) with the fee of 10 Euros to Victor, via Hermann Warneke, Feuerwehrstrasse 11, D-28857 Syke, Germany.

Mike VK7FB, has written with a reminder about the Tasmanian 'Devil' Award which, so says the publicity, is as elusive as the Tasmanian 'Devil' itself. To qualify for the Award, European stations need to work 10 Tasmanian amateurs (regardless of band or mode), since 1 January 1978. To claim, send a signed (by yourself) copy of your log, with your name, address and callsign to The Awards Manager, GPO Box 371, Hobart 7001, Tasmania, Australia, along with the fee of AUD $3.00 or equivalent in IRCs to cover the cost of the award and postage. Once you have the basic award, upgrade stickers are also available for working additional VK7 stations.

GETTING STARTED ON RTTY

IT'S GREAT TO see more and more of our table entrants putting in a score for the datamodes, whether traditional RTTY or one of the newer modes such as PSK31. Don, AA5AU, a great proponent of the mode, reports that all but one DXCC entity (BS7) has now been activated on RTTY at least once. Don has been offering assistance to those wanting to get started on the mode, but has been receiving so many requests that he decided to create pages on his website with step-by-step instructions on how to download, install and use the MMTTY program. See WWW. Don says, "RTTY is a very easy and fun mode to operate. You can watch TV, read your e-mail, surf the web and work RTTY at the same time."

COUNTRIES WORKED, 2002
(sorted this month by Mixed totals)

CALL	CW	SSB	DATA	MIXED
G4PTJ	176	194	0	240
G0NXX	233	0	0	233
ZC4BS	180	214	79	231
G3SXW	228	0	0	228
M0AWX	0	226	0	226
G3YVH	166	119	0	213
G3SED	166	125	0	199
G3JFS	155	131	118	197
M5PLY	0	195	0	195
G4WXZ	143	140	0	193
G4UCJ	187	0	47	187
G3LHJ	165	69	105	184
MW5VZW	42	124	0	166
G4IRN	164	0	0	164
G0GFQ	0	152	20	154
M0CNP	5	149	45	149
ZC4VG	140	14	4	142
ZC4DW	126	56	91	142
MU0FAL	117	101	0	140
G0ARF	0	0	140	140
MM0BQI	33	84	101	130
G4OBK	97	38	56	119
M0BZK	0	105	59	117
G4FVK	49	111	0	113
G4DJX	110	0	0	110
M0BVE	105	0	0	105
G3ING	102	0	0	102
MU3DHI	-	-	-	100
G3XTT	45	45	46	97
GU0SUP	0	0	96	96
GM4ELV QRP	72	69	0	93
G0LGJ	0	91	0	91
M0CAL	2	83	0	83
G0URR	0	0	81	81
G4YWY/M	-	-	-	75
M5AEF QRP	50	61	0	71
G4IDL	46	34	0	67
G4DDL	59	19	10	63
G3URA	0	0	42	42
M5AFA QRP	0	0	38	38

CONTESTS

ONE OF THE major contests in August is the Worked All Europe CW, which takes place over the weekend of 10 / 11 August. In last year's contest, UK results included (CW) GW7X (Op

GW3NJW) 311080, MØSDX 106132, G4OGB 72448, G3RSD 50630, G3TXF 37341, G3ZRJ 28194, G6QQ 6222, G4WFQ 5232, G3KKQ* 3950, GØWHO* 3735; (SSB) GW7X* (Op. GW4BLE) 889994, MØSDX 493626, G4IIY* 28459, G3UFY 24720. Congratulations to members of Contest Cambria (GW7X) for excellent results in both sections.

The EU HF Championship runs from 1000 to 2159 on 3 August. Results of last year's event appeared in May's 'HF'.

SM5BDT writes that the NSA Församlingstest (NSA Parish Contest, organised by the Nyköping Amateur Radio Club) invites you to participate in their annual summer contest: 3 and 4 August 2002, 0700 - 1000UTC on 160, 80, 40, 20m, Saturday SSB, Sunday CW. Complete rules for the contest can be found on the web page. The Club's special event station SD5DS is likely to be active during the event.

Not a contest as such, but Mike, GM4SUC, reminds everyone that the 'International Lighthouse / Lightship Weekend' has grown in popularity and participants. It will be held from 0001 on Saturday 17 August until 2359 on Sunday 18 August. Already over 100 entries in 27 countries have been received by VK2CE, who maintains the event's website. If you require any further information, or need help in anyway, you can contact Mike at: gm4suc@compuserve.com

In the 2002 EUCW / FISTS QRS Party, UK results included (Class A) G8NT (eldest entrant and 2002 winner, more than doubling his last year's score) with 27232 points, G3HZL 9576, G0EML 9480, G4NCU 5536, G0GSY 2688, G4LHI 265, M5ABN 192, G3WP 147, G4XPE 10; (Class B) G4FAI 3024, G3FIJ 156. Ray, G0EML, gained a certificate for 'Most Readable Morse Heard' during the event.

In the 2002 CQ / RTTY Journal WPX RTTY Contest, UK results were: Single-op all-band high-power - GW4KHQ 922746, MW2I 405283, G3UFY 111734, G4EMT 73502; single-op all-band low-power - G0URR 834210, G4WFQ 604656, GU0SUP 371205, G0MTN 241744, MM0BQI 208902, G6UQ/P 161204, MU3EFB 72846, M0AEJ 39424, M3GOJ 24415, G4OBK 6164; single-op 10m - 2E0ROB 407008, GI4KSH 207270; multi-single - M0SDX 1877928. W6/G0AZT maintains all-time records for this contest, which are posted at the *RTTY Journal* website.

THANKS

SPECIAL THANKS GO to the authors of the following for information extracted: *OPDX Bulletin* (KB8NW), *The Daily DX* (W3UR) and *425 DX News* (I1JQJ). Thanks also to G4OGB for contest results. Please send items for the **October** issue by **17 August.** ♦

WWW.

Brunei expedition:	**www.mdxc.org/v8a**
Contests Cambria:	**www.gw7x.org**
EA4DX:	**www.qsl.net/ea4dx/will.**
International Lighthouse Weekend:	**www.vk2ce.com/illw**
'Myanmar 2002':	**www.dx-pedition.de/myanmar2002**
NSA Parish Contest:	**www.qsl.net/sk5be**
RTTY:	**www.aa5au.com/rtty**
Scotia Awards:	**www.iosa.co.uk**
World Lighthouse Award:	**wlh.free.fr/**
Z35M:	**www.qsl.net/z35m**
***CQ / RJ* Contest records:**	**www.rttyjournal.com/records/wpx.html**

HF F-Layer **Propagation Predictions** for **August 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	7.....557	861.....2788	875211116878	247766667873	368998889975	.378877787..	....
*** Asia							
Yakutsk	....	....	5211..136776	577666778887	.267777644342	..3676532...	...3332.....
Tokyo	.......1..	.......27..	.......57..	......13561.	.....23334..	.....12.....	....
Singapore	....	.......266.	17872	68862	.....37875.	.....2576..	.......3...
Hyderabad	....	123	1.....4677	31.....47887	2242137888885	..65567888..	..35555654..
Tel Aviv	81.....1677	88.....7888	9861..168999	828655678879	3.3321236485	...2222.32..	....
*** Oceania							
Wellington	....	....	.....12...	.....1212...	....	....	....
Perth	....	.......131.	.......22.1	.......1..1	.....1....2	.....1.....	...232.....
Sydney	....	.......24..	.....144..	.....121..	.....222..3.	.....1.....	...23.....
Honolulu	....	....	..31.....	..3321.....	...23.....	.....2.....	....
W. Samoa	....	....	....	..23221.....	...2332.....	.....222....	....
*** Africa							
Mauritius	1.....2676	4.....6876	2.....27872	.....4775.	.....476..	.....3...	
Johannesburg	67.....66	78.....7999	26.....9997	..1....39982	..631128985.	..66336897..	..56657777...
Ibadan	....	46.....433	886.....4888	76831126888	549877889987	32987788899..	..865666687..
Nairobi	....	4.....333	64.....3556	771....16777	465211267888	226544678 8..	..24677784..
Canary Isles	771.....777	887.....3888	8883...27888	878754468888	537887889997	3.48888899..	...22.2244..
*** S. America							
Buenos Aires	32.....	887.....27	777.....47	647.....167	637.1....787	2.5.21..28..	.....36..
Rio de Janeiro	1	663.....56	766.....367	536.....566	74722...2988	3.4.421259..	....322257..
Lima	....	542.....3	534.....15	2131.....23	3.57.....276	...5.2..14..	.....3..
Caracas	....	1	121.....12	3153.....33	...42...1242	....321124..	.....34..
*** N. America							
Guatemala	....	1.....	111.....2	1.11.....2	.....1.	.....2.....	
New Orleans	....	11.....	221.....1	1.2.....12	2.2..6656674	.....36777..	.....2334..
Washington	....	33.....3	7652.....26	633131..1377	2...26326785	.....5..77..	.....2..33..
Quebec	63.....6	871.....68	522.....166	...311113562	...355557863	...2333356..	.....2..33..
Anchorage	....	....	21.....	..22..112233	2.32..246873	.....245..	.....2..33..
Vancouver	....	....	.1.....	..1.....	..1....35662	.....23..	.....2..33..
San Francisco	....	.1.....	.11.....	231	.....2..33..	.....2..33..	.....2..33..

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 June 2002 issued by the Sunspot Data Centre, Brussels, was 88.5. The maximum daily sunspot number was 150 on 4 June and the minimum was 55 on 13 June. The predicted smoothed sunspot numbers for August, September and October are respectively: (SIDC classical method – Waldmeier's standard) 103, 101, 98 (combined method) 91, 85, 82.

SWL

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E-Mail: brs32525@compuserve.com

Clare, RS102891, the Golden Jubilee Awards Manager at GB50. Please see www.gb50.com for full details of the GB50 awards.

IT SEEMS CLEAR that GB50 was an exceptional success. I am delighted to have led the team, and am pleased that we were able to demonstrate amateur radio to so many members of the public. Meeting the Duke of Edinburgh was a once in a lifetime experience. Over 24,500 QSOs in 12 days says so much about the operating team. I hope that listeners both in Britain and abroad heard GB50. I have over 50 direct QSL requests so far. Cards should be available soon after this column appears.

Remember too that awards are available for hearing GB50. You can check the website [1] for the full rules, but basically, if you heard GB50 over the Golden Jubilee weekend you qualify for the Golden Jubilee Award. The cost is only £3, $5 or 5 euros. Additionally, if you heard GB50 on different bands you might be eligible for the Golden Jubilee Points Award. Whether you qualify depends on when you logged GB50, as a logging during the Jubillee weekend is worth more than either side of that period. Claims should be sent to Clare Treacher, RS102891, at my address.

Also, the RSGB has an award for hearing British stations who used a special Golden Jubilee prefix (GQ, MQ, 2Q0 etc). Full details of this award were published on page 5 of the June *RadCom*.

ILLW 2002

OVER THE LAST few years the International Lighthouse / Lightship Weekend has grown in popularity. In 1999 there were 204 lighthouse / lightship stations QRV in 36 countries; the following year, 2000, the number had grown to 255 stations in 44 countries and last year, 2001, it had reached 348 stations in 46 countries. There are quite a few lighthouse / lightship stations on the air each year for which an entry is not received in time for the event.

So when is the ILLW this year? 0001UTC on Saturday 17 August until 2359UTC on Sunday 18 August 2002. Already over 100 entries in 27 countries have been received by VK2CE at the offical website for the event [2].

Listeners are really welcome to join in the fun of the weekend, and listen to the QSOs being made by a station at a lighthouse, lightship or maritime beacon. Further information on the event can be obtained from the official website or from gm4suc@compuserve.com This is *not* a contest. Enjoy!

BROADCAST STATION DXING

I TEND NOT TO have much correspondence about BC SWLing, but I have been asked for suggestions about a good book that is available which lists MW and SW Broadcast Stations. Any SWL with information is invited to contact Martin VE7MM, who is also VE0BC, G4EZG and BRS32595 at mmacgregor@asttbc.org

MORE 'DUBIOUS' SWL REPORTS

TONY, G4UZN, also confesses to amazement having read my write-ups on cluster QSL-ing. His initial view was that it was hard to believe, but he suggested that some people must get really obsessed to the point of dishonesty. Tony has operated with special callsigns and had recently operated from HS0 and 9M6. Being the DX, he invariably sits on the same frequency for an hour or more working a pile-up. If he then gets a SWL card reporting on only one QSO, he reluctantly consigns it to the bin. He suggests that in such circumstances a minimum of three calls should be given. (Interesting that I have been preaching the need to give more than one QSO for years!) Tony accepts that the practice of giving only one callsign is partly the fault of pre-printed cards that give space in a box for only one callsign.

He was an SWL for many years and he reflects that the time when reports were actually needed and sometimes requested, is long gone. However, short wave listening is a valid hobby in its own right. Tony is one that considers that any would-be amateur should serve 'an apprenticeship' as an SWL so that the person is able to get a good insight into the amateur bands, conditions, propagation, and the most important thing of all - how to operate on the HF bands.

SPECIAL EVENT QSLs

MIKE, MW0CNA, HAS confirmed that he has had a good response from special event station QSL managers who have sent him envelopes so that SWL cards can be replied to. Well done, guys! Mike hopes that the recent batch of special event stations for the Queen's Jubilee will follow suit. See Mike's website [3] for more.

THE MONTH'S DX NEWS

I SHALL LEAVE Robert Small's, BRS8841, account to stand as this month's account of DX conditions in the last month. Robert was very complimentary about the GB50 operation and remarked that it was nice to copy the stations worked with ease on SSB and CW. He had not been too active, but felt that conditions had been quite good. Most of his activity had been on HF where he reported YK1BA, 6Y5/YO3YB and R3CA from new IOTA numbers AS-163 and AS-164, HL17FWC and YA3GIB. 18MHz had only provided A71CD, but 21MHz DX included 7O/OH2YY, J88DR, OX3DB, VQ9SH, H44A and 4W1RO, while 24MHz gave Robert TN3W and VQ9SH on SSB and FO5QB on CW. TN3B also gave Robert a new country on 28MHz CW, and YA/DL5NAV was new on 28MHz SSB.

COLLECTING SWL CARDS

I RAN AN ITEM recently about Peter, ONL5923, collecting SWL cards. Tony, G4UZN, collects QSL cards too, and has a collection going back as far as 1922. However, he has no real use for the SWL cards. So, if Peter would like to e-mail me, I will put him in touch with Tony. ♦

WWW.

[1] GB50 Golden Jubilee Station: www.gb50.com
[2] International Lighthouse / Lightship Weekend: www.vk2ce.com/illw
[3] Mike, MW0CNA (GB QSL Sub-Manager): http://homepage.ntlworld.com/mw0cna/qslmanager.html

Antennas

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E-mail: g3ldo@ukonline.co.uk

MOST home-made beam antennas are constructed from designs published in amateur radio publications. Once the beam is constructed it is raised to its operating position, and provided the SWR is reasonable, and the antenna exhibits some directional properties, it is assumed that it is working correctly. In many cases this is true but there must always be the nagging doubt about its performance. Could be improved? Keen DXers and contest operators spend a lot of time optimising their beam antennas. This month, inspired by correspondence with Louis Thomas, GW4ZXG, regarding his quad, we will look at methods of doing this.

The dimensions of the driven element only affect the feed impedance and have little effect on the gain or directivity of the beam. For this reason, and because this column is limited to one page, I will only be considering a two-element quad and the tuning of the reflector.

The GW4ZXG antenna is a home-brew two-element two-band quad designed to operate on 10 and 15m. It uses short boom 'spider' construction with an element spacing of approximately 0.13λ for both antennas. It is mounted diamond pattern on an Altron telescopic tiltover tower with the boom approximately 40ft above ground. The mast can be tilted over so the antenna elements are easily accessible. In this way the reflector on each antenna can be resonated using a GDO, but the resonance changes when the antenna is raised to the operating height. A much better solution is to resonate the reflector at its operating height.

THE GW4ZXG REMOTE TUNER

THIS IS A really neat idea, see **Fig 1**. It comprises tuning stubs of stiff copper wire about 0.84m (30in) long with 50mm (2in) spacing. A sprung metal paper (bulldog) clip is drilled and threaded on to the stub to form a sliding shorting bar. The stub is connected to the reflector element at the bottom of the 'diamond'. The ends of the stubs are taped to the fibreglass arm to hold them in a firm vertical position and a small simple pulley system using a small china 'egg' insulator is fixed to the arm just above the end of the stub. The clip is fixed, as shown in Fig 1, to a long nylon cord so that it may be slid up or down the stub whilst the antenna is at full working height and the operator is at ground level. GW4ZXG designed this stub for his diamond configuration antenna, with the tuning stub fixed to the lower reflector element support. With a conventional quad configuration, or any wire beam antenna such as the Moxon rectangle, a special stub support would have to be constructed.

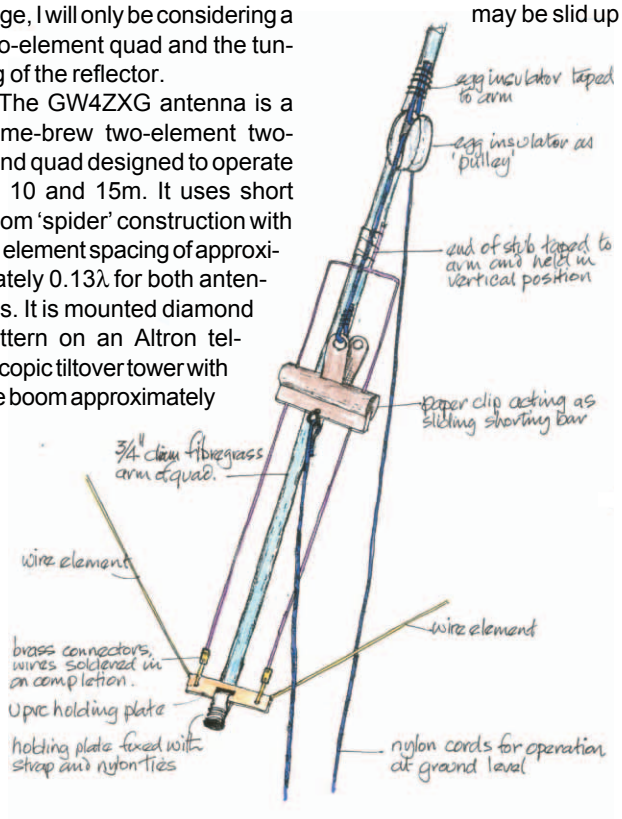

Fig 1: Remote quad tuner with bulldog clip remote controlled tuning slider, designed and drawn by GW4ZXG.

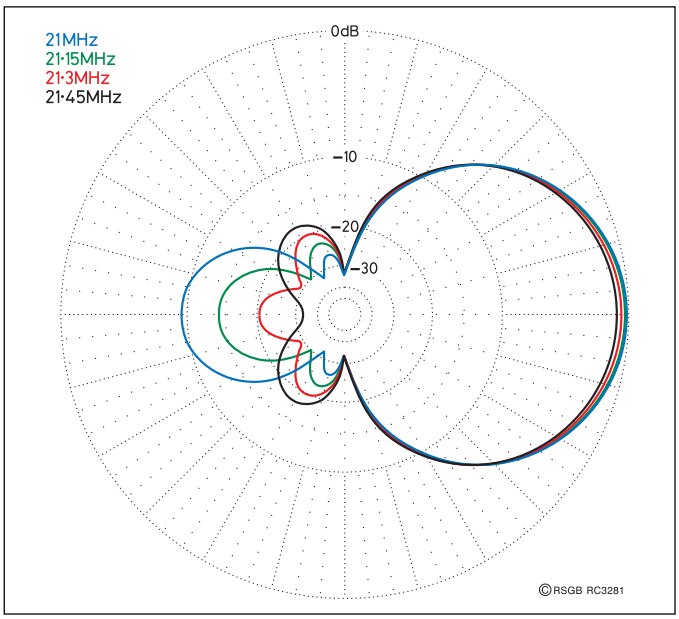

Fig 2: Polar diagrams of a two-element quad from 21.0 to 21.45MHz. This is a free-space diagram, however, real ground azimuth diagrams plotted at very low angles of radiation are very similar.

MEASUREMENTS

ANTENNA TUNING can be monitored in several ways, as described in [1]. You can use the transmitter, set to low power, connected to the antenna and use a remote antenna and field strength meter (FSM) to measure the signal strength as the antenna is tuned and rotated. The other option is to use a remote transmitter or signal generator and measure the signal strength on the transceiver S-meter.

GW4ZXG uses the remote receiver approach. This comprises a Kenwood DM-81 GDO switched to the FSM function with a link-coupled half-wave dipole, which is located about 200m from the antenna under test (AUT). A twin cable is run back to a remote meter on the operator's bench at the base of the tower. This allows the stub to be adjusted for minimum signal with the reflector of the AUT positioned nearest to the FSM. The process is repeated for the reflector element of the other band. The process is then repeated to minimise the effects of interaction of the interlaced antennas. The bulldog clip on the remote tuner of each antenna is then removed and replaced with stiff copper wire soldered in position. The FSM should be located in the far field. If you do not have the space a mobile FSM installation can be used.

The S-meter method of measurement is less sensitive because the S-meter has a log scale and it is very difficult to see small changes in signal strength as you make the parasitic element adjustments. Most FSMs use a linear (or near linear) scale so it is much easier to see these variations in signal strength.

Would it be better to tune the antenna for maximum gain or maximum 'front to back' because these two points do not coincide in frequency? Computer analysis, see **Fig 2**, indicates that if a two-element quad is tuned for maximum 'front to back' ratio at the high frequency end of the band it will have slightly greater gain at the expense of reduced 'front to back' on the lower frequencies. With an optimised beam using director(s), maximum front to back occurs at a lower frequency than maximum gain.

I always think that a beam with good directivity somehow seems better.

REFERENCES

[1] *Backyard Antennas*, Peter Dodd, G3LDO. Available from RSGB Sales. ♦

CUSHCRAFT

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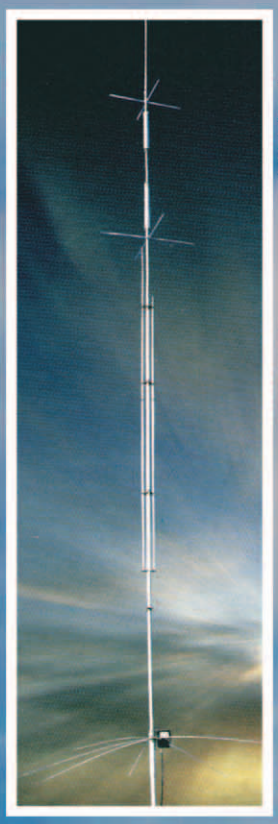

- Bands: 6, 10, 12, 15, 17, 20, 30, 40m
- Gain: 3dBi
- Power rating: 1.5kW
- VSWR: 1.2:1 (typical)
- Bandwidth (2:1) kHz 6m (1500) 10m (1500) 12m (100) 15m (450) 17m (100) 20m (350) 30m (-50) 40m (150)
- Radiation angle: 16 deg
- Horiz. Rad. Pattern: 360 deg
- Height: 8.7m
- Mast size range: 38-44mm
- Wind survival: 129 kph
- Weight: 10.5kg

MA-5V

- Bands: 10, 12, 15, 17, 20m
- Gain: 2dBi
- Power rating: 250W (PEP)
- VSWR: 1.3:1 (typical)
- Bandwidth (2:1) kHz 10m (500) 12m (100) 15m (450) 17m (100) 20m (200)
- Vert. Rad. Angle: 16 degs
- Height: 3.7m
- Mast size range: 38-44mm
- Wind survival: 160 kph
- Weight: 3.2kg

MA-5B

- Bands: 10, 12, 15, 17, 20m
- Max gain: 5.3, 0, 4.8, 0, 3.6dBi
- Front to back ratio: 10, 0, 12, 0, 22dB
- Sidelobe att: 25dB (all bands)
- Power rating: 1.2kW
- VSWR: 2:1
- Bandwidth: 665, >110, 255, >100, 90kHz
- Boom length: 2.2m
- Boom diameter: 3.8cm
- Longest element: 5.2m
- Turning radius: 2.7m
- Max wind surface area: 0.3m3
- Weight: 12kg

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A-743	7 MHz/10 MHz add on kit for A3S	£159.95 C
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D-3	14/21/28 MHz 2KW 7.86m long	£249.95 C
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A270-6S	2m/70cms 3 element beam 7.8db gain 0.85m long	£79.95 C
AR-270B	2m/70cms vertical 5.5/7.5db gain 2.3m high dualband Ringo	£99.95 C
AR-270	2m/70cms vertical 3.7/5.5db gain 1.13m high dualband Ringo	£89.95 C
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13-B2	2m 13 element beam 15.8db gain 4.57m long	£159.95 C
17-B2	2m 17 element beam 18db gain "N" 9.45m long	£269.95 C
26-B2	2m 26 element beam 18.8db gain 4.75m long	£429.95 D
A144-10SN	2m 10 element beam 13.2db gain 3.6m long "N" socket	£79.95 C
A148-3S	2m 3 element beam 7.8db gain 0.85m long	£54.95 C
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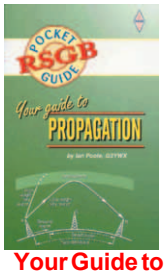

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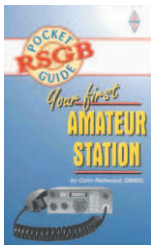

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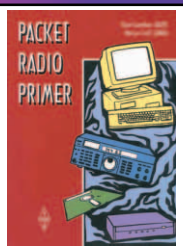

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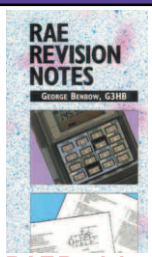

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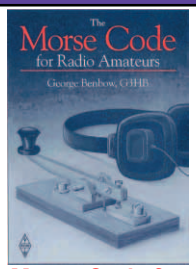

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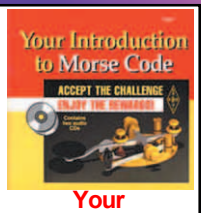

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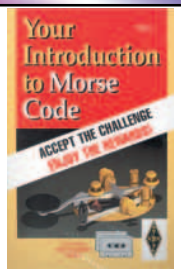

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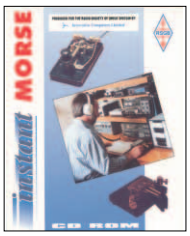

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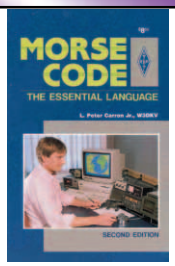

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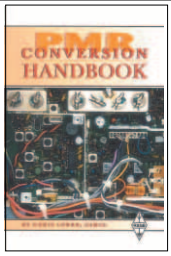

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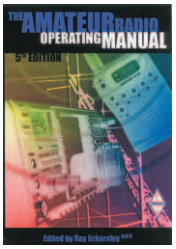

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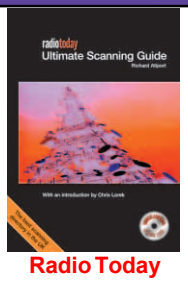

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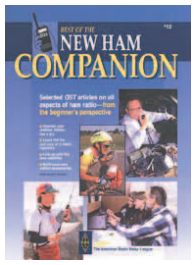

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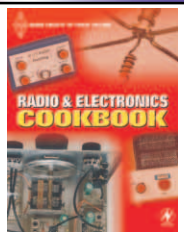

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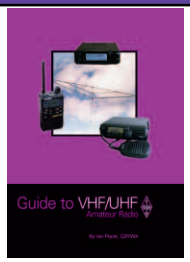

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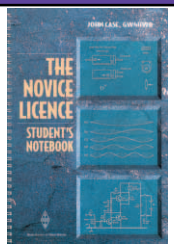

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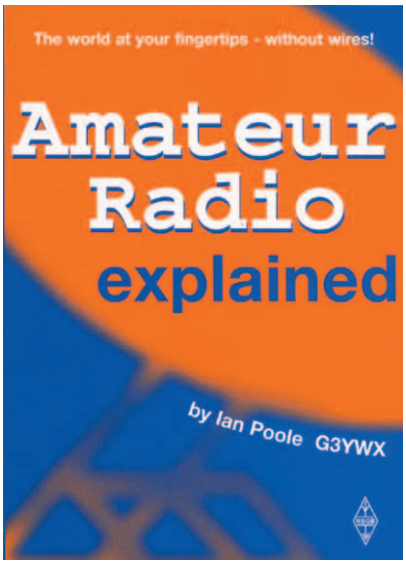

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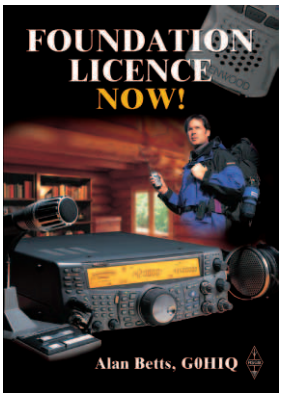

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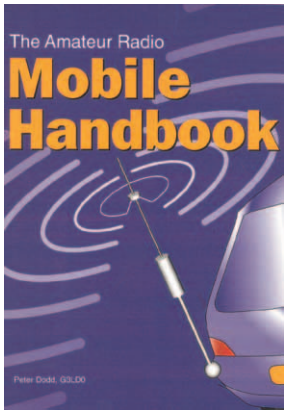

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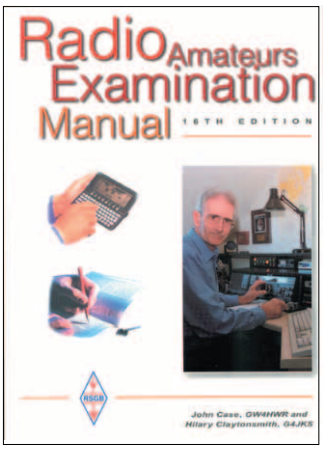

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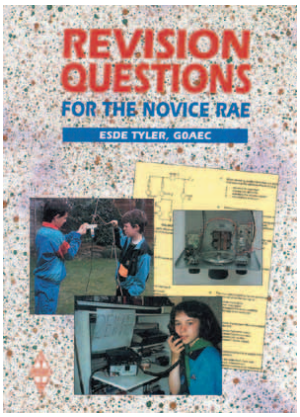

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EMC

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UNFORTUNATELY, the prospect of Power Line Telecommunications (PLT / PLC) is still very much alive, largely due to new developments in modulation techniques. As the potential for interference from such systems is of great concern to radio amateurs and other HF users, this subject is featured again in this month's 'EMC'.

PLC TRIAL IN SCOTLAND

TWO PLC TRIALS are planned in Scotland, starting mid-July 2002 (see WWW). About 100 residential, business and public sector customers in Crieff and Campbeltown are expected to take part in a PLC trial of a broadband 'always-on' Internet access service using existing electrical supply cables.

The Scottish trials are to be operated by SSE Telecom, which is part of Scottish and Southern Energy plc. It is reported that, if the trials are successful, SSE Telecom plans to carry out further trials before deciding whether to make the service available commercially.

For the Crieff trials, the company is in partnership with Perth and Kinross Council, with support from Scottish Enterprise Tayside. For Campbeltown, SSE Telecom is in partnership with Highlands and Islands Enterprise. Both pilot schemes are claimed to be in line both with Government aims to increase broadband access for remote communities, and with the Scottish Executive's 'Digital Scotland' policy. The trials are reported to be partly funded by the Department of Trade and Industry DTI 'Broadband Fund'.

The trials in Crieff and Campbeltown are claimed to provide access speeds up to 2Mb/s but it is not clear whether this is per user or the total data rate shared between multiple users on the same section of electricity supply wiring.

In 1999, United Utilities and Nortel Networks conducted PLC trials in Manchester, but did not proceed further. This was reported to be for financial reasons, but there was also the matter of EMC standards.

WWW.

'The Register' - article on PLC in Scotland
www.theregister.co.uk/content/22/25649.html

SSE Telecom (PLC in Scotland)
www.ssetelecom.co.uk/latestnews/index.asp
(Follow the link to '19 March 2002 - Crieff and Campbeltown are Scots pioneers')

Sumitomo Electric Industries, Japan, news release on PLC modem
www.sei.co.jp/news_e/press/02/02_06.html

DS2 PLC chip vendor **www.ds2.es/**

Crosstainment PCI card PLC modem
www.crosstainment.com/Products/Communication/Powerline-Technologie/powerline-technologie.html

There can be little doubt that the following two fundamental points apply to any 'access' PLC system (ie one that provides access from outside the premises):

- If it provides data rates of the order of megabits per second, it cannot operate below 150kHz because there is not enough bandwidth.
- As Information Technology Equipment (ITE), the applicable EMC standard is EN 55022 Class 'B' for conducted emissions into the mains, but it does not appear that any practical 'access' system that operates above 150kHz can meet this standard. There is strong commercial pressure for new relaxed standards for PLC but, fortunately, this has not happened yet.

Operating PLC below 1.6MHz is not an attractive option either because of possible interference to the LF / MF broadcast bands and also because of the higher levels of electrical interference on the mains. It is therefore likely that operating frequencies would be somewhere in the range 1.6 - 30 MHz. Although it is to be hoped that the HF amateur bands would not be used intentionally, it is unlikely that emissions in amateur bands could be avoided completely (see below), so the question is whether these stray emissions can be kept low enough. There is also the question of how immune a PLC system would be to nearby HF amateur radio transmissions.

Not surprisingly, the EMC Committee is very concerned about these trials. We are making our views known to all parties involved and plan to publish information about the responses that we get.

A particular issue is the possible use of PLC in rural areas which are normally 'electrically quiet', but where much of the electricity supply wiring is on overhead wires rather than underground. It is well known that an aerial wire on a high pole radiates much more effectively than a wire buried in the ground!

INTERNATIONAL PLC

SUMITOMO ELECTRIC INDUSTRIES Ltd (SEI) of Japan has issued a news release about a 45Mb/s PLC modem (see WWW), developed in collaboration with Tokyo Electric Power Company Inc. Sumitomo are using PLC chips from the Spanish vendor, DS2. It is claimed that data transmission rates of up to 200Mb/s will be possible in future by improving the PLC chip.

According to SEI, "*The PLC modem uses the HF band (1.7 - 30MHz), whose release for PLC is now under discussion in Japan*". It says that the domestic market will be exploited after the deregulation.

A shareholder in the Spanish PLC chip vendor, DS2, is ENDESA, claimed to be the largest power utility in Spain and South America. ENDESA has done PLC trials in apartments in Zaragoza, Spain. It also plans a trial of high-speed Internet access and voice over IP (VoIP) to several thousand homes in summer 2002.

In China, the Fujian Electric Power Testing and Research Institute is reported to have developed a PLC system known as 10Mb/s Digitised Power Line (DPL).

PLC - TECHNICAL DETAILS

MUCH PUBLISHED INFORMATION on PLC is short on technical information. An exception is the 'PCI In House Powerline Modem' from Crosstainment AG of Germany, which gives some interesting insights. This is a network card that fits a PCI slot in a PC and uses power wiring for 'access' PLC services or for in-house services such as a home or office LAN. The card claims to meet EN 55022 (emissions) and EN 55024 (immunity) "except in the PLC band". The frequency range of the so-called 'PLC band' is not specified however.

The card uses the DS2 chip. The DS2 web site gives some technical details on the DSS4200, although this is chip is for 'head-end' use rather than in customers' modems (see WWW). The maximum data rate of 45Mb/s is split between 27Mb/s downstream and 18Mb/s upstream. It uses Orthogonal Frequency Division Multiplex (OFDM) modulation with 1280 carriers. This is the same principle that is used for digital terrestrial TV and ADSL. Based on the specified modulation efficiency of up to 7.25b/s/Hz, it appears to need a bandwidth of 27,000,000 / 7.25 = 3.72MHz downstream and 2.48MHz upstream. It therefore appears that the 1280 sub-carriers would be spaced about 4.8kHz apart.

The operating frequency is programmable from 1 to 38MHz, but it appears unlikely that a frequency above 30MHz would be used because of radiated emis-

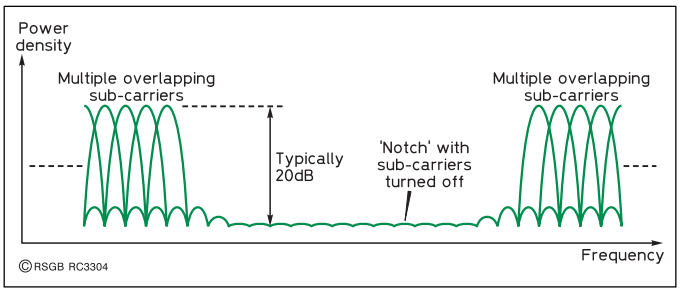

Fig 1: Frequency spectrum of OFDM modulation showing a 'notch'.

sion limits that apply from 30 to 1000MHz. For frequencies below 30MHz, it would be difficult to avoid all amateur bands and impossible if the upstream and downstream frequency ranges are in a single 6.2MHz block.

'Programmable spectrum management' is provided via a transmission power mask. This may mean that certain ranges of sub-carriers could be 'turned off' digitally to leave 'notches', for example in an amateur band (see **Fig 1**). In practice, it is considered to be difficult to suppress the sub-carriers in the 'notches' by more than about 20dB using this technique.

This raises the question "How much power might be left in the amateur bands?". The power spectral density (PSD) of the Crosstainment card is specified as less than -50dBm/Hz so in 9kHz bandwidth, the maximum power would be 9000 times higher or up to -10.5dBm. Converting to voltage and assuming 50Ω, that would be 96.5dB(μV). This figure should be compared with the EN 55022 Class 'B' average limit for conducted emissions which is 46dB(μV) from 0.5 to 5MHz and 50dB(μV) from 5 to 30MHz (see **Fig 2**).

From the above, it can be seen that PLC modems may need to operate at levels up to about 50dB above existing EN 55022 limits for conducted emissions. That is 100,000 times higher as a power ratio. Even if OFDM sub-carriers are suppressed in amateur bands, they would probably only be reduced by about 20dB, which is still up to 30dB above the limit or 1000 times higher power. The EMC Committee has also found that any equipment near the existing limit can cause significant interference to amateur HF reception so the implications of up to 30dB on top of that are clear.

Some members have asked what PLC interference sounds like. There is no simple answer as it depends on the type of modulation used. For OFDM with continuous carriers modulated with data, it would probably sound like white noise so it might not be obvious that it was actually a man-made signal. For an 'access' PLC system, there is also the question of how the 'upstream' bandwidth is shared between multiple users. Some sort of time division multiplexing might be used, in which case the emissions would be amplitude modulated in a rapid regular or irregular pattern.

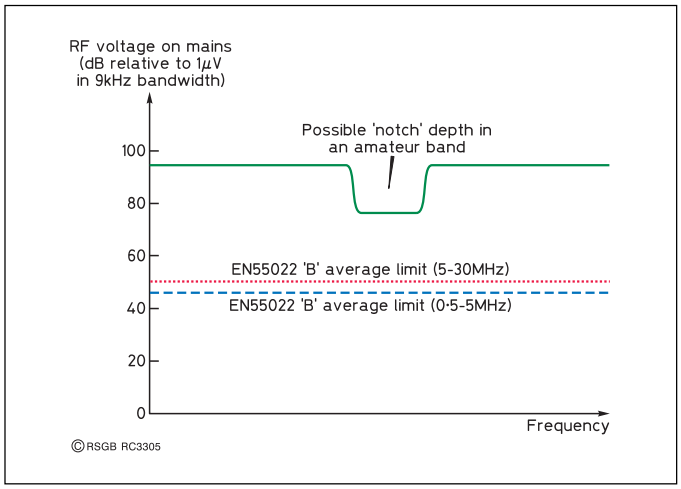

Fig 2: Possible emission levels from an 'access' PLC system using OFDM, in relation to the EN 55022 conducted emission limits.

DIGITAL TERRESTRIAL TV

PETER, G4ADJ has recently purchased a Pace digital terrestrial TV adaptor as mentioned in the June 'EMC'. He states that he is impressed with its immunity to electromagnetic interference.

For both analogue and digital TV reception, Peter uses two loft-mounted 18 element wideband Yagis feeding a Maxview distribution amplifier, also in the loft. These provide reception from the Mendip main (South West) transmitter and his local Malvern (Midlands) relay.

Analogue reception is fair, but Peter uses a Tandy TV interference filter in the aerial downlead at the back of the TV receiver to avoid two breakthrough problems. The first was audio breakthrough when transmitting 100W of SSB to a G5RV on any band 14 to 28MHz. The second was blocking of the analogue TV signals when transmitting 10W FM on 144MHz into a vertical dipole in the loft some 3m away from the TV aerials.

Using the Pace adapter to feed the TV via a video recorder, Peter found that the insertion loss of the Tandy filter was enough to cause complete loss of digital TV signals so it had to be removed. This illustrates an important point about filters for digital terrestrial TV. If a filter is needed, it usually needs to have a really low passband loss.

In this case, however, Peter was surprised to find that,even without the filter, he could operate the HF or VHF rigs at full power, with no audible or visual effects on the digital TV reception. He plans to check for any significant increase in the Bit Error Rate, which can be monitored by selecting the 'Technical Information / Signal Information' option from the menu.

Checking the Bit Error Rate before and after would also be a good idea for anyone who fits a filter to a DTTV installation.

Peter reports that the power supply for the Pace digital TV adaptor does create detectable RF interference which appears to peak at around 150MHz on the version he has. This is S5 to S9 on an FT-817 with a whip in 144MHz FM mode almost anywhere in the same room as the power supply, but it drops to an insignificant level on leaving the room. The HF amateur bands seem to be unaffected.

Overall, Peter states that he is pleased with his Pace digital TV adapter.

Colin, G3NRQ, reports a different experience of digital terrestrial TV reception, although he does not give details of the make and model of set-top box or digital receiver. He has had digital TV for the last 14 months but it took him 12 months to get most channels.

Colin has spent most of his life in radio communications and, in his opinion, the main problem is the low level of digital TV signal. From the top of his lane, he can see the Belmont transmitter mast. The use of amplifiers can increase interference problems and he has found that multipath effects can cause an apparent difference of up to 15 degrees between channels. Any of his vehicles freeze the picture even though they are driven behind the TV aerial. Regarding immunity to amateur radio transmissions, Colin reports that any transmitter within 30m will give problems and he considers that this will continue to be the case until the digital TV signal strength is increased. ♦

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REPEATERS

MARK LEWIS, GW7KDU
14 Hornbeam Close, St Mellons, Cardiff CF3 0JA. E-mail: rmc-wales@net.ntl.com

THE RSGB Repeater Management Committee (RMC) [1] is concerned about problems caused by 70cm repeaters to car remote control central locking / alarm systems. These systems have been placed in the 433MHz portion of the band on a frequency of 433.92MHz with a power restriction of 25mW. Unfortunately the receivers built into the car are not particularly selective and can easily be swamped by an amateur radio transmitter operating close by.

There have been several cases recently where 70cm repeaters installed in residential areas appear to have caused this type of device to stop working, with the result that car drivers have been unable to lock / unlock and drive their cars. The AA and RAC estimate that more than 8800 breakdowns attended in 1996 (data taken from the RA's website [2]) were a result of remote key fobs being blocked by radio interference. It is not known how many of these were caused by amateur radio repeaters. Although the permission for use of 'low power devices' in the UK is on the understanding that they have no protection from other services using the band, the RMC is concerned about the bad publicity for the hobby that could be caused by 70cm repeaters sited in residential areas preventing car drivers from using their vehicles. Both frequency splits (1.6MHz and the new 7.6MHz) have caused problems.

For the time being the RMC would prefer to receive applications for new / site change 70cm repeaters that are sited in more remote locations where the problem is likely to be less significant. The RMC is currently seeking guidance as to whether further applications for repeaters sited on residential properties should be accepted.

GB3US LOGIC MODIFICATION

BOB, G3VVT, has sent me details of a simple modification that he has implemented on the GB3US logic unit in use on GB3LF. Bob's circuit (**Fig 1**) is based around a LM567 tone decoder, a 74LS123 monostable and NPN switching transistor. The circuit works by detecting a CTCSS tone on the input of the LM567, which then fires the monostable and this in turn operates the switching transistor to provide a half-second pulse into the GB3US MK1 logic. This is done in parallel with the output from the (original) LM567 tone burst decoder on the GB3US logic PCB. This 'fools' the logic into thinking that it has received a valid 1750Hz tone burst. Bob estimates that the cost of the modification is around £2.

Bob is also developing a further enhancement to his original project. This is based around a FX365 CTCSS [3] encoder / decoder chip from CML. In this design the audio band is split at 300Hz with the lower frequencies being fed to the FX365. The higher frequencies are fed back to the GB3US logic together with the half-second pulse from the monostable mentioned above. Additionally a new CTCSS signal is provided back to the logic board, gated by the 'TX relay' line of the logic and fed through a delay circuit to retain the outgoing CTCSS tone after the through audio has been removed by the logic for pip tones etc. Bob is still testing his design and it is hoped that more details including circuit diagrams can be included in a future edition of this column.

GROUP NEWS

JOHN, G7RXS, Chairman of Leicestershire Repeater Group, sent me an e-mail to report that the group has now completed the first stage of its mast refurbishment project. All three voice repeaters now have brand new dedicated commercial specification aerials with their own dedicated new feeders. The group also now has a brand new spare 70cm aerial for experimental and development purposes. Reception reports so far generally indicate an improved performance of 1 or 2 S-points. The group's website [4] is listed below. ♦

LATEST CLEARED REPEATERS

Call	Type	Channel/ Frequency	Proposed Keeper
GB3BK	70cm Site change, Reading, Berks	RB11 433.275MHz	G8DOR
GB3BZ	New 70cm Wide split, Braintree, Essex	RU68 In 438.450MHz Out 430.850MHz	G0DEC
GB3CH	70cm Site change, East Cornwall	RB2 433.050MHz	G1RXR
GB3GH	70cm Site change, Gloucester	RB5 433.125MHz	G3LVP
GB3IE	New 70cm Wide split Plymouth	RU68 In 438.450MHz Out 430.850MHz	G7DQC
GB3MG	70cm Site change Bridgend, Mid Glam	RB7 433.175MHz	GW3RVG
GB3ND	New 70cm Bideford, Devon	RB14 433.350MHz	G4SOF
GB3SY	70cm Site change, Barnsley	RB6 433.150MHz	G4LUE

Outstanding voice repeater proposals submitted for licensing are

Call	Type	Process Stage	Proposed Keeper
GB3BY	6m Site change Kidderminster	RIS	G8EPR
GB3CD	New 70cm Wide split Cardiff	RMC	GW6CUR
GB3PL	New 2m East Cornwall	RMC	M5DAP
GB3IB	New 70cm Wide split Weston-super-Mare	RIS	G4SZM
GB3IT	New 70cm Wide split Tamworth	RIS	G6NHG
GB3KR	70cm Site Change, Kidderminster	RIS	G8NTU
GB3RB	New 70cm Wide split Bolsover	RIS	G1SLE
GB3SV	70cm Site change Bishop Stortford	NFAP	G1NOL
GB3XN	New 70cm Wide Split Worksop	RIS	G3XXN
GB3YR	New 2m Rotherham	RIS	G4LUE

Repeater proposal status as of 14 June 2002. The latest clearance status can be obtained from the RMC website [1]. Please note that even though an application may have cleared it is beyond the control of the RMC as to when the keeper will bring the repeater into service.

WWW.
[1] RMCweb: http://www.coldal.co.uk/rmc
[2] RA: http://www.radio.gov.uk/
[3] Data sheet for FX365: http://www.cmlmicro.com/products/Datasheets/Docs/FX365CDS.pdf
[4] LRG: http://homepages.stayfree.co.uk/lrg/

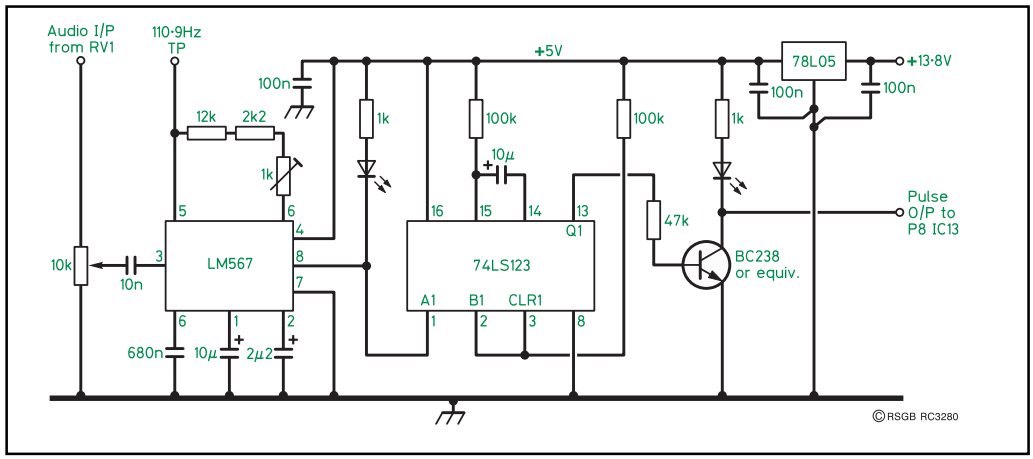

Fig 1: G3VVT's CTCSS modification for GB3US logic.

IARU

TIM HUGHES, G3GVV
10 Farm Lane, Tonbridge TN10 3DG.

THE VENUE for the next IARU Region 1 Conference is always chosen at the previous conference by its Member Societies. Thus, at Lillehammer, Norway, in 1999, San Marino was voted as the location for the 2002 Region 1 Conference. A similar procedure is adopted by Region 2 (North and South America) and Region 3 (Asia and Australasia).

Known to radio amateurs by its prefix T77, San Marino has the distinction of being the oldest republic in the world; it is mostly hilly country with a total area of 61 square kilometres, and is bordered by two Italian regions - Emilia Romagna to the north-east and Marche-Montefeltro to the south-west. It is 10km distant from the Adriatic Coast.

IARU EC MEETING

THE IARU Executive Committee (EC) holds its pre-conference meeting at the conference centre, this year from 26 to 29 April. In addition to the EC, the Region 1 Office Manager, Audrey Jefcoate; the President of IARU, Larry Price, W4RA; the Secretary of Region 2, Rod Stafford, W6ROD; and Young-Soon Park, HL1IFM, Director of Region 3, were present.

Routine work was concerned with administrative and financial matters, including the preparation of budgets. Much of the time was spent on issues which affect the future of amateur radio, particularly those to be discussed at the World Radio Conference in 2003 (WRC-03).

The work of EURO-COM under the Chairmanship of Gaston Bertels, ON4WF, and the group of experts dealing with Power Line Communications (PLC) was discussed in depth. The need to achieve internationally-recognised and accepted limits was emphasised, for early indications are that the levels of interference caused by PLC systems are unacceptably high. Several European countries are carrying out tests. The EC urged member societies to monitor activities in their countries, and to share this information with EC member Karl Voegele, DK9HU, who is coordinating the IARU Region 1 work on PLC.

The harmonisation of the 7MHz band is a matter of major interest and importance, on which there is continuous effort. Whilst the current position looks more positive than previously, there are still many unresolved issues. Renewed interest by the military in high frequency communication is one of the many challenges to be met. The EC will soon update member societies, and seek their support to lobby their governments with the IARU position. The 7MHz initiative will be discussed at the IARU Liaison Officers' Workshop to be held at the forthcoming Region 1 Conference in November.

STARS & IARU MS

AFRICA, WITH ITS many countries but relatively few radio amateurs, is a continent which merits and receives the EC's attention. Consequently the functioning of the STARS (Support To the Amateur Radio Service) Working Group, the African Development Programme, and the recent Central African Initiative, were reviewed. It was agreed to follow up these initiatives, and to continue efforts to create a better understanding and support for amateur radio by African governments. Following successful contacts with Mr Jan Motai, the Secretary General of the African Telecommunication Union (ATU), the EC will develop its relations with that organisation and utilise the Memorandum of Understanding signed several years ago by IARU Region 1 and by the ATU. The IARU Monitoring System (IARU MS), the Co-ordinator of which is Ron Roden, G4GKO, is now recognised as a source of accurate and credible information. Government monitoring networks are using details about intrusion in exclusive amateur bands, and acting on these. The EC complimented the IARU MS team on its work, and urged more member societies to participate in this vital activity.

HALTING THE DECLINE

THE EXECUTIVE Committee noted the steady decline in the numbers of radio amateurs, and the slow progress in bringing young people into the service. Member societies were urged to review their promotional activities, and to develop new campaigns directed at the younger generation. The challenge that faces amateur radio to increase growth in numbers will be another topic at the Liaison Officers' Workshop.

Progress has been made with the formulation of the ITU Amateur Regulations. The latter will no longer carry the prefix 'S', as the simplification process has been completed. Thus S25 will in future be known as Article 25. W4RA pointed out that the expression 'WARC Bands' is no longer appropriate, since the allocations at 10, 18 and 24MHz was made in 1979!

Three new members were appointed to the IARU Region 1 Team of Experts: John Gould, G3WKL; Hans P Blondeel Timmerman, PA7BT; and Heinz-Günter Bottcher, DK2NH.

An application to join IARU was received from the Cameroun society ARTJ, approved by the EC and forwarded to the International Secretariat for inclusion in the next IARU Calendar. The Council of Europe Radio Club's, TP2CE, application was found not to be in accordance with Article 11.2 of the IARU Constitution, and therefore could not be accepted.

This report is of necessity brief, and does not cover every topic considered. The Conference Host Society is ARRSM, Associazione Radioamatori della Republica di San Marino. The EC expressed its gratitude to the President Julian Giacomoni, T77J, and members of his society, for the arrangements made for the meeting, and the preparatory work for the Conference.

ANOTHER HONOUR FOR ZL2AMJ

J F C (FRED) Johnson, ZL2AMJ, Chairman of the Board of Directors of IARU Region 3, has been made a Member of the New Zealand Order of Merit in recognition of his services to amateur radio. More details about ZL2AMJ appear on page 92 of the April 2002 'IARU' column in *RadCom*. ♦

At the IARU EC meeting in San Marino in April: left to right (back row) HL1IFM, 6W1KI, LA2RR, ZS6AKV, A41JT, W6ROD, DK9HU; (front) W4RA, Audrey Jefcoate, PA0LOU.

ANDY TALBOT, G4JNT
15, Noble Road, Hedge End, Southampton SO30 0PH.
E-mail: data.radcom@rsgb.org.uk

ON 26 APRIL, the South Coast Packet Users Group, SUNPAC, held a 're-formation' meeting at Romsey in Hampshire. The attendance was good, which gave an indication that interest in packet as an amateur radio mode is still high. Stations within the SUNPAC area are shown in **Fig 1**. Not having much personal knowledge of the medium, I asked if someone could write a short piece on the status of packet radio today, and what it gives to the amateur radio user. The information in the box was duly supplied by Peter, G6HJP.

It seems to me that most of the original advantages that packet radio brought to radio amateurs, those of messaging and bulletin boards, have mainly been replaced by the Internet. A 1200-baud simplex link cannot hope to compete with a 56Kb dial-up link, even if it is free to air! However, the medium still offers some advantages in other areas such as the DXCluster and the Automatic Packet Reporting System (APRS) with GPRS for position reporting. It is also an excellent medium for emergency communications when the telephone network goes down, as actually happened in South Hampshire the day before the SUNPAC meeting! Packet radio still seems to have a steady group of followers keeping the network operational.

DIGITS AT DAYTON

AT THE DAYTON Hamvention, one of the forums was devoted to Digital Voice Modes. G4GUO gave a presentation on our HF system, detailed in *RadCom* a couple of years ago. Gary Barbour, AC4DL, gave a presentation on DV performance goals and timing issues plus various aspects of high-speed digital signalling. Then, to round off, Frederic Demeurre of Thales Broadcast and Multimedia gave a fascinating talk on digital HF broadcasting and an 'amateur radio friendly' version of the modem that had been produced by the same group. There is a lot of interest in digital voice modes and software-defined radios in the US and ARRL are urging amateurs to push the technology forward, so watch this space. ♦

WHAT IS PACKET RADIO?

PACKET RADIO is a type of digital communication via amateur radio; it takes any digital data stream and sends it via radio to another amateur radio station. Packet radio is so named because it sends the data in small bursts, or packets.

KEYBOARD-TO-KEYBOARD

LIKE OTHER digital communications modes, packet radio can be used to talk [type - *Ed*] to other amateurs. For those who cannot use HF, two amateurs can talk to each other over long distances using the packet radio network.

PACKET BBSs

MANY TOWNS and cities have packet Bulletin Board Systems (BBSs) attached to their local packet network. Amateurs can check into a BBS and read messages from other packet users on almost any topic. BBSs are networked together over the packet network to allow messages to reach a broader audience than your local users. Private messages may also be sent to other packet operators, either locally, or who use other BBSs. Many have a file section containing various text files full of information on amateur radio in general and the latest ARRL, AMSAT and propagation bulletins.

DX PACKET CLUSTER

THIS DEVELOPMENT uses packet radio for DX spotting. HF operators connect to the local DX Packet Cluster for the latest reports on DX. Often a user will 'spot' some hot DX and disseminate the DX report in real time.

FILE TRANSFER

WITH SPECIAL SOFTWARE, amateurs can pass any binary files to other amateurs. Currently, this is done with TCP/IP communications, and other programs such as *YAPP* (Yet Another Packet Program) and *7Plus*.

WHY PACKET?

PACKET HAS THREE great advantages over other digital modes: transparency, error correction, and automatic control.

The operation of a packet station is transparent to the end user; connect to another station, type in your message, and it is sent automatically. The Terminal Node Controller (TNC) automatically divides the message into packets, keys the transmitter and sends the packets. While receiving packets, the TNC automatically decodes, checks for errors and displays the received messages. In addition, any packet TNC can be used in a packet relay station, sometimes called a 'digipeater' (digital repeater). This allows greater range by stringing several packet stations together.

Packet radio provides error-free communications. If a packet is received, it is checked for errors and will be displayed only if it is correct. With VHF / UHF packet, many countries allow packet operators to operate in automatic control mode, meaning that you can leave your packet station on constantly. Other users can connect to you at any time they wish, to see if you are at home. Some TNCs even have Personal BBSs (sometimes called 'mailboxes') so other amateurs can leave you messages if you are not at home.

Another advantage of packet over other modes is the ability for many users to be able to use the same frequency channel over the same period of time.

A TYPICAL PACKET STATION

Terminal Node Controller (TNC)

This contains a modem to decode the audio signals into digital signals. It also contains a micro-computer to convert the digital signals into text that can be sent via an RS-232 port to the computer. The CPU also handles the protocol overhead of the packet station. Metaphorically speaking, when you send data, the text is taken, error checking applied, and it is put into an 'envelope' for sending. When receiving the signal, the text is taken out of the 'envelope', and sent to the computer. TNCs use 1200 baud for local VHF / UHF packet and 300 baud for HF packet communications. For VHF / UHF packet, higher speed modems are available, but are more difficult to interface.

A COMPUTER OR TERMINAL

This is the user interface. A computer running a terminal program or just a dumb terminal can be used. For computers, any phone modem communications program can be adapted for packet use, but customised packet radio programs are available.

A TRANSCEIVER

For 1200-baud VHF / UHF packet, commonly-available narrow band FM voice radios are used. For HF packet, 300-baud data are used with single-sideband modulation. For high-speed packet (anything greater than 1200 baud), special or modified FM radios must be used.

WWW.SUNPAC www.sunpac.org.uk

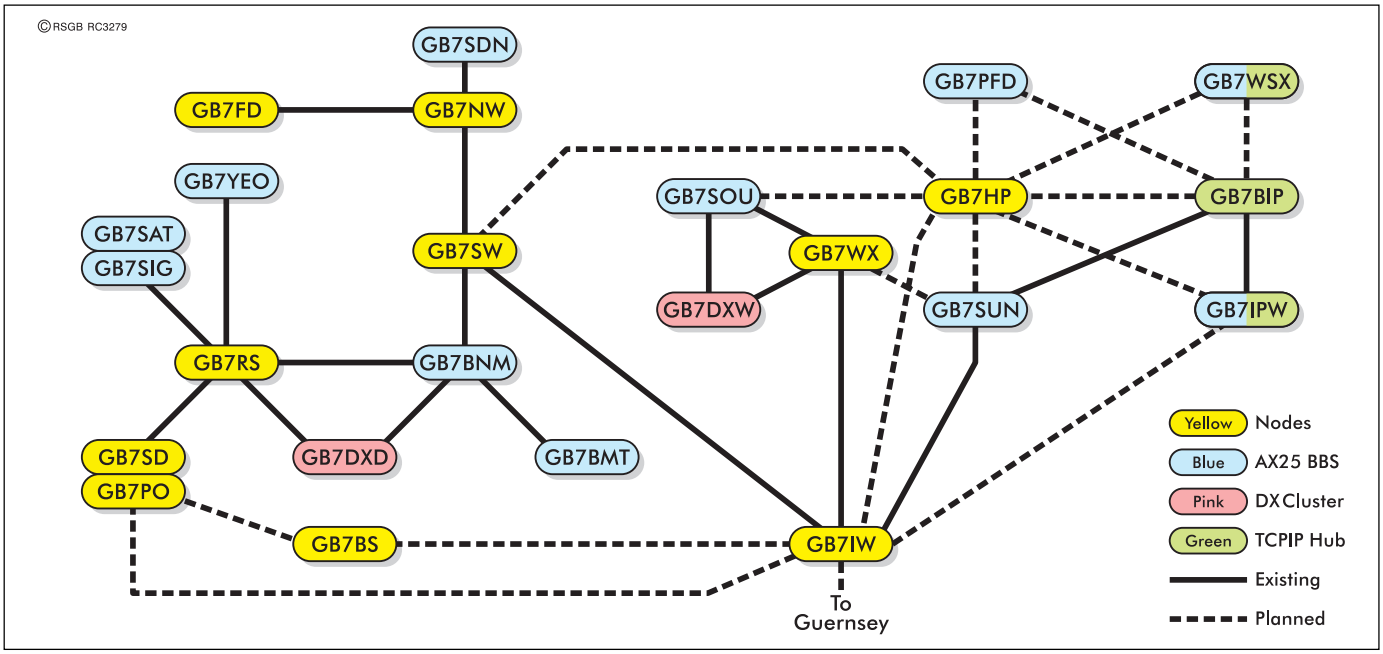

Fig 1: Various stations within the SUNPAC area.

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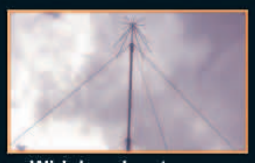

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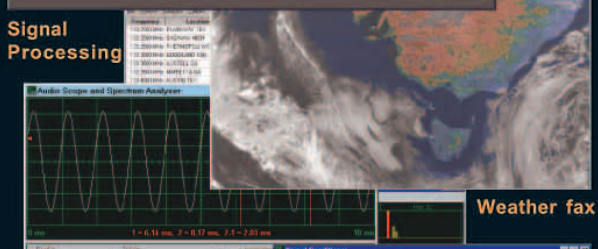

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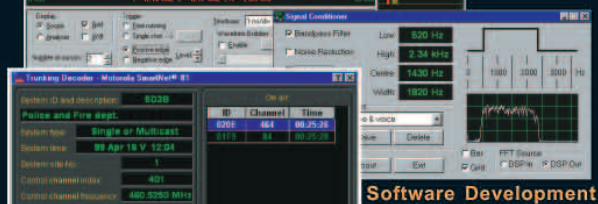

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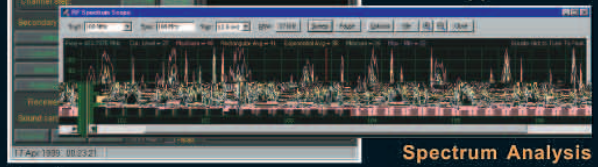

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the last WORD

We have received a bumper postbag lately, with the letter from Linda Chesters, MW3LIN (June 2002), producing an unprecedented response. This month, therefore, we have expanded 'The Last Word' to two pages. Even so, there are many excellent letters which we do not have space to publish here. You can find some of these letters on the RSGB members-only website at www.rsgb.org/membersonly/lastword - Ed

'A Joy'

Hello from North Carolina. I am an RSGB member, and greatly enjoy your magazine. I wanted to comment on these M3s I've been hearing on 15m. Never in my life have I come across a more enthusiastic group of hams than these M3s that I've been speaking with lately on 15m. As a group, they are a joy to listen to. They are having more fun being on the air than any group of hams I have heard in years. I'll give you an example of just one of many that I have heard and spoken to. M3SDX called me the other Sunday. During the course of the conversation, he said he was operating from a farmer's pasture. He said he drove his vehicle into the pasture every weekend and put up a mast with a triband Yagi on top. Now think about the efforts that ham has to make just to get on the air. If we old goats could catch that same enthusiasm and can-do attitude, the bands would be so much more fun. Y'all folks in the UK are obviously having much more success with these newcomers than we are on this side of the Atlantic. Whatever you're doing, it's working.
Jack Emerson, W4TJE

Program Source Code

I am pleased to see the open source model being discussed in *RadCom* as this approach is very much in the 'spirit of amateur radio' and also has much to offer. Alan Messenger, G0TLK, raises a number of interesting points ('The Last Word', June 2002) and he is, of course, entirely free to issue his own software under any licence that he sees fit. However, the large number of successful open source projects demonstrate that the potential problems he identifies can all be overcome.

For example the rights of the author are usually protected in some form of GPL licence while digital signatures can be used to identify *bona fide* releases. Open source tools are available to manage issues such as version control etc.

Open source may not be appropriate in all circumstances, but it is a valid approach that can deliver highly successful software to everyone's benefit.
Neil Turner, GU7NCZ

. . . I have to agree with Alan Messenger as I have had months of work on code (not ham radio related) ripped off by a commercial company and now I will not release source code unless I know the recipient personally.

I disagree in part over the open development group. You just have to look at the Linux and Open Source groups to see how well this works. There can be problems but it does give the newer programmer a chance to help in serious development. I can't, however, agree with Godfrey Manning, G4GLM, that Java is a good development language. There are plenty of good compilers available, eg X-basic runs on Windows and Linux, also the GCC set of compilers. A compiler will always produce code that will run far faster than an interpreter.
Andy Norrie, GM1MQE

Partition Magic

John Welsh, G0NVZ ('The Last Word', May 2002), laments the fact that Windows XP no longer supports DOS programs. True, but the use of a program such as *Partition Magic* will permit the creation of a separate partition on the hard disk which can then be formatted with DOS 6.2. All DOS legacy programs can then be loaded on and then run from that partition.
André Kesteloot, N4ICK

Take Your PIC

Re the article in the June *RadCom*, I completed the CQ program resulting in unusual sounds which I suspected were the inverse of the sounds expected (ie sounds where the spaces should be and *vice versa*). I corrected this by reversing the connections to the sounder, having originally connected the red lead to the positive terminal strip. All is now working fine, although I haven't yet worked out why!
John Speller, GJ3YLN

For the Timid?

Help is at hand for the newly-licensed, those returning after a long break from the hobby, those who did not find their first CW QSO enjoyable, the timid and anyone who needs sympathetic practice at a low speed. Michel Baudoin, F3LDB, calls each Tuesday evening from 1800 to 1900 UK time around 7017kHz at 5WPM. As this is the speed of the test, it should not be too frightening. He will answer in English, French or German - after all, for this, you do not need to be fluent in the language. His idea is that, once the very first QSO is under your belt, life looks rosier and you should feel confident enough to try again. The QSO consists of an exchange of callsign, name and location; a little more if you feel confident enough. He would appreciate a QSL to tell him if his idea has been of any use to you.
Esde Tyler, G0AEC

Aberystwyth Rally

I would like to apologise to those who didn't hear about the cancellation of the Aberystwyth Radio Rally, particularly to those in the cars I turned away at the Penparcau School gates, who had come from as far afield as Gloucester, Port Talbot, Rhyl and Welshpool, and I would like to thank them for being so understanding.

It is still my hope, and that of the club, that a rally is organised in Aberystwyth early next year, but if anyone can offer advice on how to encourage more vendors to sell and network, it would be much appreciated.
Ray Ricketts, GW7AGG, Secretary, Aberystwyth & DARS

Internet Linking

Martin Russell's letter ('The Last Word', May 2002) deserves - and will get from me - short shrift. The same argument about something not being 'real amateur radio' was used about packet radio, about satellite working before that, about repeaters before that, about ex-WD radios coming on to the market long before that, and so on back to the beginning! The arguments were not true then, and Martin Russell's is not true now. The fact is that Internet linking has brought many inactive amateurs back on to the air, using linked repeaters, thus safeguarding our portions of the spectrum by use.

But "shame" upon those who only use the PC-to-PC mode? That would mean shame upon the Japanese amateur to whom I recently spoke; he lives in an apartment block with 200 other families and no space for an HF antenna. His local VHF repeater is blocked all day by pirate 'squeakies'. Being able to communicate with others who share his hobby has become a welcome lifeline to him - a breath of fresh air.
Paul Thompson, GM6MEN

RadCom Propagation Predictions

Why do we bother with propagation figures? I ask this as they appear to have no significance on reception. It is stated in the key that the figures are based on an average installation. Is this 100 watts to a dipole?

Over the last few years I have regularly worked Great Britain to Australia on long and short path, also extended periods working Australia to UK either portable or mobile with good results, mostly on 20m.

I have just returned from a trip 'down under'. From January to April I worked only mobile using long path mostly from VK2, 3 and 7, around 0700 - 0830UTC. Looking at the figures in *RadCom* over this period, one would not even bother, yet it was possible to work into 'G' getting and giving reports of 57 to 59, sometimes 59+

During this period I worked 308 G stations, some over 50 times, all mobile using a TS-50S and a centre-loaded whip on the bumper. I think this would qualify

as an 'average' set-up.

The purpose of this letter is to generate some interest and discussion. Surely it is of interest to all hams not to be put off by what they read?

E C Holmes, G4TLY / VK2IVG / VK3EOQ

Gwyn Williams, G4FKH, replies on behalf of the RSGB Propagation Studies Committee:

"As mentioned previously in *RadCom*, the 'average' station will consist of a transceiver with 100W (20dBW) output, a dipole aerial, orientated for an omni-directional pattern and a radio noise environment equal to normal suburban conditions. Furthermore, this is expected to be the case at *both* ends of any predicted path. Changing these parameters can have a profound effect upon the predictions. The method by which the *RadCom* predictions are produced was elucidated in the April 2002 edition of *RadCom* and will not be repeated here. Finally, some words concerning long path (LP) radio propagation. LP has long been recognised as a viable method of communication for amateurs, in certain circumstances providing daily openings. However, for our set-up, as above, this has not proven to be the case. Predictions in the latter circumstances have proven to be unreliable and have therefore been omitted from the *RadCom* prediction tables. For more information on LP and propagation generally, it is suggested that those interested should read the publications available from many sources including the RSGB bookshop."

M3s Take Heart

My advice to MW3LIN ('The Last Word', June 2002) is to hang in there. Discrimination of the type you describe is seldom a sign of superiority on the part of those who practice it, more one of insecurity. That sort of behaviour is usually a sign of immaturity, fear of competition or sheer bad manners.

For your own satisfaction, Linda, research the membership of your local repeater group, the people who support the repeater by putting their time and money where their mouths are, then compare that list with the critics you've heard on the air; I don't expect there to be a close match!

Lastly, be tenacious. You've passed the entry qualification, paid your licence fee and (presumably) your RSGB subs, you have the right to be here and I for one welcome you. My experience is that amateur radio is an enjoyable, educational, challenging and satisfying hobby, and should you get involved with Field Days, it's a healthy outdoor sport too! There are lots of amateurs out there who are big enough to help others, I've enjoyed the benefits of their help myself.

Take what you wrote about as just a part of the challenge, there are people like that in every hobby from stamp collecting to dog shows and in the world of work as well. I wish you well.

Peter Weedon, G8ZKZ

. . . It is sad to hear, on the bands, operators 'who have done it the hard way', disparaging M3 licensees over the air (never during a face-to-face contact with one, of course). A few refuse to work them at all. Why can't everybody just treat M3s for what they are; apprentices, learning 'on-the-job'? What they need is the help and encouragement of the rest of us 'experts', as other apprentices do, to progress to higher things. Rubbishing them, some of whom are long-standing SWLs and Class B licence-holders, is plainly foolish and does nothing to uphold the true amateur radio spirit, which I and most amateurs are very proud of.

Mike Street, G3JKX

. . . I say to you Linda, ignore these ill-mannered hooligans, for that is what they are. I don't know where you did your Foundation Licence, but as an instructor / mentor with the combined clubs Foundation Licence courses at The Beacons in Frodsham, Cheshire, I know how hard you worked for that. Congratulations to you and all others throughout the country who embark on these courses and were successful.

These idiots are the very people who have been discouraging new licensees for years and creating this decline in numbers that we have been through. The RA and RSGB got it absolutely right when they launched this course. Console yourself with this fact. As part of your training you were given theoretical and practical instruction in how to operate a radio. The hooligans did their training without that instruction, and it shows. Enjoy your radio. You and everybody else like you have earned it.

Dave Bibby, G1PIX / M3PIX (and proud of it)

. . . Nothing is new! I was licensed as a G6 back in 1982 and a G4 a year later. I can remember the derogatory remarks being made about new G6s and I remember being reduced to tears in a very early CW QSO by a poor operator who would not slow down for me. I didn't let these things put me off and although my activity is not what it was, I still enjoy my radio licence. Do not be put off by these sarcastic ignoramuses, you have earned the right to be on air and to enjoy the friendship of the majority of enlightened amateurs.

Welcome Linda, and welcome to all the new methods for encouraging more people to become amateurs.

Rex Waygood, G4OXK

. . . How sad to read Linda Chesters' letter about her treatment on the air by men who should know better. After all, we were all beginners once and I expect we all made mistakes, but politeness costs nothing.

Dick Biddulph, M0CGN

. . . I was shocked and saddened to see the letter from a new M3 licensee regarding poor treatment of newcomers to the hobby, and I have written to your correspondent to offer my support and encouragement. Since reading her letter I have discovered to my horror that in my locality newcomers, mainly M3s, have been subjected to outright abuse and even foul language from operators who apparently consider themselves better qualified to use the amateur bands.

It should be perfectly obvious to everyone by now that the only way to prevent the eventual death of amateur radio is to attract more newcomers into the hobby, and that one way of doing this is to update the licensing arrangements. Some people may find this impossible to accept, but there can be no excuse for the sort of shabby behaviour presently being employed by a minority of operators, many of whom are old enough to know better. These people do nothing but bring shame to the amateur radio movement, undoing the work of the RSGB and threatening the future for all of us. I trust that strong action will be taken where appropriate.

I write, incidentally, as a holder of a full Class A licence.

(Name, callsign and address supplied)

. . . The Scarborough Special Events Group has just commenced its summer season of special event stations. On the first day of operation our HF SSB station was amazed to be called by more than 40 newly-licensed enthusiastic M3 stations, out of a total of 200 contacts, which is in excess of 20%. Every single M3 station we heard was a credit to their course tutors, using the correct procedures, waiting patiently until called and passing information in a clear manner, albeit hesitantly in some cases.

The HF bands have changed forever. A new generation is taking over. Forget repeaters and local 'natter nets', Linda, there are thousands of amateur stations all over Europe and groups such as ourselves, who will be pleased to reply to your call. You have earned your amateur radio wings, which gives you the tremendous privilege and the responsibility to represent the United Kingdom on the international amateur radio bands.

Have fun with that new personalised callsign - go ahead and fly.

Roy Clayton, G4SSH

RSGB Website

I just wanted to say how excellent the RSGB sites are, and from my own efforts to set up a website I can see how much time and maintenance this needs. I always try and leave a comment on the website even if it had not proved to be helpful at the time, well done and keep up the good work.

John Walker, G4SSW

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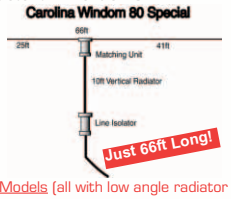

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MFJ

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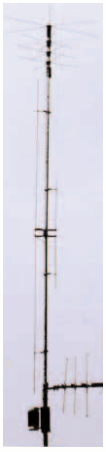

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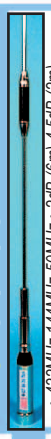

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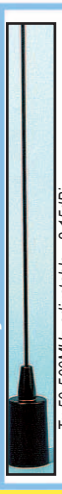

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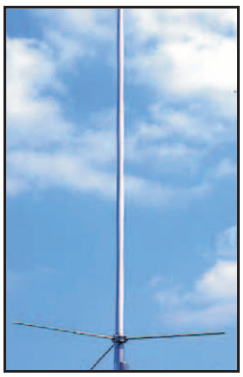

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SMARTUNER™–THE WORLD'S BEST SELLING COUPLERS

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

£399

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

£439

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

£299

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

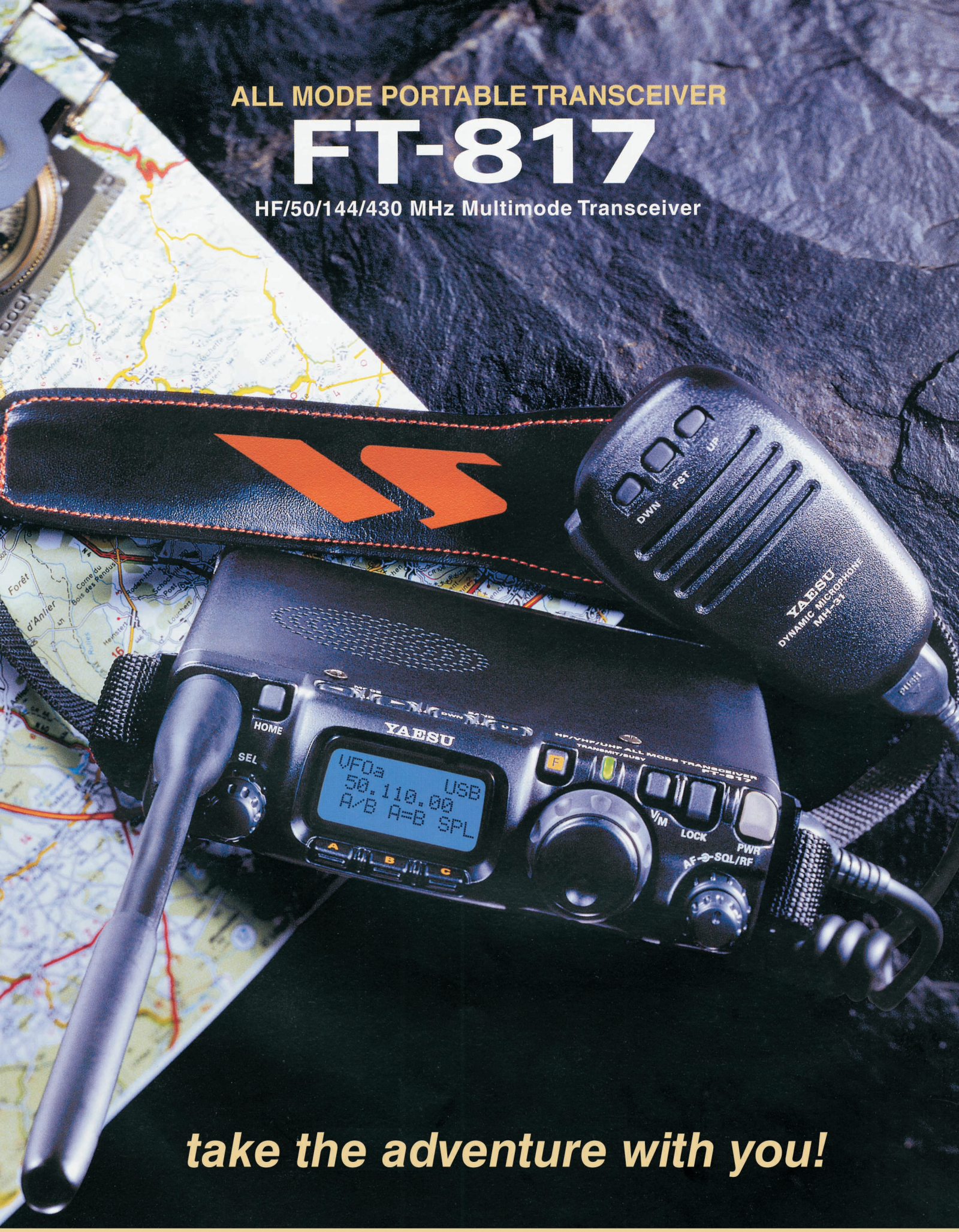
£439

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

£1499

BUY ONE OF THESE TUNERS IN MAY, JUNE OR JULY & CLAIM AN INSTANT £50 DISCOUNT OFF THESE PRICES!



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